

Gender-based Property Tax Discounts: Role in bargaining power of women in household and intergenerational educational outcome

Faiyaz Julfikar*

Sukumar Vellakkal†

Abstract

This paper examines whether gender-based property taxes discount related to land property in India increase women's intra-household bargaining power, intergenerational educational effects following the first-order positive changes in land ownership of women. The question is analysed in the context of a property tax discount given to women by different states introduced at different times, in which discount are granted to a woman while buying land on her name or jointly with her husband. We find that the tax discount directly increases the land ownership of women after the treatment. We find that the tax discount for women increases the intra-household bargaining power of women. Adoption of clean cooking fuel, flush toilet has increased significantly. We also find a significant increase in educational outcomes of children whose mothers are affected by the property tax discount.

JEL classification: H71, Q15, D13, I21

Keywords: Property rights, Property ownership, Intra-household bargaining, Women, India

1. Introduction

Land and housing constitute a significant portion of household assets globally (S. Wang, 2014). The Federal Reserve Flow of Funds Account's data in 1990 shows that real estate made up about one-third of household assets in the United States. These figures are typically much higher in developing countries: 78% of urban wealth/asset and 87% of rural wealth in India, 45% of urban wealth and 80% of rural wealth in China (S. Wang, 2014). In many developing nations, the critical role of real estate in household economies has driven property rights reforms. These reforms include changes to succession laws and gender-specific tax

* Department of Economic Sciences, Indian Institute of Technology Kanpur, India. faiyazj20@iitk.ac.in.

† (Corresponding author) Department of Economic Sciences, Indian Institute of Technology Kanpur, India. vellakkal@iitk.ac.in.

benefits to promote equal property ownership between men and women and enhance access to land and housing markets.

Research has shown that property rights influence various household decisions, such as residential choices (Wang, 2011), labour market participation (Wang, 2012; Field, 2007), consumption, and time spent on household chores (S. Wang, 2014). However, the property rights literature has often treated the household as a single unit. In reality, however, household does not function as a unitary entity (Duflo, 2003), property rights can belong to individual household members rather than the household as a whole, or they may not be equally distributed among all members. For instance, often property titles list only the household head's name (Deere and Leon, 2001a; Deere and Leon, 2001b). In many developing countries, the household head is typically male, so property rights reforms and land distribution initiatives that do not consider intra-household dynamics can significantly impact intra-household gender inequality.

This paper investigates how a gender-based discount on stamp duty for women impacts their bargaining power within households. Additionally, it examines the mechanisms driving these results, particularly the direct effect on women's land ownership. The results contribute to the policy discussion on property rights reforms to consider the implications for women's rights in developing countries. The tax incentives, in the form of stamp duty discounts, aim to encourage female property ownership, reduce the gender gap in property ownership, and increase the inclusion of women in land titles.

Descriptive evidence shows a positive correlation between female land or housing ownership and improved women outcomes within the household, such as reduced domestic violence (Panda and Agarwal, 2005). This analysis is, to my knowledge, the first to rigorously identify the causal impact of gender-based tax discounts on women's intra-household bargaining outcomes and intergenerational educational outcome. The study focuses on tax incentives offered by several Indian states, providing stamp duty and property tax discounts to women property owners to encourage female property ownership and narrow the gender ownership gap. Before the reform, stamp duty and registration fees were the same for male and female property owners, although these taxes vary by state in India. Using repeated cross-sectional data, the empirical strategy compares women's outcomes before and after the reform in states with and without these discounts. The key treatment variable is whether a woman was born in a state offering discounts. The treated group comprises women born in these states. The

identifying assumption is that, absent the reform, differences between women born in states with and without discounts would have remained the same.

In addition to exploring the microeconomic effects of gender-based tax discounts on property, this paper enhances the understanding of women's intra-household bargaining outcomes. The relevant literature can be broadly categorized into two areas. The first area investigates women's intra-household bargaining power and its determinants (Anderson and Eswaran, 2009; Hoddinott and Haddad, 1995; Browning et al., 1994; Duflo, 2003; Lundberg et al., 1997; Ponczek, 2011; Luke and Munshi, 2011; Thomas, 1990). The second area focuses on individual asset ownership, not on control over income (Fafchamps and Quisumbing, 2002; Thomas et al., 2002; Fafchamps and Quisumbing, 2005; Fafchamps et al., 2009).

This paper belongs to the second category, addressing asset ownership and its impact on intra-household bargaining outcomes and intergenerational educational outcome. Existing research primarily examines the effects of gender-progressive inheritance law reforms on women's outcomes in developing countries. However, tax incentives for property ownership might directly influence women's property ownership and subsequently enhance their bargaining power within households and educational outcome of the treated women. To our knowledge, this paper is the first to analyse the impact of an exogenous change in property tax on women's asset ownership and intra-household bargaining outcomes.

2. The Institutional Background

2.1. Indian Stamp Act, 1899

The primary law governing stamp duty on land in India is the Indian Stamp Act of 1899. This act was established to specify the tax obligations for homebuyers when purchasing property and to consolidate and amend the law related to stamps. It applies throughout India, except for the State of Jammu and Kashmir. The Act stipulates the tax levied through stamps on documents recording transactions. Its main objective is to ensure that stamped documents serve as valid evidence in court and to make the payment of stamp duty on such documents mandatory, thereby rendering them legally valid and authentic.

A key feature of the Indian Stamp Act is that, in the case of property purchases, the buyer is responsible for paying the stamp duty when a certificate of sale is issued. According to Entry 63 of the State List in the Constitution of India, state governments have the exclusive

authority to set stamp duties and registration fees. Stamp duty is a property transfer tax imposed by state governments on the conveyance or sale deeds of properties and is one of the most significant sources of revenue for state and city governments.

2.2. Registration Act, 1908

The Registration Act of 1908 was established to consolidate the laws related to the registration of documents. It applies across India, except in the State of Jammu and Kashmir. The Act aims to ensure that documents, especially those related to land or other immovable property, are registered to enhance their authenticity.

The main objective of the Registration Act is to ensure the proper preservation and recording of documents, providing public information about legal rights and obligations affecting specific properties. Registered documents help prevent fraud and serve as valid evidence in court. A key feature of the Act is that non-testamentary instruments that acknowledge the payment of any consideration related to movable or immovable property must be registered.

2.3. State's Pro-female Property Tax Incentives

State governments in India impose various stamp duties and registration charges on different types of transactions and instruments. Although the Stamp Act and Registration Act are central laws, several states have amended these laws over time. Notable amendments include those by Maharashtra in 2021, Punjab in 2010, Gujarat in 2006, Bihar in 2015, Odisha in 2014, Haryana in 2006, Himachal Pradesh in 2023, Uttarakhand in 2011, Uttar Pradesh in 2020, and Delhi in 2003. These amendments offer tax incentives to female property owners to encourage female property ownership.

We use these legislative amendments by the state governments as a natural experiment to examine the impact of gender-based property tax incentives on the pattern of women's property ownership. Despite significant improvements in women's participation in education and employment over the years, their land ownership patterns have not shown a similar trend. Discrimination against women in accessing, owning, and controlling land leaves them economically and socially vulnerable. Although there has been a gradual increase in the rate of women's property ownership during the sample period, overall rates remain low. In India, while 73 percent of women workers in rural areas were employed in the agricultural sector

(Agriculture Census, 2015–16), only 20 percent of the women are land owner (NFHS-4). Economic empowerment for women, particularly in rural areas, requires addressing land control issues, as land is a primary source of income and a crucial factor in enhancing women's bargaining power in agricultural economies (Agarwal, 1994).

3. Conceptual framework

Evidence indicates that property ownership makes women feel empowered, and this ownership can profoundly transform the lives of women and their families and children (Lahoti and Swaminathan, 2016). The distribution of resources within a household influences intrahousehold bargaining and associated socioeconomic outcomes (Anderson and Eswaran 2009). Owning a house or agricultural land enhances a woman's ability to travel and make independent decisions about employment, health, and financial matters (Lahoti and Swaminathan 2016). Women's property ownership enhances the welfare outcomes of the entire household (Doss et al. 2011) and is instrumental in reducing violence against women (Oduro et al., 2015). The increase in bargaining power through improvements in property rights may further positively affect intergenerational outcomes through children's education, health, and nutritional status (Allendorf, 2007; Menon et al., 2014). Access to and control over land and property is key to empowering women and advancing gender equality (Food and Agriculture Organization of the United Nations, 2018).

Women tend to show a stronger attachment to their homes than men, especially when they hold joint titles (Rajul Awasthi et al., 2023), which may make gender-based tax discounts an effective incentive for increasing women's property ownership and reducing the gender gap in property ownership. Women are often hindered by their limited ability to accumulate wealth through employment or to access small and medium enterprise loans or mortgages for property purchases. Economic limitations prevent them from acquiring property through the real estate market. Therefore, it is crucial to create conditions that enable women to participate in the property market, such as offering price incentives or property tax discounts during property transfer transactions. However, there is limited evidence of property tax incentives being used to encourage female land ownership, and few empirical studies examine property taxation through a gendered perspective. In India, the effects of property tax incentives for female property owners have not been well-documented or analysed.

Tax policies aim to generate revenue for public goods and influence taxpayer behaviour (Anuradha Joshi et al., 2020). In terms of behaviour change, tax policies can impact women's

entry into labour markets, narrow the gender pay gap, increase women's property and asset ownership, and alleviate the burden of unpaid care work (Anuradha Joshi et al., 2020). Providing discounts on property tax rates on land owned individually by women or jointly with women could encourage land registration in women's names, thereby improving their livelihoods, social status, and bargaining power (Joshi, 2017), and enhancing their productivity (Food and Agriculture Organization of the United Nations, 2018). Mothers empowered through increased income, education, or asset-holding tend to allocate more resources towards children (Hoddinott & Haddad, 1995; Lundberg et al., 1997; Thomas, 1990), significantly improve educational attainment (H. Wang et al., 2024). Previous literature shows that women use their bargaining power also to enhance children's health and education outcomes (Thomas, 1990; Hoddinott & Haddad, 1995; Lundberg et al., 1997). India has demonstrated a positive bias towards women by implementing lower property tax rates for female owners (Anuradha Joshi et al., 2020).

Achieving equity requires changing the patterns of access to and control over land, economic, and natural resources. Legal changes, like those discussed here, are significant because by enhancing women's bargaining power, they can influence outcomes in various areas. For instance, even if women do not currently own land, the prospect of benefiting from tax discounts when purchasing land could increase their asset endowments, thereby boosting the returns from employment and education. Research indicates that an exogenous increase in expected returns to education for young females can lead to higher school enrolment. Similarly, gender-based tax discounts could impact women's labour force participation and productivity.

4. Data and methodology

4.1. Data

We used data from the National Family Health Survey (NFHS), a nationally representative survey that covers population, health, and nutrition. This survey was conducted in various years across all states of India. The NFHS questionnaire includes a broad range of topics such as socio-demographic and household characteristics, access to related health services, reproductive health, maternal health outcomes, social outcomes like decision-making power within the household and freedom of mobility, financial and economic agency. For this study, we focus on women born in the states that implemented the amendments.

The dataset provides data related to land ownership among women. It also offers several measures of household bargaining outcomes of women. First, whether the woman has access

Women own land alone	9,472	40.41	7,913	6.47	9,525	8.76
Women own land jointly	4,770	20.35	16,625	13.59	14,056	12.92
Women don't own land	9,200	39.25	85,438	69.83	69,608	63.99
N	1,24,385		6,99,686		7,24,115	

Note: Sample comprises of women who are between the age of 7 years to 45 years. Property ownership sub-section shows the descriptive statistics of the direct outcome variables. Data source: NFHS survey for 2005-06, 2015-16 and 2019-21.

4.2. Identification strategy

The identification strategy in this paper uses the exposure to a gender-based tax incentives on property ownership is determined by a woman's state of birth and year of implementing the tax incentive. A woman had to be born in a gender-based tax incentives state, in order to benefit from the tax discount. Exposure to the tax benefit is defined by the state in which a woman is born. Only if a woman is born in a state that gives gender-based tax incentives she would benefit, since only in such states would the land purchase be determined according to the new discounted property tax rates.

Therefore, we identify the causal impact of the gender-based tax incentives by using a double differences methodology that exploits variation in year of implementing the tax incentive and women's state of birth. Whether or not the woman is born in a state that gives gender-based tax incentives constitute the key treatment in this context. The identifying assumption is that, in the absence of gender-based tax incentives, any difference between women in states with tax incentives and the women in the states without tax incentives would have been the same across all age groups.

Firstly, we use an event study design as baseline analysis to estimate the effect of the gender-based tax incentives on the land ownership outcome and bargaining power of women. Event studies are commonly implemented by two-way fixed effect regressions, such as:

$$Y_{ist} = \alpha_s + \beta_t + D_{isk} + BS_i + \varepsilon_{it}$$

Then D_{isk} is a binary variable indicating whether woman i belongs to cohort k from state s . BS_i is a binary variable that is equal to 1 if woman is born in a state with gender-based tax incentives, and zero otherwise. α_s represents state fixed-effects which account for state-specific characteristics that do not vary across cohorts, β_t represents year of year fixed-effects.

Within an event study regression framework, we therefore estimate the following equation:

$$y_{ist} = \alpha + \sum_{j=2}^J \beta_j (Lead\ j)_{st} + \sum_{t=1}^T \gamma_t (Lag\ t)_{st} + \mu_{it} + \lambda_{it} + X_{ist} + \varepsilon_{ist}$$

The dependent variable y_{ist} denotes the relevant outcome of woman i born in state s in year t . Let the property tax discount be introduced in year t' in state s . X_{ist} is a vector of control variables, including age, education, etc. ε_{ist} is the error term. To allow for heteroscedasticity and to address serial correlation concerns, the standard errors are clustered at the state level.

The gender-based property tax benefit was implemented in a staggered manner, whereby the tax discount is introduced by different states at different times. We utilize the staggered DID methodology to estimate the dynamic treatment effect of the gender-based tax incentive on intra-household bargaining power of women and to take into account heterogeneous treatment effects. We estimate the following equation for staggered Difference-in-Difference:

$$y_{it} = \alpha + \sum_{l \neq -1} \beta_l (D^l)_{it} + \pi_i + \lambda_t + \mu_{it}$$

5. Tax discount and impact on land ownership

In this section, we analyse the first-order impact of the gender-based property tax incentives for women on land ownership of women. The results are presented in Table 2. The dependent variable is a categorical variable that takes the value 1 if the woman owns land alone, 2 if woman owns land jointly only, 3 if woman owns land both alone and jointly, and zero if woman does not own any land. Column 2 indicates that gender-based property tax discounts increase the land ownership among women increases with years of education. This result is robust to the inclusion of year fixed effect (Column 1).

Table 2: Impact on land ownership

	Land ownership	Land ownership
	(1)	(2)
Years of Education	0.0063119*** (0.0019197)	0.004691** (0.0019302)
Current Age	0.009748*** (0.0009358)	0.0095398*** (0.0009339)
Access to Phone	0.0349903**	0.0163013

	(0.0149342)	(0.0186565)
Wealth Index	-0.0345462***	-0.0383434***
	(0.0037562)	(0.00493)
Working Status	-0.0263017**	0.0252312
	(0.0120391)	(0.0157444)
Constant	1.081044***	0.639619
	(0.1103923)	(0.03588)
Observations	1,75,491	1,79,822
R-squared	0.0600	0.0551
Root MSE	1.0496	1.0469
Year Fixed Effect	Yes	No
State Fixed Effect	Yes	Yes
Other Controls	Yes	Yes

Note: The outcome variable in column 1, land ownership of women, is categorical in nature. Robust standard errors are clustered at state level in the parentheses. Data source: NFHS 3rd, 4th and 5th rounds.

* p<0.10, ** p<0.05, *** p<0.01

Event study plots in Figure 1 indicate that there is a significant differential impact of the tax benefit on the likelihood of owning land for any of the ‘treated’ groups relative to the pre-reform period. This implies that land ownership among women increased after the gender-based property tax benefit was started.

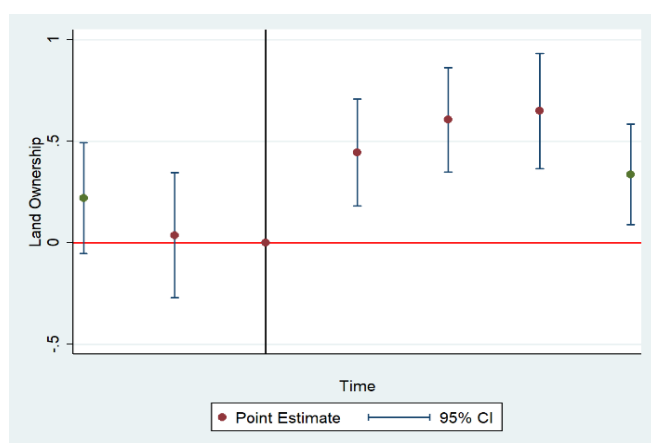


Figure 1: Land ownership of women.

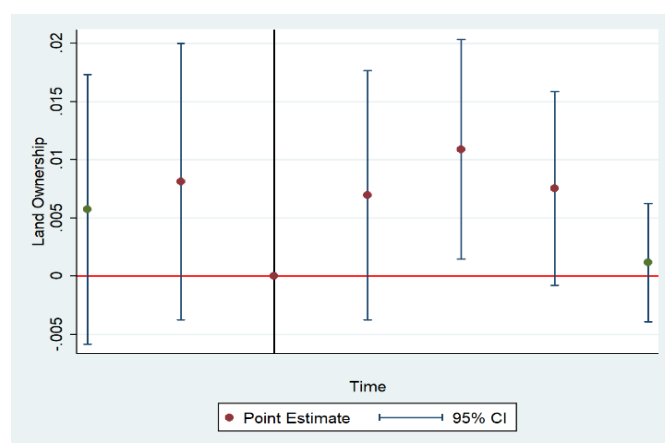


Figure 2: Use of clean cooking fuel

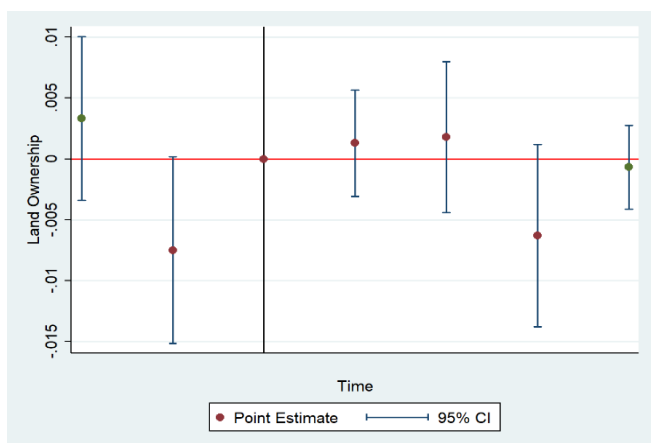


Figure 3: Flush toilet in the household

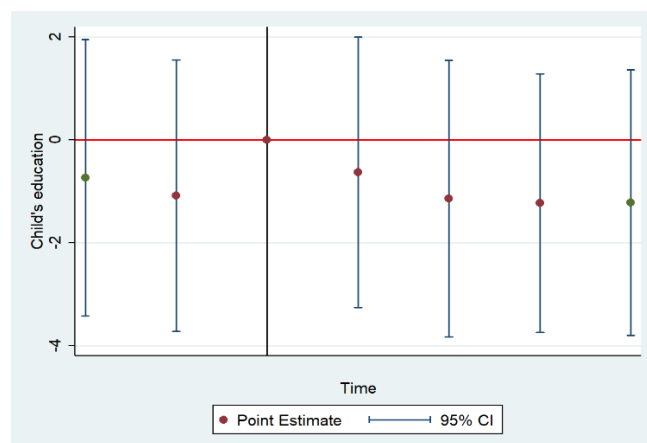


Figure 4: Child's education in single years

6. Intra-household bargaining power of women

The event study estimates for bargaining power of women are presented in Table 3. The dependent variable, use of clean cooking fuel, is a binary variable that takes the value 1 if the woman uses biogas to cook, and 0 otherwise. We find that women's bargaining power in terms of use of clean cooking fuel has improved, with land ownership of women, for any of the 'treated' groups relative to pre-reform period. Event study plots in Figure 2 indicate that there is a significant differential impact of the tax benefit on the decision-making power of women in terms of use of clean cooking fuel.

The corresponding results for access to flush toilets of women is in column (2) of Table 3. We find that access to flush toilet within the household has increased significantly with land ownership of women. Event study plots in Figure 3 also indicate that access to flush toilets of women increased.

Table 3: Impact on bargaining power of women and intergenerational educational outcome

	Biogas	Flush toilet	Child education
	(1)	(2)	(3)
Land ownership	0.0002751 (0.0003277)	0.0001529 (0.00041)	0.0484019 (0.0366579)
Education	0.0000996 (0.0001102)	-0.0004066 (0.0003382)	0.2783873*** (0.0385333)
Current Age	0.0000372** (0.0000182)	4.33e-06 (0.0000194)	0.1307896*** (0.0109982)

Access to Phone	0.0000506 (0.000696)	0.0005097 (0.0006241)	0.5697223*** (0.1022292)
Working Status	-0.0010477* (0.0006106)	0.0001598 (0.0006618)	-0.0365174 (0.0791535)
Constant	-0.0046861 (0.0032618)	0.0077741*** (0.0023254)	-1.040404 (0.9641632)
Observations	176,926	247,066	23,830
R-squared	0.0059	0.0057	0.1742
Root MSE	0.07039	.08909	4.3894
Year Fixed Effect	Yes	Yes	Yes
State Fixed Effect	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes

Note: The outcome variable in column 1, use of clean cooking fuel, is binary in nature. The outcome variable in column 2, access to flush toilet in the household, is a binary variable. The outcome variable in column 3 is children's education in single years. Standard errors are reported in the parentheses. Data source: NFHS 3rd, 4th and 5th rounds. * p<0.10, ** p<0.05, *** p<0.01

Table 4 presents the results from the staggered DID estimates for land ownership of women and the intra-household bargaining power of women, reporting the pre-average, and post-average. Column (1) in the table displays results for the land ownership of women. Column (2) presents the results for the use of clean cooking fuel of women. Column (3) presents the results for the access to flush toilet of women within the household. The coefficients of Post average indicate that the introduction of the gender-based property tax benefit have improved the bargaining power of women in terms of improvement in usage of clean cooking fuel and access to flush toilet by women significantly. It also increased the land ownership among women significantly.

Table 4: Staggered DID estimates on land ownership, bargaining power and intergenerational educational outcome

	Land	Biogas	Flush toilet	Child education
ATT	0.5516507*** (0.1741681)	0.0023916*** (0.0006369)	0.0018245** (0.0007413)	0.9019221 (0.7196191)
Pre average	0.005679 (0.1183228)	0.0025749 (0.0016351)	-0.0009737 (0.000661)	0.2127358 (0.5235301)

Post average	0.4580447** (0.2267302)	0.0020612*** (0.0007125)	0.0007603 (0.000803)	2.091001* (1.07336)
Observations	1,54,996	2,11,581	2,11,581	29,637
Chi-square	47.3721	86.0422	96.0552	41.7392
p-value	0.0000	0.0000	0.0000	0.0000
Other Controls	Yes	Yes	Yes	Yes

Note: The outcome variable in column 1, land ownership of women, is categorical in nature. The outcome variable in column 2, use of clean cooking fuel, is binary in nature. The outcome variable in column 3, access to flush toilet in the household, is a binary variable. The outcome variable in column 4 is children's education in single years. Standard errors are reported in the parentheses. Data source: NFHS 3rd, 4th and 5th rounds. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

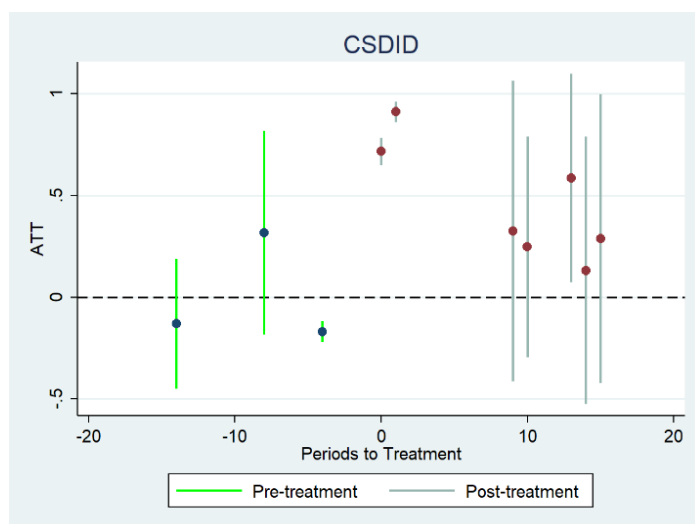


Figure 5: Land ownership of women.

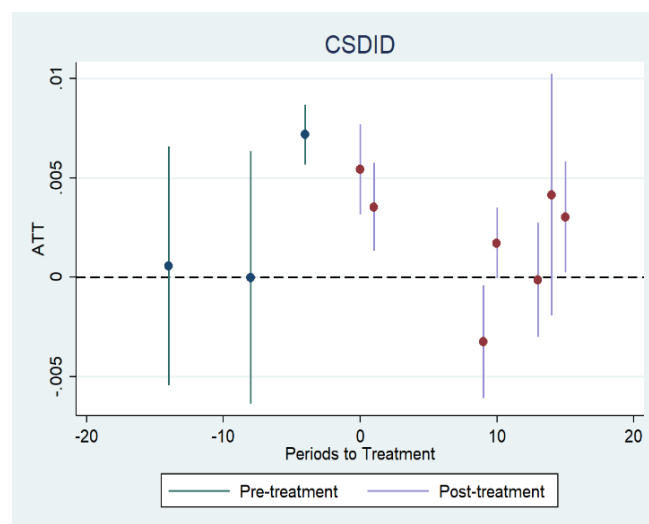


Figure 6: Use of clean cooking fuel.

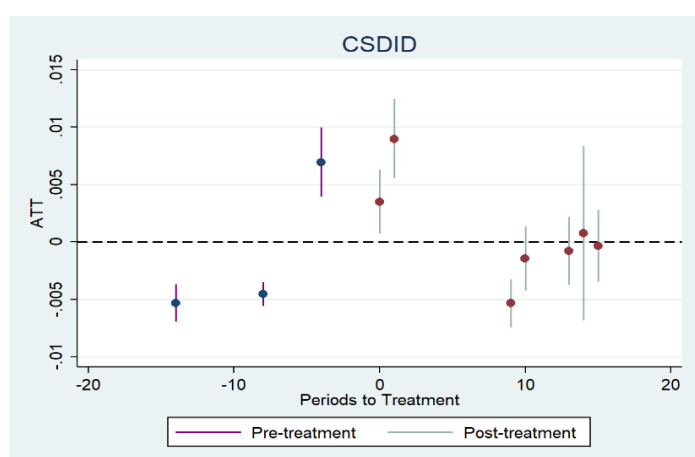


Figure 7: Flush toilet in the household

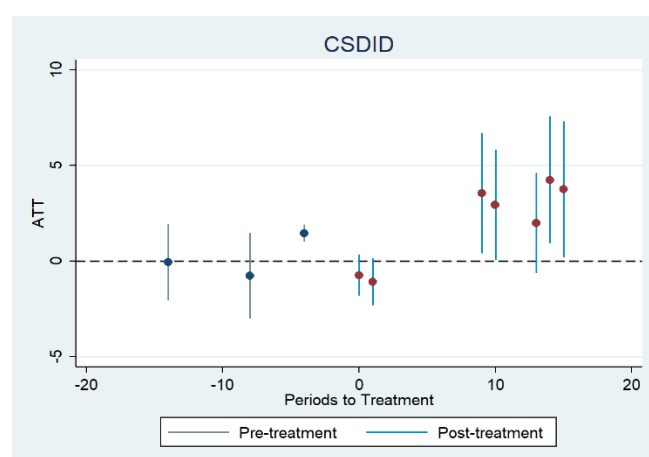


Figure 8: Child's education in single years

Figure 5 depicts the staggered DID results, which demonstrates that the estimates for land ownership among women are consistent with the event study estimates, the treatment

effect is positive and significant. Figure 6 shows that the treatment effect on use of clean cooking fuel is positive and significant. Figure 7 shows that the access to flush toilet within the household for women have increased significantly after the treatment. Figure 8 presents the staggered DID results for the children's education in single years, the treatment effect is positive and significant.

7. Intergenerational educational outcome

In order to examine how the improvement in intra-household bargaining power and land ownership of women translates into increased education for her children, first we identify the children of the women in our sample, allowing us to estimate the impact of gender-based property tax discount on education in single years of children of the treated women compared to the children whose mother were not exposed to property tax discount.

The event study estimates for children's educational outcome are presented in columns (3) of Table 3. We find that children's educational outcome in terms of education in single years has improved, with land ownership of mothers, for any of the 'treated' groups relative to pre-reform period. Event study plots in Figure 4 presents the result for the differential impact of the tax benefit on intergenerational educational outcome.

The staggered DID estimates in columns (4) in Table 4 shows that children whose mothers were exposed to the property tax benefit have higher education in single years. The coefficients of Post average indicate that the introduction of the gender-based property tax benefit have improved the children's educational outcome of treated mothers.

8. Robustness

Significant gender inequalities existed in the Hindu Succession Act of 1956, the law governing the inheritance rights of four religious groups i.e. Hindus, Sikhs, Buddhists, and Jains. Daughters did not have a direct birthright to a share in the ancestral or joint family property. The amendment by the central government of India in the HSA 1956, Hindu Succession (Amendment) Act 2005, granted daughters equal claim in ancestral or joint family property to that of their brothers, including the right to a share by survivorship which improves the likelihood of inheritance of land and other asset of women. Previous studies have shown that the inheritance law reform increased the women's likelihood of inheriting land, the value of total transfers, and the share of land they received.

Land is the most commonly owned form of ancestral or joint family property (S. Roy, 2015). A possible concern is that land ownership of women may be correlated with the inheritance law reform. However, the death of the household head serves as the main trigger for the partition of the ancestral property of a daughter's natal household and key treatment for inheritance law reform is whether household head of daughter's natal household died after the amendment or not. Women who benefitted from the amendment may have inherited land which may cause an upward bias in the above estimates of gender-based property tax benefit to women on land ownership. To deal with this concern and to test the robustness of the findings of this paper, we use a subsample of the NFHS of women whose fathers are alive during the survey. While the previous studies, estimating the effect of inheritance law reform on women's outcomes, have mostly focused on women who are daughters of the head of a household to estimate the treatment effect.

NFHS does contain data on whether a woman's father is alive or not at the time of the survey. Hence, we use a sub-sample of women whose fathers are alive, those who did not benefit from the HSA amendment, to distinguish the effect of gender-based property tax benefit to women from the effect of inheritance law reform. The robustness results are presented in Table 5 and are qualitatively similar to and consistent with those obtained in our baseline estimates.

Table 5: Staggered DID estimates of robustness check

	Land ownership	Biogas	Flush toilet	Child education
ATT	0.4827754*** (0.1240699)	0.0037671*** (0.0012231)	0.0140072*** (0.0035403)	0.9029873 (0.7197228)
Pre average	-0.0454541 (0.1747878)	0.0024252 (0.0019672)	0.0094223 (0.0064737)	0.2111307 (0.5235365)
Post average	0.366332** (0.1743034)	0.0042505** (0.0018891)	0.0185709*** (0.0054731)	2.09161* (1.073478)
Observations	19,941	1,22,864	1,22,864	29,629
Chi-square	15.5261	28.1553	22.0137	41.4340
p-value	0.0037	0.0000	0.0002	0.0000
Other Controls	No	No	No	No

Note: The outcome variable in column 1, land ownership of women, is categorical in nature. The outcome variable in column 2, use of clean cooking fuel, is binary in nature. The outcome variable in column 3, access to flush toilet in the household, is a binary variable. The outcome variable in column

4 is children's education in single years. Standard errors are reported in the parentheses. Data source: NFHS 3rd, 4th and 5th rounds. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

9. Conclusion

This paper studies the impact of a gender-based property tax benefit to women on women's intra-household bargaining outcomes and intergenerational educational outcome, by utilizing state-level amendments to the property tax law of India. Whether a woman is born in a state with the tax benefit is the key treatment, since the state of residence decides whether a woman has access to a discounted property tax rate or tax benefit. We use a staggered difference-in-difference method to estimate the impact of the gender-based tax benefit, whereby we analyse the women's outcomes in the states with tax benefit, relative to control groups. We find that the gender-based property tax benefit to women provided monetary benefits to improve the participation of women in land ownership, and it did. The first-order effect of the tax benefit to women is significant, and land ownership of women increases significantly with years of education which increases the productivity and rate of return to an asset. It also improved the intra-household bargaining power of women significantly, which further led to transmission of educational benefits to children.

The findings of this paper raise a broader question of whether progressive policy reforms can effectively bring about change in existing social norms. In the case of land ownership of women in India, there is a significant change in this case, and a potential explanation may be that increased education and participation in the labour market improved both the return to the asset and also access to credit. This is an example of one of the gender progressive laws being successful in its actual implementation and achieving a direct impact. It is also important to note that the gender-based property tax benefit not only achieve its intended first-order direct impact on women's land ownership, it also improved intrahousehold decision-making power of women and intergenerational educational outcome. Therefore, an intriguing aspect to consider here is how shifting the socio-economic status of women might lead to additional factors supporting progressive gender laws and influencing societal norms. Further exploration into these factors, such as changes in the labour market, would enhance our comprehension of broader social change processes.

References

- Field, E., 2007. Entitled to work: urban property rights and labor supply in Peru. *The Quarterly Journal of Economics*, 122(4), 1561–1602. <https://doi.org/10.1162/qjec.2007.122.4.1561>
- Wang, S., 2012. Credit Constraints, Job Mobility, and Entrepreneurship: Evidence from a Property Reform in China. *The Review of Economics and Statistics*, 94(2), 532–551. https://doi.org/10.1162/rest_a_00160
- Wang, S., 2011. State Misallocation and Housing Prices: Theory and Evidence from China. *The American Economic Review*, 101(5), 2081–2107. <https://doi.org/10.1257/aer.101.5.2081>
- Wang, S., 2014. Property rights and intra-household bargaining. *Journal of Development Economics*, 107, 192–201. <https://doi.org/10.1016/j.jdeveco.2013.12.003>
- Deere, Carmen Diana, Leon, Magdalena, 2001a. *Empowering Women: Land and Property Rights in Latin America*. University of Pittsburgh Press, Pittsburgh, PA.
- Deere, C. D., & León, M., 2001b. Who owns the land? Gender and Land-Titling programmes in Latin America. *Journal of Agrarian Change*, 1(3), 440–467. <https://doi.org/10.1111/1471-0366.00013>
- Panda, Pradeep, Agarwal, Bina, 2005. Marital violence, human development and women's property status in India. *World Development*. vol. 33(5), 823–850.
- Anderson, S., & Eswaran, M., 2009. What determines female autonomy? Evidence from Bangladesh. *Journal of Development Economics*, 90(2), 179–191. <https://doi.org/10.1016/j.jdeveco.2008.10.004>
- Browning, M., Bourguignon, F., Chiappori, P., & Lechene, V., 1994. Income and Outcomes: A structural model of intrahousehold allocation. *Journal of Political Economy*, 102(6), 1067–1096. <https://doi.org/10.1086/261964>
- Duflo, E., 2003. Grandmothers and Granddaughters: Old-Age pensions and intrahousehold allocation in South Africa. *The World Bank Economic Review*, 17(>1), 1–25. <https://doi.org/10.1093/wber/lhg013>
- Hoddinott, J., & Haddad, L., 1995. Does female income share influence household expenditure? Evidence from Côte d'Ivoire. *Oxford Bulletin of Economics and Statistics*, 57(1), 77–96. <https://doi.org/10.1111/j.1468-0084.1995.tb00028.x>

Luke, N., & Munshi, K., 2011. Women as agents of change: Female income and mobility in India. *Journal of Development Economics*, 94(1), 1–17. <https://doi.org/10.1016/j.jdeveco.2010.01.002>

Lundberg, S. J., Pollak, R. A., & Wales, T. J., 1997. Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit. *The Journal of Human Resources*, 32(3), 463. <https://doi.org/10.2307/146179>

Ponczek, V., 2011. Income and bargaining effects on education and health in Brazil. *Journal of Development Economics*, 94(2), 242–253. <https://doi.org/10.1016/j.jdeveco.2010.01.011>

Thomas, D., 1990. Intra-Household resource allocation: an inferential approach. *The Journal of Human Resources*, 25(4), 635. <https://doi.org/10.2307/145670>

Fafchamps, M., & Quisumbing, A., 2002. Control and ownership of assets within rural Ethiopian households. *Journal of Development Studies*, 38(6), 47–82. <https://doi.org/10.1080/00220380412331322581>

Fafchamps, M., & Quisumbing, A., 2005. Assets at marriage in rural Ethiopia. *Journal of Development Economics*, 77(1), 1–25. <https://doi.org/10.1016/j.jdeveco.2004.02.003>

Fafchamps, M., Kebede, B., & Quisumbing, A. R., 2009. Intrahousehold welfare in rural Ethiopia. *Oxford Bulletin of Economics and Statistics*, 71(4), 567–599. <https://doi.org/10.1111/j.1468-0084.2009.00553.x>

Thomas, Duncan, Contreras, Dante, Frankenberg, Elizabeth, 2002. Distribution of Power within the Household and Child Health. Working paper 2002.

Awasthi, R., Pyle, K., Aggarwal, N., & Rakhimova, P., 2023. Gender-Based discounts on taxes related to property: Role in encouraging female Ownership — A case study of Indian states and cities. In World Bank policy research working paper. <https://doi.org/10.1596/1813-9450-10287>

Roy, S., 2015. Empowering women? Inheritance rights, female education and dowry payments in India. *Journal of Development Economics*, 114, 233–251. <https://doi.org/10.1016/j.jdeveco.2014.12.010>

Agarwal, Bina, 1994. *A Field of One's Own: Gender and Land Rights in South Asia*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511522000>

Lahoti, R., & Swaminathan, H., 2016. Economic development and women's labor force participation in India. *Feminist Economics*, 22(2), 168–195.
<https://doi.org/10.1080/13545701.2015.1066022>

Doss, C. R., Deere, C. D., Oduro, A. D., & Swaminathan, H., 2011. The gender asset and wealth Gaps: Evidence from Ecuador, Ghana, and Karnataka, India. Indian Institute of Management, Bangalore. https://repository.iimb.ac.in/bitstream/2074/13750/1/Sen_DCMFA_2011.pdf

Oduro, Abena D., Carmen Diana Deere, and Zachary B. Catanzarite. 2015. Women's Wealth and Intimate Partner Violence: Insights from Ecuador and Ghana. *Feminist Economics* 21 (2): 1–29.

Gilleri, G., Osorio, M., Chartres, R., & Giadrossi, A., 2018. Realizing Women's Rights to land in the Law: A Guide for Reporting on SDG Indicator 5.A.2. Food and Agriculture Organization of the United Nations. <https://boa.unimib.it/handle/10281/332878>

Joshi, A., Kangave, J., & Van Den Boogaard, V., 2020. Gender and Tax Policies in the Global South. Institute of Development Studies.
<https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/15450>

Joshi, A., 2017. Tax and Gender in Developing Countries: What are the Issues? (ICTD Summary Brief No. 6; p. 8). International Centre for Tax and Development.

Choragudi, S., 2024. Do all the empowered women promote smokeless kitchens? Investigating rural India. *Journal of Cleaner Production*, 447, 140903.
<https://doi.org/10.1016/j.jclepro.2024.140903>

Sinharoy, S. S., McManus, S., Conrad, A., Patrick, M., & Caruso, B. A., 2023. The Agency, Resources, and Institutional Structures for Sanitation-related Empowerment (ARISE) Scales: Development and validation of measures of women's empowerment in urban sanitation for low and middle-income countries. *World Development*, 164, 106183.
<https://doi.org/10.1016/j.worlddev.2023.106183>

Dickin, S., Bisung, E., Nansi, J., & Charles, K., 2021. Empowerment in water, sanitation and hygiene index. *World Development*, 137, 105158.
<https://doi.org/10.1016/j.worlddev.2020.105158>

Wang, H., Cheng, Z., & Smyth, R., 2024. Parental early-life exposure to land reform and household investment in children's education. *World Development*, 173, 106391. <https://doi.org/10.1016/j.worlddev.2023.106391>

Allendorf, K., 2007. Do women's land rights promote empowerment and child health in Nepal? *World Development*, 35(11), 1975–1988. <https://doi.org/10.1016/j.worlddev.2006.12.005>

Menon, N., Van Der Meulen Rodgers, Y., & Nguyen, H., 2014. Women's land rights and children's human capital in Vietnam. *World Development*, 54, 18–31. <https://doi.org/10.1016/j.worlddev.2013.07.005>

Bose, N., & Das, S., 2017. Women's Inheritance Rights, Household Allocation, and Gender Bias. *American Economic Review*, 107(5), 150–153. <https://www.aeaweb.org/articles?id=10.1257/aer.p20171128>

Deininger, K., Goyal, A., & Nagarajan, H., 2013. Women's Inheritance Rights and Intergenerational Transmission of Resources in India. *The Journal of Human Resources*, 48(1), 114–141. <https://doi.org/10.1353/jhr.2013.0005>

Deininger, K., Jin, S., Nagarajan, H. K., & Xia, F., 2019. Inheritance Law Reform, Empowerment, and Human Capital Accumulation: Second-Generation Effects from India. In Taylor and Francis eBooks. <https://doi.org/10.1596/32601>