Institutions and Female Empowerment:
The Impact of Village Governance Reforms in Rural India

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Major Paper presented to the
Department of Economics of the University of Ottawa
in partial fulfillment of the requirements of the M.A. Degree
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Ottawa, Ontario

November 2018

Abstract

In 1993, the 73rd amendment to the Indian constitution was passed, which entrenched the *Panchayati Raj* system into the constitution. The Panchayati Raj system is a government structure whereby villages are governed by small village councils rather than a centralized, national government. The 73rd amendment included a set of quotas, one of which required that one-third of members elected to these village councils must be women. Starting in 2005, some Indian states began passing legislation that raised the quota of elected women to one-half. I exploit variation in the implementation of the one-half gender quota to see if there are any effects on female development outcomes. Using a difference-in-differences framework, I provide evidence that raising the quota from one-third to one-half increases female empowerment, as measured by the number of management decisions women are responsible for making on farms. However, household consumption of "male" and "female" goods does not change in response to raising the quota.

Despite making up approximately 50% of the world's population in 2017, only approximately 24% of elected legislators at the national level are women according to the Inter-Parliamentary Union (Inter-Parliamentary Union, 2017). This discrepancy creates an issue when it comes to political representation. Political institutions do not function properly if their composition is not representative of the group they purport to represent. By not including as many women, women's issues may be less likely to be raised and less women-oriented policies may be likely to be passed. This can also have non-political consequences. The fact that women do not occupy political positions as readily as men may give them the impression that they are not as important as men. It is to this end that proponents of gender quotas argue that the need for quotas extends beyond just political reasons. Although only 24 countries have gender quotas of some sort at the national level (IDEA, 2018), they are more popular among sub-national governments.

India is an example of a country with gender quotas at the sub-national level. The affairs of Indian villages are administered by village councils whereby one-third of members must be women. Starting in 2005, some Indian states began increasing this threshold to one-half. Using data collected for a sample of Indian farms, I estimate the effect of increasing the quota of these councils on female empowerment, where the individual responsible for management decisions is used as a measure of female empowerment. I provide some suggestive evidence that an increase in the minimum threshold of women elected to village councils is associated with a statistically significant increase in the number of self-reported management decisions made exclusively by women, conditional on controls.

My paper situates itself within a growing literature in economics that studies the effects of gender quotas. That said, most papers in this field do not look at the effects on female specific

outcomes but rather the effects on political life. The overwhelming majority of this literature studies the impact of quota adoption on election outcomes. Bagues and Campa (2017) find that gender quotas increase both the number of female candidates and elected city councillors among municipalities in Spain. These quotas were implemented in 2007 for municipalities with more than 5,000 residents and later expanded in 2011 to include municipalities with more than 3,000 residents. Baltrunaite et al. (2014) find that quotas improve the quality of politicians elected to city councils in Italy by both encouraging more qualified female candidates and weeding out less qualified male candidates. Similar results are found by Besley et al. (2017), who find that male party leaders of lower quality are pushed out of parties that implemented zipper quotas in Sweden.[1] De Paola, Scoppa and Lombardo (2010) find that even after a gender quota law in Italy was struck down, more women were elected in regions that held elections bound by the quota compared to regions that did not hold elections while the quota was in effect.[2]

Another segment of the literature looks at policy outcomes when quotas are implemented. The results here are mixed, such that quotas appear to affect policy outcomes only in developing countries and not in developed countries. Chattopadhyay and Duflo (2004) find that village councils in India that experienced a higher share of women being elected through quotas increased spending on public goods related to women's issues (for example, drinking water) and decreased spending on goods related to men's issues (for example, maintaining public roads). Clots-Figueras (2011) finds that women elected to Indian state legislative assemblies that are members of Scheduled Castes or Scheduled Tribes support women-friendly laws, such as the

[1] Zipper quotas require parties to alternate between male and female candidates on their party list.

[2] A law mandating that neither sex could make up more than two-thirds of a party's candidates was in place from March 1993 to September 1995, when it was struck down as being unconstitutional. Municipal elections in Italy are held every 5 years, so not all municipalities conducted elections during this time.

Hindu Succession Act, and laws that concern themselves with wealth redistribution. Duflo and Topalova (2004) find that residents of village councils led by women report higher satisfaction with their provision of public drinking water and are less likely to have to pay bribes to receive these goods. As for developed countries, Bagues and Campa (2017) find no major policy changes when Spanish municipalities became governed by a gender quota.

A recently emerging branch of the literature addresses the effects of quotas on development outcomes. Pathak and Macours (2017) find that children born into villages with imposed gender quotas in Andhra Pradesh have improved health outcomes and higher test scores. Baltrunaite et al. (2014) provide evidence that female politicians tend to have a higher educational attainment than male politicians and education of politicians has previously been found to be a determinant of economic growth.[3] Van der Windt et al. (2018) find no evidence that gender quotas on Congolese development boards increased female empowerment, both in terms of future projects undertaken and societal attitudes towards women. This is where my paper situates itself within the literature on gender quotas – it fits into the emerging literature that looks at the effect of gender quotas on development outcomes.

This paper is structured as follows. Section 2 provides the conceptual framework relating gender quotas to female development. In Section 3, I explain my dataset. Section 4 explains my identification strategy and Section 5 presents my results. In Section 6, I perform three robustness checks. Section 7 concludes.

2. Background and Conceptual Framework

In an effort to reduce the level of centralization within the federal government, India formally entrenched the *Panchayati Raj* system into its constitution by introducing the 73rd

[3] See Jones and Olken (2005) and Besley, Montalvo and Reynal-Querol (2011).

Amendment in 1993. While past iterations of the Panchayati system had existed in India before 1993, they were largely undemocratic (members were usually appointed to terms of indeterminate length) and these bodies lacked significant decision making power. That is to say, the regional government was free to limit and amend the power of these bodies as they saw fit. The constitutional entrenchment of the Panchayati system devolved the administration of villages and village expenditures from the federal government to elected village councils (called *Gram Panchayats*). These councils are made up of between five and seventeen councillors (*panchas*) and one mayor (*pradhan*). Each village council represents about 10,000 people. These village councils are responsible for the administration of local infrastructure and the provision of welfare. A unique feature of the Panchayati system is that each village council is required to hold two public meetings a year in which all villagers aged 18 and above can vote directly on matters, rather than doing so through their elected official. This includes voting on a provisional semi-annual budget.

As part of the 73rd Amendment, a series of quotas were introduced that governed the election of village council members. These quotas required that no less than one-third of elected councillors were women and no less than one-third were members of either a scheduled caste or tribe.[4] Additionally, one-third of elected mayors must be women. The 73rd Amendment did not set out how this threshold is to be met; rather it establishes a national standard that individual states are allowed to deviate from, as long as they meet these standards. In order to satisfy the requirement that one-third of mayors elected are women, many states use a rotation whereby villages are randomly required to only allow women to stand for election to these positions.

[4] Scheduled Castes (SC) and Scheduled Tribes (ST) are the groups regarded by the Indian government as being the most societally disadvantaged.

In 2005, the state of Bihar became the first state to increase the threshold of elected women to one-half – meaning that half of the elected Gram Panchayat members must be women. It is unclear what motivated them to make this increase. Since then, 15 other states have also raised the threshold of women to one-half. There have been talks to further amend the constitution to raise the gender quota to one-half across all of India since 2009, but nothing has materialized from this at the federal level.

Many households in Indian villages are involved in the agricultural sector. Additionally, these households are typically headed by men, who usually make decisions regarding the management of farms. Increasing the threshold of women elected to Gram Panchayats can work to improve female development outcomes through two channels. First, more women elected to village council seats can make other women feel comfortable about bringing forward female-specific issues to these councils. As a result of this, village councils might approve more women-friendly business and female development outcomes improve. Second, a higher reservation of women improves the value of the marginal women. The marginal woman is more likely to be regarded in higher esteem since she is now more likely to be a potential village councillor. This higher esteem could have non-political ramifications, such as being responsible for more important tasks on farms. One way to test the second channel is to see if the implementation of gender quotas for village council seats affects female development outcomes, which my paper attempts to do.

3. Dataset and Descriptive Statistics

In collaboration with the Bill & Melinda Gates Foundation, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) launched the Village Dynamics in South Asia project (VDSA), designed to collect data to facilitate measuring changes in the rural

poor of South Asia. One of the ways they do this is through conducting household surveys on various topics related to agriculture. Agriculture is a major component of rural India, so surveys targeting agricultural workers are useful in assessing development outcomes. Since 2001, the VDSA has issued a series of household surveys. One of these surveys is the General Endowment Survey (GES).

The GES was administered yearly from 2009 to 2014 in 30 villages across nine states in India.[5] For households in the Semi-Arid Tropics region, between 39 and 93 households are surveyed in each village per year. For households in East India, between 37 and 46 households are surveyed each year. The GES's primary focus is to collect yearly data on the household endowments of farms. The endowments covered by the survey include both agricultural goods (for example, the amount of livestock) and non-agricultural goods (for example, consumer goods owned by each household that are not related to farm activities). A secondary focus of the GES is also to collect data on the gender changes happening within agriculture. This includes data on the decision making roles within each farm by gender. These decision making roles include those directly related to farm activity (for example, the use of different assets and inputs on farms) and not related to farm activity (for example, child educational attainment). For this paper, I use data on management decisions directly related to farm activity. Decision making on non-farm activity is used as a robustness check.

Table 1 presents summary statistics for my sample. My sample is made up of 1,531 unique households spanning 7,632 observations. Most households remain in the sample for the duration of the survey's administration[6]. If households are not in the sample during the entire

[5] The GES was also administered in 12 villages in Bangladesh, but my study is only concerned with India so households in Bangladesh are omitted.
[6] Data for East Indian households in 2009 is unavailable.

administration, it is due to attrition and households are added to the sample to offset this. Approximately 46.8% of households are in states governed by the one-half gender quota law at a given time. Regarding the share of the sample in each province, the population shares are about in line with that of the Indian population. For example, Maharashtra is the most populous of all nine states represented in the sample and makes up the largest share of the sample while Jharkhand is the least populous and makes up the third smallest share of the sample. Similar things can be said about the composition of castes and religion within the sample.

Table 2 presents summary statistics for the ten main outcome variables, divided into three columns based on implementation of the one-half gender quota. The "always treat" observations are in states that implemented the quota before 2009; the "switch treat" observations are in states that implemented the quota sometime between 2009 and 2014; and the "never treat" observations are in states that never implemented the quota. Observations are divided into two panels based on whether the decision variable is an asset or an input. These outcome variables are dummies that equal one if the female head is the sole decision maker of that commodity and zero if the male is the sole decision maker or decisions are made jointly by the two heads. Table 3 is the same as Table 2, except the outcome variables take the value one if the female plays any role in the decision making process of each commodity and zero if not (i.e., the male head is the sole decision maker). For both Tables 2 and 3, neither the "always treat", "switch treat" nor "never treat" groups report a higher share of women reporting making management decisions. This makes me feel confident that there is not an endogeneity issue, whereby states that are more *pro-women* are more likely to adopt the one-half gender quota than states that are not more *pro-women*.

4. Identification Strategy

In this paper, I exploit variation in the timing of the one-half gender quota coming into effect across different states. My baseline estimating equation is

$$Y_{ist} = \alpha + \lambda_i + \gamma_t + \delta \text{treat}_{st} + \phi \text{X}_{it} + \varepsilon_{ist}, \quad (1)$$

where Y_{ist} are various farming-related management decisions made by household *i* in state *s* at time *t*; λ_i and γ_t are individual and time fixed effects, respectively; treat_{st} is a dummy that takes the value one if state *s* is governed by the one-half gender quota law at time *t* and zero if they are not being governed; X_{it} is a set of farm controls; and ε_{ist} is the error term. The identification assumption is that no changes occurred during the survey period in treated states that would have induced higher female empowerment, except for those that directly arise from the implementation of one-half gender quota law. In other words, I am making the assumption that the trends are parallel, conditional on the time-varying farm controls.

The management decisions act as a measure of female empowerment, with the assumption that women reporting that they are being tasked with more management decisions is indicative of increased female empowerment. All management decisions are broken up into two types; those relating to farm assets and farm inputs. The assets are land, livestock, credit, machinery and investment. The inputs are seeds, fertilizer, pesticides, own labour and hired labour. Decisions on these ten resources can either be made by the male head, the female head, both or neither (in cases where that household does not own the given commodity). Both heads are asked independently who is responsible for making each management decision. I consider the answers given by both the male and female heads. Each outcome variable is assigned a value of one if the head surveyed identifies the female head as being the sole decision maker of that resource and zero if the head surveyed identifies either the male head or both heads as being the

decision maker. I alternatively consider these decision making variables if the female head is identified as being part of the decision making process, whether solely or jointly with the male head.

The treatment varies by state across time because the decision to adopt the one-half gender quota is made at the state level. Therefore, all households in state *s* at time *t* are either affected by the quota or not. Of the nine states represented in the sample, two are always governed by the one-half quota, three are never governed by the quota and four adopt the quota during the survey period. The classification of these different states is presented in Table 4. To relax the identification assumption, I also include farm controls. The controls grouped into three categories; controls for the farm's landholdings, agricultural tools and buildings. I also control for which caste group and religion the household belongs to. As a robustness check, I use non-agricultural decision making and household consumption on non-agricultural goods as outcomes.

5. Results

The estimates from equation (1) are presented in Table 5 for survey responses by female heads and Table 6 among male heads. Results are divided into two panels, to reflect the differing nature of the decisions at hand. Panel A contains results for the five asset decisions and Panel B contains the results for the five input decisions. The estimates on the control variables are removed for brevity's sake. The number of observations varies across each outcome variable since some households do not have that specific asset or input. For example, data on land decision making is not collected for households that do not own their own land.

The results in Table 5 suggest that the imposition of the one-half gender quota is positively associated with female exclusive decision making for different assets and inputs according to the woman head. The estimates on decision making regarding the use of land,

livestock, credit, seeds, own labour and hired labour are all positive and significant at the 1% level. Additionally, the estimates on investment and fertilizer are significant at the 5% level while the estimate on pesticides is significant at the 10% level. The estimates on decision making regarding the use of machinery is statistically insignificant.

The coefficients on these estimates are not overly insightful on their own, since the outcome variables are decision making dummies. The estimated effects in an increase of the quota range from approximately 1 percentage point to 6 percentage points. For example, the land estimate suggests that adopting the one-half gender quota is associated with an increase in the probability that a household's female head is the sole decision maker by approximately 3 percentage points. On its own, each estimate does not offer much insight: rather, it is the totality of these coefficients that gives Table 5 its importance. Table 5 offers suggestive evidence that the treatment is increasing the number of female heads that identify as having sole decision making responsibility over the use of different assets and inputs. To sum up, Table 5 offers some evidence that the adoption of the one-half gender quota is responsible for increased levels of female decision making.

The results reported in Table 6 are as in Table 5, except the respondents are the male heads rather than the female heads. The results are almost identical across male and female heads, except for the fact that the coefficient estimates vary slightly. This reinforces the results from Table 5. The male heads reaffirming the female heads' response suggests that the gains in female decision making are being realized. The size of the estimates is somewhat similar among male heads.

Table 7 also estimates equation (1), except the decision making variable captures whether or not the female head reports playing any decision making role, rather than exclusive decision

making (as was done in Tables 5 and 6). That is to say, the estimates in Table 7 treat women reporting "both" as being involved in the decision making, whereas Tables 5 and 6 did not. The coefficients on the estimates of credit, machinery and seeds are all negative and significant at either the 1% or 5% levels. All other coefficients are all statistical zeroes. Similar results are observed among male heads in Table 8.

When taken together, Tables 5, 6, 7 and 8 suggest that, in response to the imposition of the quota, households select away from joint decision making activity and move towards female-only and male only decision making behaviour. This suggests that any gains in female empowerment observed in Tables 5 and 6 are being done at the expense of joint decision making by male and female heads.

6. Robustness Checks

In this section, I undertake three different robustness checks. Two of these robustness checks re-estimate equation (1), but with different outcome variables and one robustness check adds extra controls. In Section 6.1, I consider decision making on non-management decisions. In Section 6.2, I consider changes in household consumption of goods categorized as male or female goods. In Section 6.3, I re-estimate equation (1) but add two sets of controls – household biographical controls and livestock controls.

6.1. Non-management Decision Making

In this robustness check, I consider seven different decision making contexts that do not relate to agriculture. They are child marriage, disaster response, education of children, household maintenance, migration, pleasure trips and who to vote for. Due to unknown reasons, response data is only available for male heads. Like with the questions about management decisions, when

asked who is responsible for these non-agricultural decisions, the male heads could have answered male, female or both.

Table 9 presents the results of estimating equation (1) where the outcome is a dummy that is one if the male head identifies the female head as being the sole decision maker and zero otherwise. The estimates on education of children, household maintenance, pleasure trips and migration are all positive and significant at the 1% level. The estimates on child marriage and for whom to vote are significant at the 10% level. The estimate on disaster response is statistically insignificant. All estimates are small in magnitude, except for household maintenance.

Table 10 estimates the same specification playing any decision making role, by either identifying women or both as making the decision. The estimates on education of children, child marriage and disaster response are negative and significant at the 1% level. The other estimates are all statistically insignificant.

These two tables taken together reinforce the phenomenon observed in Section 5. In response to the imposition of the one-half gender quota, households select away from having both men and women make decisions. This is observed in the case of decision making on education of children and child marriage; where the results from Table 9 suggest that female heads are solely more responsible for these decisions and Table 10 suggests that both heads (jointly) are less responsible for them. That said, some gains in female empowerment can be observed. Table 9 suggests female heads are more responsible for decisions regarding household maintenance, for whom to vote, pleasure trips and migration while Table 10 shows no change among either male or female heads. Conversely, male heads appear to be more responsible for decisions regarding disaster response with no change whether female heads are responsible for these.

6.2. Household Consumption on Non-Agricultural Goods

In this robustness check, I consider household consumption behaviour of nine different non-agricultural goods. I use consumption of non-agricultural goods because I am assuming that consumption behaviour of non-agricultural goods is not likely to change in response to a non-agricultural shock (that being the imposition of the one-half gender quota). These goods are classified into two groups: *female goods* and *male goods*. Female goods are those thought to improve the functioning of the household. They are fridges, sewing machines, telephones, washing machines, toilets and bathrooms.[7] Male goods are those that do not tend to assist in running the household. They are computers, motorcycles and televisions. This is designed to see if the female empowerment arising from the implementation of the one-half gender quota carries over into other facets of life. These nine goods are selected because of their availability and the ease with which they can be classified as male or female. This robustness check allows me to see if the gains in female empowerment extend into household consumption patterns.

The results of this are presented in Table 11 and are split into two panels based on whether the goods are female or male. The results from Table 11 are mixed. If it were the case that the increase in female empowerment extended into household consumption, I would expect to see positive coefficients among the female specific goods and negative coefficients or statistical insignificance among the male specific goods. This would suggest that households are substituting away from (or at least not changing their consumption of) male specific goods and increasing their consumption of female specific goods. The results from Table 11 suggest that this is not the case. The coefficients in Panel A of Table 11 offer mixed evidence. The

[7] Toilet and Bathroom are dummies that equal one if the household has the given commodity and zero if not. The other seven variables measure the amount of each commodity owned by the household.

coefficients on the estimates of fridges, telephones and bathrooms are positive and significant at the 1% level. However, the coefficients on washing machine and toilets are negative and significant at the 5% and 1% levels, respectively. The estimate on sewing machines is statistically insignificant. The coefficients in Panel B of Table 11 are all positive. The coefficients on motorcycle and television are significant at the 1% level and the coefficient on computer is significant at the 10% level.

These results do not indicate an increase in female empowerment because they are inconsistent with the idea that households substitute away from male goods and towards female goods. Although three of the coefficients in Panel A are positive and significant, so are three of the coefficients in Panel B. Rather than substituting between goods, these results suggest an increase in household consumption across most goods. So any gains in female empowerment are not carried over into household consumption and just remain in the realm of farm management.

6.3. Robust to Different Specifications

In this robustness check, I re-estimate equation (1), but I add two extra sets of variables. They are controls on different livestock the household has and household biographical controls, which account for gendered characteristics of the household and information about the heads of each household. This is to account for issues of endogeneity, where households that are more advanced (better educated heads, for example) would be more likely to give female heads more decision making responsibility. In this robustness check, I only use the four outcome variables used in Section 5, as they are the main outcome variables.

The re-estimated results from equation (1) are presented in Table 12 among female heads and Table 13 among male heads. Tables 12 and 13 are analogous to Tables 4 and 5, except the

results in Tables 12 and 13 control for the aforementioned extra variables. The results of Tables 12 and 13 are similar, although less strong. The coefficients on the estimates for livestock and own and hired labour are positive and significant at the 1% level. The coefficients on the estimates for credit and investment are positive and significant at the 5% level with all other estimates being statistically insignificant.

Tables 14 and 15 are analogous to Tables 7 and 8 in that they both consider whether female heads play any role in management decisions (either solely or jointly), except the results in Tables 14 and 15 also control for the aforementioned extra variables. These results are also similar to the results in Tables 7 and 8. In both Tables 14 and 15, the estimates for credit, machinery and seeds are negative and significant. The other estimates are statistically insignificant.

Taken together, Tables 12 through 15 reaffirm the results found in Section 5. Although not as convincingly, households appear to respond to the implementation of the one-half gender quota by selecting away from joint decision making and move towards female-only and male-only decision making.

7. Conclusion

This paper uses data from the Village Dynamics of South Asia (VDSA) program to study the effect of a widespread village governance reform in India. I exploit variation in the timing of the implementation of laws requiring no less than half of the elected members on village councils to be women. Using agricultural decision making as a measure of female empowerment, I provide suggestive evidence that the implementation of the one-half gender quota on village councils increases female empowerment by prompting households to delegate more decisions to

the female head exclusively. When I use non-agricultural decision making as a measure of female empowerment, I find the same thing. These results are robust to different specifications. I find no effect of the implementation of the quota on household consumption of non-agricultural goods.

These results suggest that policies that encourage women to enter politics can have non-political ramifications insofar as they extend beyond politics and into civilian life. In this particular case, the increase in female empowerment comes in the form of increased managerial responsibilities in farming related activities.

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Table 1
Summary Statistics

	(1)	(2)
Treatment	0.468	(0.499)
Andhra Pradesh	0.139	(0.346)
Bihar	0.107	(0.309)
Gujarat	0.125	(0.330)
Jharkhand	0.105	(0.306)
Karnataka	0.127	(0.333)
Madhya Pradesh	0.063	(0.243)
Maharastra	0.212	(0.409)
Orissa	0.108	(0.310)
Telangana	0.015	(0.121)
Forward Caste	0.227	(0.419)
Other Backwards Caste	0.385	(0.487)
Backwards Caste	0.108	(0.310)
Special or Economically Backwards Caste	0.0178	(0.132)
Scheduled Caste	0.118	(0.322)
Scheduled Tribe	0.0886	(0.284)
Nomadic Tribe	0.0563	(0.231)
Hindu	0.949	(0.220)
Christian	0.017	(0.129)
Muslim	0.012	(0.107)
Number of obs.	7,632	
Number of households	1,531	

Notes: Column (1) contains means with standard deviations in parentheses in column (2). Means are not weighted.

Table 2
Summary Statistics on Decisions Made by Treatment Group

	Always Treat		Switch Treat		Never Treat	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Assets						
Land	0.055	(0.306)	0.065	(0.246)	0.038	(0.192)
Livestock	0.062	(0.241)	0.076	(0.246)	0.129	(0.336)
Credit	0.044	(0.499)	0.073	(0.260)	0.051	(0.220)
Machinery	0.032	(0.333)	0.023	(0.150)	0.020	(0.139)
Investment	0.036	(0.309)	0.050	(0.217)	0.035	(0.184)
Panel B: Inputs						
Seeds	0.061	(0.310)	0.040	(0.195)	0.024	(0.152)
Fertilizer	0.051	(0.346)	0.035	(0.183)	0.022	(0.148)
Pesticides	0.034	(0.409)	0.029	(0.168)	0.018	(0.131)
Own Labour	0.053	(0.243)	0.108	(0.310)	0.140	(0.347)
Hired Labour	0.061	(0.330)	0.120	(0.325)	0.066	(0.248)

Notes: Columns (1), (3) and (5) contain means with standard deviations in columns (2), (4) and (6). Decision variables are dummies that equal 1 if the female head makes the decision, 0 if the decision is made by the male head or both.

Table 3
Summary Statistics on Decisions Made by Treatment Group

	Always Treat		Switch Treat		Never Treat	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Assets						
Land	0.451	(0.498)	0.600	(0.490)	0.370	(0.483)
Livestock	0.574	(0.495)	0.746	(0.436)	0.551	(0.497)
Credit	0.524	(0.500)	0.664	(0.472)	0.428	(0.495)
Machinery	0.394	(0.489)	0.533	(0.499)	0.241	(0.428)
Investment	0.517	(0.500)	0.651	(0.477)	0.448	(0.497)
Panel B: Inputs						
Seeds	0.369	(0.483)	0.520	(0.500)	0.320	(0.466)
Fertilizer	0.330	(0.471)	0.400	(0.490)	0.277	(0.448)
Pesticides	0.321	(0.467)	0.351	(0.477)	0.145	(0.352)
Own Labour	0.574	(0.495)	0.817	(0.387)	0.683	(0.465)
Hired Labour	0.560	(0.497)	0.815	(0.388)	0.640	(0.480)

Notes: Columns (1), (3) and (5) contain means with standard deviations in columns (2), (4) and (6). Decision variables are dummies that equal 1 if the female head or both male and female heads make the decision, 0 if the decision is made by the male head only.

Table 4
States in Sample

Panel A: Always Treat
Bihar
Madhya Pradesh
Panel B: Never Treat
Gujarat
Orissa
Telangana
Panel C: Switch Treat
Andhra Pradesh (2011)
Karnataka (2010)
Jharkhand (2010)
Maharashtra (2011)

Notes: States in Panel A implemented the one-half gender quota before the survey period. States in Panel B did not implement the one-half gender quota during the survey period. States in Panel C did not have the quota at the beginning of the survey period, but switch during the year in parentheses.

Table 5
Linear Probability Model Results Among Female Heads

	Dependent variable: sole decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	0.0330***	0.0583***	0.0344***	0.0117	0.0366**
	(0.0116)	(0.0116)	(0.00944)	(0.0133)	(0.0147)
Number of obs.	6,128	5,200	6,518	5,200	5,369
R^2	0.641	0.510	0.637	0.554	0.579
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	0.0248***	0.0199**	0.0160*	0.108***	0.127***
	(0.00909)	(0.00958)	(0.00902)	(0.0146)	(0.0155)
Number of obs.	5,815	5,791	5,663	4,021	5,369
R^2	0.597	0.595	0.608	0.592	0.483

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the female head identifies that she is solely responsible for the management decision of a given commodity and zero if not (either the male head or both). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Linear Probability Model Results Among Male Heads

	Dependent variable: decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	0.0330***	0.0652***	0.0344***	0.0138	0.0304**
	(0.0115)	(0.0150)	(0.00939)	(0.0114)	(0.0147)
Number of obs.	6,092	5,196	6,482	3,982	5,338
R^2	0.663	0.500	0.693	0.535	0.604
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	0.0251***	0.0203**	0.0174*	0.110***	0.124***
	(0.00902)	(0.00957)	(0.00903)	(0.0145)	(0.0155)
Number of obs.	5,438	5,417	5,028	6,251	5,971
R^2	0.604	0.584	0.614	0.507	0.502

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the male head identifies that the female head is solely responsible for the management decision of a given commodity and zero if not (either the male head or both). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7
Linear Probability Model Results Among Female Heads

	Dependent variable: decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	-0.0260	-0.0397	-0.106***	-0.139***	-0.0142
	(0.0271)	(0.0282)	(0.0203)	(0.0474)	(0.0360)
Number of obs.	6,128	5,200	6,518	4,021	5,369
R^2	0.496	0.446	0.495	0.528	0.470
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	-0.0736**	-0.0405	-0.453	0.000536	0.00335
	(0.0313)	(0.0320)	(0.0306)	(0.0204)	(0.0198)
Number of obs.	5,815	5,791	5,663	6,254	5,986
R^2	0.507	0.493	0.534	0.508	0.502

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the female head identifies that the female head is responsible for the management decision of a given commodity (either solely or jointly with the male head) and zero if not (the male head is solely responsible). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Linear Probability Model Results Among Male Heads

	Dependent variable: decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	-0.0260	-0.0299	-0.107***	-0.138***	-0.0199
	(0.0271)	(0.0285)	(0.0203)	(0.0478)	(0.0361)
Number of obs.	6,092	5,196	6,482	3,982	5,338
R^2	0.501	0.461	0.505	0.537	0.490
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	-0.0733**	-0.0405	-0.0491	0.000958	-0.00247
	(0.0313)	(0.0320)	(0.0308)	(0.0205)	(0.0198)
Number of obs.	5,438	5,417	5,028	6,251	5,971
R^2	0.512	0.495	0.547	0.549	0.539

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the male head identifies that the female head is responsible for the management decision of a given commodity (either solely or jointly with the male head) and zero if not (the male head is solely responsible). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9
Linear Probability Model Results Among Male Heads

	Dependent variable: decision making in non-agricultural domains		
	Education of Children	Child Marriage	Household maintenance
Treatment	0.0365***	0.0178*	0.352***
	(0.00955)	(0.00990)	(0.0211)
Number of obs.	6,454	5,877	7,023
R^2	0.543	0.599	0.528

	Who to vote for	Disaster	Pleasure Trips	Migration
Treatment	0.0174*	0.0113	0.0337***	0.0362***
	(0.00980)	(0.00972)	(0.0111)	(0.0133)
Number of obs.	6,993	5,935	6,067	3,708
R^2	0.756	0.710	0.682	0.719

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the male head identifies that the female head is solely responsible for the making the decision and zero if not (the male head is solely responsible or both). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 10
Linear Probability Model Results Among Male Heads

	Dependent variable: decision making in non-agricultural domains		
	Education of Children	Child Marriage	Household maintenance
Treatment	-0.0718***	-0.106***	-0.00722
	(0.0197)	(0.0173)	(0.0174)
Number of obs.	6,454	4,299	7,023
R^2	0.471	0.469	0.483

	Who to vote for	Disaster	Pleasure Trips	Migration
Treatment	0.0357	-0.0620***	0.00255	0.0304
	(0.0239)	(0.0207)	(0.0251)	(0.0250)
Number of obs.	6,993	5,935	6,067	5,131
R^2	0.486	0.541	0.527	0.599

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the male head identifies that the female head is responsible for the making the decision (either solely or jointly with the male head) and zero if not (the male head is solely responsible). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 11
OLS Results on Consumer Behaviour

	Dependent variable: household, non-agricultural consumption					
	Fridge	Sewing Machine	Telephone	Washing Machine	Toilet	Bathroom
	Panel A: Female goods					
Treatment	0.0349***	-0.00635	0.437***	-0.0202**	-0.0715***	0.0797***
	(0.0111)	(0.0139)	(0.0381)	(0.00924)	(0.0151)	(0.0164)
Number of obs.	6,274	6,271	6,815	6,162	7,053	5,918
R^2	0.757	0.745	0.675	0.366	0.811	0.844

	Computer	Motorcycle	Television
	Panel B: Male goods		
Treatment	0.0116*	0.0538***	0.0762***
	(0.00618)	(0.0176)	(0.0202)
Number of obs.	6,176	6,319	6,611
R^2	0.659	0.685	0.744

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. All outcome variables represent the number of each commodity owned by a household except for Toilet and Bathroom, which are dummies that equal one if the household has that item and zero if not. Additional controls not shown include land controls, farming equipment controls, building controls, caste controls and religion controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12
Linear Probability Model Results Among Female Heads

	Dependent variable: sole decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	0.00867	0.00573***	0.0173**	-0.0169	0.0256**
	(0.00917)	(0.0161)	(0.00767)	(0.0127)	(0.0125)
Number of obs.	4,030	4,290	4,093	2,868	3,503
R^2	0.553	0.536	0.598	0.584	0.545
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	0.00355	0.000516	0.00159	0.100***	0.109***
	(0.00918)	(0.00913)	(0.00889)	(0.0183)	(0.0206)
Number of obs.	3,987	3,972	3,915	4,092	3,929
R^2	0.589	0.570	0.580	0.612	0.476

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the female head identifies that she is solely responsible for the management decision of a given commodity and zero if not (either the male head or both). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls, religion controls, household biographical controls and livestock controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 13
Linear Probability Model Results Among Male Heads

	Dependent variable: decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	0.00808	0.0648***	0.0172**	-0.0167	0.0136
	(0.00905)	(0.0160)	(0.00723)	(0.0129)	(0.0116)
Number of obs.	4,006	4,287	4,065	2,836	3,478
R^2	0.551	0.501	0.605	0.570	0.552
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	0.00385	0.000528	0.00146	0.105***	0.105***
	(0.00901)	(0.00909)	(0.00860)	(0.0183)	(0.0204)
Number of obs.	3,675	3,662	3,383	4,086	3,921
R^2	0.562	0.554	0.564	0.461	0.467

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the male head identifies that the female head is solely responsible for the management decision of a given commodity and zero if not (either the male head or both). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls, religion controls, household biographical controls and livestock controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 14
Linear Probability Model Results Among Female Heads

	Dependent variable: decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	-0.00602	-0.0209	-0.112***	-0.136***	-0.0349
	(0.0369)	(0.0292)	(0.0299)	(0.0522)	(0.0473)
Number of obs.	4,030	4,290	4,093	2,868	3,503
R^2	0.523	0.464	0.525	0.553	0.518
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	-0.101**	-0.0583	-0.0471	0.00740	0.0284
	(0.0366)	(0.0380)	(0.0356)	(0.0259)	(0.0267)
Number of obs.	3,987	3,972	3,915	4,092	3,929
R^2	0.549	0.535	0.575	0.518	0.515

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the female head identifies that the female head is responsible for the management decision of a given commodity (either solely or jointly with the male head) and zero if not (the male head is solely responsible). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls, religion controls, household biographical controls and livestock controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 15
Linear Probability Model Results Among Male Heads

	Dependent variable: decision making on the use of different assets and inputs				
	Land	Livestock	Credit	Machinery	Investment
			Panel A: Assets		
Treatment	-0.0107	-0.0167	-0.119***	-0.139***	-0.0478
	(0.0370)	(0.0294)	(0.0297)	(0.0534)	(0.0475)
Number of obs.	4,006	4,287	4,065	2,836	3,478
R^2	0.532	0.473	0.534	0.560	0.530
	Seeds	Fertilizer	Pesticides	Own Labour	Hired Labour
			Panel B: Inputs		
Treatment	-0.0980***	-0.0555	-0.0585	0.00873	-0.0214
	(0.0366)	(0.0380)	(0.0356)	(0.0256)	(0.0266)
Number of obs.	3,675	3,662	3,383	4,086	3,921
R^2	0.562	0.554	0.602	0.556	0.545

Notes: Estimates from equation (1) are reported. Coefficients are reported with robust standard errors in brackets below. Each outcome variable is a dummy that is one if the male head identifies that the female head is responsible for the management decision of a given commodity (either solely or jointly with the male head) and zero if not (the male head is solely responsible). Additional controls not shown include land controls, farming equipment controls, building controls, caste controls, religion controls, household biographical controls and livestock controls. ***, **,and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.