

# A Field of Her Own: Property Rights and Women's Agency in Myanmar\*

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Can financial incentives lead households to register land in women's names, thereby providing them with more formal property rights? Can formal property ownership improve women's economic outcomes and change political dynamics within the household? To investigate these questions, we take advantage of a bank lending policy in Myanmar that motivates men in households with land holdings above ten acres to title the surplus land in their wives' names. We surveyed 5,068 men and women living in the Ayeyarwaddy region of Myanmar about land-holding, economic activity, and gendered decision-making. We find that financial incentives provided by bank lending policies can lead to some increases in women's formal property ownership, but these exogenously assigned rights do not manifest in greater economic empowerment for recipients. Underlying sociocultural and structural factors impede the ability of women to translate title possession into greater negotiating power both inside and outside of the home.

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# 1 Introduction

Women are economically and socially disadvantaged in many parts of the world. A critical driver of gender inequality is women's limited access to land and other assets: 61% of working women are employed in agriculture in least developed states (ILO 2019), but women hold only 18% of global agricultural land (FAO 2022). Many global poverty reduction programs focus on giving cash and other assets to women in order to reduce gender inequality and improve socioeconomic outcomes (Almas et al. 2018; Duflo 2003), but policymakers' knowledge about both the effectiveness and unintended consequences of such policies is still limited.<sup>1</sup> In this paper, we explore what happens in the presence of financial incentives to subdivide household land and obtain additional formal land certificates. Will such incentives serve to provide access to formal property ownership for women, thereby improving economic outcomes as well as shifting power dynamics within the household?

Assessing the relationship between women's property rights and economic and political power is fundamental to understanding gender inequality, but is empirically difficult. A first challenge is that systematic data on economic indicators, including sources of income and ownership of housing and land, are usually collected at the level of the household. This excludes important within-household variation in power, a key factor in producing structural inequality (Cheema et al. 2021; Doss et al. 2015). Second, because property rights structure access to power, the distribution of these rights is intertwined with other dimensions of women's position in society. This makes it hard to disentangle the impact of property rights themselves on women's economic and political power. The complexity of these relationships

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<sup>1</sup>Previous studies find positive effects of asset transfers to women, education and skills training, and providing financial autonomy to women (see, among others, Ashraf et al. 2020; Bandiera et al. 2017; Field et al. 2021). Studies on formal property rights are mixed, with some showing that these rights reduce economic vulnerability and increase investment (e.g., Ali, Deininger and Goldstein 2014 in Rwanda, Galiani and Schargrodsky 2010 in Mexico, Goldstein et al. 2018 in Benin), while others show that inheritance law changes in India lead to increases in female foeticide (Bhalotra, Brulé and Roy 2020) and increased rates of suicide (Anderson and Genicot 2015). A systematic review of the literature finds that most empirical studies are limited by small sample sizes and the lack of credible counterfactuals (Meinzen-Dick et al. 2019).

is well documented in work in economics (Meinzen-Dick et al. 2019), but is less-well explored in political science (Brulé and Gaikwad 2021 is a notable exception).

Our study focuses on a national banking policy to explore the empirical consequences of a simple conceptual framework linking access to property rights with economic and political empowerment. Previous work on this question has focused on NGO and other donor-led programs, which, while important, may be seen by local actors as informal or ephemeral, causing them to take strategic actions that undermine the achievement of sustainable equality. The role of external actors can make it hard to assess the durability of shifts in gender inequality (Milazzo and Goldstein 2019). Our framework posits that both economic and political changes could flow from formal access to property rights through changes in economic bargaining between household members and/or shifts in social norms (Agarwal 1997).

Myanmar is a useful place to explore the process and the consequences of women's economic empowerment. A number of international agencies have documented the severity of the economic gap between men and women in the country. In 2003, the FAO estimated that only 15% of land in Myanmar was held by women. In 2020, the World Bank concluded that 76% of men participated in the labor force compared with 46% of women. And in 2013, the WHO estimated that 37% of women in Southeast Asia experienced either physical and/or sexual violence (WHO 2013).

These power differentials, many of which are produced within the household, have direct implications for local and national politics: in 2016, Myanmar citizens elected local village tract officials for the first time, and 95% of successful candidates were men. Further, the Myanmar state has relatively high levels of property tax collection, and most citizens recognize the importance of written documentation of property rights (nearly 80% of respondents in our survey said that having their name on a written document is what makes the land "theirs"). This makes Myanmar a much more likely case for formal property rights to have an impact, compared to places with more limited documentation (e.g., Huntington and Shenoy 2021).

To test our hypotheses, we take advantage of a quasi-experiment created by a policy of the Myanmar Agricultural Development Bank (MADB), the country's dominant rural lender, which capped the amount of land eligible for agricultural lending at ten acres. Families with plot holdings larger than ten acres have an incentive to break apart the plot and formally register the surplus land in the name of a different household member, most often their female spouse, in order to access additional bank credit. Using a regression discontinuity design, we compare households with plot sizes just below 10 acres (who have no incentive to divide the plot), to those just above this threshold, in order to understand whether the exogenous assignment of land holdings to women leads to greater formal property ownership, economic activity, and greater agency in household bargaining.

In November 2019 through January 2020, we surveyed male and female partners in 2,534 households across 128 villages of Ayeyarwaddy region. We collected information from both partners in each household on a wide range of demographic and economic factors, as well as on household decision-making processes, perceptions of agency, social norms, and the quality of intimate relationships. We also collected information from a behavioral intervention designed to capture an aspect of women's economic empowerment. Building on the work of Almas et al. (2018), we elicit the amount (price) that women would be willing to pay in order to control a small cash transfer, following the intuition that women's willingness to pay for control decreases when their control of existing resources is greater.

We find strong evidence for a financial incentive to transfer formal *de jure* property rights to women: households that have more than ten acres report a significantly larger number of individual plots in the household and are nearly 13 percentage points more likely to have at least one land title (known as a Form 7) with the female household head's name on it. Households with more than 10 acres also report a higher number of land-collateralized loans, suggesting that economic activity is also shaped by the change in property rights.

Despite these important legal improvements, we find that property rights are not linked to differences in economic or social decision-making in the household, nor do property rights

lead to changes in levels of political activity for women. This is consistent with previous evidence that even though granting women access to economic and political rights may ultimately benefit men, extension of power is considered zero-sum (Brulé 2020). While incentives can change *de jure* legal rights, these rights do not lead to empowerment—at least in the short term—in the absence of changes to social norms that restrain women’s role within the household.

Our findings that *de jure* rights do not lead to empowerment have several implications. First, supplying formal property rights to women does not necessarily change their bargaining position within the household, perhaps because long-standing social norms do not change in response to these formal rights. Future work should focus on designing policies that both encourage inclusive property rights and seek to shift changes in intra-household power dynamics. Second, exploratory analysis of the impact of incentives to formalize women’s property rights on political participation also show no effect. Shifting a patriarchal equilibrium in property rights and politics requires more than financial incentives.

The rest of the paper is structured as follows: Section 2 sets out a brief conceptual framework and Section 3 describes the context in Myanmar. Section 4 describes our data, Section 5 lays out the empirical strategy, Section 6 documents our empirical results, and Section 7 concludes.

## 2 Conceptual Framework

An extensive literature in economics emphasizes the importance of property rights for investment, growth and market-oriented beliefs (Goldstein and Udry 2008; Besley and Ghatak 2010; De Soto 2001; Di Tella, Galiani and Schargrodsky 2007; Galiani and Schargrodsky 2010). However, in most patriarchal societies, restrictions on access to, control over, and ownership of immovable property (such as land and houses) is restricted to men (Agarwal 1994). Social norms and institutional barriers have prevented women from receiving the full benefits of more secure property rights. Many studies have documented the inability of

spouses to have their names included on household property and land titles (Brown 2003; Savath, Fletschner and Santos 2015; Valera et al. 2018). As a result, in many parts of the world, women have not been able to use household property to seek individual loans or start businesses that might provide them with economic autonomy.

The empirical literature on women's property rights has emphasized three outcomes.<sup>2</sup> First, scholars have documented a wide range of economic benefits of increased property rights security for women and their household members, in both urban areas (Field 2007) and in rural areas (Goldstein et al. 2018). These benefits include diversification of risk, increased access to credit, expansion of existing agricultural activities, establishment of off-farm business activities, and changes in expenditure, such as a greater emphasis on child health (Doss 2006; Field 2003; Galiani and Schargrotsky 2004; Hatlebakk and Gurung 2016; Agyei-Holmes et al. 2021).

Second, scholars have studied the non-economic political and social benefits of formal property rights, including on "empowerment," which is defined as the ability to take decisions about one's own life. These benefits may follow directly from the economic returns to formal property rights (e.g. Agarwal 1997; Field et al. 2021), or from non-economic changes, including changes in the allocation of time, social status, perceptions of self-efficacy, reductions in vulnerability to violence, or changes in decision-making within the household (Panda and Agarwal 2005; La Ferrara and Milazzo 2017; Harari 2019). Measuring changes in empowerment has proven challenging. New attempts exploit data collected from both partners within a couple (Donald et al. 2020) and qualitative and quantitative data on women's experiences (Jayachandran, Biradavolu and Cooper 2021). These efforts underline the importance of understanding political institutions not only as reflecting and transforming individual characteristics and preferences, but also as a product of intimate relationships, especially those within the household.<sup>3</sup>

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<sup>2</sup>See Meinzen-Dick et al. (2019) for theoretical pathways by which women's property rights are related to a variety of outcomes, including complex feedback loops.

<sup>3</sup>For example, Cheema et al. (2021) show that in Pakistan men effectively act as gatekeepers of their wives political behaviour, with the implication that theories of women's political power must take "private"

Third, some studies have found that women's acquisition of formal property rights may engender backlash against these changes in women's relative economic power or established (male-oriented) social norms. For example, Roy (2015) finds that institutional changes do not necessarily lead to greater property rights for women in India, because of backlash against increased women's economic power, and may even lead to female foeticide (Bhalotra, Brulé and Roy 2020).

Empirically, what this means is that the effects of formal property rights for women are ex-ante ambiguous. While there are reasons to expect increases in women's economic and non-economic outcomes, it is also possible that, if decision-making by household members follows traditional gender roles regardless of the *de jure* economic power of either party, then the introduction of formal property rights will not lead to changes in decision-making. We expect such status quo biases to be stronger in places where pre-existing gender norms are particularly strong or where historical circumstances favored a strongly gendered division of labor.<sup>4</sup> In an important recent paper, Rangel and Thomas (2019) find that property rights do lead to greater bargaining power for women and efficient intra-household allocation of resources when the family structure is simple (monogamous couples without co-resident children), but that efficient allocation declines as household structures become more complex.

This conceptual framework generates the following observable implications which we aim to test with our data:

- ***Hypothesis 1:*** *Households exposed to financial incentives to split their land across multiple plots will include more women with property rights in their name than unexposed households.*

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household dynamics into account to fully understand the “public” politics most often considered the legitimate domain of political science research.

<sup>4</sup>Prior research has demonstrated, for instance, that agricultural areas where the plough was more likely to be used led to a preponderance of male labor in agriculture, resulting in lower female labor force participation in non-agricultural domains as well (Alesina, Giuliano and Nunn 2013; Carranza 2014).

- **Hypothesis 2:** *Women in households exposed to financial incentives to split their land will report higher levels of economic participation, including more loans in their name, compared to women in unexposed households.*
- **Hypothesis 3:** *Women in households exposed to financial incentives to split their land will report increased economic benefits, including agricultural income and revenue, compared to women in unexposed households.*
- **Hypothesis 4a:** *Women in households exposed to financial incentives to split their land will report higher levels of agency, including more participation in household decision-making on agricultural matters, compared to women in unexposed households.*
- **Hypothesis 4b:** *Women in households exposed to financial incentives to split their land will be willing to sacrifice less to control an unconditional transfer to the household, given that they already exert more control over decision-making, compared to women in unexposed households.*

While our conceptual framework has important implications for economic activity and decision-making within the household, the model has less to say about whether changes in women's formal property rights will lead to changes in power dynamics outside the household. The existing literature on democratization and political participation finds that historically, more equal land rights are related to increases in demands for democracy (Ansell and Samuels 2010; Albertus 2015; Albertus, Brambor and Ceneviva 2018). To see whether reducing formal property rights inequality within the household can also decrease political inequality, we test the following hypothesis:

- **Hypothesis 5:** *Women in households exposed to financial incentives to split their land will be more likely to report political participation than women in unexposed households.*

Empirically estimating the relationship between women's property rights and economic or social outcomes is complicated by the fact that underlying household characteristics (structure, norms, ideology) could shape both whether women have formal property rights and



what their outcomes look like. A different challenge is that changes in economic or social outcomes could, in turn, lead to changes in formal property rights, e.g., women entrepreneurs may be more likely to pursue property rights to better insulate their operations from expropriation, rather than property rights leading to entrepreneurship. Previous work has struggled to untangle these complicated causal pathways because of the difficulty of exogenously assigning property rights and land titles. The benefit of the MADB's loan policy, which we describe in more detail below, is that it provides an exogenous incentive for allocating formal land titles to women, which enables us to overcome these issues of omitted variables bias and reverse causality.

### 3 Property Rights and Bank Lending in Myanmar

#### 3.1 Property Rights in Myanmar

All land in Myanmar is owned by the Myanmar state. The central government allocates long-term usage rights, which can be exchanged, sold, and mortgaged, and therefore are akin to private property rights. Throughout this paper we refer to these usage rights as "property rights" for simplicity's sake. This land can be taken back by the local authorities for eminent domain or when the lease is violated by the user, but such cases are relatively rare (Rhoads 2018).

The documents that provide the strongest property rights are the *Land Grant* for urban settings and *Form 7* for agricultural settings (like the Ayeryawaddy region, where our data was collected). *Form 7* is often referred to as a land-use rights certificate (LURC) to denote that it provides tenure security (Mark 2016). While the LURC is formally limited to agricultural work, in practice non-farm activities often take place on *Form 7* land. In a recent survey of businesses with *Form 7* titles, only 4% listed their primary sector as agriculture,

with the rest listing manufacturing, retail trade, and services (Malesky, Dulay and Peltovuori 2020).<sup>5</sup>

Myanmar's colonial history, as well as intermittent conflict between the state and armed groups in certain regions, has led to the uneven proliferation of documented property rights throughout the country. In addition to Land Grants and LURCs, households also hold other land documents that in most cases do not offer the same protection of property rights. For instance, many citizens claim to have a Form 105 as their primary documentation. However, Form 105 is merely a prerequisite to acquiring a Form 7. It lists the name of the owner or lessee, the plot number, the status of the land (commercial, government, or agricultural), the land type, and it often includes a map of land boundaries. Form 106, another common document, is only a legal documentation of the land's history. Form 15 is a sublet of primarily agricultural land, and Form 39 allows the transfer of agricultural land to other uses, and can eventually be upgraded to a Land Grant. Forms 105, 106, 15, and 39 do not independently have the same exchange or mortgage privileges as a Land Grant or Form 7 and cannot be considered a secure title (UN Habitat 2019). It is also common in Myanmar for families to hold Form 7s with the names of previous owners, together with an informal contract that stipulates that the current holder bought the land from the previous owner. This informal contract, however, is not officially recognized as a tenure right by government authorities. Formal transfer of the Form 7 is required to secure the land plot (Mark 2016).

In January 2016, the Myanmar Parliament, under the control of the National League for Democracy, approved a new National Land Use Policy<sup>6</sup> following an extensive public consultation process that included domestic businesses, foreign investors, non-government organizations, and regional and ethnic political groups. The main goal of the new Land Use Policy was to harmonize existing land laws and guide the development of new land. The policy clarified the legal rules for obtaining Form 7 rights, registration of those rights in a cadastral map, and utilization of the rights for exchange and mortgage. Importantly for our

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<sup>5</sup>According to the 1953 Land Nationalization Act, Article 39, to change a parcel from "agricultural" to "nonagricultural" land, one must get permission from the State/Region Peace and Development Council.

<sup>6</sup><http://extwprlegs1.fao.org/docs/pdf/mya152783.pdf>

project, the policy provided assurance of equitable land access for smallholders and landless people, with consideration of customary tenure and gender equality (Mark and Belton 2020).

There is no legal prohibition on women's property registration or joint registration on a Form 7 in the 2016 National Land Policy. In practice, however, joint registration is limited and few women have documented rights to agricultural land. According to very limited data on farmland certification in Myanmar, 80% of farmland certificates have only a man's name listed (Namati 2016). In many cases, cultural norms about women's roles in Myanmar society limit equal access to formal property rights. This cultural norm can be visually observed in the small space available for the listing of names on the LURC. Without extremely small penmanship, it is difficult to display the names of both a husband and wife on the certificate. In our survey, 13% of respondents from landed families expressed the view that only men's names should be on the land certificates since men were the main decision makers for the household, and a similar fraction of respondents also expressed the view that having two names on a land certificate would lead to conflicts between the couple. These attitudes were shared by land officials as well, constituting a further barrier towards formal land ownership by women: 22% of land officials in our survey expressed the view that women should never make decisions about household plots and only 50% believed that a woman's name should be included in the land document.

### 3.2 Rural Bank Lending in Myanmar

While small private banks, micro-lenders, and other actors do exist, the dominant source of agricultural lending in the country is the Myanmar Agricultural Development Bank (MADB), which accounts for between 60 to 90% of bank lending in rural parts of the country (Win 2013). The MADB is a government-owned entity, which is required by a 1997 statute to return 75% of its profits back to state co-ops. Currently, MADB has 206 branches throughout the country and over two million customers.

To obtain an MADB loan, a potential recipient must present evidence of a Form 7 for the plot where they wish to deploy the money, verification of a savings account at MADB, participation in a lending group, and approval by a village loan screening committee regarding the viability of the project (Aung, Nguyen and Sparrow 2019). The average interest rate on MADB agricultural loans is about 0.71% per month or approximately 8.5% per annum (Luna-Martinez and Anantavrasilpa 2014). Strict lending criteria, including Form 7 possession, have ensured very high repayment rates for MADB. The bank accounts for less than 35% of total outstanding rural loans in the country, despite providing well over 60% of the total lending.

Loan sizes increase incrementally with plot size. Loan recipients receive 100,000 Kyat (about USD 100) per acre for paddy production (and 20,000 Kyat for other crops), up to a maximum of ten acres, and any plot above ten acres in size is still only entitled to the maximum loan of 1 million Kyat. Additional loan amounts require a separate Form 7 in the name of a different party. Aung, Nguyen and Sparrow (2019) verify the immediate effect of the policy, showing that farms just above the ten acre threshold receive loan sizes that are USD 18-24 per acre less than for those just below the threshold—up to a 25% reduction in loan size. However, they find no difference in the agricultural yield or income from the sale of rice on either side of the threshold.

The potential for increased access to credit creates a clear financial incentive for families with household plot sizes greater than ten acres to divide the land within the household, register the additional land with a Form 7, and apply for a new loan under the new household member's name. According to our own discussions in Myanmar and anecdotal conversations, most families decide to put the land in the female spouse's name for this purpose.

## 4 Data and Measurement

### 4.1 Research Ethics

Research ethics are a critical part of any study involving human subjects. In all aspects of the research process, investigators must carefully consider trade-offs between the potential costs and/or harms to research participants versus the benefits that can be generated by the findings. The research team, in collaboration with all implementation partners—including the local organizations Innovations for Poverty Action (IPA) Myanmar and Landesa, a land rights NGO with long established connections to Myanmar government and civil society—took several steps to ensure that the research was conducted ethically.

The research team consulted with and received feedback on all stages of this project from their respective universities, local partners, and funding organizations, including research design, survey creation, and project implementation. IRB approval was obtained from an affiliated university as well as IPA Myanmar, and permission for survey work was also obtained from the Government of Myanmar.<sup>7</sup> Perhaps most critically, for survey questions that might be understood to be sensitive, including questions about the dynamics of the relationship between husbands and wives, multi-part protocols were followed. Enumerators received special training on how to ask sensitive questions, which were administered privately so that women would be assured of the confidentiality of their responses. Respondents heard the questions read aloud over headphones and input their responses directly into the tablet. Finally, reporting mechanisms were put in place to manage any adverse events or challenges that may have arisen.

### 4.2 Household Survey

Our main source of data is a household survey conducted in the Ayeyarwaddy region of Myanmar from November 2019–January 2020. The survey was conducted across 128 ran-

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<sup>7</sup>University of Notre Dame Protocol #19-10-5608; IPA Protocol #14597; Ayeyarwaddy regional government decision No. 16 at the cabinet meeting No. (35/2019).

domly selected village tracts in 14 out of 26 townships in this region. Townships were selected as potential sites based on the availability of vacant land for a planned land-to-the-landless program in the region.<sup>8</sup>

Our budget allowed us to survey 2,534 households across these village tracts. Since we are interested in co-registration and other intra-household dynamics, our sample was restricted to households that had both a male and female head; single-headed households were excluded from our survey. Around one-third of survey respondents were landless households that were potential beneficiaries of the land-to-the-landless program, but since they did not yet possess land (and land registration was therefore not applicable to them), these households are excluded from our analysis.

The average age of our survey respondents was 48 for women and 51 for men, and households consisted of 4.6 members on average. The vast majority of women (79%) had only completed primary school but not secondary school; 17% of men had completed secondary school compared to only 11% of women (See Table 1, panel A).

The survey team was directed to survey at least two households with land ownership greater than ten acres in each village tract. Our main estimation sample consists of 1,657 households, in which both the man and the woman report non-zero ownership of land.<sup>9</sup> The median landholding reported in our estimation sample was 8 acres, the mean was 12 acres, the 5th percentile was 2 acres and the 95th percentile was 35 acres of land. Only 12% of households own more than two plots. For this sample, the distribution of landholdings reported by women was extremely similar to the distribution of landholdings reported by men (see histograms in Appendix Figure A.1). Note that there is a tendency to report land holdings in multiples of five, since the histogram shows distinct spikes in the frequency of reporting 5, 10, 15 or 20 acres.

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<sup>8</sup>Following the military coup of February 2021, the status of this program is uncertain.

<sup>9</sup>There were six households where men did not report landholding size while women did, and eight households where women did not report landholding size while men did. These are excluded from our analysis.

We administered a comprehensive survey module to the household in which the majority of questions were asked separately to both partners, enabling a comparison of their responses and assessment of each partner's individual knowledge of household activities. The survey included modules on the household's land holdings and associated land rights, agricultural activities (crop patterns, input choices, revenues), other economic activities within the household (including engagement in non-farm enterprises), legal literacy, and knowledge of land rights. Several modules that implemented measurements of women's empowerment were administered only to women, with strict confidentiality protocols in place (see section 4.1).

### 4.3 Land Distribution and Formal Land Rights

In our data, a very high proportion (88%) of households report possession of at least one Form 7, which, as explained above, is the formal legal title to agricultural land. Interestingly, more than 30% of plots with at least one Form 7 are reported to have multiple Form 7s associated with the plot as well. The most common reasons stated for such multiplicity are boundary differences between the landholder and the land authority (40%), acquisition of different parts of the plot from different owners or at different times (39%), and for the purpose of applying for multiple loans (8%).<sup>10</sup>

We observe significant gender differences between men and women regarding the existence of formal documentation of the household's land. To the question of how many Form 7s are associated with a given plot, men answer "don't know" on about 19% of a household's plots, compared to nearly 23% for women, a difference that is statistically significant. As a result, women respondents report 2.16 total Form 7 certificates in the household compared to 2.23 for men. In particular, women report 31.6% of plots to have multiple Form 7s, while men report 34.4%, a difference that is also statistically significant.<sup>11</sup>

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<sup>10</sup>These figures are based on respondent's reports for the first three plots.

<sup>11</sup>Here we assess statistical significance via a simple t-test comparing the responses of women versus men.

To measure women's formal land rights in our data, we use the following two indicators: a dummy variable for whether the female household head has her name on any Form 7 for any household plot (this could be co-registered with the male household head), and a dummy for whether the female head of household has only her name listed on the Form 7 for an entire plot (i.e., this variable reflects sole control over that plot for the female household head).

Women's formal claims to household land assets are very low in this setting. Only 9.4% of households have any Form 7 with the female household head's name on it, according to female respondents (men report this figure as 8.9%), and only 5.8% of households report any plot of land with the female head of household's name exclusively on that plot's Form 7 (Table 1, panel B).

#### 4.4 Economic Outcomes

We focus on indicators of economic participation for which the literature predicts improvement associated with an increase in formal access to land. These include indicators of financial access (the number of land-collateralized loans taken by the female and male heads of household) and indicators of economic activity and success (agricultural income generated by a given plot, engagement in a non-agricultural enterprise, and the revenue from such enterprises). Very few women report having taken out land-collateralized loans compared to men; the average number of such loans for women is 0.06 compared to 0.74 for men (Table 2, panel A). At the same time, in terms of economic activity, only 21% of men and 19% of women report being engaged in any non-agricultural activities, and the revenue from such activities is only about 5% of the revenue from agricultural activities.



Table 1: *Summary Statistics on Demographics and Women’s Property Rights*

|   | Female            | Male              | Total             |
|---|-------------------|-------------------|-------------------|
| Panel A: Demographics   |                   |                   |                   |
| Age of Respondent   | 48.44<br>(10.42)  | 50.81<br>(10.33)  | 49.62<br>(10.44)  |
| Respondent has Less than Primary Education                              | 0.0467<br>(0.211) | 0.0401<br>(0.196) | 0.0434<br>(0.204) |
| Respondent has at least Primary but Less than Secondary Education       | 0.785<br>(0.411)  | 0.722<br>(0.448)  | 0.753<br>(0.431)  |
| Respondent has at least Secondary Education                             | 0.111<br>(0.315)  | 0.172<br>(0.377)  | 0.142<br>(0.349)  |
| Number of Household Members   | 4.564<br>(1.642)  | 4.563<br>(1.642)  | 4.563<br>(1.642)  |
| Panel B: Formal Property Rights   |                   |                   |                   |
| Number of plots with nonmissing plot size                               | 1.543<br>(0.893)  | 1.549<br>(0.888)  | 1.546<br>(0.891)  |
| Total number of Form 7’s in hh  | 2.156<br>(1.685)  | 2.232<br>(1.821)  | 2.195<br>(1.756)  |
| Household has at least 1 Form 7 in Female HoH’s name (joint)            | 0.0940<br>(0.292) | 0.0892<br>(0.285) | 0.0916<br>(0.288) |
| HH has at least 1 Form 7 in Female HoH’s name (excl. and no other male) | 0.0575<br>(0.233) | 0.0586<br>(0.235) | 0.0580<br>(0.234) |

Notes: This table shows sample means for each variable separately by gender, as well as a combined figure; standard deviations are reported in parentheses. In all figures, the sample is restricted to those who report non-zero landholdings.

## 4.5 Measuring Women’s Empowerment

We use a range of indicators for women’s empowerment, since there is no single universally accepted measure for this concept. First, we compute an index of household decision-making for agricultural activities and related expenditures. We asked questions about women’s involvement in agricultural decisions such as hiring agricultural labor, livestock raising, gardening, choosing crops, and buying/selling/renting land, and whether decisions were made by the female head alone, jointly with another person, or wholly by another person. We code the woman as being involved in decision-making in a given domain if she makes decisions in that domain alone or jointly with someone else (see Appendix Table A.1 for summary statistics of

Table 2: *Summary Statistics on Economic Outcomes and Women's Empowerment Measures*

|  | Total              | Female             | Male               |
|--|--------------------|--------------------|--------------------|
| Panel A: Economic Outcomes   |                    |                    |                    |
| Number of Loans in Female HoH's Name (Land Collateralized)                   | 0.0580<br>(0.252)  | 0.0634<br>(0.265)  | 0.0527<br>(0.239)  |
| Number of Loans in Male HoH's Name (Land Collateralized)                     | 0.738<br>(0.708)   | 0.710<br>(0.693)   | 0.765<br>(0.723)   |
| Total Agricultural Revenue from Plots with Female Name on Form 7 (1000s MMK) | 3689.7<br>(5103.6) | 3747.1<br>(5352.0) | 3632.4<br>(4856.3) |
| Total Paddy Revenue from Plots with Female Name on Form 7 (1000s MMK)        | 3070.2<br>(5173.9) | 3084.0<br>(5400.4) | 3056.5<br>(4951.7) |
| Total non-Agricultural Income from Female HoH (1000s MMK)                    | 65.70<br>(349.7)   | 69.07<br>(366.6)   | 62.33<br>(332.0)   |
| Total Agricultural Revenue from all Plots (1000s MMK)                        | 2888.1<br>(7672.4) | 2727.8<br>(4701.6) | 3048.4<br>(9778.0) |
| Total Agricultural Revenue from all Paddy Plots (1000s MMK)                  | 2061.7<br>(7535.0) | 1910.3<br>(4443.2) | 2213.1<br>(9684.9) |
| Panel B: Women's Agency  |                    |                    |                    |
| Index of Female Agency in Agricultural Decisions (Standardized Sum)          | 0.197<br>(0.967)   | 0.106<br>(0.659)   | 0.287<br>(1.192)   |
| Index of Female Agency in Expenditure Decisions (Standardized Sum)           | -0.0215<br>(0.999) | 0.125<br>(0.787)   | -0.168<br>(1.156)  |
| Agriculture decisions index: Woman takes power                               | 0.651<br>(0.857)   |                    |                    |
| Agriculture decisions index: Husband gives power                             | 0.0311<br>(0.202)  |                    |                    |
| Agriculture decisions index: Wife and husband agree                          | 0.300<br>(0.646)   |                    |                    |
| Expenditure decisions index: Woman takes power                               | 2.312<br>(1.842)   |                    |                    |
| Expenditure decisions index: Husband gives power                             | 0.406<br>(0.872)   |                    |                    |
| Expenditure decisions index: Wife and husband agree                          | 1.203<br>(1.362)   |                    |                    |

Notes: This table shows sample means for each variable separately by gender, as well as a combined figure; standard deviations are reported in parentheses. In all figures, the sample is restricted to those who report non-zero landholdings.

each individual component). We sum all these components and construct a standardized index for agricultural decision-making (z-score obtained by subtracting the mean and dividing by the standard deviation).

Based on their self-reports, we find that female heads of household are rarely involved in decisions about land transactions or livestock raising, but much more involved in decisions regarding gardening or hiring labor (Appendix Table A.1). Interestingly, the standardized index of women's agricultural decision making as reported by men is significantly higher than the index reported by women (Table 2, panel B).

In a similar manner, we construct a second index of household decision-making based on questions about women's involvement in decisions relating to child care, health care, cooking, education, children's expenditure, food consumption, religious expenditure and fertility. Based on self-reports, women are more involved in these decisions relative to the agricultural sphere—with the exception of fertility decisions, where only 17% of women report being involved (Appendix Table A.1). Unlike before, where men reported higher female participation in *agricultural* decision-making, measures of women's involvement in *expenditure* decisions are considerably lower from men's reports relative to women's reports (Table 2, panel B).

Scholars of women's empowerment have recently emphasized the importance of "critical consciousness" of an individual who moves from being an object to a subject (with agency) who takes power (Donald et al. 2020). A valuable dimension of empowerment, then, is not only whether a women reports that she has the ability to control economic and social aspects of her life, but also whether she takes that power for herself as opposed to being permitted to exercise it in a circumscribed way. Previous work has found that households in which both partners agree on the woman's decision-making power experience significantly better outcomes in terms of family planning decisions, children's health outcomes, and domestic violence (Donald et al. 2020; Bussolo et al. 2021). We operationalize this by categorizing women who report higher levels of decision-making authority than their partners report

*about them* as “power-takers,” and women who report less decision-making authority than their partners report *about them* as “power-receivers.” If *both* partners report that the woman is involved in decision-making, we categorize these as domains in which the husband and wife agree, while domains in which both partners report no female involvement are not included in this measure. We find that, on average, both husband and wife report that the woman has *no* involvement in four out of five components of agricultural decision-making, while households report power-taking behavior in two out of eight components of expenditure decision-making (Table 2, panel B).

Finally, we also conducted an elicitation exercise designed to measure women’s demand for autonomy by asking how much money they would be willing to give up in order to retain sole control of a specific amount. This methodology is based on the idea that women with very little within-household autonomy would be willing to give up larger amounts to retain control (see details in Appendix B). Interestingly, despite the patriarchal nature of Myanmar society and the limited empowerment measured by the decision making indices, we find that a sizeable fraction of women in our survey do not have a preference for sole control.

## 5 Empirical Strategy

### 5.1 Identification Using the Bank Lending Policy

To examine the effect of formal land rights on women’s economic outcomes or empowerment, we cannot simply compare these outcomes across households in which the female head has formally registered property rights and those in which she does not. Such a comparison would yield biased estimates due to selection effects and/or the endogeneity of formal land rights. If it is the case that only the most economically productive or otherwise empowered women manage to obtain formal titles to land, then our estimated association will overestimate the effects of formal land titling. On the other hand, if other family members are willing to allow land to be titled in a woman’s name only if she is otherwise disempowered within the household, then this comparison would underestimate the strength of the relationship. What

we need for valid identification is a factor that leads to greater probability of formal titling in a woman’s name, but that is not correlated with the woman’s own characteristics. Such a factor is provided by the discontinuity in the MADB’s lending policies.

As described in Section 3, households that have more than 10 acres of land have an incentive to divide their land into multiple plots for the purpose of obtaining additional loan amounts, and registering those newly created plots under the name of a different member of the household (which is often the female household head). As stated in Hypothesis 1 above, we therefore expect households with land holdings greater than 10 acres to report a larger number of plots, a larger number of Form 7s, and a larger number of Form 7s registered with a woman’s name. We can also examine whether outcomes related to economic activities, women’s empowerment, and political participation are systematically different in households with land holdings above ten acres (hypotheses 2-5). However, since households with more than 10 acres of land are also likely to be different than those with less than 10 acres on other confounding dimensions—and these differences are likely to increase as we move further from the 10-acre threshold in either direction—we cannot trust broad comparisons between large and small landholders.

To this end, we examine the impact of financial incentives using a regression discontinuity design (RDD) to examine whether there is a sudden sharp increase in the landholding structure for households that are just above the ten acre threshold relative to those that are just below. Specifically, we run the following regression specification:

$$Y_h = \alpha_{RDD} + \beta_{RDD}AboveThreshold_h + f(Landholding_h) + \epsilon_h \quad (1)$$

where  $Y_h$  is an outcome measure for household  $h$ ,  $Landholding_h$  (the “running variable”) is the total land owned by household  $h$  (in acres) and  $AboveThreshold_h$  is an indicator that equals one if landholding is above ten acres.  $f()$  is a function that controls for any continuous relationship between total landholding size and our outcomes of interest, so that we are identifying only effects that vary discontinuously at the same threshold as our bank

lending policy. As has been argued in recent work, such RDD analyses should primarily focus on points close to the discontinuity (Stommes, Aronow and Savje 2021). We therefore restrict our sample to a narrow bandwidth of landholdings around the 10-acre discontinuity, and use a local linear polynomial for  $f()$ . To calculate optimal bandwidths, we use the algorithm from Calonico, Cattaneo and Titiunik (2014), which optimizes the tradeoff between greater precision obtained from a larger bandwidth (that retains more observations and hence more degrees of freedom for estimation) and greater bias generated by observations further away from the discontinuity. (Note that the optimal bandwidth is not constant across outcomes due to differences in the distribution of each variable.)

## 5.2 Validity of RDD Estimation Strategy

Before we examine the effects of these financial incentives, we verify that other important factors do not vary discontinuously at the 10-acre threshold. Appendix Figure A.2 shows how household characteristics such as the age/education of the household head and the number of household members change with land holdings. Note that these characteristics vary continuously at the 10-acre threshold, lending support to the assumption that our comparison is not confounded by differences in household characteristics on either side of the threshold.

We also examine whether the “running variable” (household land holdings) is smoothly distributed at the 10-acre threshold. We would be concerned if households strategically obtained land in order to exceed the loan policy cutoff, but we believe this to be unlikely in the Myanmar context, as land markets do not function very smoothly and land transactions are relatively rare events. It would also be quite illogical for families to strategically purchase land to cross the threshold, as the MADB policy guarantees there is no financial incentive to do so. Following the norms in the literature, we present a McCrary Density test in Appendix Figure A.3, and while the graph indicates a discontinuity of landholding size at the 10-acre threshold, we do not interpret this as evidence of sorting. Rather, we believe it results from

a natural bunching of self-reported landsize amounts at 10 acres (and other even integer values).

Since the incentive to sub-divide an individual plot is only active for plots *larger* than 10 acres, we employ an inclusive cut-off in all subsequent RD specifications. This means that households reporting exactly 10 acres of land are considered to be below the threshold, and only households reporting landholdings of greater than 10 acres are considered to be above the cut-off. With exactly 10 acres of land, MADB's lending policy confers no financial advantage for holding two 5-acre plots, for example, relative to a single 10-acre plot.

In addition, we sought to confirm that our methods are sufficiently powered to identify true effects in the data and to avoid Type-II estimation errors. Following Stommes, Aronow and Savje (2021), we conducted power calculations to determine the number of observations necessary within the optimal bandwidth to detect a minimum detectable effect of given size. We find that our sample size is sufficient to detect effects of 0.8 standard deviations at 80% power for 46% of our outcome variables among female respondents and 56% among male respondents. This proportion increases to nearly 80% for female respondents after decreasing power to 60% or increasing the effect size to 1 standard deviation (see Appendix Table A.2 for full summary tables by power and effect size).

## 6 The Impact of Financial Incentives on Land Rights, Economic Outcomes and Female Empowerment

### 6.1 Financial Incentives and Women's Land Rights

Our results provide empirical support for Hypothesis 1. As expected, we find that having more than 10 acres of land results in a significantly larger number of individual plots in the household, consistent with the hypothesis that the MADB lending policy incentivizes plot splits (Table 3, panel A, column 1). Households above the 10-acre threshold also have a

higher number of Form 7s, which are required if these plots are to be used as collateral for MADB loans (column 2).

Most importantly, households above the threshold are nearly 13 percentage points more likely to have at least one Form 7 with the female household head's name on it. Almost all of this increase is driven by Form 7s with the woman's name registered exclusively, as would be required for the lending policy (Table 3, panel A, columns 3 and 4). Since we asked all questions of men as well as women, we can also observe any differences between male and female reports, though here we find general agreement between sexes (as men above the cutoff also report more Form 7s with a woman's name; Table 3, panel B). Though the point estimates from men's responses are larger in magnitude than those from women's responses, the two are not statistically different from one another.

Table 3: *Financial Incentives Lead to Greater Formal Property Rights for Women*

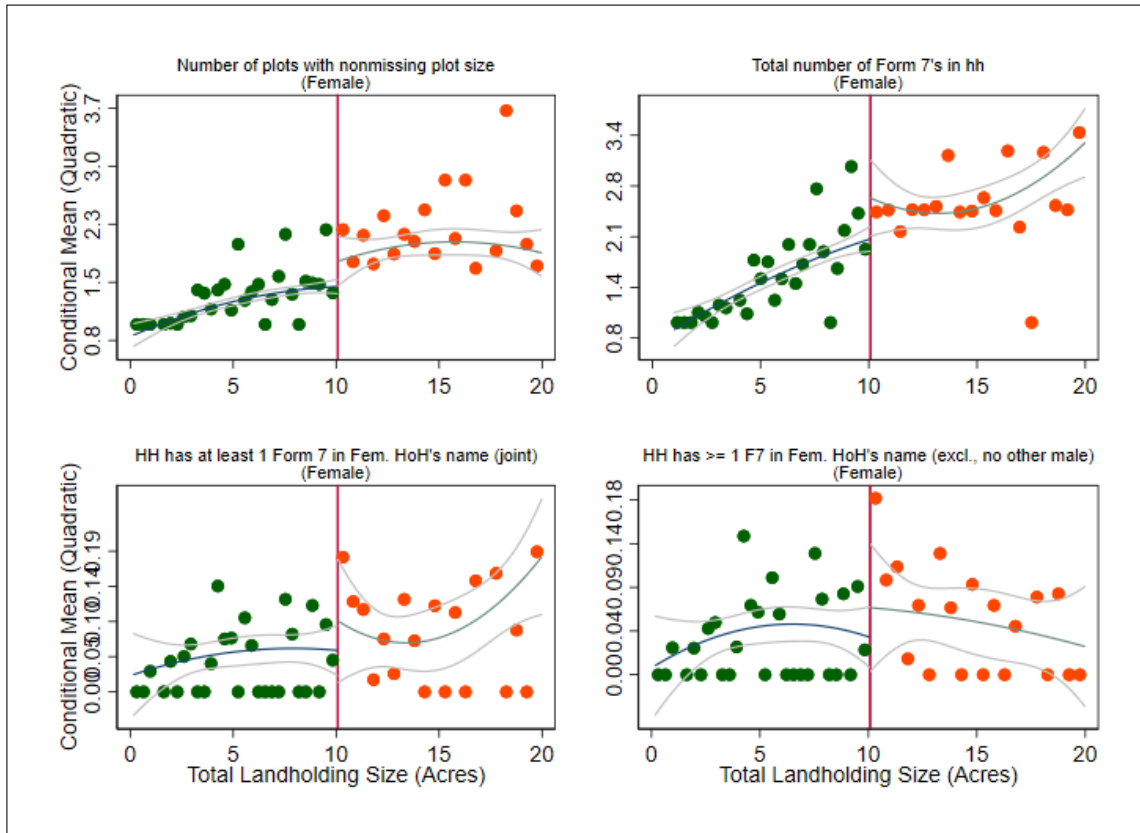
|                 | (1)                                       | (2)                         | (3)  | (4)   |
|-----------------|---|-----------------------------|--|---|
|                 | Number of Plots with nonmissing plot size | Total num. of Form 7s in HH | Household has at least 1 Form 7 in Female HoH's name (joint) | HH has at least 1 Form 7 in Female HoH's name (excl. and no other male) |
| Panel A: Female | 0.7794***<br>(0.2204)                     | 0.5975**<br>(0.2863)        | 0.1275*<br>(0.0709)  | 0.1289*<br>(0.0683)   |
| Control Mean    | 1.4464                                    | 1.9834                      | 0.0692   | 0.0530  |
| Observations    | 406                                       | 358                         | 427  | 421   |
| Bandwidth       | 2.1861                                    | 2.4529                      | 2.5860   | 2.5635  |
| Panel B: Male   | 0.7701***<br>(0.2187)                     | -0.0631<br>(0.2786)         | 0.1976*<br>(0.1039)  | 0.1997*<br>(0.1045)   |
| Control Mean    | 1.4384                                    | 2.0278                      | 0.0488   | 0.0463  |
| Observations    | 406                                       | 358                         | 427  | 421   |
| Bandwidth       | 2.1861                                    | 2.4529                      | 2.5860   | 2.5635  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RD effect estimates—with a cutoff defined at 10 acres—for females and males separately (restricted to couples that both report non-zero landholdings). Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. "Control Mean" is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while "Observations" indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. "Bandwidth" reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.



Our RDD results are presented graphically in Figure 1, where we show binned outcome values on both sides of the 10-acre threshold (with a quadratic relationship fit separately to either side) for female responses only. The graphs show a clear upward jump to the right of the 10-acre threshold for all measures of land holdings and property rights.

Figure 1: *Formal Property Rights Vary Discontinuously at the 10-Acre Threshold*



Notes: In each figure, the conditional mean of the indicated dependent variable is plotted for bins of fixed width in the running variable (Total Landholding Size). The horizontal red line indicates the RD cut-off at 10 acres, and separate quadratic lines are fit below the cut-off (between 0 and 10 acres) and above the cut-off (between 10 and 20 acres); 95% confidence intervals for the best fit lines are also indicated in gray. All plots are based on female responses only.

One potential objection to our analysis is that families with large plots may simply be more likely to sub-divide. Such a tendency would call into question the unique incentive caused by the MADB policy and the validity of the counterfactual assumption we make about households directly below the 10-acre threshold. In Appendix Figures A.8 and A.9, we test the validity of the 10-acre cut-off for both land and loan (see Section 6.2) outcome variables

by re-running the RDD specification at alternative cut-offs. The resulting coefficient plots clearly demonstrate that, for both male and female respondents, the results shown above are only statistically significant at the 10-acre threshold. For a range of other thresholds above and below 10 acres, there is no observable effect on land registration outcomes.

## 6.2 Financial Incentives and Economic Outcomes

We now explore whether the data support Hypothesis 2, that the financial incentives to split land will result in higher levels of economic participation for women. First, we expect that women directly above the 10-acre threshold will be able to take out more formal sector loans since they are more likely to have plots titled in their name. We find that this is indeed the case: women in households above the threshold report a higher number of land-collateralized loans (compared to those in households below the threshold), and this result is corroborated by men's reports (Table 4, panels A and B, column 1). Surprisingly, both men and women also report a higher number of loans in the male household head's name, though only the women's reports yield a statistically significant estimate (column 2).

Despite this higher access to formal sector loans, we do not find any increases in economic revenues, as also predicted by Hypothesis 2. We examine total revenue generated from plots with the female household head's name on the associated Form 7, as well as total revenue generated from all household plots (see Table 5). We find no significant differences for households with more than 10 acres of land compared to those with less. On the other hand, we do find a significant decline in total non-agricultural revenues earned by the female household head, suggesting that access to land-collateralized loans (which are reserved for agricultural use) may lead to greater focus on the agricultural sector, at the expense of other types of economic activity. The graphical representation of these loan and income variables can be seen in Appendix Figures A.4 and A.5.

Table 4: *Financial Incentives are Associated with Access to Credit*

|                 | (1)<br>Number of Loans<br>in Female HoH's Name<br>(Land Collateralized) | (2)<br>Number of Loans<br>in Male HoH's Name<br>(Land Collateralized) |
|-----------------|---|---|
| Panel A: Female | 0.1370*<br>(0.0721)   | 0.6089***<br>(0.2116)   |
| Control Mean    | 0.0321  | 0.8143  |
| Observations    | 407   | 406   |
| Bandwidth       | 2.2487  | 2.2173  |
| Panel B: Male   | 0.2971<br>(0.1921)  | 0.1396<br>(0.2171)  |
| Control Mean    | 0.0507  | 0.8877  |
| Observations    | 407   | 406   |
| Bandwidth       | 2.2487  | 2.2173  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RD effect estimates—with a cutoff defined at 10 acres—for females and males separately (restricted to couples that both report non-zero landholdings). Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. “Control Mean” is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while “Observations” indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. “Bandwidth” reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.

### 6.3 Financial Incentives and Women’s Empowerment

Thus far, we have shown that an exogenous financial incentive induces couples to transfer property rights to the women’s name, which in turn leads her to take out more formal loans. These results demonstrate the validity of our research design, confirming the underlying assumption that the MADB lending policy is actually incentivizing a transfer of property rights and increase in female borrowing. Though we do not see effects on downstream economic outcomes, we now examine whether formal property rights and credit access lead directly to higher levels of female decision-making within the household. Overall, we do not find any significant effects on these measures, falsifying Hypothesis 3. Table 6 shows the RDD results for several measures of women’s agency in agricultural decisions. Women in households with more than 10 acres of land report only a 0.07 standard deviation increase in their decision making index, which is statistically insignificant. We also find no significant

Table 5: *Financial Incentives Do Not Increase Revenues*

|                 | (1)<br>Log of<br>Total<br>Agricul-<br>tural<br>Revenue<br>from Plots<br>with<br>Female<br>Name on<br>Form 7 | (2)<br>Log of<br>Total non-<br>Agricul-<br>tural<br>Income<br>from<br>Female<br>HoH | (3)<br>Log of<br>Total<br>Agricul-<br>tural<br>Revenue<br>from all<br>Plots |
|-----------------|---|---|---|
| Panel A: Female | -1.7827<br>(3.5348)   | -1.6507*<br>(0.9908)  | 1.2346<br>(1.0245)  |
| Control Mean    | 10.4941   | 2.2528  | 11.6264   |
| Observations    | 78  | 474   | 575   |
| Bandwidth       | 6.2496  | 3.0490  | 3.4168  |
| Panel B: Male   | -2.3150<br>(3.2164)   | -1.8602**<br>(0.8807)   | -0.5980<br>(1.1825)   |
| Control Mean    | 12.1966   | 2.2347  | 12.3376   |
| Observations    | 78  | 474   | 575   |
| Bandwidth       | 6.2496  | 3.0490  | 3.4168  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RD effect estimates—with a cutoff defined at 10 acres—for females and males separately (restricted to couples that both report non-zero landholdings). Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. “Control Mean” is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while “Observations” indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. “Bandwidth” reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.

increases in women’s agency as reported by their male partners, and a marginally significant decline in the probability of women “taking power” within the household.

Similarly, in contrast to Hypothesis 4, we find no significant effects on women’s agency with regard to expenditure decisions (Table 7). This is not surprising given the lack of any effect on agricultural decision making, where we expected effects to be more likely ex-ante. The graphical representation of these empowerment outcomes can be seen in Appendix Figures A.6 and A.7. Consistent with these null results, we also do not find any impact of

Table 6: *Financial Incentives are Unrelated to Women's Agency in Agricultural Decisions*

|              | (1)<br>Index of<br>Female<br>Agency in<br>Agricul-<br>tural<br>Decisions,<br>Female<br>Response<br>(Standard-<br>ized Sum) | (2)<br>Index of<br>Female<br>Agency in<br>Agricul-<br>tural<br>Decisions,<br>Male<br>Response<br>(Standard-<br>ized Sum) | (3)<br>Agricul-<br>tural<br>Decisions<br>index:<br>Woman<br>takes power | (4)<br>Agricul-<br>tural<br>Decisions<br>index:<br>Husband<br>gives power | (5)<br>Agricul-<br>tural<br>Decisions<br>index:<br>Wife and<br>husband<br>agree |
|--------------|--|--|---|---|---|
| RD Effect    | 0.0692<br>(0.1402)   | 0.2557<br>(0.3355)   | -0.4048*<br>(0.2334)  | 0.1805<br>(0.1873)  | 0.3285<br>(0.3328)  |
| Control Mean | 0.0767   | 0.4219   | 0.6390  | 0.0686  | 0.3220  |
| Observations | 582  | 404  | 328   | 269   | 329   |
| Bandwidth    | 3.7372   | 2.3666   | 2.0112  | 1.8993  | 2.0293  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RDD estimates, with a cutoff defined at 10 acres. Sample is restricted to couples that both report non-zero landholdings. Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. "Control Mean" is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while "Observations" indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. "Bandwidth" reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.

formal property rights on the demand for autonomy, as measured by our demand elicitation survey (see Appendix B).

## 6.4 Financial Incentives and Political Engagement

Finally, as a test of Hypothesis 5, we explore the impact of formal property rights on political engagement. Specifically, we look for effects on four basic measures of political knowledge and behavior: whether participants could name political leaders in the Ayerawaddy regional government, whether they were planning to vote in the upcoming national election, whether they thought democratic processes were preferable to other forms of government, and their overall satisfaction with democracy in Myanmar. Overall, we find little to no effects. While we do not observe any evidence that women in households above the 10-acre threshold are more politically aware or have different democratic preferences, we note that men in such households are more likely to know the name of the village tract administrator (VTA). One

Table 7: *Financial Incentives are Unrelated to Women's Agency in Expenditure Decisions*

|              | (1)<br>Index of<br>Female<br>Agency in<br>Expend-<br>iture<br>Decisions,<br>Female<br>Response<br>(Standard-<br>ized Sum) | (2)<br>Index of<br>Female<br>Agency in<br>Expend-<br>iture<br>Decisions,<br>Male<br>Response<br>(Standard-<br>ized Sum) | (3)<br>Expend-<br>iture<br>Decisions<br>index:<br>Woman<br>takes power | (4)<br>Expend-<br>iture<br>Decisions<br>index:<br>Husband<br>gives power | (5)<br>Expend-<br>iture<br>Decisions<br>index:<br>Wife and<br>husband<br>agree |
|--------------|---|---|--|--|--|
| RD Effect    | 0.0015<br>(0.2301)  | 0.2832<br>(0.3013)  | -0.0265<br>(0.4309)  | 0.5677<br>(0.3691)   | 0.1862<br>(0.4035)   |
| Control Mean | 0.1026  | -0.1174   | 2.2359   | 0.4146   | 1.2821   |
| Observations | 432   | 399   | 572  | 328  | 404  |
| Bandwidth    | 2.7926  | 2.2088  | 3.2701   | 1.9801   | 2.1042   |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RDD estimates, with a cutoff defined at 10 acres. Sample is restricted to couples that both report non-zero landholdings. Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. "Control Mean" is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while "Observations" indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. "Bandwidth" reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.

possible explanation of this result is that these men may have spent time interacting with local officials, including the VTA, while transferring land titles into their wives' names. Given that we do not find effects of *de jure* property rights transfers on other economic or empowerment outcomes, this set of largely null results for women's political engagement is not unexpected.

## 7 Conclusions and Future Research

This paper uses an unintended consequence of a bank lending policy to examine the effects—on various economic and social outcomes—of an exogenous transfer of formal property rights to women, contributing to our understanding of how women gain economic and social power. Many anti-poverty programs aim to transfer assets or income streams to women (e.g., micro-finance programs often target women) and either explicitly or implicitly attempt to confer

Table 8: *Financial Incentives are Unrelated to Political Outcomes*

|                 | (1)                                       | (2)                      | (3)  | (4)  | (5)   |
|-----------------|---|--------------------------|--|--|---|
|                 | Name<br>CM of<br>Ayeyarwaddy<br>correctly | Name<br>VTA<br>correctly | Plan to<br>vote in<br>upcoming<br>National<br>election | Dem.<br>always<br>preferable<br>to any<br>other gov. | Satisfaction<br>with<br>democracy<br>in Myanmar |
| Panel A: Female | 0.0205<br>(0.0508)                        | 0.0067<br>(0.0552)       | -0.0941<br>(0.0695)                                    | 0.1472<br>(0.0921)                                   | -0.0468<br>(0.1133)                             |
| Control Mean    | 0.0581                                    | 0.9436                   | 0.9769   | 0.4410   | 1.8489  |
| Observations    | 586                                       | 572                      | 571  | 572  | 674   |
| Bandwidth       | 3.8880                                    | 3.2521                   | 3.2204   | 3.2591   | 4.3216  |
| Panel B: Male   | -0.0358<br>(0.0687)                       | 0.0299**<br>(0.0132)     | -0.0496<br>(0.0553)                                    | 0.0417<br>(0.1199)                                   | 0.0611<br>(0.1661)                              |
| Control Mean    | 0.1418                                    | 0.9638                   | 0.9922   | 0.6150   | 1.6779  |
| Observations    | 586                                       | 572                      | 571  | 572  | 674   |
| Bandwidth       | 3.8880                                    | 3.2521                   | 3.2204   | 3.2591   | 4.3216  |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RD effect estimates—with a cutoff defined at 10 acres—for females and males separately (restricted to couples that both report non-zero landholdings). Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. “Control Mean” is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while “Observations” indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. “Bandwidth” reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.

a more powerful role in decision-making. Our research explores what happens when women instead gain access to *de jure* power as the result of a government policy, moving beyond externally-financed donor-driven programs that are typically not sustainable.

Our results show that households strongly respond to financial incentives to give women legal control over land, which is often a household’s most important asset. However, despite what might be read as a large transfer of power within the household, *de jure* control over real assets is not sufficient to lead to a generalized increase in women’s decision making or autonomy. Programs that focus exclusively on economic empowerment overlook the entrenched politics that reinforce women’s limited role in economic decision-making. In our context, survey data from local leaders confirms the prior strength of these norms in Myanmar.

Our findings reinforce the conclusion that programs seeking to change power dynamics in the household will need to move beyond simple economic interventions. Even giving women legal control of large assets is insufficient in our context. Future research should explore the

costs and benefits of changing political dynamics in order to correctly address the trade-offs that both men and women face when power is redistributed within the household.



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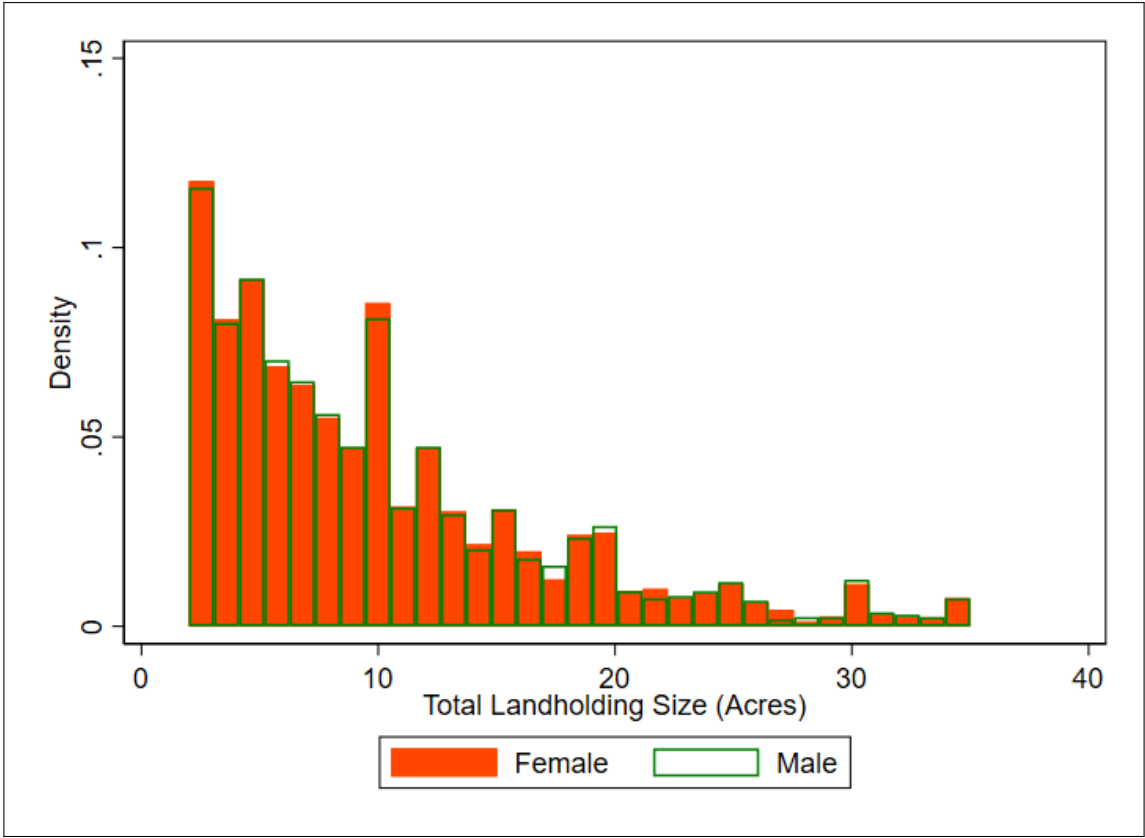
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# A Appendix A: Additional Figures and Tables

Figure A.1: *Distribution of Household Land Holdings, as Reported by Women and Men in our Survey*



Notes: This histogram shows the distribution of landholdings as reported by male and female heads of household in our survey; we restrict the sample to those reporting at least 2 acres and no more than 35 acres of land. The high degree of overlap between male and female reports shows that there was not much discrepancy in the size of landholdings as reported by the two household heads.

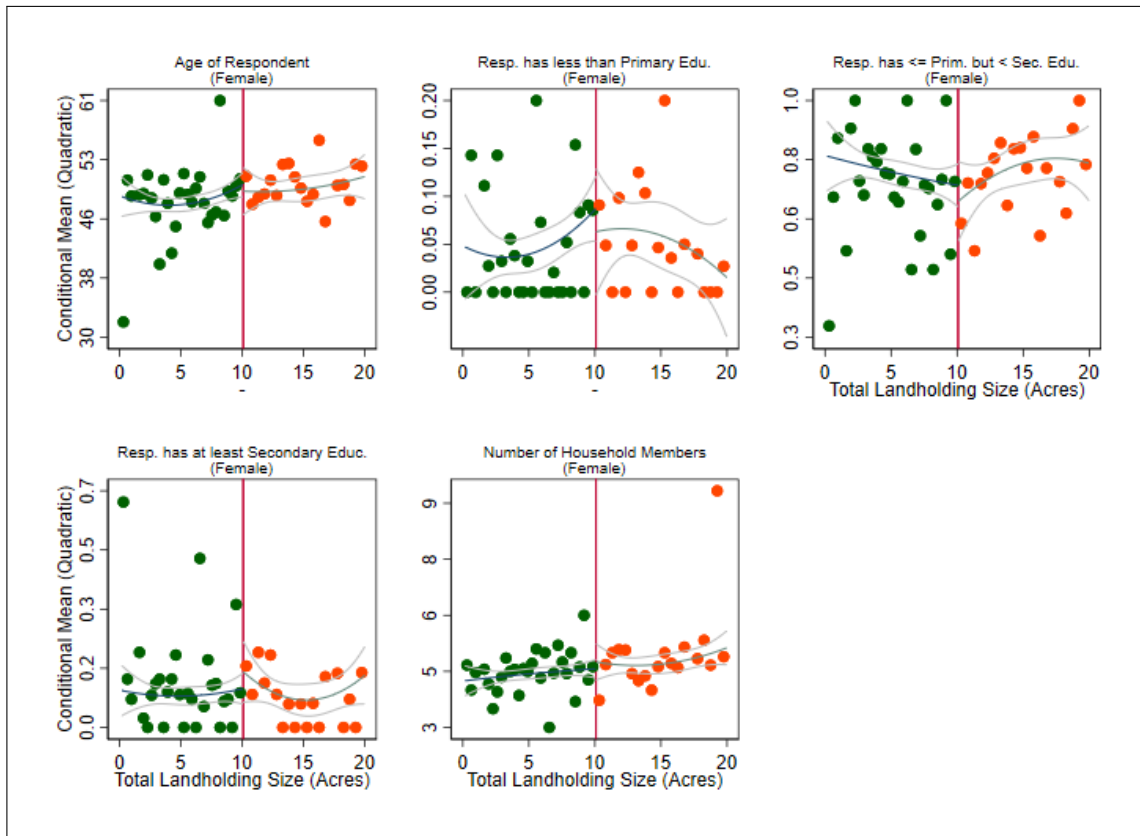
Table A.1: *Components of Decision-making Indices*

|  | Female            | Male             | Total            |
|--|-------------------|------------------|------------------|
| Panel A: Agricultural Decisions Index                                    |                   |                  |                  |
| Female HoH Involved in Decisions About Selling/Renting/Buying Land       | 0.0754<br>(0.264) | 0.261<br>(0.439) | 0.168<br>(0.374) |
| Female HoH Involved in Decisions About Livestock Raising                 | 0.0221<br>(0.147) | 0.273<br>(0.446) | 0.148<br>(0.355) |
| Female HoH Involved in Decisions About Gardening                         | 0.646<br>(0.478)  | 0.462<br>(0.499) | 0.554<br>(0.497) |
| Female HoH Involved in Decisions About Hiring Agricultural Labor         | 0.480<br>(0.500)  | 0.426<br>(0.495) | 0.453<br>(0.498) |
| Female HoH Involved in Decisions About Choosing Crops                    | 0.263<br>(0.441)  | 0.378<br>(0.485) | 0.320<br>(0.467) |
| Panel B: Expenditure Decisions Index                                     |                   |                  |                  |
| Female HoH Involved in Decisions About Child Care                        | 0.403<br>(0.491)  | 0.457<br>(0.498) | 0.430<br>(0.495) |
| Female HoH Involved in Decisions About Healthcare                        | 0.731<br>(0.444)  | 0.616<br>(0.486) | 0.674<br>(0.469) |
| Female HoH Involved in Decisions About Cooking                           | 0.966<br>(0.182)  | 0.484<br>(0.500) | 0.725<br>(0.447) |
| Female HoH Involved in Decisions About Expenditures for Education        | 0.529<br>(0.499)  | 0.536<br>(0.499) | 0.533<br>(0.499) |
| Female HoH Involved in Decisions About other Expenditures for Children   | 0.558<br>(0.497)  | 0.557<br>(0.497) | 0.557<br>(0.497) |
| Female HoH Involved in Decisions About Expenditures for Food Consumption | 0.906<br>(0.292)  | 0.711<br>(0.453) | 0.808<br>(0.394) |
| Female HoH Involved in Decisions About Religious Expenditures            | 0.861<br>(0.346)  | 0.732<br>(0.443) | 0.797<br>(0.402) |
| Female HoH Involved in Decisions About Fertility                         | 0.164<br>(0.370)  | 0.291<br>(0.454) | 0.227<br>(0.419) |

Notes: This table shows sample means for each individual component of the *Index of Female Agency* in both *Agricultural* and *Expenditure Decisions* for men and women separately, as well as a combined figure; standard deviations are reported in parentheses. In all figures, the sample is restricted to those who report non-zero landholdings.

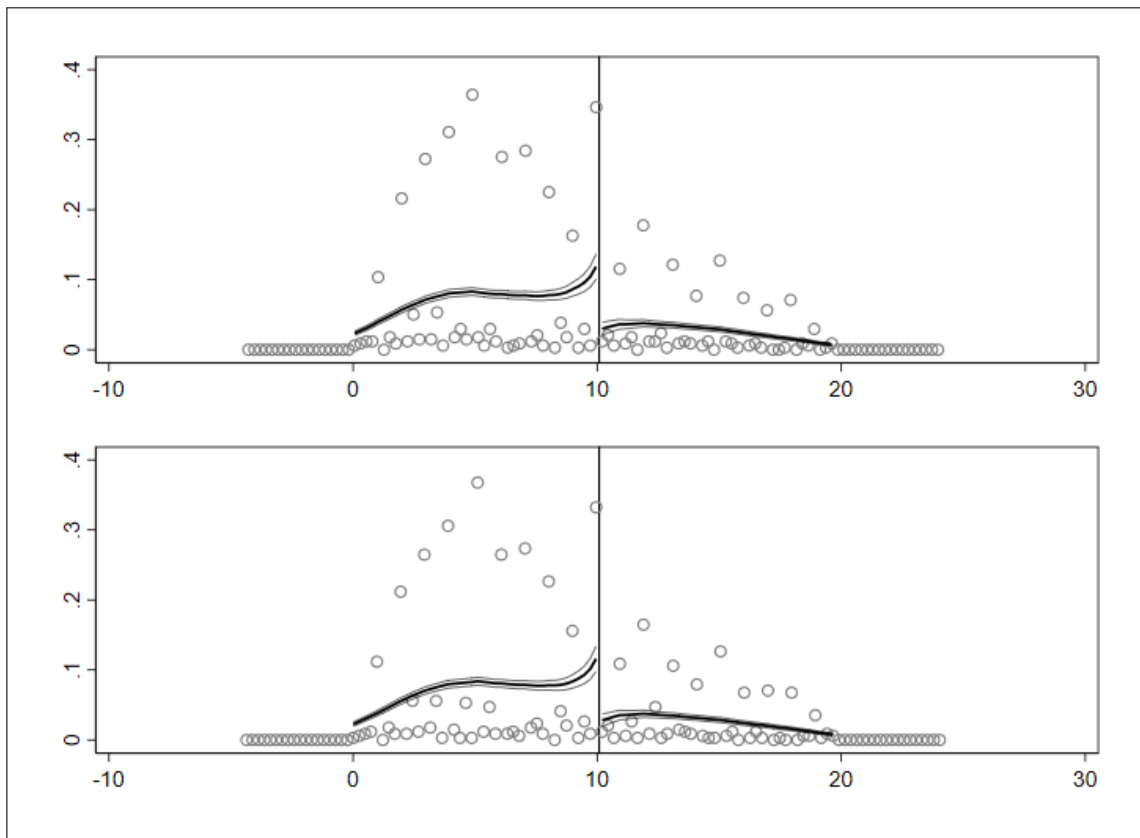


Figure A.2: *Household Characteristics Above and Below the 10-acre Threshold*



Notes: In each figure, the conditional mean of the indicated dependent variable is plotted for bins of fixed width in the running variable (Total Landholding Size). The horizontal red line indicates the RD cut-off at 10 acres, and separate quadratic lines are fit below the cut-off (between 0 and 10 acres) and above the cut-off (between 10 and 20 acres); 95% confidence intervals for the best fit lines are also indicated in gray. These figures show no evidence of discontinuities in relevant household characteristics.

Figure A.3: *Density of Landholdings as reported by Female and Male Heads of Household*



Notes: These figures represent McCrary style density tests for manipulation in the running variable. We plot the density of reported landholding size for female respondents (top panel) and male respondents (bottom panel) separately, with separate lines fit above and below the 10-acre cutoff. While these figures show patterns that are consistent with manipulation at the cutoff, we interpret this as evidence that reporting is bunched at integer values rather than evidence of intentional sorting.

Table A.2: *Power Calculations*

Female Responses

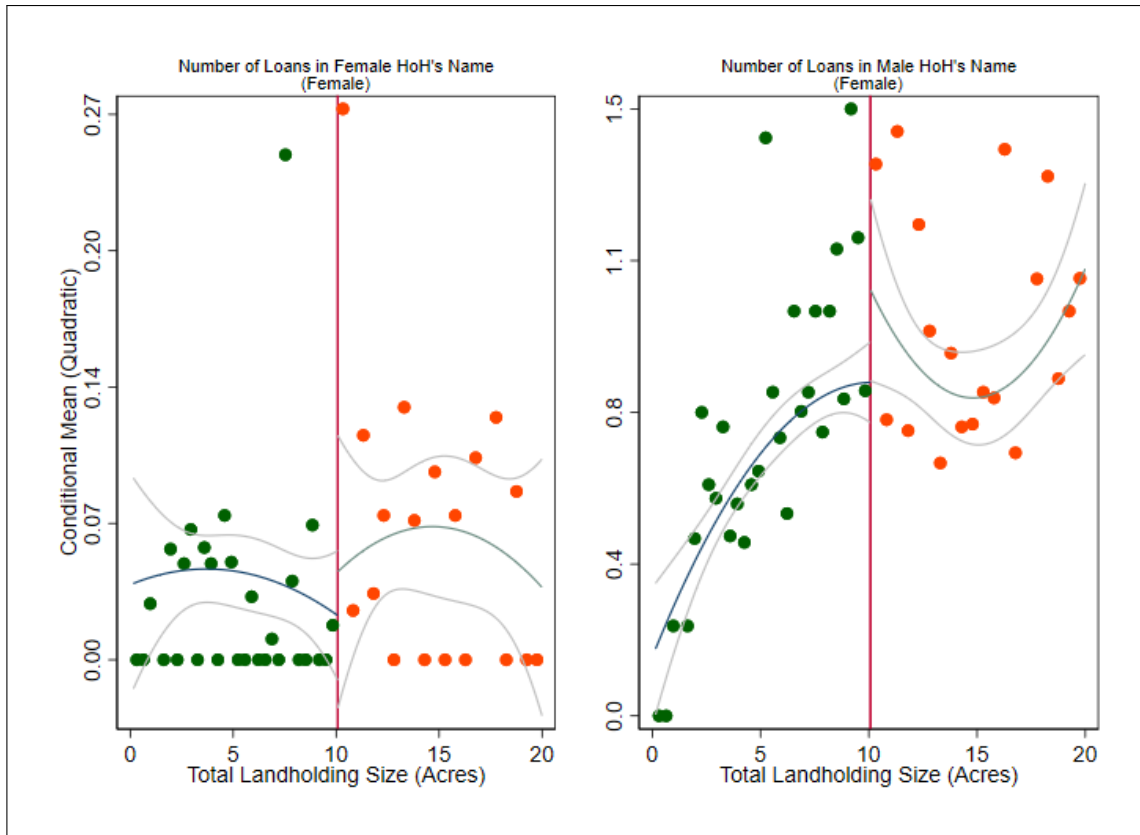
| E ffect Size | Power |      |      |
|--------------|-------|------|------|
|              | 60%   | 80%  | 95%  |
| 0.1          | 0.00  | 0.00 | 0.00 |
| 0.2          | 0.00  | 0.00 | 0.00 |
| 0.5          | 0.12  | 0.00 | 0.00 |
| 0.8          | 0.77  | 0.46 | 0.08 |
| 1.0          | 0.77  | 0.77 | 0.42 |

Male Responses

| E ffect Size | Power |      |      |
|--------------|-------|------|------|
|              | 60%   | 80%  | 95%  |
| 0.1          | 0.00  | 0.00 | 0.00 |
| 0.2          | 0.00  | 0.00 | 0.00 |
| 0.5          | 0.19  | 0.13 | 0.06 |
| 0.8          | 0.69  | 0.56 | 0.19 |
| 1.0          | 0.69  | 0.69 | 0.44 |

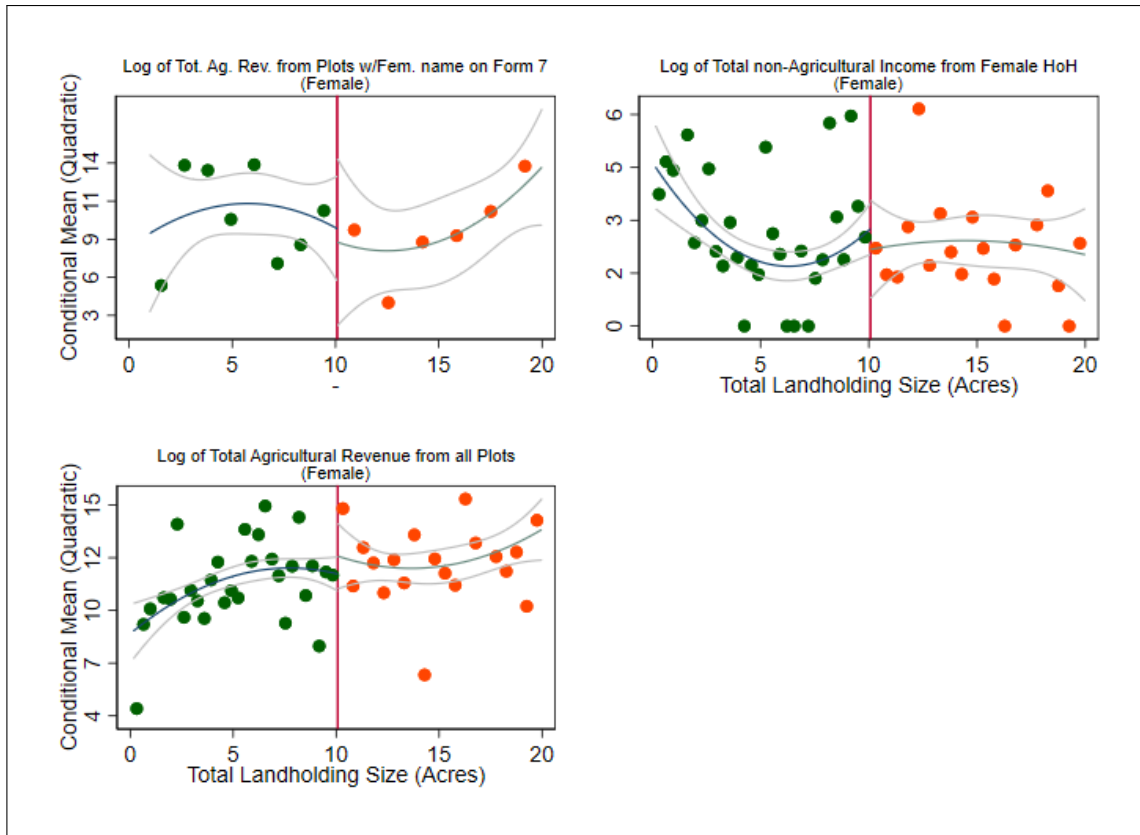
Notes: For any given e ffect size and power level, these tables indicate the proportion of outcome variables for which our e ffective sample size (as determined by the optimal bandwidth procedure in (Calonico, Cattaneo and Titiunik 2014)) is su fcient. Results are presented separately for Female and Male responses.

Figure A.4: *The Effect of Financial Incentives on Loan Outcomes*



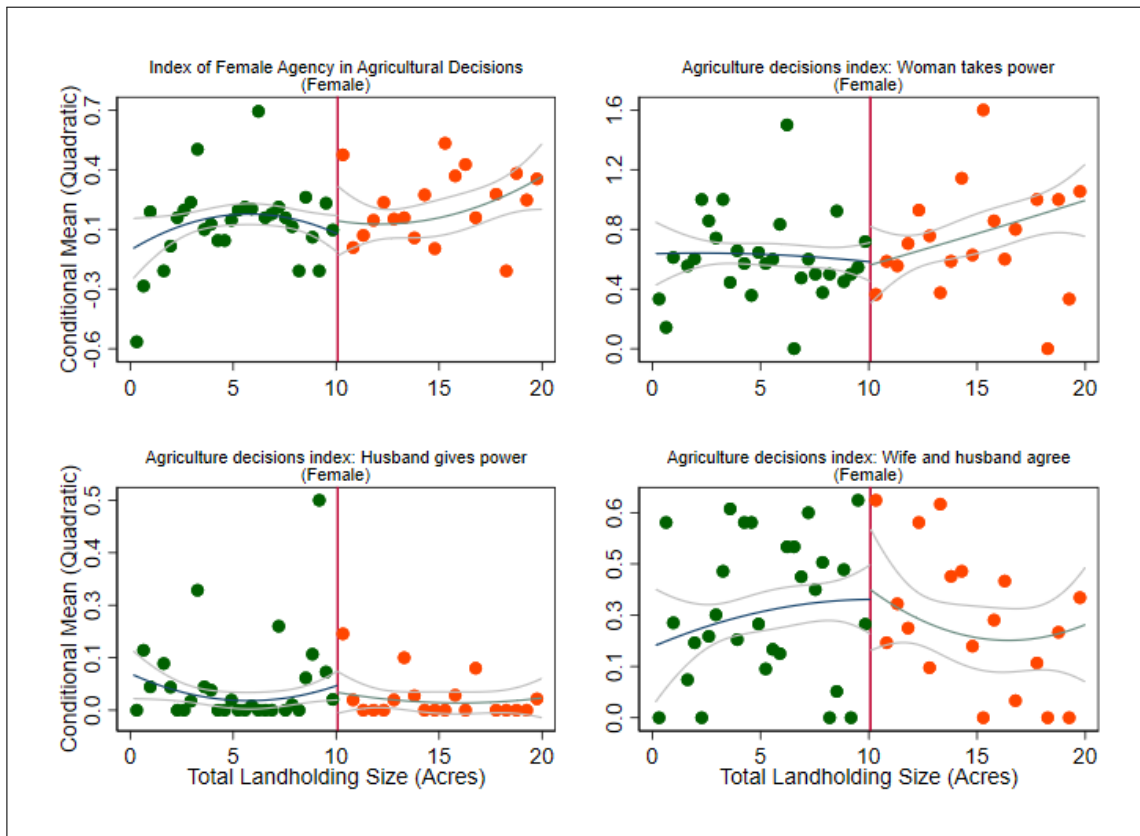
Notes: In each figure, the conditional mean of the indicated dependent variable is plotted for bins of fixed width in the running variable (Total Landholding Size). The horizontal red line indicates the RD cuto at 10 acres, and separate quadratic lines are fit below the cuto (between 0 and 10 acres) and above the cuto (between 10 and 20 acres); 95% confidence intervals for the best fit lines are also indicated in gray. All plots are based on female responses only.

Figure A.5: *The Effect of Financial Incentives on Economic Outcomes*



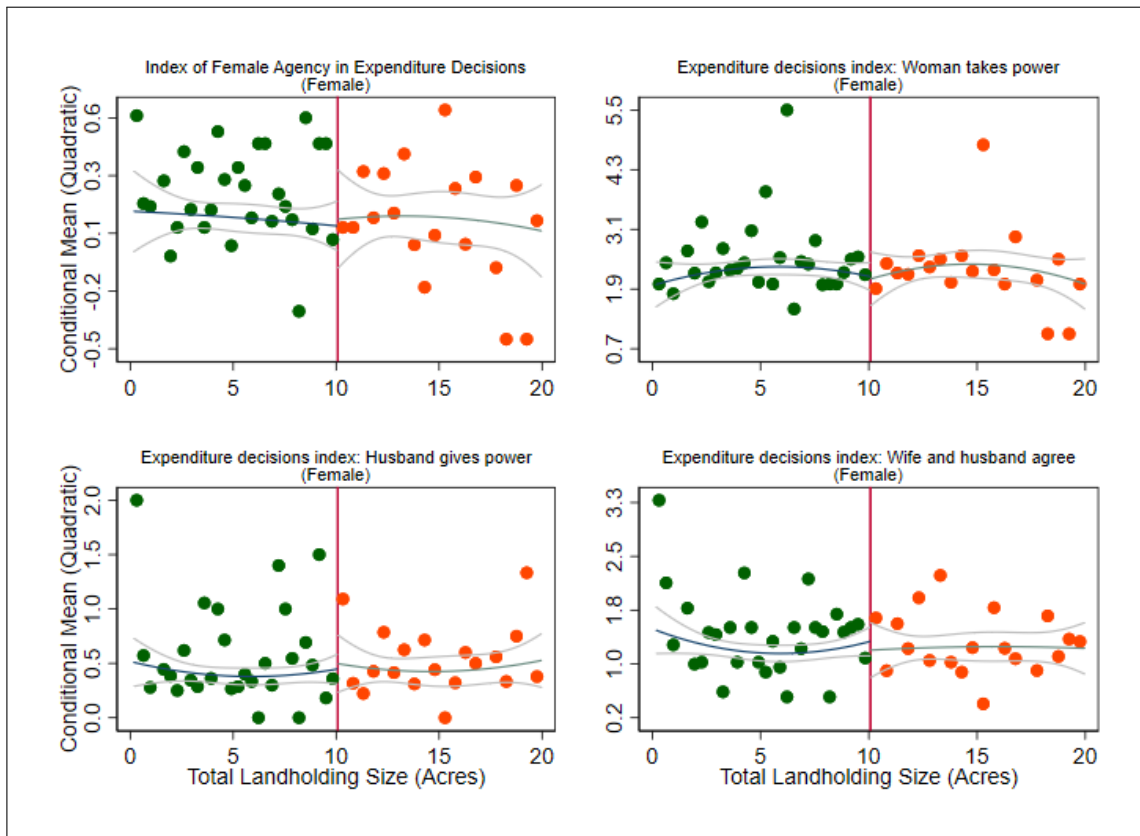
Notes: In each figure, the conditional mean of the indicated dependent variable is plotted for bins of fixed width in the running variable (Total Landholding Size). The horizontal red line indicates the RD cutoff at 10 acres, and separate quadratic lines are fit below the cutoff (between 0 and 10 acres) and above the cutoff (between 10 and 20 acres); 95% confidence intervals for the best fit lines are also indicated in gray. All plots are based on female responses only.

Figure A.6: *The Effect of Financial Incentives on Female Agency: Agricultural Decisions*



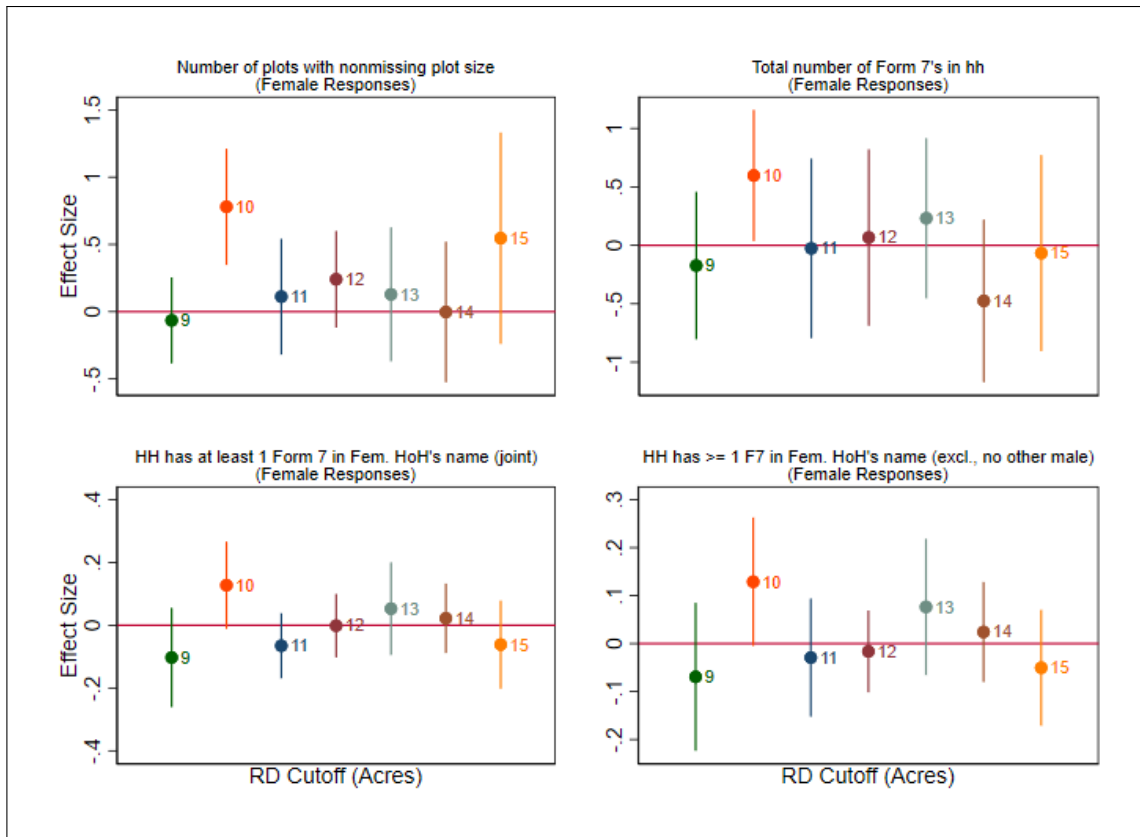
Notes: In each figure, the conditional mean of the indicated dependent variable is plotted for bins of fixed width in the running variable (Total Landholding Size). The horizontal red line indicates the RD cutoff at 10 acres, and separate quadratic lines are fit below the cutoff (between 0 and 10 acres) and above the cutoff (between 10 and 20 acres); 95% confidence intervals for the best fit lines are also indicated in gray. The aggregate index for agricultural decisions presented in the first panel is based on the female responses only. The remaining power indices are defined from a combination of male and female responses.

Figure A.7: *The Effect of Financial Incentives on Female Agency: Expenditure Decisions*



Notes: In each figure, the conditional mean of the indicated dependent variable is plotted for bins of fixed width in the running variable (Total Landholding Size). The horizontal red line indicates the RD cuto at 10 acres, and separate quadratic lines are fit below the cuto (between 0 and 10 acres) and above the cuto (between 10 and 20 acres); 95% confidence intervals for the best fit lines are also indicated in gray. The aggregate index for expenditure decisions presented in the first panel is based on the female responses only. The remaining power indices are defined from a combination of male and female responses.

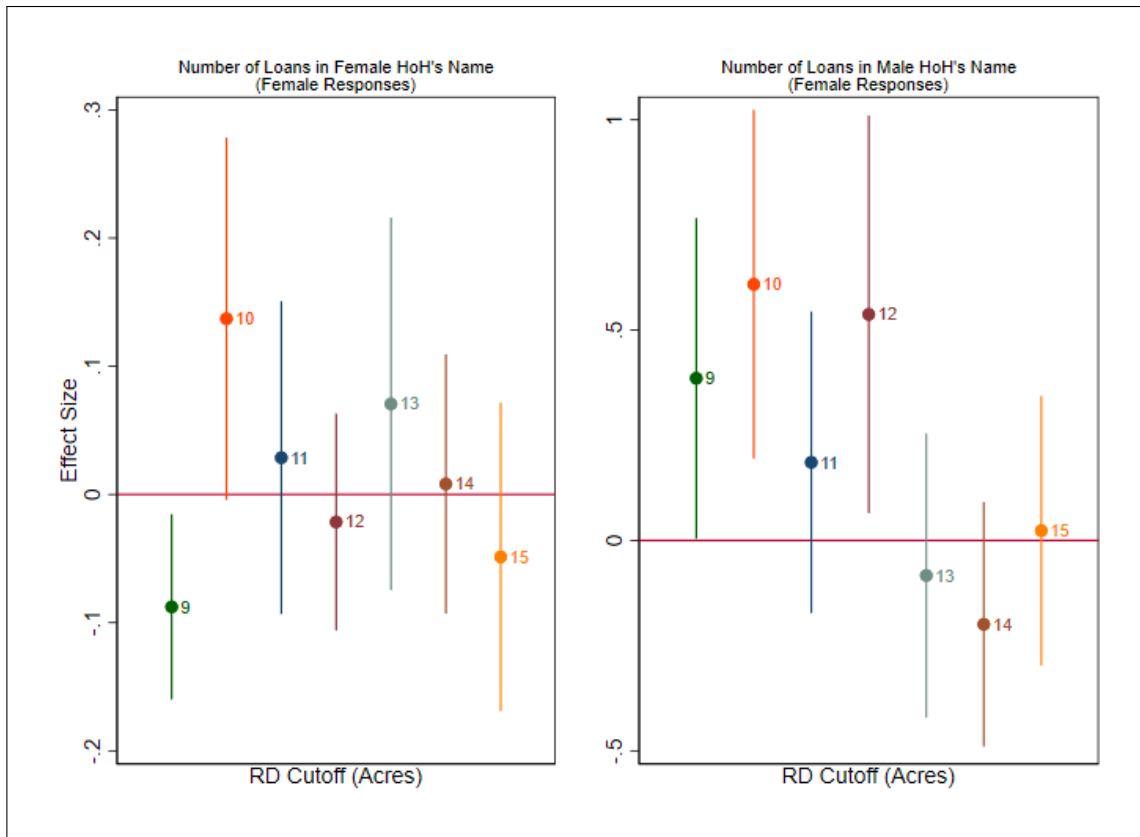
Figure A.8: Coefficient Plots for Land Outcomes



Notes: Each figure plots the RD Effect for the indicated outcome ( $\beta_{RDD}$  from Equation 1) Using 7 different cut-off points in the running variable (Total Landholding Size), ranging from 9 acres to 15 acres. For each different cut-off value, the point estimate for  $\beta_{RDD}$  is plotted along with the 95% confidence interval. All results are based on female responses only.

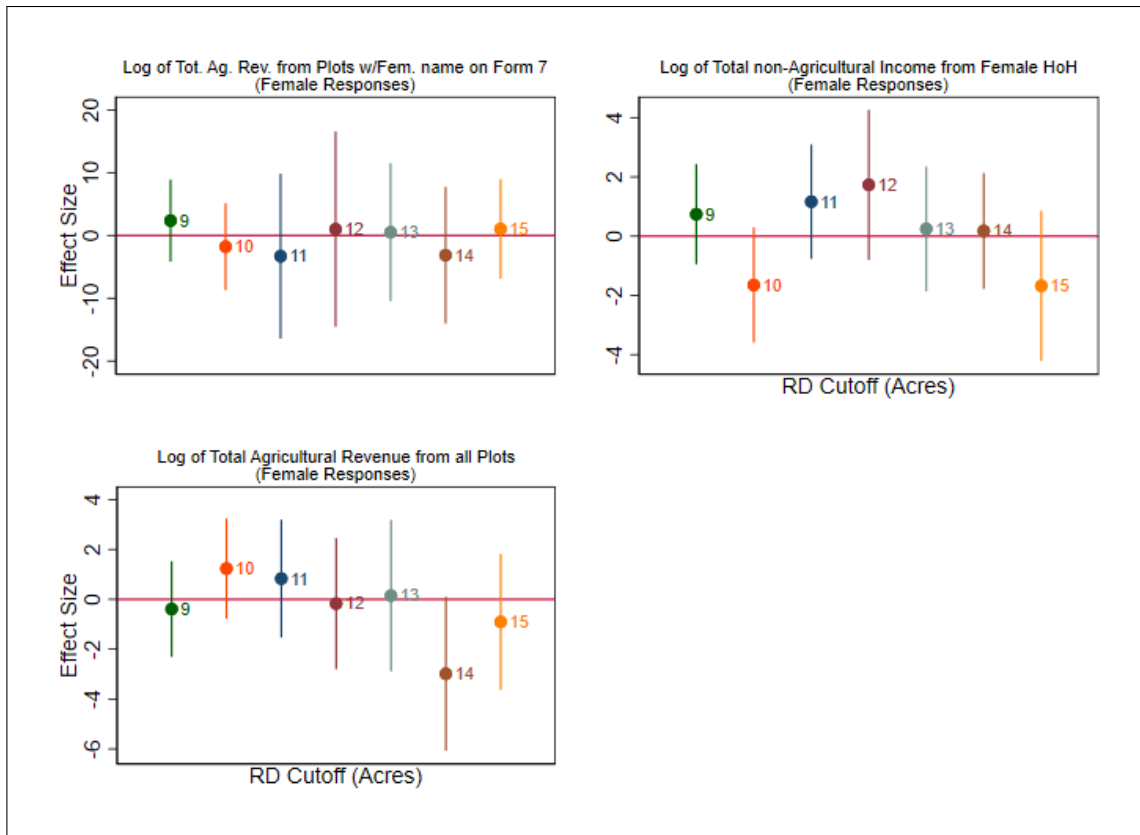


Figure A.9: Coefficient Plots for Loan Outcomes



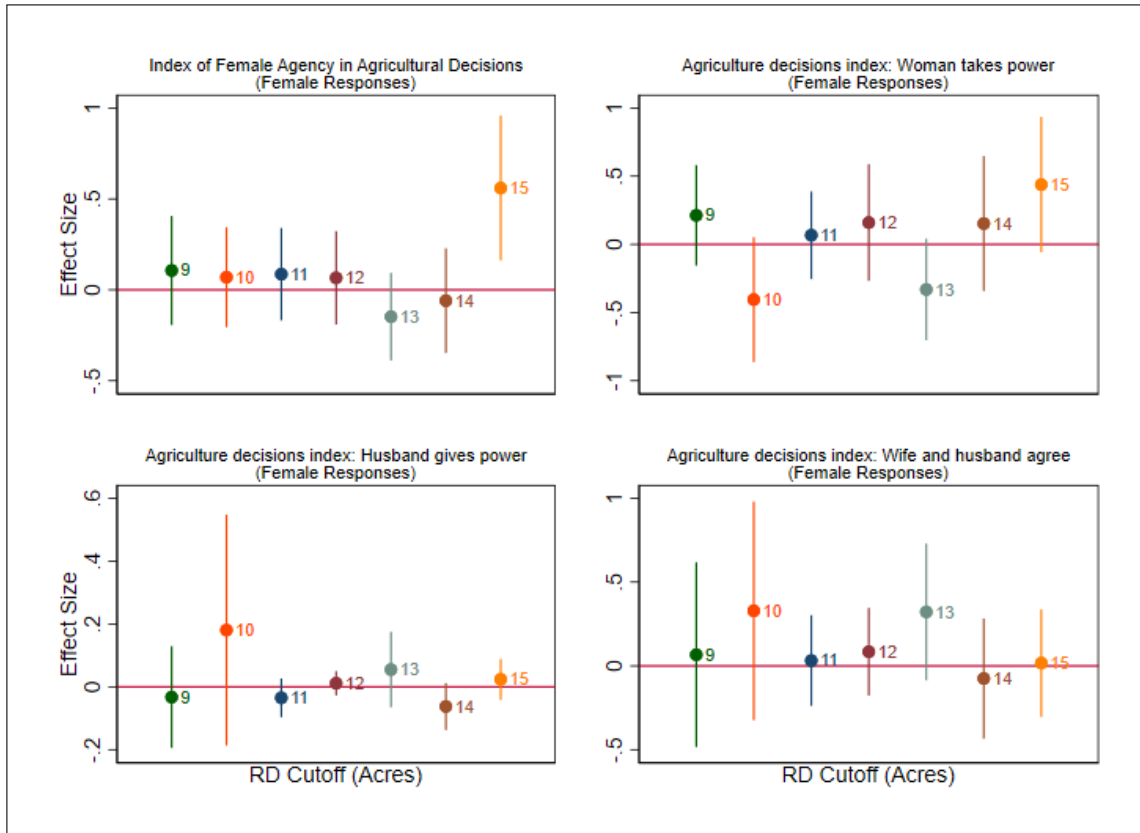
Notes: Each figure plots the RD Effect for the indicated outcome ( $\beta_{RDD}$  from Equation 1) Using 7 different cut-off points in the running variable (Total Landholding Size), ranging from 9 acres to 15 acres. For each different cut-off value, the point estimate for  $\beta_{RDD}$  is plotted along with the 95% confidence interval. All results are based on female responses only.

Figure A.10: Coefficient Plots for Economic Outcomes



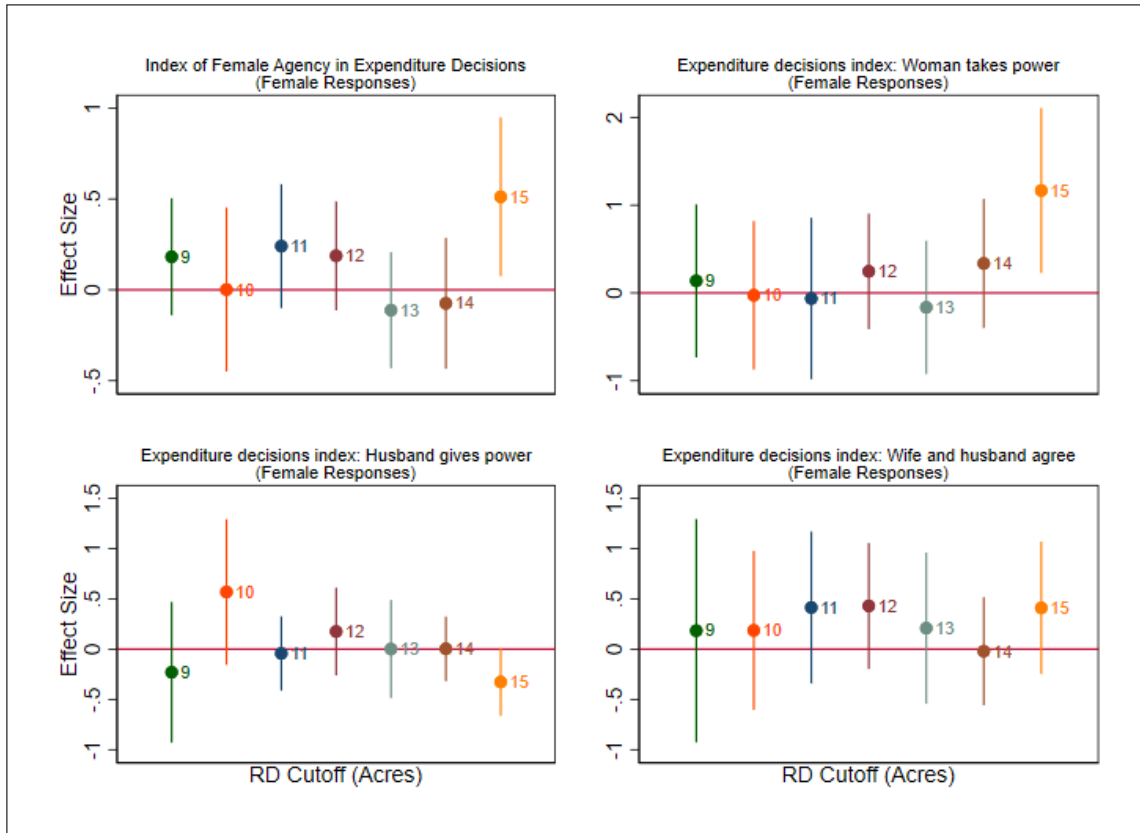
Notes: Each figure plots the RD Effect for the indicated outcome ( $\beta_{RDD}$  from Equation 1) Using 7 different cut-off points in the running variable (Total Landholding Size), ranging from 9 acres to 15 acres. For each different cut-off value, the point estimate for  $\beta_{RDD}$  is plotted along with the 95% confidence interval. All results are based on female responses only.

Figure A.11: Coefficient Plots for Agency Outcomes: Agricultural Decisions



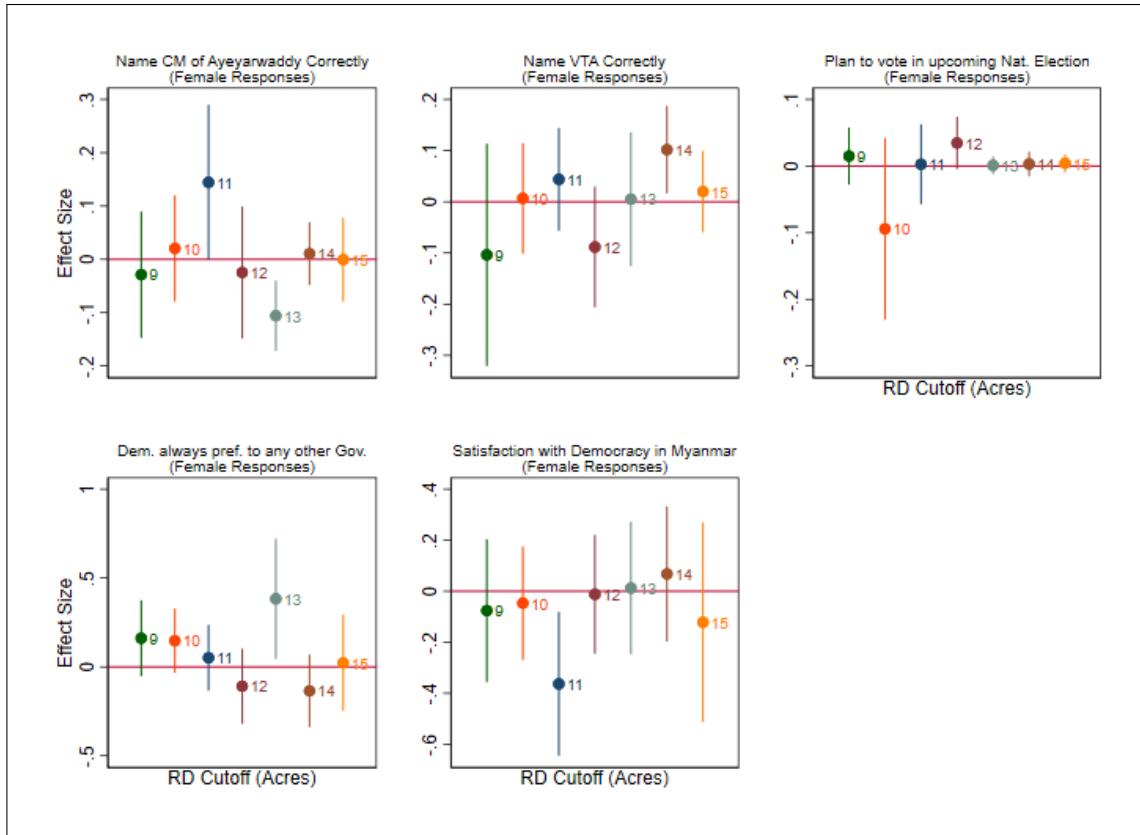
Notes: Each figure plots the RD Effect for the indicated outcome ( $\beta_{RDD}$  from Equation 1) Using 7 different cut-off points in the running variable (Total Landholding Size), ranging from 9 acres to 15 acres. For each different cut-off value, the point estimate for  $\beta_{RDD}$  is plotted along with the 95% confidence interval. The aggregate index for expenditure decisions presented in the first panel is based on the female responses only. The remaining power indices are defined from a combination of male and female responses.

Figure A.12: Coefficient Plots for Agency Outcomes: Expenditure Decisions



Notes: Each figure plots the RD Effect for the indicated outcome ( $\beta_{RDD}$  from Equation 1) Using 7 different cut-off points in the running variable (Total Landholding Size), ranging from 9 acres to 15 acres. For each different cut-off value, the point estimate for  $\beta_{RDD}$  is plotted along with the 95% confidence interval. The aggregate index for expenditure decisions presented in the first panel is based on the female responses only. The remaining power indices are defined from a combination of male and female responses.

Figure A.13: Coefficient Plots for Political Outcomes



Notes: Each figure plots the RD Effect for the indicated outcome ( $\beta_{RDD}$  from Equation 1) Using 7 different cut-off points in the running variable (Total Landholding Size), ranging from 9 acres to 15 acres. For each different cut-off value, the point estimate for  $\beta_{RDD}$  is plotted along with the 95% confidence interval. All results are based on female responses only.

## B Appendix B: Behavioral Measures of Empowerment

As part of the household survey, we collected information from a behavioral intervention designed to capture an aspect of women's economic empowerment. Building on the work of Almas et al. (2018), we elicited the amount (price) that women would be willing to pay in order to control a small cash transfer, following the intuition that women's willingness to pay more to control additional resources decreases when their control of existing resources is greater. Our game asked women to choose between keeping a certain sum of money for themselves (e.g., 2750 Kyat) versus giving a larger sum to their spouse (e.g., 3000 Kyat). This choice was repeated with different monetary amounts, until we arrived at the amount for which the woman was indifferent between keeping the smaller sum and giving away the larger sum. For instance, if a woman opted to keep 2750 Kyat for herself (as opposed to 3000 Kyat for her spouse), but did not prefer keeping 2500 Kyat, we infer that her willingness to pay for sole control is between 250 and 500 Kyat. Such an elicitation is based on the well-known Becker-DeGroot-Marschak demand elicitation mechanism.

We find that a sizeable fraction of the women in our survey do not have a preference for sole control, e.g., 10% of women would choose to hand over the entire amount of 3000 Kyat to their spouse rather than keep it for themselves and 30% of women would choose to do the same even when offered sole control over 3250 Kyat (indicating a negative willingness-to-pay for autonomy). These unexpected responses do not stem from a misunderstanding of the questions asked. We repeated the entire BDM elicitation mechanism with choices over land assets rather than cash, and obtained a similar pattern of results. In fact, the correlation between the willingness-to-pay (WTP) measures for cash and for land is a statistically significant 0.62. Interestingly, the correlation of these WTP measures with the self-reported measures of women's decision making involvement is extremely low (between  $-0.01$  and  $-0.05$ ). Recent empirical work from India also finds mixed results when comparing the results of the WTP game to both long qualitative interviews and a 70-question survey (Jayachandran, Biradavolu and Cooper 2021).

Table B.1: *Financial Incentives are Unrelated to Behavioral Game Outcomes: RDD Estimates*

|              | (1)<br>Amount<br>Willing<br>to Accept<br>for Autonomy<br>in Cash<br>Game (Min) | (2)<br>Amount<br>Willing<br>to Accept<br>for Autonomy<br>in Cash<br>Game (Max) | (3)<br>Amount<br>Willing<br>to Accept<br>for Autonomy<br>in Land<br>Game (Min) | (4)<br>Amount<br>Willing<br>to Accept<br>for Autonomy<br>in Land<br>Game (Max) |
|--------------|--|--|--|--|
| RD Effect    | -266.8435<br>(333.2297)  | -225.2355<br>(316.2007)  | -0.5131<br>(0.5804)  | -0.4969<br>(0.5743)  |
| Control Mean | 2417.9181  | 2583.2905  | 4.4625   | 4.6918   |
| Observations | 432  | 569  | 575  | 578  |
| Bandwidth    | 2.8857   | 3.1487   | 3.4049   | 3.4629   |

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . Coefficients represent the robust RDD effect estimates— with a cutoff defined at 10 acres—for females and males separately (restricted to couples that both report non-zero landholdings). Robust standard errors are shown in parentheses, and the dependent variable for each specification is indicated in the column header. “Control Mean” is defined as the average of the dependent variable for observations between the lower limit of the RD bandwidth and RD cutoff, while “Observations” indicates the total number of observations used for the RD estimate, i.e., the number of observations that fall within the chosen bandwidth. “Bandwidth” reports the size of the RD bandwidth (in acres), as calculated by the CCT optimal bandwidth procedure.