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Getting the (Gender-Disaggregated) Lay of the Land

Impact of Survey Respondent Selection on Measuring Land Ownership and Rights

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Abstract

Foundational to the monitoring of international goals on land ownership and rights are the household survey respondents who provide the required individual-disaggregated data. Leveraging two national surveys in Malawi that differed in their approach to respondent selection, this study shows that, compared with the international best practice of privately interviewing adults about their personal asset ownership and rights, the business-as-usual approach of interviewing the most knowledgeable household member(s) on adult household members' ownership of and rights to assets leads to (i) higher rates of exclusive reported and economic ownership of agricultural land among men, and (ii) lower rates of joint reported and economic ownership among women. Further, substantial agreement exists on agricultural landowners and rights holders, as reported by the privately-interviewed spouses. When discrepancies emerge, proxies for greater household status for women are positively associated with the scenarios where women attribute at least some land ownership to themselves.

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Produced by the Research Support Team

Getting the (Gender-Disaggregated) Lay of the Land: Impact of Survey Respondent Selection on Measuring Land Ownership and Rights

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1. Introduction

Individual ownership and control over assets — including land, housing, financial accounts, and durables — can help improve intra-household bargaining power and economic mobility through different channels (Doss, 2013). Assets can ease access to credit; help boost productivity and income; and provide security amid income shocks (Carter and Barrett, 2006). These channels have important implications for women in developing countries where there are significant barriers to their access to resources and economic opportunities - due to norms around inheritance, marriage, family and work (Glennerster et. al, 2018; Jayachandran, 2015), and where asset ownership can play an important role in their intra-household bargaining power (see Doss et. al, 2019, for a discussion).

Hence, accurate information on asset ownership and control among individuals can play an important role in informing policies on land reform and empowerment of individuals. Understanding gender differences in asset ownership and wealth can also reveal the extent of economic disadvantage accumulated by women over the life cycle and its inter-generational implications in a stratified social system, providing a longer-term overview of the gender dimensions of economic inequality and vulnerability (Oduro and Doss, 2018; Ruel and Hauser 2013; Warren, 2006).

Furthermore, key examples arise within crop agriculture, which employs a large share of the developing world, where smallholder farming is on the rise in part due to growing fragmentation of rural landholdings (Lowder et al, 2016; Deininger et. al, 2017a). Raising agricultural productivity among this smallholder base, including ensuring secure property rights through land reforms, has emerged as a critical policy concern across countries — but a clearer understanding of how land ownership and rights are distributed within households is needed to better understand how these efforts to boost agricultural productivity affect individuals. This is particularly important for raising economic opportunities for more vulnerable groups, including women, who play important but often less-observable roles in smallholder farming or contributing family work (see Koolwal, 2019, for a review), and who face substantial inequalities in ownership and rights over land.[2] Additionally, in contexts where formal documentation is limited and local customs determine how land holdings are managed within households and are assigned to individuals, a more disaggregated view of different types of ownership (legal versus economic, for example) and rights (selling or bequeathing, for example) is needed (Kilic and Moylan, 2016; Kang et al., 2020; Slavchevska et al., 2017).

[2] This is underscored by the Sustainable Development Goal Target 2.3: "By 2030, double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment."

Against the backdrop of sex-disaggregated indicators on individual land ownership and rights that have been endorsed as part of the monitoring of the Sustainable Development Goals (SDGs),[3] it is common for the required microdata to be provided by the most knowledgeable household member(s) interviewed by household and farm surveys - often a single respondent in each household (Doss et al., 2019; Doss et al., 2008; Deere et al., 2012; Ruel and Hauser, 2013). Under these circumstances, the surveys may not ask the most knowledgeable household member(s) to identify the individual owners and rights holders of each asset. As a result, (confounded) conclusions regarding the gender asset gap would be (and have been) anchored in the comparison of male- versus female-headed households.[4] And in the event that surveys do ask the most knowledgeable household member(s) to uniquely identify the reported, documented and/or economic owners for each asset of interest,[5] this information is seldom paired with the identification of individuals holding various rights to these assets. This in turn limits our understanding of the inter-relationships among ownership and rights indicators, and whether these relationships vary across individuals.

Recently, the international momentum behind improving the availability and quality of individual-disaggregated survey data on asset ownership and control has accelerated, in part thanks to the United Nations Evidence and Data for Gender Equality (EDGE) initiative. Over the period of 2014-16, the UN EDGE initiative supported the implementation and analysis of the Methodological Experiment on Measuring Asset Ownership from a Gender Perspective (MEXA) in Uganda (see Box 1; Kilic and Moylan, 2016), which in turn informed the design of the EDGE-supported country pilots that were implemented by the national statistical offices across Georgia, Maldives, Mexico, Mongolia, the Philippines and South Africa. These activities ultimately

[3] These include the SDG 1.4.2 indicator, namely the proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure, and the SDG 5.a.1 indicators, namely (a) the proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) the share of women among owners or rights-bearers of agricultural land, by type of tenure.

[4] These households have very different socioeconomic and demographic compositions, with women also being more likely to be living in male-headed households than men living in female-headed counterparts (Deere and Doss, 2006; Beegle and van de Walle, 2019). In the context of a household survey that solicits information on "headship", this information is gathered when a sampled household is first approached for an interview, and often through the question: "Who is the head of this household?" The simplicity of the question is, however, deceiving. First, headship definitions vary across countries. The head of household could be equated to the eldest member of the household, the primary breadwinner and/or the primary decision maker. Second, headship definitions typically refer to the head of household as the individual whose "authority" is recognized by the household members, but this definition overlooks the potential intra-household variation in authority in different realms of decision making. Relatedly, headship has rarely been extended to capture "dual-headed" households. Finally, there may be a disconnect between the headship definition and the interpretation of the survey question, with the latter exhibiting idiosyncrasy potentially at the household-level.

[5] Following the 2008 System of National Accounts, the reported owner of assets is the legal owner, and the economic owner is entitled to claim the benefits associated with the use of the asset in economic activity, by virtue of accepting the associated risks with that activity (UN, 2017). For agricultural land, an individual is identified as a documented owner if they are reported to be listed on an offer of lease, title deed, or certificate of lease for at least one agricultural parcel. As discussed further in the paper, these types of ownership typically overlap.

culminated in the United Nations Guidelines for Producing Statistics on Asset Ownership from a Gender Perspective (UNSD, 2019).[6] The guidelines, consistent with the previous work by Grown et al. (2005) and Doss et al. (2011), provide empirical evidence in support of (i) reducing the reliance on most knowledgeable household member(s) in collecting individual-disaggregated survey data on ownership of and rights to assets, (ii) expanding the practice of interviewing multiple adults per household (in fact interviewing either all adults or one randomly selected adult for collecting the required data for the SDG 5.a.1), and (iii) probing directly and solely regarding respondents' personal ownership of and rights to assets, either exclusively or jointly with someone else. The implementation of these recommendations has been demonstrated to provide a more complete picture of ownership of and rights to assets within households, particularly among women; minimize distortionary proxy respondent effects and intra-household discrepancies in reporting; and reveal hidden assets (Kilic and Moylan, 2016).

Box 1. Methodological Experiment on Measuring Asset Ownership from a Gender Perspective (MEXA)

MEXA is a randomized household survey experiment that was implemented by the Uganda Bureau of Statistics in 2014, in collaboration with the UN EDGE Initiative and the World Bank Living Standards Measurement Study (LSMS), providing a unique opportunity for more in-depth analysis of gender disparities in asset ownership, with a focus on land ownership.

The experiment targeted 140 enumeration areas (EAs) across Uganda, and randomly allocated four households in each EA to each of five treatments/arms that differed in terms of respondent selection. Regardless of the treatment, the respondent(s) were interviewed alone. The first four treatments/arms included interviewing (1) the self-identified most knowledgeable household member; (2) a randomly selected member of the principal couple; (3) the principal couple together; (4) all adult household members, simultaneously.

In Arms 1-4, the respondents reported on all assets owned, either exclusively or jointly, by members of the household. Arm 5 was identical to Arm 4, except that respondents reported only on assets they themselves owned, either exclusively or jointly. The asset types included: dwelling, agricultural land, livestock, agricultural equipment, other real estate, non-farm enterprises/enterprise assets, financial assets and liabilities, and valuables. Differentiation across legal, reported, and economic ownership and the bundle of rights (sell, rent out, use as collateral, bequeath, and make investments) at the asset level was key. Individuals associated with each of these constructs were uniquely identified.

Please consult Kilic and Moylan (2016) for more information on the design, implementation and analysis of MEXA.

However, surveying multiple household members comes with greater cost and additional measurement complexities. Disagreement may occur across spouses, and interpretations of

[6] The guidelines can be accessed here: https://unstats.un.org/edge/publications/docs/Guidelines_final.pdf.

concepts like "joint" ownership may not be well understood (Jacobs and Kes, 2015). Using plot-level data from Ethiopia and Malawi, Kang et al. (2020) also find that joint ownership may not necessarily translate into actual decision-making roles, with men often continuing to have sole-decision making on planting on jointly-owned plots.[7] Other subjective issues arise aside from overall ownership — Doss et. al (2018), for example, find using nationally representative data from Ghana and Ecuador and for the state of Karnataka, India, that across all three samples, the distribution of monetary values of dwellings reported by women tends to be more narrowly clustered around the middle of the distribution, as compared to men, potentially affecting calculations of wealth inequality depending on the share of men and women in the survey sample.

In 2016, the Malawi National Statistical Office concurrently implemented (i) the Fourth Integrated Household Survey 2016/17 (IHS4) - a cross-sectional, nationally-representative survey of 12,480 households, and (ii) the Integrated Household Panel Survey 2016 (IHPS) - a longitudinal survey of 2,508 households that have been followed since 2010. The IHPS was the first nationally-representative multi-topic household survey attempting to operationalize the aforementioned UN Guidelines and to interview each adult household member in private regarding their personal ownership of and rights to selected physical and financial assets. The individual interviews were attempted to be conducted simultaneously in each household and with a gender match between the enumerators and the respondents. On dwelling (inclusive of the residential plot) and agricultural land, the IHPS administered adapted versions of the MEXA questionnaire modules, inquiring directly regarding the respondents' personal — exclusive as well as joint — ownership of and rights. In contrast, the IHS4 followed the traditional (i.e. business-as-usual) approach of interviewing the most knowledgeable household member(s) to provide information on household members' ownership of and rights to the same set of assets.

The parallel implementation of the IHPS and the IHS4 offers an opportunity to assess the effects of conducting best-practice individual-level interviews vis-à-vis the business-as-usual approach on the measurement of ownership of and rights to agricultural land among adult household members. Overall, our findings support privately interviewing multiple household members. In the IHS4, 67 percent of women live in male-headed households, and 70 percent in the IHPS, reinforcing the importance of looking within households to better understand gender asset gaps.[8] Malawi is a unique context, where women's land ownership often exceeds men's ownership, due to strong matrilineal traditions where family land is passed through the female line. Simple comparisons reveal that women's land ownership is, on the whole, higher than men's in both the IHS4 and IHPS, although headship does matter — exclusive reported ownership and rights among non-headed women are significantly lower than for men in the IHS4, while these gaps close in the IHPS.

[7] The plot-level data used by Kang et al. (2020) stem from the national surveys implemented in Ethiopia and Malawi, with support from the World Bank Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA), including the Malawi Fourth Integrated Household Survey (IHS4), which is in part the subject of our paper.
[8] For men, this share was about 89 percent across both the IHS4 and the IHPS.

After controlling for the relevant individual, household and community characteristics in our regressions, we find the levels of exclusive reported and economic ownership of agricultural land are higher among men in the IHS4 (driven mainly by a positive association between land ownership and male headship), while the levels of joint reported and economic ownership of agricultural land decline among women. For rights to sell and bequeath, on the other hand, the business-as-usual approach leads to an increase for both men and women, and a surge in the estimate of SDG indicator 5.a.1, driven by a positive effect on reporting of joint rights. Within married/cohabiting spouses that were privately interviewed in the IHPS, there is also a substantial level of agreement over agricultural land owners and right holders. When discrepancies emerge, proxies for greater household status for women (including age, matrilineal marriage and, in particular, being the main decision-maker over crops) are positively associated with the discrepancy scenarios where the woman attributes at least some parcel ownership to herself.

The paper is organized as follows. Section 2 covers the country context and data. Section 3 lays out the empirical strategy. Section 4 presents the results, and Section 5 concludes.

2. Country Context and Data

2.1. Agriculture and Land in Malawi

Malawi is a small, landlocked country in southeast Africa, with an absolute poverty rate of 51.5 percent. Characterized by low productivity and land shortages (World Bank, 2019), the agricultural sector makes up 26 percent of the GDP. 83 percent of households are economically active in agriculture, among whom 93 percent live in rural areas (Davis et. al, 2017). Much of agricultural production is subsistence, however — the average value of crop sales as a share of the value of overall crop production stands at 18 percent (Carletto et al., 2017).

Land in Malawi is typically allocated through customary practices at the community and family levels, affecting agricultural decision-making and related outcomes. User rights for land, for example, are usually under the purview of village chiefs, with direct effects on agricultural productivity (Restuccia and Santaeulàlia-Llopis, 2017). Inheritance of land within families continues to depend strongly on whether the household is matrilineal or patrilineal (Berge et al., 2014). As part of the IHS4 and the IHPS, 56 and 58 percent of households, respectively, were matrilineal, where land is handed down through the female line, and matrilineal marriages are also much more prevalent in southern Malawi (see Berge et al., 2014, and Andersson Djurfeldt et al., 2018, for a discussion of matrilineal traditions and land ownership and decision-making in Malawi). Due to these customs, women's land ownership in Malawi is high compared to other countries — and as we see later in the data, can surpass men's land ownership for specific groups. Malawi's 2016 Customary Land Act also supports women's customary land rights, although,

through the Act's mechanisms of using local leaders to resolve land disputes and allocate land, women can face practical difficulties in securing rights (Deininger et. al, 2017b) and having input in decision-making over the management of agricultural parcels (Andersson Djurfeldt et al., 2018).

2.2. Fourth Integrated Household Survey and Integrated Household Panel Survey: Respondent Selection and Overview of Data on Assets, with a Focus on Land[9]

The Fourth Integrated Household Survey (IHS4) 2016/17 was a multi-topic, cross-sectional household survey that followed the approach of surveying the "most knowledgeable" household member(s) to provide information on household members' ownership of and rights to selected physical and financial assets, namely dwelling (including the residential plot), agricultural parcels, and financial accounts. This approach corresponds to Treatment Arm 1 ("T1") of MEXA. In line with the prevailing implementation protocols, the selection of the most knowledgeable household member(s) was a function of the adult individuals that were available at the time of the interview. This could have meant that the first choice for the most knowledgeable member was not interviewed if he/she was unavailable during the time that the field team was going to be in that enumeration area (EA). In the context of agricultural land specifically, a roster of all owned and/or cultivated agricultural parcels was created first, and the enumerator was instructed to interview the most knowledgeable household member for each parcel.

On the other hand, the Integrated Household Panel Survey (IHPS) 2016 was the third wave of a multi-topic, longitudinal household survey that attempted to carry out personal interviews of adult household members, inquiring about their personal ownership of and rights to assets in the aforementioned asset classes - corresponding to Treatment 5 ("T5") of MEXA and leveraging the contextualized and improved versions of the MEXA T5 questionnaire instrument.[10] Appendix I includes the protocol for administering the IHPS individual questionnaire. The individual interviews were capped at four per household and it was ensured that the head of household and his/her spouse (if one exists) were among the interviewed individuals.[11] Within-household

[9] The data, questionnaires and basic information document for the IHS4 2016/17 can be accessed here: https://microdata.worldbank.org/index.php/catalog/2936. The data, questionnaires and basic information document for the IHPS 2016 can be accessed here: https://microdata.worldbank.org/index.php/catalog/2939. Both the IHS4 2016/17 and the IHPS 2016 were implemented with technical and financial assistance from the World Bank Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA), using the World Bank Surveys Solutions Computer-Assisted Personal Interviewing (CAPI) platform. The implementation of the individual interviews as part of the IHPS 2016 was made possible by technical and financial assistance from the World Bank LSMS Plus (LSMS+) initiative, which aims to improve in IDA countries the availability and quality of individual-disaggregated survey data on asset ownership, work and employment and entrepreneurship. For more information on the LSMS+, please visit: http://surveys.worldbank.org/lsms/programs/lsms-plus.

[10] The IHPS additionally collected detailed information on individuals' ownership of mobile phones.

[11] This was an upper limit that only applied to 1 percent of the sampled household population that had more than four adults. If a sampled household had more than four adult household members, following the preference given to the head of the household, and his/her spouse if applicable, the remaining interview targets (2 or 3 depending on the presence of a spouse) were selected at random from the remaining pool of adult household members.

interviews were always administered in private and were attempted to be administered simultaneously and with a gender match-up between the enumerator and respondent.[12] Regarding agricultural land, following the creation of a roster of all owned and/or cultivated agricultural parcels and the identification of those that are "owned" by at least one household member, this common list of owned parcels that is generated as part of the household interview was fed forward to each individual interview in that household. [13,14]

Furthermore, the focus on "personal" ownership of and rights to land in the IHPS meant that the phrasing of the questions with respect to the IHS4 was different for a range of questions on:

(i) **reported** ownership (i.e. *Who in this household owns this [PARCEL]?* in the IHS4 versus *Are you among the owners of this [PARCEL]?* in the IHPS);

(ii) **economic** ownership (i.e. *If this [PARCEL] were to be sold/rented out today, who would decide how the money is used?* in the IHS4 versus *If this [PARCEL] were to be sold/rented out today, would you be among the individuals to decide how the money is used?* in the IHPS);

(iii) **documented** ownership (i.e. Who is listed on the title or ownership document as owner of this [GARDEN]? in the IHS4 versus *Is your name among the names listed on the ownership document for this [PARCEL]?* in the IHPS), and

(iv) right to **sell** (i.e. *Does anyone in the household have the right to sell this [PARCEL]?,* followed by *Who can decide whether to sell this [PARCEL]?* in the IHS4 versus *With regard to this [PARCEL], are you among the individuals who have the right to sell it, even if you need to obtain consent or permission from someone else?* in the IHPS); and

(v) right to **bequeath** (i.e. *Does anyone in the household have the right to bequeath this [PARCEL],* followed by *Who can decide whether to sell this [PARCEL]?* in the IHS4 versus *With regard to this [PARCEL], are you among the individuals who*

[12] For more information on the organization and implementation of the individual-disaggregated data collection as part of the IHPS, please consult the survey's basic information document, which can be accessed here: https://microdata.worldbank.org/index.php/catalog/2939/download/47216.

[13] Parcel is defined as a continuous piece of land which can have more than one plot and is referred to as "Garden" in the questionnaires for the IHS4 and the IHPS.

[14] In this process, the enumerator for each individual interview in each household copied the garden roster from the tablet of the primary enumerator assigned to the household into his/her tablet that generated a new questionnaire (under Survey Solutions census mode) for each interview target. To better facilitate the process, the enumerators also had paper booklets of household, garden and plot rosters to ensure unique identification of household members and parcels across the individual interviews in the same household.

have the right to bequeath it, even if you need to obtain consent or permission from someone else? in the IHPS).[15,16]

While the IHS4 allowed for specifying up to 4 household members and 2 non-household members as joint parcel owners/right holders in the answers to these questions, the IHPS identified joint parcel owners/right holders through subsequent questions that would be asked conditional on the respondent identifying himself/herself as a parcel owner/right holder and that would first establish the existence of other potential joint parcel owners/right holders and then identify up to 3 household members and 2 non-household members as joint owners/right holders.

Finally, another key difference between the surveys was about the land rights-related data collection. In the IHS4, following the prevailing practice, the parcel-level questions on rights to sell and bequeath were asked of the most knowledgeable household member irrespective of the answers given to the question on reported ownership of that parcel. Since the reported ownership question is phrased to refer to any individual, rather than the most knowledgeable respondent himself/herself, and is aimed at identifying all owners associated with a given parcel in one, seemingly open-ended question, it is virtually impossible to enable the later questions on the rights to sell and bequeath as a function of the answers given to the earlier, also seemingly open-ended question on reported ownership. Conversely, in the IHPS, the questions on rights to sell and bequeath were not asked of the respondent if he/she did not name himself/herself as a reported owner for a given parcel.

In terms of success of implementation, among the 2,508 IHPS households, 98.7 percent completed at least one individual interview.[17] While all (5,089) eligible adults were targeted for interviews, the non-response rate was 18 percent on the whole, 24 percent for adult men and 12 percent for adult women.[18] As discussed below, we follow a regression-based approach to compute response

[15] The IHPS solicited detailed information also on the rights to use as collateral, rent out and make improvements/invest. The scope of rights included in the questionnaire was influenced by Schlager and Ostrom's (1992) theoretical framework which focuses, in the context of natural resources, on issues related to access, withdrawal, management, exclusion and alienation while defining a bundle of rights.

[16] Along with rights/ownership, the IHPS respondents reported on how each parcel was acquired; identified the individuals from whom the asset was inherited or received as a gift, as applicable; and provided the current hypothetical sales value for each asset (and the construction costs specifically for the dwelling) and limited information on their knowledge of asset transactions in their communities.

[17] For the remaining 1.3 percent of households, the reasons for non-completion included (i) refusal due to the already lengthy household interview that had been completed; (ii) refusal due to the request to conduct the interviews in private, and (iii) loss of individual questionnaires due to Android tablet malfunction.

[18] To get a better understanding of the additional costs of implementing individual interviews, the metadata extracted from the Survey Solutions CAPI application allow for the calculation of number of days spent in a given EA by each field team, which was made up of one team supervisor and four enumerators. On average, the field teams took a total of 3.37 days to administer the IHS4 questionnaires to 16 households in every IHS4 EA, with one enumerator visiting each household. Conversely, the same field teams took, on average, 4.51 days in an IHPS EA to ensure as much as possible that each available adult household member was interviewed in private by an enumerator of the same sex, and if possible, simultaneously with other potential interviews in the same household.

weights for the IHPS sample that is used for analysis. The model controls for a range of individual- and household-level demographic and socioeconomic attributes that predict response (and that are also potentially associated with land ownership).[19]

Table 1 shows a within-household success rate breaking down the number of eligible adults versus the number of individual interviews completed. Across all households, regardless of the number of adults, all eligible adults were successfully interviewed 68 percent of the time. The remaining 32 percent of households had more than one adult but failed to interview at least one of them. Given that the household head or their spouse is most likely to be the household member owning or managing assets listed by a household, part of the analysis outlined in Section 4 has a focus on members of the principal couple. Of the 2,477 households included in the individual household sample, 72 percent had a principal couple, and in 75 percent of these cases enumerators managed to interview both the husband and spouse.

Table 1. Distribution of IHPS Households According to Number of Adults Interviewed

	Panel	
	Total	**%**
Households Interviewed	**2477**	
All Eligible Adults Interviewed	**1675**	**68%**
4 adults	115	5%
3 adults	225	9%
2 adults	1003	40%
1 adult	332	13%
Subset of Eligible Adults Interviewed	**802**	**32%**
3 out of 4	106	4%
2 out of 4	92	4%
1 out of 4	29	1%
2 out of 3	167	7%
1 out of 3	65	3%
1 out of 2	343	14%
Average # of Adults Interviewed	**1.89**	

We calculate weights to correct for non-response in the IHPS by running a logistic regression of individual response status among adults eligible for individual interviews. The results from the logistic regression are presented in the Appendix Table A1. [20] Subsequently, we (1) take the

[19] Among the eligible men who did not respond, 44 percent were heads of household and 35 percent were children of the household head, and among the non-responding women, only 6 percent were household heads, 32 percent were spouses of the head, and 37 percent were children.

[20] Van den Broeck and Kilic (2019) use a similar approach to correct for attrition bias in panel data samples, in a study of labor market dynamics in Sub-Saharan Africa. Our right-hand-side predictors of "response" include (i) fixed effects for districts, interview months and enumerators, (ii) individual covariates, including age; a dichotomous variable identifying females; a series of dichotomous variables on educational attainment; dichotomous variables identifying whether the individual is currently married, and separately, whether he/she is head/spouse of head; and individual's

inverse of the predicted response probability to construct the response weight variable for each IHPS adult household member who has been subject to an individual interview; (2) winsorize the response weights at the top 1 percent to account for potential outliers; and (3) set it equal to 1 for all adults in the IHS4 sample, which includes the most knowledgeable survey respondents and adult household members who were not interviewed by the IHS4. Henceforth, all statistics are weighted using the response weight.

2.3. Descriptive Statistics

The scope of the socioeconomic data collection was near identical across the IHS4 and the IHPS. All sample households were administered a multi-topic household questionnaire that collected individual-disaggregated information on demographics, education, health, and wage employment, as well as data on housing, food consumption, food and non-food expenditures, food security, non-farm enterprises, access to infrastructure and exposure to shocks, among other topics. Appendix Table A2 provides sample means for men and women on individual, household and geographic characteristics across the two surveys that we also control for in the empirical analysis. There are some statistically significant differences across the survey samples, although the magnitudes of these differences are typically not very large (often not more than 5-7 percentage points across the two survey approaches). The IHS4 does have a greater share of male and female household heads (73 percent of men respondents were household heads in the IHS4, compared to 65 percent in the IHPS; among women, these shares were 26 and 21 percent, respectively). The IHS4 was also more likely to represent the North region of the country. The IHPS households, while still mostly rural, do have lower share of rural residence vis-a-vis the IHS4 households, with somewhat greater nonfarm employment, ownership of mobile phones, and access to electricity. We control for these individual, household and regional characteristics in the regressions below.

On agricultural land ownership and rights, both surveys allow us to compute *individual-level* indicators related to (i) reported ownership, (ii) economic ownership, (iii) right to bequeath, and (iv) right to sell, in a way that **aggregates** the information reported at the parcel-level. In other words, in the **IHPS**, a self-reporting adult household member is tagged as a reported owner if he/she reported himself/herself as a reported owner for at least 1 agricultural parcel. In the case of

number of months living away from the household over the past year; and (iii) household covariates, including household size, dependency ratio, and wealth index. The latter is a factor analysis-based index that is composed of (i) a series of dichotomous variables that capture the ownership of mortar, bed, table, chair, fan, air conditioner, radio, radio with flash drive/micro CD, TV, VCR, sewing machine, kerosene/paraffin stove, electric/gas stove, refrigerator, washing machine, bicycle, motorcycle, car, minibus, lorry, beer-brewing drum, sofa, coffee table, cupboard/drawers, lantern, desk, clock, iron, computer, satellite dish, solar panel and generator, and (ii) a series of dwelling covariates, including number of dwelling rooms per capita and categorical variables that identify construction material (permanent; semi-permanent; traditional); roof type (grass; iron sheets; clay tiles/concrete/plastic sheeting/other); floor type (sand; smoothed mud; smooth cement/wood/tile/other); water source (piped/well; borehole; other), and toilet facility (flush/VIP toilet; traditional latrine; other/none).

the **IHS4**, an adult household member is tagged as a reported owner if he/she is listed by the most knowledgeable household member(s) as a reported owner for at least 1 agricultural parcel. All indicators of interest are dichotomous in nature, and separate versions capturing exclusive versus joint ownership/rights are too part of our analysis, as detailed below. And although the IHS4 and the IHPS included parcel-level questions on documented ownership, only 1 percent of men and women across both surveys responded that they were documented owners of any agricultural parcel.[21]

Furthermore, different combinations of ownership and rights are possible, although Figure 1 shows that individuals are either likely to have both reported and economic ownership over any parcel, or neither — as opposed to having reported (but not economic) ownership or vice-versa. Similarly, individuals with reported/economic ownership for the most part either had rights to both sell and bequeath land, or rights to neither, although about 10-12 percent of men and women reported rights to bequeath, but not sell a parcel, across both survey approaches. In separate tabulations, less than 1 percent of individuals were tagged as having the right to sell/bequeath in either survey if they were not either reported or economic owners of any parcel. Thus, even though the business-as-usual approach in the IHS4, as discussed earlier, allowed for reporting of rights independent of ownership, this difference across surveys does not appear to matter. In separate results, the share of men and women with all ownership and rights — reported and economic, as well as rights to bequeath and sell — was actually quite similar across the survey approaches. For T1/IHS4, 19 percent of men and women had all types of ownership/rights; this figure was 23 percent for men and women in T5/IHPS.

Table 2 presents summary statistics on variables capturing exclusive versus joint ownership and rights, along with a dichotomous variable, namely *SDG* Owner, based on the definition of the SDG indicator 5.a.1. The latter takes the value one if the individual is a documented owner, has the right to sell, or has the right to bequeath related to any parcel that the individual interview targets in each given household could have reported on. Means of ownership/rights are broken out by women and men overall, as well as women heads/non-heads of household.[22] Adjusted Wald tests for equality of means were also conducted across survey approaches, within the samples of women/men, with significant differences indicated in bold. Columns (9)-(12) conduct the same test on whether differences across men and women, within each survey, are statistically significant (indicated by asterisks).

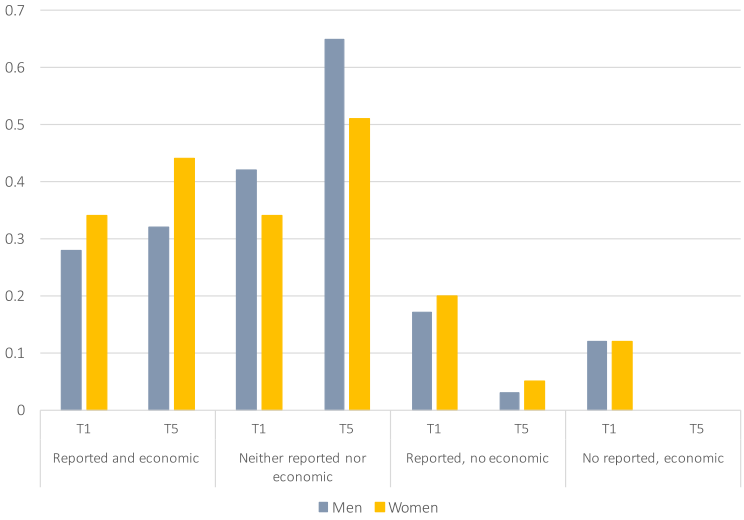
[21] Individuals, within or outside the household, who were reported to be listed on a given ownership document, if any, were identified uniquely on the questionnaire, and the enumerators requested to see the referenced ownership document to cross-check the reporting regarding the documented owners. Although our definition of documented ownership does not hinge on whether the ownership document was cross-checked, it is important to note that conditional on reporting regarding documented ownership, the respondents produced the ownership document for the enumerator less than 40 percent of the time.

[22] As compared to women where there was greater diversity in household status by head, spouse, or other household members, nearly all of men reporting ownership were household heads; we discuss implications of this further below.

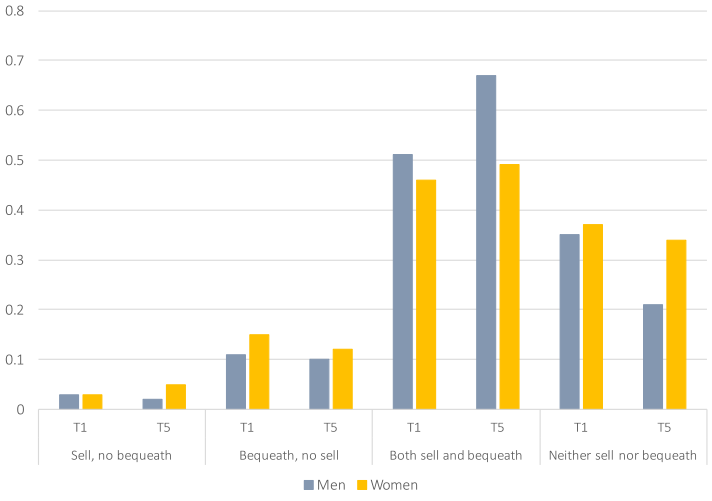
Looking at Table 2, we find that the choice of survey approach primarily affects reporting of exclusive as opposed to joint ownership, as well as joint rights to sell/bequeath (with the exception of women household heads, where the survey approach primarily affects exclusive rights, likely because their households have fewer adult household members).

Figure 1. Bundles of Ownership/Rights, by Survey Approach (T1/IHS4 vs T5/IHPS) and Gender

Reported versus Economic Ownership



Right to Bequeath and/or Sell (Among Reported/Economic Owners)



Notes:

(1) The sample is comprised of individuals 18 and older, and of those involved in agriculture. The estimates are weighted by the response weight. The agricultural parcels underlying the (individual-level) indicator definitions are those that are associated with the reference rainy season.
(2) In T5/IHPS, the parcel-level question on economic ownership was, by design, asked conditional on having been identified as a reported owner.
(3) The rights-related variables are defined irrespective of the reported need to obtain consent/permission from anyone – a topic that the IHPS collected additional information on. Less than two percent of individuals across surveys had rights to bequeath/sell if they were neither reported nor economic owners.

Specifically, the business-as-usual approach significantly increases exclusive reported ownership among men overall (columns 7-8), and women heads of household (columns 1-2). Within the business-as-usual approach, nearly all (95 percent) of women household heads responded for themselves. The business-as-usual approach also raises exclusive economic ownership for men, as well as non-household head women, but results in lower exclusive economic ownership for women heads. For women heads in particular, Figure 2 (focused on own-reporting) also shows wider positive effects of the business-as-usual approach on exclusive reported ownership among younger groups less than 50 years, while the negative effects on exclusive economic ownership tend to be focused on older women aged 50-60 (about 15 percent of the sample). Under the business-as-usual approach, joint rights to sell/bequeath are also significantly higher for both men and women (the latter driven by women non-heads). In Section 3, we explore further what may be driving these

differences across the two surveys, controlling for other individual, household and geographic characteristics described in Table A2.

Table 2 also examines how the choice of survey approach affects gender gaps in reporting of ownership and rights. Consistent with matrilineal traditions in Malawi, Table 2 shows that women overall are more likely than men in both surveys to report exclusive ownership/rights (columns 9-10), with this difference widening under the individual interview approach. Among non-household head women, for whom exclusive reported ownership is lower than men in the business-as-usual approach, individual interviews also flip the gender gap in favor of this sub-sample of women (columns 11-12), and also leads to higher levels of exclusive economic ownership, as well as exclusive rights to sell/bequeath, relative to men.

Table 2. Means of Ownership and Rights, by Survey Approach (T1/IHS4 vs T5/IHPS) and Gender

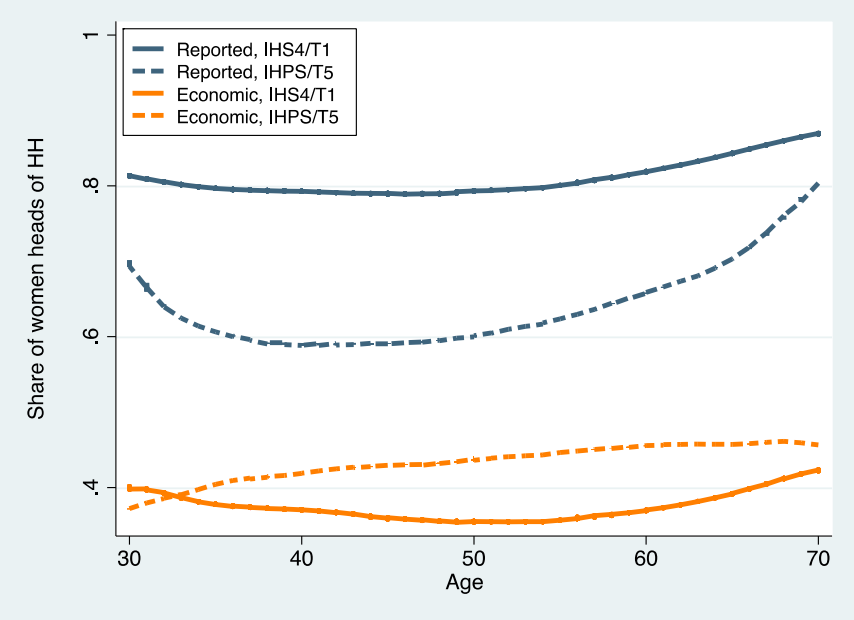
	Women						Men		Difference in share of (women-men) with ownership/rights[5]			
	HH Heads		Non-HH Heads		All Women		All Men		All Women vs. All Men		Non-HH Headed Women vs. Men Overall	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	T1: IHS4	T5: IHPS	T1: IHS4	T5: IHPS	T1: IHS4	T5: IHPS	T1: IHS4	T5: IHPS	IHS4: cols. (5)-(7)	IHPS: cols. (6)-(8)	IHS4: cols. (3)-(7)	IHPS: cols. (4)-(8)
Reported own.												
Exclusive	**0.80**	**0.63**	0.22	0.24	0.37	0.33	**0.27**	**0.18**	0.10***	0.15***	-0.05***	0.06***
	[0.40]	**[0.48]**	[0.41]	[0.43]	[0.48]	[0.47]	**[0.44]**	**[0.38]**				
Joint	0.07	0.08	0.23	0.23	0.19	0.19	0.20	0.20	-0.01***	-0.01	0.03***	0.03***
	[0.25]	[0.27]	[0.42]	[0.42]	[0.40]	[0.40]	[0.40]	[0.40]				
Economic own.												
Exclusive	**0.37**	**0.44**	**0.14**	**0.11**	0.20	0.18	**0.12**	**0.08**	0.08***	0.10***	0.02***	0.03**
	[0.48]	**[0.50]**	**[0.35]**	**[0.31]**	[0.40]	[0.38]	**[0.33]**	**[0.28]**				
Joint	0.11	0.21	0.33	0.30	0.27	0.29	0.30	0.26	0.03***	0.03	0.03***	0.04***
	[0.31]	[0.41]	[0.47]	[0.46]	[0.44]	[0.45]	[0.45]	[0.44]				
Right to sell												
Exclusive	**0.49**	**0.39**	0.14	0.17	0.23	0.22	0.22	0.20	0.01*	0.01	-0.08***	-0.03
	[0.50]	**[0.49]**	[0.35]	[0.38]	[0.42]	[0.41]	[0.41]	[0.40]				
Joint	0.04	0.03	**0.12**	**0.06**	**0.10**	**0.06**	**0.11**	**0.06**	-0.01***	-0.01	0.01***	0.00
	[0.50]	[0.16]	**[0.32]**	**[0.24]**	**[0.29]**	**[0.23]**	**[0.31]**	**[0.24]**				
Right to bequeath												
Exclusive	**0.59**	**0.45**	0.17	0.20	0.28	0.25	0.22	0.20	0.06***	0.06*	-0.05***	0.00
	[0.49]	**[0.50]**	[0.37]	[0.40]	[0.45]	[0.43]	[0.42]	[0.40]				
Joint	0.05	0.04	**0.16**	**0.07**	**0.13**	**0.06**	**0.15**	**0.08**	-0.02***	-0.02**	0.01***	-0.01*
	[0.21]	[0.19]	**[0.37]**	**[0.25]**	**[0.34]**	**[0.24]**	**[0.36]**	**[0.28]**				
SDG owner[3]	**0.66**	**0.50**	**0.34**	**0.28**	**0.42**	**0.32**	**0.38**	**0.28**	0.04***	0.04*	-0.04***	0.00
	[0.50]	**[0.50]**	**[0.48]**	**[0.45]**	**[0.49]**	**[0.47]**	**[0.49]**	**[0.43]**				
Observations	**3,099**	**511**	**8,863**	**1,707**	**11,962**	**2,218**	**10,066**	**1,721**				

Table 2 (Continued)

Notes:

(1) The sample is comprised of individuals 18 and older, and of those involved in agriculture. The estimates are weighted by the response weight. The agricultural parcels underlying the (individual-level) indicator definitions are those that are associated with the reference rainy season.
(2) The rights-related variables are defined irrespective of the reported need to obtain consent/permission from anyone – a topic that the IHPS collected additional information on.
(3) SDG owner is equal to 1 1 if the individual is a documented owner of any parcel or has the rights to sell or bequeath any parcel, and 0 otherwise.
(4) Standard deviations in brackets. Adjusted Wald tests for equality of means were also conducted across T1 and T5, within the samples of women/men. Statistically significant differences ($p<0.05$) are in bold; all except two tests within the sample of non-HH headed women (exclusive economic ownership and SDG owner) were statistically significant at $p<0.01$.
***=$p<0.01$, **=$p<0.05$, *=$p<0.10$.

Figure 2. Exclusive Reported and Economic Ownership Among Self-Reporting Female Household Heads, by Survey Approach (T1/IHS4 vs T5/IHPS) and Age



Notes:

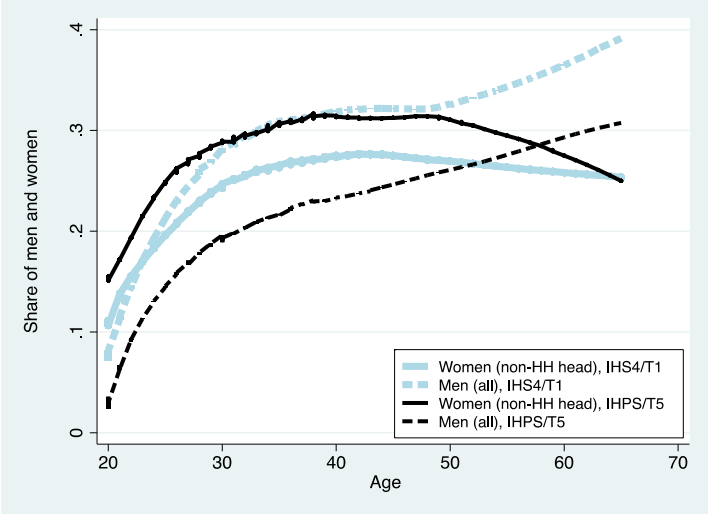
(1) The sample is comprised of self-reporting female heads 18 and older, involved in agriculture.
(2) The median age for female household heads was 46 years, and 20 percent of this sample was between 60 and 75 years.
(3) The agricultural parcels underlying the (individual-level) indicator definitions are those that are associated with the reference rainy season.

Figure 3 looks more closely at how gender gaps between men and non-household head women vary by age. Individual interviews raise women's exclusive reported ownership above that for men, among women less than 60 years old (about 88 percent of the sample). Women's exclusive economic ownership is higher under both the business-as-usual and individual interview approaches, but the reverse gender gap is much greater under individual interviews. Individual interviews also narrow gender inequalities in rights, particularly among younger men and women. Gender inequalities do widen again in ownership and rights under both survey approaches for

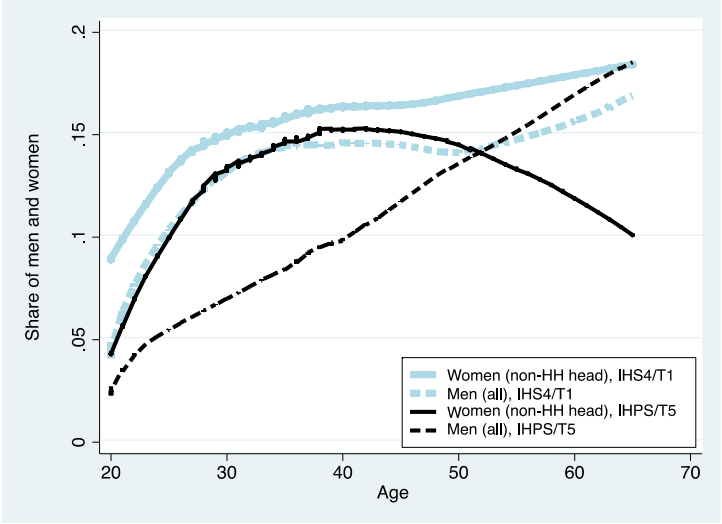
older, non-household head women — also compared to high reported/economic land ownership for women heads — indicating that this group may be particularly vulnerable.

Figure 3. Non-Household Head Women vs. Men Overall: Reversal/Narrowing of Gender Gaps in Exclusive Land Ownership/Rights under Individual Interviews (T5/IHPS)

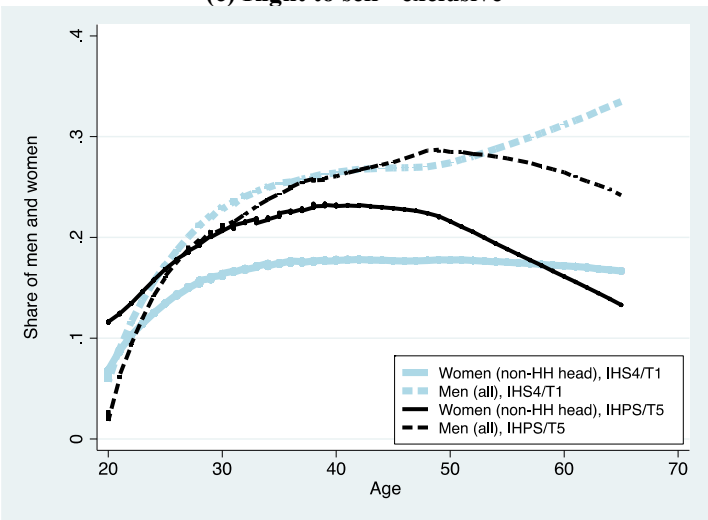
(a) Reported ownership - exclusive



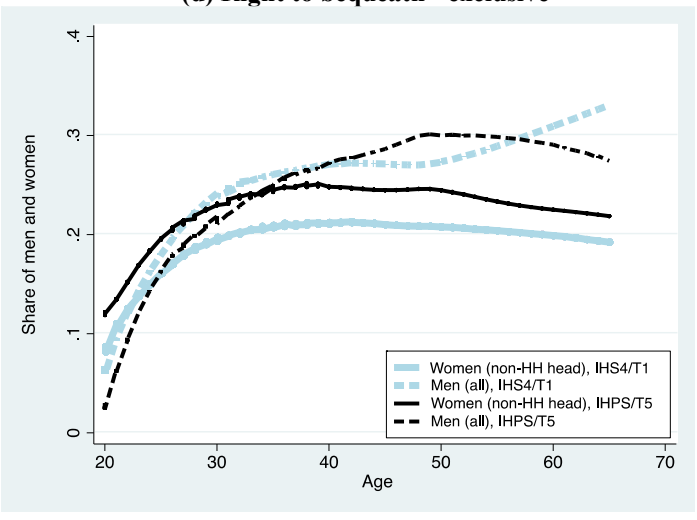
(b) Economic ownership - exclusive



(c) Right to sell - exclusive



(d) Right to bequeath - exclusive



Notes:

(1) The sample is comprised of individuals 18 and older, and of those involved in agriculture. The agricultural parcels underlying the (individual-level) indicator definitions are those that are associated with the reference rainy season.
(2) The rights related variables are defined irrespective of the reported need to obtain consent/permission from anyone – a topic that the IHPS collected additional information on.
(3) The graphs are near-identical if the sample is limited only to men in male-headed households.

3. Empirical Strategy

3.1. (Individual-Level) Ownership of and Rights to Agricultural Land

This section describes the empirical framework for estimating relative survey treatment effects that the concurrent implementation of IHS4 and IHPS can isolate. The core specification is estimated for the total sample, and separately, for the sub-populations of men and women as:

$$y_{ih} = \propto + \beta_1 \tau T_{1ih} + \gamma C + \varepsilon_{ih} \quad (1)$$

where *i* and *h* represent individual and household, respectively; *y* is the binary dependent variable on whether the individual has ownership/rights (detailed in Table 2) over any agricultural parcel in the household; α and ε represent constant and error terms, respectively. T_1 is a binary variable identifying the adults in the IHS4 sample, with the individuals in the T5/IHPS constituting the comparison category. *C* is a vector of individual and household attributes presented in Appendix Table A2 to capture any remaining unobserved heterogeneity that may also jointly determine both the dependent variable and household assignment to the IHPS versus the IHS4.

Given the dichotomous nature of the dependent variables, equation (1) is estimated as a linear probability model with weights adjusting for non-response.[23] The T5/IHPS sample is used as the comparison category in equation (1) as it represents the gold-standard in the approach to data collection on asset ownership and rights. Standard errors are clustered at the EA-level, and the regressions are weighted using the response weight variable, as described in Section 2.2.

Since the focus of the analysis is on ownership/rights over agricultural land and in part on the SDG indicator 5.a.1, the reference population is adult individuals living in agricultural households, who have operated land for agricultural purposes and/or raised/tended livestock in the past 12 months, regardless of the final destination of the production. As noted above, the IHS4 sample includes all the adult household members, who are tagged as having ownership or a particular right if they are reported as an owner or a right holder for at least 1 agricultural parcel by the most knowledgeable household member(s) who would have been interviewed in that household. Conversely, the IHPS sample includes only the adult household members who were subject to individual interviews and would have been tagged as an owner or a right holder if they reported themselves as such for at least 1 agricultural parcel.[24]

[23] Our estimates were similar to the marginal effects derived from Probit regressions, which are available upon request.
[24] We gauged the sensitivity of our findings by (i) expanding the analysis sample to include adults from non-agricultural households, and (ii) restricting the analysis sample only to adults who were personally engaged in agriculture (as opposed to simply living in an agricultural household). The resulting differences in our estimates were negligible, and we wanted to be in line with the international standards.

3.2. (Parcel-level) Intra-Household Discrepancies in Reporting

Self-reported data, with potential cross-individual heterogeneity in the interpretation of and responses to the questions on ownership and rights, can result in diverging intra-household reports regarding the same parcel, particularly in settings where documented land ownership is not prevalent.[25] In the absence of a strategy that unquestionably resolves discrepancies, the fallback option in the prior work, as in ours, has been to accept each person's response as to whether they are an owner of a given asset.

At the same time, a growing number of studies show that variation in reporting within the household could in fact offer greater insights into intra-household dynamics — including important dimensions of women's health and economic status. Ambler et al. (2017), for example, use the 2011-12 Bangladesh Integrated Household Survey to show that among women, outcomes related to health, employment, and community group participation are positively associated with cases where both they and their spouse agree on joint decision-making across a range of household economic activities, or joint ownership of different household economic farm and non-farm assets, including agricultural land (as well as, to a lesser extent, on whether the wife is attributed decision-making or ownership over a particular area, but the husband is not). Annan et al. (2019) also find, using the Demographic and Health Survey data across several Sub-Saharan African countries, that disagreement is substantial over decision-making and that the direction of disagreement matters. For example, the incidence of women attributing more decision-making power to themselves than their husbands is positively associated with a range of health outcomes for those women and their children. Intra-household discrepancies in reporting can therefore have important implications for understanding development outcomes pertaining to women, both within and outside the household.

In our case, the administration of individual interviews using a common roster of agricultural parcels within the IHPS (T5) sample permits the examination of possible discrepancies in spouses' reported ownership/rights for specific agricultural parcels. In this part of the analysis, we focus on the subsample of IHPS households in which the members of the principal couple were both interviewed, and estimate the following equation at the parcel-level:

$$y_{ph} = \ \propto + \gamma D + \varepsilon_{ph} \qquad (2)$$

[25] "Even with the documentation, the intrahousehold truth regarding who exerts control over a given asset may not line up with which household members are listed in the records as owners" (Doss et al, 2019: 22) for various reasons including (i) lags in the updating of cadastral records following inter-personal parcel transfers, (ii) temporal variation in intrahousehold control of the parcel in question and (iii) the potential disconnect between *de jure* legislation (prohibiting gender discrimination in ownership of and rights to land) and local *de facto* arrangements that may ultimately prevail over state laws and that may result in gender discrimination in a way that exhibits spatial variation in accordance with social norms.

where p and h denote parcel and household, respectively; y represents a specific intra-household reporting discrepancy on ownership/rights based on the spousal cross-reports; and α and ε represent constant and error terms, respectively. D is a vector of household and parcel attributes, subsuming those included in the vector C from equation (1), and augmenting those with additional variables to better understand whether certain features of the parcel, household economic activity and spouses' decision-making in agriculture that could affect reporting discrepancies pertaining to reported and, separately, economic ownership. In the case of parcels where different individuals may be involved in agricultural production or decision making on different plots within, there may also be variation in responses among household members over who is responsible for, and/or owns, that parcel (Doss et. al, 2019). Additional variables in D, therefore, include the number of plots in the garden, whether the household sells some of its crop, and whether the wife is listed as the main decision-maker for cropping activities on any plot.[26]

Table 3 presents the distribution of parcel-level responses regarding ownership and rights outcomes, as reported by the principal couples in the IHPS sample.[27] There is spousal agreement regarding individuals with reported ownership, economic ownership, right to sell and right to bequeath concerning 71 percent, 58 percent, 88 percent and 86 percent of the parcels, respectively.[28] The extent of spousal agreement is, however, higher than the levels reported in MEXA T5, where the comparable estimates for parcel-level agreement on reported owners and economic owners stood at 45 percent and 48 percent, respectively.

Country/regional context may contribute to these differences. In studies from Uganda and South Africa, for example, Jacobs and Kes (2015) find that around 10 to 16 percent of women in Uganda own land in their own right, and that the majority of couples disagree specifically on joint ownership. In a study from Ecuador, Twyman et al. (2015) find higher agreement on joint ownership of land (in 79 percent of parcels, couples agree on joint ownership), but also do find that where disagreement occurs, it is almost always where one spouse reports a parcel is owned jointly, while the other attributes ownership to oneself/their spouse. Similarly, where discrepancies over reported/economic ownership occur in the IHPS (Table 3), it typically involves one spouse claiming joint ownership (and in this case, the other claiming no ownership). There are, otherwise, very few cases of disagreement where each spouse claims they are the exclusive owner/have

[26] The corresponding question in the agricultural questionnaire asks, "Who in the household makes the decisions concerning crops to be planted, input use and the timing of cropping activities on this [PLOT]?" There is one respondent for each plot, who identifies one main decision-maker and two additional decision-makers on each plot. In the IHS4, 78 percent of individuals who were identified as the main decision-maker were also the respondent for the plot. This figure stood at 95 percent while looking at whether the respondent was one of the three decision-makers. For the IHPS, these shares were 74 and 93 percent, respectively.

[27] Documented ownership is almost negligible, with husbands and wives agreeing 98 percent of the time that they do not have an ownership document for the parcel in question.

[28] The country pilots that had been supported by the EDGE initiative had presented substantial agreement among couples (83 percent in Georgia and Mongolia, 90 percent in the Philippines), although this was regarding dwelling as opposed to agricultural land (United Nations, 2019).

exclusive rights. One reason for higher disagreement around joint ownership — also related to local context — may be due to ambiguity around how "joint" ownership is interpreted/defined in lower-income contexts where documentation is limited (Jacobs and Kes, 2015).

Table 3. Spousal Agreement/Discrepancies in Ownership and Rights of Agricultural Parcels in T5/IHPS

(a) Reported ownership

		Wife			
		H	J	W	No
Husband	H	14.0	5.5	1.5	
	J		9.7	5.2	7.9
	W			22.7	
	No		9.0		24.6
Share agree: 71%, Share disagree: 29%					

(b) Economic ownership

		Wife			
		H	J	W	No
Husband	H	4.7	2.1	0.2	
	J		13.1	1.4	18.0
	W			9.0	
	No		20.5		31.1
Share agree: 57.9%, Share disagree: 42.1%					

(c) Right to sell

		Wife			
		H	J	W	No
Husband	H	21.1	2.0	1.2	
	J		0.9	1.3	4.9
	W			19.6	
	No		2.3		46.7
Share agree: 88.3%, Share disagree: 11.7%					

(d) Right to bequeath

		Wife			
		H	J	W	No
Husband	H	21.3	3.2	1.6	
	J		1.2	2.1	5.5
	W			20.2	
	No		2.1		42.9
Share agree: 85.6%, Share disagree: 14.4%					

Notes: The findings are based on 1,719 parcel observations and the responses that were provided by 931 couples, about 55.5 percent of which had more than one garden. H = Owned by Husband, J = Jointly Owned, W = Owned by Wife; "No" = Reported No Ownership or Rights.

4. Results

4.1 (Individual-Level) Ownership of and Rights to Agricultural Land

Table 4 presents a summary table of the estimates of the coefficient β_1 from equation 1 (i.e. the effect of following the business-as-usual approach to respondent selection vis-à-vis conducting individual interviews) – derived from the regressions that are estimated on the whole, and separately for male and female sub-samples, and for a range of ownership and rights constructs as the dependent variables. We show that under the business-as-usual approach, the levels of exclusive reported and economic ownership of agricultural land are higher among men, while the levels of joint reported and economic ownership of agricultural land decline among women. The effect on the joint reported ownership among men is also negative, albeit significant only at the 10 percent level. On the other hand, for the rights to sell and bequeath, the business-as-usual approach to respondent selection leads to an increase for both men and women, driven by a positive effect on reporting of joint rights (as reflected above in Table 2). Given the survey treatment effects on

the measurement of these rights, and the near-negligible incidence of documented agricultural land ownership in Malawi, the estimate of the SDG indicator 5.a.1 surges under the business-as-usual approach for both male and female adults.

Table 4. Effect of Business-As-Usual Survey Approach (T1/IHS4) on Agricultural Land Ownership and Rights

Sample		*N*	Reported			Economic		
			Overall	*Exclusive*	*Joint*	*Overall*	*Exclusive*	*Joint*
All adults	*Overall*	25,967	0.017	0.052***	-0.050***	-0.017	0.022**	-0.045**
			[0.96]	[4.12]	[-3.18]	[-0.91]	[2.50]	[-2.55]
	Male	11,787	0.064**	0.087***	-0.037*	0.014	0.038***	-0.024
			[2.44]	[4.74]	[-1.71]	[0.54]	[3.53]	[-0.92]
	Female	14,180	0.001	0.015	-0.031**	-0.020	0.004	-0.033*
			[0.02]	[0.81]	[-2.11]	[-0.92]	[0.28]	[-1.91]

Sample		SDG Owner	Sell			Bequeath		
		Overall	*Overall*	*Exclusive*	*Joint*	*Overall*	*Exclusive*	*Joint*
All adults	*Overall*	0.052***	0.036***	0.001	0.030***	0.051***	0.007	0.038***
		[3.07]	[2.66]	[0.11]	[4.10]	[3.02]	[0.56]	[4.14]
	Male	0.054**	0.037	-0.004	0.039***	0.039	-0.006	0.037***
		[2.09]	[1.64]	[-0.22]	[3.95]	[1.52]	[-0.28]	[2.63]
	Female	0.062***	0.042***	-0.004	0.039***	0.068***	0.004	0.060***
		[3.36]	[2.75]	[-0.28]	[5.05]	[3.73]	[0.23]	[6.16]

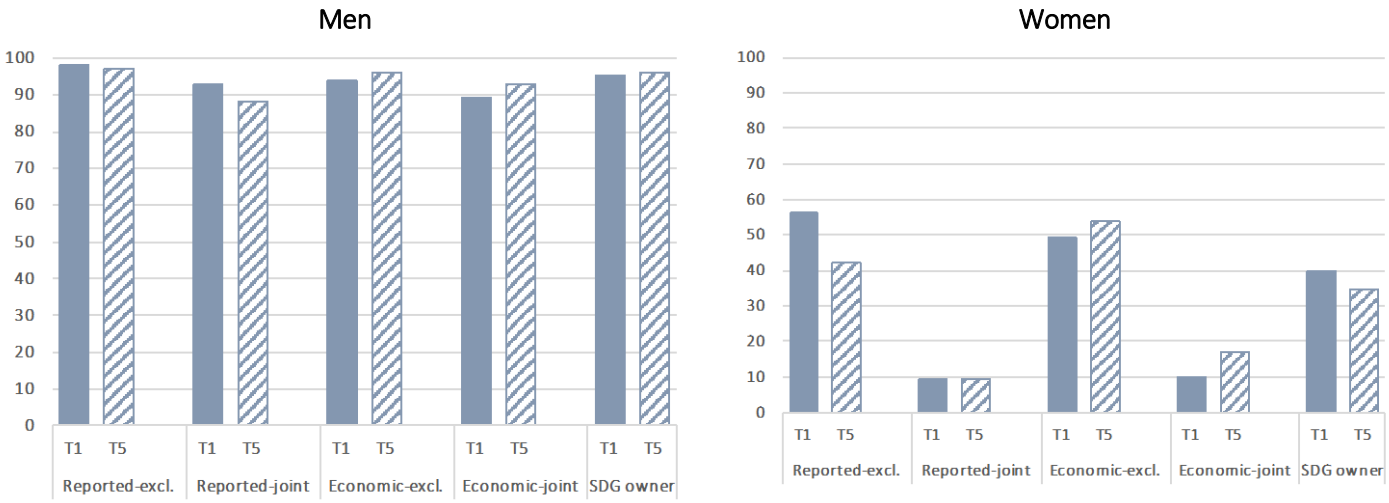
Notes:

(1) The sample is comprised of individuals 18 and older, and of those involved in agriculture. The results are from linear probability models, weighted by the response weight. ***=p<0.01, **=p<0.05, *=p<0.10. T-statistics are presented in brackets, and account for clustering at the enumeration area level.

(2) SDG owner is equal to 1 1 if the individual is a documented owner of any parcel or has the rights to sell or bequeath any parcel, and 0 otherwise.

Aside from differences in survey design, one potential reason for higher exclusive ownership among men in the business-as-usual approach may be due to the association between headship and land ownership/rights. Among all age-eligible adults, men having ownership or rights across survey approaches are almost always household heads (Figure 4), in contrast to women with ownership/rights whose household status is more varied. And, as discussed earlier, the share of male household heads overall is significantly higher in the IHS4 sample. Among the "most knowledgeable" respondents in the IHS4 parcel data who reported on household members' land ownership under the business-as-usual approach, 96 percent of men respondents were household heads, compared to 49 percent of women respondents (Appendix Table A3a). Appendix Table A3b also presents OLS regressions on correlates of the "most knowledgeable" respondent, showing that household headship is highly correlated with being the selected respondent in T1, across both samples of women and men (and for the combined sample, women household heads were significantly more likely to be selected). Spouses were also significantly likely to be surveyed as the main respondent in T1, although to a lesser extent compared to household heads.

Figure 4. Incidence of Headship Among Owners, by Survey Approach (T1/IHS4 vs. T5/IHPS) and Gender



Notes: Non-household heads owning land were primarily spouses of the household head.

The effects of other control variables on reported ownership are presented in full regression results in Appendix Table A4a (similar associations of controls were found for economic and SDG ownership, presented in Appendix Table A4b). There were some similarities across men and women — older men and women more likely to report ownership, similar effects of household composition, and indications that improved income/household infrastructure had lower association with agricultural land ownership (negative effect of salaried work and household electrification/access to piped water, and positive effects of casual wage work with joint ownership). There were gender differences in other key areas, however. Men household heads, for example, were more likely to report exclusive or joint ownership, while women household heads were more likely to report exclusive ownership, but less likely to be joint owners (reflecting different types of households/household demographic profiles). As discussed in Table 5 below, interacting the headship variable with the business-as-usual survey approach reveals further differences in reported/economic ownership across male/female heads of household.

There were gender differences across other variables as well (across women's education and work in a nonfarm enterprise, as well as the effects of marital status and mobile phone ownership for men) that underscore the importance of understanding local context and opportunities on men's and women's ownership and rights. We also found that negative shocks experienced in the last 12 months also lowered women's reporting of exclusive land ownership but were positively associated with men's exclusive ownership. This is similar to findings in the literature on how men's and women's reported asset ownership varies by experience to negative shocks (see Quisumbing et. al (2018) who use data from Bangladesh and Uganda).[29] One reason may be

[29] Their study also looks at how reporting across different classes of assets (land, livestock, productive equipment, jewelry) varies by different types of shocks — illness, natural disasters, etc.

because of differences in how male- versus female-owned assets are drawn down to cope with these events; women's landholdings are smaller or less productive, for example, and so more likely to be sold off in the event of a negative shock.

To better understand the effects of survey approach on specific sub-groups, Table 5 presents the results from the estimation of a modified equation 1, augmented with the interactions between the business-as-usual/IHS4 identifier and a subset of controls that are closely related to household structure and land ownership, including individual headship, age (whether the individual is younger than 25, compared to all other adults), marital status, education, rural residence and variables on household composition – typically linked to norms/customs that can affect reporting around land ownership (see Desai and Barik, 2017, for a discussion using data from India, as well as Doss, 2013).

While household heads overall tend to report higher exclusive ownership and rights (Appendix Tables A4a-b), Table 5 shows that under the business-as-usual approach, economic ownership is lower among women heads as compared to reported ownership, as seen earlier across Table 2 and Figure 2 as well. For other effects, Table 5 shows relatively similar patterns across reported and economic ownership. On land ownership, across age (being younger than 25), marital status (relative to married couples, being separated/divorced or never married), and education, we see that the business-as-usual approach tends to raise exclusive ownership among men and women. On the other hand, being widowed or living in a larger household with more dependents (greater share of children and women aged 65+) reflects lower exclusive/higher joint ownership under the business-as-usual approach. Interaction effects of the business-as-usual approach also tend to be stronger for men overall, including a positive effect on both men's exclusive reported and economic ownership in rural areas.

Regarding *SDG Owner*, on the other hand, Table 5 shows that the interaction effects take on statistically significant coefficients more so among women. Noteworthy are the positive interaction effects associated with headship (related mainly to exclusive rights to sell/bequeath) and share of men aged 65+ in the household (related mainly to higher joint rights) as well as negative interaction effects associated with being younger, separated/divorced, and more educated (again mainly due to joint rights). For men, the only significant interaction effect is associated with the share of women aged 65+ in the household (significant negative effect, due to lower exclusive rights).[30]

Overall, we find that compared to individual interviews, the business-as-usual approach raises exclusive ownership across reported and economic classifications, driven mainly by men household heads. For women household heads, on the other hand, the choice of survey approach matters more (higher reported ownership in the business-as-usual approach, but higher economic

[30] The results for exclusive/joint rights are available upon request.

ownership under individual interviews). We also find that the (positive) interaction effects between the business-as-usual survey approach and variables on marital status, age, and rural residence tend to be stronger for men (and in particular regarding exclusive as opposed to joint land ownership).

4.2 (Parcel-Level) Intra-household disrepancies in reporting, and discrepancy analysis

To better understand the intra-household dynamics underlying the results above, we examine spouses' reporting discrepancies on ownership and rights over the same agricultural parcel. Since overall agreement between spouses was very high (Table 3), regressions looking at overall discrepancies across ownership and rights do not reveal much information about driving factors (Appendix Table A5). Also, not all forms of disagreement have the same gender implications. For example, within the relatively more common areas of disagreement highlighted in Table 3 — where one spouse reports joint ownership, and the other reports not owning land — inferences about gender gaps in ownership/rights are very different depending on whether the wife is the one reporting joint ownership/husband reports not owning (wife attributes some landholding status to herself) — or whether the husband reports joint ownership, but she does not consider herself a land owner (wife attributes no landholding status to herself).

Table 6 presents results for these two more common discrepancy scenarios, across reported and economic ownership. Specifically, columns (1-2) (scenario 1) reflect the woman reporting less (no) reported or economic ownership for herself, respectively, as compared to columns (3-4) (scenario 2) where she reports joint land ownership, but the husband says he does not own land. Generally, the results show that greater household status for women is negatively associated with scenario 1, and positively with scenario 2 where they attribute some land ownership to themselves. Female household heads are significantly less likely to fall in scenario 1, for example. Scenario 1 is also positively associated with patrilineal marriages (for discrepancies in economic ownership, in particular). Women who are the main decision-makers over any plot in the household are also significantly less likely to fall in scenario 1, and more likely to fall in scenario 2 (although the significance is weaker). One potential reason — as discussed earlier, and in Jacobs and Kes (2015) — is that if interpretation around "joint" ownership is unclear, the husband in scenario 2 may interpret the wife as having exclusive ownership, whereas the wife still tends to attribute some ownership to him (perhaps due to cultural factors). This would also be consistent with the wife having a main decision-making role around agricultural activities in the household.

Table 5. Interactions of Business-As-Usual Survey Approach (T1/IHS4) with Individual and Household Attributes

	Men					Women				
	Reported		Economic		SDG Owner	Reported		Economic		SDG Owner
	Exclusive	Joint	Exclusive	Joint		Exclusive	Joint	Exclusive	Joint	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
T1/IHS4	0.024	0.027	0.080*	0.085	0.018	0.017	0.001	0.026	-0.005	0.035
	[0.46]	[0.40]	[1.67]	[1.25]	[0.24]	[0.32]	[0.03]	[0.64]	[-0.08]	[0.61]
HH head	0.204***	0.138***	0.113***	0.227***	0.279***	0.291***	-0.162***	0.257***	-0.109***	0.109***
	[6.44]	[4.59]	[3.96]	[6.32]	[7.39]	[9.46]	[-6.83]	[7.98]	[-3.45]	[3.51]
HH head*T1	0.074**	0.024	-0.049	-0.054	0.049	0.166***	0.028	-0.092**	-0.107***	0.089**
	[2.15]	[0.73]	[-1.57]	[-1.43]	[1.21]	[4.96]	[1.08]	[-2.57]	[-3.19]	[2.58]
Age 18-24	-0.084***	0.011	-0.068***	-0.023	-0.09***	-0.10***	-0.115***	-0.089***	-0.102***	-0.158***
	[-3.28]	[0.36]	[-4.17]	[-0.80]	[-2.74]	[-3.95]	[-4.24]	[-5.15]	[-3.78]	[-6.18]
Age 18-24*T1	0.052*	-0.099***	0.032*	-0.062**	-0.027	-0.022	-0.001	0.032*	-0.037	-0.058**
	[1.94]	[-3.21]	[1.78]	[-1.99]	[-0.87]	[-0.92]	[-0.05]	[1.76]	[-1.30]	[-2.15]
Separated/ divorced	0.045	-0.048	0.076	-0.099*	0.002	-0.060*	-0.062**	0.028	-0.136***	0.012
	[0.84]	[-0.84]	[1.56]	[-1.81]	[0.02]	[-1.76]	[-2.41]	[0.99]	[-3.70]	[0.33]
Separated/ divorced*T1	0.178***	-0.101*	0.039	-0.112*	0.053	0.079**	-0.04	-0.037	0.025	-0.071*
	[2.85]	[-1.69]	[0.66]	[-1.92]	[0.67]	[2.14]	[-1.41]	[-1.14]	[0.65]	[-1.70]
Widowed	0.299***	-0.042	0.398***	-0.179***	0.116	-0.007	-0.033	0.029	-0.101**	-0.011
	[2.86]	[-0.50]	[3.48]	[-2.93]	[1.25]	[-0.17]	[-0.94]	[0.80]	[-2.37]	[-0.31]
Widowed*T1	-0.282**	0.061	-0.379***	0.172**	-0.086	-0.026	0.051	-0.005	0.101**	0.02
	[-2.47]	[0.69]	[-3.05]	[2.49]	[-0.83]	[-0.62]	[1.37]	[-0.12]	[2.20]	[0.48]
Never married	0.077**	-0.069	0.084***	-0.057	-0.015	-0.058**	-0.074**	0.017	-0.150***	-0.047
	[2.13]	[-1.61]	[2.86]	[-1.20]	[-0.33]	[-2.07]	[-2.01]	[0.80]	[-3.96]	[-1.31]
Never married*T1	0.114**	-0.078	-0.038	-0.153***	0.06	0.057*	-0.041	-0.023	0.027	0.008
	[2.35]	[-1.60]	[-0.90]	[-2.86]	[1.04]	[1.77]	[-1.06]	[-0.90]	[0.67]	[0.19]
Education: highest level	-0.010*	0.022***	-0.007	0.024***	0.007	-0.007	0.006	-0.008	0.01	0.009
	[-1.81]	[3.18]	[-1.44]	[2.66]	[0.75]	[-0.55]	[0.71]	[-1.07]	[0.80]	[0.80]
Education level*T1	0.008	-0.024***	0.009	-0.027***	-0.008	-0.003	-0.020**	0.003	-0.028**	-0.022*
	[1.27]	[-3.22]	[1.65]	[-2.74]	[-0.81]	[-0.21]	[-2.18]	[0.39]	[-2.32]	[-1.86]
Share children ≤ 14	0.029	0.039	-0.092**	0.051	0	0.115*	-0.028	0.097**	-0.004	0.079
	[0.56]	[0.62]	[-2.25]	[0.97]	[-0.01]	[1.96]	[-0.64]	[1.97]	[-0.09]	[1.53]
Share children ≤ 14 *T1	-0.114**	0.026	0.063	0.024	-0.002	-0.047	0.103**	0.022	0.007	0.024
	[-2.02]	[0.39]	[1.42]	[0.40]	[-0.03]	[-0.76]	[2.19]	[0.42]	[0.13]	[0.44]
Share of men ≥ 65	-0.037	0.061	-0.184***	0.19	0.115	-0.265**	0.034	-0.017	-0.221	-0.374***
	[-0.34]	[0.25]	[-3.31]	[0.85]	[0.50]	[-2.17]	[0.21]	[-0.15]	[-1.59]	[-2.73]
Share of men ≥ 65*T1	-0.103	-0.102	-0.027	-0.139	-0.345	0.039	0.075	-0.039	0.143	0.361**
	[-0.81]	[-0.40]	[-0.41]	[-0.57]	[-1.46]	[0.30]	[0.44]	[-0.34]	[0.96]	[2.47]
Share women ≥ 65	0.117	0.456**	0.018	0.381***	0.269**	-0.67***	-0.041	-0.282***	-0.342**	-0.653***
	[0.86]	[2.50]	[0.19]	[2.68]	[1.99]	[-4.50]	[-0.28]	[-2.59]	[-2.03]	[-4.21]
Share women ≥ 65*T1	-0.493***	-0.195	-0.296***	-0.107	-0.295**	0.132	0.027	0.077	0.258	0.184
	[-3.48]	[-1.03]	[-2.95]	[-0.70]	[-2.08]	[0.82]	[0.17]	[0.63]	[1.40]	[1.06]
HH size	-0.013***	0.011	0.002	0.003	-0.004	-0.02***	0.005	-0.010***	-0.001	-0.014***
	[-2.92]	[1.59]	[0.39]	[0.52]	[-0.71]	[-3.52]	[0.93]	[-2.62]	[-0.17]	[-3.30]
HH size*T1	-0.004	-0.006	-0.013***	0.001	-0.005	-0.001	-0.010*	-0.006	-0.001	-0.002
	[-0.80]	[-0.87]	[-2.97]	[0.16]	[-0.85]	[-0.24]	[-1.81]	[-1.44]	[-0.21]	[-0.33]
Rural	0.013	0.042	-0.01	0.080**	0.024	0.046	0.056	0.023	0.05	-0.005
	[0.59]	[1.36]	[-0.63]	[2.46]	[0.67]	[1.58]	[1.54]	[1.01]	[1.33]	[-0.13]
Rural*T1	0.050**	0.011	0.043**	-0.008	0.051	-0.023	0.004	0.018	0.03	0.057
	[1.99]	[0.33]	[2.34]	[-0.24]	[1.34]	[-0.71]	[0.10]	[0.72]	[0.78]	[1.40]
Observations	11,787	11,787	11,787	11,787	11,787	14,180	14,180	14,180	14,180	14,180
R2	0.179	0.106	0.064	0.105	0.217	0.343	0.102	0.113	0.104	0.179

Notes:

The sample is comprised of individuals 18 and older, and of those involved in agriculture. The results are from linear probability models, weighted by the response weight. ***=p<0.01, **=p<0.05, *=p<0.10. T-statistics are presented in brackets, and account for clustering at the enumeration area level.

We also find some evidence that couples in scenario 1 are, compared to the overall sample, less likely to have certain assets (woman not owning a mobile phone) and infrastructure (no electricity). Couples in scenario 2, on the other hand, appear to be somewhat better off compared to the overall sample, with access to piped water, and less likely to have faced a shock affecting income or assets. Apart from the variables related to women's status, parcel size and number of plots in the parcel also appear to be positively correlated with scenario 1, indicating that women tend to own smaller parcels. This could be because perceptions around ownership of specific parcels are more likely to be blurred as land size and diversity of cropping activities increase.

Table 6: Correlates of Reporting Discrepancies in Parcel Reported and Economic Ownership in T5/IHPS

	Discrepancy scenario 1: **Husband: joint ownership, wife: she does not own**		**Discrepancy scenario 2:** **Wife: joint ownership, husband: he does not own**	
	(1) Reported	**(2) Economic**	**(3) Reported**	**(4) Economic**
HH head is female (Y=1 N=0)	-0.052***	-0.104**	0.065	0.002
	[-2.63]	[-2.61]	[0.97]	[0.03]
Patrilineal marriage (Y=1 N=0)	0.047	0.201***	-0.124	-0.004
	[0.62]	[2.83]	[-1.15]	[-0.05]
Matrilineal marriage (Y=1 N=0)	-0.027	0.035	-0.063	0.098
	[-0.37]	[0.53]	[-0.58]	[1.32]
Length of marriage (yrs.)	0	-0.001	0.002	0.002
	[0.28]	[-0.62]	[1.12]	[0.91]
Woman: age	-0.001	-0.004	-0.002	0.002
	[-0.44]	[-1.12]	[-0.95]	[0.72]
Man: age	0	0.005*	0.001	-0.004
	[-0.00]	[1.80]	[0.41]	[-1.46]
Woman: suffers from chronic illness	-0.037	-0.059	0.086*	0.05
	[-0.98]	[-1.17]	[1.90]	[0.94]
Man: suffers from chronic illness	0.021	0	-0.031	-0.064
	[0.45]	[0.01]	[-0.92]	[-1.27]
Woman: highest educational level	-0.015	-0.009	-0.004	-0.014
	[-1.33]	[-0.47]	[-0.31]	[-0.60]
Man: highest educational level	0.005	0	-0.006	-0.012
	[0.62]	[-0.02]	[-0.56]	[-0.68]
Woman: casual labor	0.001	-0.038	-0.008	-0.003
	[0.06]	[-1.03]	[-0.28]	[-0.08]
Man: casual labor	0.024	0.073**	-0.03	-0.008
	[1.07]	[2.18]	[-1.31]	[-0.23]
Household owns an enterprise or shop	-0.008	-0.056	0.026	-0.022
	[-0.26]	[-1.41]	[0.80]	[-0.47]
HH dependency ratio	-0.036**	-0.004	-0.007	0
	[-2.02]	[-0.17]	[-0.30]	[0.01]
HH size	0.011	0	0.008	-0.001
	[1.60]	[-0.03]	[1.14]	[-0.11]
Characteristics of parcel, market activity and decision-making				
Garden: log land size (acres)	0.031	0.094***	-0.021	-0.024
	[1.22]	[2.75]	[-1.19]	[-0.83]
Garden: number of plots	0.003	0.007*	0	0
	[0.93]	[1.89]	[-0.10]	[-0.02]
HH sells some crop (Y=1 N=0)	-0.007	-0.023	0.011	-0.036
	[-0.36]	[-0.77]	[0.42]	[-1.18]

Table 6 (Continued)

	Discrepancy scenario 1: Husband: joint ownership, wife: she does not own		Discrepancy scenario 2: Wife: joint ownership, husband: he does not own	
	(1) Reported	(2) Economic	(3) Reported	(4) Economic
Wife: listed as main decision-maker on cropping activities for any plot [3] (Y=1 N=0)	-0.049**	-0.112***	0.002	0.057*
	[-2.43]	[-3.79]	[0.06]	[1.73]
Assets and infrastructure				
Woman: owns mobile phone (Y=1 N=0)	-0.037	-0.068*	-0.035	-0.018
	[-1.40]	[-1.85]	[-1.04]	[-0.49]
Man: owns mobile phone (Y=1 N=0)	0.03	0.026	-0.004	-0.026
	[1.29]	[0.85]	[-0.17]	[-0.72]
HH has electricity (Y=1 N=0)	-0.080**	-0.048	0.026	-0.026
	[-2.29]	[-0.90]	[0.70]	[-0.45]
HH has piped water (Y=1 N=0)	0.082	0.063	0.093*	0.022
	[1.06]	[0.86]	[1.71]	[0.28]
HH distance to nearest road (km)	0.002	-0.001	0.001	0
	[0.87]	[-0.39]	[0.90]	[0.01]
HH faced a shock affecting income/assets (Y=1 N=0)	0.031	-0.023	-0.015	-0.088**
	[1.29]	[-0.65]	[-0.51]	[-2.38]
Language/region				
Language of HH head: Chewa	-0.025	0.002	-0.056*	-0.034
	[-0.70]	[0.05]	[-1.95]	[-0.89]
HH religion: Muslim	-0.039	-0.01	-0.036	-0.068
	[-0.94]	[-0.20]	[-1.15]	[-1.20]
Rural area	0.023	0.077*	0.042	0.023
	[0.64]	[1.68]	[1.11]	[0.32]
Region: North	-0.044	-0.114	0.045	-0.03
	[-0.69]	[-1.53]	[0.67]	[-0.44]
Region: Central	0.043	0.065	-0.005	-0.102**
	[1.30]	[1.38]	[-0.19]	[-2.09]
Constant	0.02	-0.023	0.224*	0.461***
	[0.22]	[-0.19]	[1.80]	[3.78]
Observations (number of parcels)	1,354	1,303	1,373	1,344
R2	0.073	0.114	0.039	0.072

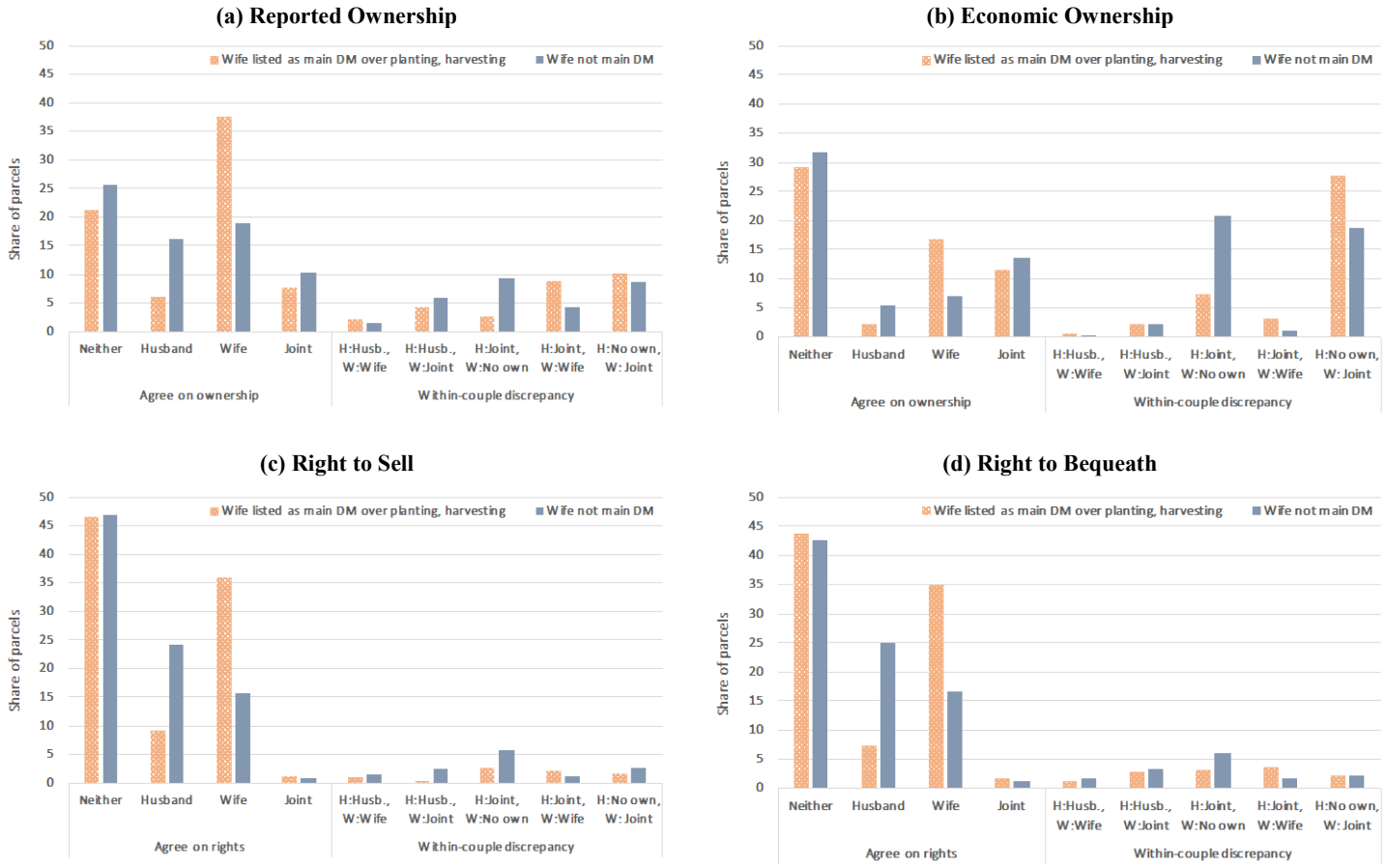
Notes:
(1) The results are from linear probability models, weighted by the response weight. ***=p<0.01, **=p<0.05, *=p<0.10. T-statistics are presented in brackets, and account for clustering at the enumeration area level.
(2) Zeroes for each reported ownership variable reflected agreement for reported ownership, and likewise for economic ownership.
(3) These include decisions concerning crops to be planted, input use and the timing of cropping activities.

Figure 5 plots the share of couples across all decision-making scenarios — by whether women are the main decision-maker in cropping activities — to better understand how greater decision-making for women in agriculture is associated with different combinations of spouses' reporting over ownership and rights. Figure 5 shows that where women are listed as the main decision-maker, couples are much more likely to agree that she is the exclusive reported owner (and, albeit to a lesser extent, economic owner), as well as with exclusive rights to sell and bequeath. Appendix Table A6, which presents regressions for agreement outcomes across reported and economic ownership, also shows similar findings. Similar to the discrepancy results in Table 6, Figure 5

shows that women listed as the main decision-makers were also much more likely to be represented in the scenario where the husband reports not owning land, but the wife reports joint ownership.

Ultimately, then, asking about women's decision-making roles in agriculture can shed light on understanding intra-household reporting over land. Discrepancies may result, for example, from household members perceiving their decision-making over the parcel as indicative of ownership, even if this is not necessarily the case. And on agreement, greater decision-making over crops is also shown in Figure 5 (and Appendix Table A6) to be more strongly associated with spouses agreeing on women's exclusive ownership — underscoring the links between decision-making, assets and bargaining power.

Figure 5. Association between Women's Decision-Making Over Agricultural Parcels, and Agreement/Discrepancy Scenarios over Ownership/Rights



Notes:

(1) The sample is comprised of individuals 18 and older, and of those involved in agriculture.
(2) Within agreement, differences between the decision-maker (DM) and non-DM columns were statistically significant at $p<0.01$ for the "Husband" and "Wife" ownership scenarios.

5. Conclusions

The results outlined above, based on concurrent nationally-representative surveys from Malawi, highlight how respondent selection can affect levels of ownership and rights constructs across men and women within households. In particular, our findings further bolster the UN (2017) recommendations to expand intra-household data collection on individual-disaggregated asset ownership and control, and to interview adult household members in private regarding their personal ownership of and rights to physical and financial assets. Doing so has significant gender implications. Asking the so-called most-knowledgeable household members on land ownership and rights of other adults, for example, raises the levels of exclusive reported and economic ownership of agricultural land among men, and lowers the levels of ownership among women. For younger to middle-age women, we find that the best-practice, private individual interviews also raise women's reported and economic ownership (exclusive and joint), as well as rights, relative to men. Further, under individual interviews, we find substantial agreement on parcel ownership among married/cohabiting spouses, and discrepancies that arise are typically associated with proxies of greater household status for women.

While the findings point to the value of following international best practices in individual-disaggregated data collection on ownership of and rights to land, further research is needed on better understanding how men and women within households (and across country/regional contexts) comprehend and interpret survey questions on asset ownership, often due to gender norms and other social customs. Doss et al. (2019), for example, suggest cognitive interviewing pilots in the field to shed light on these issues, as well as on correlates of discrepancies in intra-household reporting on land ownership and rights. In general, this is part of an important area of work on survey question design that needs to be explored further.

REFERENCES

Ambler, Kate, Cheryl Doss, Caitlin Kieran, & Simone Passarelli. (2017). "He says, she says: Exploring patterns of spousal agreement in Bangladesh." Discussion Paper 01616, International Food Policy Research Institute.

Andersson Djurfeldt, Agnes, Ellen Hillbom, Wapulumuka O. Mulwafub, Peter Mvulac, and Göran Djurfeldt. 2018. " 'The family farms together, the decisions, however are made by the man' — Matrilineal land tenure systems, welfare and decision making in rural Malawi." *Land Use Policy* 70: 601-610.

Annan, Jeannie, Aletheia Donald, Markus Goldstein, Paula Gonzalez Martinez, and Gayatri Koolwal. 2019. "Taking Power: Women's Empowerment and Household Well-Being in Sub-Saharan Africa." World Bank Policy Research Working Paper 9034.

Beegle, Kathleen, and Dominique van de Walle. 2019. "What can female headship tell us about women's well-being? Probably not much." *Development Impact* blog, World Bank.

Berge, Erline, Daimon Kambewa, Alister Munthali, Henrik Wiig. 2014. "Lineage and land reforms in Malawi: Do matrilineal and patrilineal landholding systems represent a problem for land reforms in Malawi?" *Land Use Policy* 41: 61-69.

Carletto, Calogero, Paul Corral and Anita Guelfi (2017). "Agricultural commercialization and nutrition revisited: Empirical evidence from three African countries." *Food Policy* 67: 106-118.

Carter, M., and Barrett, C. (2006). "The economics of poverty traps and persistent poverty: An asset-based approach." *The Journal of Development Studies*, 42.2, pp. 178–199.

Davis, Benjamin, Stefania Di Giuseppe, and Alberto Zezza. (2017). "Are African households (not) leaving agriculture? Patterns of households' income sources in rural Sub-Saharan Africa." *Food Policy* 67: 153–174.

Deininger, K., Savastano, S. and Xia, F. (2017a). "Smallholders' land access in sub-Saharan Africa: a new landscape?" *Food Policy* 67: 78-92.

Deininger, Klaus, Fang Xia and Stein Holden. (2017b). "Gender-differentiated impacts of tenure insecurity in Malawi's customary tenure systems." Land Governance Policy Brief, Issue 1, September.

Deere, C. D., Alvarado, G., and Twyman, J. (2012). "Gender inequality in asset ownership in Latin America: female owners versus household heads." *Development and Change*, 43.2, pp. 505–530.

Deere, C. D. and Doss, C. (2006). "The gender asset gap: what do we know and why does it matter?" *Feminist Economics,* 12.1-2, pp. 1–50.

Desai, Sonalde, and Debasis Barik (2017). "Landed Lives: Land Ownership in Rural India and Intra-Household Exchanges." IHDS Working Paper No. 2017-01.

Doss, C. (2013). "Intrahousehold Bargaining and Resource Allocation in Developing Countries." World Bank Research Observer, 28, pp. 52-78.

Doss, C., Catanzarite, Z., Baah-Boateng, W., Swaminathan, H., Deere, C. D., Boakye-Yiadom, L., and Suchitra, J.Y. (2018). "Do men and women estimate property values differently?" *World Development* 107, pp. 75-86.

Doss C., Deere, C. D., Oduro, A., Swaminathan, H., Suchitra, J., Lahoti, R., Baah-Boateng, W., Boakye-Yiadom, L., Twyman, J., Catanzarite, Z., Grown, C., and Hillesland, M. (2011). "The gender asset and wealth gaps: evidence from Ecuador, Ghana, and Karnataka, India." Bangalore: Indian Institute of Management.

Doss, C., Grown, C., and Deere, C. D. (2008). "Gender and asset ownership: a guide to collecting individual-level data." World Bank Policy Research Working Paper No. 4704.

Doss, C., Kieran, C., and Kilic, T. (2019). "Measuring ownership, control, and use of assets." *Feminist Economics*.

Doss, C., Kovarik, C., Peterman, A., Quisumbing, A., and van den Bold, M. (2015). "Gender inequalities in ownership and control of land in Africa: myth and reality." *Agricultural Economics*, 46.2, pp.403–434.

Glennerster, R., Walsh, C., and Diaz-Martin, L. (2018). "A practical guide to measuring women's and girls' empowerment in impact evaluations." Abdul Latif Jameel Poverty Action Lab.

Grown, C., Rao Gupta, G., and Kes, A. (2005). *Taking action: achieving gender equality and the millennium development goals.* London: Earthscan Publications.

Jacobs, K., and Kes, A. (2015). "The ambiguity of joint asset ownership: cautionary tales from Uganda and South Africa." *Feminist Economics*, 21.3, pp. 23-55.

Jayachandran, Seema (2015). "The roots of gender inequality in developing countries." *Annual Review of Economics*, 7, pp. 63-88.

Kang, Munsu, Benjamin Schwab, and Jisang Yu. (2020). "Gender differences in the relationship between land ownership and managerial rights: Implications for intrahousehold farm labor allocation." *World Development* 125.

Kilic, T., and Moylan, H. (2016). "Methodological experiment on measuring asset ownership from a gender perspective: technical report." Washington, DC: World Bank. Retrieved on November 4, 2019 from http://surveys.worldbank.org/publications/measuring-asset-ownership-gender-perspective.

Koolwal, Gayatri (2019). "Improving the Measurement of Rural Women's Employment: Global Momentum and Survey Research Priorities." World Bank Policy Research Working Paper 8840.

Lowder, Sarah K., Jakob Skoet and Terri Raney (2016). "The Number, Size, and Distribution of Farms, Smallholder Farms,and Family Farms Worldwide." World Development 87: 16-29.

Oduro, A., and Doss C. (2018). "Changing Patterns of Wealth Distribution: Evidence from Ghana" *The Journal of Development Studies*, 54.5, pp. 933-948.

Quisumbing, Agnes, Kumar, N., and Behrman, J. A. (2018). "Do shocks affect men's and women's assets differently? Evidence from Bangladesh and Uganda." *Development Policy Review*, 6, pp. 3-34.

Ruel, E., and Hauser, R. (2013) “Explaining the gender wealth gap.” *Demography*, 50, pp. 1155–1176.

Schlager, E., and Ostrom, E. (1992). “Property-rights regimes and natural resources: a conceptual analysis.” *Land Economics*, 68.3, pp. 249–262.

Slavchevska, V., De la O, A., Brunelli, C., and Doss, C. (2017). “Beyond Ownership: Women’s and Men’s Land Rights in sub-Saharan Africa.” Paper presented at the World Bank Conference on Land and Poverty, Washington, DC.

Twyman, Jennifer, Pilar Useche, and Carmen Diana Deere (2015). “Gendered Perceptions of Land Ownership and Agricultural Decision-making in Ecuador: Who Are the Farm Managers?” *Land Economics* 91(3): 479–500.

United Nations Statistics Division (UNSD). (2019). *Guidelines for Producing Statistics on Asset Ownership from a Gender Perspective.* Retrieved on November 4, 2019 from .https://unstats.un.org/edge/publications/docs/Guidelines_final.pdf

Van den Broeck, Goedele, and Talip Kilic. (2019). “Dynamics of off-farm employment in Sub-Saharan Africa: A gender perspective.” *World Development* 119: 81-99.

Warren, T. (2006). “Moving beyond the gender wealth gap: on gender, class, ethnicity, and wealth inequalities in the United Kingdom.” *Feminist Economics*, 12.1-2, pp. 195–219.

Appendix I

Protocol for Administering the IHPS Individual Questionnaire

1. Upon arrival in a Panel A EA during Visit 1, the team leader must attempt to identify all households assigned on Day 1.
2. At this time, the team leader needs to compile a preliminary list of the number of eligible adults in each household and the gender composition. This is, of course, the preliminary list, and the final determination of target individuals in each household will be based on the information in Module B.
3. After administering Module B, the enumerator should call/text/Whatsapp the supervisor confirming the number of adults that are within the EA and that are eligible for the individual interview.
4. Individual interviews should not all be saved for the last day in the EA, but should be conducted during the 4 days in a Panel A EA in Visit 1 or a Panel B EA in Visit 2.
5. After the enumerator administers the Household and Agriculture Questionnaires, he/she MUST copy the key information from the interview into the booklet of rosters on (i) household members, (ii) agricultural gardens (i.e. parcels), and (iii) agricultural plots.
6. Prior to approaching the household for the individual interview(s), the enumerators who will be conducting the interviews should meet away from the household, and
    a. Copy the information from the booklet of rosters into the CAPI application.
    b. Have a short briefing on the household composition such that each enumerator has a basic understanding of the household prior to starting their interview.
7. Make a proper introduction to the household of the purpose of the individual questionnaire.
8. Proceed with the interview(s) while making sure that interviews are done in private, simultaneously, and with a gender match between the enumerator(s) and the respondent(s).
9. Present questions in a way that the respondents feel comfortable sharing any hidden assets.
10. Present questions in a way that respondents feel comfortable responding honestly to questions on ownership of and rights to assets.
11. As necessary, add any agricultural gardens that were missed in the full household interview, in line with the instructions on the CAPI application.
12. Do not share any confidential information from these interviews with anyone, including others in the same household, some of whom may also be subject to an individual interview.

Table A1. Logit Regression of Response (i.e. Participation in Individual Interview) Among IHPS Adult Household Members

	Outcome: whether eligible adult is a respondent
Age	-0.000
	[-0.19]
Female	0.089***
	[9.70]
Highest educational qualification: (reference: none)	
Primary	0.099***
	[6.14]
Junior secondary	0.087***
	[4.30]
Senior secondary	0.124***
	[5.96]
Diploma/post-graduate	0.100***
	[4.66]
Currently married	-0.070***
	[-4.18]
Individual is head or spouse	0.240***
	[13.41]
Months member is away	-0.013***
	[-6.76]
Log household size	-0.051***
	[-4.42]
Household: dependency ratio of children, and elderly/adults 15-64	0.027***
	[3.44]
Wealth index, based on durable goods ownership and housing conditions	-0.008**
	[-2.09]
District Fixed Effects	Yes
Interview month Fixed Effects	Yes
Enumerator Fixed Effects	Yes
Observations	5,733
Pseudo R2	0.22

Notes:
Average marginal effects reported. Z-statistics in brackets. * ($p < 0.1$), ** ($p < 0.05$) and *** ($p < 0.01$).

Table A2. Means of Control Variables, by Survey Approach (T1/IHS4 vs. T5/IHPS) and Gender

	Men				Women			
	T1: IHS4		T5: IHPS		T1: IHS4		T5: IHPS	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Individual variables								
HH head	0.73***	[0.45]	0.65***	[0.47]	0.26***	[0.44]	0.21***	[0.41]
Aged 18-24	0.26***	[0.44]	0.30***	[0.46]	0.25***	[0.43]	0.28***	[0.45]
Aged 25-34	0.23	[0.42]	0.24	[0.43]	0.26	[0.44]	0.26	[0.44]
Marital status:(3) separated/divorced	0.03	[0.17]	0.03	[0.17]	0.13**	[0.33]	0.11**	[0.31]
Marital status: widowed	0.01	[0.12]	0.01	[0.10]	0.06***	[0.23]	0.11***	[0.31]
Marital status: polygamous marriage	0.06*	[0.24]	0.05*	[0.22]	0.03	[0.16]	0.03	[0.16]
Marital status: monogamous	0.65**	[0.48]	0.68**	[0.47]	0.61***	[0.49]	0.66***	[0.47]
Muslim	0.10*	[0.29]	0.15*	[0.35]	0.10*	[0.31]	0.16*	[0.36]
Highest educational level	1.6**	[1.3]	1.8**	[1.3]	1.2**	[1.0]	1.3**	[1.1]
Nonfarm employment:								
Ran NFE in last 12 months	0.13***	[0.34]	0.20***	[0.40]	0.11***	[0.31]	0.17***	[0.37]
Helped in NFE in last 12 months	0.04***	[0.20]	0.10***	[0.29]	0.05***	[0.21]	0.07***	[0.26]
Salaried employment	0.13***	[0.33]	0.17***	[0.38]	0.03*	[0.18]	0.05*	[0.21]
Casual labor	0.51	[0.50]	0.48	[0.50]	0.41	[0.49]	0.37	[0.48]
Suffers from chronic illness	0.09	[0.29]	0.09	[0.28]	0.12	[0.33]	0.11	[0.31]
Has a mobile phone	0.40***	[0.49]	0.49***	[0.50]	0.22***	[0.41]	0.27***	[0.45]
Household variables								
Share other HH members:(3) children <=14	0.36	[0.22]	0.37	[0.20]	0.40	[0.22]	0.40	[0.20]
Share other HH members: men 31-64	0.02***	[0.07]	0.03***	[0.07]	0.10	[0.11]	0.10	[0.11]
Share other HH members: women 31-64	0.12	[0.12]	0.11	[0.11]	0.02**	[0.07]	0.03**	[0.07]
Share other HH members: men 65+	0.01	[0.04]	0.01	[0.04]	0.02***	[0.09]	0.01***	[0.07]
Share other HH members: women 65+	0.02**	[0.09]	0.01**	[0.07]	0.01	[0.05]	0.01	[0.05]
Household size	5.1***	[2.1]	5.7***	[2.4]	4.9***	[2.1]	5.5***	[2.5]
Language of HH head: Chewa	0.60**	[0.50]	0.69**	[0.46]	0.59***	[0.49]	0.69***	[0.46]
HH faced any income/asset shock (4)	0.82*	[0.38]	0.79*	[0.41]	0.83	[0.38]	0.80	[0.40]
House has electricity connection	0.09**	[0.29]	0.14**	[0.35]	0.08*	[0.28]	0.12*	[0.32]
House has piped water	0.09**	[0.29]	0.14**	[0.34]	0.08	[0.28]	0.11	[0.31]
Regional variables								
Region: (3) North	0.22***	[0.41]	0.11***	[0.32]	0.21***	[0.40]	0.10***	[0.30]
Region: Central	0.35**	[0.48]	0.47**	[0.50]	0.34**	[0.47]	0.45**	[0.50]
Rural locality	0.88***	[0.32]	0.79***	[0.41]	0.89**	[0.31]	0.84**	[0.37]
Observations	**10,066**		**1,721**		**11,962**		**2,218**	

Notes:
(1) Sample is comprised of individuals 18 and older, and of those involved in agriculture. The IHS4 and IHPS had separate agricultural modules for the rainy and dry seasons; data are presented for the rainy season module. Estimates are weighted using the response weight.
(2) Standard deviations in brackets. Adjusted Wald tests for equality of means conducted within samples of men and women (across the two survey approaches). ***=p<0.01, **=p<0.05, *=p<0.10
(3) Excluded categories: for marital status: never married; share of household members: men/women aged 15-30; region: South.
(4) Shocks include food and/or agricultural input/output price fluctuations, natural shocks (i.e. flood, drought), death/illness in the family, theft, and conflict.

Table A3a. Means of Control Variables in IHS4, by Most Knowledgeable Respondent Status and Gender

	Men: "most knowledgeable" respondent in IHS4 parcel-level data				Women: "most knowledgeable" respondent in IHS4 parcel-level data			
	Yes		No		Yes		No	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Individual variables								
HH head	0.96	[0.18]	0.56	[0.50]	0.49	[0.50]	0.06	[0.24]
Aged 18-24	0.11	[0.31]	0.37	[0.48]	0.14	[0.34]	0.35	[0.48]
Aged 25-34	0.26	[0.44]	0.22	[0.41]	0.27	[0.45]	0.24	[0.43]
Marital status:(3) separated/divorced	0.04	[0.21]	0.02	[0.14]	0.20	[0.40]	0.06	[0.24]
Marital status: widowed	0.02	[0.14]	0.01	[0.09]	0.10	[0.30]	0.02	[0.15]
Marital status: polygamous marriage	0.06 †	[0.24]	0.06 †	[0.24]	0.03	[0.18]	0.02	[0.14]
Marital status: monogamous	0.83	[0.38]	0.53	[0.50]	0.55	[0.50]	0.66	[0.47]
Muslim	0.09	[0.28]	0.10	[0.30]	0.13	[0.33]	0.08	[0.28]
Highest educational level	1.5	[1.1]	1.8	[1.3]	1.1	[0.97]	1.3	[1.1]
Nonfarm employment:								
Ran NFE in last 12 months	0.16	[0.37]	0.11	[0.31]	0.14	[0.35]	0.08	[0.28]
Helped in NFE in last 12 months	0.04 †	[0.20]	0.04 †	[0.19]	0.04	[0.20]	0.06	[0.23]
Salaried employment	0.11	[0.30]	0.14	[0.34]	0.03 †	[0.18]	0.03 †	[0.18]
Casual labor	0.55	[0.49]	0.47	[0.50]	0.49	[0.50]	0.33	[0.47]
Suffers from chronic illness	0.10	[0.30]	0.08	[[0.28]	0.15	[0.35]	0.10	[0.30]
Has a mobile phone	0.47	[0.50]	0.34	[0.48]	0.24	[0.42]	0.21	[0.40]
Household variables								
Share other HH members:(3) children <=14	0.37	[0.23]	0.36	[0.21]	0.43	[0.24]	0.37	[0.21]
Share other HH members: men 31-64	0.01	[0.04]	0.04	[0.08]	0.08	[0.11]	0.11	[0.11]
Share other HH members: women 31-64	0.10	[0.13]	0.13	[0.11]	0.01	[0.04]	0.05	[0.09]
Share other HH members: men 65+	0.002	[0.02]	0.01	[0.05]	0.02	[0.07]	0.03	[0.09]
Share other HH members: women 65+	0.02 †	[0.09]	0.02 †	[0.08]	0.007	[0.04]	0.01	[0.06]
Household size	4.5	[2.0]	5.4	[2.1]	4.4	[2.0]	5.2	[2.1]
Language of HH head: Chewa	0.60 †	[0.49]	0.59 †	[0.49]	0.62	[0.49]	0.57	[0.50]
HH faced any income/asset shock (4)	0.86	[0.35]	0.81	[0.39]	0.80	[0.40]	0.85	[0.36]
House has electricity connection	0.05	[0.21]	0.12	[0.32]	0.06	[0.23]	0.11	[0.31]
House has piped water	0.04	[0.21]	0.12	[0.32]	0.06	[0.23]	0.11	[0.31]
Regional variables								
Region: (3) North	0.21	[0.41]	0.22	[0.41]	0.14	[0.35]	0.26	[0.44]
Region: Central	0.39	[0.49]	0.32	[0.47]	0.31	[0.46]	0.36	[0.48]
Rural locality	0.94	[0.25]	0.85	[0.36]	0.91	[0.29]	0.87	[0.33]
Observations	**4,215**		**5,851**		**5,581**		**6,381**	

Notes:

(1) In 65 percent of households in the parcel data, there was one respondent; 27 percent of households had two respondents, and the remaining 8 percent had three or more respondents. The IHS4 had separate agricultural modules for the rainy and dry seasons; data are presented for the rainy season module.

(2) Standard deviations in brackets. Adjusted Wald tests for equality of means conducted within samples of men and women (across whether "most knowledgeable" respondent in the parcel-level data). All differences were statistically significant at $p<0.01$, except those marked with † (not significant).

(3) Excluded categories: for marital status: never married; share of household members: men/women aged 15-30; region: South.

(4) Shocks include food and/or agricultural input/output price fluctuations, natural shocks (i.e. flood, drought), death/illness in the family, theft, and conflict.

Table A3b. Correlates of Being a Most Knowledgeable Respondent for At least One Parcel in IHS4

	(1) Sample of women	(2) Sample of men	(3) Combined sample
Individual variables			
Female			0.018**
			[2.45]
HH head	0.621***	0.465***	0.430***
	[26.50]	[23.12]	[29.09]
Spouse	0.221***	0.158***	0.102***
	[11.41]	[4.60]	[3.21]
Female*HH head			0.220***
			[15.82]
Female*spouse			0.176***
			[5.40]
Aged 18-24	-0.079***	-0.014	-0.047***
	[-6.05]	[-0.82]	[-4.90]
Aged 25-34	-0.007	-0.042***	-0.013
	[-0.65]	[-2.85]	[-1.63]
Separated/Divorced	0.039***	0.184***	0.099***
	[2.70]	[6.31]	[7.59]
Widowed	-0.003	-0.005	0.005
	[-0.20]	[-0.14]	[0.34]
Polygamous marriage	0.081***	-0.120***	-0.033**
	[3.15]	[-5.75]	[-2.38]
Never married	0.007	0.112***	0.034**
	[0.40]	[3.59]	[2.43]
Muslim	0.034**	-0.050***	-0.003
	[2.47]	[-3.03]	[-0.42]
Highest educational level attained	0.020***	-0.008*	0.003
	[4.20]	[-1.76]	[1.14]
Ran NFE in last 12 months	0.043***	-0.005	0.023**
	[3.15]	[-0.37]	[2.33]
Helped in NFE in last 12 months	-0.040**	0.035	-0.012
	[-2.19]	[1.54]	[-0.86]
Salaried employment	-0.077***	-0.117***	-0.114***
	[-3.23]	[-6.98]	[-8.24]
Casual labor	0.058***	0.020**	0.043***
	[6.88]	[2.13]	[8.04]
Suffers from chronic illness	0.01	0.012	0.012
	[0.88]	[0.80]	[1.56]
Has a mobile phone	0.027**	0.100***	0.070***
	[2.47]	[9.49]	[9.63]
Household variables			
Share other HH members: children <=14	0.092***	-0.055*	0.025**
	[4.42]	[-1.93]	[2.08]
Share other HH members: men 31-64	-0.110**	-0.003	-0.053
	[-2.35]	[-0.03]	[-1.35]
Share other HH members: women 31-64	-0.375***	-0.138***	-0.159***
	[-5.34]	[-2.93]	[-4.15]
Share other HH members: men 65+	-0.173***	-0.162**	-0.219***
	[-3.10]	[-2.00]	[-4.55]
Share other HH members: women 65+	0.012	0.065	0.108**
	[0.18]	[1.10]	[2.49]
Household size	-0.009***	-0.020***	-0.015***
	[-3.99]	[-6.92]	[-10.75]
Language of HH head: Chewa	0.013	-0.013	0.001
	[1.27]	[-1.06]	[0.23]

HH faced shock affecting income/assets (Y=1, N=0)	-0.057***	0.052***	-0.009**
	[-5.49]	[4.43]	[-2.10]
Dwelling has electricity	-0.016	-0.058***	-0.036***
	[-0.82]	[-2.91]	[-3.63]
Drinking water from personal pipe	-0.034	-0.046**	-0.037***
	[-1.59]	[-2.12]	[-3.06]
Region: North	-0.147***	0.041**	-0.058***
	[-9.73]	[2.42]	[-5.71]
Region: Central	-0.076***	0.067***	-0.011***
	[-7.00]	[5.36]	[-2.58]
Rural locality	-0.002	0.104***	0.048***
	[-0.14]	[5.73]	[4.24]
Constant	0.268***	0.056	0.144***
	[7.34]	[1.35]	[5.81]
Observations	11,962	10,066	22,028
R2	0.324	0.262	0.277

Notes:
(1) Sample is comprised of individuals 18 and older, and of those involved in agriculture.
(2) Regressions are linear probability models; t-statistics accounting for clustering at the enumeration-area level are presented in brackets. ***=p<0.01, **=p<0.05, *=p<0.10

Table A4a. Full Regression Results for Reported Land Ownership, by Gender

	Men		Women	
	Exclusive	**Joint**	**Exclusive**	**Joint**
Business-as-usual survey approach (T1)	0.087***	-0.037*	0.015	-0.031**
	[4.74]	[-1.71]	[0.81]	[-2.11]
Individual variables				
HH head	0.265***	0.171***	0.420***	-0.151***
	[18.60]	[11.65]	[31.10]	[-13.33]
Aged 18-24	-0.053***	-0.060***	-0.113***	-0.109***
	[-3.88]	[-4.61]	[-10.92]	[-10.82]
Aged 25-34	-0.049***	-0.005	-0.032***	-0.045***
	[-4.11]	[-0.43]	[-3.38]	[-4.92]
Separated/Divorced	0.160***	-0.101***	0.014	-0.073***
	[5.78]	[-4.66]	[1.03]	[-7.40]
Widowed	0.107***	-0.015	-0.024	-0.005
	[2.61]	[-0.55]	[-1.49]	[-0.37]
Polygamous marriage	0.032*	0.016	-0.031	0.047*
	[1.69]	[0.85]	[-1.31]	[1.87]
Never married	0.130***	-0.013	0.02	-0.083***
	[7.23]	[-0.66]	[1.41]	[-7.40]
Muslim	-0.030*	-0.054***	0.044***	-0.043***
	[-1.94]	[-3.84]	[2.66]	[-3.25]
Highest educational level attained	-0.004	0.003	-0.009**	-0.009**
	[-1.28]	[0.79]	[-2.13]	[-2.44]
Ran NFE in last 12 months	-0.012	0.001	0.034***	-0.001
	[-0.91]	[0.12]	[3.07]	[-0.12]
Helped in NFE in last 12 months	-0.035**	0.028	-0.021	0.036**
	[-2.04]	[1.54]	[-1.42]	[2.37]
Salaried employment	-0.121***	-0.060***	-0.068***	-0.041***
	[-9.33]	[-4.94]	[-3.48]	[-2.68]
Casual labor	-0.014*	0.025***	0.011	0.016**
	[-1.66]	[3.05]	[1.41]	[2.11]
Suffers from chronic illness	0.039***	-0.032**	0.020*	-0.007
	[2.97]	[-2.46]	[1.82]	[-0.71]
Has a mobile phone	0.040***	0.006	-0.018**	0.002
	[4.39]	[0.62]	[-2.01]	[0.17]
HH variables				
Share other HH members: children <=14	-0.077***	0.073***	0.080***	0.061***
	[-3.27]	[3.13]	[4.09]	[3.37]
Share other HH members: men 31-64	-0.129*	-0.068	-0.126***	0.03
	[-1.90]	[-1.28]	[-3.15]	[0.80]
Share other HH members: women 31-64	-0.314***	0.165***	-0.658***	-0.443***
	[-7.54]	[4.20]	[-13.03]	[-8.96]
Share other HH members: men 65+	-0.145**	-0.024	-0.236***	0.125**
	[-2.35]	[-0.28]	[-4.97]	[2.43]
Share other HH members: women 65+	-0.336***	0.326***	-0.583***	-0.03
	[-6.52]	[6.07]	[-9.55]	[-0.43]
Household size	-0.016***	0.007***	-0.016***	-0.003
	[-7.51]	[2.71]	[-9.00]	[-1.52]
Language of HH head: Chewa	-0.002	-0.002	0.042***	-0.009
	[-0.17]	[-0.19]	[3.26]	[-0.88]
HH faced shock affecting income/assets (Y=1, N=0)	0.027**	-0.001	-0.050***	-0.002
	[2.55]	[-0.06]	[-4.81]	[-0.18]
Dwelling has electricity	-0.029*	-0.034**	-0.059***	-0.02
	[-1.96]	[-2.17]	[-4.01]	[-1.33]
Drinking water from personal pipe	-0.035**	-0.034**	-0.012	-0.030*
	[-2.22]	[-2.12]	[-0.73]	[-1.76]
Region: North	-0.014	0.154***	-0.228***	0.134***
	[-0.86]	[6.97]	[-15.64]	[6.42]

Region: Central	0.087***	-0.002	-0.105***	-0.008
	[7.19]	[-0.13]	[-7.87]	[-0.85]
Rural locality	0.051***	0.049***	0.028*	0.057***
	[3.83]	[3.32]	[1.80]	[3.87]
Constant	0.090**	-0.026	0.448***	0.254***
	[2.42]	[-0.67]	[13.42]	[9.85]
Observations	11,787	11,787	14,180	14,180
R2	0.175	0.102	0.34	0.10

Notes:
(1) Sample is comprised of individuals 18 and older, and of those involved in agriculture.
(2) Regressions are linear probability models, weighted by the response weight.
(3) T-statistics accounting for clustering at the enumeration-area level are presented in brackets. ***=p<0.01, **=p<0.05, *=p<0.10

Table A4b. Full Regression Results for Economic and SDG Land Ownership, by Gender

	Men			Women		
	(1) Economic owner – excl.	(2) Economic owner - joint	(3) SDG owner	(1) Economic owner – excl.	(2) Economic owner - joint	(3) SDG owner
Treatment Arm 1	0.038***	-0.024	0.054**	0.004	-0.033*	0.062***
	[3.53]	[-0.92]	[2.09]	[0.28]	[-1.91]	[3.36]
Individual variables						
HH head	0.069***	0.187***	0.326***	0.190***	-0.201***	0.169***
	[5.86]	[11.54]	[19.67]	[13.32]	[-15.00]	[11.51]
Aged 18-24	-0.043***	-0.060***	-0.112***	-0.064***	-0.131***	-0.202***
	[-3.86]	[-4.29]	[-7.31]	[-6.71]	[-11.03]	[-17.05]
Aged 25-34	-0.041***	0.001	-0.060***	-0.023**	-0.037***	-0.071***
	[-4.51]	[0.05]	[-4.58]	[-2.57]	[-3.48]	[-6.49]
Separated/Divorced	0.070**	-0.163***	0.045	-0.014	-0.101***	-0.021
	[2.47]	[-7.70]	[1.40]	[-1.01]	[-7.48]	[-1.37]
Widowed	0.115**	-0.063**	0.053	0.027	-0.026	-0.017
	[2.44]	[-2.24]	[1.27]	[1.50]	[-1.62]	[-0.89]
Polygamous marriage	0.005	0.023	0.082***	0.026	-0.019	0
	[0.34]	[1.14]	[4.25]	[1.18]	[-0.73]	[0.00]
Never married	0.039***	-0.093***	0.061***	-0.024*	-0.123***	-0.003
	[3.11]	[-4.47]	[2.74]	[-1.82]	[-9.74]	[-0.19]
Muslim	0.01	-0.031	-0.079***	0.006	-0.023	-0.022
	[0.96]	[-1.53]	[-4.52]	[0.49]	[-1.31]	[-1.26]
Highest educational level attained	0	0.003	0	-0.006*	-0.013***	-0.009*
	[-0.00]	[0.85]	[0.01]	[-1.73]	[-2.93]	[-1.90]
Ran NFE in last 12 months	0.007	0.005	-0.019	0.033***	-0.003	0.023*
	[0.76]	[0.38]	[-1.43]	[3.01]	[-0.24]	[1.76]
Helped in NFE in last 12 months	0.002	0.021	-0.01	0	0.002	0.011
	[0.13]	[1.10]	[-0.54]	[0.03]	[0.14]	[0.63]
Salaried employment	-0.041***	-0.071***	-0.143***	-0.01	-0.036**	-0.077***
	[-4.27]	[-4.85]	[-9.50]	[-0.59]	[-1.97]	[-3.48]
Casual labor	-0.005	0.025**	0.033***	0.036***	-0.002	0.054***
	[-0.73]	[2.53]	[3.62]	[4.59]	[-0.24]	[5.81]
Suffers from chronic illness	0.014	-0.008	0.025*	0.011	-0.014	0.039***
	[1.34]	[-0.58]	[1.77]	[1.03]	[-1.20]	[2.95]
Has a mobile phone	-0.004	0.016	0.043***	-0.016*	0.003	-0.01
	[-0.53]	[1.60]	[4.36]	[-1.96]	[0.30]	[-0.99]
HH variables						
Share other HH members: children <=14	-0.051***	0.084***	-0.002	0.109***	0.004	0.108***
	[-2.67]	[3.34]	[-0.07]	[5.49]	[0.20]	[4.79]
Share other HH members: men 31-64	-0.232***	-0.155***	-0.175***	-0.076**	-0.066	-0.068
	[-7.37]	[-2.61]	[-3.05]	[-2.32]	[-1.57]	[-1.58]
Share other HH members: women 31-64	-0.188***	0.179***	-0.101**	-0.252***	-0.569***	-0.751***
	[-5.65]	[4.32]	[-2.16]	[-5.47]	[-9.90]	[-12.42]
Share other HH members: men 65+	-0.215***	0.083	-0.181**	-0.053	-0.078	-0.036
	[-5.73]	[0.88]	[-2.31]	[-1.16]	[-1.39]	[-0.64]
Share other HH members: women 65+	-0.248***	0.326***	0.011	-0.205***	-0.136*	-0.521***
	[-6.42]	[5.65]	[0.20]	[-3.95]	[-1.83]	[-7.13]
Household size	-0.008***	0.005*	-0.008***	-0.014***	-0.002	-0.015***
	[-4.58]	[1.87]	[-3.29]	[-8.35]	[-1.01]	[-7.86]
Language of HH head: Chewa	0.008	-0.021	-0.007	0.007	-0.015	0.065***
	[0.90]	[-1.50]	[-0.48]	[0.62]	[-1.27]	[5.32]
HH faced shock affecting income/assets (Y=1, N=0)	0.016*	0.027**	0.027**	0.036***	0.019	-0.026**
	[1.91]	[2.13]	[2.33]	[3.90]	[1.62]	[-2.09]
Dwelling has electricity	-0.013	-0.093***	-0.051***	-0.002	-0.064***	-0.061***
	[-1.25]	[-5.25]	[-2.90]	[-0.15]	[-3.68]	[-3.40]
	-0.012	0.004	-0.060***	-0.035***	-0.021	-0.041**

Drinking water from personal pipe	-0.040***	-0.001	0.137***	-0.039***	-0.015	-0.098***
	[-3.82]	[-0.07]	[6.37]	[-3.19]	[-0.80]	[-4.91]
Region: North	0.007	-0.060***	0.087***	0.035***	-0.084***	-0.143***
	[0.86]	[-4.31]	[5.99]	[3.44]	[-7.13]	[-11.92]
Region: Central	0.021**	0.073***	0.062***	0.036***	0.073***	0.039**
	[2.26]	[4.41]	[3.51]	[3.17]	[4.04]	[2.16]
Rural locality	0.123***	0.067	0.054	0.138***	0.449***	0.470***
	[4.56]	[1.56]	[1.12]	[5.48]	[13.85]	[13.24]
Constant						
Observations	11,787	11,787	11,787	14,180	14,180	14,180
R2	0.06	0.102	0.216	0.111	0.101	0.176

Notes:
(1) Sample is comprised of individuals 18 and older, and of those involved in agriculture.
(2) Regressions are linear probability models, weighted by the response weight.
(3) T-statistics accounting for clustering at the enumeration-area level are presented in brackets. ***=p<0.01, **=p<0.05, *=p<0.10

Table A5. Correlates of Reporting Discrepancies Among Couples

	Within-couple discrepancies in reporting:			
	(1) Reported ownership	(2) Economic ownership	(3) Right to bequeath	(4) Right to sell
HH head is female (Y=1 N=0)	-0.037	-0.072	-0.033	-0.066***
	[-0.52]	[-0.90]	[-0.79]	[-2.64]
Patrilineal marriage (Y=1 N=0)	0.02	0.219**	0.029	0.037
	[0.15]	[2.20]	[0.50]	[0.81]
Matrilineal marriage (Y=1 N=0)	-0.004	0.163*	-0.016	0.007
	[-0.03]	[1.78]	[-0.25]	[0.14]
Length of marriage (yrs)	0	-0.001	0	0
	[0.00]	[-0.31]	[0.07]	[0.03]
Woman: age	-0.001	0	0.005*	0.004*
	[-0.28]	[0.05]	[1.85]	[1.67]
Man: age	0	0	-0.004*	-0.003
	[0.08]	[0.14]	[-1.70]	[-1.53]
Woman: suffers from chronic illness	0.047	0.016	-0.045*	-0.029
	[1.02]	[0.34]	[-1.67]	[-0.99]
Man: suffers from chronic illness	0.069	-0.032	0.07	0.017
	[0.95]	[-0.63]	[1.20]	[0.47]
Woman: highest educational level	-0.014	-0.011	0.002	0.002
	[-0.73]	[-0.46]	[0.16]	[0.20]
Man: highest educational level	0.011	-0.009	0.024*	0.025*
	[0.68]	[-0.54]	[1.84]	[1.96]
Woman: casual labor	-0.004	-0.014	0.024	0.027
	[-0.13]	[-0.40]	[0.96]	[1.42]
Man: casual labor	-0.02	0.03	0.021	0.024
	[-0.63]	[0.83]	[0.91]	[0.86]
Household owns an enterprise or shop	0.072	-0.053	0.026	0.011
	[1.42]	[-1.12]	[0.85]	[0.36]
HH dependency ratio	-0.012	-0.006	-0.012	-0.009
	[-0.45]	[-0.24]	[-0.96]	[-0.87]
HH size	0.009	0.004	-0.002	0.005
	[1.20]	[0.57]	[-0.41]	[0.93]
Characteristics of parcel, market activity and decision-making				
Garden: log land size (acres)	0.033	0.051	0.015	-0.016
	[1.03]	[1.48]	[0.57]	[-0.71]
Garden: number of plots	0.002	0.005	0.003	-0.001
	[0.50]	[1.27]	[1.30]	[-0.46]
HH sells some crop (Y=1 N=0)	0.034	-0.023	0.012	-0.007
	[1.02]	[-0.80]	[0.49]	[-0.29]
Wife: listed as main decision-maker on cropping activities for any plot #	0.004	0.003	-0.001	-0.044*
	[0.12]	[0.09]	[-0.06]	[-1.83]
Assets and infrastructure				
Woman: owns mobile phone (Y=1 N=0)	-0.04	-0.049	0.016	0.055
	[-0.95]	[-1.21]	[0.44]	[1.38]
Man: owns mobile phone (Y=1 N=0)	0.007	-0.016	0.012	0.002
	[0.20]	[-0.52]	[0.43]	[0.08]
HH has electricity (Y=1 N=0)	-0.039	-0.042	-0.122**	-0.094**
	[-0.74]	[-0.64]	[-2.48]	[-2.25]
HH has piped water (Y=1 N=0)	0.13	0.084	0.016	-0.026
	[1.45]	[1.00]	[0.20]	[-0.58]
HH distance to nearest road (km)	0.001	-0.001	0.003	0.001
	[0.57]	[-0.26]	[1.35]	[0.73]
	0.016	-0.061	0.001	0.034

	[0.39]	[-1.61]	[0.03]	[1.30]
HH faced a shock affecting income/assets (Y=1 N=0)	-0.04	-0.049	0.016	0.055
	[-0.95]	[-1.21]	[0.44]	[1.38]
Language/region				
Language of HH head: Chewa	-0.048	-0.009	0.029	0.059***
	[-1.10]	[-0.23]	[1.26]	[2.69]
HH religion: Muslim	-0.079	-0.075	-0.03	-0.01
	[-1.25]	[-1.35]	[-0.80]	[-0.30]
Rural area	0.082	0.110*	-0.006	-0.042
	[1.30]	[1.75]	[-0.11]	[-0.93]
Region: North	0.055	-0.092	0.347***	0.114*
	[0.46]	[-1.13]	[3.64]	[1.78]
Region: Central	-0.005	-0.059	0.018	-0.005
	[-0.09]	[-1.07]	[0.51]	[-0.14]
Constant	0.161	0.230*	-0.006	-0.03
	[0.93]	[1.74]	[-0.05]	[-0.34]
Observations	1,717	1,717	1,717	1,717
R-squared	0.026	0.031	0.098	0.047

Notes:
(1) Regressions are linear probability models; T-statistics accounting for clustering at the enumeration-area level are presented in brackets. ***=p<0.01, **=p<0.05, *=p<0.10
(2) Zeroes for each outcome variable reflected agreement in that category.
(3) # These include decisions concerning crops to be planted, input use and the timing of cropping activities.

Table A6. Correlates of Agreement in Reporting Among Couples

	Agreement: reported ownership				Agreement: economic ownership			
	(1) Neither	(2) Husband	(3) Wife	(4) Joint	(5) Neither	(6) Husband	(7) Wife	(8) Joint
HH head is female (Y=1 N=0)	0.084	-0.14	0.032	-0.117*	0.051	-0.008	0.161	-0.141**
	[0.70]	[-1.36]	[0.33]	[-1.77]	[0.61]	[-0.17]	[1.38]	[-2.36]
Patrilineal marriage (Y=1 N=0)	0.01	0.277***	-0.035	-0.393**	-0.174	-0.181	-0.243**	-0.493***
	[0.04]	[3.17]	[-0.21]	[-2.53]	[-0.89]	[-0.78]	[-2.23]	[-2.90]
Matrilineal marriage (Y=1 N=0)	0.003	0.104	0.214	-0.360**	-0.136	-0.206	-0.081	-0.471***
	[0.01]	[1.21]	[1.24]	[-2.25]	[-0.68]	[-0.88]	[-0.75]	[-2.84]
Length of marriage (yrs)	0.001	-0.006*	0.001	0.002	0.001	-0.003	0	0
	[0.47]	[-1.91]	[0.58]	[0.83]	[0.51]	[-1.46]	[0.23]	[0.17]
Woman: age	-0.002	-0.007	0.003	0.010**	-0.003	0	-0.003	0.006*
	[-0.40]	[-1.42]	[0.69]	[2.10]	[-0.65]	[-0.03]	[-0.72]	[1.75]
Man: age	0	0.009**	-0.003	-0.008*	0	0.002	0.004	-0.005
	[-0.05]	[2.31]	[-0.65]	[-1.94]	[0.07]	[0.76]	[1.17]	[-1.48]
Woman: suffers from chronic illness	-0.011	0.006	-0.111	-0.07	0.004	-0.006	0.017	-0.068
	[-0.18]	[0.09]	[-1.66]	[-1.24]	[0.07]	[-0.19]	[0.33]	[-1.43]
Man: suffers from chronic illness	-0.148*	0.074	-0.132	0.022	-0.058	0.102*	-0.018	0.141
	[-1.85]	[0.99]	[-1.42]	[0.36]	[-1.11]	[1.80]	[-0.35]	[1.54]
Woman: highest educational level	0.018	0.021	-0.005	0.003	0.011	0	0.028	0.003
	[0.63]	[0.66]	[-0.15]	[0.09]	[0.38]	[0.00]	[1.07]	[0.13]
Man: highest educational level	0.005	-0.036*	-0.03	0.001	0.013	-0.027**	-0.01	0.022
	[0.23]	[-1.89]	[-1.49]	[0.06]	[0.71]	[-2.21]	[-0.64]	[1.28]
Woman: casual labor	0.009	-0.053	0.007	0.009	0.022	0.007	-0.016	0.013
	[0.16]	[-1.16]	[0.16]	[0.20]	[0.51]	[0.29]	[-0.49]	[0.32]
Man: casual labor	-0.038	-0.012	0.064	0.105**	-0.072*	-0.022	0.048	0.021
	[-0.72]	[-0.27]	[1.37]	[2.44]	[-1.67]	[-0.90]	[1.34]	[0.56]
Household owns an enterprise or shop	-0.018	-0.102	-0.07	-0.114**	0.045	0.05	0.066	0.032
	[-0.27]	[-1.62]	[-1.17]	[-2.38]	[0.75]	[1.50]	[1.04]	[0.51]
HH dependency ratio	-0.003	0.081***	0.002	-0.004	-0.018	0.009	0.002	0.036
	[-0.07]	[2.66]	[0.05]	[-0.11]	[-0.52]	[0.59]	[0.08]	[1.44]
HH size	-0.013	-0.026***	-0.008	0.007	-0.004	-0.004	0.006	-0.007
	[-1.26]	[-2.93]	[-0.84]	[0.66]	[-0.43]	[-0.65]	[0.68]	[-0.89]
Characteristics of garden, market activity and decision-making								
Garden: log land size (acres)	-0.157**	0.163***	-0.088	0.055	-0.148***	0.080***	-0.037	0.034
	[-2.20]	[2.91]	[-1.64]	[1.21]	[-3.28]	[2.67]	[-1.19]	[0.91]
Garden: number of plots	-0.001	-0.001	-0.006	-0.003	-0.003	-0.004*	-0.004	-0.002
	[-0.19]	[-0.14]	[-1.10]	[-0.62]	[-0.76]	[-1.87]	[-1.13]	[-0.46]
HH sells some crop (Y=1 N=0)	-0.004	-0.056	-0.056	0.027	0.025	-0.017	-0.032	0.072**
	[-0.09]	[-1.21]	[-1.08]	[0.79]	[0.67]	[-0.73]	[-1.01]	[2.26]
Wife: listed as main decision-maker on cropping activities for any plot #	-0.045	-0.108*	0.141***	-0.062	-0.021	-0.070**	0.082*	-0.04
	[-0.85]	[-1.97]	[3.07]	[-1.28]	[-0.51]	[-2.48]	[1.82]	[-1.25]
Assets and infrastructure								
Woman: owns mobile phone (Y=1 N=0)	0.117**	-0.014	0.018	0.05	0.075	0.001	0.021	0.037
	[2.11]	[-0.24]	[0.29]	[0.81]	[1.56]	[0.04]	[0.51]	[0.77]
Man: owns mobile phone (Y=1 N=0)	0.008	-0.026	-0.04	0.003	0.028	0.007	-0.001	0.001
	[0.17]	[-0.55]	[-0.86]	[0.08]	[0.69]	[0.26]	[-0.03]	[0.04]
HH has electricity (Y=1 N=0)	0.064	-0.018	0.09	-0.037	0.053	0.003	0.06	-0.002
	[0.75]	[-0.24]	[1.10]	[-0.35]	[0.63]	[0.04]	[0.64]	[-0.02]
HH has piped water (Y=1 N=0)	-0.085	-0.055	-0.14	-0.192	-0.025	-0.064	-0.052	-0.219**
	[-0.66]	[-0.56]	[-1.42]	[-1.62]	[-0.23]	[-1.24]	[-0.64]	[-2.43]
HH distance to nearest road (km)	0.003	0	-0.002	-0.007***	0.003	0.001	-0.003*	-0.004**
	[0.57]	[-0.11]	[-0.89]	[-3.04]	[1.03]	[0.73]	[-1.75]	[-2.13]
HH faced a shock affecting income/assets (Y=1 N=0)	0.072	0.002	-0.084*	0.033	0.094*	0.022	-0.016	0.022
	[1.10]	[0.04]	[-1.74]	[0.56]	[1.89]	[0.85]	[-0.36]	[0.43]
Language/region								

Language of HH head: Chewa	0.078	0.119*	-0.013	0.119**	0.022	0.002	-0.073	0.056
	[1.06]	[1.88]	[-0.25]	[2.59]	[0.39]	[0.04]	[-1.51]	[1.24]
HH religion: Muslim	0.097	0.178*	0.057	-0.031	0.072	0.045	0.053	0.032
	[0.85]	[1.97]	[0.75]	[-0.55]	[0.83]	[1.08]	[0.86]	[0.35]
Rural area	-0.089	-0.037	-0.018	-0.255**	-0.098	-0.141**	0.037	-0.171**
	[-0.77]	[-0.42]	[-0.18]	[-2.34]	[-1.01]	[-2.40]	[0.47]	[-2.44]
Region: North	-0.071	-0.242***	-0.223***	0.286**	-0.003	-0.076	-0.087*	0.284***
	[-0.46]	[-3.14]	[-3.34]	[2.34]	[-0.02]	[-1.21]	[-1.79]	[3.16]
Region: Central	0.035	0.033	-0.03	-0.054	0.086	0.014	0.061	-0.012
	[0.35]	[0.52]	[-0.47]	[-1.06]	[1.02]	[0.40]	[1.22]	[-0.22]
Constant	0.567*	0.115	0.568**	0.610***	0.643***	0.366	0.227	0.701***
	[1.77]	[0.65]	[2.35]	[2.77]	[3.02]	[1.53]	[1.31]	[3.48]
Observations	921	739	887	664	1,258	804	878	949
R-squared	0.069	0.153	0.198	0.156	0.067	0.072	0.115	0.107

Notes:
(1) Regressions are linear probability models; T-statistics accounting for clustering at the enumeration-area level are presented in brackets. ***=p<0.01, **=p<0.05, *=p<0.10
(2) Zeroes for each outcome reflected disagreement in that category (reported/economic).
(3) # These include decisions concerning crops to be planted, input use and the timing of cropping activities.