

Appendix

Table A1: Rental market participation rates and renter characteristics, by year

| year | Percentage renting-in land (tenants) | Percentage renting-out land (landlords) | Median age of tenants | Median age of non-tenants |
|--------------|--|---|--------------------------|------------------------------|
| 2009 | 8.5% | 1.1% | 42 | 48 |
| 2011 | 5.7% | 1.1% | 43 | 49 |
| 2013 | 7.1% | 1.4% | 41 | 49 |
| <i>Total</i> | <i>7.0%</i> | <i>1.2%</i> | <i>42</i> | <i>49</i> |

Table A2: Characteristics of sample

| Variable | Unit | 2009/10 | | 2011/12 | | 2013/14 | |
|-------------------------------|-------------------------|---------|-------|---------|--------|---------|--------|
| | | Mean | SD | Mean | SD | Mean | SD |
| Tenant | Binary | 0.11 | 0.31 | 0.07 | 0.25 | 0.07 | 0.25 |
| Land rented-in | Hectares | 0.08 | 0.33 | 0.06 | 0.32 | 0.05 | 0.29 |
| Pre-rental land | Hectares | 2.23 | 7.39 | 2.51 | 5.16 | 2.81 | 7.26 |
| Age of head | Years | 46.9 | 15.3 | 48.8 | 15.2 | 50.8 | 15.3 |
| HH size | Persons | 5.5 | 2.9 | 5.8 | 3.1 | 5.7 | 3.1 |
| Max. educ. attainment | Years | 6.4 | 3.7 | 6.6 | 3.9 | 6.9 | 3.9 |
| Female head | Binary | 0.23 | 0.42 | 0.24 | 0.43 | 0.24 | 0.43 |
| Number of plots | Count | 2.18 | 1.32 | 2.27 | 1.45 | 2.34 | 1.55 |
| Value of assets | 1000s*TSh | 116.8 | 920.8 | 428.4 | 1699.6 | 626.9 | 2549.9 |
| Uses oxplough | Binary | 0.20 | 0.40 | 0.17 | 0.38 | 0.21 | 0.41 |
| Uses tractor | Binary | 0.03 | 0.16 | 0.05 | 0.23 | 0.06 | 0.24 |
| Fertilizer application rate | kg/ha | 237 | 1,700 | 175 | 694 | 210 | 1,144 |
| Is SACCO member | Share | 0.05 | 0.22 | 0.07 | 0.26 | 0.05 | 0.23 |
| Rec'd credit within last year | Share | 0.07 | 0.25 | 0.09 | 0.29 | 0.11 | 0.31 |
| Rural ward | Binary | 0.86 | 0.35 | 0.84 | 0.37 | 0.83 | 0.37 |
| Distance to road | Km | 18.2 | 20.3 | 18.6 | 20.9 | 18.5 | 20.9 |
| Distance to market | Km | 74.6 | 50.8 | 74.4 | 51.0 | 74.2 | 50.7 |
| Elevation | Meters | 1020 | 505 | 1022 | 502 | 1022 | 503 |
| Slope | Degrees | 6.0 | 5.9 | 5.9 | 5.8 | 6.0 | 5.8 |
| Population density | persons/km ² | 836 | 3,047 | 803 | 2,893 | 770 | 2,734 |
| Bimodal area | Binary | 0.51 | 0.50 | 0.51 | 0.50 | 0.51 | 0.50 |
| Rainfall in season | Mm | 799 | 234 | 801 | 240 | 813 | 246 |

Note: The slightly increasing average size of pre-rental land across successive panel waves is due to two main factors. First, a small number of households report increases in pre-rental holding sizes of greater than 10 hectares (this is 0.9% of the sample in 2011, and 0.7% in 2013.) However, none of these households rent-in land, and their inclusion in the sample does not affect estimation results reported elsewhere. Second, the survey tracks breakaway households, as described in the text, and these households in the sample contributes to a slightly larger mean pre-rental holding size in the last panel wave. Median values of pre-rental land in the sample are: 1.21 (in 2009/10), 1.29 (in 2011/12) and 1.34 (in 2013/14).

Table A3: Probabilities of renting-in for household heads of different ages

| Age of household head | Probability | [95% Conf. | Interval] |
|-----------------------|-------------|------------|-----------|
| 20 | .050*** | .030 | .070 |
| 30 | .038*** | .023 | .052 |
| 40 | .028*** | .017 | .039 |
| 50 | .020*** | .012 | .028 |

Note: This table shows post-estimation margins calculated after Probit estimation, the results of which are shown in Table 3.

Table A4: Determinants of household credit access (probit model average partial effects)

| | (1) SACCO membership | (2) SACCO membership | (3) Rec'd credit from other source | (4) Rec'd credit from other source |
|-------------------------|----------------------------|----------------------------|---|--|
| age of head | 0.0046 (0.698) | 0.0829 (0.000)*** | -0.0134 (0.086)* | 0.0183 (0.137) |
| age of head ^ 2 | | -0.0007 (0.000)*** | | -0.0003 (0.001)*** |
| pre-rental land (ha) | 0.0074 (0.179) | 0.0087 (0.149) | 0.0075 (0.228) | 0.0079 (0.218) |
| household size | 0.0393 (0.130) | 0.0368 (0.165) | -0.0089 (0.685) | -0.0104 (0.635) |
| max. educ. attainment | 0.0226 (0.090)* | 0.0235 (0.078)* | 0.0061 (0.654) | 0.0063 (0.644) |
| female head = 1 | 0.1868 (0.547) | 0.1799 (0.603) | 0.0676 (0.786) | 0.0562 (0.826) |
| IHS(assets) | -0.0073 (0.587) | -0.0090 (0.506) | -0.0122 (0.287) | -0.0123 (0.282) |
| has ox plough = 1 | -0.1309 (0.373) | -0.1203 (0.409) | 0.1254 (0.242) | 0.1244 (0.245) |
| has tractor = 1 | -0.0981 (0.618) | -0.0995 (0.607) | 0.1841 (0.204) | 0.1830 (0.206) |
| rural = 1 | -0.3632 (0.037)** | -0.3615 (0.038)** | 0.0172 (0.925) | 0.0139 (0.939) |
| km to road | 0.0063 (0.313) | 0.0070 (0.275) | 0.0060 (0.353) | 0.0063 (0.333) |
| km to market | 0.0008 (0.786) | 0.0006 (0.837) | -0.0034 (0.337) | -0.0035 (0.317) |
| elevation | 0.0004 (0.230) | 0.0005 (0.210) | -0.0000 (0.948) | -0.0000 (0.956) |
| slope | 0.0047 (0.827) | 0.0047 (0.831) | -0.0139 (0.459) | -0.0141 (0.462) |
| log(population density) | 0.0000 (0.442) | 0.0000 (0.432) | 0.0000 (0.189) | 0.0000 (0.191) |
| bimodal rainfall = 1 | 0.2859 (0.489) | 0.2950 (0.488) | 0.0833 (0.872) | 0.0989 (0.849) |
| mean annual rainfall | -0.0013 (0.146) | -0.0012 (0.175) | -0.0009 (0.337) | -0.0009 (0.343) |
| MC device? | yes | yes | yes | yes |
| Year dummies? | yes | yes | yes | yes |
| Age turning point | | 57.9 | | 30.0 |
| N | 8741 | 8741 | 8741 | 8741 |

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“Transaction Costs, Land Rental Markets and Their Impact on Youth Access to Agriculture in Tanzania”

by Jacob Ricker-Gilbert and Jordan Chamberlin

Note: All models use the Probit estimator on 3 waves of data (2009, 2011, 2013), with Mundlak-Chamberlain controls (time-averages of time-varying regressors) included. Year dummies included, but coefficients not reported. P-values are cluster robust, with significance levels denoted as follows: * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$.

Table A5: Linear regression estimates of determinants of plot distance from homestead

| Dependent variable= <i>IHS(plot distance)</i> | (1) | (2) | (3) | (4) | (5) | (6) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1=Plot rented-in | 0.5085 (0.000)*** | 0.3235 (0.024)** | 0.5347 (0.000)*** | 0.3581 (0.011)** | 0.5449 (0.000)*** | 0.3997 (0.004)*** |
| age of head | -0.0055 (0.000)*** | -0.0056 (0.000)*** | -0.0057 (0.000)*** | -0.0058 (0.000)*** | -0.0056 (0.000)*** | -0.0057 (0.000)*** |
| [Rented plot]*[age of head] | | 0.0044 (0.159) | | 0.0042 (0.174) | | 0.0034 (0.262) |
| # members | | | 0.0085 (0.007)*** | 0.0084 (0.008)*** | -0.0134 (0.178) | -0.0136 (0.173) |
| (max) education | | | 0.0082 (0.003)*** | 0.0081 (0.004)*** | -0.0034 (0.540) | -0.0035 (0.526) |
| female head | | | 0.0390 (0.110) | 0.0388 (0.112) | 0.0315 (0.773) | 0.0314 (0.773) |
| IHS(assets) | | | -0.0245 (0.000)*** | -0.0245 (0.000)*** | -0.0221 (0.014)** | -0.0221 (0.014)** |
| rural = 1 | | | -0.4855 (0.000)*** | -0.4856 (0.000)*** | -0.3090 (0.004)*** | -0.3078 (0.004)*** |
| elevation | | | -0.0002 (0.000)*** | -0.0002 (0.000)*** | -0.0015 (0.001)*** | -0.0015 (0.001)*** |
| slope | | | -0.0002 (0.940) | -0.0001 (0.947) | -0.0131 (0.136) | -0.0131 (0.134) |
| log(population density) | | | 0.0961 (0.000)*** | 0.0963 (0.000)*** | 0.0572 (0.000)*** | 0.0574 (0.000)*** |
| bimodal rainfall = 1 | | | 0.1835 (0.021)** | 0.1834 (0.022)** | 0.6937 (0.219) | 0.6899 (0.222) |
| mean annual rainfall | | | -0.0007 (0.000)*** | -0.0007 (0.000)*** | -0.0029 (0.000)*** | -0.0029 (0.000)*** |
| Year dummies? | no | no | yes | yes | yes | yes |
| Regional dummies? | no | no | yes | yes | yes | yes |
| MC device? | no | no | no | no | yes | yes |
| N | 18603 | 18603 | 17740 | 17740 | 17740 | 17740 |

Note: Dependent variable is the inverse hyperbolic sine transformed distance in kilometers between plot and household. Plot-level model results shown; sample is all rented-in plots. MC device was defined at household-level, i.e. time-averages of time-varying household-level regressors. P-values are cluster robust, with significance levels denoted as follows: * = p<0.10, ** = p<0.05, *** = p<0.01.

Table A6: Probit model estimates of determinants of farmer identifying a plot as being of poor quality

| Dep. var. =1[poor quality plot] | (1) | (2) | (3) | (4) | (5) | (6) |
|---------------------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|
| 1=Plot rented-in | -0.1293 (0.013)** | -0.0949 (0.592) | -0.0586 (0.296) | 0.1453 (0.434) | -0.0693 (0.219) | 0.1467 (0.432) |
| age of head | -0.0035 (0.000)*** | -0.0035 (0.000)*** | -0.0015 (0.051)* | -0.0013 (0.083)* | -0.0018 (0.023)** | -0.0016 (0.041)** |
| [Rented plot]*[age of head] | | -0.0008 (0.839) | | -0.0048 (0.246) | | -0.0051 (0.221) |
| # members | | | 0.0078 (0.043)** | 0.0080 (0.039)** | -0.0074 (0.538) | -0.0072 (0.550) |
| (max) education | | | 0.0029 (0.385) | 0.0030 (0.367) | 0.0078 (0.248) | 0.0080 (0.239) |
| female head | | | -0.0455 (0.114) | -0.0452 (0.116) | -0.0845 (0.529) | -0.0842 (0.530) |
| IHS(assets) | | | 0.0124 (0.039)** | 0.0124 (0.038)** | 0.0029 (0.744) | 0.0029 (0.743) |
| elevation | | | 0.0004 (0.000)*** | 0.0004 (0.000)*** | 0.0001 (0.796) | 0.0001 (0.808) |
| slope | | | 0.0361 (0.000)*** | 0.0361 (0.000)*** | 0.0082 (0.382) | 0.0083 (0.377) |
| log(population density) | | | -0.0010 (0.913) | -0.0012 (0.894) | -0.0046 (0.653) | -0.0049 (0.631) |
| rural = 1 | | | 0.0500 (0.196) | 0.0500 (0.196) | -0.0349 (0.756) | -0.0372 (0.741) |
| bimodal rainfall = 1 | | | 0.0586 (0.558) | 0.0586 (0.559) | 0.3314 (0.335) | 0.3350 (0.328) |
| mean annual rainfall | | | 0.0002 (0.018)** | 0.0002 (0.019)** | -0.0005 (0.433) | -0.0005 (0.441) |
| Year dummies? | no | no | yes | yes | yes | yes |
| Regional dummies? | no | no | yes | yes | yes | yes |
| MC device? | no | no | no | no | yes | yes |
| N | 18604 | 18604 | 17741 | 17741 | 17741 | 17741 |

Note: Dependent variable is equal to one if respondent reports the plot to have poor soil quality, suffer from erosion, or have a pronounced slope. Plot-level model results shown; sample is all rented-in plots. MC device was defined at household-level, i.e. time-averages of time-varying household-level regressors. P-values are cluster robust, with significance levels denoted as follows: * = p<0.10, ** = p<0.05, *** = p<0.01.