**Appendix A. Summary Statistics**

Table A1

Summary statistics for continuous explanatory variables

|  |  |  |  |  | Percentile | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Explanatory variables | (A) | (B) | Mean | Std. dev. | 10th | 25th | 50th | 75th | 90th |
| FRA district-level maize purchases ('000 MT, t-1) | X |  | 1.911 | 4.88 | 0 | 0 | 0 | 0.33 | 9.89 |
| Farmgate FRA maize price (ZMK/kg, t-1) | X |  | 495 | 219 | 219 | 249 | 611 | 700 | 733 |
| Maize producer price (ZMK/kg, t-1) | X |  | 447 | 186 | 219 | 249 | 498 | 609 | 661 |
| Regional wholesale maize price, October of current agricultural year (ZMK/kg) | X |  | 447 | 277 | 130 | 146 | 465 | 657 | 856 |
| Farmgate market price of fertilizer (ZMK/kg) | X | X | 1,442 | 660 | 720 | 780 | 1,476 | 1,960 | 2,400 |
| Wage to weed 0.25 ha (‘000 ZMK) | X | X | 24.334 | 12.911 | 10.870 | 13.587 | 20.000 | 30.000 | 45.000 |
| *Kilometers from center of SEA to nearest (as of 2000):* | | | |  |  |  |  |  |  |
| District town | X |  | 34.5 | 22.6 | 9.8 | 16.0 | 28.9 | 47.0 | 70.2 |
| Tarred/main road | X |  | 25.5 | 35.7 | 0.9 | 4.0 | 12.0 | 29.2 | 69.8 |
| Feeder road | X |  | 3.3 | 3.3 | 0.6 | 1.1 | 2.4 | 4.3 | 7.7 |
| Age of household head |  | X | 48.3 | 15.3 | 30.0 | 36.0 | 46.0 | 60.0 | 70.0 |
| Landholding size (ha, cultivated + fallow) | X | X | 2.1 | 2.6 | 0.5 | 0.8 | 1.5 | 2.5 | 4.0 |
| Adult equivalents | X | X | 4.811 | 2.437 | 2.035 | 3.097 | 4.48 | 6.153 | 7.880 |
| Growing season rainfall (November-March, mm) |  | Xa | 969 | 254 | 639 | 788 | 943 | 1,140 | 1,258 |
| Moisture stress (# of 20-day periods, Nov.-Mar., with <40 mm rain) |  | Xa | 1.4 | 1.4 | 0 | 0 | 1.0 | 2.0 | 4.0 |
| Expected growing season rainfall (mm, moving average of past 9 years) | X | X | 896 | 184 | 660 | 757 | 877 | 1,059 | 1,167 |
| Expected moisture stress (# of 20-day periods with <40mm rain, moving average of past 9 years) | X | X | 1.8 | 1.0 | 0.6 | 0.9 | 1.9 | 2.4 | 3.1 |
| Groundnut producer price (ZMK/kg, t-1) |  | X | 1,139 | 355 | 769 | 900 | 1,053 | 1,400 | 1,667 |
| Sweet potato producer price (ZMK/kg, t-1) |  | X | 214 | 102 | 100 | 145 | 193 | 232 | 386 |
| Percentage point spread between MMD & leading opposition party in last presidential electionb |  |  | 41.8 | 23.6 | 11.6 | 21.2 | 41.1 | 61.4 | 74.4 |

***Notes****:* Variables with X in column (A) included in auxiliary regressions for expected maize price. Variables with X in column (B) included in output supply equations. N=16,566. SEA is standard enumeration area. An SEA contains approximately 150-200 households and 2-4 villages. MMD is the Movement for Multi-Party Democracy, the ruling party in Zambia from 1991-2011. aIncluded in yield equations but not area planted equations. bCandidate instrumental variable in government-subsidized fertilizer reduced form Tobit.

***Sources****:* CSO/MACO/FSRP 2001, 2004, & 2008 Supplemental Surveys.

Table A2

Summary statistics for binary explanatory variables

|  |  |  | Percentage of households | | |
| --- | --- | --- | --- | --- | --- |
| Explanatory variables | (A) | (B) | 1999/2000 | 2002/2003 | 2006/2007 |
| HH owns radio (=1) | X |  | 34.2 | 47.0 | 57.6 |
| HH owns cell phone (=1) | X |  | 0 | 0 | 21.1 |
| HH does not own but has access to cell phone (=1) | X |  | 0 | 0 | 45.7 |
| HH owns bicycle (=1) | X |  | 41.7 | 46.0 | 55.6 |
| HH owns motorcycle (=1) | X |  | 0.5 | 1.1 | 0.9 |
| HH owns car, pick-up, van, truck/lorry, or tractor-trailer (=1) | X |  | 1.1 | 0.8 | 1.1 |
| HH owns ox-cart (=1) | X |  | 5.1 | 7.1 | 8.3 |
| *Highest level of education completed by HH head:* |  |  |  |  |  |
| Lower primary (grades 1-4) (=1) | X | X | 23.0 | 25.6 | 27.0 |
| Upper primary (grades 5-7) (=1) | X | X | 36.2 | 34.0 | 34.5 |
| Secondary (grades 8-12) (=1) | X | X | 19.3 | 18.3 | 19.4 |
| Post-secondary education (=1) | X | X | 2.5 | 2.7 | 1.8 |
| Female-headed with non-resident husband (=1) | X | X | 0.6 | 0.9 | 0.4 |
| Female-headed with no husband (=1) | X | X | 20.8 | 21.8 | 23.6 |
| SEA is suitable for low input management rainfed maize production (=1) | X |  | 55.3 | 56.0 | 56.4 |
| Agro-ecological region I (low rainfall, less than 800 mm) (=1) | X | X | 5.6 | 5.1 | 5.4 |
| Agro-ecological region IIa (moderate rainfall, 800-1000 mm, clay soils) (=1) | X | X | 40.4 | 42.1 | 44.1 |
| Agro-ecological region IIb (moderate rainfall, 800-1000 mm, sandy soils) (=1) | X | X | 9.6 | 9.5 | 8.6 |
| Agro-ecological region III (high rainfall, over 1000 mm) (=1) | X | X | 44.4 | 43.3 | 41.9 |
| MMD won the constituency in the last presidential election (=1)a |  |  | 92.8 | 44.0 | 59.1 |
| Total number of households in sample |  |  | 6,922 | 5,358 | 4,286 |

***Notes****:* Variables with X in column (A) included in auxiliary regressions for expected maize price. Variables with X in column (B) included in output supply equations. SEA is standard enumeration area. An SEA contains approximately 150-200 households and 2-4 villages. MMD is the Movement for Multi-Party Democracy, the ruling party in Zambia from 1991-2011. aCandidate instrumental variable in government-subsidized fertilizer reduced form Tobit.

***Sources****:* CSO/MACO/FSRP 2001, 2004, & 2008 Supplemental Surveys.

Table A3

Summary statistics for dependent variables

|  |  |  |  |  | Percentile | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dependent variable | Ag. year | Obs. | Mean | Std. dev. | 10th | 25th | 50th | 75th | 90th |
| *Auxiliary regressions used to construct the expected maize price* | | |  |  |  |  |  |  |  |
| Farmgate private sector maize price | All | 4,475 | 427.899 | 237.007 | 179.105 | 243.478 | 375.000 | 560.462 | 695.652 |
| Farmgate FRA maize price | 2002/03 | 48 | 530.021 | 63.958 | 420.000 | 488.000 | 537.500 | 596.000 | 600.000 |
|  | 2006/07 | 482 | 687.684 | 55.852 | 640.000 | 660.000 | 690.000 | 720.000 | 745.000 |
| HH sold maize to FRA (=1) | 2002/03 | 5,358 | 0.00761 |  |  |  |  |  |  |
|  | 2006/07 | 4,286 | 0.0971 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| *Reduced form Tobit for kg of government-subsidized fertilizer acquired by the HH* | | | | | | |  |  |  |
| Kg of gov’t fertilizer acquired | All | 16,566 | 29.294 | 143.258 | 0 | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |  |  |  |  |
| *Output supply equations* | | | |  |  |  |  |  |  |
| Maize area planted (ha) | All | 16,566 | 0.746 | 1.085 | 0 | 0.155 | 0.500 | 1.000 | 1.620 |
| Area planted to other crops (ha) | All | 16,566 | 0.774 | 0.949 | 0 | 0.180 | 0.500 | 1.013 | 1.820 |
| Maize yield (kg/ha) | All | 13,092 | 1568.644 | 1208.216 | 402.000 | 744.444 | 1240.741 | 2010.000 | 3130.328 |
| Yield of other crops (FIQI/ha) | All | 13,087 | 24.316 | 26.741 | 4.763 | 9.511 | 17.329 | 30.025 | 48.091 |
| Maize quantity harvested (kg) | All | 13,092 | 1504.640 | 2934.940 | 172.500 | 345.000 | 804.000 | 1608.000 | 3162.500 |
| Quantity harvested of other crops (FIQI) | All | 13,087 | 21.328 | 31.929 | 2.001 | 5.176 | 12.794 | 27.232 | 48.023 |
| Area under fallow (ha) | All | 16,566 | 0.527 | 1.984 | 0 | 0 | 0 | 0.500 | 1.500 |

***Notes****:* “All” refers to all three agricultural years (1999/2000, 2002/03, and 2006/07) covered by the panel survey data used in the study. Obs. is the number of unweighted observations. 16,566 is the total number of observations in the panel dataset (6,922 for the 2001 Supplemental Survey (SS); 5,358 for the 2004 SS; 4,286 for the 2008 SS). FIQI is Fisher-Ideal Quantity Index.

***Sources****:* CSO/MACO/FSRP 2001, 2004, & 2008 Supplemental Surveys.

**Appendix B. Full regression results**

Table B1

Reduced form CRE-Tobit regression results for the control function approach:

factors affecting the kg of subsidized fertilizer acquired by the household

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Reduced form CRE-Tobit with covariates from the: | Area planted equations | | |  | Yield equations | | |
| Explanatory variables: | APE | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |
| IV: MMD won the constituency in the last presidential election (=1) | 21.452 | \*\*\* | 0.000 |  | 22.842 | \*\*\* | 0.000 |
| IV: Percentage point spread between MMD & lead opposition (%) | -0.0890 |  | 0.238 |  | -0.106 |  | 0.167 |
| IV: Interaction effect: MMD won (=1) × percentage point spread | 0.519 | \*\*\* | 0.000 |  | 0.542 | \*\*\* | 0.000 |
| Expected farmgate maize price (ZMK/kg) | 0.0889 | \*\* | 0.014 |  | 0.0928 | \*\* | 0.015 |
| Groundnut price (ZMK/kg, t-1) | -6.78E-4 |  | 0.931 |  | -0.0113 |  | 0.234 |
| Sweet potato price (ZMK/kg, t-1) | -0.00310 |  | 0.848 |  | -0.0397 | \*\* | 0.028 |
| Farmgate market price of fertilizer (ZMK/kg) | 0.0165 | \*\*\* | 0.005 |  | 0.0133 | \*\* | 0.027 |
| Wage to weed 0.25 ha field ('000 ZMK) | 0.118 |  | 0.472 |  | 0.122 |  | 0.467 |
| Growing season rainfall ('00 mm) |  |  |  |  | -3.238 | \*\*\* | 0.001 |
| Moisture stress |  |  |  |  | -1.607 |  | 0.382 |
| Expected growing season rainfall ('00 mm) | -10.268 | \*\* | 0.013 |  | -13.856 | \*\*\* | 0.002 |
| Expected moisture stress | -10.340 |  | 0.144 |  | -8.651 |  | 0.213 |
| Adult equivalents | 0.0702 |  | 0.920 |  | 0.145 |  | 0.833 |
| Landholding size (ha) | 2.501 | \*\*\* | 0.000 |  | 2.6313 | \*\*\* | 0.000 |
| Age of household head | 0.220 |  | 0.314 |  | 0.218 |  | 0.312 |
| *Highest level of education completed by HH head (base is none):* |  |  |  |  |  |  |  |
| Lower primary (grades 1-4) (=1) | -0.652 |  | 0.892 |  | -0.9600 |  | 0.839 |
| Upper primary (grades 5-7) (=1) | 4.242 |  | 0.410 |  | 3.860 |  | 0.439 |
| Secondary (grades 8-12) (=1) | 12.169 | \* | 0.078 |  | 12.064 | \* | 0.084 |
| Post-secondary education (=1) | -5.451 |  | 0.545 |  | -4.931 |  | 0.577 |

Table B1 (*Continued*)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Reduced form CRE-Tobit with covariates from the: | Area planted equations | | |  | Yield equations | | |
| Explanatory variables: | APE | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |
| *Gender & residence status of HH head (non-resident if <6 months; base is resident male):* | | | |  |  |  |  |
| Female-headed with non-resident husband (=1) | 15.057 |  | 0.418 |  | 14.960 |  | 0.423 |
| Female-headed with no husband (=1) | -0.992 |  | 0.843 |  | -1.074 |  | 0.830 |
| *Agricultural year (2006/2007 is base):* |  |  |  |  |  |  |  |
| Agricultural year 1999/2000 (=1) | 28.361 |  | 0.173 |  | -6.290 |  | 0.704 |
| Agricultural year 2002/2003 (=1) | 31.318 | \*\*\* | 0.001 |  | 12.949 |  | 0.151 |
| Provincial & agro-ecological region dummies | Yes |  |  |  | Yes |  |  |
| Time averages (CRE) | Yes |  |  |  | Yes |  |  |
| Observations | 14,999 |  |  |  | 14,999 |  |  |
| Within R-squared (Pseudo R-squared for Tobit) | 0.0472 |  |  |  | 0.0492 |  |  |
| Overall model F-stat. | 8.98 | \*\*\* | 0.000 |  | 8.62 | \*\*\* | 0.000 |

***Notes****:* \*\*\*, \*\*, \* significant at the 1%, 5%, and 10% levels. See Tables A1 and A2 in online Appendix A for more complete explanatory variable descriptions. MMD is the Movement for Multi-Party Democracy, the ruling party in Zambia from 1991-2011.

***Source****:* Authors’ calculation.

Table B2

Regression results for maize area planted (ha) and maize yield (kg/ha)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dependent variable (estimator): | Maize ha (FE) | | |  | Maize ha (CRE-Tobit) | | |  | Maize yield, kg/ha (FE) | | |
| Explanatory variables: | Coef. | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |  | Coef. | Sig. | Bootstrap  p-val. |
| Expected farmgate maize price (ZMK/kg) | 8.13E-4 | \*\* | 0.026 |  | 6.67E-4 | \*\* | 0.023 |  | -0.574 |  | 0.245 |
| Quantity of government-subsidized fertilizer acquired by the HH (kg) | 9.54E-4 | \*\*\* | 0.000 |  | 6.62E-4 | \*\*\* | 0.000 |  | 0.743 | \*\*\* | 0.000 |
| Tobit residuals from government-subsidized fertilizer reduced form | -3.28E-4 | \*\* | 0.020 |  | -2.81E-4 | \*\*\* | 0.009 |  | -0.369 | \* | 0.096 |
| Groundnut price (ZMK/kg, t-1) | -3.22E-4 | \*\*\* | 0.000 |  | -2.11E-4 | \*\*\* | 0.000 |  | 0.522 | \*\*\* | 0.000 |
| Sweet potato price (ZMK/kg, t-1) | -4.90E-4 | \*\*\* | 0.000 |  | -4.25E-4 | \*\*\* | 0.000 |  | -1.100 | \*\*\* | 0.000 |
| Farmgate market price of fertilizer (ZMK/kg) | 5.71E-5 |  | 0.208 |  | 4.46E-5 |  | 0.197 |  | -0.0826 |  | 0.249 |
| Wage to weed 0.25 ha field ('000 ZMK) | -0.00201 |  | 0.160 |  | -0.00182 |  | 0.104 |  | -1.368 |  | 0.659 |
| Growing season rainfall ('00 mm) |  |  |  |  |  |  |  |  | 99.283 |  | 0.103 |
| Growing season rainfall, squared |  |  |  |  |  |  |  |  | -5.790 | \*\* | 0.024 |
| Moisture stress |  |  |  |  |  |  |  |  | -21.268 |  | 0.334 |
| Expected growing season rainfall ('00 mm) | 0.332 | \* | 0.070 |  | -0.0267 |  | 0.315 |  | -1.21E-3 | \*\*\* | 0.000 |
| Expected growing season rainfall, squared | -0.0203 | \*\* | 0.025 |  |  |  |  |  | 69.463 | \*\*\* | 0.000 |
| Expected moisture stress | -0.0344 |  | 0.476 |  | -0.0411 |  | 0.273 |  | -344.387 | \*\*\* | 0.000 |
| Adult equivalents | 0.0130 |  | 0.380 |  | 0.0130 | \*\*\* | 0.003 |  | -1.305 |  | 0.956 |
| Adult equivalents, squared | -5.79E-5 |  | 0.961 |  |  |  |  |  | 1.8171 |  | 0.289 |
| Landholding size (ha) | 0.257 | \*\*\* | 0.000 |  | 0.182 | \*\*\* | 0.000 |  | -88.056 | \*\*\* | 0.000 |
| Landholding size, squared | -0.00171 |  | 0.116 |  |  |  |  |  | 1.287 |  | 0.197 |
| Age of household head | 0.00176 |  | 0.274 |  | 0.00277 | \*\* | 0.033 |  | -0.691 |  | 0.811 |
| *Highest level of education completed by HH head (base is none):* |  |  |  |  |  |  |  |  |  |  |  |
| Lower primary (grades 1-4) (=1) | -0.0250 |  | 0.320 |  | -0.0189 |  | 0.37 |  | 74.224 |  | 0.168 |
| Upper primary (grades 5-7) (=1) | -0.0307 |  | 0.307 |  | -0.0129 |  | 0.604 |  | 43.023 |  | 0.525 |
| Secondary (grades 8-12) (=1) | -0.0212 |  | 0.563 |  | -0.0102 |  | 0.731 |  | 39.122 |  | 0.643 |
| Post-secondary education (=1) | -9.82E-4 |  | 0.993 |  | 0.00775 |  | 0.929 |  | 109.402 |  | 0.479 |

Table B2 (*Continued*)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dependent variable (estimator): | Maize ha (FE) | | |  | Maize ha (CRE-Tobit) | | |  | Maize yield, kg/ha (FE) | | |
| Explanatory variables: | Coef. | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |  | Coef. | Sig. | Bootstrap  p-val. |
| *Gender & residence status of HH head (non-resident if <6 months; base is resident male):* | | | |  |  |  |  |  |  |  |  |
| Female-headed with non-resident husband (=1) | 0.0841 |  | 0.375 |  | 0.116 |  | 0.175 |  | -148.759 |  | 0.299 |
| Female-headed with no husband (=1) | -0.0355 |  | 0.317 |  | -0.0345 |  | 0.252 |  | -17.299 |  | 0.822 |
| *Agricultural year (2006/2007 is base):* |  |  |  |  |  |  |  |  |  |  |  |
| Agricultural year 1999/2000 (=1) | -0.0526 |  | 0.767 |  | -0.0123 |  | 0.931 |  | 164.717 |  | 0.527 |
| Agricultural year 2002/2003 (=1) | -0.295 | \*\*\* | 0.000 |  | -0.199 | \*\*\* | 0.001 |  | 77.350 |  | 0.477 |
| Constant | -0.639 |  | 0.507 |  |  |  |  |  | 7351.893 | \*\*\* | 0.000 |
| District dummies | N/A |  |  |  | Yes |  |  |  | N/A |  |  |
| Time averages (CRE) | N/A |  |  |  | Yes |  |  |  | NA |  |  |
| Observations | 14,999 |  |  |  | 14,999 |  |  |  | 11,957 |  |  |
| Within R-squared (Pseudo R-squared for Tobit) | 0.322 |  |  |  | 0.278 |  |  |  | 0.045 |  |  |
| Overall model F-stat. | 25.37 |  |  |  | 43.950 |  |  |  | 9.2 |  |  |

***Notes****:* \*\*\*, \*\*, \* significant at the 1%, 5%, and 10% levels. See Tables A1 and A2 in online Appendix A for more complete explanatory variable descriptions.

***Source****:* Authors’ calculation.

Table B3

Regression results for area planted (ha) and yield (FIQI/ha) of other crops

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dependent variable (estimator): | Hectares of other crops  (FE) | | |  | Hectares of other crops  (CRE-Tobit) | | |  | Yield of other crops in FIQI/ha (FE) | | |
| Explanatory variables: | Coef. | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |  | Coef. | Sig. | Bootstrap  p-val. |
| Expected farmgate maize price (ZMK/kg) | 5.10E-6 |  | 0.978 |  | 2.01E-5 |  | 0.932 |  | -0.0150 |  | 0.295 |
| Quantity of government-subsidized fertilizer acquired by the HH (kg) | -9.20E-6 |  | 0.937 |  | 3.30E-5 |  | 0.723 |  | 0.00762 | \*\* | 0.025 |
| Tobit residuals from government-subsidized fertilizer reduced form | *Not stat. sig. (p=0.186)* | | |  | 2.54E-4 | \*\* | 0.025 |  | -0.0220 | \*\*\* | 0.000 |
| Groundnut price (ZMK/kg, t-1) | -6.70E-5 |  | 0.181 |  | -3.56E-5 |  | 0.507 |  | 6.25E-4 |  | 0.891 |
| Sweet potato price (ZMK/kg, t-1) | 5.53E-4 | \*\*\* | 0.000 |  | 4.77E-4 | \*\*\* | 0.000 |  | -0.00161 |  | 0.830 |
| Farmgate market price of fertilizer (ZMK/kg) | 9.91E-5 | \*\*\* | 0.003 |  | 1.17E-4 | \*\*\* | 0.004 |  | 8.16E-4 |  | 0.703 |
| Wage to weed 0.25 ha field ('000 ZMK) | 0.00190 |  | 0.104 |  | 0.00114 |  | 0.393 |  | 0.193 | \*\* | 0.025 |
| Growing season rainfall ('00 mm) |  |  |  |  |  |  |  |  | 10.291 | \*\*\* | 0.000 |
| Growing season rainfall, squared |  |  |  |  |  |  |  |  | -0.380 | \*\*\* | 0.000 |
| Moisture stress |  |  |  |  |  |  |  |  | 2.297 | \*\*\* | 0.001 |
| Expected growing season rainfall ('00 mm) | 0.751 | \*\*\* | 0.000 |  | 0.0916 | \*\*\* | 0.001 |  | 51.246 | \*\*\* | 0.000 |
| Expected growing season rainfall, squared | -0.0334 | \*\*\* | 0.000 |  |  |  |  |  | -2.674 | \*\*\* | 0.000 |
| Expected moisture stress | 0.198 | \*\*\* | 0.000 |  | 0.151 | \*\*\* | 0.000 |  | -0.583 |  | 0.811 |
| Adult equivalents | 0.0226 | \*\*\* | 0.008 |  | 0.0191 | \*\*\* | 0.000 |  | -0.342 |  | 0.619 |
| Adult equivalents, squared | -5.97E-4 |  | 0.323 |  |  |  |  |  | 0.0611 |  | 0.241 |
| Landholding size (ha) | 0.289 | \*\*\* | 0.000 |  | 0.226 | \*\*\* | 0.000 |  | -2.579 | \*\*\* | 0.000 |
| Landholding size, squared | -0.00336 | \*\*\* | 0.000 |  |  |  |  |  | 0.0310 |  | 0.106 |
| Age of household head | 0.00137 |  | 0.332 |  | 0.00287 | \* | 0.075 |  | -0.124 |  | 0.192 |
| *Highest level of education completed by HH head (base is none):* |  |  |  |  |  |  |  |  |  |  |  |
| Lower primary (grades 1-4) (=1) | 0.0331 |  | 0.160 |  | 0.0476 | \*\* | 0.049 |  | -0.657 |  | 0.710 |
| Upper primary (grades 5-7) (=1) | 0.0485 | \* | 0.084 |  | 0.0739 | \*\* | 0.012 |  | -2.185 |  | 0.265 |
| Secondary (grades 8-12) (=1) | 0.0912 | \*\* | 0.026 |  | 0.131 | \*\*\* | 0.001 |  | -2.317 |  | 0.336 |
| Post-secondary education (=1) | 0.238 | \*\* | 0.012 |  | 0.256 | \*\*\* | 0.010 |  | 0.372 |  | 0.933 |

Table B3 (*Continued*)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dependent variable (estimator): | Hectares of other crops  (FE) | | |  | Hectares of other crops (CRE-Tobit) | | |  | Yield of other crops in FIQI/ha (FE) | | |
| Explanatory variables: | Coef. | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |  | Coef. | Sig. | Bootstrap  p-val. |
| *Gender & residence status of HH head (non-resident if <6 months; base is resident male):* | | | |  |  |  |  |  |  |  |  |
| Female-headed with non-resident husband (=1) | -0.0653 |  | 0.451 |  | -0.0250 |  | 0.741 |  | -0.653 |  | 0.894 |
| Female-headed with no husband (=1) | -0.0103 |  | 0.738 |  | -0.00637 |  | 0.835 |  | 1.110 |  | 0.610 |
| *Agricultural year (2006/2007 is base):* |  |  |  |  |  |  |  |  |  |  |  |
| Agricultural year 1999/2000 (=1) | 0.305 | \*\*\* | 0.008 |  | 0.226 |  | 0.140 |  | 7.945 |  | 0.350 |
| Agricultural year 2002/2003 (=1) | 0.304 | \*\*\* | 0.000 |  | 0.303 | \*\*\* | 0.000 |  | -2.330 |  | 0.555 |
| Constant | -4.746 | \*\*\* | 0.000 |  |  |  |  |  | -247.045 | \*\*\* | 0.000 |
| District dummies | N/A |  |  |  | Yes |  |  |  | N/A |  |  |
| Time averages (CRE) | N/A |  |  |  | Yes |  |  |  | N/A |  |  |
| Observations | 14,999 |  |  |  | 14,999 |  |  |  | 11,984 |  |  |
| Within R-squared (Pseudo R-squared for Tobit) | 0.318 |  |  |  | 0.2315 |  |  |  | 0.061 |  |  |
| Overall model F-stat. | 41.06 | \*\*\* | 0.000 |  | 38.12 | \*\*\* | 0.000 |  | 12.14 | \*\*\* | 0.000 |

***Notes****:* \*\*\*, \*\*, \* significant at the 1%, 5%, and 10% levels. See Tables A1 and A2 in online Appendix A for more complete explanatory variable descriptions. FIQI is Fisher-Ideal Quantity Index.

Table B4

Regression results for hectares under fallow

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Estimator: | FE | | |  | CRE-Tobit | | |  |
| Explanatory variables: | Coef. | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. | |
| Expected farmgate maize price (ZMK/kg) | -0.00131 | \*\*\* | 0.008 |  | -3.45E-04 |  | 0.197 | |
| Quantity of government-subsidized fertilizer acquired by the HH (kg) | -9.27E-4 | \*\*\* | 0.004 |  | -5.23E-04 | \*\*\* | 0.000 | |
| Tobit residuals from government-subsidized fertilizer reduced form | *Not stat. sig. (p=0.144)* | | |  | 3.71E-04 | \*\*\* | 0.000 | |
| Groundnut price (ZMK/kg, t-1) | 3.95E-4 | \*\*\* | 0.000 |  | 1.93E-04 | \*\*\* | 0.002 | |
| Sweet potato price (ZMK/kg, t-1) | -1.54E-4 |  | 0.288 |  | 1.77E-04 |  | 0.142 | |
| Farmgate market price of fertilizer (ZMK/kg) | -1.77E-4 | \*\*\* | 0.002 |  | -6.36E-05 |  | 0.160 | |
| Wage to weed 0.25 ha field ('000 ZMK) | -8.71E-4 |  | 0.611 |  | -0.00164 |  | 0.250 | |
| Expected growing season rainfall ('00 mm) | -0.834 | \*\*\* | 0.000 |  | -0.102 | \*\*\* | 0.002 | |
| Expected growing season rainfall, squared | 0.0409 | \*\*\* | 0.000 |  |  |  |  | |
| Expected moisture stress | -0.153 | \*\*\* | 0.003 |  | -0.0867 | \* | 0.066 | |
| Adult equivalents | -0.0350 | \*\* | 0.029 |  | -0.0174 | \*\*\* | 0.001 | |
| Adult equivalents, squared | 7.81E-4 |  | 0.544 |  |  |  |  | |
| Landholding size (ha) | 0.439 | \*\*\* | 0.000 |  | 0.269 | \*\*\* | 0.000 | |
| Landholding size, squared | 0.00524 | \*\*\* | 0.009 |  |  |  |  | |
| Age of household head | -0.00342 |  | 0.109 |  | -0.00122 |  | 0.474 | |
| *Highest level of education completed by HH head (base is none):* |  |  |  |  |  |  |  | |
| Lower primary (grades 1-4) (=1) | 0.00728 |  | 0.802 |  | 0.0232 |  | 0.391 | |
| Upper primary (grades 5-7) (=1) | -0.0153 |  | 0.666 |  | 0.0169 |  | 0.625 | |
| Secondary (grades 8-12) (=1) | -0.101 | \* | 0.057 |  | -0.0077 |  | 0.857 | |
| Post-secondary education (=1) | -0.214 |  | 0.157 |  | -0.0934 |  | 0.275 | |

Table B4 (*Continued*)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Estimator: | FE | | |  | CRE-Tobit | | |
| Explanatory variables: | Coef. | Sig. | Bootstrap  p-val. |  | APE | Sig. | Bootstrap  p-val. |
| *Gender & residence status of HH head (non-resident if <6 months; base is resident male):* | | | |  |  |  |  |
| Female-headed with non-resident husband (=1) | -0.0660 |  | 0.382 |  | 0.0404 |  | 0.740 |
| Female-headed with no husband (=1) | 0.0495 |  | 0.250 |  | 0.00459 |  | 0.895 |
| *Agricultural year (2006/2007 is base):* |  |  |  |  |  |  |  |
| Agricultural year 1999/2000 (=1) | -0.411 | \* | 0.088 |  | -0.0338 |  | 0.830 |
| Agricultural year 2002/2003 (=1) | -0.0981 |  | 0.315 |  | 0.116 |  | 0.124 |
| Constant | 4.899 | \*\*\* | 0.000 |  |  |  |  |
| Observations | 14,999 |  |  |  | 14,999 |  |  |
| Within R-squared (Pseudo R-squared for Tobit) | 0.614 |  |  |  | 0.223 |  |  |
| Overall model F-stat. | 38.73 | \*\*\* | 0.000 |  | 51.67 | \*\*\* | 0.000 |

***Notes****:* \*\*\*, \*\*, \* significant at the 1%, 5%, and 10% levels. See Tables A1 and A2 in online Appendix A for more complete explanatory variable descriptions.