

Supplementary Appendix

Is There a Farm Size–Productivity Relationship in African Agriculture? Evidence from Rural Rwanda

World Bank, Washington D.C.
dali1@worldbank.org, kdeininger@worldbank.org

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Preamble:

This material is supplementary to the article referred to in the title. The empirical analysis is done using all the plots, i.e., owned and rented-in plots, except the results reported in appendix table 8 that uses only owned plots.

Appendix Table 1: Descriptive Statistics at Household Level

	Total	Small	Medium		Large		East	North	South	West
Area cultivated & output										
Yield per ha (US\$)	538.60	868.02	462.64	***	284.91	***	493.13	565.41	520.82	584.58
Gross profit (US\$/ha)	458.77	748.51	392.73	***	234.89	***	412.91	467.94	461.95	492.64
Net profit (US\$/ha)	105.57	114.31	98.33		104.06		57.70	140.94	79.85	157.08
Total cultivated area	0.459	0.063	0.228	***	1.087	***	0.549	0.391	0.441	0.452
Own cultivated are (ha)	0.541	0.067	0.243	***	1.278	***	0.756	0.398	0.507	0.497
Rented-in land (%)	0.309	0.330	0.309		0.287		0.297	0.229	0.400	0.269
Size of rented land (ha)	0.215	0.040	0.110	***	0.528	***	0.313	0.120	0.221	0.163
Input use										
Labor days/ha	456.167	787.205	388.862	***	192.199	***	436.438	433.915	466.595	481.350
Used chemical fertilizer	0.164	0.115	0.156	***	0.221	***	0.071	0.252	0.130	0.226
Fertilizer use (kg/ha)	87.260	28.040	13.511	***	220.348		6.072	24.984	7.955	327.521
Used pesticides	0.093	0.068	0.092	**	0.119	**	0.050	0.139	0.086	0.106
Pesticides (US\$/ha)	2.716	4.930	2.027	**	1.188	**	1.607	4.340	1.869	3.546
Used manure	0.735	0.668	0.762	***	0.774		0.520	0.829	0.775	0.815
Share of land with grain	0.508	0.530	0.510		0.484	**	0.614	0.597	0.456	0.394
Share of land with tubers	0.262	0.250	0.260		0.275		0.165	0.233	0.297	0.336
Share of land with tree crops	0.221	0.210	0.219		0.233		0.211	0.158	0.235	0.265
Share of vegetable land	0.010	0.010	0.011		0.008	*	0.009	0.012	0.012	0.006
Household characteristics										
Age of head	46.33	44.32	46.39	***	48.28	***	45.38	45.26	48.17	45.76
Female head	0.277	0.354	0.265	***	0.214	***	0.260	0.265	0.323	0.246
Primary school completed	0.576	0.538	0.585	**	0.604		0.602	0.557	0.570	0.574
Secondary education	0.070	0.061	0.063		0.087	**	0.075	0.064	0.073	0.068
Number of members<=14	2.13	1.93	2.12	***	2.35	***	2.21	2.04	2.03	2.26
No of members 15- 35	1.59	1.45	1.56	***	1.76	***	1.56	1.69	1.56	1.59
No of members 35- 60	0.85	0.66	0.85	***	1.04	***	0.87	0.79	0.91	0.82
No members >=60	0.24	0.21	0.23		0.28	**	0.20	0.23	0.27	0.25
Number of observations	3353	1118	1118		1117		802	691	1060	800

Source: Own computation from 2010/11 LTR baseline survey.

Note: Stars indicated significance levels for t-tests of the equality of means for each of the variables between terciles (* significant at 10%; ** significant at 5%; *** significant at 1%). Two outliers with inexplicably high levels of fertilizer use are dropped from the largest tercile.

Appendix Table 2: Descriptive Statistics at Plot Level

	Total	Small	Medium	Large
Area cultivated & output				
Yield per ha (US\$)	768.49	1327.94	579.74	304.49
Gross profit (US\$/ha)	646.10	1118.01	489.62	251.82
Net profit (S\$/ha)	91.12	26.03	154.12	101.76
Plot size	0.167	0.016	0.062	0.441
Land value US\$/ha	13361	19070	11784	8387
Input use				
Labor days/ha	731.33	1421.23	447.25	213.32
Used chemical fertilizer	0.094	0.082	0.089	0.113
Fertilizer use (kg/ha)	101.68	54.69	179.65	75.07
Used pesticides	0.051	0.045	0.049	0.060
Pesticides (US\$/ha)	4.518	8.664	3.078	1.121
Used manure	0.560	0.524	0.566	0.596
Share with grain	0.496	0.483	0.515	0.493
Share with tubers	0.298	0.344	0.274	0.269
Share with trees	0.192	0.156	0.198	0.230
Share with vegetables	0.013	0.017	0.013	0.008
Plot characteristics				
No. of years possessed	16.582	14.407	16.640	19.100
Affected by crop shock	0.301	0.233	0.311	0.371
Wetland	0.123	0.162	0.114	0.084
Irrigated land	0.065	0.074	0.063	0.056
Flat land	0.282	0.311	0.276	0.255
Gently slopped land	0.249	0.224	0.259	0.267
Plot located in a valley	0.057	0.084	0.053	0.029
Sand soil	0.161	0.173	0.148	0.160
Loam soil	0.368	0.363	0.387	0.356
Light clay soil	0.137	0.139	0.137	0.135
Heavy clay soil	0.031	0.038	0.029	0.025
Gravelly soil	0.131	0.123	0.125	0.147
Number of observations	9583	3505	3122	2956

Source: Own computation from 2010/11 LTR baseline survey.

Note: Input use is reported only for those who applied positive amounts. Stars indicated significance levels for *t*-tests of the equality of means for each of the variables between terciles (* significant at 10%; ** significant at 5%; *** significant at 1%).

Appendix Table 3: Parameter Estimates and Output Elasticities for Alternative Specifications of the Production Function

	Holding level		Plot level	
	Translog	Cobb-Douglas	Translog	Cobb-Douglas
In plot area in hectares	0.291*** (14.924)	0.277*** (19.190)	0.264*** (17.123)	0.249*** (21.221)
In labor days	0.412*** (16.497)	0.421*** (21.929)	0.491*** (23.120)	0.472*** (26.385)
In chemical fertilizer use in kg	0.128** (2.044)	0.087*** (3.723)	0.154*** (4.053)	0.125*** (4.173)
In pesticide use in kg	0.040 (0.923)	0.115*** (3.884)	0.125* (1.755)	0.122*** (3.045)
In manure use in kg	0.111*** (6.099)	0.112*** (8.464)	0.102*** (5.309)	0.104*** (6.278)
Dummy chemical fertilizer use	0.215 (1.594)	0.117 (1.338)	-0.086 (1.643)	-0.111** (2.247)
Dummy pesticide use	0.018 (0.249)	-0.021 (0.317)	0.052 (0.485)	0.041 (0.385)
Dummy manure use	-0.354*** (9.123)	-0.358*** (9.449)	-0.220*** (7.005)	-0.220*** (7.346)
In (plot area in hectares) ²	-0.049*** (2.585)		-0.010 (0.823)	
In(male labor days) ²	-0.095*** (3.018)		-0.014 (0.571)	
In(chemical fertilizer use in kg) ²	-0.007 (0.551)		0.003 (0.132)	
In(pesticide use in kg) ²	0.054** (2.292)		-0.007 (0.216)	
In(manure use in kg) ²	0.000 (0.021)		0.006 (0.351)	
In land X In labor	0.067*** (3.306)		0.035*** (2.674)	
In land X In chemical fertilizer	-0.023** (2.019)		0.034 (1.543)	
In land X In pesticide use	-0.018 (0.771)		-0.020 (1.089)	
In land X In manure use	0.012 (1.055)		0.012 (1.168)	
In labor X In chemical fertilizer	0.010 (0.639)		-0.006 (0.195)	
In labor X In pesticide use	-0.044 (1.311)		-0.011 (0.405)	
In labor X In manure use	-0.018 (1.190)		-0.033* (1.933)	
In chem. fertilizer X In pesticide use	0.005 (0.451)		0.024 (0.969)	
In chem.. fertilizer X In manure use	0.009 (0.956)		0.013 (0.495)	
In pesticide use X In manure use	-0.016 (0.696)		0.009 (0.409)	
Distance from homestead in minutes	0.000 (1.527)	0.000 (1.607)	-0.003*** (6.106)	-0.003*** (6.174)
Number of years plot possessed	0.002** (2.291)	0.002** (2.062)	0.003** (2.242)	0.003** (2.366)
Plot located in wet land	0.035 (0.448)	0.039 (0.505)	-0.028 (0.617)	-0.022 (0.481)
Irrigated land	0.086 (1.238)	0.073 (1.054)	-0.040 (0.651)	-0.045 (0.743)
Flat land	-0.055 (1.242)	-0.062 (1.387)	0.055 (1.571)	0.058* (1.658)
Gently slopped land	-0.072* (1.858)	-0.082** (2.122)	0.005 (0.161)	0.005 (0.143)
Plot located in a valley	0.112	0.105	0.039	0.035

	(0.855)	(0.797)	(0.593)	(0.531)
Sandy soil	0.007 (0.133)	0.015 (0.271)	-0.001 (0.028)	-0.002 (0.045)
Loam soil	0.196*** (4.413)	0.203*** (4.589)	0.051 (1.285)	0.050 (1.262)
Light clay soil	0.143** (2.492)	0.149*** (2.597)	-0.022 (0.483)	-0.023 (0.489)
Heavy soil	0.087 (0.823)	0.081 (0.768)	0.078 (1.055)	0.079 (1.058)
Gravelly soil	0.034 (0.619)	0.034 (0.621)	-0.003 (0.057)	-0.001 (0.017)
Used improved seed	-0.214*** (6.715)			
Use extension knowledge	-0.514** (2.058)			
Crop shock	-0.214*** (6.715)	-0.218*** (6.833)	-0.241*** (8.259)	-0.240*** (8.258)
Share of area cultivated with grains	-0.514** (2.058)	-0.533** (2.154)	-0.207* (1.868)	-0.210* (1.932)
Share of area cultivated with tubers	-0.277 (1.094)	-0.293 (1.167)	-0.293*** (2.643)	-0.300*** (2.770)
Share of area with tree crops	-0.130 (0.514)	-0.153 (0.608)	0.236** (2.083)	0.233** (2.095)
Constant	0.018 (0.062)	0.142 (0.553)	0.031 (0.193)	0.066 (0.419)
Number of observations	3,339	3,339	9,315	9,315
R-squared	0.576	0.572	0.424	0.422
Output elasticities				
Land	0.274*** (18.780)	0.277*** (19.190)	0.248*** (21.096)	0.249*** (21.221)
Labor	0.416*** (21.560)	0.421*** (21.929)	0.470*** (26.158)	0.472*** (26.385)
Chemical fertilizer	0.132** (2.355)	0.087*** (3.723)	0.119*** (3.893)	0.125*** (4.173)
Pesticides	0.096*** (2.715)	0.115*** (3.884)	0.148** (2.262)	0.122*** (3.045)
Manure	0.113*** (8.329)	0.112*** (8.464)	0.106*** (6.308)	0.104*** (6.278)
Returns to scale	1.031	1.011	1.092	1.072
Test of const. ret. to scale: <i>F</i> -value	1.66	0.09	1.74	2.08
Test for global separability				
Test for Cobb-Douglas: <i>F</i> -value	1.91**		1.57*	

Note: All the regressions include village fixed effects to control for unobserved differences between villages. Most of the Allen cross elasticities are not statistically different from zero. Jointly, they are not significantly different from (marginally). Thus, the translog specification does not really strongly dominate the Cobb-Douglas specification. Absolute value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix Table 4: Farm Size Productivity Relationship: Yield Approach

	Holding level				Plot level		
Cropped area (ha)	-0.419*** (35.486)	-0.458*** (35.902)	-0.492*** (37.086)	-0.495*** (66.722)	-0.524*** (64.907)	-0.534*** (65.990)	-0.535*** (53.105)
Dist. from home (min)		0.002*** (6.932)	0.002*** (6.508)		-0.005*** (8.520)	-0.004*** (6.669)	-0.004*** (7.369)
Years possessed		0.002 (1.498)	0.004*** (2.607)		0.003*** (4.163)	0.005*** (5.264)	0.006*** (4.645)
Plot in wetland		0.089 (1.008)	0.077 (0.888)		-0.012 (0.277)	-0.019 (0.431)	-0.018 (0.366)
Irrigated land		0.104 (1.320)	0.114 (1.462)		0.078 (1.642)	0.085* (1.798)	0.013 (0.195)
Flat land		-0.027 (0.529)	-0.036 (0.724)		-0.055* (1.823)	-0.055* (1.835)	0.039 (1.046)
Gently sloped land		-0.058 (1.317)	-0.067 (1.541)		-0.058** (2.112)	-0.067** (2.461)	-0.025 (0.703)
Plot in valley		0.125 (0.835)	0.137 (0.927)		0.012 (0.197)	0.008 (0.124)	0.042 (0.597)
Sandy soil		0.015 (0.241)	0.007 (0.110)		-0.004 (0.109)	0.003 (0.086)	-0.017 (0.339)
Loam soil		0.225*** (4.467)	0.219*** (4.389)		0.174*** (5.458)	0.165*** (5.243)	0.051 (1.211)
Light clay soil		0.146** (2.233)	0.140** (2.161)		0.086** (2.189)	0.082** (2.125)	-0.004 (0.075)
Heavy soil		0.154 (1.286)	0.093 (0.779)		0.127* (1.917)	0.120* (1.838)	0.136* (1.701)
Gravelly soil		-0.000 (0.001)	-0.015 (0.244)		0.002 (0.048)	0.010 (0.261)	0.025 (0.508)
Crop shock		-0.223*** (6.164)	-0.214*** (5.964)		-0.249*** (10.418)	-0.225*** (9.454)	-0.210*** (6.721)
Grains		-1.451*** (5.449)	-1.342*** (5.091)			-0.808*** (7.695)	-0.506*** (4.598)
Tubers		-1.022*** (3.767)	-0.920*** (3.426)			-0.669*** (6.324)	-0.454*** (4.123)
Tree crops		-1.066*** (3.919)	-0.979*** (3.632)			-0.375*** (3.456)	-0.109 (0.961)
Age of head			0.002 (1.114)			-0.000 (0.308)	
Female head			-0.176*** (4.586)			-0.134*** (4.601)	
Primary school comp.			0.107*** (3.078)			0.048* (1.866)	
Sec. education			0.174*** (2.667)			0.112** (2.415)	
No of members <=14			0.034*** (3.204)			0.021*** (2.637)	
No of members 15- 35			0.039*** (2.799)			0.017* (1.677)	
No of members 35- 60			0.041* (1.714)			-0.013 (0.759)	
No of members >=60			-0.007 (0.144)			-0.020 (0.596)	
Constant	5.118*** (213.679)	6.172*** (22.768)	5.709*** (20.300)	4.436*** (183.985)	4.381*** (105.223)	4.927*** (38.890)	4.711*** (38.562)
Village fixed effects	No	Yes	Yes	No	Yes	Yes	No
Hh fixed effects				No	No	No	Yes
No of observations	3,353	3,339	3,336	9,583	9,315	9,309	9,315
R-squared	0.273	0.328	0.346	0.317	0.346	0.364	0.359

Note: Absolute value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix Table 5: Farm Size and Intensity of Labor Use

	Holding level			Plot level			
Cropped area (ha)	-0.481*** (46.783)	-0.534*** (48.472)	-0.568*** (49.636)	-0.495*** (66.722)	-0.524*** (64.907)	-0.534*** (65.990)	-0.535*** (53.105)
Dist. from home (min)		0.003*** (11.487)	0.003*** (10.959)		-0.005*** (8.520)	-0.004*** (6.669)	-0.004*** (7.369)
Years possessed		0.001 (1.429)	-0.000 (0.217)		0.003*** (4.163)	0.005*** (5.264)	0.006*** (4.645)
Plot in wetland		0.123 (1.617)	0.115 (1.538)		-0.012 (0.277)	-0.019 (0.431)	-0.018 (0.366)
Irrigated land		-0.049 (0.726)	-0.033 (0.488)		0.078 (1.642)	0.085* (1.798)	0.013 (0.195)
Flat land		0.065 (1.499)	0.051 (1.177)		-0.055* (1.823)	-0.055* (1.835)	0.039 (1.046)
Gently sloped land		0.065* (1.704)	0.052 (1.390)		-0.058** (2.112)	-0.067** (2.461)	-0.025 (0.703)
Plot in valley		0.010 (0.080)	0.004 (0.028)		0.012 (0.197)	0.008 (0.124)	0.042 (0.597)
Sandy soil		-0.019 (0.348)	-0.016 (0.295)		-0.004 (0.109)	0.003 (0.086)	-0.017 (0.339)
Loam soil		0.036 (0.827)	0.041 (0.948)		0.174*** (5.458)	0.165*** (5.243)	0.051 (1.211)
Light clay soil		0.009 (0.154)	0.012 (0.210)		0.086** (2.189)	0.082** (2.125)	-0.004 (0.075)
Heavy soil		0.147 (1.416)	0.110 (1.075)		0.127* (1.917)	0.120* (1.838)	0.136* (1.701)
Gravelly soil		-0.083 (1.530)	-0.087 (1.617)		0.002 (0.048)	0.010 (0.261)	0.025 (0.508)
Crop shock		0.003 (0.090)	0.014 (0.462)		-0.249*** (10.418)	-0.225*** (9.454)	-0.210*** (6.721)
Grains		-0.817*** (3.550)	-0.791*** (3.479)			-0.808*** (7.695)	-0.506*** (4.598)
Tubers		-0.407* (1.735)	-0.382* (1.648)			-0.669*** (6.324)	-0.454*** (4.123)
Tree crops		-0.921*** (3.917)	-0.911*** (3.919)			-0.375*** (3.456)	-0.109 (0.961)
Age of head			0.001 (0.485)			-0.000 (0.308)	
Female head			-0.104*** (3.136)			-0.134*** (4.601)	
Primary school comp.			0.030 (0.995)			0.048* (1.866)	
Sec. education			0.024 (0.427)			0.112** (2.415)	
No of members <=14			0.029*** (3.084)			0.021*** (2.637)	
No of members 15- 35			0.040*** (3.304)			0.017* (1.677)	
No of members 35- 60			0.118*** (5.668)			-0.013 (0.759)	
No of members >=60			0.143*** (3.579)			-0.020 (0.596)	
Constant	4.878*** (233.811)	5.338*** (22.781)	5.020*** (20.689)	4.436*** (183.985)	4.381*** (105.223)	4.927*** (38.890)	4.711*** (38.562)
Village fixed effects	No	No	Yes	No	Yes	Yes	No
Hh fixed effects	No	Yes	No	No	No	No	Yes
No of observations	3,353	3,339	3,336	9,583	9,315	9,309	9,315
R-squared	0.395	0.457	0.474	0.317	0.346	0.364	0.359

Note: Absolute value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix Table 6: Farm Size Productivity Relationship: Net Profit Approach

	Holding level				Plot level		
Cropped area (ha)	-0.008 (0.896)	-0.010 (1.011)	-0.013 (1.301)	0.037*** (4.437)	0.030*** (3.217)	0.024** (2.499)	0.006 (0.445)
Dist. from home (min)		-0.000* (1.758)	-0.000* (1.672)		-0.004*** (6.056)	-0.002*** (3.712)	-0.003*** (4.130)
Years possessed		0.001 (0.876)	0.003*** (2.701)		0.000 (0.522)	0.002 (1.515)	-0.000 (0.184)
Plot in wetland		-0.071 (1.081)	-0.073 (1.116)		-0.043 (0.840)	-0.028 (0.545)	0.010 (0.167)
Irrigated land		0.039 (0.667)	0.039 (0.660)		-0.006 (0.110)	-0.003 (0.060)	-0.117 (1.437)
Flat land		-0.046 (1.225)	-0.046 (1.216)		-0.020 (0.575)	-0.019 (0.551)	0.129*** (2.754)
Gently sloped land		-0.062* (1.905)	-0.061* (1.873)		-0.054* (1.687)	-0.056* (1.754)	0.073* (1.674)
Plot in valley		0.084 (0.753)	0.090 (0.806)		-0.096 (1.308)	-0.066 (0.910)	-0.014 (0.160)
Sandy soil		0.017 (0.380)	0.013 (0.290)		0.022 (0.501)	0.024 (0.553)	0.021 (0.335)
Loam soil		0.137*** (3.658)	0.133*** (3.535)		0.135*** (3.665)	0.123*** (3.345)	0.044 (0.823)
Light clay soil		0.103** (2.107)	0.099** (2.033)		0.087* (1.921)	0.082* (1.817)	-0.004 (0.063)
Heavy soil		-0.148* (1.662)	-0.163* (1.818)		-0.097 (1.263)	-0.086 (1.123)	0.047 (0.465)
Gravelly soil		0.038 (0.815)	0.031 (0.665)		0.061 (1.313)	0.062 (1.345)	0.023 (0.369)
Crop shock		-0.095*** (3.522)	-0.095*** (3.530)		-0.175*** (6.308)	-0.172*** (6.187)	-0.101*** (2.583)
Grains		-0.484** (2.444)	-0.442** (2.227)			-0.478*** (3.905)	-0.501*** (3.649)
Tubers		-0.532*** (2.636)	-0.492** (2.433)			-0.607*** (4.920)	-0.659*** (4.788)
Tree crops		-0.255 (1.263)	-0.218 (1.077)			-0.107 (0.842)	-0.109 (0.771)
Age of head			-0.000 (0.394)			-0.001 (0.480)	
Female head			-0.066** (2.296)			-0.027 (0.802)	
Primary school comp.			0.030 (1.139)			0.044 (1.467)	
Sec. education			0.065 (1.331)			0.127** (2.342)	
No of members <=14			-0.005 (0.557)			0.004 (0.463)	
No of members 15- 35			-0.002 (0.207)			-0.008 (0.726)	
No of members 35- 60			-0.013 (0.733)			-0.038* (1.876)	
No of members >=60			-0.064* (1.833)			-0.045 (1.141)	
Constant	0.094*** (5.367)	0.533*** (2.646)	0.506** (2.390)	0.200*** (7.292)	0.234*** (4.840)	0.663*** (4.486)	0.578*** (3.783)
Village fixed effects	No	No	Yes	No	Yes	Yes	No
Hh fixed effects	No	Yes	No	No	No	No	Yes
No of observations	3,353	3,339	3,336	9,583	9,315	9,309	9,315
R-squared	0.000	0.026	0.031	0.002	0.013	0.031	0.036

Note: Absolute value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix Table 7: Farm Size Productivity Relationship: Variation by Farm size

	Yield		Net profit	
	Holding	Plot	Holding	Plot
Cropped area (ha)	-0.597***	-0.598***	-0.032	-0.019
(α_1)	(14.588)	(22.185)	(1.031)	(0.578)
Cropped area (ha) *	0.108***	0.051**	0.019	0.019
first tercile (γ_1)	(2.705)	(2.554)	(0.643)	(0.761)
Cropped area (ha) *	0.076*	0.066***	0.023	-0.015
second tercile (γ_2)	(1.798)	(3.708)	(0.729)	(0.658)
Village fixed effects	Yes		Yes	
Hh fixed effects		Yes		Yes
Tests:				
$\alpha_1 + \gamma_1 = 0$	1350.03***	2387.03***	1.54	4.17**
$\alpha_1 + \gamma_2 = 0$	473.42***	1046.99***	0.23	0.39
No of observations	3,336	9,315	3,336	9,315
R-squared	0.348	0.361	0.031	0.037

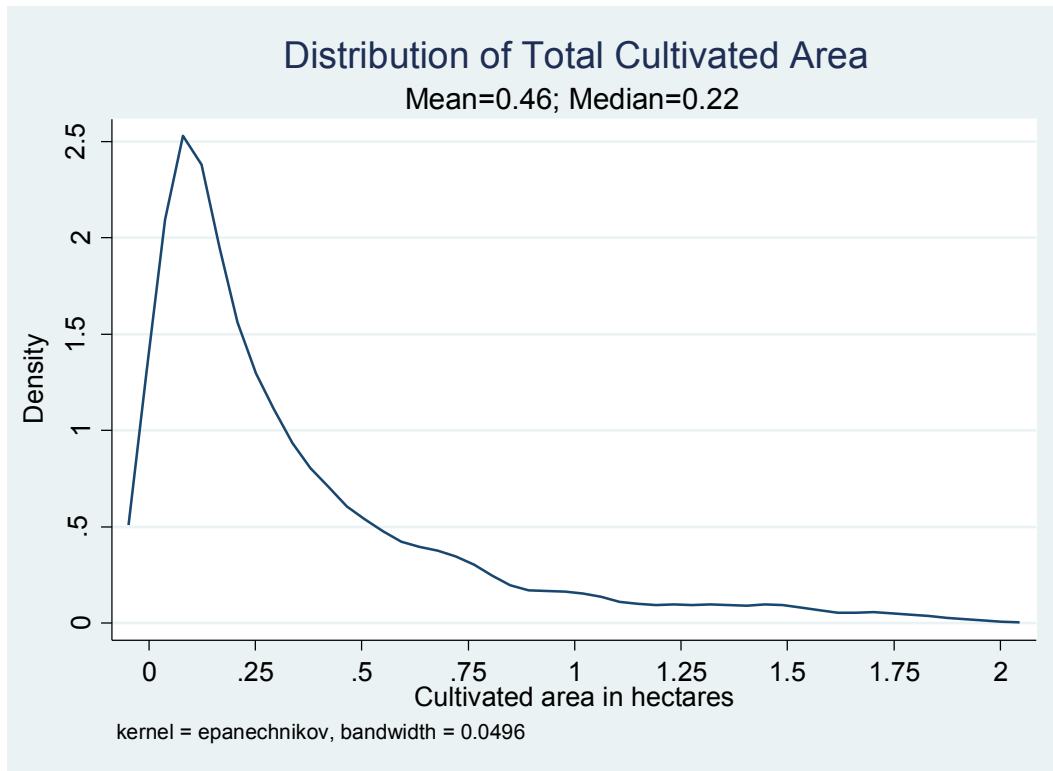
Note: Coefficients are from the specifications in columns (4) and (7) above for holding and plot levels, respectively with only the relevant coefficients reported. Absolute value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix Table 8: Farm Size Productivity Relationship: Quadratic Specification at the Holding Level

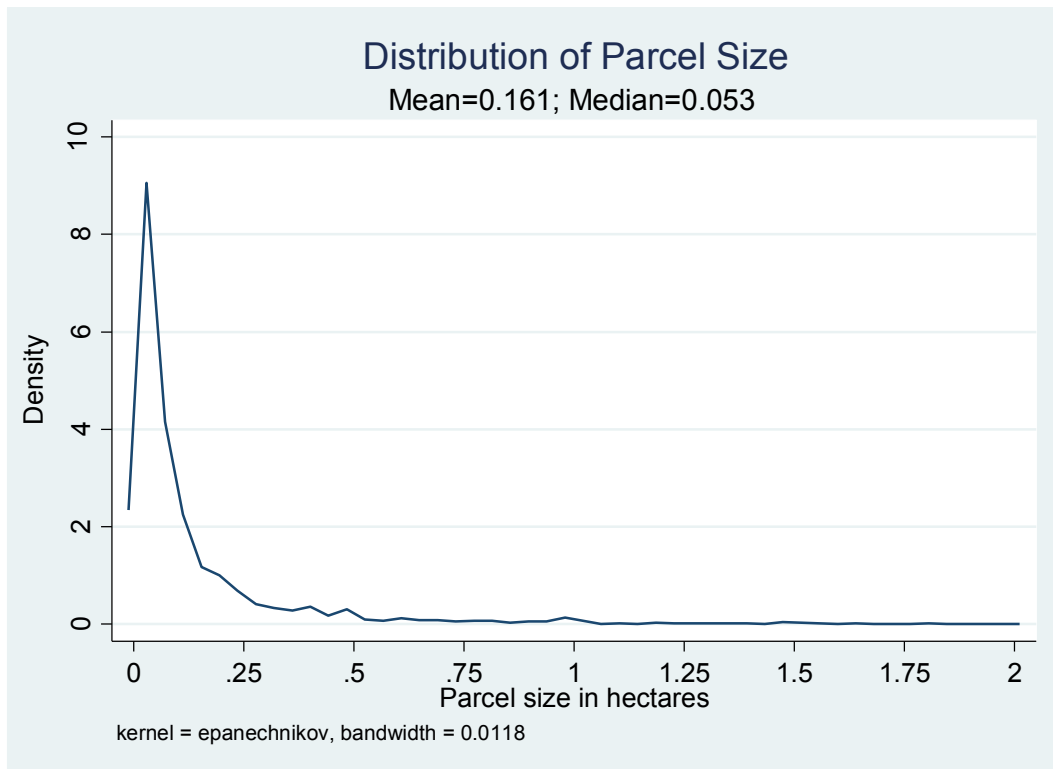
	Yield	Shadow profit	Profit
Cropped area (ha)	-0.471*** (15.854)	-0.077*** (3.969)	-0.022 (0.988)
Cropped area squared	-0.024*** (3.584)	0.019*** (4.245)	-0.003 (0.633)
In land value per hectare in USD	0.208*** (12.467)	0.091*** (8.338)	0.051*** (4.014)
Distance from homestead in minutes	0.002*** (4.867)	0.000 (0.873)	-0.000 (1.276)
Number of years parcel possessed	0.004** (2.409)	0.002* (1.799)	0.003** (2.366)
Parcel located in wet land	0.087 (0.994)	-0.006 (0.102)	-0.061 (0.914)
Irrigated land	-0.026 (0.315)	-0.042 (0.767)	-0.050 (0.782)
Flat land	-0.076 (1.468)	-0.051 (1.514)	-0.058 (1.464)
Gently slopped land	-0.038 (0.837)	-0.035 (1.198)	-0.064* (1.884)
Parcel located in a valley	0.108 (0.715)	0.111 (1.127)	0.196* (1.714)
Sandy soil	-0.087 (1.386)	-0.018 (0.433)	0.030 (0.635)
Loam soil	0.160*** (3.082)	0.044 (1.310)	0.088** (2.215)
Light clay soil	0.064 (0.961)	0.076* (1.747)	0.127** (2.489)
Heavy soil	-0.030 (0.249)	-0.029 (0.365)	-0.114 (1.236)
Gravelly soil	-0.026 (0.398)	-0.006 (0.154)	0.034 (0.704)
Crop shock	-0.223*** (5.956)	-0.081*** (3.312)	-0.096*** (3.359)
Share of total cultivated area with grains	-0.921*** (3.608)	-0.393** (2.355)	-0.254 (1.305)
Share of total cultivated area with tubers	-0.517** (1.990)	-0.233 (1.374)	-0.276 (1.393)
Share of total cultivated area with tree crops	-0.576** (2.221)	-0.202 (1.193)	-0.044 (0.222)
Age of household head	-0.002 (0.883)	-0.001 (1.259)	-0.002 (1.272)
Female headed household	-0.159*** (3.868)	-0.019 (0.694)	-0.031 (0.992)
Head completed only primary school	0.066* (1.795)	0.021 (0.870)	0.046* (1.656)
Head completed secondary education	0.113 (1.615)	0.017 (0.365)	0.066 (1.243)
Members aged 14 and less	0.026** (2.222)	0.007 (0.897)	-0.007 (0.744)
Number of adult members between 15 and 35	0.013 (0.855)	-0.008 (0.848)	-0.007 (0.572)
Number of adult members between 35 and 60	0.043* (1.670)	0.025 (1.484)	-0.011 (0.578)
Members aged 60 and above	0.011 (0.230)	-0.002 (0.059)	-0.054 (1.441)
Constant	3.849*** (12.587)	-0.325 (1.629)	-0.071 (0.305)
Village fixed effects	Yes	Yes	Yes

Average marginal effects at:			
First Quartile	-0.344*** (19.250)	-0.176*** (15.000)	-0.005 (0.390)
Median	-0.387*** (25.550)	-0.143*** (14.470)	-0.011 (0.950)
Third Quartile	-0.427*** (21.240)	-0.111*** (8.470)	-0.016 (1.070)
Number of observations	3,060	3,058	3,060
R-squared	0.335	0.171	0.034

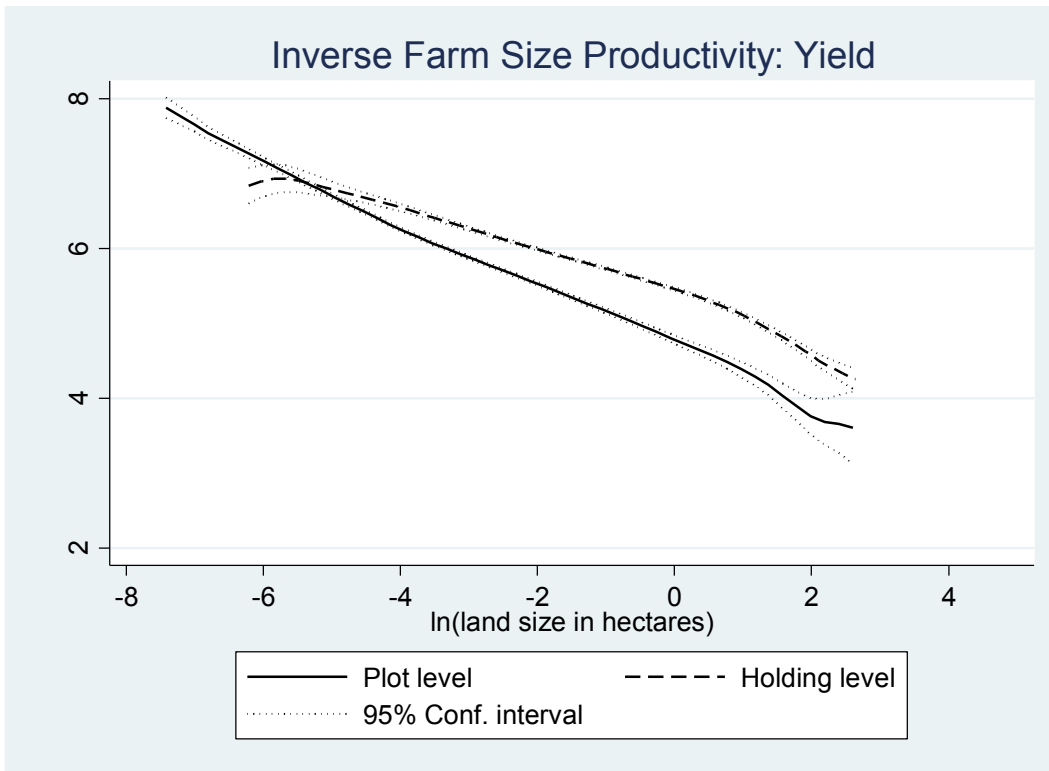
Note: Absolute value of *t*-statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%.



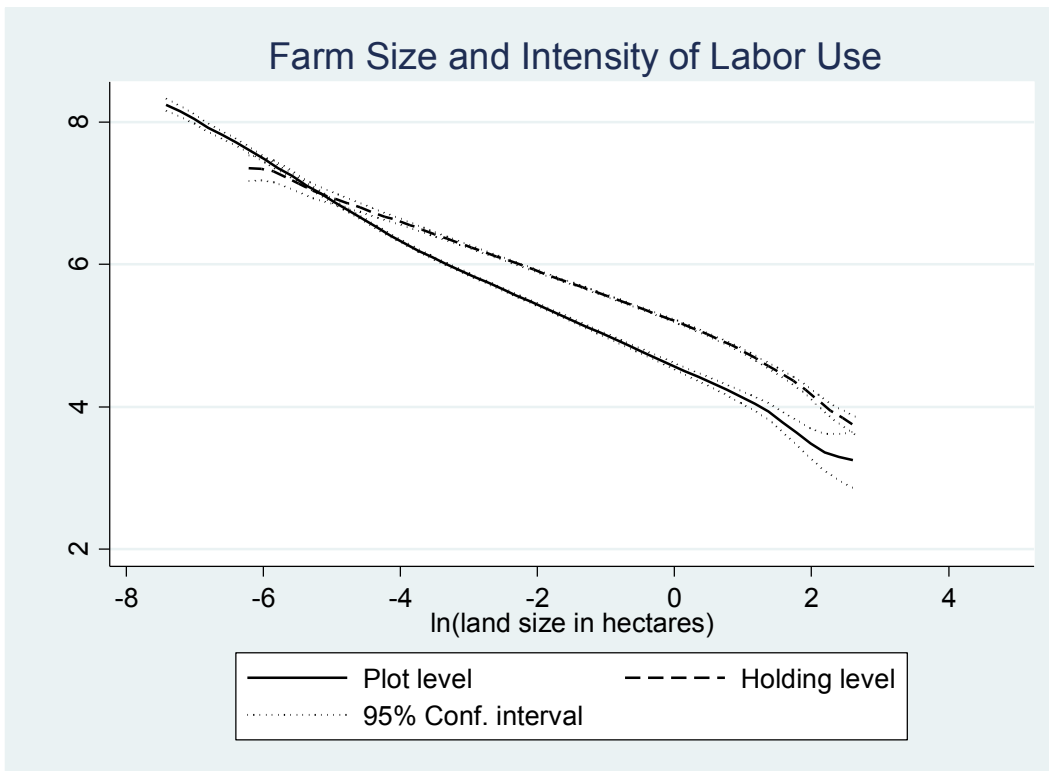
Appendix Figure 1



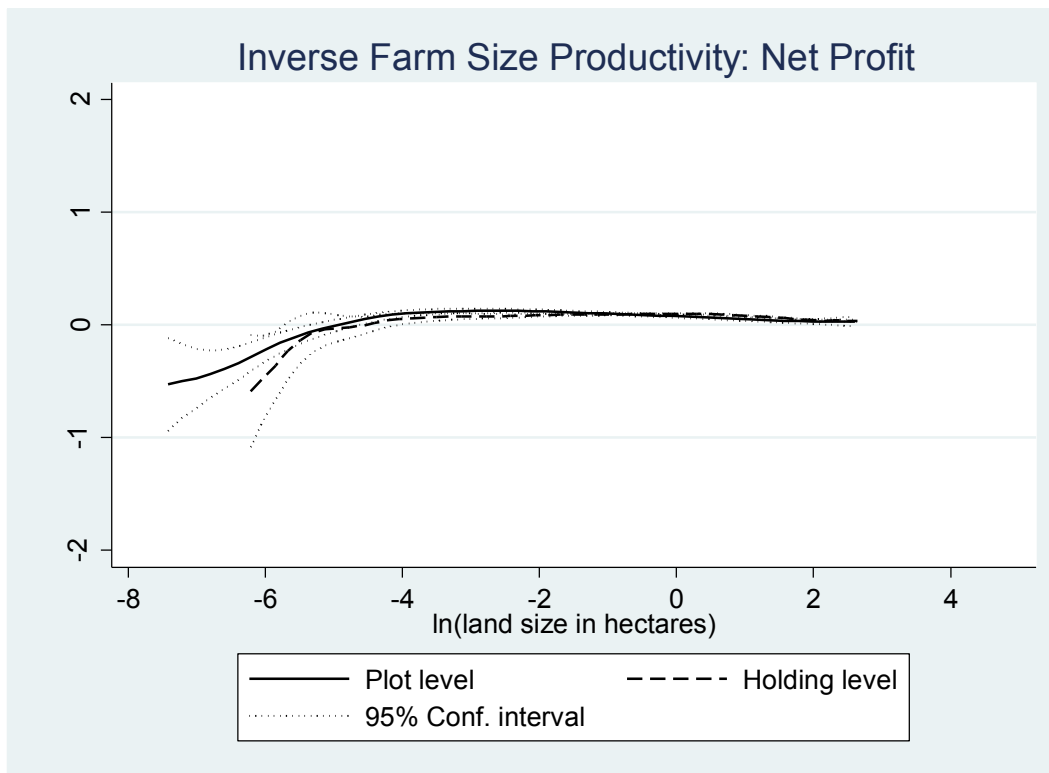
Appendix Figure 2



Appendix Figure 3



Appendix Figure 4



Appendix Figure 5