

Supplementary material: Descriptive tables from Rooting the future: on-farm trees contribution to household energy security and asset creation as a resilient development pathway —evidence from a 20-year panel in rural Ethiopia.

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Table 1. Different tree types and household frequencies from ERHS 1994.

Tree type	Number of households
EUCALYPTUS	595
ENSET	395
GESHO	108
SHIEFERA/HALEKO	23
AVOCADO	115
FRUIT	8
MANGO	30
HAMICHO	1
ORANGE	32
Tid (Junipers)	10
Olive Tree (Woyera)	6
Shembeko	1
Belase	37
Yemeno zafi	2
Wanza	3
Papaya	13
Kitekelo	2
Bisana	2
Kasmir	3
Zeytuna	2
Git	1
Lomi	1
Teha bula	1
Medilo	1
Kundo Berber	1
Shew shewe	1
Kerese	1
Ankelba	1
Girar	1
Marshalo	1
Coniferous tree	3

Table 2. other variables considered in reverse stepwise regression.

Variables eliminated in reverse stepwise procedure, had quality issues or not available in all rounds	
Time constant	Education of Head of Household
	Average education of household
	Access to water source
	Latitude
	Longitude
	Elevation
Time varying	Land owned
	Sales of timber and firewood
	Per capita income and consumption
	Food ratio
	Diet diversity
	Transfers
	Asset index
	# Shocks

Table 3. Dwelling Value G2SLS Results.

G2SLS random-effects IV regression		Number of obs = 5,900	
Group variable: hhid3		Number of groups = 1,475	
R-sq:	Obs per group:		
within = 0.0176	min =	4	
between = 0.4121	avg =	4.0	
overall = 0.3422	max =	4	
Wald chi2(7) = 1730.66			
corr(u_i, X) = 0 (assumed)	Prob > chi2 =	0.0000	

zltcst_	Coef.	Std. Err.	z P> z [95% Conf. Interval]
-----+-----			
zleuc_	.2522862	.0479892	5.26 0.000 .1582292 .3463432
zlens_	-.0193004	.017774	-1.09 0.278 -.0541368 .015536
zlcrr_	.0337839	.0099352	3.40 0.001 .0143113 .0532566
zlhhs_	.0909594	.012646	7.19 0.000 .0661737 .1157451
zlnumrm_04	.115648	.0154325	7.49 0.000 .0854008 .1458951
meanzltcst_4	.7047835	.0345667	20.39 0.000 .637034 .7725329
femalehh	-.093969	.03743	-2.51 0.012 -.1673305 -.0206075
_cons	.0208962	.0172174	1.21 0.225 -.0128494 .0546417
-----+-----			
sigma_u	.61861665		
sigma_e	.59937668		
rho	.51579251 (fraction of variance due to u_i)		

Instrumented: zleuc_ zlens_			
Instruments: zlcrr_ zlhhs_ zlnumrm_04 meanzltcst_4 femalehh lagpeuc2 zlpens_			

First-stage G2SLS regression			
Number of obs =		5,900	
Wald chi(7) =		1167	

Prob > chi2 = 0.0000						

zleuc_	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----						
zlcrcr_	.0689592	.0113167	6.09	0.000	.0467789	.0911394
zlhhs_	.1418638	.0126504	11.21	0.000	.1170694	.1666582
zlnumrm_04	.0189664	.0187466	1.01	0.312	-.0177763	.0557091
meanzltcst_4	.4196235	.0303036	13.85	0.000	.3602295	.4790175
femalehh	-.0932054	.0453123	-2.06	0.040	-.1820159	-.004395
lagpeuc2	.1931433	.011169	17.29	0.000	.1712526	.2150341
zlpens_	.1392048	.0144838	9.61	0.000	.1108171	.1675925
_cons	.0207264	.0209982	0.99	0.324	-.0204293	.061882

First-stage G2SLS regression						
Number of obs = 5,900						
Wald chi(7) = 19505						
Prob > chi2 = 0.0000						

zlens_	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----						
zlcrcr_	-.0135661	.0048177	-2.82	0.005	-.0230086	-.0041235
zlhhs_	.0428629	.0053855	7.96	0.000	.0323074	.0534183
zlnumrm_04	.0368087	.0079808	4.61	0.000	.0211666	.0524509
meanzltcst_4	-.0334211	.0129009	-2.59	0.010	-.0587063	-.0081359
femalehh	-.0578274	.0192904	-3.00	0.003	-.0956358	-.020019
lagpeuc2	.0133496	.0047549	2.81	0.005	.0040303	.022669
zlpens_	.8010436	.006166	129.91	0.000	.7889584	.8131288
_cons	.0128593	.0089393	1.44	0.150	-.0046615	.0303801

Table 4. Tropical Livestock Unit G2SLS Results.

G2SLS random-effects IV regression	Number of obs = 5,900
Group variable: hhid3	Number of groups = 1,475

R-sq:	Obs per group:
within = 0.0899	min = 4
between = 0.4895	avg = 4.0
overall = 0.3102	max = 4

Wald chi2(4) = 2129.50
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0000

zltsu_	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
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zlc_r	1.030726	.0482784	21.35	0.000	.936102	1.12535
zlens_	.2443161	.0749232	3.26	0.001	.0974694	.3911629
femalehh	-.6950671	.387963	-1.79	0.073	-1.455461	.0653265
crfodd2	.1152699	.0308991	3.73	0.000	.0547088	.1758311
_cons	.1026731	.0912908	1.12	0.261	-.0762537	.2815998
-----+-----						
sigma_u	0					
sigma_e	1.2762394					
rho	0 (fraction of variance due to u_i)					
-----+-----						
Instrumented: zlc_r zlens_ femalehh						
Instruments: crfodd2 zlhhs_ zleuc_ zllon						

First-stage G2SLS regression

Number of obs = 5,900
Wald chi(4) = 1891
Prob > chi2 = 0.0000

zlc_r_	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----						
crfodd2	.1937841	.0237908	8.15	0.000	.147155	.2404132
zlhhs_	.3437099	.0119542	28.75	0.000	.3202801	.3671397
zleuc_	.1437475	.0122396	11.74	0.000	.1197583	.1677367
zllon	.237782	.0117827	20.18	0.000	.2146884	.2608756
_cons	-.0872357	.0155898	-5.60	0.000	-.1177912	-.0566802
-----+-----						

First-stage G2SLS regression

Number of obs = 5,900
Wald chi(4) = 2408
Prob > chi2 = 0.0000

zlens_	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----						
crfodd2	-.1767371	.0230386	-7.67	0.000	-.2218919	-.1315822
zlhhs_	.2208908	.0115763	19.08	0.000	.1982017	.2435799
zleuc_	.1329748	.0118526	11.22	0.000	.1097441	.1562056
zllon	-.4133376	.0114102	-36.23	0.000	-.4357011	-.3909741
_cons	.0795617	.0150969	5.27	0.000	.0499722	.1091511

First-stage G2SLS regression

Number of obs = 5,900
Wald chi(4) = 492
Prob > chi2 = 0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
femalehh					
crfodd2	-.0129936	.0109272	-1.19	0.234	-.0344106 .0084233
zlhhs_	-.0956177	.0054906	-17.41	0.000	-.1063791 -.0848562
zleuc_	-.0042151	.0056217	-0.75	0.453	-.0152335 .0068032
zllon	.0593343	.0054118	10.96	0.000	.0487273 .0699413
_cons	.2282222	.0071605	31.87	0.000	.2141879 .2422565