

The Adoption of Climate-Resilient Groundnut Varieties Increases Agricultural Production and Smallholder Commercialization in West Africa

Supplementary Information (Full model tables and robustness check)

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1 Supplementary Note

We present the results of the estimation using the pooled FE-OLS model. Figure S1 presents the results of the relationship between the adoption of climate-resilient groundnut varieties and commercialization where we employ the linear probability model for binary outcomes. We present results when we consider adoption as a dummy and the extent of adoption of climate-resilient groundnut varieties. Considering adoption as a dummy, we establish a positive association with the commercialization outcomes; market participation, quantity of groundnut sold, and sales. Considering the area under adoption, we obtain negative estimates that are not statistically significant. However, this result could mean that increasing the area of cultivation of improved climate-resilient groundnut varieties is negatively correlated with market participation, quantity sold and the associated sales value. This negative relationship although not statistically significant could be due to diminishing returns when we consider the area under adoption. Otherwise, these negative results could be due to endogeneity issues which could lead to biased estimates. Given that we control for these endogeneity issues using the 2SLS and both household fixed effects and the correlated random effects model, we only use these results for comparison with the main estimation results.

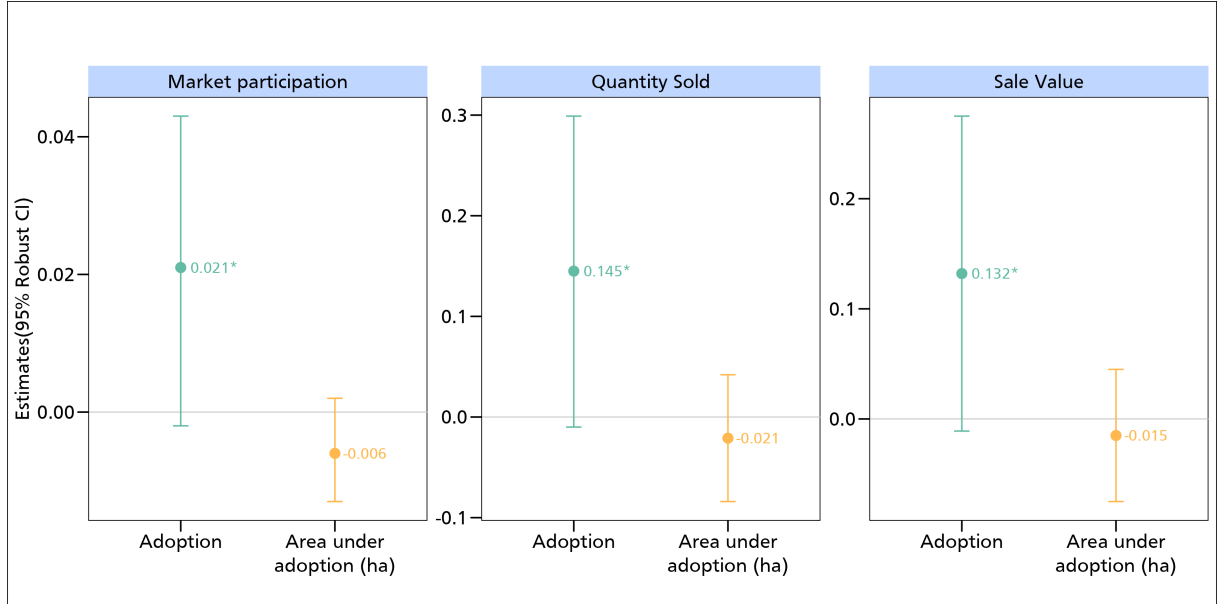


Figure 1: OLS estimates of the relationship between adoption and commercialization

Note: Full models are reported in SM2. Robust standard errors in parentheses. Additional controls include age and educational level of the household head, dependency ratio, whether the household head is male, household size, cooperative membership, training, access to public and private extension, access to credits both in

Estimating the relationship between adoption of improved groundnuts, production, production value and land productivity using the FE-OLS model (Figure S2), we obtain positive coefficients for all outcomes. When we consider adoption as a dummy, we observe production and productivity increases of about 540Kg and 285Kg/ha respectively. Considering the scale of adoption, we observe that adoption of improved climate-smart groundnut varieties increases groundnut production by 240Kg and land productivity by approximately 60Kg/ha. The magnitudes here are positive indicating that adoption both when considered as a dummy as well as extent increases yield, production, and production value. The smaller magnitudes here might be indicative of diminishing returns as early highlighted. The positive and significant estimates of the area under adoption variable aligns with the tenets of the non-separable agricultural household model where the production, consumption and ultimately commercialization decisions of households are non-separable. This suggests that households would only participate in markets to the extent that the household food production and consumption needs are met.

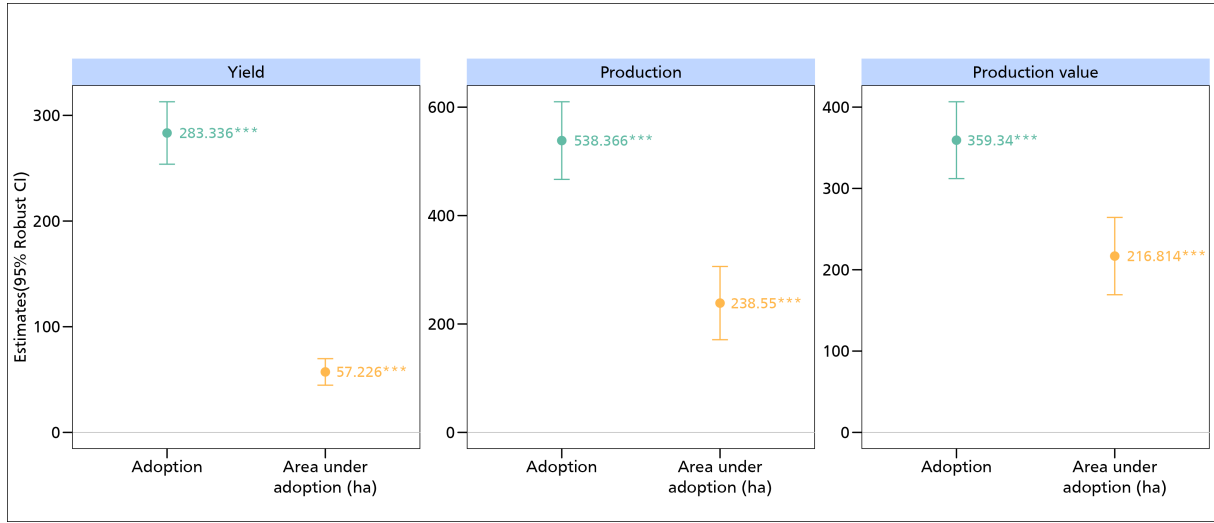


Figure 2: OLS estimates of the relationship between adoption and commercialization

Note: Full models are reported in SM4. Robust standard errors in parentheses). Additional controls include age and educational level of the household head, dependency ratio, whether the household head is male, household size, cooperative membership, training, access to public and private extension, access to credits both in cash and kind, distance to nearest urban and village market, crop rotation, mixed cropping, labour, market price, input costs, area of cultivation, off-farm income and soil type (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

2 Descriptive statistics

Table SM1: Descriptive statistics by year and adoption status

Characteristic	2017, N = 2868			2018, N = 2868			2019, N = 2868		
	Non-adopter, N = 1,809	Adopter, N = 1,059	p-value	Non-adopter, N = 1,770	Adopter, N = 1,098	p-value	Non-adopter, N = 1,670	Adopter, N = 1,198	p-value
Country			<0.001			<0.001			<0.001
Ghana	327 (18%)	171 (16%)		353 (20%)	145 (13%)		340 (20%)	158 (13%)	
Mali	697 (39%)	143 (14%)		693 (39%)	147 (13%)		642 (38%)	198 (17%)	
Nigeria	785 (43%)	745 (70%)		724 (41%)	806 (73%)		688 (41%)	842 (70%)	
Age of household head (years)	48 (13)	47 (11)	0.073	49 (13)	47 (11)	<0.001	50 (12)	49 (12)	0.14
Sex of household head (dummy, male=1)	1,681 (93%)	1,004 (95%)	0.047	1,629 (92%)	1,056 (96%)	<0.001	1,546 (93%)	1,139 (95%)	0.007
Education level (Number of years)	2.5 (3.8)	3.4 (4.4)	<0.001	2.4 (3.8)	3.6 (4.4)	<0.001	2.1 (3.3)	3.9 (4.8)	<0.001
Household size (number of persons)	12 (7)	10 (6)	<0.001	12 (7)	10 (6)	<0.001	13 (10)	10 (7)	<0.001
Dependency ratio	1.59 (1.10)	1.77 (1.38)	0.029	1.64 (1.15)	1.69 (1.30)	0.8	1.74 (1.32)	1.95 (1.63)	0.015
Farmers group membership (dummy)	757 (42%)	551 (52%)	<0.001	771 (44%)	537 (49%)	0.005	696 (42%)	518 (43%)	0.4
Training on agriculture (dummy)	591 (33%)	473 (45%)	<0.001	557 (31%)	507 (46%)	<0.001	530 (32%)	565 (47%)	<0.001
Training on groundnut farming(dummy)	1,020 (56%)	587 (55%)	0.6	1,001 (57%)	606 (55%)	0.5	629 (38%)	766 (64%)	<0.001
Public agricultural extension service (number of visits)	1.21 (1.66)	3.32 (3.30)	<0.001	1.40 (1.84)	2.94 (3.29)	<0.001	1.71 (1.90)	2.47 (2.12)	<0.001
Private agricultural extension service (number of visits)	0.58 (0.90)	1.54 (1.89)	<0.001	0.62 (0.94)	1.44 (1.88)	<0.001	1.11 (1.33)	1.38 (1.57)	<0.001
Cash credit for groundnut farming (dummy)	32 (1.8%)	24 (2.3%)	0.4	30 (1.7%)	26 (2.4%)	0.2	49 (2.9%)	76 (6.3%)	<0.001
Credit in kind for groundnut farming (dummy)	62 (3.4%)	129 (12%)	<0.001	54 (3.1%)	137 (12%)	<0.001	87 (5.2%)	150 (13%)	<0.001
Distance to the nearest urban market (km)	15 (18)	11 (11)	<0.001	15 (19)	11 (11)	<0.001	13 (14)	12 (14)	<0.001
Distance the nearest village market (km)	3.8 (5.3)	3.5 (3.7)	0.004	3.9 (5.4)	3.4 (3.6)	0.003	4.8 (5.0)	3.6 (4.5)	<0.001
Crop rotation (dummy)	889 (49%)	397 (37%)	<0.001	905 (51%)	381 (35%)	<0.001	921 (55%)	393 (33%)	<0.001
Mixed Crops (dummy)	657 (36%)	448 (42%)	0.001	681 (38%)	424 (39%)	>0.9	725 (43%)	542 (45%)	0.3
Labor force (man.day)	3.9 (5.1)	6.5 (7.4)	<0.001	4.4 (5.5)	5.6 (7.1)	<0.001	7 (9)	7 (6)	<0.001
Unit selling price (USD/kg)	0.53 (0.07)	0.71 (0.08)	<0.001	0.53 (0.07)	0.72 (0.08)	<0.001	0.53 (0.07)	0.71 (0.09)	<0.001
Seed cost (USD/ha)	8 (16)	27 (19)	<0.001	8 (17)	25 (20)	<0.001	20 (21)	23 (19)	<0.001
Fertilizer cost (USD/ha)	17 (29)	53 (39)	<0.001	18 (30)	49 (40)	<0.001	19 (28)	49 (39)	<0.001
Pesticide cost (USD/ha)	4 (8)	14 (14)	<0.001	4 (8)	13 (14)	<0.001	6 (13)	11 (11)	<0.001
Labor cost (USD/ha)	21 (33)	49 (41)	<0.001	24 (34)	43 (41)	<0.001	50 (49)	50 (41)	0.031
Groundnut area (ha)	1.44 (1.47)	1.81 (1.62)	<0.001	1.49 (1.46)	1.72 (1.64)	<0.001	1.60 (1.47)	1.72 (1.32)	<0.001
Off-farm income (dummy)	80 (4.4%)	190 (18%)	<0.001	85 (4.8%)	185 (17%)	<0.001	142 (8.5%)	199 (17%)	<0.001
Clay soil (dummy)	279 (15%)	164 (15%)	>0.9	271 (15%)	172 (16%)	0.8	282 (17%)	207 (17%)	0.8
Sandy-clay soil (dummy)	987 (55%)	595 (56%)	0.4	977 (55%)	605 (55%)	>0.9	740 (44%)	516 (43%)	0.5
Silty soil (dummy)	281 (16%)	162 (15%)	0.9	278 (16%)	165 (15%)	0.6	306 (18%)	200 (17%)	0.3

¹ n (%); Mean (SD)² Pearson's Chi-squared test; Wilcoxon rank sum test

3 Pooled OLS Regressions

Table SM2: Full OLS estimates of the relationship between adoption and commercialization(Adoption)

variables	Sellers	Quantity Sold	Sales value
Adoption dummy	0.021*	0.145*	0.132*
	0.012	0.079	0.073
Age of household head (years)	-0.001**	-0.006**	-0.005***
	0.000	0.002	0.002
Sex of household head (dummy, male=1)	-0.012	0.105	0.112
	0.020	0.129	0.118
Education level (Number of years)	0.001	-0.005	-0.005
	0.001	0.006	0.005
Household size (number of persons)	0.000	0.015***	0.015***
	0.001	0.005	0.004
Farmers group membership (dummy)	0.022***	0.132***	0.120***
	0.004	0.029	0.027
Training on agriculture (dummy)	-0.057***	-0.320***	-0.282***
	0.011	0.074	0.068
Training on groundnut farming (dummy)	-0.021***	-0.154***	-0.143***
	0.004	0.025	0.023
Public agricultural extension service (number of visits)	0.001	-0.017	-0.018
	0.002	0.014	0.013
Private agricultural extension service (number of visits)	0.007**	0.034*	0.027
	0.003	0.020	0.019
Cash credit for groundnut farming (dummy)	0.011	0.034	0.026
	0.020	0.140	0.130
Credit in kind for groundnut farming (dummy)	-0.008	0.039	0.043
	0.012	0.088	0.082
Distance to the nearest urban market (km)	-0.002***	-0.015***	-0.014***
	0.000	0.002	0.002
Distance the nearest village market (km)	-0.004***	-0.021***	-0.019***
	0.001	0.007	0.007
Crop rotation (dummy)	0.010	0.085	0.078
	0.010	0.063	0.057
Mixed Crops (dummy)	0.003	-0.095*	-0.097**
	0.008	0.051	0.047
Labor force (man.day)	0.002***	0.024***	0.023***
	0.001	0.004	0.004
Unit selling price (USD/kg)	0.068	0.579**	2.001***
	0.042	0.286	0.264
Seed cost (USD/ha)	0.001***	0.010***	0.009***
	0.000	0.002	0.002
Fertilizer cost (USD/ha)	0.000	0.001*	0.001*
	0.000	0.001	0.001
Pesticide cost (USD/ha)	-0.000	0.003	0.003
	0.000	0.002	0.002
Labor cost (USD/ha)	0.000***	0.002***	0.002***
	0.000	0.001	0.001
Groundnut area (ha)	0.019***	0.347***	0.335***
	0.003	0.022	0.021
Off-farm income (dummy)	-0.033***	-0.151**	-0.135**
	0.010	0.074	0.069
Dependency ratio	0.001	-0.002	-0.003
	0.003	0.019	0.017
Clay soil (dummy)	-0.008	-0.097	-0.095
	0.011	0.077	0.071
Sandy-clay soil (dummy)	0.007	0.035	0.031
	0.009	0.061	0.056
Silty soil (dummy)	0.008	0.052	0.046
	0.011	0.076	0.070
Observations	8,604	8,604	8,604
R-squared	0.274	0.421	0.451
F test	13.95	30.48	37.56

Table SM3: Full OLS estimates of the relationship between adoption and commercialization (Area under Adoption)

variables	Production	Production value	Yield
Area under adoption (ha)	-0.006 0.004	-0.021 0.032	-0.015 0.031
Age of household head (years)	-0.001** 0.000	-0.006** 0.002	-0.005*** 0.002
Sex of household head (dummy, male=1)	-0.011 0.020	0.110 0.129	0.116 0.118
Education level (Number of years)	0.001 0.001	-0.005 0.006	-0.006 0.005
Household size (number of persons)	0.000 0.001	0.014*** 0.005	0.014*** 0.004
Farmers group membership (dummy)	0.022*** 0.004	0.132*** 0.029	0.120*** 0.027
Training on agriculture (dummy)	-0.056*** 0.011	-0.319*** 0.074	-0.282*** 0.068
Training on groundnut farming (dummy)	-0.021*** 0.004	-0.155*** 0.025	-0.144*** 0.023
Public agricultural extension service (number of visits)	0.001 0.002	-0.015 0.014	-0.016 0.013
Private agricultural extension service (number of visits)	0.008*** 0.003	0.042** 0.020	0.033* 0.019
Cash credit for groundnut farming (dummy)	0.011 0.020	0.038 0.140	0.030 0.131
Credit in kind for groundnut farming (dummy)	-0.006 0.012	0.052 0.087	0.053 0.082
Distance to the nearest urban market (km)	-0.002*** 0.000	-0.015*** 0.002	-0.014*** 0.002
Distance the nearest village market (km)	-0.004*** 0.001	-0.021*** 0.007	-0.019*** 0.007
Crop rotation (dummy)	0.009 0.010	0.080 0.063	0.074 0.058
Mixed Crops (dummy)	0.002 0.008	-0.100* 0.051	-0.102** 0.047
Labor force (man.day)	0.002*** 0.001	0.023*** 0.004	0.022*** 0.004
Unit selling price (USD/kg)	0.134*** 0.034	0.982*** 0.235	2.357*** 0.218
Seed cost (USD/ha)	0.001*** 0.000	0.010*** 0.002	0.009*** 0.002
Fertilizer cost (USD/ha)	0.000 0.000	0.002** 0.001	0.002** 0.001
Pesticide cost (USD/ha)	-0.000 0.000	0.004 0.002	0.004* 0.002
Labor cost (USD/ha)	0.000*** 0.000	0.002*** 0.001	0.002*** 0.001
Groundnut area (ha)	0.022*** 0.003	0.355*** 0.022	0.342*** 0.021
Off-farm income (dummy)	-0.033*** 0.010	-0.150** 0.074	-0.134* 0.069
Dependency ratio	0.001 0.003	-0.003 0.019	-0.003 0.017
Clay soil (dummy)	-0.009 0.011	-0.101 0.077	-0.099 0.071
Sandy-clay soil (dummy)	0.006 0.009	0.032 0.060	0.028 0.055
Silty soil (dummy)	0.008 0.011	0.053 0.076	0.046 0.070
Observations	8,604	8,604	8,604
R-squared	0.273	0.421	0.451
F test	14.32	31.28	38.78

Table SM4: Full OLS estimates of the relationship between adoption, production and yields(Adoption)

variables	Production	Production value	Yield
Adoption dummy	538.366***	359.340***	283.336***
	36.536	24.099	15.075
Age of household head (years)	0.226	0.246	-0.023
	0.882	0.625	0.374
Sex of household head (dummy, male=1)	-17.450	-20.938	-24.355
	31.798	23.338	17.706
Education level (Number of years)	0.573	-0.462	1.681
	2.929	2.113	1.329
Household size (number of persons)	-2.087	-3.346**	0.531
	1.918	1.312	0.633
Farmers group membership (dummy)	27.503*	23.696**	1.717
	14.436	10.143	5.305
Training on agriculture (dummy)	20.058	10.166	12.945
	28.123	19.713	11.464
Training on groundnut farming (dummy)	-2.803	-3.008	-2.129
	9.558	6.533	4.027
Public agricultural extension service (number of visits)	-10.965	-9.267*	-7.113**
	7.583	5.383	2.889
Private agricultural extension service (number of visits)	-20.005**	-13.667**	-3.053
	9.408	6.454	3.826
Cash credit for groundnut farming (dummy)	-116.583*	-96.283**	-3.990
	62.411	42.370	27.589
Credit in kind for groundnut farming (dummy)	19.798	39.725	-8.167
	52.308	37.817	19.779
Distance to the nearest urban market (km)	-0.254	-0.150	0.039
	0.828	0.553	0.353
Distance the nearest village market (km)	-3.361*	-2.097*	-1.617**
	1.840	1.198	0.795
Crop rotation (dummy)	-54.106*	-50.565**	1.007
	27.676	19.779	11.600
Mixed Crops (dummy)	40.551*	32.475**	-1.605
	21.514	15.265	9.425
Labor force (man.day)	-4.390	-3.713**	-1.619**
	2.721	1.808	0.788
Unit selling price (USD/kg)	36.726	1,208.590***	93.809*
	128.183	90.647	55.544
Seed cost (USD/ha)	-0.542	-0.338	-0.371
	0.569	0.402	0.257
Fertilizer cost (USD/ha)	-1.346***	-1.273***	-0.004
	0.440	0.322	0.199
Pesticide cost (USD/ha)	2.260*	2.177**	0.024
	1.289	0.999	0.531
Labor cost (USD/ha)	0.075	0.043	-0.082
	0.265	0.191	0.131
Groundnut area (ha)	698.176***	436.072***	1.376
	20.072	13.993	3.300
Off-farm income (dummy)	-15.131	-9.056	-21.645
	39.174	29.191	18.076
Dependency ratio	-10.922	-9.494*	-1.563
	7.625	5.439	3.538
Clay soil (dummy)	6.092	0.292	3.708
	29.406	20.300	13.795
Sandy-clay soil (dummy)	28.195	20.606	-1.381
	25.243	17.693	11.221
Silty soil (dummy)	20.218	14.880	12.882
	30.870	21.598	13.986
Observations	8,604	8,604	8,604
R-squared	0.616	0.594	0.181
F test	69.22	73.12	26.48

Table SM5: OLS estimates of the relationship between adoption, production and yields(Area under Adoption)

variables	Production	Production value	Yield
Area under adoption (ha)	238.550***	216.814***	57.226***
	34.459	24.253	6.403
Age of household head (years)	0.377	0.374	0.025
	0.875	0.611	0.380
Sex of household head (dummy, male=1)	-17.307	-23.796	-20.776
	29.621	20.843	17.751
Education level (Number of years)	2.728	1.428	2.280*
	2.916	2.076	1.354
Household size (number of persons)	0.104	-1.326	1.023
	1.852	1.243	0.641
Farmers group membership (dummy)	23.024	19.604*	0.668
	14.530	10.143	5.411
Training on agriculture (dummy)	19.017	8.794	13.199
	28.199	19.422	11.653
Training on groundnut farming (dummy)	-6.485	-5.155	-4.435
	9.625	6.519	4.090
Public agricultural extension service (number of visits)	-5.811	-6.431	-3.685
	7.401	5.123	2.924
Private agricultural extension service (number of visits)	-10.123	-10.434*	6.138
	9.116	6.215	3.799
Cash credit for groundnut farming (dummy)	-87.350	-74.251*	8.406
	63.173	42.902	28.328
Credit in kind for groundnut farming (dummy)	-8.897	6.830	-6.967
	50.662	35.263	20.115
Distance to the nearest urban market (km)	-0.735	-0.486	-0.196
	0.826	0.541	0.363
Distance the nearest village market (km)	-3.326*	-2.099*	-1.568**
	1.806	1.139	0.794
Crop rotation (dummy)	-42.921	-38.056**	0.911
	26.863	18.900	11.740
Mixed Crops (dummy)	34.291	30.585**	-7.613
	21.331	14.868	9.562
Labor force (man.day)	-4.084	-3.021	-2.037**
	2.927	1.994	0.808
Unit selling price (USD/kg)	512.083***	1,339.478***	565.109***
	133.797	96.971	49.594
Seed cost (USD/ha)	0.128	0.059	0.042
	0.546	0.370	0.259
Fertilizer cost (USD/ha)	-0.846**	-0.963***	0.288
	0.431	0.312	0.201
Pesticide cost (USD/ha)	2.188*	1.732*	0.456
	1.325	1.024	0.540
Labor cost (USD/ha)	0.010	-0.006	-0.110
	0.257	0.179	0.133
Groundnut area (ha)	634.558***	376.027***	-11.249***
	20.141	13.418	3.596
Off-farm income (dummy)	-3.625	0.179	-17.434
	38.674	28.513	18.365
Dependency ratio	-7.874	-6.761	-0.786
	7.614	5.353	3.592
Clay soil (dummy)	28.503	22.644	6.733
	29.032	19.653	14.049
Sandy-clay soil (dummy)	45.222*	36.851**	1.791
	24.917	17.077	11.460
Silty soil (dummy)	26.747	20.009	15.403
	30.838	21.038	14.258
Observations	8,604	8,604	8,604
R-squared	0.622	0.613	0.156
F test	64.51	71.32	16.55

4 Panel Regression

Table SM6: Full 2SLS estimates of the relationship between adoption and commercialization(Adoption)

variables	Production	Production value	Yield
Area under adoption (ha)	238.550***	216.814***	57.226***
	34.459	24.253	6.403
Age of household head (years)	0.377	0.374	0.025
	0.875	0.611	0.380
Sex of household head (dummy, male=1)	-17.307	-23.796	-20.776
	29.621	20.843	17.751
Education level (Number of years)	2.728	1.428	2.280*
	2.916	2.076	1.354
Household size (number of persons)	0.104	-1.326	1.023
	1.852	1.243	0.641
Farmers group membership (dummy)	23.024	19.604*	0.668
	14.530	10.143	5.411
Training on agriculture (dummy)	19.017	8.794	13.199
	28.199	19.422	11.653
Training on groundnut farming (dummy)	-6.485	-5.155	-4.435
	9.625	6.519	4.090
Public agricultural extension service (number of visits)	-5.811	-6.431	-3.685
	7.401	5.123	2.924
Private agricultural extension service (number of visits)	-10.123	-10.434*	6.138
	9.116	6.215	3.799
Cash credit for groundnut farming (dummy)	-87.350	-74.251*	8.406
	63.173	42.902	28.328
Credit in kind for groundnut farming (dummy)	-8.897	6.830	-6.967
	50.662	35.263	20.115
Distance to the nearest urban market (km)	-0.735	-0.486	-0.196
	0.826	0.541	0.363
Distance the nearest village market (km)	-3.326*	-2.099*	-1.568**
	1.806	1.139	0.794
Crop rotation (dummy)	-42.921	-38.056**	0.911
	26.863	18.900	11.740
Mixed Crops (dummy)	34.291	30.585**	-7.613
	21.331	14.868	9.562
Labor force (man.day)	-4.084	-3.021	-2.037**
	2.927	1.994	0.808
Unit selling price (USD/kg)	512.083***	1,339.478***	565.109***
	133.797	96.971	49.594
Seed cost (USD/ha)	0.128	0.059	0.042
	0.546	0.370	0.259
Fertilizer cost (USD/ha)	-0.846**	-0.963***	0.288
	0.431	0.312	0.201
Pesticide cost (USD/ha)	2.188*	1.732*	0.456
	1.325	1.024	0.540
Labor cost (USD/ha)	0.010	-0.006	-0.110
	0.257	0.179	0.133
Groundnut area (ha)	634.558***	376.027***	-11.249***
	20.141	13.418	3.596
Off-farm income (dummy)	-3.625	0.179	-17.434
	38.674	28.513	18.365
Dependency ratio	-7.874	-6.761	-0.786
	7.614	5.353	3.592
Clay soil (dummy)	28.503	22.644	6.733
	29.032	19.653	14.049
Sandy-clay soil (dummy)	45.222*	36.851**	1.791
	24.917	17.077	11.460
Silty soil (dummy)	26.747	20.009	15.403
	30.838	21.038	14.258
Observations	8,604	8,604	8,604
R-squared	0.622	0.613	0.156
F test	64.51	71.32	16.55

Table SM7: Full 2SLS estimates of the relationship between adoption and commercialization

variables	FE-MP	RE-MP	FE-QS	RE-QS	FE-SV	RE-SV
Adoption dummy	0.064*** (0.020)	0.053*** (0.018)	0.594*** (0.134)	0.544*** (0.120)	0.570*** (0.124)	0.526*** (0.110)
Age of household head (years)	0.002 (0.003)	-0.001* (0.000)	-0.011 (0.024)	-0.006** (0.003)	-0.013 (0.022)	-0.005** (0.003)
Sex of household head (dummy, male=1)		-0.011 (0.020)		0.115 (0.137)		0.121 (0.126)
Education level (Number of years)		0.001 (0.001)		-0.005 (0.009)		-0.006 (0.008)
Household size (number of persons)	0.002*** (0.001)	0.001* (0.001)	0.027*** (0.005)	0.020*** (0.004)	0.026*** (0.004)	0.019*** (0.004)
Farmers group membership (dummy)	0.022*** (0.005)	0.023*** (0.004)	0.124*** (0.035)	0.132*** (0.028)	0.111*** (0.032)	0.119*** (0.026)
Training on agriculture (dummy)	-0.043*** (0.011)	-0.052*** (0.009)	-0.314*** (0.078)	-0.318*** (0.065)	-0.287*** (0.072)	-0.285*** (0.059)
Training on groundnut farming (dummy)	-0.025*** (0.003)	-0.023*** (0.003)	-0.176*** (0.023)	-0.166*** (0.021)	-0.162*** (0.021)	-0.153*** (0.019)
Public agricultural extension service (number of visits)	0.002 (0.002)	0.002 (0.002)	-0.024 (0.016)	-0.020 (0.014)	-0.025 (0.015)	-0.021 (0.013)
Private agricultural extension service (number of visits)	0.003 (0.003)	0.004 (0.003)	0.045* (0.024)	0.026 (0.020)	0.042* (0.022)	0.021 (0.019)
Cash credit for groundnut farming (dummy)	-0.010 (0.023)	0.000 (0.020)	-0.186 (0.156)	-0.076 (0.136)	-0.193 (0.144)	-0.083 (0.125)
Credit in kind for groundnut farming (dummy)	-0.044*** (0.016)	-0.026* (0.014)	-0.046 (0.109)	-0.019 (0.094)	-0.022 (0.100)	-0.006 (0.086)
Distance to the nearest urban market (km)	-0.000 (0.000)	-0.001*** (0.000)	-0.003 (0.002)	-0.009*** (0.002)	-0.003 (0.002)	-0.008*** (0.002)
Distance the nearest village market (km)	-0.003*** (0.001)	-0.003*** (0.001)	-0.013** (0.006)	-0.017*** (0.005)	-0.011* (0.006)	-0.015*** (0.005)
Crop rotation (dummy)	-0.023** (0.011)	-0.005 (0.009)	-0.144** (0.072)	-0.016 (0.061)	-0.135** (0.066)	-0.014 (0.056)
Mixed Crops (dummy)	0.004 (0.009)	0.003 (0.007)	-0.063 (0.061)	-0.079 (0.050)	-0.066 (0.056)	-0.080* (0.046)
Labor force (man.day)	0.002*** (0.001)	0.002*** (0.001)	0.027*** (0.005)	0.026*** (0.004)	0.026*** (0.004)	0.025*** (0.004)
Unit selling price (USD/kg)	0.009 (0.054)	0.012 (0.050)	-0.134 (0.365)	-0.180 (0.338)	1.301*** (0.336)	1.249*** (0.311)
Seed cost (USD/ha)	0.002*** (0.000)	0.002*** (0.000)	0.011*** (0.002)	0.010*** (0.001)	0.010*** (0.001)	0.009*** (0.001)
Fertilizer cost (USD/ha)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Pesticide cost (USD/ha)	-0.001*** (0.000)	-0.001** (0.000)	-0.005 (0.003)	-0.002 (0.003)	-0.004 (0.003)	-0.001 (0.002)
Labor cost (USD/ha)	0.000*** (0.000)	0.000*** (0.000)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Groundnut area (ha)	0.003 (0.003)	0.013*** (0.003)	0.198*** (0.023)	0.282*** (0.019)	0.195*** (0.021)	0.274*** (0.017)
Off-farm income (dummy)	-0.020 (0.014)	-0.027** (0.012)	-0.035 (0.098)	-0.101 (0.083)	-0.024 (0.090)	-0.088 (0.076)
Dependency ratio	0.002 (0.003)	0.001 (0.003)	0.013 (0.022)	0.003 (0.018)	0.012 (0.020)	0.003 (0.016)
Clay soil (dummy)	-0.016 (0.013)	-0.012 (0.011)	-0.161* (0.087)	-0.120 (0.073)	-0.155* (0.080)	-0.116* (0.068)
Sandy-clay soil (dummy)	0.006 (0.010)	0.006 (0.009)	0.052 (0.068)	0.036 (0.059)	0.048 (0.063)	0.032 (0.054)
Silty soil (dummy)	-0.004 (0.013)	0.002 (0.011)	-0.032 (0.087)	0.010 (0.073)	-0.033 (0.080)	0.007 (0.067)
Constant	0.841*** (0.183)	0.987*** (0.053)	6.998*** (1.244)	7.194*** (0.361)	5.742*** (1.144)	5.831*** (0.331)
Observations	8,604	8,604	8,604	8,604	8,604	8,604
Number of id	2,868	2,868	2,868	2,868	2,868	2,868
District FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table SM8: Full 2SLS estimates of the relationship between adoption (Area),
production and yields

variables	FE-MP	RE-MP	FE-QS	RE-QS	FE-SV	RE-SV
Area under adoption (ha)	0.044*** (0.014)	0.036*** (0.013)	0.414*** (0.094)	0.370*** (0.086)	0.397*** (0.087)	0.358*** (0.079)
Age of household head (years)	0.002 (0.004)	0.001 (0.004)	-0.015 (0.024)	-0.021 (0.024)	-0.017 (0.022)	-0.022 (0.022)
Sex of household head (dummy, male=1)		-0.015 (0.020)		0.065 (0.140)		0.073 (0.128)
Education level (Number of years)		0.001 (0.001)		-0.002 (0.009)		-0.002 (0.008)
Household size (number of persons)	0.002*** (0.001)	0.002*** (0.001)	0.030*** (0.005)	0.030*** (0.005)	0.029*** (0.005)	0.029*** (0.005)
Farmers group membership (dummy)	0.022*** (0.005)	0.022*** (0.005)	0.119*** (0.035)	0.120*** (0.035)	0.106*** (0.032)	0.107*** (0.032)
Training on agriculture (dummy)	-0.043*** (0.012)	-0.041*** (0.012)	-0.312*** (0.078)	-0.296*** (0.079)	-0.285*** (0.072)	-0.270*** (0.072)
Training on groundnut farming (dummy)	-0.025*** (0.003)	-0.025*** (0.003)	-0.178*** (0.023)	-0.181*** (0.023)	-0.165*** (0.021)	-0.167*** (0.021)
Public agricultural extension service (number of visits)	0.002 (0.002)	0.003 (0.002)	-0.025 (0.017)	-0.019 (0.017)	-0.026* (0.015)	-0.021 (0.015)
Private agricultural extension service (number of visits)	0.004 (0.003)	0.003 (0.003)	0.046* (0.024)	0.043* (0.024)	0.043** (0.022)	0.041* (0.022)
Cash credit for groundnut farming (dummy)	-0.006 (0.023)	-0.005 (0.023)	-0.144 (0.157)	-0.139 (0.157)	-0.152 (0.145)	-0.148 (0.145)
Credit in kind for groundnut farming (dummy)	-0.048*** (0.016)	-0.047*** (0.016)	-0.090 (0.111)	-0.080 (0.111)	-0.064 (0.102)	-0.056 (0.103)
Distance to the nearest urban market (km)	-0.000 (0.000)	-0.001*** (0.000)	-0.003 (0.002)	-0.009*** (0.002)	-0.003 (0.002)	-0.008*** (0.002)
Distance the nearest village market (km)	-0.003*** (0.001)	-0.003*** (0.001)	-0.012* (0.006)	-0.016*** (0.005)	-0.010* (0.006)	-0.015*** (0.005)
Crop rotation (dummy)	-0.020* (0.011)	-0.019* (0.011)	-0.114 (0.074)	-0.101 (0.074)	-0.106 (0.068)	-0.093 (0.068)
Mixed Crops (dummy)	0.005 (0.009)	0.002 (0.009)	-0.049 (0.061)	-0.068 (0.061)	-0.052 (0.056)	-0.069 (0.056)
Labor force (man.day)	0.002*** (0.001)	0.002*** (0.001)	0.028*** (0.005)	0.028*** (0.005)	0.027*** (0.004)	0.027*** (0.004)
Unit selling price (USD/kg)	0.017 (0.052)	0.037 (0.050)	-0.055 (0.355)	0.045 (0.337)	1.376*** (0.326)	1.469*** (0.310)
Seed cost (USD/ha)	0.002*** (0.000)	0.002*** (0.000)	0.011*** (0.002)	0.011*** (0.002)	0.010*** (0.001)	0.010*** (0.001)
Fertilizer cost (USD/ha)	0.000 (0.000)	0.000 (0.000)	0.002* (0.001)	0.002* (0.001)	0.002* (0.001)	0.002* (0.001)
Pesticide cost (USD/ha)	-0.001*** (0.000)	-0.001*** (0.000)	-0.006** (0.003)	-0.007** (0.003)	-0.006** (0.003)	-0.006** (0.003)
Labor cost (USD/ha)	0.000*** (0.000)	0.000*** (0.000)	0.002*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Groundnut area (ha)	-0.009* (0.004)	-0.006 (0.004)	0.085** (0.024)	0.103*** (0.024)	0.087*** (0.022)	0.103*** (0.022)

Table SM8: Full 2SLS estimates of the relationship between adoption (Area),
production and yields (*continued*)

variables	FE-MP	RE-MP	FE-QS	RE-QS	FE-SV	RE-SV
	(0.005)	(0.005)	(0.035)	(0.034)	(0.033)	(0.031)
Off-farm income (dummy)	-0.019	-0.021	-0.031	-0.043	-0.020	-0.031
	(0.015)	(0.015)	(0.099)	(0.099)	(0.091)	(0.091)
Dependency ratio	0.002	0.002	0.017	0.020	0.016	0.019
	(0.003)	(0.003)	(0.022)	(0.022)	(0.020)	(0.020)
Clay soil (dummy)	-0.015	-0.010	-0.143	-0.102	-0.138*	-0.098
	(0.013)	(0.011)	(0.088)	(0.074)	(0.081)	(0.068)
Sandy-clay soil (dummy)	0.008	0.008	0.068	0.060	0.063	0.056
	(0.010)	(0.009)	(0.069)	(0.059)	(0.064)	(0.055)
Silty soil (dummy)	-0.005	0.002	-0.034	0.012	-0.035	0.009
	(0.013)	(0.011)	(0.087)	(0.074)	(0.080)	(0.068)
Constant	0.871***	1.032***	7.284***	7.482***	6.016***	6.123***
	(0.186)	(0.078)	(1.267)	(0.534)	(1.166)	(0.490)
Observations	8,604	8,604	8,604	8,604	8,604	8,604
Number of id	2,868	2,868	2,868	2,868	2,868	2,868
District FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table SM9: Full 2SLS estimates of the relationship between adoption, production and yields

variables	FE-Prod	FE-ProdSUP	FE-ProdVal	FE-ProdValSup	FE-Yield	FE-YieldSup
Adoption dummy	733.162*** (70.243)		476.159*** (48.846)		344.491*** (31.119)	
Age of household head	-6.469 (12.385)	-11.786 (12.474)	-0.649 (8.612)	-4.102 (8.466)	-1.764 (5.487)	-4.263 (5.779)
Household size	1.104 (2.525)	5.319** (2.575)	-1.605 (1.756)	1.133 (1.747)	1.631 (1.119)	3.611*** (1.193)
Farmers group membership	14.674 (18.056)	8.574 (18.160)	17.512 (12.556)	13.551 (12.324)	-4.339 (7.999)	-7.206 (8.413)
Training on agriculture	29.032 (40.677)	31.665 (40.831)	12.633 (28.286)	14.343 (27.710)	27.801 (18.021)	29.038 (18.916)
Training on groundnut farming	10.426 (12.085)	6.901 (12.114)	6.025 (8.404)	3.735 (8.221)	1.255 (5.354)	-0.402 (5.612)
Public agricultural extension service	-5.634 (8.577)	-7.147 (8.624)	-4.887 (5.964)	-5.869 (5.853)	-2.771 (3.800)	-3.482 (3.995)
Private agricultural extension service	-18.655 (12.348)	-16.862 (12.364)	-11.633 (8.586)	-10.469 (8.391)	-4.178 (5.470)	-3.336 (5.728)
Cash credit for groundnut farming	-106.315 (81.666)	-54.613 (81.878)	-100.824* (56.789)	-67.245 (55.566)	-34.959 (36.180)	-10.665 (37.932)
Credit in kind for groundnut farming	23.271 (57.044)	-31.282 (57.889)	32.827 (39.667)	-2.602 (39.286)	-11.792 (25.272)	-37.424 (26.818)
Distance to the nearest urban market	-0.570 (1.035)	-0.295 (1.041)	-0.795 (0.720)	-0.616 (0.706)	0.277 (0.458)	0.406 (0.482)
Distance the nearest village market	-3.228 (3.348)	-2.185 (3.359)	-3.282 (2.328)	-2.604 (2.280)	-0.900 (1.483)	-0.410 (1.556)
Crop rotation	-59.658 (37.772)	-22.303 (38.548)	-57.944** (26.266)	-33.684 (26.160)	0.657 (16.734)	18.209 (17.858)
Mixed Crops	1.649 (31.675)	18.779 (31.872)	-0.791 (22.026)	10.334 (21.630)	-3.981 (14.033)	4.068 (14.765)
Labor force	-5.128** (2.451)	-3.198 (2.484)	-3.726** (1.705)	-2.472 (1.685)	-1.834* (1.086)	-0.927 (1.151)
Unit selling price	-374.406** (190.887)	-277.840 (184.518)	944.429*** (132.740)	1,007.144*** (125.222)	-4.303 (84.567)	41.071 (85.482)
Seed cost	-1.056 (0.818)	-0.203 (0.814)	-0.706 (0.569)	-0.152 (0.552)	-0.316 (0.362)	0.084 (0.377)
Fertilizer cost	-1.748*** (0.560)	-0.972* (0.560)	-1.623*** (0.389)	-1.120*** (0.380)	-0.326 (0.248)	0.038 (0.259)
Pesticide cost	2.643* (1.542)	0.611 (1.604)	2.361** (1.072)	1.042 (1.088)	0.479 (0.683)	-0.476 (0.743)
Labor cost	-0.121 (0.406)	0.196 (0.410)	-0.216 (0.282)	-0.010 (0.278)	-0.132 (0.180)	0.017 (0.190)
Groundnut area	711.395*** (11.903)	572.431*** (18.442)	442.704*** (8.277)	352.452*** (12.516)	4.688 (5.273)	-60.607*** (8.544)
Off-farm income	-50.273 (51.302)	-45.363 (51.501)	-30.255 (35.674)	-27.066 (34.951)	-32.969 (22.728)	-30.662 (23.859)
Dependency ratio	-10.456	-4.814	-8.979	-5.315	-2.550	0.101

Table SM9: Full 2SLS estimates of the relationship between adoption, production and yields (*continued*)

variables	FE-Prod	FE-ProdSUP	FE-ProdVal	FE-ProdValSup	FE-Yield	FE-YieldSup
	(11.389)	(11.462)	(7.920)	(7.778)	(5.046)	(5.310)
Clay soil	-8.685	13.348	-4.912	9.397	-8.783	1.570
	(45.479)	(45.756)	(31.625)	(31.052)	(20.148)	(21.198)
Sandy-clay soil	19.119	39.057	23.207	36.156	-6.730	2.638
	(35.738)	(35.927)	(24.851)	(24.382)	(15.832)	(16.644)
Silty soil	43.742	41.707	38.862	37.540	18.191	17.234
	(45.255)	(45.439)	(31.470)	(30.837)	(20.049)	(21.050)
Area under adoption		510.874***		331.791***		240.044***
		(49.140)		(33.348)		(22.765)
Constant	208.427	561.033	-644.945	-415.941	578.046**	743.725**
	(650.165)	(659.428)	(452.114)	(447.516)	(288.035)	(305.495)
Observations	8,604	8,604	8,604	8,604	8,604	8,604
Number of id	2,868	2,868	2,868	2,868	2,868	2,868
District FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table SM10: Full 2SLS estimates of the relationship between continuous adoption, production and yields

variables	MP	QS	SV
Three years continuous adoption	0.324*** (0.117)	3.459*** (0.843)	3.330*** (0.776)
Age of household head	0.002 (0.004)	-0.010 (0.025)	-0.012 (0.023)
Sex of household head	-0.011 (0.021)	0.100 (0.148)	0.108 (0.136)
Education level	0.001 (0.001)	-0.005 (0.009)	-0.005 (0.009)
Household size	0.002*** (0.001)	0.026*** (0.005)	0.025*** (0.005)
Farmers group membership	0.023*** (0.005)	0.130*** (0.037)	0.117*** (0.034)
Training on agriculture	-0.041*** (0.012)	-0.291*** (0.083)	-0.265*** (0.077)
Training on groundnut farming	-0.026*** (0.003)	-0.184*** (0.025)	-0.170*** (0.023)
Public agricultural extension service	0.004 (0.002)	-0.012 (0.017)	-0.014 (0.016)
Private agricultural extension service	0.005 (0.004)	0.062** (0.025)	0.058** (0.023)
Cash credit for groundnut farming	-0.004 (0.024)	-0.128 (0.165)	-0.137 (0.153)
Credit in kind for groundnut farming	-0.039** (0.017)	-0.004 (0.116)	0.018 (0.107)
Distance to the nearest urban market	-0.001*** (0.000)	-0.009*** (0.002)	-0.008*** (0.002)
Distance the nearest village market	-0.003*** (0.001)	-0.019*** (0.006)	-0.017*** (0.005)
Crop rotation	-0.026** (0.011)	-0.170** (0.076)	-0.160** (0.070)
Mixed Crops	-0.000 (0.009)	-0.089 (0.064)	-0.089 (0.060)
Labor force	0.002*** (0.001)	0.025*** (0.005)	0.024*** (0.005)
Unit selling price	0.138*** (0.035)	1.093*** (0.245)	2.482*** (0.226)
Seed cost	0.002*** (0.000)	0.011*** (0.002)	0.010*** (0.002)
Fertilizer cost	0.000 (0.000)	0.002 (0.001)	0.002 (0.001)
Pesticide cost	-0.001** (0.000)	-0.003 (0.003)	-0.002 (0.003)
Labor cost	0.000*** (0.000)	0.002*** (0.001)	0.002*** (0.001)
Groundnut area	0.004	0.209***	0.206***

Table SM10: Full 2SLS estimates of the relationship between continuous adoption, production and yields (*continued*)

variables	MP	QS	SV
	(0.003)	(0.024)	(0.022)
Off-farm income	-0.021	-0.041	-0.029
	(0.015)	(0.104)	(0.096)
Dependency ratio	0.002	0.013	0.012
	(0.003)	(0.023)	(0.021)
Clay soil	-0.015	-0.149*	-0.144**
	(0.011)	(0.078)	(0.072)
Sandy-clay soil	0.007	0.053	0.049
	(0.009)	(0.062)	(0.058)
Silty soil	0.001	0.004	0.001
	(0.011)	(0.078)	(0.072)
Constant	1.520***	12.715***	11.158***
	(0.219)	(1.574)	(1.450)
Observations	8,604	8,604	8,604
Number of id	2,868	2,868	2,868
District FE	YES	YES	YES
Year FE	YES	YES	YES
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

5 Correlated random effects

Table SM11: Full Correlated random effects estimations of the relationship between adoption , commercialization and market orientation

variables	OLS-Share	FE-Share	RE-Share	OLS-orientation	FE-orientation	RE-orientation
Adoption dummy	-0.030** (0.013)	-0.035 (0.028)	-0.054*** (0.021)	-0.058*** (0.022)	-0.045 (0.052)	-0.065* (0.036)
Age of household head (years)	-0.001** (0.000)	-0.018*** (0.005)	-0.017*** (0.004)	-0.001** (0.001)	-0.024*** (0.009)	-0.025*** (0.008)
Sex of household head (dummy, male=1)	-0.005 (0.016)		-0.004 (0.018)	0.013 (0.024)		0.011 (0.029)
Education level (Number of years)	-0.002* (0.001)		-0.002* (0.001)	-0.004** (0.002)		-0.005** (0.002)
Household size (number of persons)	0.001 (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.001 (0.001)	0.004** (0.002)	0.004*** (0.002)
Farmers group membership (dummy)	0.013*** (0.004)	0.017** (0.007)	0.017*** (0.006)	0.013* (0.008)	0.021* (0.013)	0.018 (0.011)
Training on agriculture (dummy)	-0.050*** (0.011)	-0.040*** (0.015)	-0.044*** (0.014)	-0.054*** (0.018)	-0.066** (0.028)	-0.071*** (0.024)
Training on groundnut farming (dummy)	-0.020*** (0.004)	-0.022*** (0.005)	-0.025*** (0.004)	-0.018*** (0.006)	-0.023*** (0.008)	-0.025*** (0.007)
Public agricultural extension service (number of visits)	-0.005** (0.002)	-0.007** (0.003)	-0.007** (0.003)	-0.007* (0.004)	-0.013** (0.006)	-0.012** (0.005)
Private agricultural extension service (number of visits)	0.005* (0.003)	0.007* (0.004)	0.008** (0.004)	0.004 (0.005)	0.004 (0.008)	0.008 (0.007)
Cash credit for groundnut farming (dummy)	-0.002 (0.021)	0.003 (0.031)	-0.030 (0.027)	-0.035 (0.038)	-0.013 (0.056)	-0.064 (0.049)
Credit in kind for groundnut farming (dummy)	0.003 (0.013)	-0.026 (0.022)	-0.009 (0.019)	-0.012 (0.024)	-0.063 (0.040)	-0.027 (0.035)
Distance to the nearest urban market (km)	-0.003*** (0.000)	-0.001 (0.001)	-0.002*** (0.000)	-0.003*** (0.001)	-0.001 (0.001)	-0.003*** (0.001)
Distance the nearest village market (km)	-0.002** (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.002)	0.002 (0.002)	0.000 (0.002)
Crop rotation (dummy)	0.023** (0.010)	0.000 (0.014)	-0.001 (0.013)	0.013 (0.016)	-0.014 (0.026)	-0.021 (0.023)
Mixed Crops (dummy)	0.005 (0.008)	0.016 (0.012)	0.014 (0.011)	0.010 (0.014)	0.046** (0.022)	0.037* (0.019)
Labor force (man.day)	0.003*** (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.004*** (0.001)	0.003 (0.002)	0.003 (0.002)
Unit selling price (USD/kg)	-0.023 (0.046)	0.030 (0.073)	0.043 (0.059)	-0.057 (0.080)	-0.084 (0.132)	-0.067 (0.105)
Seed cost (USD/ha)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.001)	0.002*** (0.001)
Fertilizer cost (USD/ha)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Pesticide cost (USD/ha)	0.002*** (0.000)	0.001* (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.002* (0.001)	0.003*** (0.001)
Labor cost (USD/ha)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001*** (0.000)
Groundnut area (ha)	-0.002	-0.013***	-0.010**	-0.014***	-0.019**	-0.014*

Table SM11: Full Correlated random effects estimations of the relationship between adoption , commercialization and market orientation (*continued*)

variables	OLS-Share	FE-Share	RE-Share	OLS-orientation	FE-orientation	RE-orientation
	(0.002)	(0.005)	(0.004)	(0.004)	(0.008)	(0.007)
Off-farm income (dummy)	0.003	0.010	-0.003	0.035	0.026	0.013
	(0.013)	(0.021)	(0.018)	(0.024)	(0.038)	(0.033)
Dependency ratio	0.002	-0.003	0.001	0.003	-0.000	0.002
	(0.003)	(0.005)	(0.004)	(0.005)	(0.009)	(0.007)
Clay soil (dummy)	0.015	-0.004	0.006	0.036*	0.011	0.027
	(0.012)	(0.017)	(0.012)	(0.020)	(0.032)	(0.021)
Sandy-clay soil (dummy)	0.019*	0.013	0.012	0.020	0.024	0.013
	(0.010)	(0.014)	(0.010)	(0.017)	(0.025)	(0.017)
Silty soil (dummy)	0.010	-0.023	0.001	-0.009	-0.055*	-0.016
	(0.012)	(0.018)	(0.012)	(0.021)	(0.033)	(0.021)
Constant	0.445***	1.302***	0.654***	0.461***	1.721***	0.704***
	(0.038)	(0.250)	(0.074)	(0.063)	(0.457)	(0.122)
Observations	5,418	5,418	5,418	5,418	5,418	5,418
R-squared	0.290			0.182		
Number of id		2,555	2,555		2,555	2,555
District FE		YES	YES		YES	YES
Year FE		YES	YES		YES	YES
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Table SM12: Full Correlated random effects estimations of the relationship between adoption (area), commercialization and market orientation

variables	OLS-Share	FE-Share	RE-share	OLS-orientation	FE-orientation	RE-orientation
Area under adoption (ha)	-0.010*** (0.004)	-0.026 (0.021)	-0.038** (0.015)	-0.013* (0.007)	-0.033 (0.038)	-0.046* (0.025)
Age of household head (years)	-0.001** (0.000)	-0.017*** (0.005)	-0.017*** (0.004)	-0.001** (0.001)	-0.024*** (0.009)	-0.024*** (0.008)
Sex of household head (dummy, male=1)	-0.005 (0.016)		-0.003 (0.018)	0.012 (0.024)		0.012 (0.029)
Education level (Number of years)	-0.002* (0.001)		-0.003** (0.001)	-0.004** (0.002)		-0.005*** (0.002)
Household size (number of persons)	0.001 (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.001 (0.001)	0.004** (0.002)	0.004** (0.002)
Farmers group membership (dummy)	0.014*** (0.004)	0.017** (0.007)	0.017*** (0.006)	0.014* (0.008)	0.021* (0.013)	0.018 (0.011)
Training on agriculture (dummy)	-0.050*** (0.011)	-0.041*** (0.015)	-0.045*** (0.014)	-0.054*** (0.017)	-0.067** (0.028)	-0.073*** (0.024)
Training on groundnut farming (dummy)	-0.020*** (0.004)	-0.022*** (0.005)	-0.025*** (0.004)	-0.017*** (0.006)	-0.023*** (0.008)	-0.026*** (0.007)
Public agricultural extension service (number of visits)	-0.005** (0.002)	-0.008** (0.003)	-0.007** (0.003)	-0.008** (0.004)	-0.013** (0.006)	-0.012** (0.005)
Private agricultural extension service (number of visits)	0.005 (0.003)	0.008* (0.005)	0.008** (0.004)	0.002 (0.005)	0.004 (0.008)	0.008 (0.007)
Cash credit for groundnut farming (dummy)	-0.003 (0.021)	-0.004 (0.031)	-0.037 (0.027)	-0.038 (0.038)	-0.021 (0.056)	-0.072 (0.049)
Credit in kind for groundnut farming (dummy)	0.004 (0.013)	-0.023 (0.022)	-0.005 (0.020)	-0.012 (0.025)	-0.060 (0.041)	-0.022 (0.035)
Distance to the nearest urban market (km)	-0.003*** (0.000)	-0.001 (0.001)	-0.002*** (0.000)	-0.003*** (0.001)	-0.001 (0.001)	-0.003*** (0.001)
Distance the nearest village market (km)	-0.002** (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.002)	0.002 (0.002)	0.000 (0.002)
Crop rotation (dummy)	0.022** (0.010)	-0.001 (0.014)	-0.004 (0.013)	0.013 (0.016)	-0.016 (0.026)	-0.025 (0.023)
Mixed Crops (dummy)	0.006 (0.008)	0.015 (0.012)	0.013 (0.011)	0.011 (0.014)	0.045** (0.022)	0.036* (0.019)
Labor force (man.day)	0.003*** (0.001)	0.003*** (0.001)	0.002** (0.001)	0.004*** (0.001)	0.003 (0.002)	0.003 (0.002)
Unit selling price (USD/kg)	-0.055 (0.040)	0.033 (0.075)	0.046 (0.060)	-0.143** (0.068)	-0.080 (0.136)	-0.063 (0.106)
Seed cost (USD/ha)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.001)	0.002*** (0.001)
Fertilizer cost (USD/ha)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Pesticide cost (USD/ha)	0.002*** (0.000)	0.001** (0.001)	0.002*** (0.001)	0.003*** (0.001)	0.003** (0.001)	0.003*** (0.001)
Labor cost (USD/ha)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001*** (0.000)
Groundnut area (ha)	0.000	-0.006	0.001	-0.011**	-0.009	-0.001

Table SM12: Full Correlated random effects estimations of the relationship between adoption (area), commercialization and market orientation (*continued*)

variables	OLS-Share	FE-Share	RE-share	OLS-orientation	FE-orientation	RE-orientation
	(0.003)	(0.007)	(0.006)	(0.005)	(0.014)	(0.010)
Off-farm income (dummy)	0.003	0.012	0.001	0.035	0.029	0.018
	(0.013)	(0.021)	(0.018)	(0.024)	(0.038)	(0.033)
Dependency ratio	0.002	-0.003	0.000	0.003	-0.000	0.002
	(0.003)	(0.005)	(0.004)	(0.005)	(0.009)	(0.007)
Clay soil (dummy)	0.014	-0.005	0.001	0.035*	0.011	0.021
	(0.012)	(0.018)	(0.012)	(0.020)	(0.032)	(0.021)
Sandy-clay soil (dummy)	0.018*	0.013	0.009	0.019	0.024	0.009
	(0.010)	(0.014)	(0.010)	(0.017)	(0.025)	(0.017)
Silty soil (dummy)	0.009	-0.022	0.000	-0.009	-0.054	-0.018
	(0.012)	(0.018)	(0.012)	(0.021)	(0.033)	(0.021)
Constant	0.459***	1.268***	0.638***	0.499***	1.677***	0.685***
	(0.036)	(0.259)	(0.077)	(0.060)	(0.471)	(0.127)
Observations	5,418	5,418	5,418	5,418	5,418	5,418
R-squared	0.290			0.181		
Number of id		2,555	2,555		2,555	2,555
District FE		YES	YES		YES	YES
Year FE		YES	YES		YES	YES
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

6 Causal mediation analysis

Table SM13: Linear IV mediation analysis of adoption and commercialization (production)

variables	Sellers	Quantity Sold	Sales Value
Total effect (TE)	0.0603** (0.0281)	0.524*** (0.181)	0.522*** (0.165)
Direct effect	0.0856 (0.0640)	0.542 (0.409)	0.433 (0.372)
Indirect effect	-0.0253 (0.0839)	-0.0175 (0.537)	0.0886 (0.488)
Observations	5,418	5,418	5,418
Additional controls	YES	YES	YES
District dummies	YES	YES	YES
Mediator share of TE (%)	-41.93	-3.347	16.99
F statistic on instrument (1)	3238	3238	3238
F statistic on instruments (2)	13.82	13.82	13.82
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Table SM14: Linear IV mediation analysis of adoption and commercialization (Yield)

variables	Sellers	Quantity Sold	Sales Value
Total effect (TE)	0.0603** (0.0281)	0.524*** (0.181)	0.522*** (0.165)
Direct effect	0.0924 (0.0868)	0.547 (0.552)	0.409 (0.499)
Indirect effect	-0.0321 (0.108)	-0.0223 (0.683)	0.113 (0.618)
Observations	5,418	5,418	5,418
Additional controls	YES	YES	YES
District dummies	YES	YES	YES
Mediator share of TE (%)	-53.31	-4.255	21.61
F statistic on instrument (1)	3238	3238	3238
F statistic on instruments (2)	11.12	11.12	11.12
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

7 Cross country analysis

Table SM15: 2SLS estimates of the relationship between adoption and commercialization and yield across countries

variables	Ghana		Mali		Nigeria	
	Yield	Commercialization	Yield	Commercialization	Yield	Commercialization
Adoption dummy	385.942*** (145.660)	0.799 (0.918)	-84.823 (96.872)	0.766 (0.820)	431.345*** (28.020)	0.623*** (0.120)
Age of household head (years)	18.465 (19.720)	-0.283*** (0.109)	5.380 (18.787)	0.371** (0.159)	-22.341** (10.387)	-0.055 (0.040)
Sex of household head (dummy, male=1)	-21.851 (30.821)	-0.397 (0.246)			134.969*** (51.409)	1.344*** (0.270)
Education level (Number of years)	0.670 (3.005)	0.026 (0.024)			-0.629 (1.885)	0.001 (0.010)
Household size (number of persons)	-1.773 (4.809)	0.030 (0.025)	1.499 (1.268)	0.012 (0.011)	8.868*** (2.725)	0.034*** (0.011)
Farmers group membership (dummy)	26.037 (19.483)	0.584*** (0.102)	-7.581 (13.220)	-0.107 (0.112)	8.993 (15.530)	0.136** (0.060)
Training on agriculture (dummy)	29.392 (50.728)	0.101 (0.266)	-12.268 (24.415)	-0.326 (0.207)	35.243 (35.442)	0.029 (0.138)
Training on groundnut farming (dummy)	6.421 (16.793)	-0.133 (0.088)	-16.592 (12.698)	-0.441*** (0.107)	1.387 (12.095)	-0.023 (0.047)
Public agricultural extension service (number of visits)	-9.259 (8.534)	0.053 (0.045)	11.961 (8.207)	-0.073 (0.069)	-19.427*** (6.226)	-0.074*** (0.024)
Private agricultural extension service (number of visits)	1.969 (11.466)	-0.019 (0.061)	15.118* (8.860)	0.115 (0.075)	4.239 (12.294)	0.093** (0.047)
Cash credit for groundnut farming (dummy)	138.703 (95.714)	-0.084 (0.501)	88.393 (56.032)	-0.261 (0.474)	-117.523* (63.581)	0.127 (0.245)
Credit in kind for groundnut farming (dummy)	-76.980 (69.112)	-1.641*** (0.367)	60.651 (51.483)	0.058 (0.436)	16.144 (39.399)	0.991*** (0.153)
Distance to the nearest urban market (km)	-0.300 (2.734)	0.041** (0.017)	-0.703 (1.132)	-0.008 (0.010)	0.286 (0.724)	-0.011*** (0.003)
Distance the nearest village market (km)	0.754 (3.540)	-0.023 (0.022)	-1.293 (1.756)	-0.033** (0.015)	0.276 (3.554)	0.042*** (0.016)
Crop rotation (dummy)	58.596 (40.034)	-0.096 (0.215)	-17.500 (30.666)	0.416 (0.260)	4.937 (29.112)	-0.172 (0.113)
Mixed Crops (dummy)	-12.176 (37.081)	-1.265*** (0.194)	-7.760 (22.242)	0.153 (0.188)	-20.042 (25.858)	0.426*** (0.100)
Labor force (man.day)	-1.005 (3.844)	0.095*** (0.021)	2.782 (2.375)	0.050** (0.020)	0.388 (1.919)	0.030*** (0.007)
Unit selling price (USD/kg)	-142.078 (182.015)	0.160 (1.043)	73.324 (190.131)	-1.154 (1.609)	163.784 (105.642)	0.747* (0.421)
Seed cost (USD/ha)	-0.100 (1.116)	0.036*** (0.006)	0.366 (0.559)	-0.003 (0.005)	-0.038 (0.849)	0.015*** (0.003)
Fertilizer cost (USD/ha)	-4.264 (4.077)	-0.012 (0.025)	1.560 (1.021)	0.010 (0.009)	0.458 (0.357)	0.005*** (0.001)
Pesticide cost (USD/ha)	-3.166 (3.243)	-0.006 (0.017)	3.758** (1.559)	0.025* (0.013)	3.212*** (1.083)	0.005 (0.004)
Labor cost (USD/ha)	-0.614 (0.404)	0.004** (0.002)	-0.328 (0.360)	0.004 (0.003)	0.605* (0.335)	0.003** (0.001)

Table SM15: 2SLS estimates of the relationship between adoption and commercialization and yield across countries (*continued*)

variables	Yield	Commercialization	Yield	Commercialization	Yield	Commercialization
Groundnut area (ha)	-6.822 (15.714)	0.021 (0.083)	2.845 (6.934)	0.311*** (0.059)	-21.704** (10.964)	0.350*** (0.043)
Off-farm income (dummy)	44.229 (97.768)	-0.560 (0.507)	-27.203 (80.968)	-0.511 (0.685)	-72.570** (30.455)	-0.041 (0.117)
Dependency ratio	3.737 (15.098)	-0.120 (0.079)	-16.615 (10.173)	-0.326*** (0.086)	-5.697 (7.741)	0.059* (0.031)
Clay soil (dummy)	27.055 (33.936)	0.232 (0.206)	-25.166 (33.179)	-0.133 (0.281)	-51.193** (24.308)	-0.110 (0.109)
Sandy-clay soil (dummy)	13.683 (27.918)	0.301* (0.171)	-47.229* (27.385)	0.120 (0.232)	-25.007 (19.355)	0.017 (0.085)
Silty soil (dummy)	47.805 (34.783)	0.194 (0.219)	21.825 (32.334)	-0.085 (0.274)	-8.890 (24.590)	-0.030 (0.111)
Constant	1,011.750*** (162.896)	1.356 (1.229)	371.203 (987.865)	-11.532 (8.361)	717.844*** (140.380)	3.785*** (0.719)
Observations	1,230	1,230	1,771	1,771	2,417	2,417
Number of id	477	477	786	786	1,292	1,292
District FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

8 Robustness checks

8.1 Control function approach

Table SM16: Full Control function estimations of the relationship between adoption and market participation

variables	MP-FE	MP-CRE	QS-FE	QS-CRE	SV-FE	SV-CRE
Adoption dummy	0.105*** (0.033)	0.063** (0.027)	0.799*** (0.210)	0.557*** (0.171)	0.772*** (0.192)	0.548*** (0.156)
Age of household head (years)	0.002 (0.006)	-0.001 (0.006)	-0.036 (0.039)	-0.050 (0.035)	-0.037 (0.035)	-0.050 (0.032)
Sex of household head (dummy, male=1)		-0.024 (0.024)		0.011 (0.159)		0.027 (0.145)
Education level (Number of years)		0.001 (0.002)		-0.001 (0.011)		-0.001 (0.010)
Household size (number of persons)	0.003*** (0.001)	0.003*** (0.001)	0.029*** (0.008)	0.027*** (0.007)	0.027*** (0.007)	0.026*** (0.006)
Farmers group membership (dummy)	0.028*** (0.009)	0.031*** (0.008)	0.188*** (0.055)	0.202*** (0.051)	0.172*** (0.050)	0.184*** (0.046)
Training on agriculture (dummy)	-0.032* (0.019)	-0.040** (0.018)	-0.198 (0.121)	-0.270** (0.111)	-0.179 (0.110)	-0.248** (0.102)
Training on groundnut farming (dummy)	-0.028*** (0.006)	-0.033*** (0.005)	-0.192*** (0.036)	-0.231*** (0.033)	-0.178*** (0.033)	-0.214*** (0.030)
Public agricultural extension service (number of visits)	0.002 (0.004)	0.006 (0.004)	-0.028 (0.024)	-0.004 (0.023)	-0.028 (0.022)	-0.006 (0.021)
Private agricultural extension service (number of visits)	0.001 (0.006)	0.000 (0.005)	0.035 (0.035)	0.030 (0.033)	0.033 (0.032)	0.028 (0.030)
Cash credit for groundnut farming (dummy)	0.020 (0.038)	0.011 (0.035)	0.044 (0.243)	-0.048 (0.222)	0.010 (0.222)	-0.075 (0.203)
Credit in kind for groundnut farming (dummy)	-0.068** (0.028)	-0.049** (0.025)	-0.168 (0.175)	-0.033 (0.158)	-0.134 (0.160)	-0.008 (0.144)
Distance to the nearest urban market (km)	-0.000 (0.001)	-0.003*** (0.000)	-0.004 (0.004)	-0.021*** (0.003)	-0.004 (0.004)	-0.020*** (0.003)
Distance the nearest village market (km)	-0.006*** (0.002)	-0.005*** (0.001)	-0.026** (0.011)	-0.029*** (0.008)	-0.023** (0.010)	-0.026*** (0.007)
Crop rotation (dummy)	-0.036** (0.018)	-0.022 (0.016)	-0.188* (0.111)	-0.116 (0.103)	-0.170* (0.102)	-0.105 (0.094)
Mixed Crops (dummy)	0.012 (0.015)	0.019 (0.014)	0.146 (0.094)	0.163* (0.087)	0.135 (0.086)	0.147* (0.080)
Labor force (man.day)	0.005*** (0.001)	0.004*** (0.001)	0.044*** (0.009)	0.036*** (0.008)	0.042*** (0.008)	0.035*** (0.007)
Unit selling price (USD/kg)	0.034 (0.087)	0.111 (0.076)	0.220 (0.551)	0.673 (0.484)	1.418*** (0.504)	1.868*** (0.442)
Seed cost (USD/ha)	0.002*** (0.000)	0.002*** (0.000)	0.015*** (0.003)	0.015*** (0.002)	0.013*** (0.002)	0.014*** (0.002)
Fertilizer cost (USD/ha)	0.000 (0.000)	0.000 (0.000)	0.004** (0.002)	0.004** (0.002)	0.004** (0.002)	0.003** (0.002)
Pesticide cost (USD/ha)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.006)	0.000 (0.005)	-0.000 (0.005)	0.001 (0.004)
Labor cost (USD/ha)	0.001*** (0.000)	0.001*** (0.000)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Groundnut area (ha)	0.014**	0.017***	0.272***	0.302***	0.262***	0.290***

Table SM16: Full Control function estimations of the relationship between adoption and market participation (*continued*)

variables	MP-FE	MP-CRE	QS-FE	QS-CRE	SV-FE	SV-CRE
	(0.006)	(0.005)	(0.036)	(0.034)	(0.033)	(0.031)
Off-farm income (dummy)	-0.042	-0.040*	-0.116	-0.149	-0.088	-0.125
	(0.026)	(0.023)	(0.164)	(0.148)	(0.150)	(0.136)
Dependency ratio	-0.011*	-0.004	-0.070*	-0.026	-0.063*	-0.023
	(0.006)	(0.005)	(0.037)	(0.033)	(0.034)	(0.030)
Clay soil (dummy)	-0.011	-0.002	-0.146	-0.058	-0.142	-0.060
	(0.022)	(0.016)	(0.139)	(0.101)	(0.127)	(0.092)
Sandy-clay soil (dummy)	0.009	0.009	0.056	0.053	0.051	0.048
	(0.017)	(0.013)	(0.111)	(0.082)	(0.101)	(0.075)
Silty soil (dummy)	0.012	0.016	-0.019	0.056	-0.030	0.045
	(0.023)	(0.016)	(0.143)	(0.102)	(0.131)	(0.094)
Constant	0.563*	0.995***	5.388***	6.878***	4.401**	5.646***
	(0.306)	(0.098)	(1.940)	(0.643)	(1.774)	(0.587)
Observations	5,418	5,418	5,418	5,418	5,418	5,418
R-squared	0.115		0.149		0.174	
Number of id	2,555	2,555	2,555	2,555	2,555	2,555
District FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

8.2 Hausman Taylor IV

Table SM17: Full HAUSMAN TAYLOR IV estimations

variables	MP	QS	SV
Age of household head (years)	-0.004*** (0.001)	-0.031*** (0.005)	-0.031*** (0.005)
Household size (number of persons)	0.000 (0.001)	0.007 (0.005)	0.007 (0.005)
Farmers group membership (dummy)	0.015** (0.006)	0.110*** (0.040)	0.110*** (0.040)
Training on agriculture (dummy)	-0.063*** (0.014)	-0.385*** (0.089)	-0.385*** (0.089)
Training on groundnut farming (dummy)	-0.017*** (0.004)	-0.096*** (0.028)	-0.096*** (0.028)
Public agricultural extension service (number of visits)	-0.007** (0.003)	-0.065*** (0.018)	-0.065*** (0.018)
Private agricultural extension service (number of visits)	-0.004 (0.004)	-0.026 (0.027)	-0.026 (0.027)
Cash credit for groundnut farming (dummy)	0.057** (0.029)	0.304 (0.188)	0.304 (0.188)
Credit in kind for groundnut farming (dummy)	-0.058*** (0.020)	-0.117 (0.131)	-0.117 (0.131)
Distance to the nearest urban market (km)	-0.001*** (0.000)	-0.006** (0.003)	-0.006** (0.003)
Distance the nearest village market (km)	-0.007*** (0.001)	-0.041*** (0.008)	-0.041*** (0.008)
Crop rotation (dummy)	-0.047*** (0.012)	-0.434*** (0.079)	-0.434*** (0.079)
Mixed Crops (dummy)	0.051*** (0.011)	0.382*** (0.070)	0.382*** (0.070)
Labor force (man.day)	0.006*** (0.001)	0.053*** (0.006)	0.053*** (0.006)
Unit selling price (USD/kg)	-0.044 (0.065)	-0.152 (0.411)	-0.152 (0.411)
Seed cost (USD/ha)	0.003*** (0.000)	0.018*** (0.002)	0.018*** (0.002)
Fertilizer cost (USD/ha)	0.001*** (0.000)	0.010*** (0.001)	0.010*** (0.001)
Pesticide cost (USD/ha)	-0.001 (0.001)	0.003 (0.004)	0.003 (0.004)
Labor cost (USD/ha)	0.001*** (0.000)	0.002** (0.001)	0.002** (0.001)
Groundnut area (ha)	0.039*** (0.004)	0.457*** (0.025)	0.457*** (0.025)
Off-farm income (dummy)	-0.036* (0.018)	-0.051 (0.121)	-0.051 (0.121)
Dependency ratio	0.000 (0.004)	-0.012 (0.027)	-0.012 (0.027)
Clay soil (dummy)	-0.020 (0.017)	-0.187* (0.108)	-0.187* (0.108)
Sandy-clay soil (dummy)	-0.003 (0.013)	-0.019 (0.088)	-0.019 (0.088)
Silty soil (dummy)	0.003 (0.017)	-0.061 (0.111)	-0.061 (0.111)
Adoption dummy	0.087*** (0.019)	0.656*** (0.123)	0.656*** (0.123)
Sex of household head (dummy, male=1)	-0.048 (0.029)	-0.065 (0.207)	-0.065 (0.207)
Education level (Number of years)	0.002 (0.002)	0.012 (0.013)	0.012 (0.013)
Constant	0.933*** (0.066)	5.857*** (0.445)	5.857*** (0.445)
Observations	5,418	5,418	5,418
Number of id	2,555	2,555	2,555
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

8.3 Lewbels Test

Table SM18: Full Lewbel instrumental variable estimations of the relationship between adoption and commercialization

variables	MP	QS	SV	MP-Access	QS-Access	SV-Access
Adoption dummy	0.108*** (0.026)	0.769*** (0.162)	0.718*** (0.149)	0.108*** (0.026)	0.769*** (0.162)	0.718*** (0.149)
Age of household head	-0.002 (0.006)	-0.050 (0.041)	-0.049 (0.038)	-0.002 (0.006)	-0.050 (0.041)	-0.049 (0.038)
Household size	0.003* (0.002)	0.027** (0.011)	0.025** (0.010)	0.003* (0.002)	0.027** (0.011)	0.025** (0.010)
Farmers group membership	0.030** (0.012)	0.207*** (0.078)	0.189*** (0.071)	0.030** (0.012)	0.207*** (0.078)	0.189*** (0.071)
Training on agriculture	-0.035 (0.027)	-0.212 (0.171)	-0.191 (0.157)	-0.035 (0.027)	-0.212 (0.171)	-0.191 (0.157)
Training on groundnut farming	-0.026*** (0.008)	-0.188*** (0.050)	-0.175*** (0.045)	-0.026*** (0.008)	-0.188*** (0.050)	-0.175*** (0.045)
Public agricultural extension service	0.004 (0.005)	-0.019 (0.031)	-0.020 (0.028)	0.004 (0.005)	-0.019 (0.031)	-0.020 (0.028)
Private agricultural extension service	-0.002 (0.007)	0.022 (0.046)	0.022 (0.042)	-0.002 (0.007)	0.022 (0.046)	0.022 (0.042)
Cash credit for groundnut farming	0.026 (0.049)	0.089 (0.318)	0.053 (0.292)	0.026 (0.049)	0.089 (0.318)	0.053 (0.292)
Credit in kind for groundnut farming	-0.073* (0.038)	-0.189 (0.248)	-0.151 (0.231)	-0.073* (0.038)	-0.189 (0.248)	-0.151 (0.231)
Distance to the nearest urban market	0.000 (0.001)	-0.002 (0.005)	-0.003 (0.005)	0.000 (0.001)	-0.002 (0.005)	-0.003 (0.005)
Distance the nearest village market	-0.005* (0.003)	-0.023 (0.018)	-0.020 (0.017)	-0.005* (0.003)	-0.023 (0.018)	-0.020 (0.017)
Crop rotation	-0.030 (0.025)	-0.144 (0.152)	-0.132 (0.138)	-0.030 (0.025)	-0.144 (0.152)	-0.132 (0.138)
Mixed Crops	0.008 (0.021)	0.120 (0.134)	0.111 (0.123)	0.008 (0.021)	0.120 (0.134)	0.111 (0.123)
Labor force	0.005*** (0.002)	0.044*** (0.012)	0.042*** (0.011)	0.005*** (0.002)	0.044*** (0.012)	0.042*** (0.011)
Unit selling price	0.031 (0.081)	0.287 (0.511)	1.535*** (0.469)	0.031 (0.081)	0.287 (0.511)	1.535*** (0.469)
Seed cost	0.002*** (0.001)	0.015*** (0.004)	0.013*** (0.004)	0.002*** (0.001)	0.015*** (0.004)	0.013*** (0.004)
Fertilizer cost	0.000 (0.000)	0.004** (0.002)	0.004** (0.002)	0.000 (0.000)	0.004** (0.002)	0.004** (0.002)
Pesticide cost	-0.001 (0.001)	-0.001 (0.007)	-0.001 (0.006)	-0.001 (0.001)	-0.001 (0.007)	-0.001 (0.006)
Labor cost	0.001** (0.000)	0.004** (0.002)	0.004** (0.002)	0.001** (0.000)	0.004** (0.002)	0.004** (0.002)
Groundnut area	0.015** (0.007)	0.278*** (0.055)	0.268*** (0.051)	0.015** (0.007)	0.278*** (0.055)	0.268*** (0.051)
Off-farm income	-0.044 (0.030)	-0.129 (0.212)	-0.098 (0.198)	-0.044 (0.030)	-0.129 (0.212)	-0.098 (0.198)
Dependency ratio	-0.012 (0.008)	-0.075 (0.047)	-0.067 (0.043)	-0.012 (0.008)	-0.075 (0.047)	-0.067 (0.043)
Clay soil	-0.016 (0.032)	-0.174 (0.202)	-0.167 (0.184)	-0.016 (0.032)	-0.174 (0.202)	-0.167 (0.184)
Sandy-clay soil	0.004 (0.024)	0.027 (0.150)	0.024 (0.137)	0.004 (0.024)	0.027 (0.150)	0.024 (0.137)
Silty soil	0.003 (0.032)	-0.063 (0.199)	-0.069 (0.181)	0.003 (0.032)	-0.063 (0.199)	-0.069 (0.181)
Observations	5,418	5,418	5,418	5,418	5,418	5,418
R-squared	0.092	0.129	0.156	0.092	0.129	0.156
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						