

Economic efficiency of coffee growers in the department of Caldas, Colombia

Supplementary Material

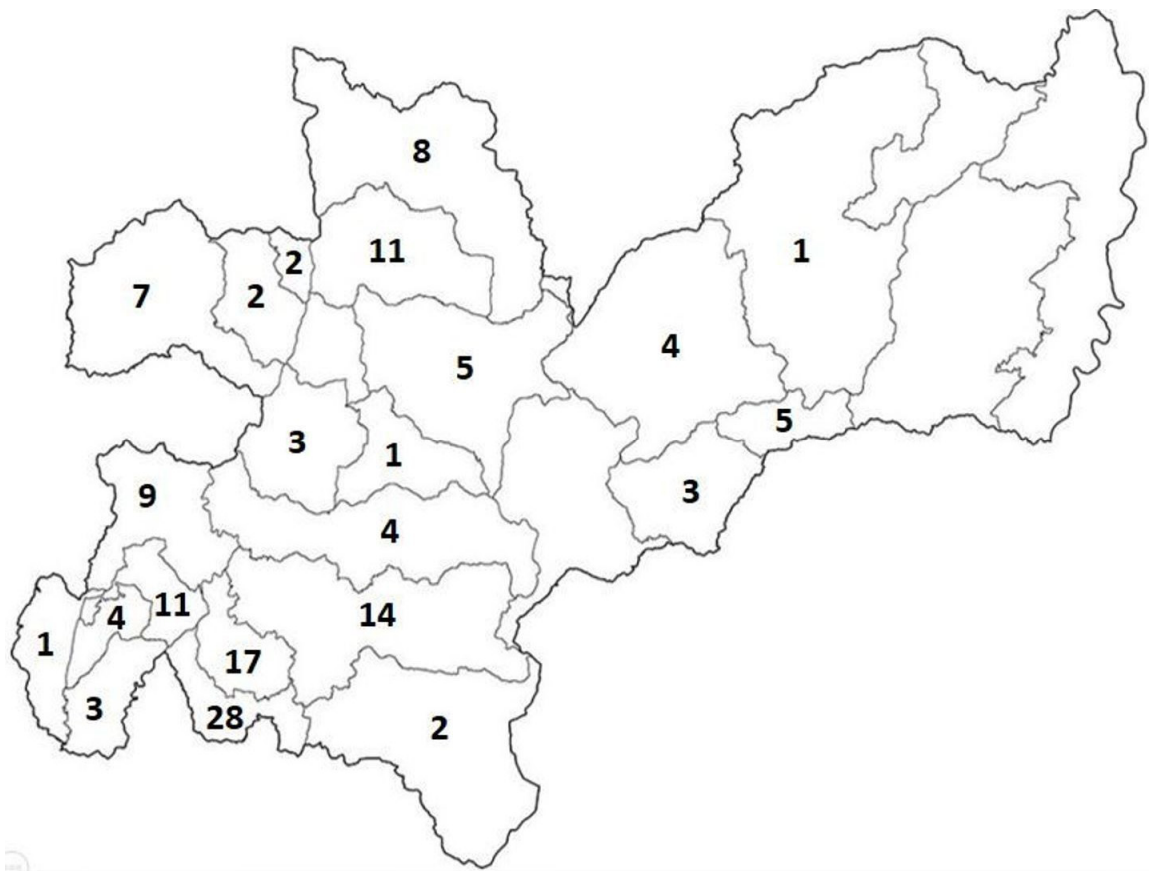


Figure S1. Number of coffee growers per municipality that participated in the study.

Table S1. Economic variables of coffee production.

Variable	Description	Unit of measurement
Unit cost	Cost of production	U\$/kilograms/ dry parchment coffee
Cost crop renewal	Cost of implementing the work in the productive exercise	
Cost weed management		
Cost fertilization		
Cost pest control		
Cost post-harvest		
Administrative expenses		
Productivity	Registration of the production of dry parchment coffee per area cultivated with coffee	Kilograms/ dry parchment coffee /hectare

Table S2. Technological variables considered in the study.

Variable	Description	Unit of measurement
Sowing density	Number of trees plated per hectare	Number/trees/ hectare
Crop age	Average age of the coffee crops in the farm	years
Area under production	Area of the farm with coffee crops in production	hectare
Unproductive area	Area of the farm with unproductive renewed coffee crops	hectare
Fertilization	Amount fertilizer applied per hectare per year	Kilograms/fertilizer/ hectare
Variety grown	Percentage of area cultivated in coffe with resistant varieties	Percentage resistant varieties

Table S3. Multiple regression results of the selected model for coffee growing in Caldas for the period 2015/2021.

Fixed-effects (within) regression	Number of obs = 952
Group variable Farmer Code	Number of groups = 136
R-sq:	Obs per group:

Within = 0.8387					Min = 7	
Between = 0.9047					Avg = 7	
Overall = 0.8681					Max = 7	
corr(u_i, Xb) = 0.2147					F(9,807) = 466.08	
					Prob > F 0 = 0.0000	
LUnit cost	Coef.	Std. Err	t	P> t	[95% Conf. Interval]	
LProductivity	-.0560874	.0101111	-5.55	0.000	-.0759345	-.0362403
LCost harvest	.5756807	.0227519	25.30	0.000	.5310208	.6203406
LCost post-harvest	.0123589	.0030069	4.11	0.000	.0064566	.0182611
LCost fertilization	.145483	.0083532	17.42	0.000	.1290864	.1618796
LCost pest control	.0022139	.000669	3.31	0.001	.0009007	.0035272
LCost crop renewal	.010923	.0006284	17.38	0.000	.0096895	.0121566
LCost weed management	.0789098	.006504	12.13	0.000	.066143	.0916767
LAdministrative expenses	.1174327	.0060548	19.39	0.000	.1055476	.1293178
Scale	-.008681	.0163739	-0.53	0.596	-.0408214	.0234594
_cons	2.233896	.2509647	8.90	0.000	1.741275	2.726517
Sigma_u	.0510581					
Sigma_e	.06951879					
rho	.35040357	(fraction of variance due to u_i)				
F test that all u_i =0: F(135, 807) = 2.41					Prob > F = 0.0000	

Table S4. Stochastic frontier, true fixed – effects model (exponential) in the Caldas coffee growers data panel.

True fixed-effects model (exponential)				Number of obs = 952		
Group variable Farmer Code				Number of groups = 136		
Time variable: Year				Obs per group:		
				Min = 7		
				Avg = 7		
				Max = 7		
Log simulated-likelihood = 1535.3159				Prob > chi2 = 0.0000		
				Wald chi2(10) = 7.16e+11		
LUnit cost	Coef.	Std. Err	Z	P> z	[95% Conf. Interval]	
Frontier						
LProductivity	-.0169658	.000023	-737.41	0.000	-.0170109	-.0169207
LCost harvest	.5780096	.000054	1.1e+04	0.000	.5779039	.5781154
LCost post-harvest	.0589442	.0000484	1218.95	0.000	.0588494	.059039
LCost fertilization	.1690715	.0000374	4522.54	0.000	.1689982	.1691448
LCost pest control	.0018602	4.35e-06	427.38	0.000	.0018516	.0018687
LCost crop renewal	.0076802	3.76e-06	2041.39	0.000	.0076728	.0076875
LCost weed management	.0818091	.0000302	2712.44	0.000	.08175	.0818682
LAdministrative expenses	.1120786	.0000288	3892.46	0.000	.1120222	.112135
Aptitude	.010122	.0000212	476.40	0.936	.0100804	.0101636
Scale	.0138224	.0000147	938.05	0.000	.0137935	.0138513
Usigma _cons	-5.225196	.0648249	-80.60	0.000	-5.35225	-5.098141
Vsigma _cons	-31.68584	21.18022	-1.50	0.135	-73.19831	9.82663
Sigma_u	.0733438	.0023772	30.85	0.000	.0688293	.0781543
Sigma_v	1.32e-07	1.39e-06	0.09	0.925	1.27e-16	136.0898
lambda	557000.5	.0023772	2.3e+08	0.000	557000.5	557000.5