

THE INFLUENCE OF AGRICULTURAL ASSOCIATIONS ON MAIZE COMMERCIALIZATION IN MOZAMBIQUE

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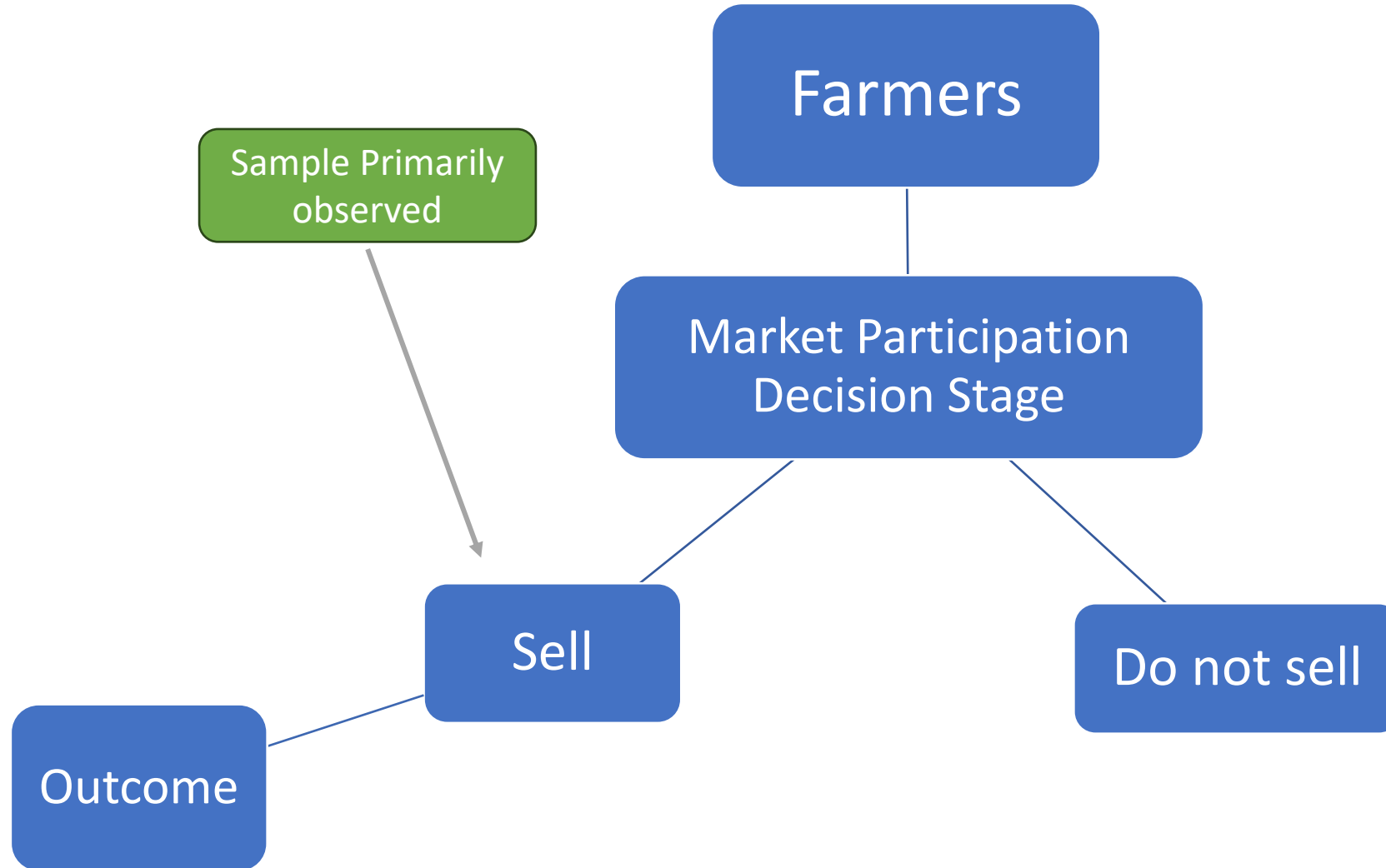
Aim and Motivation

- This research aims to find the impact of agricultural associations on maize commercialisation
- Despite the country's potential to produce maize, most of the production is still for subsistence.
- Diagnostic studies in Mozambique (e.g. Tschirley, Abdula and Weber, 2006) indicate that factors such as the dispersed and small-scale production structures and restricted access to market information condition the commercialisation of maize at the national level.
- Agricultural commercialisation is part of the government's strategies to increase households' income. The Mozambique's Commodity Exchange Market (BMM) is part of the government's efforts to reach this goal.
- Associativism is an accessible alternative to overcome some of these constraints

Literature

- The literature has shown that Associativism is associated with several benefits such as
 - Increased production (Verhofstadt and Maertens, 2014)
 - Higher selling prices (Bernard, Taffesse and Gabre-Madhin, 2008)
 - Reduction of the risk of individual production (Bachke, 2009; Siteo and Sitole, 2019)

The Model – A Diagram – Framework (1)



Methods – Framework (2)

- The study uses a Heckman model to quantify the impact of agriculture associations on commercialisation
- The use of this method is motivated by the potential selection into market participation
 - Farmers participating in the market commercialisation may be systematically different from those not participating
 - Conventional methods such as the OLS may be biased in the presence of selection bias
 - Commercialisation is only observed for farmers participating
- Heckman (1979) resolves the potential bias resulting from selection as if it were a problem of specification failure.

Methods - Econometric Strategy – The model

- 1st Step: a Probit for the probability of participating
 - Given a $Z^*_i = W\gamma + \mu_i$
 - $P(PM_i = 1) = \Phi(W\gamma)$
- 2nd Step: The Outcome equation – commercialisation
 - $IC_i = X\beta + \varepsilon_i$
 - $IC_i = \frac{QS_i}{Q_i}$ is the index of commercialization measuring the participation intensity for aggregate i,
 - $\varepsilon_i \sim N(0, \sigma)$
- $corr(\varepsilon_i, \mu_i) = \rho$
- In addition to a plain Heckman model as specified above, an Heckman in which the production is instrumented is estimated.
 - Instrument: Number of Meals per day during the lean season
 - Relevance: Explains the production through labour
 - Exogeneity: Its effect is only through production

Data

- The study used the Integrated Agrarian Surveys (IAI) for the years 2017 and 2020
- The IAI is an annual survey conducted by the Directorate for Planning and International Cooperation
- Our analysis sample is composed only of maize producers as our crop of interest – Maize
- The data here is mostly composed by smallholder farmers
- Because the sample in each of these years is different,

Descriptive Statistics 2020

Variables	Mean		Standard deviation		Sign. Dif.	Total		
	Affiliated	Unaffiliated	Affiliate	Unaffiliated		Average	Standard deviation	Obs
Affiliated to agricultural associations (AA)						0,04	0,19	18515
Market Particiaption (PM)	0,25	0,20	0,43	0,40	Non sig.	0,20	0,40	18515
Gender of the head of the household(genchaf)	0,72	0,66	0,45	0,47	Non sig.	0,67	0,47	18515
Uses irrigation in the crop(irrig)	0,13	0,09	0,34	0,28	**	0,09	0,29	18515
Access to extension services(acesext)	0,34	0,07	0,47	0,25	***	0,08	0,26	18515
Access to credit (acescred)	0,04	0,01	0,19	0,07	***	0,01	0,08	18515
# of members in non-agricultural activities(rendnagr)	0,87	0,73	0,93	0,88	Non sig.	0,73	0,89	18515
Commercialization Index(IC)	0,11	0,08	0,24	0,19	Non sig.	0,08	0,19	18515
Age of the head of the household(idachaf)	47,20	42,02	14,39	15,29	Non sig.	42,20	15,29	18515
Years of schooling of the head of the household(eschaf)	4,45	3,77	3,48	3,49	Non sig.	3,80	3,49	18515
Dependency ratio(rdaf)	0,45	0,42	0,23	0,26	Non sig.	0,42	0,26	18515
Total size of acreage(ha) (tarea)	1,96	1,43	2,04	1,46	Non sig.	1,45	1,49	18515
Total number of employees(ftrab)	3,18	1,26	16,51	5,86	Non sig.	1,33	6,55	18515
Quantity produced(Q) (kg)	789,90	487,58	1263,87	921,78	Non sig.	498,33	937,72	18515

Notes: Aggregate-level figures (2020)

*** P (> t) = 5%; ** P (T > t) = 10%. Probabilities of t-stats adjusted for different sample variances where necessary.

Main Results

- Rho significant – indicating selection
- number of meals highly significant – instrument relevant
- AA not significant for commercialization
- Comparable estimates between instrumented and non-instrumented Heckman

	(1) [†]		(2) [†]		
	PM - Probit 1st Stage - Heckman	Ln(IC) - 2nd Stage - Heckman	Ln(Q) - Heckman IV	PM - Probit Stage 1 - Heckman IV	Ln(IC) - 2nd Stage - Heckman IV
AA	-0.052 (0.107)	0.099 (0.071)	0.174* (0.095)	-0.057 (0.108)	0.098 (0.072)
ln_q		-0.045* (0.027)		0.593*** (0.042)	-0.040 (0.045)
n_refeições			0.181*** (0.029)		
N	24129	4441	20884	23823	4441
ρ		0.155***			0.154***
ρ - VI				-0.081	-0.015
E.M. AA	-0.011			-0.011	
District FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

Standard Errors in Parentheses

IV - Instrumental Variables

E.M. - Marginal Effects; Significance Stars Applicable to Reported AA E.M

[†] Estimates are Heckman's Maximum Likelihood

* p<0.10, ** p<0.05, *** p<0.01

Robustness Checks

1. Use of the quantity sold as an alternative to the commercialisation index used in this study.
 - Other studies, such as Reyes et al. (2012), use this variable.
 - No changes in the results
2. Exclude district fixed effects to see how sensitive our coefficients are to factors inherent to each district
 - The exclusion of fixed effects seems to make the coefficients stronger, suggesting a potential overestimation in their absence
 - The differences are moderate
3. Exclusion of the 4th quartile from the production volume
 - The magnitude of the coefficients decreases slightly and the coefficient for AA, although still not significant for both Heckman steps for all models, now presents a positive impact direction in the participation equation.
 - The differences are moderate

Conclusions and Discussion

- Filiation to associations does not have a significant impact on the marketing participation decision or participation intensity.
- The Impact directions indicated that filiation had a negative association with the decision to participate, at the same time as it had a positive association in the intensive margin.
- Farmers can benefit from association different ways, such as social safety nets, especially in rural areas.
- Some associations do not have commercial goals in their core (Bernard and Taffesse, 2012)

Limitations and Recommendations

- Despite the non-significant effect, the literature indicates that these organisations can benefit farmers.
 - Nonetheless, membership remains still low for maize farmers in the country.
 - About 4% in 2020
 - We do not have any information on the type of the associations
 - This may have limited the ability of our models to detect any significant effect.
- Overall, promotions for associativism still seem a cheap alternative for improving the well-being of farmers, especially in rural areas.