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Promoting Peru's Smallholder Farmer's Access to Profitable Markets: The Effects of Social Networks and Farmer Training

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Introduction

Since 2005, the share of agriculture in Peru's GDP has shown a steady annual growth rate of 5% on average (INEI, 2014). Nevertheless, the poverty rate in the rural area remains above 50% during the period 2005-2011 (INEI, 2014), which suggests that the increase in the agricultural production has not significantly reduced poverty especially for low-income farmers. Smallhoder farmers in Peru could improve their family income by selling their products in profitable markets rather than self-consuming. Therefore, gainin access to national and foreign markets is important to enhance smallhoder farmer's income and promote their economic mobility.

Objectives

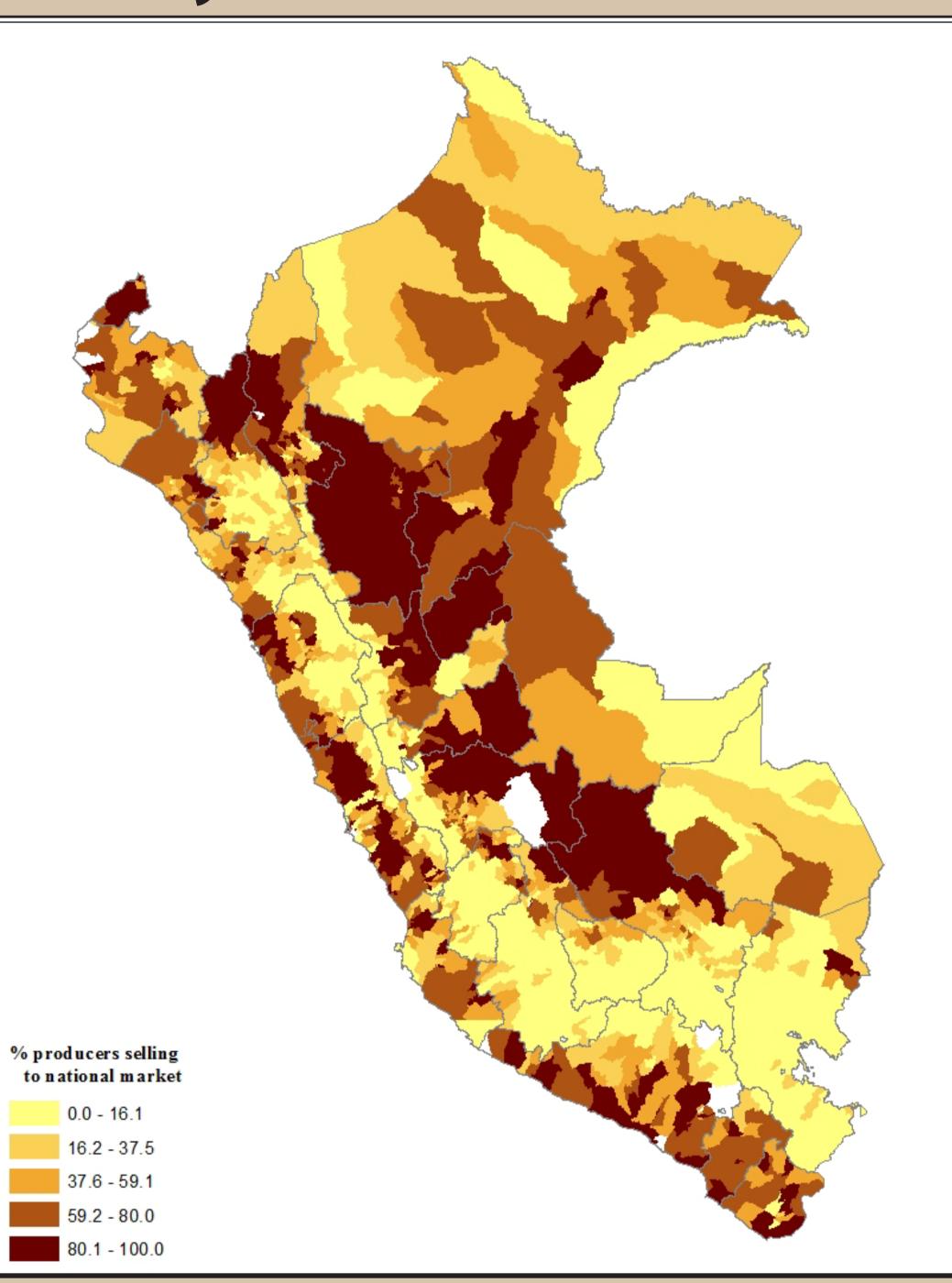
This study will focus on explaining the factors that favor the integration of the rural economy to profitable marketst. Specifically this study seeks to asses:

- 1. The impact of farmer training provided by the Peruvian government, and
- 2. The impact of social networks separating the effect of nearby and distant social contacts.

Methodological Approach

- 1. All the variables are constructed at the district level using only information of smallholder producers who own less than 5 hectares of agricultural land.
- 2. The farmer training variable is constructed based on 15 questions related to training programs provided by the Peruvian government.
- 3. The social network is constructed based on the migration flow to capture the effect of interaction with those districts that participate in the commercial markets.
- 4. Nearby contacts are those districts within a distance below the average distance.
- 5. The estimations are based on a conditional mixed process estimator that allows estimating seemingly unrelated equations with a Tobit approach.
- 6. There are two main dependent variables: selling only to national markets, and selling to foreign markets.

Map 1: % of producers selling only to national markets



Map 2: % of producers selling to foreign markets

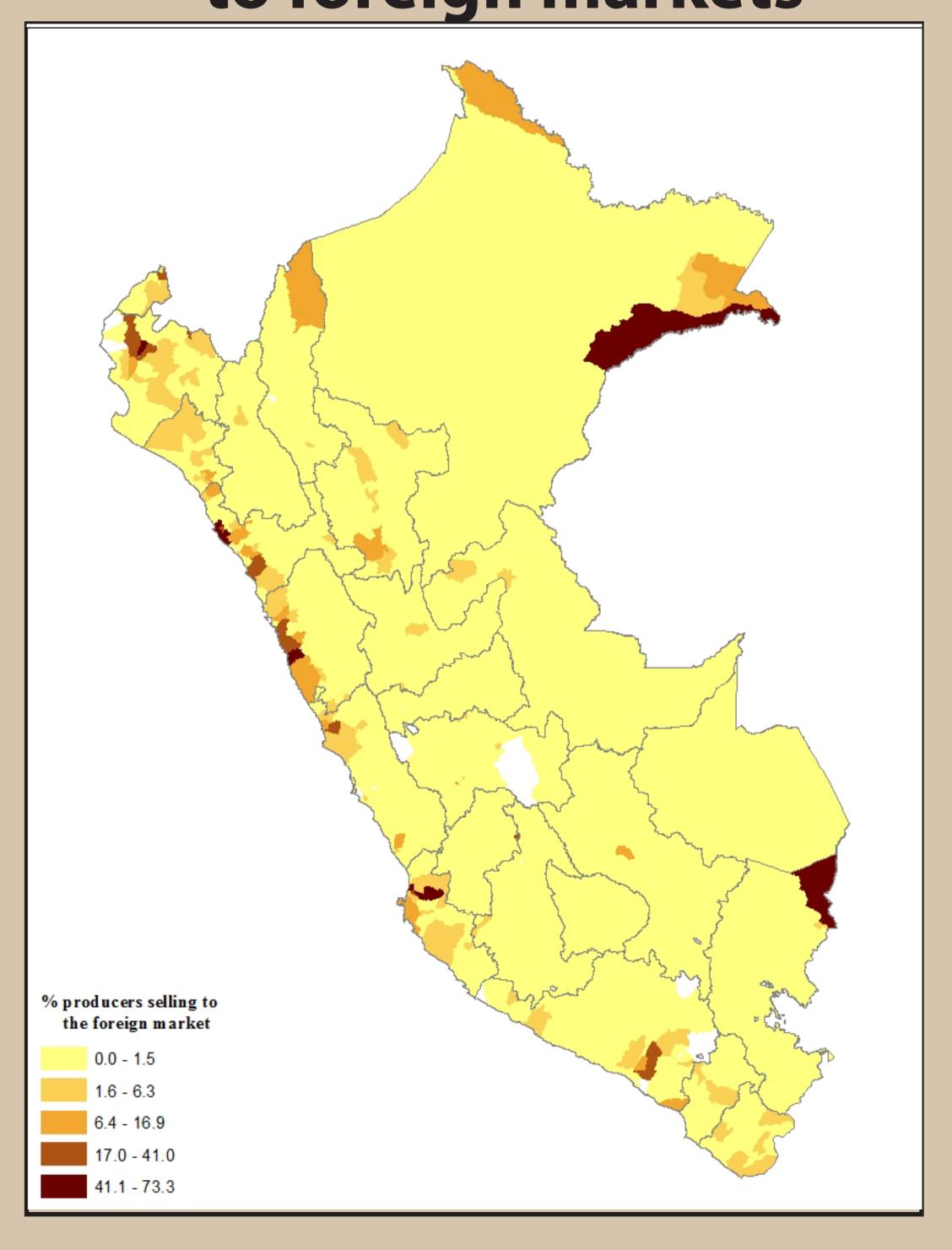


Table 1: Model 1 - 25% + producers selling

Model 1: 25% + producers sell	% producer s to nati		% producers selling to foreign		
Main independent variables:					
% producers with farmer training	0.047	(0.68)	0.020	(0.43)	
Networking variables:					
Migration interaction with nearby contacts	12.710***	(3.63)	2.174	(0.92)	
Migration interaction with distant contacts	-2.368	(-0.40)	9.826**	(2.46)	
Socio-economic variables:					
% producers who read and write	0.228***	(2.85)	-0.073	(-1.36)	
Mean size household	-5.374***	(-4.69)	-1.214	(-1.56)	
% male producers	0.376***	(6.35)	0.033	(0.82)	
Mean age	1.222	(0.97)	1.588*	(1.81)	
Age squared	-0.017	(-1.33)	-0.018**	(-2.08)	
Mean farm size	28.360***	(13.33)	11.651***	(7.82)	
% producers hiring labor	0.205***	(9.78)	-0.007	(-0.46)	
% producers with other income source	-0.183***	(-2.90)	-0.031	(-0.50)	
Mean number of plots	-13.060***	(-9.87)	-5.201***	(-5.00)	
Electricity (=1)	5.196***	(4.95)	4.450***	(5.97)	
Physical characteristics					
Mean hours far to capital district	-1.086***	(-2.99)	0.314	(1.44)	
% producers in the Pacific basin	0.103*	(1.90)	0.066*	(1.95)	
% producers in the Amazonas basin	0.041	(0.79)	0.085***	(2.67)	
% producers in the Highlands	0.202***	(4.83)	-0.045	(-1.60)	
% producers in the Jungle	0.368***	(10.71)	-0.098***	(-4.41)	
Elevation (meters)	-0.010***	(-7.37)	-0.001	(-1.40)	
Constant	-14.079	(-0.42)	-45.298**	(-1.99)	
District fixed effects	Ye:	S	Yes		
Observations	1,76	54	1,764		

Table 2: Model 2 - 50% + producers selling

producers selling					producers selling					
		elling only onal	% producers selling to foreign		Model 3: 75% + producers sell	% producer selling only to national		% producers selling t foreign		
Main independent variables:		-			Main independent variables:					
% producers with farmer training	0.056	(0.82)	0.022	(0.48)	% producers with farmer training	0.062	(0.90)	0.023	(0.51)	
Networking variables:					Networking variables:					
Migration interaction with nearby contacts	7.253**	(2.06)	2.819	(1.16)	Migration interaction with nearby contacts	6.637	(1.55)	0.626	(0.21)	
Migration interaction with distant contacts	-1.009	(-0.16)	10.156**	(2.39)	Migration interaction with distant contacts	8.734	(1.17)	9.393*	(1.84)	
Socio-economic variables:					Socio-economic variables:					
% producers who read and write	0.228***	(2.84)	-0.072	(-1.35)	% producers who read and write	0.220***	(2.74)	-0.075	(-1.41)	
Mean size household	-5.456***	(-4.74)	-1.283*	(-1.65)	Mean size household	-5.469***	(-4.75)	-1.244	(-1.60)	
% male producers	0.378***	(6.36)	0.034	(0.85)	% male producers	0.380***	(6.38)	0.037	(0.90)	
Mean age	1.318	(1.05)	1.603*	(1.82)	Mean age	1.233	(0.98)	1.608*	(1.83)	
Age squared	-0.018	(-1.41)	-0.018**	(-2.09)	Age squared	-0.017	(-1.36)	-0.018**	(-2.09)	
Mean farm size	28.252***	(13.24)	11.638***	(7.79)	Mean farm size	28.192***	(13.22)	11.526***	(7.74)	
% producers hiring labor	0.206***	(9.76)	-0.007	(-0.48)	% producers hiring labor	0.207***	(9.81)	-0.007	(-0.52)	
% producers with other income source	-0.185***	(-2.92)	-0.031	(-0.50)	% producers with other income source	-0.188***	(-2.97)	-0.026	(-0.42)	
Mean number of plots	-13.023***	(-9.80)	-5.217***	(-5.01)	Mean number of plots	-12.977***	(-9.77)	-5.183***	(-4.98)	
Electricity (=1)	5.265***	(5.00)	4.464***	(5.98)	Electricity (=1)	5.312***	(5.04)	4.441***	(5.95)	
Physical characteristics					Physical characteristics				N 110	
Mean hours far to capital district	-1.096***	(-3.01)	0.295	(1.35)	Mean hours far to capital district	-1.104***	(-3.03)	0.290	(1.33)	
% producers in the Pacific basin	0.106*	(1.94)	0.067**	(1.96)	% producers in the Pacific basin	0.099*	(1.81)	0.066*	(1.94)	
% producers in the Amazonas basin	0.034	(0.65)	0.085***	(2.67)	% producers in the Amazonas basin	0.024	(0.46)	0.083***	(2.59)	
% producers in the Highlands	0.203***	(4.84)	-0.045	(-1.59)	% producers in the Highlands	0.206***	(4.90)	-0.042	(-1.49)	
% producers in the Jungle	0.370***	(10.70)	-0.100***	(-4.48)	% producers in the Jungle	0.369***	(10.73)	-0.096***	(-4.33)	
Elevation (meters)	-0.010***	(-7.36)	-0.001	(-1.43)	Elevation (meters)	-0.010***	(-7.37)	-0.001	(-1.50)	
Constant	-10.818	(-0.32)	-45.335**	(-1.99)	Constant	-5.236	(-0.16)	-43.686*	(-1.91)	
District fixed effects	Yes Yes		District fixed effects	Yes		Yes				
Observations	1,76	,764 1,764		54	Observations	1,764		1,764		
z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1					z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1					

Table 3: Model 2 - 75% +

Discussion and Conclusion

Government intervention through farmer training programs may caused an endogeneity problem but after using "% of constituency producers" as IV, the results show that there is not an endogeneity problem. Thus, Tables 1 - 3 present the results without correcting for endogeneity.

Three different models are estimated based on the market participation of neighboring districts, and controlling for socio-economic and physical characteristics. The results show that "% producers with farmer training" does not have a significant effect on the decision of selling products regardless the model estimated. On the other hand, the social interaction captured by migration flow among distant districts, i.e., social contacts with distant neighbors, does have a positive and significant impact on the decision to sell to the more profitable market, i.e., the foreign market. Meanhwile, social interactions with nearby neighbors only has a positive and significant effect for selling to national markets.

These results shed some light for government intervetion in rural areas to delineate a strategy that involves building social networks as a tool to integrate smallholder farmers to more profitable markets.