

"The Mexican PROCAMPO Farmland Subsidy and Its Effectiveness as a Rural Anti-Poverty Program"

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Motivation

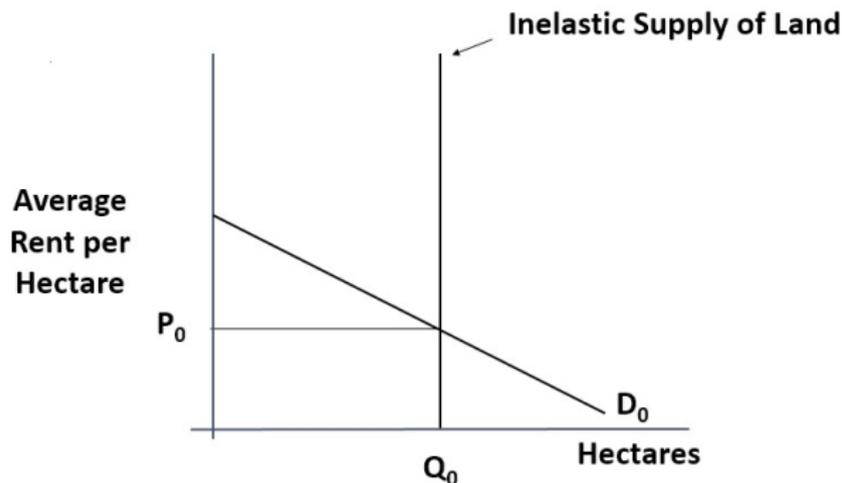
- ▶ PROCAMPO (Program of Direct Supports to the Farmland):
Most important agricultural program in Mexico's history
- ▶ PROCAMPO is a decoupled payment tied to the number of hectares of land, not to production
- ▶ Similar to the fixed Direct Payments (DP) established in the 2002 Farm Bill of the USA
- ▶ PROCAMPO's goal: Improve income of poor farmers
- ▶ Economic theory predicts that 100% of this type of subsidies goes to the landlords, not to the tenant farmers
- ▶ Who gets the subsidy? Policy effectiveness?

Research Questions

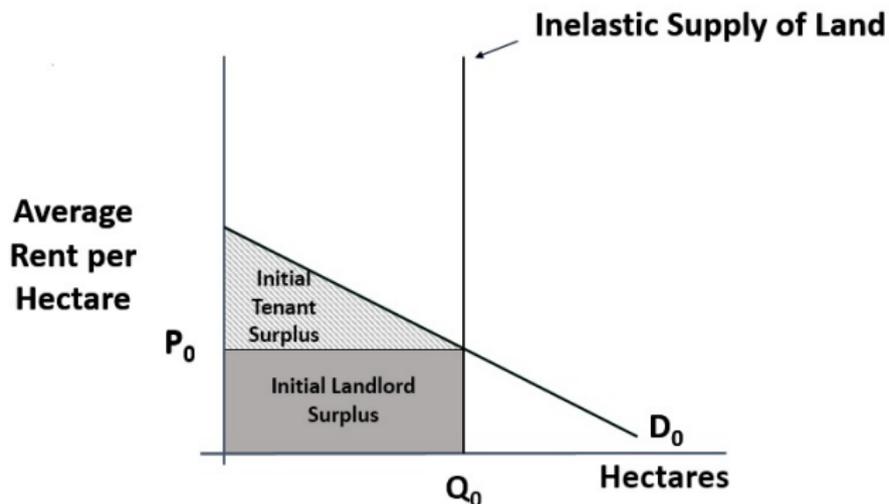
- ▶ What is the distribution of PROCAMPO subsidy among tenant farmers and their landlords?
- ▶ How does this distribution differ across the tenant farmers income distribution?

Theoretical Framework

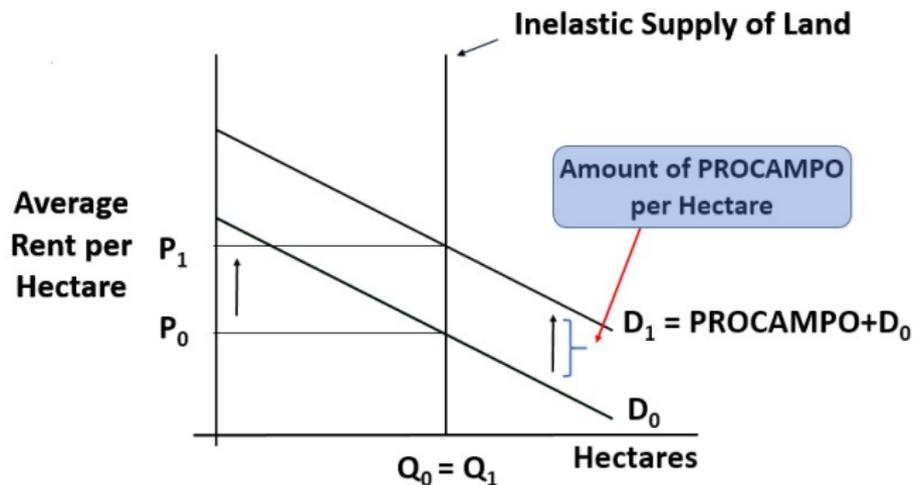
- ▶ Economic theory suggests incidence of farmland subsidies on rents is 100% (Floyd 1965, Gardner 1987, Kuchler and Tegene 1993, and others)
- ▶ Ricardian rent theory:



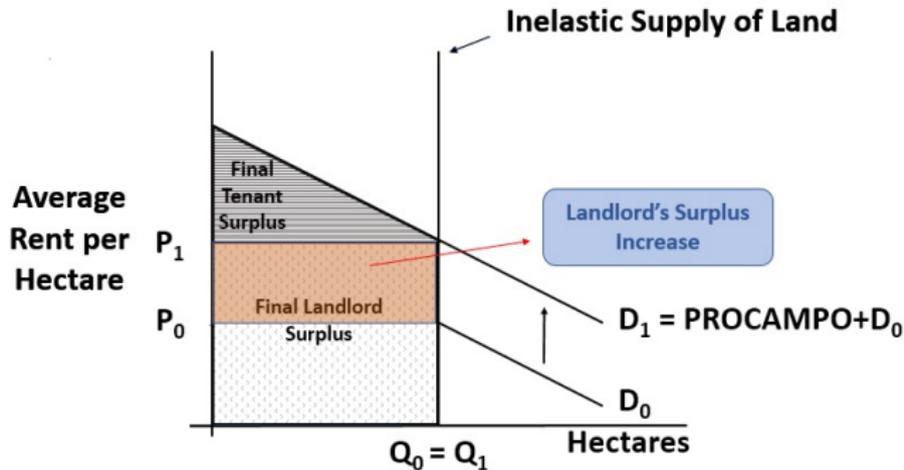
Theoretical Framework



Theoretical Framework



Theoretical Framework



Brief Review of Literature

- ▶ Alston and James 2002, Roberts et al. 2003: incidence relevant to understand distribution of payment benefits landowners vs. tenant farmers
- ▶ Mixed evidence, incidence in the range of 20–78% going to the landlords, with Kirwan 2009, Kilian et al. 2012, O'Neill and Hanrahan 2013, and Kirwan and Roberts 2016 finding the lower incidences. Hendricks and Pokharel 2016 cannot reject the null hypothesis of 100% incidence
- ▶ Literature on PROCAMPO effects on poverty: Evidence of its multiplier effects in household income of the poorest beneficiaries (Sadoulet, De Janvry, and Davis 2001, Tangerman 2006)

Contributions

- ▶ First to study the incidence of an agricultural subsidy targeting poor farmers, in a developing country setting
- ▶ Dataset has not been used before
- ▶ First to use quantile regression analysis to assess distributional effects of farmland subsidies

- ▶ Food and Agriculture Organization of the United Nations (FAO) and Mexico's Ministry of Agriculture (SAGARPA) Survey for the 2008 agricultural year:
 - ▶ I participated designing survey and collecting these data
 - ▶ Representative sample of all rural Mexican farms
 - ▶ 935 farmers rented any percentage of their cropland from another farmer/landowner
- ▶ Soil data: Edaphologic Vectorial Data available at INEGI (Instituto Nacional de Estadística, Geografía e Informática)

Selected Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	N
Average rent per hectare (pesos)	1,769.9	1,837.0	100.0	12,000.0	935
PROCAMPO per hectare (pesos)	319.8	418.9	0.0	2,000.0	935
Total crop area (Ha)	13.7	19.8	0.0	228.0	935
% Rented land	75.5	27.9	5.3	100.0	935
Amount of other subsidies per Ha (pesos)	916.1	2,094.7	0.0	16,514.3	935
Dummy for credit access	0.20	0.40	0.00	1.00	935
% of Eligible farmers in state getting PROCAMPO (%)	4.26	2.33	0.35	13.79	935
Farm grows vegetables	0.04	0.20	0.00	1.00	935
White Corn (grain) (Highest Share in Value of Production)	45.88	47.43	0.00	100.00	908
Beans (Highest Share in Value of Production)	5.31	20.24	0.00	100.00	908
High quality soil Dummy	0.17	0.37	0.00	1.00	588
Medium quality soil Dummy	0.31	0.46	0.00	1.00	588
Low quality soil Dummy	0.14	0.35	0.00	1.00	588
Worst quality soil Dummy	0.38	0.49	0.00	1.00	588

Main features of PROCAMPO in 2008

- ▶ Producers were eligible if they owned, had rights to, or rented their land
- ▶ All legal crops were eligible since 1995
- ▶ Two different amounts of the subsidy:
 - ▶ “Preferential Fee”: 1,160 pesos per hectare (104 dollars per hectare)
 - ▶ “Normal Fee”: 963 pesos per hectare (87 dollars per hectare)
- ▶ Upper limits on land-size for individual farmers: subsidy given for up to 100 hectares of irrigation land and 200 hectares of rain-fed land.

Econometric Model

OLS model of the log-linear model:

$$\ln(r_i) = \alpha + \ln(g_i)' \gamma + X_i' \beta + \text{Region}_j' \delta + \epsilon_i, \quad (1)$$

where

$\ln(r_i)$ = log average rent per hectare reported by farm i

$\ln(g_i)$ = log amount of PROCAMPO subsidy per hectare for the 2008 agricultural year for farm i

X_i = vector of farm-level covariates

Region_j = vector of regional fixed effects

Econometric Model

Quantile regression model (Koenker and Bassett 1978):

$$Q_{\theta}(\ln(r_i)|X_i) = \alpha_{\theta} + \ln(g_i)\gamma_{\theta} + X_i'\beta_{\theta} + \text{Region}'_j\delta_{\theta} + \epsilon_i, \quad (2)$$

where subscript θ denotes the rent quantiles (in this case, the 10th, 25th, 50th, and 90th quantiles)

Results: Effects of Selected Variables

Dependent Variable: log(Avg Rent/Ha)	OLS estimates	.10 quantile	.25 quantile	.50 quantile	.75 quantile	.90 quantile
PROCAMPO per Ha (logs)	0.001 [0.010]	-0.003 [0.018]	-0.004 [0.011]	0.005 [0.014]	0.004 [0.012]	0.001 [0.013]
Dummy for credit access	0.37*** [0.091]	0.63*** [0.130]	0.53*** [0.081]	0.37*** [0.100]	0.24*** [0.086]	0.21** [0.093]
% of Eligible farmers in state getting PROCAMPO	0.02 [0.012]	-0.03 [0.021]	-0.01 [0.013]	0.02 [0.016]	0.01 [0.014]	0.03* [0.015]
Farm grows vegetables	0.09 [0.200]	-0.05 [0.270]	0.24 [0.170]	0.23 [0.210]	0.66*** [0.180]	0.64*** [0.190]
High quality soil	0.23*** [0.073]	0.01 [0.150]	0.06 [0.091]	0.32*** [0.110]	0.17* [0.095]	0.17* [0.100]
Medium quality soil	0.17** [0.081]	0.02 [0.120]	0.17** [0.074]	0.17* [0.091]	0.07 [0.078]	0.05 [0.085]
Regional effects and Crop type controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	576	576	576	576	576	576

Note: Heteroskedasticity-robust standard errors are in brackets. *10% significance, **5% significance, ***1% significance. All the variables that are not categorical are included in logs. Other controls include total crop area, % of rented land, amt. of other subsidies per ha, other soil quality categories.

Main Results

- ▶ PROCAMPO subsidies remain with the tenant farmers
- ▶ Result holds when we consider all quantiles separately as well
- ▶ Relevant significant predictors of the rental rate paid by tenant farmers:
 - ▶ Access to credit
 - ▶ Share of production in white corn and beans
 - ▶ High and medium quality soil
 - ▶ Regional fixed effects

Resolved Issues

- ▶ Endogeneity: inclusion and omission of different variables, PROCAMPO per hectare estimate remains insignificant
- ▶ Sample Selectivity: Heckman model shows no statistically significant evidence of selection bias
- ▶ Gaming of the system: Included interactions of PROCAMPO with different farm sizes (not significant), and percentage of eligible farmers in state getting PROCAMPO (not significant, except for the 90th quantile)

Conclusions

- ▶ PROCAMPO subsidy is not passed through from tenant farmers to their landowners and thus the program is successfully supporting the income of tenant farmers
- ▶ Results are possible evidence of imperfect farmland markets in Mexico:
 - ▶ Farms small and below efficient scale
 - ▶ Informal (and thin) farmland markets may reduce price responses
- ▶ Low incidence matches previous literature on PROCAMPO multiplier effects in household income of the poorest beneficiaries

Policy Implications

- ▶ The policy goal of helping poor farmers' household incomes is generally achieved
- ▶ Using a developed country experience to guide policy in developing countries may lead to misguided policies
- ▶ Motivates re-framing of current policies affecting poor farmers in Mexico, or the creation of simpler public policy mechanisms to help the rural sector

THANK YOU!

Questions or comments:
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