The Mexican Sugar Industry: Pathologies and Public Policy

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BANCO DE MÉXICO

Introduction

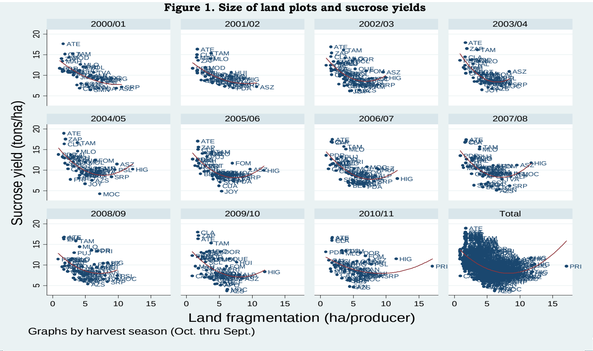
This paper studies some of the most relevant structural bottlenecks of the Mexican sugar industry. We examine: (a) the relationship between a highly fragmented land ownership structure and the yields of sucrose production; (b) some of the drivers of productivity of sugar mills; (c) the flow of credit; and (d) the Mexican trade policy on sugar. We propose public policies aimed at promoting a more competitive sector, which we subject to a political economy analysis to assess their viability.

Results

(a) Fragmentation of land and sucrose yields

The relationship between the fragmentation of land plots and productivity remains an open debate.

Figure 1. Size of land plots and sucrose yields



Graphs by harvest season (Oct. thru Sept.)

We find a robust U-shaped association between the level of fragmentation of land plots and the volume of sucrose produced per hectare (see Figure 1 and Table 1).

Table 1. Size of land plots and sucrose yields

	Dependent variable: Production of sucrose (tons) per hectare				
Hectares per producer	-1.691***	-1.699***	-0.733**	-0.830*	-0.928**
	(0.372)	(0.368)	(0.306)	(0.417)	(0.395)
Hectares per producer^2	0.102***	0.103***	0.045**	0.051*	0.063**
	(0.029)	(0.029)	(0.021)	(0.030)	(0.028)
Altitude					0.002***
					(0.001)
Intercept	15.010***	15.377***	8.824***	16.173***	16.276***
	(1.090)	(1.094)	(1.086)	(3.347)	(2.893)
Season dummies	N	Y	Y	Y	Y
State dummies	N	N	Y	Y	N
Controls	N	N	N	Y	Y
N	541	541	541	432	432
R^2	0.318	0.347	0.62	0.723	0.622
Implicit critical farm size (has/producer)	8.29	8.25	8.14	8.14	7.37

Heteroskedasticity-robust standard errors clustered at the municipality level are shown in parentheses. Stars denote statistical significance at the *10%, **5% and ***1% levels. Control variables include rain; availability of irrigation, mechanical choppers and trucks; use of fertilizers; and ownership of sugar mills (private vs public).

(b) Productivity of sugar mills

We find no relationship between mills' productivity and whether they are state-owned or not.

We present mixed evidence of the relation between mills' productivity and their efficiency at producing non-sugar products; we find a positive association with mills' generation of electricity, and no relation with their production of alcohol (see Table 2).

Table 2. Drivers of mills' productivity

	Dependent variable: Sugar mill efficiency (rate of transformation of sucrose into sugar)				
Private ownership of the sugar mill	0.979			-0.266	0.135
	(0.680)			(0.513)	(0.490)
Generation of electricity (kWh) per ton of sugarcane		-0.193**		1.948***	1.747***
		(0.090)		(0.380)	(0.552)
Production of alcohol (L) per ton of sugarcane			0.063	0.063	0.052
			(0.127)	(0.076)	(0.058)
Intercept	81.610***	85.586***	82.215***	85.312***	86.872***
	(0.572)	(1.508)	(0.341)	(0.859)	(0.783)
Season dummies	N	N	N	Y	Y
Sugar mill FE	N	N	N	Y	Y
Controls of consumption of electricity, oil and steam	N	N	N	Y	Y
Controls of lost time due to rain, holidyas as well as factory, staff and fields issues	N	N	N	N	Y
Within R^2	0.023	0.093	0.002	0.124	0.256
N	594	594	594	594	594

Heteroskedasticity-robust standard errors clustered at the sugar mill level are shown in parentheses. Stars denote statistical significance at the *10%, **5% and ***1% levels.

(c) Flow of credit

We find that obtaining credit can take up to three months on average, with great variability in the waiting period (see Table 3).

Table 3. Flow of credit

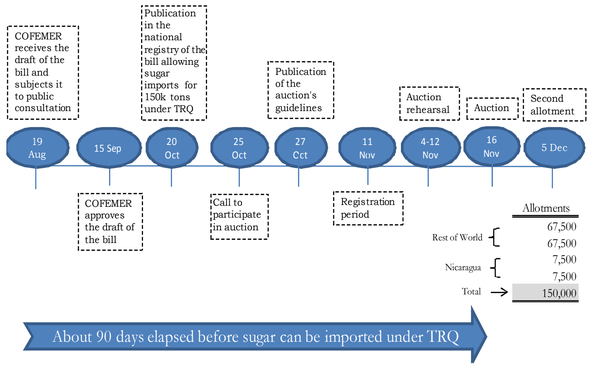
	N	Mean	Std. Dev.	Median	Min	Max
All	33,057	79.85	149.73	25	0	3,684
Avio credit	14,626	89.80	178.57	16	0	3,684
Refaccionary credit	18,431	71.95	121.52	33	0	3,653

This table shows the descriptive statistics of the number of days elpased between the submission of credit applications and the payments of credits sponsored by FIRA between 2004-2011. Avio credit comprises short-term loans aimed at investments in field preparation, seeds, fertilizer, inputs (including labor), etc. Refaccionary credit comprises long-term loans aimed at investments in capital, real estate, etc.

(d) Trade policy

The Mexican sugar industry is highly protected from foreign competition. When a shortage of supply is identified, restrictions to imports are relaxed through a tariff-rate quota system. However, this system unfolds quite slowly, undermining its effectiveness at countering upward pressure on sugar prices (see Figure 2 for an example).

Figure 2. Unfolding of the TRQ system activated on August 2011



Policy proposals

We argue that speeding up the flow of credit is the most viable policy meant to boost the sector's productivity (see Table 4).

Table 4. Political economy of policy proposals

	Sugarcane producers	Sugar mill owners	Government	Industrial consumers	Final consumers
Foster consolidation of land plots	n	y	?	y	y
Speed up sale of state-owned sugar mills to the private sector	?	y	y	y	y
Allow sale of electricity from sugar mills to final consumers	y	y	n	y	y
Quicken flow of credit	y	y	y	y	y
Remove restrictions on sugar imports	n	n	y	y	y

This table shows which actor would be in favor or opposed to each of our policy proposals.

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