Effectiveness marketing strategies and risk measurement in the sugarcane industry

Daniel H. D. Capitani[a]; Fabio Mattos[b] and Carlos E. O. Xavier[c]
(a) University of Campinas, (b) University of Nebraska-Lincoln, (c) University of Sao Paulo

Poster prepared for presentation at the Agricultural & Applied Economics Association's 2014 AAEA Annual Meeting Minneapolis, MN, July 27-29, 2014

Effectiveness marketing strategies and risk measurement in the sugarcane industry

Daniel H. D. Capitani
University of Campinas

Fabio Mattos
University of Nebraska

Carlos E. O. Xavier
University of Sao Paulo

Introduction

- Marketing decisions are key elements for most of agricultural producers and industry. These agents face several possible production and trade strategies and simultaneously the uncertainty regarding their outcomes.
- The random components of prices are linked with the occurrence of new information about the expected supply and demand, linked with the seasonality of inventory changes and of information about market conditions.
- There is a lack of consensus about marketing strategies. The efficient market hypothesis implies that there are no significant differences in returns considering many marketing strategies. However, other studies have found evidence that preharvest marketing strategies provide significantly greater returns than trading at harvest.
- Sugarcane industry faces uncertainty over better market strategies regarding production mix and trade.
- What is the ideal production mix? How much risk each product result? When the selling provide positive margins?

Objective

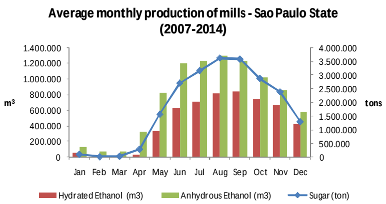
- To explore marketing strategies in Brazilian sugarcane industry.
  - o To investigate sugarcane production mix and profit margins of sugar and ethanol.
  - o To assess price risk.

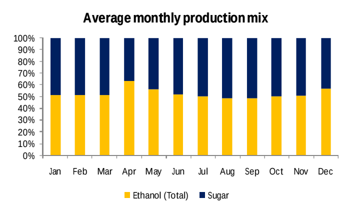
Research method

- Profit margins calculation:
  - ❖ Average cash prices and harvest cost of production.
- Price risk assessment:
  - ❖ Dispersion Measures and Downside risk analysis
  - ❖ Sugarcane, hydrated and anhydrous ethanol
- First step: sugarcane market conjuncture
  - ❖ Average profit margins at several intervals over crop year (monthly)
  - ❖ Analysis of sugarcane mills average production mix
- Second step: assess price risk at marketing strategies considering three trading intervals over a year
  - ❖ coefficient of variation (CV)
  - ❖ lower partial moment (LPM): target = cost of production.
  - ❖ value-at-risk (VaR)
  - ❖ expected shortfall (ES)

Data

- Weekly prices: July, 2007– June, 2014 (7 crop years)
  - ❖ spot price for Brazilian raw sugar, hydrated ethanol and anhydrous ethanol: Cepea/Esalq/USP
  - ❖ Cost of production: Pecege/Esalq/USP
- Monthly production mix: UNICA





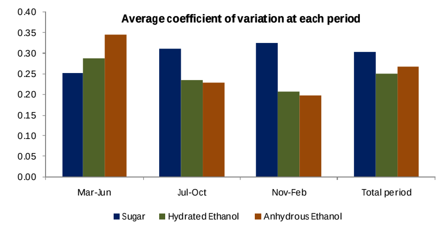
Results

Summary statistic for sugar and ethanol prices and returns in Sao Paulo, 2007-2014

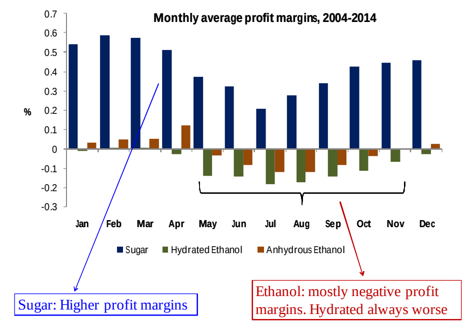
	Sugar (R$/50kg)	Hydrated Ethanol (R$/L)	Anhydrous Ethanol (R$/L)
Mean	48.85	0.98	1.12
Std. dev.	14.77	0.24	0.30
Coeff. of var.	30.23%	25.00%	26.87%
LPM	0.06%	0.14%	0.11%
VaR	-20.20%	-30.96%	-33.69%
ES	-36.07%	-36.71%	-41.94%

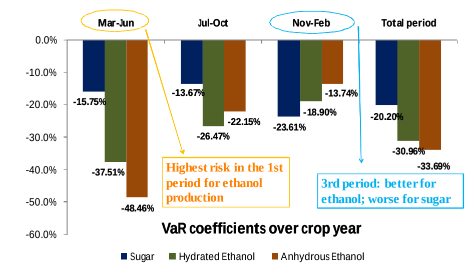
Summary stats analysis for the total period shown that:

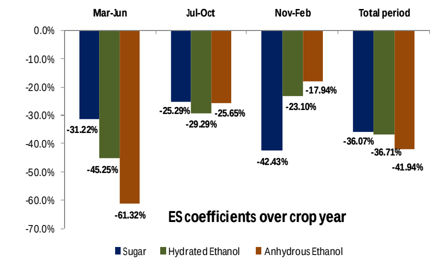
- There is no such significant difference on prices dispersion.
- Sugar exhibits smaller risk, but can reach similar extreme negative returns as ethanol.
- For agricultural marketing strategies, it is desirable a separate analysis at different periodicities along a crop year.



Coefficient of variation: significant differences if considered production intervals over the crop year. Anhydrous ethanol prices are more volatile in the beginning of harvesting while sugar prices are more disperse over the off-season/preharvest period.







VaR and ES analysis

- Sugar exhibits lesser VaR levels than ethanol, although ES point out to similar extreme possible losses than ethanol.
- Ethanol, especially anhydrous, shows more risk in the beginning of harvest. Sugar is much more risk susceptible for big losses during the off-season/preharvest period.

Conclusions and extensions

- Over the considered period, ethanol was the first output choice by Brazilian sugarcane mills.
  - ❖ Sugarcane crushing is concentrated from May through October.
- Margins are more profitable over production off-season,
  - ❖ But ethanol margins are mostly negative.
- Each price has similar volatility over total period.
  - ❖ Disaggregating more periods according sugarcane harvesting, dispersion is more disparate.
- VaR and ES analysis suggest that price risk can be more negative for anhydrous ethanol. However, all commodities can reach extreme losses, depending on trade period.
- Overall, sugarcane mills marketing strategies should focus not only on profit margins at each period.
- The strategy must also be associated with an efficient price risk management.
- An optimal strategy for each product might be focused or margins and risk, simultaneously.

For further information

Daniel Capitani (daniel.capitani@fca.unicamp.br)
Fabio Mattos (fmattos@unl.edu)
Carlos Xavier (ceoxgo@fmail.com)