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Careers in Farming: Evidence from the Chilean Wine-grape Market

by

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

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MOTIVATION

Measures of grape **quality** do not fully capture farmers' **performance**. In any contract relationship where measured performance does not fully capture desired performance, buyers cannot rely solely on pay-for-performance contingencies to motivate on-going work diligence and human-capital investment.

We investigate **production contracts** between independent wine-grape farmers and wineries in Chile. We observe **explicit incentives** in pay-for-performance provisions that depend on measurable characteristics of grape quality, and we test for the presence of complementary **implicit incentives** that arise from competition in the market for contract farmers. In addition to the traditional use of long-term contracts as *ex ante* protection against potential future hold-up, we hypothesize that long-term contracts represent the final stage in the farmers' careers after a series of short-term contracts.

RESEARCH QUESTIONS

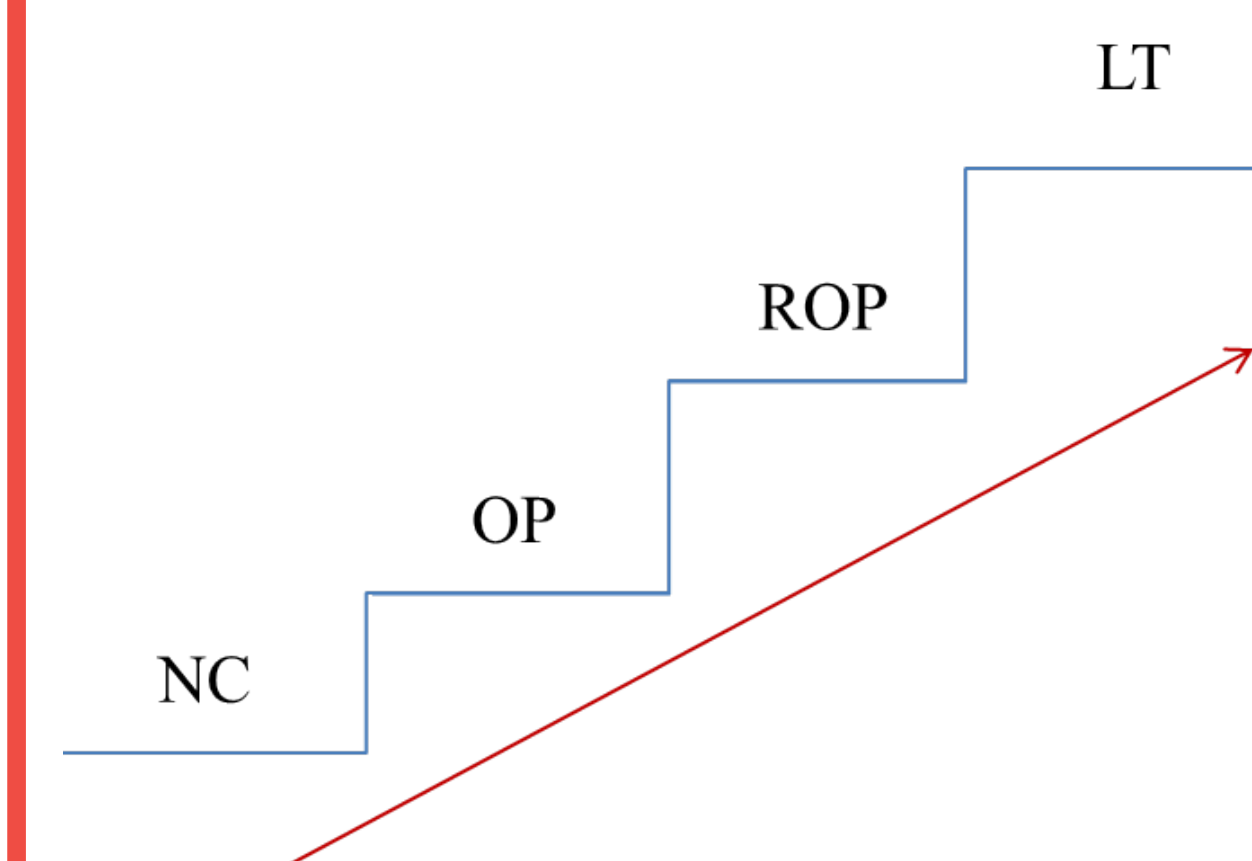
Are there "career" incentives in arm's-length contracts between wine-grape farmers and wineries in Chile?

Specific questions:

- Are contracts structured like a ladder?
- Who can access long-term contracts?

EMPIRICAL BACKGROUND

The Contract Ladder



- NC: No contract
- OP: one-period contract
- ROP: repeated one-period contract
- LT: long-term contract

In Chile, wine grapes are mostly sold through contracts signed between wine-grape farmers and wineries. Contracts vary depending on **length, price, product quality requirements, and technical assistance** provided by buyers with LTs demanding more of each.

MODEL

In **career concern models**, the market learns about the worker's ability over time and competes for high-ability workers. This competition generates **incentives** for workers to **exert effort** [1, 2, 3].

We **develop a model** based on Gibbons and Murphy [3] where the existence of implicit incentives can be inferred by measuring differences in the characteristics of farmers, and in the structure of the contracts farmers face, as they progress through their "careers." In addition, we incorporate investment in training by the winery on the farmer in LTs.

This model results in **conditions under which LTs are preferred** and in **predictions** regarding:

- explicit incentives to exert effort,
- past performance,
- farmers' abilities, and
- market competition by wineries.

We expect these to be **higher for farmers in LTs**.

DATA AND EMPIRICS

- **Random sample** of 184 wine-grape farmers.
- **Two wine valleys** of Chile, Colchagua and Maule. **Representative of Chilean wine production** including heterogeneous types of contracts.

- During 5 months in the **2011-2012 season**.
- Collected data on:
 - Characteristics of farmer, farm, vineyard, current and previous contracts, training, and investments.

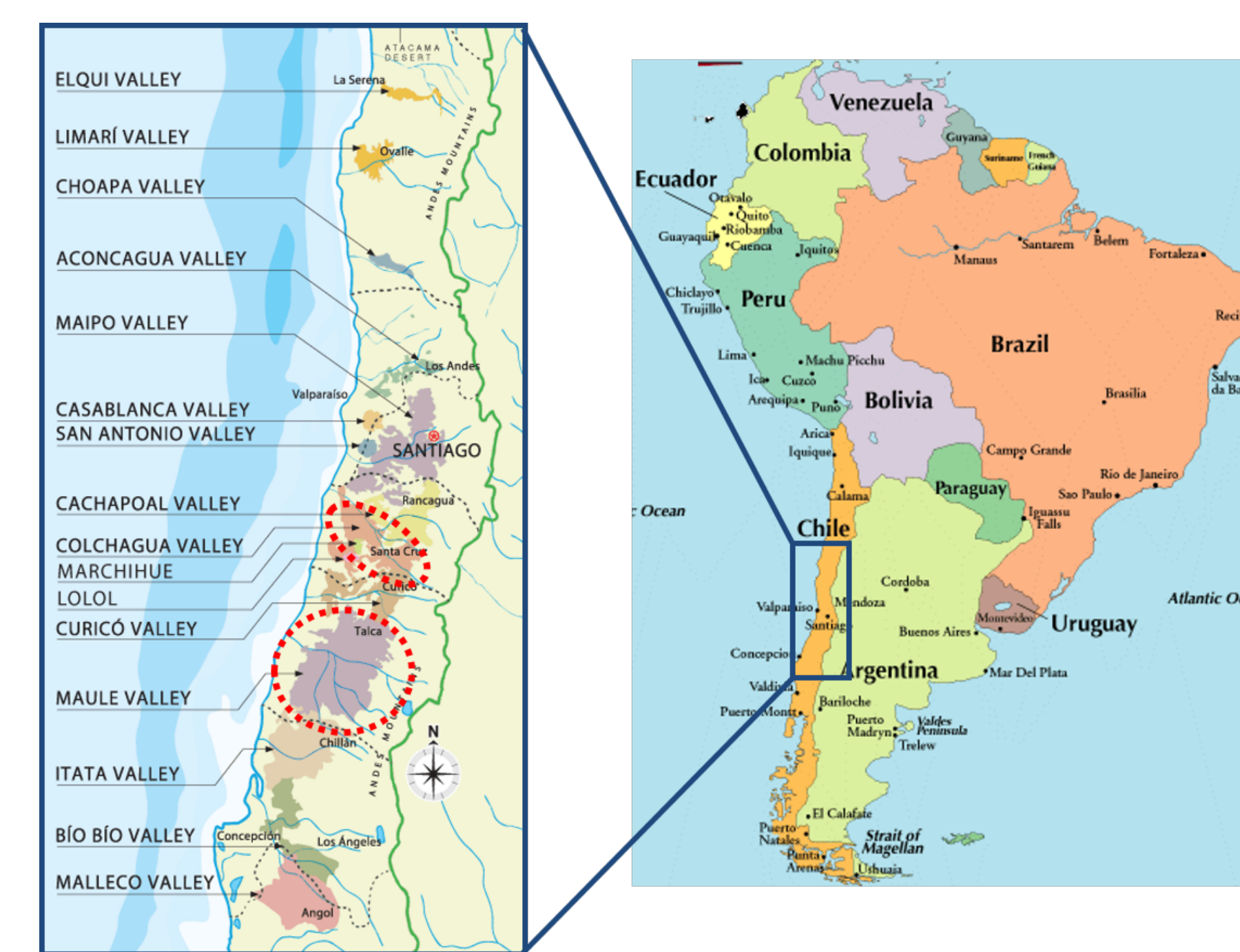
- **Empirical model** using a logistic distribution,

$$Pr(LT = 1 | \mathbf{x}) = \frac{e^{\mathbf{x}'\beta}}{1 + e^{\mathbf{x}'\beta}}$$

where $Pr(LT = 1)$ is the probability of accessing an LT, \mathbf{x} is a vector of regressors, and β is a vector of parameters.

- **Regressors:** crop-management practices, farmer characteristics reflecting ability, quality-improving past investments, wealth proxy and credit variables, indicator of market competition, interaction between training and contracting with same winery, other controls.

RESEARCH AREA



RESULTS

Table 1: Determinants of the probability of having a long-term contract in the current season

	LT 1	LT 2	LT 3	LT 4
Cultivation ability	0.012 (0.021)	0.008 (0.020)	-0.005 (0.023)	-0.004 (0.022)
Log of experience in years	0.083** (0.040)	0.087** (0.038)	0.096** (0.031)	0.097** (0.031)
Contracting early in the season	0.405*** (0.083)	0.427*** (0.077)	0.378*** (0.059)	0.390*** (0.063)
Thinning in previous contract	0.275*** (0.089)	0.284*** (0.067)	0.313*** (0.060)	0.314*** (0.054)
Summer pruning	0.025 (0.068)	0.014 (0.063)	0.051 (0.037)	0.047 (0.038)
Had Botrytis last season	0.128** (0.070)	0.163** (0.074)	0.199** (0.058)	0.216** (0.053)
Training from buyer in previous contract	0.150*** (0.043)	0.155*** (0.042)	0.161*** (0.031)	0.164** (0.032)
Ag. studies person in charge of the wine grape	0.262*** (0.083)	0.255*** (0.070)	0.281*** (0.056)	0.280*** (0.054)
Soil quality	0.052*** (0.018)	0.063*** (0.017)	0.064*** (0.017)	0.067*** (0.016)
Tractor ownership	-0.006 (0.049)	-0.012 (0.059)	-0.019 (0.054)	-0.021 (0.067)
Credit constrained	0.053 (0.039)	0.069 (0.046)	0.003 (0.040)	0.020 (0.047)
Previous contract with same winery			-0.132** (0.041)	-0.111* (0.044)
Training in previous contract with same winery			-0.153 (0.167)	-0.122 (0.160)
Largest buyers' dummies	No	Yes	No	Yes
Number of obs.	168	168	168	168
Pseudo R-sqr	0.602	0.630	0.650	0.658

Notes: *p<0.10 ** p<0.05 *** p<0.01. Estimated using a logit model with robust standard errors. Average marginal effects reported. Standard errors are in parenthesis. Average marginal effects of interaction terms were calculated using Norton's *et al.* (2004) methodology. Regressions include a constant term, a dummy for cultivating classic varieties and for having invested before current contract, buyer characteristics, and valley of production.

LTs associated with (see Table 2):

- higher quality and requirements,
- higher prices, and
- higher training.

RESULTS CONTINUED

Table 2: Descriptive statistics existence of contract ladder

	NC	OP	ROP	LT
Quality bonus offered at contract agreement	0%	0%	2%	29%
High-quality classification at contract agreement	0%	4%	13%	67%
Average price per Kg	140 (-)	219.82 (46.18)	220.58 (45.94)	321.32 (106.62)
Average requirement level (1 to 5)	1 (-)	1.67 (0.99)	2.15 (1.33)	3.60 (1.24)
Received training during contract	0%	29%	58%	100%
Average training level during contract (1 to 5)	1 (-)	1.59 (1.18)	2.73 (1.74)	4.17 (1.13)
Number of obs.	1	28	131	24
Percentage of total	0.5%	15%	71%	13%

Notes: Standard deviation in parenthesis.

CONCLUSION

- Contracts in the Chilean wine-grape market are structured as a **ladder** with long-term contracts located at the top.
- Find evidence for **implicit market based incentives** ("careers") in farming. LTs are more likely with:
 - High past performance (past investments in high-quality production),
 - High ability (experience and past investments in human capital), and
 - Market competition (contracting early in the season).

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ACKNOWLEDGEMENTS

Support during fieldwork provided primarily by the Rural Territorial Dynamics Program, implemented by Rimisp-Latin American Center for Rural Development, funded by the International Development Research Center (IDRC). Additional support was provided by the Division of International Studies, the Latin American, Caribbean, and Iberian Studies Program, and the Graduate School at the University of Wisconsin-Madison.