Summary of the Master Thesis[1]
"Demand for differentiated varieties of rice and impacts on retailer and manufacturer profits"

Rice production in Chile has been supported by a genetic improvement program implemented by *Instituto Nacional de Investigación Agropecuaria* (INIA) since 1979, which developed varieties of *japonica* rice with long-wide type grains with germplasm of other varieties adapted to the temperate climate in clayey soils of central-south regions of Chile.

This research exploits detailed data on individual transactions from two supermarket brands of a large retail holding that captures 28% of retail sales in Chile, along with data of wholesale prices paid by retailers to producers (manufacturers) for the period October 2009 to July 2010. Demand estimation is implemented following a recent non-parametric technique, which constitutes a flexible, data-driven extension of the random coefficients model of discrete-choice (mixed logit). Counterfactual equilibrium scenarios are considered using a supply model of competition frequently employed in vertical relationships analysis.

The data richness combined with model flexibility permits to formally evaluate the influence of market demand and product characteristics on profit generation among producers and retailers. Moreover, each supermarket brand has a different business strategy,[2] and the proposed demand-supply equilibrium model is applied to each channel separately.

Characterization of the rice value chain in Chile from previous studies indicate that manufacturing companies purchasing domestic production typically rely on an imports cost indicator of rice published weekly by the Ministry of Agriculture,[3] to establish a basis for their own purchasing strategy, considering also that spot transactions are infrequent, and most purchases are performed in advance (using contracts). The study accordingly uses this cost indicator to calculate the profits of manufactures.

The supply model market shares based on Nash-Bertrand competition strategies are explained in more than 93% by the structural model, while the gross estimates of margin data are explained in 64%-74% for manufacturing companies and 66% for the *"Value"* retailer. However, in *"Quality"* the explanation of the margin is close to 50%. The different counterfactual supply scenarios allow to derive equilibrium outcomes for multiple hypothetical situations. As heterogeneity in preferences for product attributes influences substitution patterns, the counterfactual market equilibrium scenario that excludes all local variety products from sale in each retailer generates a very limited shift in demand towards products of imported origin, and the response in the preferences of consumers would generate a reduction in the size of the market of up to 28% in *"Quality"* and of almost 45% in retailer *"Value"*.

Results suggest the existence of significant bargaining power over retailers by the manufacturing companies that have local origin variety products in their offer. Also, are consistent with the interest of the Chilean rice manufacturing industry with INIA in research and development projects, adaptation of new varieties, and providing incentives and signing contracts with rice farmers favoring the use of certified seeds of local varieties. Likewise, help to explain the entry of *private-label* retailer brands that occurred in the period and their interest in gaining positioning in the market in the most demanded segment of products. The research findings, however, particularly question the use of imported rice prices that manufacturing companies generally rely on to value *paddy* rice from local farmers, as this indicator is not necessarily related to the market premium from demand preferences for the local variety. Building on this research, subsequent analyses are recommended to gain further understanding of vertical relationships associated to bargaining among retailers with different store and service characteristics and food manufacturers with multiple category products.

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[1] Espinoza Hernández, Álvaro. (2018). Valoración de productos de arroz de variedad desarrollada en Chile y su efecto en las ganancias del retail y empresas productoras. Tesis de Grado de Magíster en Economía Aplicada. Santiago, Chile: Universidad de Chile - Facultad de Ciencias Físicas y Matemáticas. Published version available at: https://repositorio.uchile.cl/handle/2250/168680 [In Spanish.]

[2] One supermarket brand – here named *"Quality"* – owns 11 large "hypermarket" stores and is focused on high quality products and service in food retailing. The other – named *"Value"* – owns 53 stores and is focused on location, convenience, and value.

[3] This indicator started to be implemented since March 2009, roughly six months before the start of the study period, and was part of a more general policy to improve transparency in domestic agri-food markets that comprise other cereals (such as wheat and maize.)