UNIVERSITA' CATTOLICA DEL SACRO CUORE MILANO

Dottorato di ricerca in : Economia e Management Agro-alimentare

Ciclo: XXII
S.S.D: AGR/01 SECS-P/01

BRAND COMPETITION AND MARKET POWER IN THE ITALIAN FLUID MILK MARKET: ESTIMATION OF DISCRETE CHOICE MODELS FOR DIFFERENTIATED PRODUCTS

Coordinatore: Ch.mo Prof. Gianfranco PIVA

Tesi di Dottorato di : Elena Castellari
Matricola:3580153

Anno Accademico 2008/09

Table of content

List of figures

List of Tables

Introduction

In the field of Industrial Organization many are the empirical studies on the measurement of market power applied to the food industry.

The relevance of measuring market power is really high, especially from the point of view of policy makers aiming to analyze the degree of competition among players along the supply chain, where market power influences both vertical and horizontal relationships.

It is therefore crucial for policy makers and Antistrust institutions to have a correct measure of the degree of market power in order to ascertain and evaluate market distortions and abuse of dominant position and to define correct policies; there are many situations in which the measurement of market power is required, for example in evaluating the impact due to a merger or a buyout, as well as the introduction of a new product or of a new policy or of a new strategy.

On the other hand, from the point of view of an individual firm, it may be important to know the competitive positions of all the incumbents within the market for all its strategic decisions, from strategies on pricing and on promotion to strategies on merger and diversification.

In the modern food chain, mainly characterized by the presence of an intense process of differentiation in products attributes, it is important to measure market power within markets with non-homogeneous products. In the Industrial Organization literature many approaches to estimating market power are available, as reviewed in chapter 1, but of course the choice of a model with respect to another it is not an easy task and have many important implications.

This research mainly aims to provide a description of the Italian milk market considering two particular aspects:

- *The consumer behavior*: which characteristics are important on the purchasing decision; how the consumption shift from one category of milk to another one; the degree of substitution between (ultra-high-temperature pastured) "UHT" milk and refrigerated one.

- *The behavior of the major players of the Industry and the degree of market power*: Analyze the price brand competition in the Italian milk market among the major player: Granarolo, Parmalat and Private Labels.

Using a nested logit model, a well-known model in the discrete choice literature, I estimate how the consumer behaviour on purchasing decision is sensitive to particular product characteristics. Then, following Nevo (2001), I use the estimated demand parameters to determine economic profit margins (PM) in the milk industry, under three different conduct strategies of firms. The first one is just related to the ability of the firms to differentiate their product from those of their competitors. The second one is the Portfolio effect which is based on the principle that if a firm produces more than one product and products are not perceived as perfect substitutes by the consumer, then the firm is able to charge prices higher than those charged if products were produced separately by two different manufactures. The third situation refers to the possibility of collusion between players.

In the first chapter, I review the literature on product differentiation as one of the ways to escape from the Bertrand Paradox, where, under the assumptions of the Bertrand oligopoly model of price competition, price equal to marginal cost becomes the only equilibrium. Considering products as differentiated, firms are able to transcend from the Paradox and to gain a premium price exercising some market power. On a modern market, many are the ways to differentiate products: packaging, advertisement, intrinsic characteristics, promotions, place. Moreover, marketing became a

strategic area on the management of the firms, as, in a dynamic market with high degree of competition, differentiating your own product from those of the competitors is crucial to gain a premium price and to reach a particular segment of the market. A good segmentation of the market and the implementation of correct strategies to reach the target are decisive on the placement of the firm in the market.

On the other side, the issue of market power is of particular interest to policy makers and legislators as its exploitation can significantly erode market welfare, damaging consumers and incumbents benefits and producing deadweight losses. Furthermore, if we look at the market as a set of segments of consumers purchasing differentiated products, just considering the degree of competition among firms and the power within the market, without taking into account the substitution patterns among different products can be misleading. Antitrust merger and market power analysis usually refers to differentiated-products markets.

A second part of the first chapter is devoted to review the literature of empirical Industrial Organization (IO) on models used for the measurement of the degree of market power. Starting from the Structure-Conduct-Performance approach, that was the most used in IO from 1950's to 1980's, I briefly mention the "*market poker versus efficiency*" discussion between the Harvard school and the Chicago

school. Then, I refer to the empirical research that uses structural parameter to estimate and test the degree of market power. Such approach belongs to the New Empirical Industrial Organization (NEIO); starting from 1980's many are the applications of these models on the measurement of industries' market power, with a particular focus on food industry.

I finally introduce models which measure market power starting from a demand estimation and using the estimated coefficients to compute the Lerner Index and Profit Margins. This last group of models is really sensitive to the quality of the demand estimation, which is a crucial issue for the validity of the measurement of market power. Then I briefly illustrate the product and characteristics space approaches to the demand estimation going though the pros and cons of both.

The demand and supply sides of the model are both described in the second chapter. First, starting from a Bertrand competition and assuming constant marginal cost, I present the supply framework and show how to calculate Profit Margins from the estimated elasticities without observing actual costs. Second, in describing the demand side, I start from the Lancaster's approach, which considers products as bundles of characteristics, to introduce Discrete Choice models, following Berry (1994). I then discuss how different models deal with the Independence for Irrelevant Alternatives (IIA)

property: in particular I focus on the nested logit model, which is the one chosen for the empirical analysis and allows for more flexibility in the estimation of cross price elasticities; also the endogeneity issue and the computation of the market share of the outside good are briefly discussed.

In the third chapter I give an overview of the methodology used, starting from the goals of the research, I describe the IRI (*Information Resources Incorporated*) Infoscan database and the steps in the research. Moreover, I describe the econometric techniques used to solve the endogeneity issue and the Generalized Method of Moments (GMM) as method of estimation.

I present the application of the model in the Italian milk industry in chapter four and five, describing first the specification of the model used and second how to use the estimated coefficients to determine price elasticities and profit margins, as a measure of the degree of market power.

In chapter four I first provide a brief description of the Italian milk market, followed by the specification of the model; then the estimation technique, including the treatment of the endogeneity issue, is presented. I estimate vendor-level demand; then using estimates jointly with the pricing rule derived from different models of firm conduct, I estimate profit margins (PM) without observing actual cost., assuming a Nash-Bertrand game in price under three

different industries structures: single-product firm, multi-product firm and multi-brand monopolist. In the first case PMs are just given by product differentiation; in the second case are given by a portfolio effect, and finally in the third case they are obtained under the hypothesis of a joint ownership or full collusion. Conclusions follow in the last section.