Estimating Market Power in Food Retailing: The Case of Milk Products in Austria

Klaus Salhofer, Christoph Tribl and Franz Sinabell[1]

***Abstract –** An increasing market concentration in food retailing raises concerns about market power towards consumers and input suppliers. This is especially true for countries like Austria with a CR-3 in food retailing greater than 75%. Based on a NEIO model we estimate the market power of food retailers towards consumers and input suppliers with regard to three groups of dairy products (drinking milk, cheese, butter and others). Our empirical results suggest that market power of retailing exists towards consumers (in particular in the case of drinking milk) and towards input suppliers (in particular in the case of butter and other milk products). Market power is more significant (in statistical terms) downstream than upstream. Moreover, departures from perfect competition are moderate and commodity specific.*

INTRODUCTION

A high and increasing concentration in food retailing generates concerns about the possible exercise of market power and the departure from marginal cost pricing. Austria is among the top five countries in the EU with the highest concentration of retailers: For example, in 2005, the two largest retailers together with the largest discounter had a common market share of 75.9% of total revenues (BWB, 2007). In the retail industry, dairy products are among the top selling products. However, about 30-40% of revenues of dairy processors originate from one single retailer. This creates strong dependencies of food processors on retailers and offers the possibility of upstream market power. The high market share of discounters, however, might imply a low market power towards consumers.

There is only little knowledge on the magnitude of market power of the food industry in Europe, and knowledge on market power of retailers is even more limited: Gohin and Guyomard (2000) analyze market power of French retailers considering milk, meat and other food products. Most recently, Anders (2008) analyzes market power of German retailers with respect to meat products, and Sckokai et al. (2009) estimate market power of Italian retailers with respect to cheese. Several methodological approaches such as the structure-conduct-performance (SCP) approach and analyses of price transmissions using time series models aim to empirically reveal market power. Contrary to these approaches, methods termed New Empirical Industrial Organization (NEIO) try to estimate the degree of imperfect competition directly: The estimated parameter can be interpreted as the strategic interaction between firms (conjectural elasticity) or as the wedge between prices and marginal costs; it can take values between zero (perfect competition) and one (monopoly or collusion).

Our analysis focuses on market power of Austrian food retailers with respect to milk products, both, towards consumers and input suppliers by utilizing a NEIO model in the tradition of Gohin and Guyomard (2000) and Sckockai et al. (2009). We estimate supply functions at the dairy processor level, a Linear Approximate of the Almost Ideal Demand System (LA/AIDS) for the consumer demand side and first order conditions of retailers to derive deviations of retailers from marginal cost pricing.

EMPIRICAL MODEL, DATA AND ESTIMATION

In our empirical application we estimate market power parameters in regard to milk products in Austria by splitting them into three categories: 1) drinking milk including fresh milk, ESL (extended shelf life) milk and UHT (ultra high treatment) milk; 2) cheese in all forms; and 3) a residual category of other milk products including butter and vegetable oils. To be able to empirically estimate these parameters we must estimate values for final demand and input supply flexibilities. Demand flexibilities are derived by estimating a LA/AIDS model. On the input supply side we assume simple linear functional forms. Once we have derived demand and input supply flexibilities, we can estimate the retailers' first order conditions: The difference between the final consumer prices and purchase prices of our three product categories is explained by a vector of additional input costs and some price spreads caused by market power towards consumers and towards dairy processors.

We use monthly data from January 1997 to December 2008. Quantities and prices of milk products at the retail level are retrieved from the household panel RollAMA managed by keyQUEST. In this panel about 1,400 households are recording food purchases at the retail level both in value and quantity. Supply quantities at the processor level are equal to aggregated monthly production of drinking milk, cheese, and butter (as a representative for the third category). As it is difficult to get actual purchase prices of retailers, we use prices ex (dairy) factory

[1] Klaus Salhofer is from the Technical University of Munich, Environmental Economics and Agricultural Policy Group, Germany (salhofer@wzw.tum.de).

Christoph Tribl is working at the Federal Institute of Agricultural Economics, Austria (christoph.tribl@awi.bmlfuw.gv.at).

Franz Sinabell is from the Austrian Institute of Economic Research, Austria (franz.sinabell@wifo.ac.at).

as input prices. Since no such price for drinking milk exists it is constructed by using the price of raw milk for farmers and additional information. In addition, there is a lack of information on retailers' cost structure. Thus, as additional input costs of retailers we utilize labour costs (index of average gross hourly wages in the Austrian food industry) and capital costs (index of average interest rates for loans to non-financial firms); we include a trend to account for other factors. Input supply functions at the dairy processors' level are estimated by simple OLS estimation techniques. The LA/AIDS model and the system of first order conditions of retailers is estimated by using 3SLS.

RESULTS

Own price elasticities of demand are relatively inelastic for drinking milk (-0.16), but more elastic for cheese (-1.40) and other milk products (-1.72). Average input supply elasticities are rather low: 0.81 for drinking milk, 0.39 for cheese, and 0.59 for butter. These low supply elasticities represent the sector as a whole as sectoral supply is restricted due to the quota regime for raw milk. Estimation results of the first order conditions of retailers are presented in table 1.

Table 1. Estimation results of the first order conditions.

	drinking milk	cheese	butter/others
constant	0.150*	1.008	-1.613***
	(1.680)	(0.551)	(-3.135)
labour	-0.102	2.505**	1.116***
	(-1.588)	(2.296)	(3.044)
capital	0.012	0.553**	-0.035
	(0.548)	(2.177)	(-0.275)
oligopoly	0.011**	-0.089	0.083
	(2.541)	(-1.458)	(1.519)
oligopsony	-0.028	0.062	0.102**
	(-0.497)	(0.854)	(2.385)
trend	0.001**	-0.002	0.006***
	(2.186)	(-0.376)	(3.659)
R^2	0.958	0.629	0.930

[a]t-values in parentheses; ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

All significant cost factors of retail production have a positive influence on margins (difference between consumer prices and ex-factory prices). Significant market power parameters are greater than 0. In all cases departures from perfect competition seem to be quite moderate. For drinking milk, the oligopoly parameter (0.01) is highly significant, for cheese none of the market power parameters is significant, and for other dairy products the oligopsony parameter (0.10) is significant at the 5% level.

Wald tests performed on the market power parameters reveal, first, that some extent of market power with respect to dairy products exists. Second, the null hypothesis of no market power towards consumers in all three markets together can be rejected at the 5% significance level. Third, the null hypothesis of no market power towards input suppliers in all three markets together can be rejected at a lower level of significance. Finally, the null hypothesis of no market power in both directions for each

product category can be rejected at least at the 10% significance level. Significance is highest for butter and other products followed by milk and cheese.

CONCLUSIONS

In Austria, the market concentration in food retailing is rather high, which might imply the exercise of market power and a price setting, which departs from marginal cost pricing. Since dairy products add to the top sellers of retailers and since dairy processors are strongly dependent on large volume contracts with only a few retailers, market power of retailers is rather likely to be exercised. Our empirical results suggest that market power of retailing exists towards consumers and input suppliers. We have a slightly stronger evidence of market power towards input suppliers than towards consumers. To some marginal extent, market power seems to be exercised towards consumers with respect to drinking milk and towards input suppliers with respect to other dairy products (including butter and vegetable oil). In contrast to the other two product categories, our estimated elasticity of demand for drinking milk is inelastic, which facilitates the exercise of market power towards consumers. Similarly, the low supply elasticity for other dairy products might contribute to the possibility of exercising some oligopsony power towards input suppliers.

By interpreting these results limited data availabilities, especially regarding purchase prices and the cost structure of retailers, have to be considered. Despite of these limitations, our results seem to be a good starting point for a discussion on market power of retailers, as comparable studies on the behaviour of Austrian retailers are missing so far.

REFERENCES

Anders, S.M. (2008). Imperfect competition in German food retailing. *Atlantic Economic Journal*, 36:441-454.

BWB – Austrian Federal Antitrust Authority (2007). Allgemeine Untersuchung des österreichischen Lebensmitteleinzelhandels unter besonderer Berücksichtigung des Aspektes der Nachfragemacht - Zusammenfassung. www.bwb.gv.at, February, 2009.

Gohin, A. and Guyomard, H. (2000). Measuring market power for food retail activities: French evidence. *Journal of Agricultural Economics*, 51:181-195.

Sckockai, P., Soregaroli, C. and Moro, D. (2009). Estimating market power by retailers in the Italian Parmigiano Reggiano and Grana Padano cheese market. Contributed paper at the International Association of Agricultural Economists Conference, 16-22 August 2009, Beijing, China.