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Buyer and seller power in grocery retailing: evidence from Italy

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Abstract. This work investigates the effect of upstream and downstream market concentration on retailers' price-cost margins using bimonthly data over the period 1989–1992 disaggregated by retailer type and product. In addition to horizontal concentration, differentiation, and cost factors, the analysis includes buyer power amongst the determinants of retailers' profitability, as a result of vertical bargaining. Using a fixed effects model in first differences we find evidence of bargaining activity between large chains and food manufacturers. Our analysis of price competition at the retail level also reveals some interdependence in the pricing decisions of the largest retail organisations and price leadership by large independent shops.

Key words: price-cost margins, vertical bargaining, price competition, Italian grocery trade, panel data.

JEL classification: L13, L81, L42, C78, C23.

Resumen. Este trabajo investiga los efectos de la concentración de mercado *upstream* y *downstream* sobre el margen precio-coste de los minoristas usando datos bimestrales durante el período 1989–1992 desagregados por tipo de minorista y producto. Adicionalmente a la concentración horizontal, la diferenciación y los factores de costo, el análisis incluye el poder del comprador entre los determinantes de la rentabilidad de los minoristas, como resultado de la negociación vertical. Usando un modelo de efectos fijos en primeras diferencias, encontramos evidencia de actividad de negociación entre las grandes cadenas y los productores de alimentos. Nuestro análisis de la competencia de precios al nivel minorista también revela una cierta interdependencia en las decisiones de fijación de precios de las organizaciones minoristas más grandes y liderazgo en precios por parte de las grandes tiendas independientes.

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Palabras clave: márgenes precio-costo, negociación vertical, competencia de precios, comercio de comestibles italiano, datos de panel.

Clasificación JEL: L13, L81, L42, C78, C23.

1. Introduction

The European grocery trade has been subject to an intensive process of consolidation and modernisation in the last twenty years, although at a different pace in different countries. Since the mid-1980s Northern European countries (UK, Scandinavia, France, and Germany) have been developing a modern retail distribution system, dominated by a few large companies with a relatively small number of large-size outlets. The modernisation of food distribution in these countries has been accompanied by a shift in the balance of power from manufacturers to retailers (Tordjman, 1994). One of the most evident effects of this has been an increased ability of the most powerful retailers to impose restrictive vertical arrangements to manufacturers (Shaffer, 1991; Dobson and Waterson, 1997; Clarke, Davies, Dobson, and Waterson, 2002). The behaviour of grocery retailers and the increasing level of concentration in these countries have raised competition authorities' concerns, both at the national and European level (e.g., Kesko/Tuko merger case in Finland and Competition Commission, 2000, in the UK).

In Southern European countries (Greece, Italy, Spain, and Portugal) the modernisation process in grocery retailing has progressed at a slower pace. The retail distribution systems in these countries are still characterised by low levels of concentration and by a significant presence of traditional outlets. The Italian grocery trade, in particular, has been dominated by a large number of small local shops, but has been subject to some relevant changes in the last twenty years, which are reflected in a 40% reduction in the number of outlets between 1970 and 1990, and by a further 50% reduction between 1991 and 2000. Furthermore, between 1980 and 2000 a ten-fold increase was observed in the number of large supermarkets and hypermarkets (Euromonitor, 1980–2003).

This work investigates profitability in the Italian grocery trade, taking into account the nature of vertical relationships between firms in the retailing and manufacturing sectors. The aim of the work is to investigate the nature of grocery retailers' pricing behaviour and to identify any evidence of a shift in the balance of power in favour of retailers, similar to that observed in other European countries, despite the relatively low concentration levels in the Italian market.

In addition to the factors traditionally considered when investigating the determinants of price-cost margins, we shall allow for the possibility that the retailers' bargaining power vis-à-vis manufacturers affects their profit margins. Anecdotal evidence for the Italian grocery retailing¹ indicates that the large

¹This emerged from discussion with experts of consumer markets and grocery trade at ACNielsen and from articles in the general and specialist press.

and centrally managed retail organisations conduct their bargaining directly with their suppliers over quantity traded and/or price levels. To reflect this type of vertical interaction our empirical analysis allows for the possibility of a bargaining process, rather than assuming arm's length pricing between vertically related industries. The empirical evidence leads us to conclude that the Italian grocery trade is moving towards the adoption of the practices observed in the US and Northern European distribution systems.

No systematic analysis of pricing patterns in the Italian grocery retailing has previously been carried out, due to the limited availability of detailed pricing information in the public domain. This work relies on detailed information on the retail prices disaggregated by retailer type and product level, based on scanner data collected on a regular basis by ACNielsen Italy. The availability of such detailed information allows us to provide evidence about some of the predictions in recent theoretical contributions on countervailing power (von Ungern-Sternberg, 1996, and Dobson and Waterson, 1997).

The data set used contains information about structural and behavioural features of 6 types of retailers from large, centralised multiples to small, independent shops. It covers 36 product markets for 19 time periods from 1989 to 1992. Panel data estimation techniques are used to account for the effects of retailer and product specific unobservable factors and to address dynamic pricing issues.

The structure of the paper is as follows: section 2 contains a brief description of Italian grocery trade, section 3 presents the related literature and the hypotheses underlying the estimating equation. Section 4 discusses the data and the estimation method while section 5 contains a discussion of results. Section 6 concludes.

2. The Italian grocery trade in the European context

The Italian grocery trade has been traditionally characterised by a large number of small and medium-sized independent shops. In 1995 a food store served on average 500 inhabitants in Italy and Spain, compared with about 1000 in Germany and 1700 in France and the UK. In 1997 Italy had 150 000 independent food retail outlets, three times as many as Germany and ten times as many as France and the UK. The number of independent outlets had halved by 2001, so that Italy now has about twice as many outlets as Germany and five times as many as France and the UK. Independent retailers represented about 45% of the market in terms of revenue share in 1997, a much lower share than in 1990 when they represented one third of the market (see Euromonitor, 1992–2003).

Although not as dominant as in Northern European countries, in Italy the centralised retailing organisations (comprising large chains, voluntary unions, and buying groups) supplied about 50% of the market in 1996, which represents a substantial increase from the 25% share of 1990 sales. Over the same period the market share of food sales in hypermarkets also doubled from 6% to 13%.

The number of hypermarkets in France, Germany, and the UK was 1000 or more in 1996, while Italy and Spain only had about 250. Their market share ranges from 35% in France and the UK to 25% in Germany. The substantial growth in large retail organisations in recent years seems to indicate that the Italian market might be moving towards the Northern European system. The evolution of the Italian grocery trade during the 1990s was characterised by the emerging role of large multiples, of voluntary and buying groups. While in 1989 their joint market share was about 30% by 1993 it had increased to 55%, with buying groups doubling their market share from 12% to 25%. This increased concentration on the buyers' side of the market is likely to have been reflected in an increased retailer bargaining power, affecting the profitability of the largest retail organisations.

Despite the evidence of a modernisation process taking place in the Italian grocery retailing system, little is known about the impact of the changes on the pricing policies of different retailing organisations and in particular about the impact of the increase in buyer power of centralised organisations and voluntary groups. This work aims to provide evidence of the effect of seller and buyer power on food retailers' margins, over a period of 3 years at the beginning of the modernisation process in the Italian retailing system.

3. Price-cost margins and bargaining power in the literature

The main determinants of firms' price-cost margins have been identified in the industrial organisation literature and used extensively as theoretical reference in empirical work (for a survey, see Martin, 1993). Few attempts have been made to include the effects of vertical relationships on profitability (see Waterson, 1980, as an exception).

Traditional models of successive monopoly or oligopoly assume arm's length pricing between vertically related industries, ignoring the potential effects of buyers' power. In standard oligopoly models with conjectural variations a firm's price-cost margin (Waterson, 1980) depends on the firm's market share in the relevant market (which should capture the firms' power as a seller), on a measure of implicit collusion at the industry level (traditionally represented by a concentration measure), and on the industry-level price elasticity of demand. This specification implicitly assumes arm's length pricing between vertical levels by assuming that the input price is exogenous to the firm.² Recent contributions have analysed, from a theoretical standpoint, the outcomes of bargaining processes between the manufacturing and the retailing stage (von Ungern-Sternberg, 1996, and Dobson and Waterson, 1997), but empirical studies of industry profitability tend to ignore the vertical dimension.

Bilateral oligopoly models, on the other hand, have been used extensively

²Even when different vertical stages are considered the equilibrium value of price-cost margins in a successive oligopoly model at each stage is identical to the outcome of the standard oligopoly model with conjectural variation, if the assumption of arm's length pricing is maintained (Waterson, 1980).

in the trade union literature to model the bargaining activity by unions aimed at extracting firms' rents, generated in the final market (see Pencavel, 1991, and Booth, 1995, for recent surveys). When analysing the interactions between manufacturers and retailers we are dealing with a similar situation of bilateral power. In the case of retailing both players maximise profit functions (rather than the wage rate or the wage bill, as in the labour market) and bargain over the conditions of supply of an intermediate product (which is physically the same as the final product rather than the supply of labour). However, the main features of the bargaining process in retailing can be modelled in a similar fashion to the union-firm bargaining.

Two main models have been adopted for empirical purposes in the trade union literature to represent vertical bargaining: the *right-to-manage* or price-only bargaining, where the transfer price for the goods traded (labour input) does not depend on the quantities exchanged (employment level), and the *efficient bargaining* model, leading to an equilibrium solution along a contract curve as a result of bargaining over both price (wage rate) and quantity (employment level). Differently from price-only bargaining, this approach to bargaining potentially generates agreements on quantity discounts (side payments), which create incentives for the players to maximise their joint pay-offs (efficient bargaining).

If the transfer price between vertically related industries is determined through Nash bargaining, it is possible to show that the relative bargaining power of the upstream level firm affects the equilibrium value of the price-cost margin obtained downstream. Several theoretical contributions on these issues have been provided in the trade-union literature (see Horn and Wolisnki, 1988a and 1988b; Dowrick, 1990a, and Naylor, 2002, for examples of union-firm bargaining); however, the theoretical model developed by Svejnar (1986) represents the main reference for empirical work on efficient bargaining because it generates testable predictions about the effect on bargaining power (and its determinants) on the wage share out of total revenue.

In the industrial organisation literature two recent theoretical contributions (Dobson and Waterson, 1997, and von Ungern-Sternberg, 1996) have focussed on the relationship between manufacturers and retailers, and have developed equilibrium solutions for models of sequential bargaining between a monopolist supplier and an oligopolistic group of retailers. Dobson and Waterson (1997) assume quantity setting retailers, while von Ungern-Sternberg (1996) assumes price competition at the downstream level. Due to the complexity of the vertical relationships analysed these models rely on linear demand functions in order to generate equilibrium outcomes.

In both cases the vertical bargaining activity involves prices only (similarly to the right-to-manage models of the trade union literature). Based on these theoretical premises Dobson and Waterson (1997) identify a link between the players' relative bargaining power and final consumer prices, while von Ungern-Sternberg (1996) highlights the role of the degree of differentiation and the number of firms at the downstream level as determinants of retail prices.

These theoretical contributions provide useful guidance for the interpretation of the empirical results discussed in the next section.

In this work the role of bargaining power will be explicitly included in the analysis; however, the aim of the work is not to identify the exact nature of the bargaining process, but rather to provide evidence about the main determinants of retailers' price-cost margins or revenue share, of which the retailers' bargaining power is only one element. We will refer to the established results from the industrial organisation and trade union literature for predictions about the effect of horizontal and vertical factors on downstream price-cost margins.

Based on these theoretical contributions our empirical analysis will therefore consider both variables relating to the nature of horizontal competition and variables reflecting the nature of bargaining activity. This approach will allow us to discriminate between the retail organisations whose profitability reflects the outcome of their vertical bargaining activity and those whose profits are mainly driven by the nature of horizontal market competition. Furthermore the nature of inter-firm rivalry at the downstream level will be analysed in a dynamic context in order to identify organisations which can be considered as potential price leaders for the whole industry.

4. Data and estimation method

The empirical analysis of the Italian grocery trade relies on bimonthly retail data supplied by the marketing company ACNielsen. This type of information, even at this rather high level of aggregation, is not generally available for academic purposes, since it is obtained from highly disaggregated scanner data which are collected for use by private companies for commercial purposes. Another advantage of using these data is that they are observed on a regular basis and are processed according to the same criteria, unlike most of the Italian data on distribution, even when published by official sources.

Six types of retail organisations are considered: large chains, buying groups, voluntary unions, large independents, other independents, specialist shops, covering a period of three years from October–November 1989 to October–November 1992.

The choice of the product classes considered in this work has been determined by the availability of data on input prices.³ Of the 36 products considered 31 are food products and 5 are detergents/toiletries. Even though this group of products does not cover the whole range of products traded by retailers, they are a representative sample of the bundle of goods commonly purchased by an average Italian household (see list in the appendix). For 6 out of the 36 product classes some initial observations are missing, leaving us with an unbalanced panel of 651 observations.

³Data on producer prices of 43 food and detergent products are collected and published in the form of a price index by the Italian Association of Chambers of Commerce, on a monthly basis since 1989. We converted these monthly data into bimonthly observations with common base year 1990 = 100, to make them consistent with the retail price data. The retail price data, on the other hand, were converted into price indices with the same base year.

Six separate equations have been estimated, one for each type of organisation to allow for inter-firm variability in the estimated coefficients. The role of rival firms' pricing decision is accounted for by including in each equation lagged values of rival firms' prices for each individual product.

Our main estimating equation aims to explain profitability at the retailing level by referring to the manufacturers' share of total revenues. Following the theoretical predictions of the industrial organisation and the trade union literature we can identify two main sets of determinants of retailers' profitability: product market conditions and bargaining power; both sets of determinants are present in Svejnar's (1986) wage share equation. Although some determinants are relevant both to the labour market and to the final product market other variables included in our analysis are specific to the retailing trade. In the presence of bargaining activity the retailers' price-cost margin depends on the retailer's market share, the degree of horizontal collusion, the degree of product differentiation, demand elasticity, and on the relative bargaining power of retailers vis-à-vis manufacturers, as a result of vertical links.

Therefore, our estimating equation can be defined as follows:

$$\frac{p_{jt}^*}{p_{ijt}} = b_{0j} + b_1\beta_{jt} + b_2\alpha_{jt} + b_3k_{jt} + b_4s_{ijt} + b_5iW_{ijt} + \varepsilon_{ijt}, \quad (1)$$

where all the variables are expressed as logarithms.

In this equation j identifies the product traded between vertically related firms and sold to final consumers ($j = 1, \dots, 63$); i , a generic retailing organisation ($i = 1, \dots, 6$), and t , the time period ($t = 1, \dots, 10$). The dependent variable is obtained as the ratio of p_{jt}^* (manufacturing prices) and p_{ijt} (retail level prices), and can be interpreted as the manufacturers' share out of total revenue. The size of the dependent variable in our estimating equation is affected by the fact that the price in the denominator results from the mark-ups charged by both wholesalers and retailers. We therefore expect that our results will underestimate the effects of the explanatory variables in (1), compared to the estimates which would be obtained if the price ratio could be defined using information about the size of the wholesalers' mark-up.

Since this information is not available for our analysis, we have tried to capture its effect by including among the regressors the proportion of the bi-monthly purchases which retailers made directly from manufacturers (W_{ij}) as a proxy for the wholesalers' mark-up. Our expectation is that the wholesalers' mark-up will be higher on those products a high proportion of which is obtained directly from manufacturers and therefore a low proportion is bought through wholesalers. This leads us to predict a negative effect of this variable on the dependent variable.

β_j identifies the manufacturers' relative bargaining power in product market j , α_j is a measure of downstream collusion, s_{ij} is the market share of retailer i in product market j . A measure of market-level final price-elasticity is not explicitly included in (1) because this elasticity is assumed to be time-invariant over the period considered in this work (three years maximum), and

therefore its effect will be captured by the market-specific terms (b_{0j}).

Since it is not possible to obtain a direct measure of the manufacturers' bargaining power (β_j), in the estimating equation this variable will be replaced by those exogenous factors, such as industry-level concentration indexes, which are likely to affect the bargaining environment, using a similar approach to Svejnar's (1986). We proxy the manufacturers' bargaining power by a concentration measure for the relevant product market. The Herfindahl index of manufacturers' concentration (LHU) was constructed using data on the number of units and level of employment by class of employment.⁴

A 3-firm manufacturers' concentration ratio was also available for most of the product markets considered in this work and could have been used as an alternative to the Herfindahl measure,⁵ but this measure of concentration has been criticised (Davies, 1984).

This type of measure does not work well in empirical analyses of price-cost margins⁶ and in our empirical work was always outperformed by the Herfindahl index. On the basis of the theoretical predictions of the bargaining models discussed in section 3 we expect to observe a positive effect of the level of upstream concentration on the manufacturers' share of total revenues, given that this variable should reflect the manufacturers' relative bargaining power.

A measure of concentration in the grocery retailing sector (LHD) was obtained by constructing a Herfindahl index of concentration based on the squared value of the market shares, by product type, for the 6 types of organisation considered in the work. The level of downstream concentration should play an important role on the determination of the transfer price (p_{jt}^*) between vertical stages, given that it should reflect the retailers' bargaining power and should therefore have a negative effect on the dependent variable. If this is the case, the expected effect of an increase in downstream concentration should be a reduction of transfer price, with a negative impact on the dependent variable. However, the net effect of the concentration measure on the dependent variable will depend on how much of the reduction in transfer price is passed on to consumers as a reduction in final retail prices as a result of the nature of competition at the downstream level.

Among the variables which can affect the bargaining position of the retailers vis-à-vis the manufacturers we also considered the share of each organisation out of the total purchases in the grocery retailing sector, since we expect that any discounts granted to specific retailers are likely to be proportional to the

⁴Source: Eurostat's Industrial Yearbook, various issues. The data on employment by employment class are organised according to the NACE classification at the 3-digit level of aggregation and exclude firms with less than 20 employees. This implies that our Herfindahl measure is likely to be biased upwards (Waterson, 1980).

⁵Market shares for most of the product classes in 1988–1990 in Italy have been obtained from Euromonitor publications; Nielsen provided data on market shares for the years 1991–1993.

⁶As shown for instance in Nickell and Metcalf (1978), where it is also shown that the correlation between the Herfindahl index and the 5-firm concentration ratio, commonly used to measure concentration in previous price-cost margins studies, is quite low. See also Sleuwagen and Dehandschutter (1986) for a more general discussion.

amounts purchased as a proportion of the manufacturers' total sales to the retailing sector.

The individual market share of different retailers included in (1) may also capture relevant aspects of the nature of horizontal competition. While one would expect that an increase in market share by increasing the seller's power would lead to an increase in final prices, in the presence of bargaining activity this outcome might be reversed.

As suggested by von Ungern-Sternberg (1996), a decrease in the number of retailers, allowing for an increase in the remaining firms' market share, might generate a more intense price competition between retailers, especially when the market is characterised by the presence of larger retailers who are able to obtain lower transfer prices and who tend to charge lower prices. A similar effect would also be observed in the presence of high levels of concentration at the downstream level. The overall effect of downstream concentration on the manufacturers' share of total revenue will therefore depend on whether the bargaining power effect (inducing a reduction in transfer prices) will dominate the horizontal competition effect (leading to a reduction in final prices).

To provide a more complete insight into the horizontal dimension of price competition, we tried to account for strategic interactions across retailers by including in each equation lagged values of the prices of rival retailing organisations.

Dobson and Waterson (1997) highlight the importance of the degree of differentiation amongst retailers as a determinant of final prices, in the presence of vertical bargaining. Indeed, their model of bilateral oligopoly predicts a positive relationship between final retail prices and the degree of differentiation between retailers, for any given number of retailers.

We have tried to account for the fact that different types of retail organisation offer different services to consumers (e.g., range of brands, variety of products, type of display, check-out systems, parking space, attention to the individual customer, etc.) by including in the analysis a series of variables relating to the number and size of shops belonging to each organisation. For the six organisations analysed we can observe the total number of shops for each organisation and the number of small ($< 200 \text{ m}^2$), medium, and large shops ($> 400 \text{ m}^2$) belonging to each retail organisation.

Organisations characterised by a high number of small shops are likely to be conveniently located with respect to consumers' location and to be able to offer a more personal *high quality* service, while organisations dominated by larger shops are likely to provide a better range of products, parking facilities, etc. In general, one would expect that in organisations with many small-sized shops the degree of differentiation would be low and that consumers would consider the different small shops as highly substitutable. However, it is also possible to observe high levels of loyalty amongst the customers of the small shops which provide personal attention to the customer, more difficult to offer in large retailing outlets.

In the light of these consideration our prediction, in terms of service dif-

ferentiation, would be that lower levels of final prices are more likely to be observed in organisations with large shops characterised by lower levels of customer loyalty. However, we are aware that the variables used to measure the retailers' differentiation provide only an indirect measure of this concept and therefore they are not appropriate to estimate the direction of the effect predicted by Dobson and Waterson (1997). Their inclusion in the analysis mainly aims to avoid a potential omitted variables bias in the estimation.

Finally, as measures of the cyclical activity we considered alternatively quarterly data on the unemployment rate, the index of industrial production, and the growth rate of total real consumer expenditure. An attempt was also made to consider the fact that large selling areas imply a more efficient use of resources and therefore the proportion of "modern" types of shops (large selling area, free service, equipped with scanners, etc.) was included among the explanatory variables. The cost associated with holding the stock of goods supplied to final consumers has been measured by using the stock level held in each period and an index of the number of months required to eliminate the stock.

The non-random nature of the sample used in this work led us to assume fixed individual (product-specific) effects.⁷ In our model consistency will be defined in terms of the time dimension, given that we consider the number of markets to be logically limited.

Equation (1) was estimated in first differences for all retailers. The first difference transformation is commonly adopted in the empirical literature following Anderson and Hsiao (1982), to reduce the number of estimated parameters in a fixed effect model, although it introduces an MA(1) error process.

The instrumental variables estimation method was adopted, accounting for the potential endogeneity of the market share variable. The instruments used were the number of shops belonging to the retailing organisation and the proportion of branded to own label goods sold, since these variables are determined as the result of long term decisions on outlet expansion and own label product development which are not affected by short term decisions about the level of price or margins and can therefore be considered as exogenous.

The validity of the instruments was evaluated on the basis of the Sargan statistic. The 2-step estimator was used for all the regression equations, in order to obtain efficient estimates in the presence of heteroskedasticity. The specialist shop equation was estimated by OLS, due to the lack of significance of the market share variable.

A summary of the estimated coefficients and their significance level for each type of retail organisation is provided in table 1. In all cases there is no evidence of dynamic misspecification, according to the AR(2) statistic for second order serial correlation (see Arellano and Bond, 1991) and to the Sargan test,⁸ a test

⁷The choice of this specification is also justified by potential correlation between the regressors and the error term, given that some explanatory variables might be endogenous. On this issue, see Hsiao, 1986, pp. 43–45.

⁸The Sargan test is distributed as a χ^2 , with $p - k$ degrees of freedom, where p is the number of instruments and k is the number of regressors.

Table 1. Summary of regression results (2-step estimates)

Dependent variable is ΔLPR						
Variable	Large chains	Buying groups	Voluntary unions	Large independ.	Other independ.	Specialist shops
ΔLHU	0.02 (3.1)	-	-	-	-	-
ΔLHD	-	0.036 (4.2)	0.02 (2.9)	0.01 (2.3)	0.013 (1.93)	-
ΔLSV	0.18 (3.5)	-0.06 (-4.1)	-0.09 (-1.8)	-0.15 (-20.3)	-0.11 (-2.7)	-
ΔGRC	-0.007 (-3.5)	-	-	-	-0.005 (-1.8)	-0.015 (-2.0)
$\Delta STKI$	-	-0.014 (-3.6)	-	-0.04 (-14.8)	-0.01 (-1.8)	-
$\Delta LSPU$	-0.13	- (-3.6)	0.088	0.12 (-14.8)	0.06 (-1.8)	-
$\Delta LPLC (-1)$	-	-0.062 (-2.1)	0.09 (2.0)	-	-	-
$\Delta LPBG (-1)$	-0.08 (-2.0)	-	-	-0.1 (-2.8)	-0.11 (-3.11)	-
$\Delta LPVU (-1)$	-0.1 (-5.4)	-	-	-	-	-
$\Delta LPLI (-1)$	-	-0.063 (-2.0)	-0.2 (-2.4)	-	0.018 (3.8)	-0.2 (-2.4)
$\Delta LPOI (-1)$	-	-	-	-	-	-
$\Delta LPSS(-1)$	-	-	-	-	-	-
Diagnostic statistics						
AR(2) [$n = 36$]	0.62	0.402	-1.78	0.623	-0.162	0.941
Wald test joint significance	988.54 (d.f.= 12)	33.81 (d.f.= 5)	86.45 (d.f.= 8)	1586.3 (d.f.= 9)	58.76 (d.f.= 7)	6.38 (d.f.= 5)
Sargan test (d.f.= 16)	18.14	20.22	20.61	19.68	15.5	-
Number of observations	615	615	615	615	615	615

t -statistics in parenthesis, based on heteroskedasticity robust standard errors.

(-) variable not included in the preferred specification because insignificant (at the 10% significance level).

AR(2) test for second order autocorrelation is asymptotically distributed as standard Normal (see Arellano and Bond, 1991).

The Sargan test is distributed as a χ^2 with $p - k$ degrees of freedom, where p is the number of instruments and k is the number of regressors.

of overidentifying restrictions.

Given the choice of first difference specification all the variables included in the regression equations measure the rate of change in the original variables, and given the logarithmic transformations the estimated coefficients can be interpreted as elasticities.

5. Discussion of results

As far as the theoretical predictions of section 3 are concerned, in the large chains equation can we identify a significant effect of manufacturers' concentration (LHU) on retailers' price-cost margins, a result which seems to provide support for the hypothesis of bargaining activity. For all the other retailers, excluding specialist shops, both downstream concentration (LHD) and market shares (LSV) have a significant effect on price-cost margins, but upstream concentration (LHU) does not. This result is consistent with the fact that most of the Italian grocery retailers are not (yet) sufficiently powerful to be able to engage directly in bargaining activities with the food manufacturers. Apart from large chains, the prevailing form of vertical interaction seems to be characterised by arm's length pricing and the retail margins mostly driven by the nature of horizontal competition.

For all the types of retail organisation, with the exception of large chains, the impact of increases in market share (LSV) on final price is negative, while the effect of downstream concentration level (LHD) is positive. This might reflect the fact that increases in individual organisations' market shares are reflected in higher final prices as a result of increased sellers' power. On the other hand, an increase in industry concentration levels might lead to a situation of more intense price competition between larger retailers who are able to obtain lower transfer prices from manufacturers and tend to charge lower prices, as suggested by von Ungern-Sternberg (1996) when discussing the relationship between vertical bargaining and horizontal competition.

The estimated coefficients associated with the share of purchases (LSPU) differ in sign between large chains and the other types of retailers (voluntary unions and independent shops). Only for large chains does an increase in the share of total purchases generate a decrease in the manufacturers' share of revenues, while for all the other types of retailers the opposite result is observed. This result can be considered as indirect evidence of the ability of large chains to obtain more favourable terms from manufacturers when they increase the volumes purchased (quantity discounts).

For buying groups and both types of independent shops an increase in the time required to deplete the existing stock significantly affects the price-cost margin. This result can be interpreted as a higher retail price being charged for those products which have low turnover and therefore imply higher cost of stock management. For large chains, other independent, and specialist shops we observe a pro-cyclical behaviour of retail prices, although in the case of other independents a period of about two months is required for prices to adjust to

cyclical variations in consumption. The specialist shops' performance appears to be driven mainly by cyclical factors, such as the growth rate of consumption, and competitive factors, such as the prices charged by independent shops.

None of the variables used to capture the effects of product/service differentiation across retailers (number of shops, average size of the shops, number of modern shops) turned out to be significant for any retail organisation. However, we are aware that these variables are only imperfect measures of the differences in service quality across retailers.

When we look at the effect of rival's pricing behaviour on each retailer organisation's pricing behaviour our results indicate that large chains, buying groups, and voluntary unions seem to engage in horizontal strategic interaction through prices. Indeed, past changes in retail prices by buying groups and voluntary unions generate variations in the same direction in large chains' prices. Also, changes in prices by large chains and independent retailers generate changes in buying groups' price in the same direction. The asymmetric nature of the reaction to price changes between large chains and voluntary unions seems to indicate an attempt by voluntary unions to avoid direct competition over prices with large chains, possibly by providing a different type of in-store service.

To sum up, our results seem to reveal some form of interdependence in pricing decisions among the large and centralised retailers, and symmetry in the price changes of most retail organisations. Large independents' prices significantly affect all the rivals' prices, with the exception of large chains. Only changes in buying groups' prices are relevant for large independents' pricing decisions. These empirical results do not allow us to identify a clear price leader in the market, although large independents seem to play a relevant role in the pricing behaviour of most rival retailers.

Finally, to allow for the possibility that the slope parameters are not constant across markets, some of the explanatory variables have been interacted with product market dummies in order to capture effects that are specific to particular product markets. For instance, we have tried to account for the fact that own label products might be relevant only in some of the markets considered. This was achieved by multiplying the market-specific dummies by the share of branded goods to total goods supplied in each type of organisation and also in the whole distribution system. However, none of the multiplicative terms included in the regression equation turned out to be significant.

6. Conclusions

We analyse the determinants of grocery retailers' profitability using data on six Italian grocery retail organisations over the period 1989–1992, taking into account both horizontal and vertical factors. The purpose of the analysis was to identify the main determinants of grocery retailers' price-cost margins, including the nature of horizontal competition between retailers and the effect of vertical pricing arrangements with suppliers.

One of the most interesting and original results of the empirical work is the identification of a significant effect of the structure of the manufacturing sector on the profitability of large chains. Although alternative explanations are possible, this result seems to be consistent with the recent theory of countervailing power, which identifies a potential role for manufacturers' bargaining power in the determination of retailers' profitability.

Our evidence is consistent with bargaining activity between large grocery retail chains and food manufacturers. This leads us to conclude that the assumption of parametric transfer price (arm's length pricing) is inappropriate for the analysis of profitability in some vertically related markets. This result can be interpreted as an indication that the Italian grocery trade is moving towards those forms of vertical relationship which have been observed in less traditional distribution systems (such as the US and Northern Europe). It might even be an indication that in the future large chains will be able to acquire a dominant role to the detriment of more traditional forms of retailing, due to their preferential supply conditions.

We were also able to identify some pattern of price interactions across different retailers. Our results indicate a potential role of price leaders for large independents, since variations in their prices affect the pricing decision of all the rival retailers except for large chains. Furthermore the pricing decisions of large chains, voluntary unions, and buying groups appear to be highly interdependent and symmetric. However, a more detailed analysis of causality issues, which is beyond the scope of this work, would be required to identify situations of interdependence or price leadership in more precise terms.

Although our empirical analysis covers only a limited period of time it seems to be consistent not only with related theoretical contributions but also with retail analysts' view about the current state of vertical relations in the Italian grocery trade. However, access to more extensive time series, covering several years, would allow us to find more evidence on the change over time in the relative bargaining power of retailers.

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Appendix

List of variables appearing in the estimating equation

(All the variables are in first differences)

Dependent variable:

LPR: logarithm of the ratio of manufacturers' to retailers' price.

Explanatory variables:

LHU: logarithm of the Herfindahl index of concentration at the upstream level (manufacturing).

LHD: logarithm of the Herfindahl index of concentration at the downstream level (retailing).

LSV: logarithm of the market share in value in each product market for each type of organisation.

GRC: growth rate of total consumption.

STKI: index of stock, indicating how many months are required to eliminate the current stock in each type of organisation.

LSPU: logarithm of the share of total purchases (all retailers) made by each type of organisation.

LP*: logarithm of the retailers' price charged by retailer *, where * stands for large chains (**LC**), buying groups (**BG**), voluntary unions (**VU**), large independent (**LI**), other independent (**OI**), specialist shop (**SS**), respectively.

List of product classes		
1) durum wheat pasta	13) gorgonzola cheese	25) grocery coffee
2) biscuits	14) stracchino cheese	26) canned tomatoes
3) rice (packets)	15) mozzarella	27) canned peas and beans
4) canned meat	16) vegetable oil	28) frozen vegetables
5) stock cubes	17) olive oil	29) frozen fish
6) Parma ham	18) virgin olive oil	30) jams and preserves
7) salami	19) butter	31) canned tuna
8) mortadella	20) margarine	32) laundry detergent
9) UHT milk	21) mineral water	33) washing-up liquid
10) yoghurt	22) fruit juices	34) toothpaste
11) parmesan cheese	23) table wine	35) soap
12) provolone cheese	24) beer	36) nappies

