Retail price levels and concentration of wholesalers, retailers, and hypermarkets [*]

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Abstract

This paper examines retail grocery price levels with a very large (unbalanced) panel of stores that operate in well-defined local markets. We explain price variation across grocery retailers by the concentration of wholesalers and retailers, and the market share of hypermarkets (and control for a number of store and region specific factors). Our most important result is that concentration at the wholesale level is an important determinant of retail prices. The price effect of retail concentration and hypermarket market share are statistically significant but small in economic terms.

Keywords: Firm concentration, market structure, price competition, grocery retail, grocery wholesale.
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1. Introduction

Can differences in food prices across stores, regions and countries be solely attributed to costs or does market power in different stages of the distribution play a role? If market power matters, are the effects quantitatively important? We examine these issues using a rich data set with prices from a large number of stores in local Swedish grocery markets.

Oligopoly theories typically predict a negative relation between firm concentration and the intensity of competition. A number of studies estimate the relation between market structure and prices (or price indexes) for different regional markets within the same industry, (driving lessons, Asplund and Sandin, 1999; credit, Berger and Hannan, 1989; gasoline, Borenstein and Shepard, 1996; beer, Culbertson and Bradford, 1991; Weiss, 1989, surveys early studies).[1] Several studies find a positive relation between firm concentration and price levels but a number of issues remain which can be exemplified with food retailing. First, in a large town all firms do not compete with each other (market definition). Second, retailers in a regional market are not only spatially differentiated but also differ in terms of service and product range (firm asymmetries). Finally, the retail price level will also be influenced by input costs, which are partly determined by the intensity of competition among wholesalers (up-stream competition). More generally, industry characteristics (such as the extent of entry barriers, scale economies and product differentiation) and the fine details of short run competition that determine the potential for implicit collusion (sequencing of moves and detection lags) imply that results from one industry can not be directly applied to another.

Food is a principal component of household expenditures and food prices are therefore interesting in their own right. Food retailing is also attractive to study the relation between prices and market structure, as there is substantial regional variation in explanatory variables - from small single store locations to large towns. Our study differs in most respects from previous attempts to study competition in food retailing. First, our price information contains prices of individual products that are available at essentially each food retail store in the country. Of roughly 8500 stores in Sweden there is price information from approximately 1000 stores on four occasions - a vastly greater sample than previous studies. Second, we

[1] Today it is widely acknowledged that industry concentration and profitability are at best only weakly correlated; for a survey see Schmalensee (1989). Two of the primary explanations for the failure to find significant effects are that industry classifications rarely correspond to markets where the included firms compete, and that profitability measures are distorted in a variety of ways (such as accounting practices, aggregation of different lines of businesses).

have access to store specific information (e.g. revenue, wholesaler, store type) from every store. Third, detailed information on location allows us to define a large number of regional retail markets (close to 1400). These, in turn, can be aggregated to reflect the markets where wholesalers compete. Together, this permits a close examination of the price effects of firm concentration at the retail and at the wholesale level, as well as hypermarket presence. We find that concentration at the wholesale level contributes to price variation and that the magnitude of the price effect is substantial. Our results show that there is statistically significant positive relation between prices and retail concentration, but in economic terms the effects are small. We examine the competitive influence of presence of hypermarkets within the market and find evidence of a small, general negative price effect.

To our knowledge this study is the first econometric analysis of price levels and competition on European food markets.[2] There have been some studies examining US data; Cotterill (1993) provides a survey. Most closely related to ours are studies that make use of variation in prices across regional markets. In almost every case the number of observations is severely limited, price indexes rather than actual prices are used, and market definitions are broad. Some examples are illustrative of the problems and results. An often-cited study by Cotterill (1986) uses a cross-section of prices of a product basket from 35 supermarkets in rural Vermont. He finds that prices are higher in markets where supermarket concentration is high. Newmark (1990) questions the validity of the then existing literature on the grounds that it had not controlled for regional differences in income and used small non-random samples. Controlling for income, and with data on the price of a basket of goods in 14 cities across the US and 13 cities in Florida, he does not find any correlation between concentration and price levels. Claycombe and Mahan (1993) regress a price index of beef to market structure and also find little in terms of correlation. Marion (1998) relates the rate of change in a price index from 15 U.S. metropolitan areas to the presence of warehouses, and finds lower price increases where their market shares are increasing.

The next section provides a detailed description of the data and the markets where wholesalers and retailers operate. Section 3 discusses the econometric procedures to correct for sample selection bias. Section 4 gives the econometric results and their economic significance. The final section concludes.

[2] Gripsrud (1982) and Giuletti and Waterson (1997) examine differences in pricing policy for different types of food products using indexes of product groups on Norwegian and Italian data respectively.

2. Market and data

We study prices across grocery retailers in Sweden over the period 1993-1997. Table 1 details the variable definitions and the data sources. The store specific data contains yearly (1993-97) observations on a number of variables for all Swedish food retailers. Altogether there are 8360 retailers that were active at least in one of the years. The information contains revenue, sales space, store type (for example, hypermarket, supermarket, grocery, convenience store), and primary wholesaler as well as the exact address (location, street address, postal code, postal area, municipality, region, and county). The identity of a store is based on its address; a change in e.g. name or wholesaler does not alter the identity. The geographical variables are used to define markets. Our most narrowly defined market is the postal area (in total 1396) where, in most cases, it is reasonable to believe that all retailers are closely located.[3] It is most likely that wholesalers compete in markets larger than the postal area and municipal. We use the county (24) as a rough approximation of their markets. In 1996, the three largest wholesalers ICA, KF and DAGAB had 28, 13 and 40 regional distribution centers, respectively. The distribution centers correspond roughly to the counties we use as the market definition for wholesalers. We have also experimented with the region (70) as delineating market boundaries.

No general information is available at the postal area level except the number of households for all but the smallest postal areas. The municipal (288) is the standard area classification in Sweden, and the most disaggregated for which income and population statistics are available. Each municipal is classified according to a type (e.g. large town, suburb, farm area, and rural area). Since we lack information on cost differences at the municipal level the type will proxy for these. Wages exhibit very little variation across Swedish regions. Of greater importance is variation in the cost of floor space for which we only have a crude proxy measured at the county level. In large markets there will be great unobservable variation in costs of floor space (prime location versus outskirts).

Table 1 about here

[3] All previous studies (with the exception of Cotterill, 1986) have, as far as we know, used market definitions far greater than ours (for instance U.S. metropolitan areas in Binkley and Connor, 1998, Marion, 1998 and Newmark, 1990).

We use store level prices of individual products.[4] The Pensioners' National Organization (Pensionärernas Riksorganisation, PRO) gave us access to their price survey forms. Its surveys of food prices cover approximately 1000 stores across the country and are conducted by the members twice annually (during one week) since 1993. The participating members (several hundreds in 1996) are supposed to gather price information in the store where they regularly shop and, if possible, in some nearby stores. Hence, the stores are a non-random sample with only a handful of price observations from convenience stores and other small stores. We selected the surveys for 1993 (fall), 1995 (fall), 1996 (spring) and 1997 (fall).[5] In total, prices of roughly thirty well-defined products (brand and quantity) are collected on location and the store manager signs the form to confirm its accurateness. We selected five products; washing-up detergent (Yes, 0.5 liter), castor sugar (2kg, no specific brand), crisp bread (Wasa Husman, 500g), spread (Kalles Kaviar, 190g), and cocoa (Fazer, 200g). Our choice of products was motivated by a desire to have products with different characteristics (washing-up detergent: multinational producer, sugar: high transport costs, bread: agricultural product, fish roe spread: uniquely Swedish, cocoa: fluctuating world market price) with a unique brand (except sugar) that were included in each survey.[6] From these a price index for each store is constructed, denoted PRICE. In addition, for 1995 and 1996 we have information on butter (Bregott, 300g) and soap (Lux or Palmolive, three pack). For comparison we report regressions with the prices of the individual products as dependent variables. The recorded price of a product is the normal price; occasional sales prices are ignored. For our purpose this has an advantage since with only a handful of wholesalers and a small basket of products a promotion campaign from a wholesaler on one product could seriously distort our index.

Even though the range of products in a typical grocery store is very large we argue that our small basket provides a reasonable representation (except that we have no prices of produce and meat). The first check is to study the correlation between PRICE for stores included in two adjacent years. The correlation coefficients are comparatively high ($\rho_{93,95} = 0.70, \rho_{95,96} = 0.85, \rho_{96,97} = 0.77$) given that no control is made for factors that might

[4] Earlier studies (e.g. Marion, 1998, Newmark, 1990) of competition in food retail have generally relied on price indexes for baskets of goods from census sources, commonly aggregated to a market average.

[5] The motivation for choosing the spring survey for 1996 was to examine the pass-through of a large reduction in VAT (from 21 to 12.5 percent in January 1996. We found that the pass-through, on average, was almost complete. Furthermore, there was only weak evidence that the price change in an individual store could be explained by market structure variables. Results are available upon request.

[6] Several of the other products were less well defined (pork chops-quality differences, soap-different producers). Others were available in different sizes (potatoes, toilet paper). To minimize the impact of such error sources we deemed it better to limit the number of products.

affect prices such as changes in wholesaler or market structure.[7] The second check is to compare our index to the price of a more comprehensive basket collected by the Swedish government consumer agency. This basket gives the price of monthly food consumption for a representative family in a given store and includes 157 items. These baskets, however, are collected at much fewer locations and are therefore used only for comparison. The correlation between their basket (for 1997) and our basket was 0.59 for the 85 stores where we have price information from both sources, which is high considering that the large basket includes occasional sales prices and store brands.

Of primary interest is if differences in the intensity of competition can help explain variation in food prices across regional markets. Finding an appropriate measure of competition intensity is a general problem in this type of study. It is widely accepted that firm concentration is of little or no use when comparing different industries (see e.g. Schmalensee, 1989 p.976). However, in studies of competition in local markets within the same industry firm concentration often proves a useful determinant of price levels (Schmalensee, 1989 p.988, Weiss, 1989). Hence, with an appropriate market definition firm concentration can serve as a proxy. We measure concentration at two levels. First, at the postal area level we use the Herfindahl index of retailers' revenue, HERF_RETAIL.[8] Clearly, HERF_RETAIL will be inversely related to the market size - in small markets there may be room for only one firm but as the market size increases there will be entry and a fall in concentration. Second, the Herfindahl index of wholesalers' revenue in the county, HERF_WHOLE, is used. The Swedish food retailing sector is dominated by three wholesale groupings; ICA, KF and DAGAB. Each of these groups has a particular structure. ICA (in 1996 there were 3155 stores with a 45 percent market share) is a cooperation of independent retailers who presently are allowed to cooperate on buying, transport and marketing.[9] Importantly, the individual retailers are by competition laws prohibited to cooperate on prices, except for occasional advertised special offers. ICA has a particularly high market share in the northern regions and municipalities in the countryside (often above 60 percent). KF (1253 stores, 25 percent market share) is a centrally coordinated group of consumer cooperatives. Finally, there are a number of chains using the wholesale dealer DAGAB. Altogether there are 2150 DAGAB stores but as these are primarily convenience stores the market share is only to 24 percent. In addition to

[7] Further testing of price correlations for individual products yields a ρ on the order of 0.5-0.7, except for cocoa where it is around 0.3.

[8] The concentration ratio (usually CR1 or CR4) is an alternative measure but less suited for markets with few firms (in our sample CR4 would be 1.0 for almost 30 percent of the markets).

these groups there are a number of independent wholesalers that in some regions make up a significant share of sales but at a national level have a joint market share of only 6 percent. In a European perspective the high wholesale or chain concentration is not unique. To exemplify, the three firm concentration ratios for Denmark, Norway, Finland, Netherlands, Switzerland, Great Britain and Germany are 66, 75, 67, 67, 40 and 50 percent, respectively (source: The Swedish Ministry of Trade and Industry, 1998, Ds 1998:72, Appendix, p.37).[10]

There is reason to believe that hypermarkets have low prices and that this may spill over to other stores in the neighborhood. Although consumers rarely travel significant distances to reach another grocery store they may do so if prices are sufficiently low or if it is attractive in some other dimension.[11] This implies that the market boundaries for hypermarkets are wider than for other grocery stores. To capture this effect we define MSHARE_HYPER to be the market share of hypermarkets in the municipality.

Table 2 presents some summary statistics corresponding to the firms for which we have information on prices. Of great concern is our definition of a market; is it sufficiently narrow?

Table 2 about here

The table suggests that for the majority of observations the postal area is a well-defined market. The median market contains nine firms, the 40:th percentile six firms and the 25:th percentile only four firms. It is reasonable to argue that in at least 40 percent of the markets firms are in direct competition, and in a quarter of the markets the competition is close. For postal areas with more than twenty firms (above the 70:th percentile) the market definition is too wide.[12] In terms of market sizes, the median postal area has approximately 7000 households and the 30:th percentile roughly 3000. Further we note that all counties are concentrated at the wholesale level (HERF_WHOLE ranges from 0.3 to 0.5).

From the table it is clear that there is considerable variation in prices across stores, albeit smaller than might have been expected. In the 10:th percentile, PRICE is roughly twelve

[9] Following the new competition laws in Sweden, effective from 1993, the cooperation of independent ICA retailers was given a temporary exemption. Currently (April 1999) this exemption is up for renewal.

[10] The numbers are not directly comparable, however, due to different market definitions (e.g. in Norway and Finland alcohol sales are excluded).

[11] Hypermarkets generally have a large product range, are located outside the town center, are reached by car and offer free parking.

[12] Gripsrud and Gronhaug (1985) reports the results from an interview survey of grocery retailers in a Norwegian town with 51 stores. The question was how many important competitors each firm perceived it had. The average was 3.2 perceived competitors. The percentages with one, two, three, four and five or more competitors were 16.3, 20.9, 16.9, 20.9, and 23.3, respectively.

percent lower than the average and in the 90:th percentile twelve percent higher.[13] The distribution of prices is approximately symmetric. Table 3 gives summary statistics (1996) for stores with a price quote, which are active in a postal area with fewer than twenty firms.

Table 3 about here

Overall, there is a negative relation between PRICE and the number of firms, but not particularly strong. The monopolies, duopolies, triopolies and quadropolies have on average three, four, three and two percent higher price than the average, respectively. Strikingly, there is substantial variation in prices for markets with a given number of firms, as evidenced by large standard errors and wide differences between minimum and maximum price. These results are not driven by outliers - means and medians are almost identical. The strong positive relation between number of firms and market size indicates that entry barriers can not be substantial - when the market size grows new firms will enter.[14]

3. Econometric specification

The stores for which we have price information is a non-randomly selected subset of all stores, which may potentially induce sample selection bias. To control for this we apply a Heckman (1979) two-stage procedure. Let PRICEDUM be a dummy variable taking the value one if there is information on PRICE from store i in year y. The specification we estimate is

$$\begin{aligned} PRICEDUM_{i,y} &= g(F^{Z}_{i,y}, M^{Z}_{m,y}) + e_{i,y} \\ PRICE_{i,y} &= f(F^{P}_{i,y}, M^{P}_{m,y}) + \varepsilon_{i,y} \quad | \; PRICEDUM_{i,y} = 1 \end{aligned} \tag{1}$$

where F is a set of variables specific to firm i (e.g. sales space, wholesaler) and M variables common to all firms operating in market m (e.g. average income, retail concentration). To

[13] In the basket (from 156 stores) collected by the Swedish Government Consumer Agency the corresponding numbers indicate that the stores in 10th and 90th percentile have 10 percent lower and 9 percent higher prices than the mean, respectively.

[14] Under the assumption that all firms within a market are symmetric, Bresnahan and Reiss (1991) argue that the relation between market size and number of firms can be used as a measure of the intensity of competition. The prediction is that there is a convex relation, such that each firm needs a larger market size to cover fixed costs. For retail grocery, where firms within a market are heterogenous (e.g. in terms of sales space), the methodology is not applicable.

help identification we include more variables in F^Z and M^Z than in F^P and M^P. The error terms e and ε are assumed to have a bivariate normal distribution. To exemplify the potential sample selection bias, consider the case where the survey primarily includes prices from high cost regions. If not accounted for it would be like an omitted variable in the PRICE regression and thereby bias the coefficients on the included variables. The Heckman procedure amounts to a first stage probit regression, where the dependent variable is whether there is a price observation from the store. The second stage is a standard OLS regression with the price as the dependent variable and the inverse Mill's ratio, obtained from the probit regression, added to the set of regressors F^P and M^P. A positive (negative) coefficient on the Mill's ratio indicates that prices are primarily from high (low) price stores. We also report regressions with PRICE in (1) replaced by prices of individual products.

A number stores appear in several price surveys. This suggests that efficiency could be gained by using the (unbalanced) panel structure of the data. We therefore also provide SUR (generalized least squares) estimates of the price regressions. Since the SUR specification requires balanced panels, we restrict the sample to data from 1995-1997 (611 observations) in order to avoid losing too many observations. The specification is

$$
\begin{aligned}
&\mathrm{PRICEDUM}_i^{SUR} = g(F_i^Z, M_m^Z) + e_i \\
&\mathrm{PRICE}_{i,1995} = f(F_{i,1995}^P, M_{m,1995}^P) + \varepsilon_{i,1995} \mid \mathrm{PRICEDUM}_i^{SUR} = 1 \\
&\mathrm{PRICE}_{i,1996} = f(F_{i,1996}^P, M_{m,1996}^P) + \varepsilon_{i,1996} \mid \mathrm{PRICEDUM}_i^{SUR} = 1 \\
&\mathrm{PRICE}_{i,1997} = f(F_{i,1997}^P, M_{m,1997}^P) + \varepsilon_{i,1997} \mid \mathrm{PRICEDUM}_i^{SUR} = 1
\end{aligned}
\qquad (2)
$$

where the dummy variable $\mathrm{PRICEDUM}^{SUR}$ takes the value one if there are price observations from the store in all years 1995-1997. We impose the restriction that all coefficients F^P and M^P, except the wholesaler dummy variables (their pricing policy may change over the years), should be the same for each year, respectively. The loss of the SUR specification is fewer observations but it might be compensated by the structure of the error terms (error terms $\varepsilon_{i,y}$ are correlated with $E(\varepsilon_{i,j}\varepsilon_{i,k})=\sigma_{i,k}I$) and cross equation restrictions on coefficients.

4. Results

Determinants of store price level[15]

The results from the probit regressions are presented in Appendix Table A3. Since there are only a handful prices from convenience and seasonal stores and gasoline stations these are excluded from all regressions. The sample selection regressions are of no independent interest to us. We therefore refrain from discussing the significance levels on individual coefficients and simply note that most are statistically significant and do not change sign over the years. Table 4 presents the estimated coefficients from price regressions. Columns 4:1-4:4 are OLS estimates for the four years, column 4:5 presents the SUR estimates for the years 1995-1997, and finally column 4:6 presents the corresponding estimates for a subsample of small markets.

Table 4 about here

We begin with a discussion of 4:1-4:4 and note first that coefficients in 4:1 are based on fewer observations and explanatory variables for 1994. The variables of key interest are HERF_RETAIL, HERF_WHOLE and MSHARE_HYPER. HERF_RETAIL is positive and significant for all years; higher retail concentration in a location increases the store's price level. The coefficients on HERF_WHOLE are positive and significant for all but the first year. As an alternative we defined HERF_WHOLE at the region rather than county level. This resulted in lower levels of significance, something that we attribute to a too narrow market delineation for wholesalers. Finally the coefficients on MSHARE_HYPER are negative and significant for all but the first year. Below we discuss the economic significance.[16]

The store specific variables contribute to explaining price variation. Large stores have lower prices as evidenced by the negative coefficients on SALESSPACE and HYPERMARKET. Together with the estimate for MSHARE_HYPER this is evidence that hypermarkets have lower prices and induce other stores to lower their prices in response. The wholesaler dummy variables WHOLE_1 and WHOLE_2 are both significant and positive. To some extent this can reflect geographical differences not captured by the included regional

[15] Table A1 and Table A2 give summary statistics (1996) for the variables included in the sample selection and price regression, respectively.

[16] In preliminary regressions we experimented with a cross product of HERF_RETAIL and HERF_WHOLE. The coefficient was not significant. Furthermore, we included the store's market share in the location but it never showed up significant.

dummy variables. For example, WHOLE_1 (ICA) is dominant in sparsely populated regions where transport costs are high. However, this effect would be weighted against low costs of sales space. The positive coefficient on WHOLE_2 (KF) can be explained by reference to the cooperative's practice of reimbursing members for a fraction (usually a few percent) of the purchases.

Regional variables are also significant and conform to our prior expectations. Stores in STOCKHOLM; probably reflecting higher costs of sales space. The coefficients on COUNTRYSIDE are likewise positive which could be due to either higher transport costs or that it captures less price competition in markets with greater distance between stores. We favor the latter explanation, as location in DISTANTREGION (where transport costs should be the highest) generally does not have any explanatory power. Prices in the Gothenburg region are lower than the rest of the country, despite that one would expect that costs of sales space is almost as high as in Stockholm. We believe that the reason is that the region's closeness to Denmark and Norway allows (at least large) stores to buy from alternative wholesalers. The variables RENT and INCOME are only occasionally positive and significant. A likely explanation is that both variables are sampled at a too aggregate level (county and municipality) and therefore do not reflect the local conditions where retailers compete. Finally, the sample selection parameter, MILLSRATIO, is positive and highly significant. This suggests that our sample consist of stores where prices are high. In other words, the pensioners tend to shop in stores in their neighborhood and have difficulties in reaching stores where prices are low (for instance, hypermarkets located in places with limited public transport). The explanatory power of the regressions are reasonably high, given that data are for cross sections of retailers and the basket of products is small.

Column 4:5 presents the results from the SUR regression (Table A3 shows the corresponding probit regression). Generally, the signs of coefficients are the same as in 4:1-4:4 and so are their levels of significance. The magnitude differs, however. This is largely attributable to the size of the constant - marginal effects are quite similar.

Column 4:6 is for a sub-sample of markets with MARKETSIZE less than 10000, corresponding to markets with roughly ten stores. Results are little affected compared to the previous columns. The main difference is the lower explanatory power. Contrary to our priors, a narrower market definition rather reduces the significance of HERF_RETAIL, whereas HERF_WHOLE remains significant at the one percent level.

Although most of the coefficients are statistically significant their economic importance differ widely. Table 5 shows the marginal effects of HERF_RETAIL and HERF_WHOLE based on the coefficients in column 4:5 and means of other variables in Table A2.

Table 5 about here

Clearly, concentration at the retail level is of virtually no importance for prices. Increasing HERF_RETAIL from 0.25 (equivalent to four firms of equal size) to 0.5 (two equal sized firms) corresponds to an increase in PRICE of less than one percent. However, a similar experiment with HERF_WHOLE by raising the wholesale concentration from 0.35 (the mean) to 0.5 would result in a price rise of more than five percent. Thus, the generally high wholesale concentration in food retailing translates into higher consumer prices.[17] Finally, the effect (not shown) of MSHARE_HYPER is small, doubling the market share of hypermarkets from 0.07 (the mean) to 0.14 results in less than one percent lower prices.

Determinants of prices of individual products

In Table 6 we use prices of all individual products for each year respectively as the dependent variables. The explanatory variables are the same as in Table 4 but we only report HERF_RETAIL, HERF_WHOLE and MSHARE_HYPERMARKET. Other coefficients are typically only marginally affected (we indicate one exception).

Table 6 about here

The pattern corresponds closely to the effects on PRICE established in Table 4. Overall HERF_WHOLE is positive and significant for most products and years (16 out of 24). To a lesser extent this also holds for HERF_RETAIL (10 are positive and significant). MSHARE_HYPER is negative but at varying levels of significance (9 are negative and significant). The price in a HYPERMARKET is again lower (14 are negative and significant). In only three cases out of 96 are the coefficients significant with the opposite sign. Explanatory power generally ranges from 0.20 to 0.35. Taken together these results point to that, qualitatively, the impact of market structure for variation in grocery prices is not very

[17] The inverse Mills ratio changes with the change in HERF_RETAIL and HERF_WHOLE. For the former the effect is negligible but for the experiment with latter it implies that the price effects are somewhat smaller than in Table 5 (for example, at HERF_RETAIL=0.32 and HERF_WHOLE=0.5 the corresponding PRICE is 104.5).

sensitive to the product characteristics. The cocoa price regressions differ the most from the pattern in Table 4 (negative HERF_RETAIL and HERF_WHOLE in several cases). As indicated in Section 2, cocoa has a volatile world market price. If store prices are set as a simple markup on wholesale price, and are not adjusted before new stock arrives, then the cocoa price in a given store will to a large extent be influenced by when it was stocked. This in contrast to the detergent (a product which can be assumed to have a relatively more stable wholesale price) price regressions, for which explanatory power is the highest. A final feature of the price regressions is that sugar is the only product for which DISTANTREGION is consistently positive and significant, revealing the importance of transport costs for bulky products.

5. Conclusions

Our examination of Swedish food markets establishes that although high concentration in local retail markets is associated with higher prices this effect is, in economic terms, negligible. Stated differently, you pay roughly the same price for groceries at a local 'monopoly' as in a randomly selected store in a large market. For a free entry (subject to fixed entry costs) market without any great advantages of incumbent stores we expect prices to be driven down by entry of new firms as soon as market size permits. The small price effects we find would thereby be attributed to the integer nature of the number of firms. This also sheds some light on why previous studies have had problems in finding any links between concentration and prices in food retailing - small effects and small samples make it difficult to find statistically significant effects.

The presence of hypermarkets exerts some downward pressure on prices. Our own prior, we believe shared by many, was that hypermarkets would have a strong competitive effect on retail food prices. The reason being that the hypermarkets take their sales from other stores that must respond, either by meeting price competition or exit the market. The results point to the latter response, as the price effects are small in economic terms. This is also supported by the long downward trend in the number of grocery stores. In future work we will address this issue more directly by examining the change in revenue for different types of existing stores as a hypermarket enters.

The by far strongest price effects were associated with concentration at the wholesale level. Entry barriers at the wholesale level (derived from distribution networks, quantity

rebates from producers, and brand recognition) are considerable. In fact, Sweden is completely dominated by three groupings and there have been no large-scale entry attempts over the last decades. Hence we expect wholesalers to have market power. Let a simple experiment illustrate how this translates into prices; decreasing the Herfindahl index of wholesale concentration in a county from 0.35 (roughly three equal sized wholesalers) to 0.25 (four equal sized wholesalers) corresponds to a fall in store price by 4.5 percent. For an average household with a consumption of SEK 5000 per month it represents SEK 2700 per annum. With two million households in Sweden it adds up to SEK 5.4 billion (ECU 675 million) - a very considerable sum.

The bottom line from this examination is then that grocery retailing is competitive but grocery wholesale is not. Whether the results are specific to Sweden or holds for other countries as well is an open issue until further research has been conducted. However, the structure with high wholesaler or chain concentration is found also in many other European countries.

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Table 1. Variable definitions and data sources.

Variable	Definition and source
LOCATION	Name of the location ("ort") where the store is located. Source: DELFI.
POSTALAREA	Postal areas ("post ort") as of 1996, in total 1396. Approximately 100 very small locations are part of joint postal areas. Source: Posten Sverige AB.
MUNICIPALITY	Standard municipality ("kommun") classification as of 1996, in total 288. Source: Statistics Sweden.
REGION	Standard region ("A-region") classification which are aggregates of nearby municipalities, in total 70. Source: Statistics Sweden.
COUNTY	Standard county ("län") classification, in total 24. Source: Statistics Sweden.
MUNICIPTYPE	Each municipality is classified according to type. The types are: city (Stockholm, Gothenburg, Malmoe), suburb (36), big town (25), medium town (41), industrial (51), farm area (40), rural area (31), big other (28), small other (33). Source: Statistics Sweden.
COUNTRYSIDE	Dummy variable taking the value one if MUNICIPTYPE is farm area *or* rural area.
DISTANTREGION	Dummy variable taking the value one if REGION is in the northern inland (A-regions 63, 64, 66, 67, 68, 69 and 70).
STOCKHOLM	Dummy variable taking the value one if A-region is 1 *and* MUNICIPTYPE is city *or* suburb.
GOTHENBURG	Dummy variable taking the value one if A-region is 33 *and* MUNICIPTYPE is city *or* suburb.
MARKETSIZE	Number of households in the postal area. The locations not matched by a postal area are treated as missing. Source: Posten.
INCOME	Municipal per capita income for 1996, measured in thousands of SEK. Source: Statistics Sweden.
RENT	County assessed value of office space per square meter in 1994, measured in thousands of SEK. Source: Statistiska Centralbyrån, 1995, Rikets Fastigheter 1995 (1), Statistiska meddelanden, Bo 38 SM 9501, table 7a.
WHOLE_X	Each store has a primary wholesaler. Some wholesalers are part of a larger grouping and serve only a region or a particular type of stores. We treat wholesalers belonging to the same grouping as one, using information from Små företag och konkurrenslagen, Bilaga 3, Ds 1998:72. This results in seven wholesalers: ICA (X=1), KF (X=2), DAGAB, KIAB, Bergendahl, Rudolf Persson, other or unknown. Source: DELFI.
REVENUE	Store level revenue in million SEK, grouped in 19 classes. The upper bounds on the first 18 size classes are: 0.75, 1.5, 2.5, 3.5, 4.5, 5.5, 7.0, 9.0, 12.5, 17.5, 22.5, 27.5, 35.0, 45.0, 55.0, 67.5, 87.5, 100. Store revenue greater than 100 are recorded as is. Source: DELFI.
SALESSPACE	Store level sales space in square meters. Due to many gaps in data for 1994, 1995 figures are used instead. Source: DELFI.
STORETYPE	Each store is classified according to type. The types are: hypermarket, department store, supermarket (two different), other grocery store (two different), convenience store, traffic store and seasonal store. Source: DELFI.
HYPERMARKET	Dummy variable taking the value one if STORETYPE is a hypermarket. Hypermarkets, in a Swedish context, are generally stores with yearly revenue exceeding SEK 100 million (≈ECU 12 million) and with a sales space greater than 1000 square meters.
SUPERMARKET	Dummy variable taking the value one if STORETYPE is a department store or supermarket.
HERF_RETAIL	Herfindahl index of store concentration, calculated from REVENUE at the location. We assume that store revenues are at the upper bound.
HERF_WHOLE	Herfindahl index of wholesaler concentration, calculated from REVENUE at the county level. We assume that store revenues are at the upper bound.
MSHARE_HYPER	Market share of HYPERMARKET in the municipality, based on REVENUE.
PRICE_X	Store level price of product X=1,..,7. The products are: washing-up detergent (Yes, 0.5liter), sugar (no specific brand, 2kg), bread (Wasa Husman, 500g), fish roe spread (Kalles Kaviar, 190g), cocoa (Fazer, 200g), butter (Bregott, 300g) and soap (Lux or Palmolive, pack of three). Source: PRO, Pensionärernas Riksorganisation.
PRICE	Store level price index. It is constructed as follows: For each year the average price of each product X=1,..,5 is calculated. The price at each store i is divided by the corresponding average price. The resulting indexes of individual product at each store are then averaged to obtain $PRICE_{i,YEAR}$. Where the price of one or more products is missing the index is based on fewer observations.

Notes. Store level information for 1993 is not available, 1994 data used instead.

Table 2. Descriptive statistics for markets with at least one price observation (1996).

	FIRMS	PRICE	HERF_RETAIL	HERF_WHOLE	MARKETSIZE
MEAN	23.7	99.9	0.304	0.348	24126
ST.DEV	41.3	8.9	0.237	0.0392	50642
NOBS	1041	1041	1041	1041	918
MIN	1	78.3	0.0158	0.297	86
10^{th}	2	88.1	0.0531	0.305	1741
20^{th}	4	92.4	0.103	0.305	2793
25^{th}	4	94.5	0.127	0.318	3315
30^{th}	5	95.7	0.142	0.323	3730
40^{th}	6	97.4	0.195	0.331	5295
MEDIAN	9	99.5	0.259	0.339	7145
60^{th}	13	101.9	0.322	0.350	11701
70^{th}	18	103.9	0.374	0.365	15500
75^{th}	22	104.9	0.420	0.380	19986
80^{th}	33	106.6	0.466	0.385	25835
90^{th}	58	112.2	0.591	0.404	50315
MAX	234	137.2	1.000	0.513	320158

Table 3. Relation between the number of firms in the market and PRICE (1996).

FIRMS	PRICE MEAN	PRICE MEDIAN	PRICE STDEV	PRICE MAX	PRICE MIN	MARKET-SIZE MEAN	NOBS
1	102.9	101.9	7.08	118.7	87.8	913	45
2	104.4	103.9	7.73	125.4	89.8	1169	70
3	102.9	102.2	6.85	125.6	86.3	1853	68
4	101.8	101.4	6.85	123.4	82.7	2338	97
5	99.7	99.0	6.98	121.1	84.0	2868	86
6	100.5	100.9	8.84	131.7	82.4	3150	63
7	100.7	101.6	8.88	121.4	83.8	3862	46
8	99.4	98.2	8.23	130.9	82.7	5309	48
9	100.1	99.4	7.71	116.9	83.2	5561	41
10	99.2	97.5	6.90	108.6	89.3	7055	14
11	104.0	100.4	11.17	126.1	84.3	6109	19
12	95.3	96.1	8.35	107.9	82.9	8069	27
13	96.0	94.9	10.71	118.6	80.2	9466	32
14	99.9	99.2	8.92	116.4	83.2	10985	30
15	92.8	95.2	7.00	102.2	82.8	12573	14
16	104.2	104.9	10.64	120.3	80.0	11759	16
17	95.4	96.4	7.77	108.1	83.9	11100	18
18	99.8	98.0	12.85	122.5	83.2	12505	17
19	101.5	101.5	9.96	131.9	88.1	12008	14
20	97.1	95.9	4.56	103.9	92.9	12440	5

Table 4. Regressions with store price index, PRICE, as dependent variable.

ESTIMATOR	OLS	OLS	OLS	OLS	SUR	SUR
SAMPLE	1993[a]	1995	1996	1997	1995-7[b]	1995-7[c]
VARIABLE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE
HERF_RETAIL	2.25**	2.23***	2.26**	3.98***	3.37***	2.33*
	(1.13)	(1.20)	(0.967)	(0.985)	(1.08)	(1.29)
HERF_WHOLE	9.81	43.4***	27.6***	38.6***	44.3***	49.2***
	(9.35)	(9.89)	(7.14)	(9.86)	(7.92)	(8.89)
MSHARE_HYPER	-4.06	-6.72**	-6.62***	-5.40**	-10.0***	-8.43**
	(3.12)	(3.21)	(2.38)	(2.44)	(2.69)	(3.61)
HYPERMARKET	-8.21***	-3.77**	-3.79**	-11.1***	-4.78***	-3.19
	(1.49)	(1.78)	(1.73)	(1.49)	(1.58)	(3.72)
SUPERMARKET	-0.428	-1.89**	1.10	0.223	0.123	0.663
	(0.949)	(0.892)	(0.900)	(0.900)	(0.455)	(0.542)
SALESSPACE	-4.03E-4	-2.45E-3***	-3.20E-4	1.08E-3	-1.51E-3***	-1.73E-3***
	(6.85E-4)	(7.55E-4)	(6.37E-4)	(1.03E-3)	(4.30E-4)	(6.14E-4)
WHOLE_1	4.20***	4.11***	6.07***	4.99***	5.64***	6.05***
	(1.10)	(0.903)	(0.856)	(0.851)	(0.742)	(0.930)
WHOLE_2	7.60***	3.76***	5.79***	8.37***	5.24***	4.76***
	(1.36)	(1.25)	(1.12)	(1.47)	(0.854)	(1.09)
INCOME	0.0309	0.0542	-0.0301	0.0977***	0.0820***	0.0827**
	(0.0372)	(0.0375)	(0.0250)	(0.0249)	(0.0313)	(0.0335)
RENT	0.138	-0.0664	-0.0826	0.234*	-0.142	-0.0428
	(0.155)	(0.136)	(0.128)	(0.125)	(0.155)	(0.178)
COUNTRYSIDE	2.14***	1.91**	1.32*	2.00**	2.05**	1.31
	(0.872)	(0.846)	(0.739)	(0.815)	(0.835)	(0.819)
STOCKHOLM	10.2***	7.94***	9.84***	4.96***	7.54***	4.037***
	(1.54)	(1.40)	(1.22)	(1.19)	(1.26)	(1.81)
GOTHENBURG	-7.91***	-3.61**	-8.50***	-16.3***	-8.56***	-5.83
	(2.10)	(1.72)	(2.03)	(2.49)	(2.53)	(4.26)
DISTANTREGION	-1.16	0.765	-0.481	-3.08**	-1.83	-1.81
	(1.23)	(1.34)	(1.00)	(1.36)	(1.26)	(1.38)
MILLSRATIO	7.09***	5.22***	11.8***	14.9***	8.67***	9.20***
	(1.79)	(1.86)	(1.67)	(2.69)	(1.04)	(1.35)
CONSTANT	73.6***	67.9***	74.5***	46.3***	55.1***	52.8***
	(7.67)	(8.09)	(5.37)	(8.73)	(5.93)	(6.46)
R2 ADJ	0.41	0.35	0.36	0.34	0.36	0.29
NOBS	541	886	1028	1122	611	398

a) Store specific variables are from 1994, except SALESPACE which is from 1995.
b) Stores with observations on PRICE in all years 1995-7.
Coefficients on WHOLE_1 and WHOLE_2, and R2 ADJ are for the 1996 regression.
c) Stores with observations on PRICE in all years 1995-7, active in market with less than 10000 households.
Coefficients on WHOLE_1 and WHOLE_2 and R2 ADJ are for the 1996 regression.

Heteroskedasticity consistent standard errors. Variables starred with *** are significant at the 1 percent level, with ** at the 5 percent level and with *at the 10 percent level.

Table 5. Simulation of price effects from changes in retailer and wholesaler concentration. Based on SUR coefficients in Table 4, column 4:5, and means of other variables (1996).

		HERF_WHOLE		
		0.25	0.35	0.50
HERF_RETAIL	0.25	94.2	98.8	105.4
	0.32	94.5	99.0	105.6
	0.50	95.1	99.6	106.2
	1.00	96.8	101.3	107.3

Table 6. Results from OLS-regressions with prices of individual products as dependent variables. The other variables in Table 4 were included but are not reported.

PRODUCT	DETERG	DETERG	DETERG	DETERG	SUGAR	SUGAR	SUGAR	SUGAR
SAMPLE	1993	1995	1996	1997	1993	1995	1996	1997
HERF_RETAIL	2.99	11.5***	16.9***	21.2***	8.63***	7.45**	1.51	3.78*
	(4.75)	(4.62	(4.09)	(4.21)	(2.67)	(2.77)	(1.89)	(2.47)
HERF_WHOLE	-62.1**	169.0***	169.0***	153.0***	75.1***	125.0***	60.0***	76.1***
	(32.4)	(39.8)	(30.0)	(38.2)	(28.8)	(20.9)	(12.3)	(17.1)
MSHARE_HYPER	2.60	-14.5	-11.1	-19.1**	-3.21	-13.2*	-7.20*	-6.41
	(11.0)	(12.3)	(9.57)	(9.78)	(5.38)	(7.21)	(3.95)	(4.08)
HYPERMARKET	-19.3***	-13.8**	-15.6***	-41.3***	-10.1**	1.21	1.23	-12.0***
	(4.59)	(6.33)	(6.83)	(5.40)	(4.92)	(3.65)	(3.13)	(2.35)
NOBS	520	877	1007	1090	539	880	1019	1118
R2 ADJ	0.36	0.35	0.36	0.32	0.24	0.30	0.30	0.27
PRODUCT	BREAD	BREAD	BREAD	BREAD	SPREAD	SPREAD	SPREAD	SPREAD
SAMPLE	1993	1995	1996	1997	1993	1995	1996	1997
HERF_RETAIL	-1.00	6.48***	6.91***	5.86**	2.56	-0.111	-2.51	6.10**
	(3.29)	(2.63)	(2.04)	(2.40)	(3.71)	(2.95)	(2.60)	(3.00)
HERF_WHOLE	33.0*	93.5***	46.8***	59.6***	-11.1	51.2**	18.7	77.1***
	(22.9)	(22.4)	(15.8)	(24.4)	(28.5)	(23.5)	(19.5)	(19.4)
MSHARE_HYPER	-0.869	-10.0	-10.3**	-13.1**	-17.5**	-14.8*	-8.62	-8.22
	(8.54)	(7.43)	(5.16)	(5.85)	(8.94)	(7.74)	(5.59)	(5.57)
HYPERMARKET	-25.4***	-1.51	-0.602	-12.4***	-6.05	-12.2***	-4.70	-19.0***
	(3.71)	(3.57)	(3.25)	(3.60)	(3.92)	(3.91)	(4.05)	(3.03)
NOBS	531	870	998	1109	522	861	987	1080
R2 ADJ	0.36	0.19	0.24	0.20	0.18	0.18	0.19	0.17
PRODUCT	COCOA	COCOA	COCOA	COCOA	BUTTER	BUTTER	SOAP	SOAP
SAMPLE	1993	1995	1996	1997	1995	1996	1995	1996
HERF_RETAIL	3.49	-4.12*	-1.85	1.81	4.68	3.61	-0.381	8.41
	(2.79)	(2.65)	(1.75)	(1.55)	(3.34)	(2.67)	(5.63)	(5.06)
HERF_WHOLE	6.88	-17.3	-22.0*	-0.267	52.2**	4.19	184.0***	124.0***
	(24.4)	(27.2)	(12.7)	(18.2)	(24.5)	(17.6)	(38.0)	(36.0)
MSHARE_HYPER	-8.26	-6.90	-11.8**	-0.0255	-11.4	-5.77	-40.2***	0.465
	(5.83)	(9.41)	(4.97)	(5.33)	(8.86)	(5.71)	(14.2)	(10.7)
HYPERMARKET	-5.41	-9.03	-15.3***	-16.0***	-4.28	0.750	-20.1***	-23.6***
	(4.61)	(7.89)	(3.25)	(3.21)	(4.51)	(3.42)	(5.90)	(6.11)
NOBS	500	818	941	1039	875	1016	732	840
R2 ADJ	0.10	0.30	0.29	0.16	0.29	0.33	0.25	0.20

In the 1993 regressions the explanatory variables are from 1994.
Heteroskedasticity consistent standard errors. Variables starred with *** are significant at the 1 percent level, with ** at the 5 percent level and with *at the 10 percent level.

Table 7. Regressions with change in store price index, ΔPRICE, and of individual products (percentage change) around VAT change as dependent variables.

VARIABLE	ΔPRICE_ 96-95	ΔPRICE_ 97-95	ΔPRICE_ DETERG	ΔPRICE_ SUGAR	ΔPRICE_ BREAD	ΔPRICE_ SPREAD	ΔPRICE_ COCOA	ΔPRICE_ BUTTER	ΔPRICE_ SOAP
CONSTANT	6.55***	6.48**	-0.0082	-0.028	0.0703	-0.048	0.011	-0.19***	0.046
	(2.14)	(2.7)	(0.0352)	(0.024)	(0.045)	(0.04)	(0.038)	(0.029)	(0.047)
HERF_RETAIL	0.645	1.86	0.0224**	-0.0267***	-0.006	0.0129	0.0048	0.0104	0.0299
	(0.78)	1.29	(0.0104)	(0.01)	(0.015)	(0.015)	(0.011)	(0.014)	(0.0227)
HERF_WHOLE	-19.5***	-24.4***	0.0511	-0.172***	-0.433***	-0.089	-0.226***	0.225***	-0.0752
	(5.29)	(6.59)	(0.0874)	(0.06)	(0.113)	(0.099)	(0.061)	(0.083)	(0.118)
MSHARE_HYPER	0.912	3.72	0.0207	0.0268	0.0019	0.0061	-0.014	-0.008	0.065
	(1.71)	(2.84)	(0.0197)	(0.025)	(0.045)	(0.032)	(0.033)	(0.024)	(0.0428)
R2 ADJ	0.031	0.036	0.004	0.045	0.023	0.033	0.03	0.028	0.007
NOBS	771	668	750	761	741	718	687	754	583

WHOLE_1; WHOLE_2 and MILLSRATIO (not reported) were included in regressions.
Heteroskedasticity consistent standard errors. Variables starred with *** are significant at the 1 percent level, with ** at the 5 percent level and with *at the 10 percent level.

Table A1. Descriptive statistics for variables used in probit regression for 1996.

	MEAN	ST.DEV.	SKEW	KURT	MIN	MAX	NOBS
PRICEDUM	0.201	0.401	1.48	3.21	0	1	5161
HERF_RETAIL	0.325	0.274	1.13	3.52	0.0157	1	5161
HERF_WHOLE	0.346	0.0431	1.88	7.62	0.296	0.512	5161
MSHARE_HYPER	0.0726	0.110	1.81	6.70	0	0.844	5161
HYPERMARKET	0.0143	0.118	8.17	67.7	0	1	5161
SUPERMARKET	0.164	0.370	1.81	4.29	0	1	5161
SALESSPACE	493	590	3.09	17.3	15	6000	5053
REVENUE	24959	36286	3.94	26.9	250	480000	5158
WHOLE_1	0.490	0.500	0.0383	1.00	0	1	5161
WHOLE_2	0.218	0.413	1.36	2.84	0	1	5161
INCOME	144	14.8	1.76	9.14	116	241	5161
RENT	6.16	2.68	0.791	2.52	2.13	12.1	5161
BIGTOWN	0.222	0.416	1.33	2.78	0	1	5161
MEDIUMTOWN	0.248	0.432	1.16	2.35	0	1	5161
FARMAREA	0.0916	0.288	2.83	9.01	0	1	5161
RURAL	0.0854	0.279	2.96	9.79	0	1	5161
BIGOTHER	0.0852	0.279	2.97	9.82	0	1	5161
SMALLOTHER	0.0528	0.223	3.99	16.9	0	1	5161
STOCKHOLM	0.124	0.330	2.27	6.15	0	1	5161
GOTHENBURG	0.0612	0.239	3.65	14.4	0	1	5161
DISTANTREGION	0.0961	0.294	2.74	8.51	0	1	5161

Table A2. Descriptive statistics for variables used in PRICE regression for 1996.

	MEAN	ST.DEV.	SKEW	KURT	MIN	MAX	NOBS
PRICE	99.9	8.93	0.304	3.37	78.3	137	1041
HERF_RETAIL	0.304	0.236	1.27	4.43	0.0157	1	1041
HERF_WHOLE	0.348	0.0392	1.09	5.02	0.296	0.512	1041
MSHARE_HYPER	0.0648	0.112	2.45	11.3	0	0.844	1041
HYPERMARKET	0.0365	0.187	4.94	25.4	0	1	1041
SUPERMARKET	0.348	0.476	0.639	1.41	0	1	1041
SALESSPACE	823	694	2.15	10.0	35	5500	1028
WHOLE_1	0.444	0.497	0.222	1.05	0	1	1041
WHOLE_2	0.366	0.481	0.556	1.30	0	1	1041
INCOME	145	14.0	1.57	9.23	116	241	1041
RENT	5.82	2.24	0.778	2.52	2.13	12.2	1041
COUNTRYSIDE	0.167	0.373	1.78	4.17	0	1	1041
STOCKHOLM	0.1421	0.349	2.04	5.19	0	1	1041
GOTHENBURG	0.0144	0.119	8.14	67.3	0	1	1041
DISTANTREGION	0.0797	0.271	3.10	10.6	0	1	1041
MILLSRATIO	1.19	0.377	0.0201	3.05	0.0670	2.61	1028

Table A3. Probit regressions with PRICEDUM as dependent variable.

SAMPLE	1993[a]	1995	1996	1997	1995-7[b]
VARIABLE	PRICEDUM	PRICEDUM	PRICEDUM	PRICEDUM	PRICEDUM^{SUR}
HERF_RETAIL	0.129	0.00732	0.0116	0.113	0.137
	(0.109)	(0.0953)	(0.0894)	(0.0873)	(0.103)
HERF_WHOLE	-0.154	4.02***	1.52**	3.76***	3.99***
	(0.965)	(0.767)	(0.730)	(0.652)	(0.819)
MSHARE_HYPER	-0.908***	-1.07***	-0.642***	-0.605***	-1.02***
	(0.296)	(0.253)	(0.230)	(0.217)	(0.284)
HYPERMARKET	-0.402*	-0.945***	-0.576***	-0.794***	-0.380
	(0.226)	(0.208)	(0.222)	(0.189)	(0.239)
SUPERMARKET	0.319***	0.247***	0.361***	0.253***	0.415***
	(0.0853)	(0.0779)	(0.0793)	(0.0735)	(0.0868)
SALESSPACE	2.88E-4***	3.01E-4***	2.32E-4***	4.67E-4***	9.24E-5
	(6.49E-5)	(6.06E-5)	(6.55E-5)	(6.62E-5)	(7.08E-5)
REVENUE	4.61E-6***	6.82E-6***	5.92E-6***	3.42E-6***	6.20E-6
	(1.16E-6)	(1.06E-6)	(9.92E-7)	(1.02E-6)	(1.05E-6)
WHOLE_1	0.312***	0.241***	0.279***	0.206***	0.190***
	(0.0697)	(0.0590)	(0.0562)	(0.0552)	(0.0651)
WHOLE_2	0.721***	0.714***	0.739***	0.697***	0.604***
	(0.0763)	(0.0660)	(0.0620)	(0.0618)	(0.0706)
INCOME	0.00224	0.00626**	-0.00164	0.00229	0.00242
	(0.00289)	(0.00269)	(0.00262)	(0.00255)	(0.00300)
RENT	0.00277	-0.0361***	-0.0320***	-0.0116	-0.0341**
	(0.0142)	(0.0128)	(0.0121)	(0.0117)	(0.0140)
BIGTOWN	0.363**	1.47***	0.635***	0.349**	1.16***
	(0.173)	(0.283)	(0.165)	(0.151)	(0.281)
MEDIUMTOWN	0.0972	1.41***	0.624***	0.343**	1.01***
	(0.176)	(0.284)	(0.167)	(0.151)	(0.283)
FARMAREA	0.334*	1.48***	0.561***	0.271	1.09***
	(0.197)	(0.297)	(0.184)	(0.169)	(0.298)
RURAL	0.781***	1.66***	0.766***	0.209	1.17***
	(0.205)	(0.301)	(0.191)	(0.180)	(0.304)
BIGOTHER	0.564***	1.74***	0.861***	0.429***	1.39***
	(0.186)	(0.290)	(0.176)	(0.162)	(0.289)
SMALLOTHER	0.384*	1.71***	0.739***	0.308*	1.29***
	(0.201)	(0.296)	(0.186)	(0.173)	(0.297)
STOCKHOLM	0.572***	1.59***	0.878***	0.468***	1.32***
	(0.190)	(0.289)	(0.181)	(0.167)	(0.288)
GOTHENBURG	-0.433*	0.724**	-0.173	-0.563***	0.262
	(0.238)	(0.313)	(0.214)	(0.195)	(0.331)
DISTANTREGION	-0.386***	-0.582***	-0.385***	-0.404***	-0.636***
	(0.141)	(0.110)	(0.103)	(0.104)	(0.123)
CONSTANT	-2.54***	-5.11***	-2.21***	-3.27***	-4.34***
	(0.586)	(0.595)	(0.514)	(0.476)	(0.638)
LogL	-1494.1	-2010.9	-2196.9	-2257.1	-1607.4
NOBS	5006	5104	5056	4822	5018

a) Explanatory variables are from 1994, except SALESPACE which is from 1995.
b) Explanatory variables are from 1996.
Heteroskedasticity consistent standard errors. Variables starred with *** are significant at the 1 percent level, with ** at the 5 percent level and with *at the 10 percent level.