Pricing in practice

-An empirical study of the market for haircuts in Sweden

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Abstract

This paper analyses prices in the haircut market in Sweden with help of a large data set collected by phone interviews. The price variation is explained with help of several quality, firm specific and market structure variables. The quality and firm specific variables are proved to be the most important for the price determining. Vertical product differentiation is shown to be central. The market structure variables are to some extent evidenced to affect the price level. The price will be higher in a market, *ceteris paribus*, if the firm concentration is low. This unexpected result might be due to product differentiation, asymmetric information and cost variations. Firms with senior citizen discount are shown to offer the lowest price as well as quality and price discrimination against men is evidenced.

Keywords: Prices, haircut market, quality, firm specific variables, market structure, firm concentration, price competition, vertical product differentiation, price discrimination.

JEL codes: D21, D43

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1. Introduction

Nearly everyone of the population has expenditures on their health and look. This kind of industry expands and sometimes seems to be more and more important for many peoples. A particular part of the most households' budgets contain expenditures for hairdresser services. The size of the money used up depends not only on how often the consumer uses the service but also on the price offered by the hairdresser firm. However, the expenditure level could vary a lot between different people when just taking the price in consideration.

The purpose with this paper is, first, to explain the price determining and price variation in the haircut industry in Sweden using firm specific and market structure variables. Second, two different types of third degree of price discrimination in the haircut market will be analysed.

For a firm there exist many instruments that could be used to compete in a market. This study is focused on prices, which is a main tool for short run competition because it is easy to change. In the long run, firms may compete by changing the quality of the product through e.g. expenditures on advertising or research and development (Tirole p.205). The long run innovations are customarily studied with time series data while the short run tool, price suitably is examined with cross-section data.

To get a premonition about the features of the haircut industry, a short and general sketch of the market will be done. The degree of competition in the haircut market could vary a lot between different markets. Intuitively, the market would be rather close to the textbook models of perfect competition. However, starting with the demand side states that it could be a large variation in the number of consumers, depending on the size of the market. On the supply side, the number of firms in the market could vary a lot depending on the geographical localisation of the firms. Yet, it is important to mention that the size of the majority of the firms is small. In some cases the characteristics indicate basic conditions to get a well functioning competition in the market. Anyway, there exists more than one price in the market, which implies that the firms are not price takers.

An interesting question at issue is whether or not there exist barriers to entry the market. The barriers to entry due to product innovations, sunk costs and large-scale advantages are rather small. There are relatively low start costs. The Swedish Hairdresser Union, SFF, calculates the start cost for one chair, all included (e.g. mirrors, place in reception

and washing), between 50 000 and 75 000 SEK even though there exist a second hand market. There is no need of a large floor space and the technology level is almost the same for all firms. There might be innovations or trends in different products (e.g. hair extension). This study will not include any new or firm specific services. Instead the analysis is focused on the more traditional hairdresser services.

The barriers to entry might be large due to the existence of quality differences between firms even though the services appear to be relatively homogenous. The quality level is not predetermined but instead the firm could choose the quality supplied (Kwoka p.211). The degree of product differentiation could be troublesome to measure. However, one measure could be the level of education. Hairdressers are educated at the upper secondary school level (gymnasium) so the claim of base education is relatively low. Anyhow, it is important to mention that employees with some kind of higher education are quite common. For consumers, a common problem in markets containing services is the less of information in assessing the quality level. They most likely have search costs to get perfectly informed about prices and quality. Thus, there might be asymmetric information between buyers and sellers. Furthermore, firms could have advantage of its geographical localisation although cost differences presumably exist between the firms. There would not either be any large barriers to exit the market because the lack of large capital investments in equipment and the shortage of long time contracts with consumers.

The outline of the thesis is as pursues. *Chapter 2* gives the main conclusions from articles analysing prices in other markets. In *Chapter 3*, economic theory of imperfect competition and price discrimination is considered. *Chapter 4* illustrates the data set, first the dependent variable price and then the groups of explanatory variables used in the analysis. In *Chapter 5*, price determining and the third degree of price discrimination are tested including analysis of the results. *Chapter 6* states the main conclusions from the empirical analysis. *Chapter 7* gives suggestions for further research. Finally, *Chapter 8* presents a summary of the study.

2. Literature Survey

In the literature research no empirical study of price variation in the haircut market are found. Only studies analysing other markets, considering the haircut market as an example and a newspaper article are given. Anyway, many empirical studies of prices and market structure in other markets have been done. Even if there are differences between industries, the major conclusions in these studies may contain end results that could be used as a reference when analysing the haircut market. Most of the studies do not test a particular theory instead they are studying general oligopoly theory. Some articles will be analysed in detail while results from several other papers only will be reported shortly.

Cotterill (1986) studies the food retail industry in Vermont and concludes that firms operating in the same market offer different prices due to the fact that consumers have imperfect information and differences in firm specific factors (e.g. store size and chain affiliation). Market structure variables, measured by concentration ratios and Herfindahl index, also have a significant impact on the price level. Moreover, a positive relationship between firm concentration and food prices is proved. Asplund and Friberg (2001) study food prices in Sweden using two large data sets. They conclude that most of the price variation depends on firm specific factors (e.g. store size and chain affiliation). Part of the variation in the price levels could be explained by the degree of competition, measured by market structure variables. Cost factors depending on the geographical localisation are evidenced to have a small impact on price. Large firms are shown to offer a relatively low price level and the same result is stated for firms in the west region of Sweden. The difference is argued to be due to the closeness to Norway, which permits some large firms to buy from substitute suppliers and therefore make a downward pressure on the price level in the region. Furthermore a positive relationship between seller concentration and price is evidenced. Other studies that also state a positive relationship between price and firm concentration are, for example, Marion (1979) studying the supermarket food retailing, Koller and Weiss (1989) examining the US cement industry and two studies of Marvel (1978) and (1981) investigating the US gasoline retailing. The main issue in this paper is not to analyse the consequences of entry a market. However, it is interesting to mention the main conclusions from a study of the competitive consequences of entry in five retail and professional industries made by Bresnahan and Reiss (1991). They conclude that in markets with five or fewer firms, nearly

all of the variation in competitive behaviour is due to the entry of the second or third firm. Asplund and Sandin (1999) analyse how market structure influences competition in driving schools in Sweden. Their focus is mostly on horizontal product differentiation. The result is that the price level is low if the prices in nearby markets are low and the distance to them is short. Even if this paper primarily not studies horizontal product differentiation, it is of interest to compare price levels in different markets.

Kwoka (1984) analyses advertising effects on price and quality in the optometric services in the US. Most of the studies are focused on one product or a basket of products so this article is specifically interesting because it analyses a service. A main problem with services is the difficulties to observe and measure the quality. Kwoka gauges the time for an examination as a quality indicator. Many consumers observe the price, which is easy to get, as a quality factor. This makes advertising an effective way of changing demand and may lead to lower prices. The results show that advertising firms provide a downward pressure on the price level in the market and offer at the same time a lower quality. Non-advertising firms are forced to decrease their price but they still keep the same quality.

Stiglitz & Salop (1977) focus their study on markets with asymmetric information where the consumers have different search costs to become perfectly informed. They declare that in markets where the consumers are forced to make costly search, the prices are lower if the sellers are less concentrated i.e. the opposite conclusion to the majority of empirical studies. With fewer firms in the market the search costs are lower and it is easier for consumers to change to lower price firms. In a similar study, Stiglitz (1979) conclude that it is inefficient to increase the number of firms by removing barriers to entry. This strategy will only lead to increased price levels and lower efficiency. Salop and Stiglitz show that it is possible that the relationship between seller concentration and price is an empirical question. Finally, Kelton and Weiss (1989) have made a time analysis of simultaneous changes in concentration, cost, demand and price for all type of markets. When studying tight oligopolies, for example cigarettes, they found it misleading just to look at the supply side. This because it is costs and changes in demand that gives the largest influence on price. They found the strongest relationship between concentration and higher prices among consumer goods. The study is very interesting but requires a lot of information about cost variables and consumer behaviour.

To sum up, the research shows importance of firm specific variables and, to some extent, also market structure variables. The majority of the studies detect a positive relation between firm concentration and price. If the opposite conclusion is stated it is justified by asymmetric information.

3. Theory

As mentioned in chapter 1, there is a large variation in the degree of competition in the haircut market depending on the geographical localisation. This makes it troublesome to define the market as one traditional industry structure and thus makes it difficult to test a particular theory. Therefore, this paper follows the same line as the majority of earlier empirical studies of price variations and not test a specific theory. The theoretical framework is based on imperfect competition and price discrimination. The chapter will give a short and to some extent general description of these theories. At first, imperfect competition is considered including theories of oligopoly, monopolistic competition, product differentiation and asymmetric information. Next, the third degree of price discrimination is illustrated. During the theory chapter, the haircut market will be mentioned to state examples.

3.1 Imperfect competition

First, the thesis of oligopoly is considered. Basic models state importance of characteristics like barriers to entry as well as interdependence between firms i.e. each firm will be affected by its rivals' decisions. Hence, competition in oligopoly markets consists of strategic interactions between firms and game theory is often used as a tool for analysis. While the aim in this study is to analyse prices, models of competition in quantity will be excluded. Instead, a model of short run price competition will be described i.e. the Bertrand paradox of simultaneous price setting. The model implicitly relies on the assumptions that firms are assumed to meet only once, that they always supply the given demand and that products are undifferentiated (the consumers buy from the firm that offers the lowest price). The paradox is solved by relaxing any of the three assumptions, which results in a more realistic view of the price determining. Hence, the factors reducing price competition are; capacity constraints, repeated competition and product differentiation (Tirole p.211). In the haircut market, there

might not exist capacity constraints but the thesis of repeated competition and product differentiation is applicable. Repeated competition states that each firm has to compare different outcomes when deciding whether to decrease the price or not. The short run gain of a price cut has to be compared with the long run loss in a forthcoming price war (Tirole p.212). Bertrand states that when product differentiation exists, it is the main factor determining the market performance (Martin p.44).[1] In the hairdresser industry, firms operating in small towns or suburb areas could be anticipated to work in an oligopoly market. This is argued to depend on the relatively small number of firms in the market and a restricted demand that probably contribute to build up barriers to entry.

Second, theory of monopolistic competition introduced by Chamberlin is examined. Here the market often consists of a large number of firms. This will result in that each firm has a relatively small share of the market and a comparatively elastic demand. One of the most central characteristics is the existence of product differentiation. It gives opportunities for each firm to increase its monopoly power and hence decrease the elasticity of demand. Moreover, there are independence of firms i.e. the decisions of one firm will not have any significant effect on the demand curves of its rivals. This makes it possible for each firm to determine its prices without taking competitors in consideration. Apart from this, freedom of entry for new firms is a major characteristic. However, variations in firm properties might lead to a more troublesome analysis of monopolistic markets. There might be variations in size, cost structure, excess capacity and elasticity of demand (Sloman p.191). Under these conditions the optimal prices between firms will differ. A firm with low costs, excess capacity or expectations of a greater elasticity of demand among buyers than its rivals will offer a lower price and probably reach market power (Weiss p.2). In the haircut market, firms located in larger cities probably operate in a monopolistic environment. This could be motivated by the existence of a large number of firms, all offering differentiated services. The occurrence of many consumers results in a large demand opening for new firms to enter the market. Apart from this, the problem with varies in firm characteristics is applicable on the haircut market.

One of the most fundamental parts of economic theory considering imperfect competition is to study the relationship between firm concentration and price. Two of the most common measures are concentration ratios and Herfindahl index.[2] However, there exist many other factors that could be used as a proxy. The concentration is high if there are few

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[1] See Tirole for a more detailed description.
[2] See for example Feurguson p.40 for a detailed description of the measures.

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firms in the market. Hence, the market is less competitive (Feurguson p.39). Most of the theories get to the conclusion that price increases with concentration (e.g. Bertrand under product differentiation). That means, when there are many firms in the market the price will be low. Thus, it is important to mention that the opposite relation might exist even though it is not common (Weiss p.3).

3.1.1 Product differentiation

To get a good position in the market firms search for niches that gives a good position for their product (Tirole s 295). The meaning of product differentiation is that one firm's product is sufficiently different from its rivals' products (Sloman, p.192). The firm could increase the price without loosing all customers to the rivals' products i.e. the cross elasticity of demand is not infinite at equal prices. Under these conditions a price larger than the marginal cost are offered (Tirole p. 277). Economic theory presents two different types of differentiation that relax price competition. First, horizontal differentiation where the optimal choice, at equal prices, depends on the particular consumer and tastes vary in the population (Tirole p. 97). The horizontal differentiation is analysed by a spatial differentiation model where the consumers are assumed to buy the product from the closest supplier (Tirole s 278). Therefore, the geographical localisation is the most important for the firm. The horizontal differentiation will not be analysed in this study so there will be no further analysis of this theory. Second, vertical differentiation where the firm changes the products physical properties, advertise or supply a higher service for the customers. All improvements of products are regarded as better for all consumers (Martin, p.261). The vertical product differentiation will primarily be analysed by a hypothetical case of a duopoly. The firms are producing at two different quality levels, s_1 and s_2 where $s_1 < s_2$. The model relies on three assumptions, namely that the cost is the same for both firms, the amount of consumer heterogeneity is enough for what follows and the market is "covered" in the price equilibrium. First, price competition will be considered. In this model the high-quality firm offers a higher price and makes a higher profit, compared to the firm with low quality level. Second, a two-stage game will be taken in consideration. In this model each firm chooses a quality i.e. the firms first compete in quality and then in price. Without loss of generality, the cost for quality is assumed to be zero. Start looking at pure strategies gives the result that the two different qualities will differ in equilibrium because firms with undifferentiated products make zero profit. Both firms will

state a higher profit if they have more differentiated products. Therefore, in the case with only two firms, there exist two Nash equilibriums that rely on maximal differentiation. When firm one entries the market it will choose high quality while the second firm will reduce its quality to the low level. If the consumer heterogeneity is low, the price competition forces the low quality firms out of the market. If the lower quality level is "low" it does not compete with higher quality but if it is closer to a high quality level it generates price competition, which swamps the increase in demand associated with the increase in quality (Tirole p.297).

To get this analysis more general, a model of Shaked and Sutton (1983) is taken in consideration. Here the marginal cost for producing the quality s, MC(s), is included. All consumers will buy the product with the highest quality if all qualities are sold and produced at marginal cost i.e. P(s) = MC(s). Within this, there could exist a finite number of firms with positive market share in the industry even though the relative sizes of demand and entry costs are not taken in consideration. Like in the case of only two firms, this case also leads to price competition between the high quality firms, which lead to decreasing prices to a level at which there is no space for low quality products. A criticism to the model is that it requires that the marginal cost of quality does not increase too fast with quality. Thus, the model is more likely to hold if the quality changes consist of research and development and to a lesser extent on the firms' costs (Tirole p. 298).

3.1.2 Asymmetric information

If there is perfect information between buyers and sellers it is easy and cost less to obtain the quality of a product. A problem with the haircut market as well as other markets offering services is the trouble to verify the quality. Therefore, there exist search costs for the consumers to reach necessary information causing problems with the markets' efficient functioning (Varian p.630). Adverse selection is the type of asymmetric information that captures unobserved quality and is often called the hidden information problem. This phenomenon would result in too few transactions being made in the industry (Varian p. 637). In the haircut industry, the consumers do not know the quality of a certain cut, except if they have used it before. Instead, the consumers learn by trial and error which hairdresser that offers the desirable quality (Johnson). Reputation is a tool to soft the problem of adverse selection (Pindyck p.623). Hairdressers have the opportunity to use this when customers visit the firm more than once.

3.2 Price discrimination

Theories about the second and third degree of price discrimination will be taken in consideration. The second degree exists when firms offer different prices for different units of output, but every individual that buys the same amount of the good pays the same price. Hence, there are price differences between the number of goods, but not between people. The third degree takes place when firms offer products to different people at different prices and where every unit of the product sold to a given group is sold to the same price (Varian, p. 425). This phenomenon could be explained with a firm that could divide the aggregated demand into k groups due to an exogenous factor e.g. student and senior citizen. The firm has information about demand and each of the k groups has a particular downward sloping demand curve for the product. If the firm is assumed not to discriminate within a group it will offer k linear tariffs. If there are k different prices offered in k different markets, the firms are maximising their profits given the costs of production. Under these conditions the relative price margins are given by the inverse-elasticity rule (appendix 1). When firms offer a higher price in markets with lower elasticity of demand they have an optimal price strategy (Tirole p. 137). Hence, an optimal price is offered for each group due to the elasticity of demand for the given group. This strategy will result in additional consumers and less excess capacity, which end up in higher profits.

4. Data

To get reliable information within a short period of time, cross-section data are collected by phone interviews. The School of Economics, Gothenburg, financed the interviews. The sample is selected as a simple random sample from the local Yellow Pages.[3] Totally there are 7243 firms registered and the sample consists of 980 of them[4]. Almost all information used in this study is primary data captured from phone interviews. Five variables contain information from SCB and are hence secondary data. The reliability of this information is good while the interviewer might affect the answers from the phone interviews. Table 1 presents all variables that will be used in this study.

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[3] The local Yellow Pages are available (online): <http:// www.gulasidorna.se>
[4] 980 random numbers where constructed in Excel and applied on the total number of firms selected alphabetically. The sample is available from the author upon request.

Table 1. Variable definitions.

Variable	Definition
HEPRICE	The price for a male cut (SEK).
HETIME	The time it takes for a male cut (minutes).
HEPRICE/MIN	Price per minute for a male cut (SEK).
TIMESHORT	If HETIME < 25 the variable takes the value 1 otherwise it takes the value 0.
TIMEMEDIUM	If $25 \leq$ HETIME ≤ 40 the variable takes the value 1 otherwise the variable takes the value 0.
TIMELONG	If HETIME > 40 the variable takes the value 1 otherwise it takes the value 0.
SHEPRICE	The price for a female cut (SEK).
SHETIME	The time it takes for a female cut (minutes).
SHEPRICE/MIN	Price per minute for a female cut (SEK).
SHEHIGH	If SHETIME > 40 the variable takes the value 1 otherwise it takes the value 0.
PERMANENT	The price for a permanent (SEK).
DYING	The price to dye the hair (SEK).
EDUCATION	If the hairdresser(s) have been on education the past 12 months. Yes=1, No=0.
REGULAR	The share of regulars (percent).
MEMBER	Member in the Swedish Hairdresser Union. Yes=1, No=0.
EMPLOY	Number of employees working at the firm.
CHAIRS	Number of barber chairs in the local.
YEARSOWNED	How long the present owner has own the firm on the present address (years).
ESTABLISH	If the owner have owned a barber firm before this one. Yes=1, No=0.
SQUAREMETER	The number of square meters of the floor space.
SENIOR	Discount for senior citizens. Yes=1, No=0.
STUDENT	Discount for students. Yes=1, No=0.
DIST1	Distance to the nearest competitor (meters).
DIST2	Distance to the second nearest competitor (meters).
DIST3	Distance to the third nearest competitor (meters).
TOTDIST	DIST1 + DIST2 + DIST3.
DENSE	If TOTDIST < 500 the variable takes the value 1 otherwise it takes the value 0.
MEDIUM	If $500 \leq$ TOTDIST < 3000 the variable takes the value 1 otherwise it takes the value 0.
LIGHT	If TOTDIST $\geq$ 3000 the variable takes the value 1 otherwise it takes the value 0.
MARKET	Total population in the locality, source: Statistics Sweden.
FIRM	Number of firms in the locality, source: Statistics Sweden.
POPDENSITY	The population density per km^2 in the municipality, source: Statistics Sweden.
INCOME	Yearly average income per person in the municipality, source: Statistics Sweden, 1000 SEK
POP/FIRM	The population per firm in the municipality, source: Statistics Sweden.

To get a first intuition of the data set some central measures are revealed. Table 2 shows descriptive statistics for the most interesting variables. It also shows information about the skewness for the variables. Almost all of the variables are normally distributed which can be seen of the small skewness and scatter plots. Overall, the answer frequency is good where only 2.6 percent of the firms are missing observations. Apart from this, around 2 percent only offer men or women hair services, respectively.

Table 2. Descriptive statistics of the sample.

Variable	Mean	Median	Min	Max	St. dev.	Skewness	NOBS
HEPRICE	206.6	200	100	395	45.72	0.588	946
HETIME	30.22	30	10	60	8.854	0.898	946
HEPRICE/MIN	7.171	6.75	2.50	16.67	1.758	0.629	946
TIMESHORT	0.207	0	0	1	0.406	1.447	946
TIMEMEDIUM	0.654	1	0	1	0.476	-0.650	946
TIMELONG	0.139	0	0	1	0.346	2.097	946
SHEPRICE	225.5	220	100	450	51.97	0.750	944
SHETIME	39.82	45	15	60	8.587	0.106	944
SHEPRICE/MIN	5.773	5.586	2.22	12.5	1.194	0.885	944
SHEHIGH	0.533	1	0	1	0.499	-0.132	944
EDUCATION	0.621	1	0	1	0.485	-0.500	950
REGULAR	81.90	85	10	100	13.32	-1.363	932
MEMBER	0.516	1	0	1	0.5	-0.065	951
YEARSOWNED	10.77	9	0.01	58	9.346	1.626	949
EMPLOY	2.150	2	1	53	2.282	12.33	952
STUDENT	0.082	0	0	1	0.274	3.053	952
SENIOR	0.147	0	0	1	0.354	1.996	952
DIST1	575.9	200	1	40 000	2 363	11.05	950
DIST2	1 000	300	6	40 000	3 057	7.447	950
DIST3	1 275	500	10	40 000	3 435	6.461	949
LIGHT	0.134	0	0	1	0.341	2.154	949
MEDIUM	0.574	1	0	1	0.495	-0.301	949
DENSE	0.266	0	0	1	0.442	1.063	949
FIRM	111.9	27	1	569	176.8	1.810	974
POPDENSITY	828.7	81.97	0.84	4006	1373	1.648	978
INCOME	149.1	146	115.9	241.5	14.99	1.315	978

a) As of January 2002, 10.34 SEK = 1.00 USD.

4.1 Prices

The price variables are central in this study, where the determining mechanism will be explained. The data set consists of prices on both male and female haircuts. As could be seen in Figure 1, HEPRICE is normally distributed and the skewness is 0.593. In the 25:th percentile, HEPRICE is around 12.8 percent lower than the average and in the 75:th percentile 11.4 percent higher. The mean of HEPRICE is 206.5 SEK while the median is 200 SEK. There is a large concentration in the middle, which is confirmed by the kurtosis of 1.194. The mode is 200 SEK, offered by around 20 percent of the firms.

Figure 1. Histogram of HEPRICE with a normal curve.
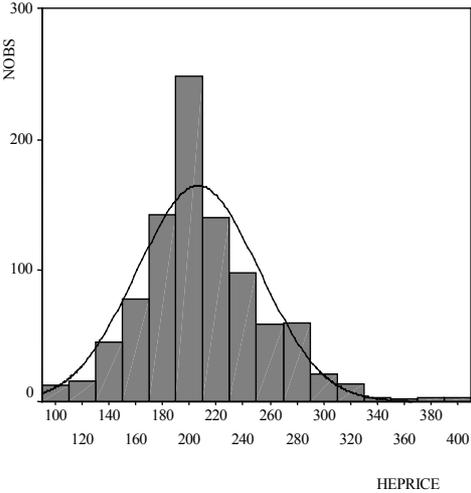
SHEPRICE has mean and median values that are approximately 20 SEK higher than HEPRICE. The distribution of SHEPRICE is normal and presented in Figure 2. Compared to HEPRICE, there is a larger spread. In the 25:th percentile SHEPRICE is 15.7 percent lower than the average and in the 75:th percentile 10.9 percent higher. The kurtosis is 1.288 while the skewness is 0.752. The mode for women is 220 SEK, offered by 18.2 percent of the firms.

Figure 2. Histogram of SHEPRICE with a normal curve.
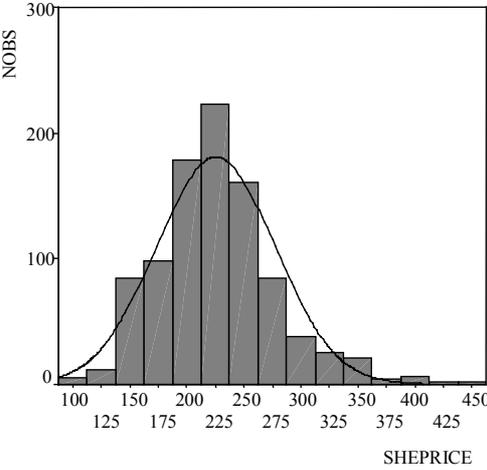
During the interviews there have been tendencies to large variations in the price for female haircuts. These variations depend on the length of the hair, if the price includes washing, setting and blow-drying or not.[5] These tendencies could also be seen in the prices for permanent and dyeing, which may possibly depend on combined prices (haircut bundled with

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[5] The question was the cutting price for an avarage length of the hair.

permanent or dyeing). On the other hand, the data is representative in the way that firms with high haircut prices also have relatively high prices on permanent and dyeing. To limit the analysis and exclude some problems of measuring, the analysis will be focused on the price for men's haircut comprising some comparisons with SHEPRICE.

An alternative and interesting way to connect the price and the quality variable, time, is to construct the variable price per minute, HEPRICE/MIN. The distribution of this alternative measure of the nominal price is represented in Table 3.

Table 3. Distribution of the price per minute variables.

	HEPRICE/MIN	SHEPRICE/MIN
MINIMUM	2.50	2.22
10th	5.00	4.54
20th	5.73	4.89
25th	6.00	4.89
30th	6.33	4.89
40th	6.67	5.33
MEDIAN	6.75	5.59
60th	7.33	6.00
70th	8.00	6.22
75th	8.33	6.44
80th	8.50	6.67
90th	9.33	7.33
MAXIMUM	16.7	12.5

The large spread in HEPRICE/MIN substantiates a large difference in the price the consumers pay per minute. There is a mean value of 7.16 SEK and in the 25:th percentile the price per minute is 16.2 percent lower than the average and in the 75:th percentile 16.3 percent higher. The skewness is 0.629, while the kurtosis is 1.191. Studying SHEPRICE/MIN ends up in a mean of 5.77 SEK. In the 25:th percentile the price per minute is 15.3 percent lower than the average and in the 75:th percentile 11.6 percent higher. It is worthwhile to notice the difference between the genders. Even if men, on average, pay a lower price they pay a higher price per minute for their haircut. That men in general have shorter hair than women might explain this detection. The hairdresser may have fixed activities to do, for example cleaning and handling money, despite the length of the hair.

Apart from analysing the price determining, this paper also takes price discrimination in consideration. The third degree of price discrimination will be analysed because it gives the impression to be the most common. In this case student and senior citizens, where each group is offered the same price. The second degree of price discrimination could eventually be

offered, but in the case this is not common, it is eliminated from the analysis. In the sample, 8.2 percent have student discount while 14.3 percent offer senior citizen discount. Totally, just about 23 percent of the 954 firms that answered have some kind of discount for their customers. To limit the number of questions all firms are assumed to have approximately the same discount size.

4.2 Quality variables

This study will be focused on the somewhat homogenous product a haircut. Several dummy variables are included in the study because they are simple to analyse and a good way to capture qualitative characteristics. The large price spread could be a consequence of differences in quality realistically measured by time, EDUCATION and REGULAR. As a consequence of the large price spread it is expected to be a relatively large variation in HETIME as well. The longest time is approximately six times the shortest and the variation in SHETIME is almost as high. When using cross-section data it is important to be able to aggregate individual firms into strategic groups. To capture different type of firms, HETIME is reasonable divided into three dummy groups (TIMESHORT, TIMEMEDIUM, TIMELONG). Each group has similar characteristics and compete plausible in a particular market segment. This is substantiated by the difference in price levels between the groups. Firms in TIMESHORT offer lower prices compared to firms in the other time groups. The result indicates that firms in TIMELONG offer high-price and high-quality services whereas firms in TIMESHORT offer low-price and low-quality services. SHETIME is selected to the dummy variable SHEHIGH for the same reason. If the employees have been on education the last 12 months it is assumed to be a relevant measure for higher quality. Around 62 percent of the firms reach this rank of education. A high percent of regulars is most likely due to a good satisfaction from the customers and is therefore a quality variable. The education and regular measures are not only quality factors, but might also be an image factor for the firms.

4.3 Firm specific variables

According to people familiar with the industry, the firms had many employees and many chairs 10-15 years ago. This has changed and it is now more common that the firms consist of 1-3 employees and 2-6 chairs (1.75 chairs/employee). The structure is supported in the sample

where nearly half of the observations (457 NOBS) only have one employee. EMPLOY and CHAIRS have both high maximum values, (53 and 60), which is due to one very large firm in Stockholm. The second largest firm has 10 employees and 15 chairs. These outliers have a negligible influence on the regression results, though the tests are done with and without these observations. Many of the small firms have been owned by the same person(s) for a long time and have propensity to be located in the countryside. Around half of the firms in the sample are members of the Swedish Hairdresser Union, SFF. When comparing prices for members with the non-members they both are normally distributed with the difference that non-members have a larger spread, as expected. Many of the non-member firms offer a HEPRICE of 200 SEK or 220 SEK, which is the same level as many of the members' price. The interviews give an approximately measure of the firms distance to the three nearest competitors. The high maximum value for DIST1 (40 000) shows the existence of a firm operating isolated on an island outside Gothenburg. On the other hand, the low minimum value (1) show firms with closely related competitors. In the analysis the distances are summarised into TOTDIST and then aggregated in three strategic dummy groups, DENSE, MEDIUM and LIGHT. Firms having three competitors within a distance of 500 meters are likely located in central areas while firms with over 3000 meters belongs to the countryside. The largest group MEDIUM includes firms located in suburb areas. The distance variables give an intuition about the competitive environment for each firm and will be used as a measure of concentration. There are some notably price differences between the groups. The mean price in DENSE is 11.5 percent higher than MEDIUM and 14.9 percent higher than LIGHT. EDUCATION and REGULAR are almost the same in all groups, 60 and 80 percent, respectively. Dividing the firms into strategic groups due to time and distance make it easier to compare different type of firms operating in dissimilar quality and market segments.

4.4 Market structure

The existence of a market is at most influenced by the size of demand. A market should include firms whose services are close substitutes for the consumers i.e. cross-elasticity of demand should be low against services of other markets and high between services within the market (Ferguson p.24). It is always difficult determining a market size because of firms on the boundaries. A market in this study is reasonable defined as a locality (approximately

correspondent to a postal area). Total in Sweden there is 1617 localities and the sample is representing 61 of them[6]. Aggregated measures of firms and population are included to capture market size. The total population in the locality, MARKET, is a proxy of total demand. The number of firms in the locality, FIRM, gauges market size and give a proxy of the difference in the competing atmosphere among markets. There is a large spread from 1 to 569 (Stockholm) firms per market. The number of markets with different number of firms is represented in Table 4.

Table 4. Relation between HEPRICE and the number of firms in the market (FIRM).

Number of firms in the market	Number of observations	Mean	Median
1	20	201.8	200
2	36	198.0	200
3-5	58	195.4	200
6-10	98	199.9	200
11-15	107	196.4	200
16-20	78	205.1	200
21-25	74	206.9	200
26-30	37	203.4	200
31-35	41	217.4	220
36-41	42	206.0	200
49-57	37	213.2	210
58-71	35	214.9	205
74-103	86	210.1	200
109-119	44	203.5	200
245	42	220.9	205
454	56	199.2	200
569	83	224.6	220

There are 20 firms in the sample operating as a monopoly with a HEPRICE mean of 201.8 SEK. Compared to the markets with more than one firm, the monopolies have an unforeseen low price level. The mean prices in markets including between two and five firms are both under 200 and are hence lower than the monopoly case. To some extent, this result supports the conclusion that the competitive behaviour at most is influenced by the entry of the second or third firm made by Bresnahan and Reiss (1991). There are 181 observations that belong to the three largest cities, Stockholm, Gothenburg and Malmoe, all with over 200 firms. Stockholm and Malmoe have the highest mean values while Gothenburg have a remarkably low price level. Nevertheless, the cost of floor space could be expected to be approximately the same. This result confirms the conclusion of Asplund and Friberg (2001) where food prices are proved to be low in the west regions of Sweden. Their explanation of the closeness to Norway might not fit in the haircut market. There are relatively small needs

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[6] Source: interview with Lars Rame, Posten.

of product purchases for hairdresser firms. Therefore, alternative suppliers are of less importance. Hence, it is possible that the price levels in general are low in this region.

An overall analysis of the means detect small differences between markets. Nearly all of the markets have a mode of 200 SEK. Thus, it is troublesome to show a certain monotony pattern among the number of firms in the market and the price level. There is a small but not strikingly tendency that prices are slightly higher in markets containing many firms. Intuitively, this detection might depend on higher costs in areas with many firms i.e. city areas have larger costs compared to the countryside.

4.5 Other variables

Demand and cost are important factors explaining differences in price levels. The firms' costs are a central factor determining the price for a cut, but it is difficult to measure. The most important costs, except starting expenditures, are wages, costs of floor space and costs of used and/or products sold. It could be emotional questions to ask and it is hard to get correct information about these factors by phone. Not to get a lower answer frequency the cost factors are excluded from the interviews. However, it is central to include these variables so they are approximated by aggregated statistics. The most disaggregated area in Sweden, for which population and income statistics are available, is the municipality. Information at this standard area level is included in the analysis. To capture costs of floor space, the population density in the municipality (POPDENSITY) is integrated in the regressions as a proxy. The costs also depend on the hairdressers' use of cheap or expensive products i.e. shampoo, colouring and so on. It is possible that large firms, which order a lot of products, get a cheaper price (second degree of price discrimination). Because of measuring problems, it is necessary to say this is an unobservable factor. The SFF calculates the product costs to 10 percent of the firms' turnover so it will be assumed to be approximately the same for all firms. There might be variation in demand between markets. This is approximated by the size of average income per capita in the municipality, INCOME, which also could be seen as an approximation of the differences in wages between markets.

5. Empirical analysis

To prove the variables determining the price levels, the following econometric model is used.

$$P_i = \beta_0 + \lambda X_i + e_i$$

Where P is a price variable and β_0 is a constant. Furthermore, $\lambda = [\beta_1, \beta_2, \ldots, \beta_k]$ is a vector of parameters being estimated while X is a matrix of explanatory variables. The error term e_i is independent and assumed to have the property $e_i \sim (0, \sigma_e^2)$ while i is a certain observation. The estimations are made by ordinary least square estimation, OLS. All the regression results will be presented in Table 6.

5.1 Price

To eliminate collinearity between the explanatory variables, the analysis starts with correlation tests. The Pearson coefficients of correlation (ρ) between EMPLOY and CHAIRS, $\rho_{(EMPLOY, CHAIRS)}$, is 0.912 which implies existence of multicollinearity. Comparing the correlation between the two variables and HEPRICE, respectively, state that EMPLOY has a slightly higher correlation with the dependent variable, $\rho_{(EMPLOY, HEPRICE)} = 0.433$ while $\rho_{(CHAIRS, HEPRICE)} = 0.432$. Therefore only EMPLOY will be analysed.

The correlation between the distance variables are large, all values are over 0.711. The highest value is $\rho_{(DIST2, DIST3)} = 0.908$. DIST3 has the highest correlation with HEPRICE (-0.106 compared to –0.098). Thus, due to multicollinearity DIST2 is refrained from the model. There is a strong positive relationship between MARKET and FIRM that symbolize markets with approximately the same relationship between demand and the number of firms supplying the service. The correlation, $\rho_{(MARKET, FIRMS)}$, is 0.959. Comparing the correlation between the two variables and HEPRICE, respectively, state that FIRM has a slightly higher correlation with the dependent variable, $\rho_{(FIRM, HEPRICE)} = 0.111$ while $\rho_{(MARKET, HEPRICE)} = 0.115$. For this reason only FIRM is included in the analysis.

Primarily HEPRICE will be tested. To give an intuition of the price determining, the first step is to perform an OLS regression (1) with the dependent variable HEPRICE. The explanatory variables that will be captured in this model are quality, firm specific and market

structure variables. The time dummy variables (TIMEMEDIUM, TIMELONG), EDUCATION and REGULAR, are included in the regression as quality explanatory measures. Apart from the quality variables, several firm specific variables are included. Analysing TOTDIST result in an unexpected negative relationship with price i.e. the longer distance to the three nearest competitors the lower price level for both men and women. This result indicates an unanticipated negative relation between firm concentration and price. Furthermore, TOTDIST could be a proxy for differences in cost levels i.e. a short distance to competitors would reasonably result in higher costs forcing firms to offer a high price. The distance dummy variables are used as explanatory variables. To capture market structure, FIRM is included to gauge market size and to proxy the degree of competition. To comprise the cost of floor space, POPDENSITY is integrated. POPDENSITY is nonlinear and according to that, included in the regression as a logarithm. Demand variations and differences in wages across markets are approximated by INCOME.

Model 1.

$$HEPRICE_i = \beta_0 + \beta_1 TIMEMEDIUM_i + \beta_2 TIMELONG_i + \beta_3 EDUCATION_i + \beta_4 REGULAR_i$$
$$+ \beta_5 MEMBER_i + \beta_6 YEARSOWNED_i + \beta_7 EMPLOY_i + \beta_8 STUDENT_i + \beta_9 SENIOR_i$$
$$+ \beta_{10} MEDIUM_i + \beta_{11} DENSE_i + \beta_{12} FIRM_i + \beta_{13} LOG(POPDENSITY)_i$$
$$+ \beta_{14} INCOME_i + e_i$$

The overall significance of the model is proved at the 1 percent level. The F-value is 88.71, which is strictly larger than the critical value of F. At least one of the explanatory variables is significantly different from zero and makes impact on the price level.

All explanatory variables, except EDUCATION and INCOME, are significant at the 0.01 level. The price will be higher if the firm belongs to TIMEMEDIUM or TIMELONG, compared to TIMESHORT. Time appears to be one of the most substantial factors that influence price and an anticipated positive relation between time and price is demonstrated i.e. the longer time for a cut the higher the price. EDUCATION is significant at the 0.05 level with an expected positive impact on the price level. Thus, firms with trained staff offer a higher price level compared to firms without education. The results of (1) exhibit that firms are using vertical product differentiation to smooth price competition by changing the quality using time and education. The group with low cutting time also has a low education level. The

part of educated employees in TIMELONG is 20 percent higher than TIMEMEDIUM and 40 percent higher than TIMESHORT. During the interviews and with information from the SFF, it could be concluded that most of the firms calculate how much to earn in a special time horizon. Each firm choose the time to spend on each customer and then which price to offer for the given time or vice versa. Within this, each firm selects a particular quality level. This result bears out the selection into strategic time groups. The third quality variable, REGULAR has an expected positive impact on price. Hence, the price level will be higher if the firm has a high percent of regulars. This is reasonable because of firms with many regulars have excess capacity close to zero and are therefore incapable to satisfy a larger demand. This makes it useless for these firms to decrease their prices and get involved in price competition. As anticipated, the signs of the expected quality variables are proved to be positive i.e. high quality firms offer high prices.

All firm specific variables have a significant impact on the price proved at the 1 percent level. MEMBER influences the price positively thus, as anticipated, a membership in the SFF results in a higher price level. YEARSOWNED is proved to be negative so firms that have been owned for a short period of time by the present owner offer a high price for their customers. This might be due to that new firms require high revenues or that young hairdressers start firms in cities using vertical product differentiation, which permit them to offer a high price. EMPLOY has a positive sign i.e. a high number of employees result in a high price. One additional employee gives on average a 9.16 SEK higher price (Table 6). This result is unexpected because it is conceivable to argue the opposite. Firms with many employees ought to have low prices because of their good opportunities to diversify and satisfy total demand. If there exist economies of scale the large firms would have lower costs and for that reason have a lower price level. In this case the result is the opposite. This study does not include any measures of profitability so it is possible that large firms make high profits. STUDENT has a positive affect on price and SENIOR a negative. Both were expected to be positive (more about this in chapter 5.2). The distance variables MEDIUM and DENSE are both significant at the 1 percent level and have a surprisingly positive influence on the price level. If all other variables are held constant, firms in MEDIUM and DENSE offer a higher price than in LIGHT. Thus, a high price level is offered if the distance to the three nearest competitors is short. This result indicates an unexpected negative relationship between

firm concentration and price. At the same time, the positive signs indicate that the costs are higher in areas with many firms. This phenomenon could force the firms to offer high prices.

The market structure variable, FIRM is significant at the 1 percent level and has an unexpected positive sign i.e. a high number of firms in the locality result in a high price level. This confirms a negative relationship between price and seller concentration.[7] Few studies have concluded this result even though some exist e.g. Salop and Stiglitz (1977). However, the outcome is the opposite to the majority of earlier studies where firm concentration is proved to raise prices, e.g. Asplund and Friberg (2001), Cotterill (1986), Koller and Weiss (1989). The result is probably due to the following three things. First, the price competition is smoothed because of vertical product differentiation, which makes each firm's service unique. Second, there may exist asymmetric information between buyers and sellers. The consumers are considered to do costly search to reach enough information about the quality. The quality is easier to obtain if there are few firms in the market (Stiglitz, Salop 1977). Third, this phenomenon may depend on larger costs in cities, which forces the firms to offer a high price. Firms in countryside areas appear to have lower costs and may be forced to offer a lower price to get customers and to compete. On the other hand, the demand in cities might be larger because of the mobility of people. In (1) LOG(POPDENSITY) has an unreasonable negative sign and is significant at the 0.01 level. If the cost of floor space is high the price will be lower and vice versa, which is unexpected and irrational. INCOME is insignificant with an expected positive sign i.e. a large demand and high wages ought to result in a high price level. Anyway, the variation in demand and wages is not proved to affect the price level. The unreasonable result of LOG(POPDENSITY) and the weak affect of INCOME are presumably due to that these measures are defined at the municipality level. In this paper a market is defined as a locality, which makes it hard to incorporate affects from variables measured at a broader level.

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[7] An alternative measure of the relationship between concentration and price is to use the number of population per firm in the locality, POP/FIRM as a measure of concentration. This variable has been included in regressions but without successful outcomes. However, it is important to mention some of its basic properties. The correlation $\rho_{(POP/FIRM, HEPRICE)} = -0.082$ supports that a high level of POP/FIRM give low price levels. This is the opposite of the results of the distance and FIRM variables. Hence, the prices will be low in markets with many populations per firm and vice versa. The result could be related to the study of Bresnahan and Reiss where the number of people per firm increases when the number of firms increases in the market. Hence, the negative correlation is expected and supports the majority theories and empirical studies concluding a positive relation between firm concentration and price. The outcome could be argued to depend on existence of price competition, which forces each firm to have a larger demand to survive. The low level of the correlation is a problem that makes the result somehow unreliable. However, the detection indicates the trouble of stating a final solution of the relationship between firm concentration and price.

To sum up, (1) states that quality as well as firm specific factors have a significant impact on the price level. The market structure is also proved to influence the price, except for the differences in demand and wages across markets. The price will be high if a firm has long cutting time, educated employees, a high percent of regulars or a membership in the SFF as well as many employees, student discount, a short distance to competitors or a high firm concentration in the market, *ceteris paribus*.[8]

An alternative regression is model (2). It incorporates the original time and distance measures as well as firm specific explanatory variables. ESTABLISH and SQUAREMETER are added while the market structure variables are excluded. SQUAREMETER is incorporated as a logarithm because of its non-linear relationship with price.

Model 2.

$$HEPRICE_i = \beta_0 + \beta_1 HETIME_i + \beta_2 EDUCATION_i + \beta_3 REGULAR_i + \beta_4 MEMBER_i$$
$$+ \beta_5 EMPLOY_i + \beta_6 YEARSOWNED_i + \beta_7 ESTABLISH_i$$
$$+ \beta_8 LOG(SQUAREMETER)_i + \beta_9 STUDENT_i + \beta_{10} SENIOR_i + \beta_{11} DIST1_i$$
$$+ \beta_{12} DIST3_i + e_i$$

The overall significance of the model is proved at the 1 percent level by the high F-ratio of 104.6. The explanatory variables have exactly the same signs as those included in (1). Anyway, there are some differences between the models. EDUCATION is not proved to influence price and it is interesting that ESTABLISH is insignificant with a negative sign. Thus, that the owner has owned a firm before could not be evidenced to affect the price level. LOG(SQUAREMETER) is positive and significant at the 5 percent level. The low precision of the significance of LOG(SQUAREMETER) may perhaps be due to measurement problems. Having the positive sign of EMPLOY in mind makes the result of the cost of floor space reasonable i.e. large firms offer high prices. This is the opposite of the expectations because large firms have opportunities to diversify and satisfy total demand, which should result in lower prices. The differences in the affect from the distance variables are unexpected. DIST1 is positive and insignificant while DIST3 is negative and significant at the 1 percent level.[9]

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[8] If the dependent variable in (1) is changed to SHEPRICE and the time dummy variables are substituted by SHEHIGH, the signs of the explanatory variables are exactly the same. There are two differences namely that MEDIUM is surprisingly insignificant and LOG(POPDENSITY) is significant only at the 10 percent level. The small differences indicate that the price determining variables nearly seems to be the same for men and women.
[9] Doing regression (2) with the dependent variable SHEPRICE, except that HETIME is substituted by SHETIME, gives almost the same results. It is interesting to note that ESTABLISH is significant at the 5 percent level while SENIOR is insignificant.

In econometric analysis it is always important to show a model explaining as much as possible of the variation in the dependent variable. Therefore, a parsimonious regression (3) is done i.e. as few mathematical parameters as possible are used to describe the actual situation (Aczel s. 417). The model contains the most important variables explaining the systematic price variation. Quality and firm specific variables are included and the result is presented in Table 6. The overall significance of the model is evidenced at the 1 percent level by the F-value of 129.5. The only difference from previous results is that EDUCATION only is significant at the 10 percent level. Otherwise, (3) is confirming the importance of the quality and firm specific variables for the price determining.[10]

The adjusted R^2 is around 0.58 in model (1), (2) and (3) i.e. the explanatory variables explain around 58 percent of the systematic variation in HEPRICE. Comparatively these values are good because a low value of R^2 is typical in studies involving cross-sectional data analysed at the micro level. To show the importance of the quality and firm specific variables some separate regressions are done. Model (3) includes only quality and firm specific explanatory variables and results in an adjusted R^2 of 0.583. Only using market structure and cost explanatory variables gives an adjusted R^2 of 0.021. Incorporating the market structure and cost variables in (3) only lead to a marginal increase in the adjusted R^2 of 0.001. This result indicates that most of the price variation due to cost and market structure variables appears not being measured in this study. Nevertheless, the distance dummy variables as well as FIRM are evidenced to be positive and hence a negative relation between firm concentration and price is showed.

5.2 Price per minute

Only analysing HEPRICE might be misleading because of firms using different time for the same price. Although (1) reflects different time choices, it would be of interest to have a more precise measure of these important variables. To get a new dimension of the price levels HEPRICE/MIN, rather than HEPRICE, will be analysed. Model (4) uses the dependent variable HEPRICE/MIN and is reflecting explanatory variables capturing quality, firm specific and market structure variables. Hence, the explanatory variables are the same as in model (1). Because of its nonlinear relationship with HEPRICE/MIN, POPDENSITY is included in the regression as a logarithm.

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[10] The parsimonious model tested with the dependent variable SHEPRICE concludes mostly the same results except insignificance of EDUCATION and SENIOR.

Model 4.

$$(HEPRICE / MIN)_i = \beta_0 + \beta_1 TIMEMEDIUM_i + \beta_2 TIMELONG_i + \beta_3 EDUCATION$$
$$+ \beta_4 REGULAR_i + \beta_5 MEMBER_i + \beta_6 YEARSOWNED_i + \beta_7 EMPLOY_i$$
$$+ \beta_8 STUDENT_i + \beta_9 SENIOR_i + \beta_{10} MEDIUM_i + \beta_{11} DENSE_i$$
$$+ \beta_{12} FIRM_i + \beta_{13} LOG(POPDENSITY)_i + \beta_{14} INCOME_i + e_i$$

The overall significance of the model is evidenced at the 1 percent level. The F-value of 107.1 is strictly larger than the critical value of F. Ten variables are significant at the 1 percent level. A difference from the price analysis is that the time variables have negative signs but are still two of the most important variables. The price per minute will be lower if a firm has TIMEMEDIUM or TIMELONG, compared to TIMESHORT. Hence, it is concluded that firms in TIMEMEDIUM and TIMELONG will have a higher price and a lower price per minute, compared to firms in TIMESHORT. EDUCATION is negative but insignificant so the education could not be evidenced to affect the price per minute. The negative sign is unreasonable because trained staff ought to claim higher wages. On the other hand, REGULAR have a positive influence on the price per minute. The quality variables appear to affect the price per minute but in contrast to the price analysis the time variables have the opposite signs and EDUCATION is not evidenced to make any impact at all.

The firm specific variables are significant at the 1 percent level. They have the same signs as in the price analysis i.e. MEMBER, EMPLOY and STUDENT are positive while YEARSOWNED and SENIOR are negative. Furthermore, the price per minute has, like the original price, a negative relationship with TOTDIST. This result verifies the unexpected negative relationship between firm concentration and the price level. If a firm belongs to MEDIUM or DENSE, the price per minute on average will be higher, compared to firms in LIGHT.

The market structure variables are not shown to influence the price per minute on the same precision as they influence price. FIRM is positive but insignificant. Anyway, the positive sign indicates a negative relation between firm concentration and the price level. The cost factor, LOG(POPDENSITY), is negative and significant at the 10 percent level. Thus, the influence on price per minute is proved with lower exactness than the influence on price. INCOME is positive but insignificant so demand and wage differences are not evidenced to affect the price per minute. Like in the price analysis, the unreasonable result of

LOG(POPDENSITY) and the weak result of INCOME might depend on the to wide approximation of these measures.

To sum up, (4) results that the price per minute is affected by quality and firm specific variables and to a less extent by the market structure.[11] The R^2 values are slightly lower in (4), compared to the models (1), (2) and (3), namely around 0.4. The most notably differences between the price and the price per minute are interesting to mention. There is a negative sign of the time variables and education could not be evidenced to influence the price per minute. Anyway, both the price and the price per minute analysis state importance of quality and firm specific variables and a negative relation between firm concentration and the price as well as the price per minute are shown.

5.3 Third degree of price discrimination

The third degree of price discrimination will be analysed in two different points of view. First, discount for the two groups student and senior citizens are considered. Second, price differences between genders are analysed using the two groups men and women.

5.3.1 Student and senior citizen discount

The third degree of price discrimination is measured by the discount variables STUDENT and SENIOR, respectively. As mentioned in chapter 4.1 around 23 percent of firms offer some kind of discount, 8.2 percent for students and 14.7 percent for senior citizens. When running different type of regressions in chapter 5.1 and 5.2 it is shown that the two variables have the opposite signs. Firms with student discount have a higher original price while firms with senior discount have a lower, compared to firms without any discount at all. Both discount factors are expected to have positive signs because it is reasonable that firms offering discount should have a higher original price, compared to firms without discount. In Table 5 the price and time variables for discount and no-discount firms are shown.

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[11] Testing (4) with SHEPRICE/MIN as dependent variable and the time variables altered to SHEHIGH suggest explanatory factors having the same signs as in (4), except for a positive sign on SENIOR and a negative on INCOME. Furthermore the result states insignificance of EDUCATION, SENIOR, MEDIUM, LOG(POPDENSITY) and INCOME. The affect from FIRM and STUDENT are proved with lower exactness and is significant at the 5 percent level.

Table 5. Descriptive statistics for firms with and without discount.

	STUDENT 140 NOBS	SENIOR 78 NOBS	No Discount 752 NOBS
	Mean	Mean	Mean
HEPRICE	247.1	185.6	205.9
SHEPRICE	262.1	203.8	225.2
HETIME	32.09	28.30	30.36
SHETIME	43.18	34.27	40.38
HEPRICE/MIN	7.919	6.885	7.140
SHEPRICE/MIN	6.135	6.112	5.676

Firms with student discount have a mean price for men, before the discount, that is around 20 percent higher than no-discount firms. Hence, assuming a discount factor of 10 percent gives a price difference of 10 percent. The difference for women is slightly lower. At the same time, firms with student discount have the longest cutting time for both men and women. However, the education level is surprisingly lower than other firms. That firms with student discount offer a higher price may perhaps be due to that younger consumers have a large willingness to pay resulting in a low elasticity of demand.

It is surprising that SENIOR is negative i.e. firms with senior citizen discount offer a lower price before the discount. Firms with senior citizen discount have a mean of HEPRICE and SHEPRICE, respectively, that is around 10 percent lower compared to firms without any discount at all. Thus, assuming a discount factor of 10 percent applied on the original price gives a final price difference of 20 percent. Hence, firms with senior discount offer the lowest price for all type of customers. The result is the same for both men and women. These firms also have the lowest price per minute for men (Table 5). The outcome for women depends on the size of the discount factor. Assuming a discount factor larger than 7.5 percent states that firms with senior discount offer the cheapest price per minute also for women. Studying quality state that these firms have the shortest time for both genders, an education level that is around 15 percent lower than for other firms and a percent of regulars that is roughly 5 percent lower. Hence, firms with senior discount offer the lowest price and the lowest quality. Apart from this, the result might be due to the economic situation for the senior citizen. Overall, the group has the lowest income in the society and might be very price sensitive i.e. the price elasticity of demand is high.

5.3.2 Price discrimination between genders

In economic research it is common to analyse dissimilarities between genders. This paper will shed some light on the topic as a phenomenon of third degree of price discrimination, analysing price differences comparing the two groups men and women. The price analysis in this paper states that women are offered a higher price compared to men. On the other hand, the price per minute analysis states the opposite conclusion. The price per minute gives in some way the best picture when comparing price levels for men and women. According to this the gender discrimination will be tested using a regression with the dependent variable (HEPRICE/MIN)/(SHEPRICE/MIN).

Model 5.

$$
\left(\frac{HEPRICE / MIN}{SHEPRICE / MIN} \right)_i = \beta_0 + \beta_1 TIMEMEDIUM_i + \beta_2 TIMELONG_i + \beta_3 SHEHIGH_i
$$

$$
+ \beta_4 EDUCATION_i + \beta_5 REGULAR_i + \beta_6 MEMBER_i
$$
$$
+ \beta_7 YEARSOWNED_i + \beta_8 EMPLOY_i + \beta_9 STUDENT_i + \beta_{10} SENIOR_i
$$
$$
+ \beta_{11} MEDIUM_i + \beta_{12} DENSE_i + \beta_{13} FIRM_i + \beta_{14} LOG(POPDENSITY)_i
$$
$$
+ \beta_{15} INCOME_i
$$

The genders are offered the same price per minute if the quote of the dependent variable is equal to one. From the distribution of the price per minute variables it is stated that HEPRICE/MIN is higher than SHEPRICE/MIN (chapter 4.1). Men, on average, have to pay a 1.4 SEK higher price per minute. This result occurs because many firms have the same price for both genders but the cut time for men is shorter. This advocates price discrimination against men. Therefore, the nominator is expected to be larger than the denominator and hence lead to a quote larger than one. Explanatory variables with a negative sign smooth the gender discrimination for men while explanatory variables with a positive sign increase the discrimination.

The result of the regression states that the constant, β_0, is equal to 1.586. Most of the explanatory variables have a negative impact, causing a quote close to one. The time variables are significant at the 1 percent level. The time variables for men are negative. Hence, the price discrimination for men is reduced if a firm belongs to TIMEMEDIUM or TIMELONG, compared to TIMESHORT. As an opposite, it is logically that SHEHIGH is positive and

therefore increases the gender discrimination. EDUCATION and REGULAR are insignificant with positive and negative signs, respectively. All firm specific variables, except YEARSOWNED, are proved to have impact on the quote. MEMBER is positive and significant at the 10 percent level. STUDENT is also positive but proved to increase the gender discrimination at the 1 percent level. EMPLOY and SENIOR are significant at the same level but with negative signs. Analysing the distance variables result in a positive sign of MEDIUM, proved at the 10 percent level. Consequently, the gender discrimination will be larger if a firm belongs to MEDIUM, compared to LIGHT. This result is confirmed by descriptive statistics of the price per minute variable. Firms in dense and light areas offer, on average, a 1 SEK higher price per minute for men compared to women. For MEDIUM the mean difference is larger, namely 1.68 SEK. In (5), DENSE is not proved to influence the quote even though it has a positive sign. The market structure variables are not shown to influence the gender discrimination. FIRM and LOG(POPDENSITY) have negative signs while INCOME have a positive. The price discrimination against men could be explained by the fixed activities that the hairdresser has to do for each customer. Thus, that men in general have shorter hair than women could affect the group to get a higher price per minute. That men are offered a higher price per minute might depend on their higher level of income and hence lower elasticity of demand. On the other hand, women might in general be more interested in their hair and could therefore be willing to pay a higher price. However, this interest could increase their knowledge about the market reducing the level of asymmetric information, which possibly makes the demand for women more elastic.

6. Conclusions

This paper proves that the price level in the haircut market foremost is influenced by quality and firm specific factors. The positive result from the quality variables states importance of vertical product differentiation i.e. the firms change their services with time and education to reach market power. A high percent of regulars indicates low excess capacity for the firms. Hence, they are incapable to satisfy a larger demand. This makes it useless to get involved in price competition, which result in a high price level for these firms. Most of the firm specific factors e.g. membership in the SFF, influences the price levels in a positive direction. Large firms offer unexpectedly high prices. This could due to that they are located in cities and

hence have high costs. The conclusion that firm specific factors as well as quality variables, are the most important for price determining supports many other studies (e.g. Coterill, 1986, Asplund and Friberg, 2001). Market structure variables, like the number of firms in the market, are to some extent evidenced to affect the price. A negative relationship between firm concentration and price are shown. This is the opposite of the expectations and the majority of earlier studies of price and market structure even though there exist studies proving this relation (e.g. Stiglitz and Salop, 1977). To some extent, this paper concludes that the relation between firm concentration and price is an empirical question. The unexpected result might depend on product differentiation, asymmetric information and cost variations. The proxy for differences in cost of floor space is surprisingly negative and significant. This is due to measurement problems and a too wide approximation of the cost variables. Due to the same reasons, demand and wage variations could not be proved to influence the price level. Hence, it is necessary to say that these factors are a limitation of this paper.

When assuming a discount factor over 7.5 percent, the analysis of the third degree of price discrimination show that firms offering senior citizen discount have the lowest price and price per minute for both genders. This detection is argued to depend on the low quality level of these firms as well as a presumably high elasticity of demand of senior citizen. Gender discrimination against men is affected by quality and firm specific factors. The phenomenon is argued to be due to that men, in general, have shorter hair. The hairdresser is forced to do fixed activities for each cut, despite the length of the hair. Moreover, the elasticity of demand is lower for men because of the higher income, compared to women.

Table 6. Regression results from the total analysis (t-value in parenthesis).

	HEPRICE (1)	HEPRICE (2)	HEPRICE (3)	HEPRICE/MIN (4)	(HEPRICE/MIN) (SHEPRICE/MIN) (5)
HETIME		2.219*** (17.87)	2.172*** (17.66)		
TIMEMEDIUM	29.78*** (11.42)			-2.565*** (-25.07)	-0.632*** (-39.44)
TIMELONG	60.81*** (16.25)			-4.423*** (-30.13)	-1.021*** (-42.83)
SHEHIGH					0.372*** (25.06)
EDUCATION	4.745** (2.119)	3.076 (1.340)	4.680** (2.128)	-3.24 E-03 (-0.037)	5.568 E-03 (0.440)
REGULAR	0.373*** (4.765)	0.367*** (4.590)	0.389*** (5.094)	0.013*** (4.277)	-4.49 E-04 (-1.014)
EMPLOY	9.172*** (12.28)	8.129*** (9.839)	8.537*** (11.60)	0.212*** (7.240)	-0.013*** (-3.260)
ESTABLISH		-0.735 (-0.341)			
YEARSOWNED	-0.513*** (-4.638)	-0.550*** (-4.983)	-0.551*** (-5.045)	-0.017*** (-4.006)	3.450 E-04 (0.554)
MEMBER	12.24*** (5.780)	13.71*** (6.565)	13.923*** (6.752)	0.628*** (7.566)	0.022*** (1.875)
LOG(SQUAREMETER)		11.53** (2.145)			
STUDENT	28.85*** (7.607)	30.47*** (8.207)	28.91*** (7.749)	0.882*** (5.927)	0.0573*** (2.688)
SENIOR	-19.16*** (-6.687)	-18.09*** (-6.299)	-18.03*** (-6.433)	-0.497*** (-4.420)	-0.0824*** (-5.036)
DIST1		7.924 E-04 (1.330)			
DIST3		-1.33 E-03*** (-3.104)			
DENSE	14.90*** (4.524)		15.08*** (4.721)	0.524*** (4.059)	4.829 E-04 (0.027)
MEDIUM	8.189*** (2.876)		8.302*** (2.989)	0.366*** (3.275)	0.02687* (1.709)
FIRM	0.023*** (3.123)			3.416 E-04 (1.165)	-3.64 E-05 (-0.881)
LOG(POPDENSITY)	-4.960*** (-2.799)			-0.119* (-1.707)	-9.15 E-03 (-0.937)
INCOME	0.088 (1.01)			4.641 E-03 (1.444)	6.616-4 (1.462)
CONSTANT	112.0*** (8.790)	72.48*** (7.363)	78.70*** (10.79)	6.990*** (13.98)	1.586*** (22.34)
Adjusted R^2	0.572	0.578	0.583	0.559	0.733
F-value	88.71	104.6	129.5	107.1	84.19
NOBS	919	910	921	919	909

a) Variables starred with *** are significant at the 0.01 level, with ** at the 0.05 level and with * at the 0.1 level.

7. Suggestions for further research

This study is concluding some of the basic factors influencing the price levels. Thus, to expand the analysis and get more reliable results some new explanatory factors as well as more precisely measures of some of the explanatory variables used in this paper would be of interest.

First, a better measure of the cost factors would be of importance. That means not approximated but instead more detailed measures of firm specific costs. This would result in opportunities to more fairly compare firms.

Second, the negative relation between firm concentration and price is a troublesome topic. It could be possible to control the result by including more and better variables measuring the market structure. To include measures of product differentiation and asymmetric information would also be of importance. It would also be interesting to study price variations within markets i.e. make total investigations of some local markets and pay attention on the aspect of horizontal product differentiation.

Third, it would be relevant to have information about the consumers' price sensitivity and preferences on quality, social factors, geographical localisation and so on would be of interest. This knowledge would result in a better understanding of the demand.

Finally, for further research it would be remarkable to calculate a minimum price that could be offered to be able to pay social fees and taxes. This would be a tool to select firms that compete at the same properties. Moreover, it would be of interest to research the new certification that probably is going to take place in Sweden. Similar certifications already exist in other services, e.g. the cab market to guarantee a particular quality. The project is now tested in Malmoe and it would be interesting to analyse the consequences it leaves on prices and market structure.

8. Summary

This paper analyses price determining and price discrimination in the haircut market in Sweden using a large data set collected as a simple random sample from the local Yellow Pages. This paper does not test a particular theory. Instead, general theories of imperfect competition and price discrimination are considered. The data set includes information of prices for both men and women but the study is focused on the price for men. There is a large price spread i.e. the highest price is around four times the cheapest. The price variation is explained with several quality, firm specific and market structure variables. The quality variables are proved to be central for the price determining, specifically the time offered for a cut. The existence of vertical product differentiation is large because of firms using time and education to soften price competition and obtain market power. The firm specific variables are also shown to be substantial for the price determining. The number of employees, membership in the SFF, years owned by the present owner and discount offering are the most important when explaining price variations. The conclusion of importance of quality and firm specific factors supports the result from studies made in other industries. The market structure variables state that the price will be higher in a market, *ceteris paribus*, if the firm concentration is low. This conclusion is the opposite to the majority of other studies and might be due to product differentiation, asymmetric information and cost variations. Variation in demand and wages are only proved to have a small impact on the price level and the proxy for cost of floor space is surprisingly negative. This is anticipated to be due to measurement problems and a to broad approximation of these variables. This study also shed some light on two different sorts of third degree of price discrimination. Analysing discount for student and senior citizen state that firms having senior citizen discount overall offer the lowest price and quality for both men and women. Price differences between genders show that men, on average, have to pay a higher price per minute than women. This detection supports gender discrimination against men.

Appendix

Appendix 1. Price discrimination and the inverse elasticity role.

Assume the cost of production is $C(q)$, where q is the quantity produced. If the prices p in k different markets are,

$$(p_1, ..., p_i, ..., p_k)$$

The quantity demanded *(D)* of quantities in the different markets is equal to,

$$[q_1 = D(p_1), ..., q_i = D(p_i), ..., q_k = D(p_k)]$$

Then the aggregate demand is,

$$q = \sum_{i=1}^{k} D_i(p_i)$$

Therefore the firm offer prices that maximises the profit,

$$\sum_{i=1}^{k} p_i D_i(p_i) - C\left(\sum_{i=1}^{k} D_i(p_i)\right)$$

Where C is the cost of producing the quantity demanded. If it is assumed that the total cost could be divided into x separate groups. Then the relative price margins are given by the inverse-elasticity rule

$$\frac{p_i - C'(q)}{p_i} = \frac{1}{\varepsilon_i}$$

Where the elasticity of demand in market i is

$$\varepsilon_i = \frac{-D_i'(p_i)p_i}{D_i(p_i)}$$

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