



B.A. Thesis
Economics

Fighting Misconception
A Survey of Price Discrimination

Guðmundur Óli Magnússon

Advisor: Birgir Þór Runólfsson

Faculty of Economics

October 2014



HÁSKÓLI ÍSLANDS

Fighting Misconception
A Survey of Price Discrimination

Guðmundur Óli Magnússon

A thesis towards a B.A. degree in Economics

Advisor: Birgir Þór Runólfsson

Faculty of Economics

Social Science Division of the University of Iceland

October 2014

Fighting Misconception

This essay is a 12 credit thesis towards a B.A. degree from the Faculty of Economics, Social Science Division of the University of Iceland.

© 2014 Guðmundur Óli Magnússon

This thesis may not be copied or distributed without the consent of its author.

Printed by: Háskólaprent

Reykjavík, 2014

Preface

This essay is a 12 ECTS credit thesis towards a B.A. degree from the Faculty of Economics at the University of Iceland. I want to thank my advisor Birgir Þór Runólfsson for the invaluable guidance and feedback, especially during the closing stages of the writing process, without which this project would not been possible.

Abstract

This thesis' aim is to clarify common misunderstandings in relation to price discrimination. It will present the microeconomic literature on price discrimination as well as new research and analyze the effects of price discrimination on welfare using the fundamental models of microeconomics as benchmarks.

Price discrimination is when two or more similar goods are sold at prices that are in different ratios to marginal costs. The practice can help firms raise their profits by attracting new customers, increasing sales and by charging a higher price to those that value its product highest.

The word discrimination however, helps fuel a general distaste for the practice among the public. The perceived unfairness leads to immense pressure for legislative actions. The measures taken in order to relive such pressure are often misguided and can lead to inferior outcomes than those they were aimed to cure.

New research has changed the way economists and regulators have to approach price discrimination by challenging one of the main criteria for a firm's ability to adopt discriminatory prices. The results from said research, along with an analysis of the welfare effects of price discrimination will be used here to make a case for the positives of the practice.

Table of Contents

Preface	4
Abstract.....	5
1 Introduction.....	9
2 Economic theory and models	12
2.1 Perfect competition.....	12
2.2 Monopoly.....	14
2.3 Monopolistic Competition.....	18
2.4 Market power and the price elasticity of demand.....	21
2.5 Willingness to pay.....	22
3 What is price discrimination?.....	23
3.1 First-degree Price Discrimination	23
3.1.1 The Internet	24
3.2 Second-degree price discrimination.....	25
3.3 Third-degree Price Discrimination.....	26
3.4 Summary.....	26
4 Some examples of price discrimination tactics.....	28
4.1 Bundling.....	28
4.2 Tie-in-sales.....	28
4.3 Two-part tariffs.....	29
4.4 Summary.....	29
5 Why do firms price discriminate?.....	31
6 Competition law	33
6.1 In the United States	33
6.2 The European Union.....	34
6.3 Economic Issues.....	35
6.4 Summary.....	35
7 Conditions of Price Discrimination	36
7.1 Ways to prevent resale.....	37
8 Is it possible to price discriminate without market power?.....	38
8.1 A negatively sloping demand curve does not equal market power.....	39
8.2 Charging prices equal to marginal cost will not cover costs	39
8.3 Firms might be forced to adopt discriminatory prices.....	40

8.4	Firms are price takers in the long run	41
8.5	Major implications	41
8.6	Summary	42
9	Price discrimination's effects on the market	43
9.1	Distribution effects	43
9.2	How does price discrimination effect competition?	44
10	Does price discrimination improve or diminish overall welfare?	46
10.1	Welfare effects of perfect price discrimination	46
10.2	Welfare effects of second degree price discrimination	48
10.3	Welfare effects of third degree price discrimination	50
10.4	Summary	51
11	Conclusion	52
	References	53

List of Figures

Figure 1 : Profit Maximization for a Competitive Firm.....	13
Figure 2: Profit Maximization by a Monoply	15
Figure 3: The Inefficiency of Monopoly.....	17
Figure 4: Long Run Equilibrium under Monopolistic Competition.....	19
Figure 5: Possible Equilibria under Monoplistic Competition	20
Figure 6: Small town doctor	44
Figure 7: Perfect Degree Price Discrimination	47
Figure 8: Quantity Discounts	49
Figure 9: Third Degree Price Discrimination.....	50

1 Introduction

Discrimination is normally referred to as the unjust or prejudicial treatment of different categories of people, especially on the grounds of race, age, or sex. Therefore the word discrimination, in general, has a very negative connotation in today's society. Discrimination however can be split into the previously mentioned prejudice discrimination and then statistical discrimination. The difference between the two can be tricky to understand as both lead to inequalities based on race, sex, age etc. Prejudice discrimination is defined as discrimination that arises from tastes that inherently prefer one group over another while statistical discrimination arises from asymmetric information.¹ Statistical discrimination is an economic theory of racial or gender inequalities based on stereotypes and can exist even when economic agents, such as consumers, employers and workers, are rational and non-prejudiced (Nechyba, 2011). As an example, insurance companies discriminate on the basis of statistical evidence. Young adults, especially young males, generally face a higher fee for car insurance than a middle aged individual. This discrimination has no prejudice behind it, purely statistical evidence that young adults have a higher chance of being in an accident. Similarly, life insurance charges are higher for individuals that smoke or have a history of certain diseases.

The word discrimination however, generally implies the prejudice variation. Therefore it tends to evoke strong negative emotions in us, so strong that it might be hard to understand why anyone would try to justify any version of it. That is still the objective of this thesis. It will address one distinct version of discrimination; price discrimination. The Oxford English Dictionary defines price discrimination as:

the action of selling the same product at different prices to different buyers,
in order to maximize sales and profits

¹ Asymmetric information is when one individual in a transaction has more information compared to other involved in the same transaction.

The practice is usually perceived to be unfair by the public. The public's view of unfairness probably comes from the fact that today's society is extremely focused on equality. Every single individual should be treated the same, without concerns of sex, race, or sexuality and here we are not objecting to this. The point is that this notion of equality spreads to the business arena and the public feels it is unfair for one person to pay more for a given product or service than someone else. And the dictionary definition put forth describes just that. Obviously some consumers are being taken advantage of in a firm's pursuit of further wealth and power. In this thesis we will challenge this view by analyzing the welfare effects of price discrimination. The results will surprise many as price discrimination tends to lead to increased welfare by opening up markets, increasing output and improving efficiency in the economy. But because people do not like being taken advantage of, they tend to be quite wary of economic analysis, often put forth in a complicated matter. The fact is that price discrimination is an ancient practice that has prevailed for ages. Because of its potential to increase efficiency it tends to have the support of the government, which tries to act in society's interests.

The practice also gets plenty of attention by legislative powers, which is often misguided by intense political pressure from consumers, especially those faced with the higher of the discriminatory prices charged. In this thesis we will therefore also challenge the legislative approach to price discrimination as well as dispel the notion that price discrimination is illegal and therefore wrong and unfair.

We will present what we deem to be the important aspects of price discrimination with the hope of shedding light on what is behind it and to show that price discrimination is far from the horrible monster it tends to be marked out to be. In order to fully understand price discrimination and how it affects the market it is imperative to have a basic understanding of certain key concepts in economics. In Section 2 we will, for this reason, present a short run through of major models and concepts needed to be able to understand the reasoning that will follow. The concepts explained will be reoccurring throughout this thesis and the models will be used as a benchmark for further analysis later on. After that we will continue on to the basics of price discrimination in section 3. We will build on the previous definition of price

discrimination and present the popular three type separation. In section 4 we will cover a few common price discrimination tactics as well as present examples of each and we will conclude the section by discussing the importance of such tactics. In section 5 we will present and explain the incentives that lead firms to price discriminate, followed by a discussion on some legal aspects of price discrimination in section 6, as this seems to be an area of some confusion. We will present the traditional conditions that need to be in place for price discrimination to be possible in section 7. In section 8 we will present a new way of thinking about price discrimination. The analysis found there will challenge the fundamental conditions of price discrimination as well as having major implications for future study on price discrimination and competition laws. Finally in sections 9 and 10 we focus on the impacts of price discrimination on the market and welfare. We will show that price discrimination can open up new markets as well as improve the efficiency of established markets.

2 Economic theory and models

In this section we will present a short overview of the most important models and concepts relating to the economics of price discrimination. This will not be a comprehensive or complete account but adequate enough to enlighten those with little background in economics and refresh previous learning for those with more background.

2.1 Perfect competition

Perfect competition is a theoretical market structure, a benchmark to which other market structures are compared. Under perfect competition there are many buyers and sellers, so many that it leads to each participant, seller or buyer, having minimal influence on the market as a whole. Because each participant represents such a small portion of the market he cannot affect the market price. Thus, everyone is a price taker, meaning that they have to take the market price as given. Under perfect competition the quality and characteristics of the market good does not vary across sellers, this means the good each seller offers is a perfect substitute for the good of other sellers; referred to as a homogenous good.

There are no entry or exit barriers, so firms can easily move around and the market will always stay saturated. Buyers and sellers also have perfect information and there are no transaction costs. Since all goods are the same and everyone has perfect information no seller is able to raise its price because every buyer knows exactly what each seller is charging; information is available at no cost.

Figure 1 shows how a competitive firm maximizes their profit. Raising prices above marginal cost would lead to the firm losing all its business to its rivals. Similarly, firms have no incentive to lower their price below marginal cost as they are able to sell every unit they want under the set market price so in the long-run price equals marginal cost.

When there are no externalities² or public goods³ the perfect competitive equilibrium is Pareto efficient.⁴

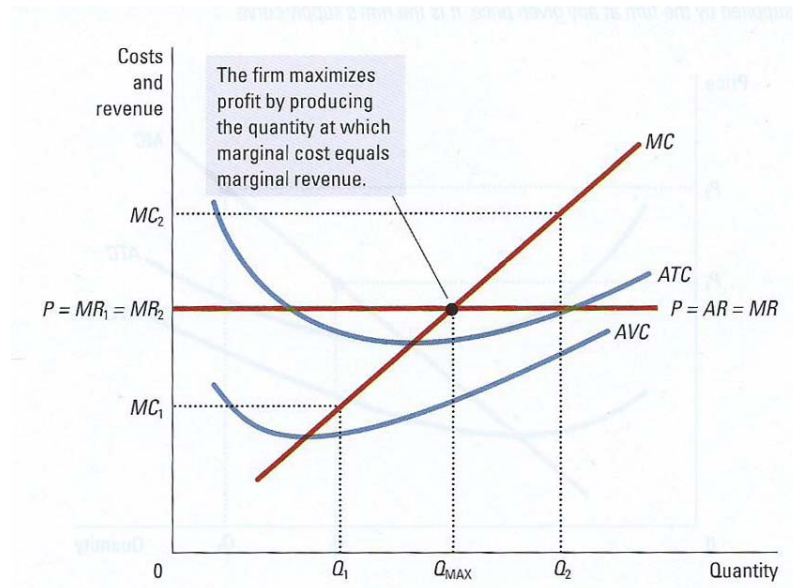


Figure 1 : Profit Maximization for a Competitive Firm (Mankiw & Taylor, 2008, pp. 271).

Under perfect competition, firms are not able to earn economic profit in the long run.⁵ Economic profit is possible in the short run but if there is profit in the short-run it will lead to the entry of new firms. The new entrants will increase supply, causing prices to fall and the economic profit drops to zero. The perfect competition model therefore describes a situation that leads to the highest level of consumer surplus⁶ possible, as

² An externality is the consequence of an economic activity that is experienced by unrelated third parties.

³ A public good is a product that one individual can consume without reducing its availability to another individuals.

⁴ An economic situation is Pareto efficient if there is no way, by changing the allocation of goods among different individuals, to make one or more consumer better off without someone else being worse off because of it.

⁵ In economics, the term profit does not have exactly the same meaning as it does in accounting. The difference is that economic profit reflects total opportunity costs, both explicit and implicit. So when economists say profit, they are talking about the extra profit compared to the next best alternative.

⁶ Consumer surplus is the difference between what a good is worth to a consumer and what the consumer pays for it.

well as the highest level of economic welfare possible for society. This is a situation where there will be no deadweight loss.⁷

A real world market that has numerous sellers and buyers is the dairy market and one of the products there is milk. There, each seller should have relatively little control of his price as his milk is so similar to all other milk on the market. In reality this is not the case as agriculture is highly regulated by the government. This market is often characterized by subsidies that interfere with its free operation.

In summary: perfect competition is characterized by the following

- Many buyers and sellers
- Homogenous goods
- No barriers of entry or exit
- No transaction costs
- Perfect information

And it leads to

- Maximum efficiency
- Maximum consumer surplus
- Maximum welfare

Again, it is important to remember that the model of perfect competition is not intended as a description of reality. It is designed to be an idealized benchmark used to evaluate real life situations. Therefore a market can be highly efficient even though it does not fit into this model.

2.2 Monopoly

Pure monopoly can be looked on as the opposite of perfect competition. It, like perfect competition, is a theoretical market structure. There, one single firm, a monopolist, is

⁷ Deadweight loss is a loss of welfare for society.

the only firm in the market of a certain good.⁸ Therefore no close substitutes exist and the monopolist is able to control supply in the market. This means that the monopolist is not a price taker, because its control over the market supply gives it the power to influence price by the amount that it sells. This influence on the market means the monopolist is able to raise prices without losing all its business. As can be seen in figure 2, the monopolist will choose an output where marginal cost equals marginal revenue. This will always lead to a lower output than the one that would prevail under perfect competition. This will raise the market price above marginal price and lead to the highest possible profit for the monopolist.

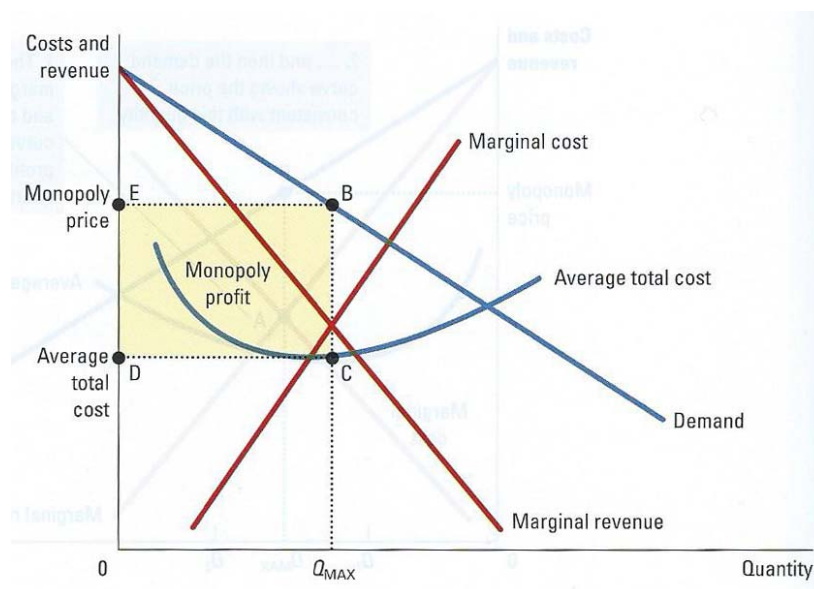


Figure 2: Profit Maximization by a Monopoly (Mankiw & Taylor, 2008, pp. 296).

In 'The Wealth of Nations', Adam Smith (1776, vol. I, bk. I, ch. 7.) summarized the difference between price under monopoly and perfect competition:

The monopolists, by keeping the market constantly under-stocked, by never fully supplying the effectual demand, sell their commodities much above the natural price, and raise their emoluments, whether they consist in wages or

⁸ Note that two or more firms can join forces and form a cartel, which then behaves like a single monopolist.

profit, greatly above their natural rate. The price of monopoly is upon every occasion the highest which can be got. The natural price, or the price of free competition, on the contrary, is the lowest which can be taken, not upon every occasion, indeed, but for any considerable time together. The one is upon every occasion the highest which can be squeezed out of the buyers, or which, it is supposed, they will consent to give: the other is the lowest which the sellers can commonly afford to take, and at the same time continue their business

A monopoly usually arises because of barriers to entry. These barriers can be caused by a variety of situations like economies of scale,⁹ capital requirements¹⁰ and legal barriers,¹¹ to name a few. Entry barriers protect the already established firm by making it very hard, usually financially, for prospective firms to enter the market.

The monopolist will decrease output from the social optimum of perfect competition. The excess demand will cause prices to rise above marginal cost. The transfer of income from consumer to the monopoly will cause inefficiencies as well as deadweight loss, which is represented in figure 3 by the shaded area. Therefore a monopoly will reduce economic welfare compared to perfect competition and society as a whole will be worse off.

The lack of competition can lead a monopolist to have less incentive to innovate and to keep costs down. This could lead to even more inefficiencies as time goes by. On the other hand, there also are some markets that need monopolies in order work. Markets that have extremely high research and development costs, like the pharmaceutical market, may need the monopoly power that comes with new patented drugs in order to fund further research. Without patents firms could find it hard to stay afloat in that market.

⁹ When a firm's size, gives it a proportionate cost saving advantage because of increased levels of production.

¹⁰ Large fixed costs or high research and development costs for example.

¹¹ Like patents and other intellectual property rights.

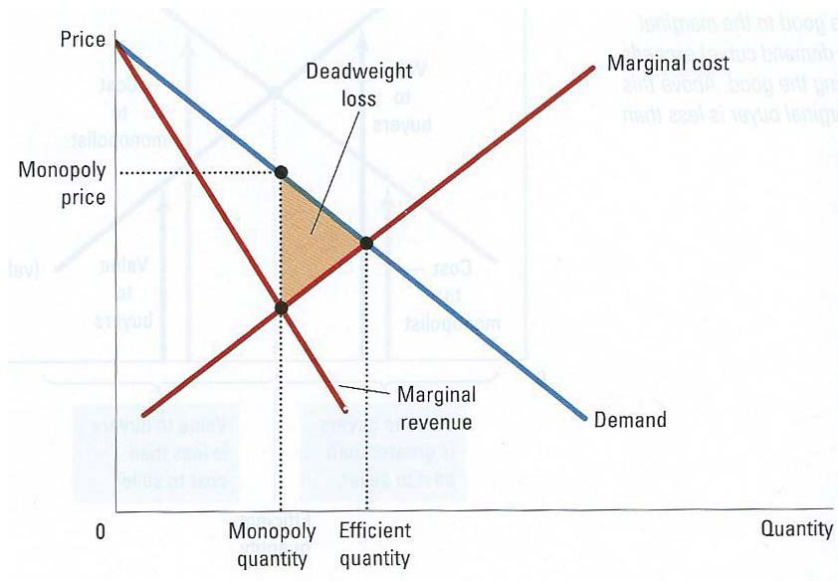


Figure 3: The Inefficiency of Monopoly (Mankiw & Taylor, 2008, pp. 300).

In certain markets the socially optimal prices can only be achieved by using price discrimination. In such markets it can be in society's interests to allow monopolies to practice price discrimination in order to reach the socially optimal scenario. These markets understandably tend to be highly regulated by the government. This regulation can come in the way of a policy rule, which stands as an economic goal or target for the market. One such rule is Ramsey Pricing, which is intended to lead to the monopolist setting prices that maximize social welfare while still allowing the firm to break even. Ramsey pricing is the argument that if prices are to be increased, it is a good strategy to increase the markup on goods with the most inelastic demand, because consumers will not be as sensitive to the price raise. Under Ramsey Pricing the misallocation of resources are minimized but not eliminated (Armstrong, 2006).

In summary: monopoly is characterized by the following

- Single seller
- Price maker
- High entry barriers
- Profit maximization
- Imperfect information

And it leads to

- Higher prices
- Lower output
- Deadweight loss

Again, it is important to remember that the model of pure monopoly, much like perfect competition, is not intended as a description of reality. Monopolies exist in reality but without perfect information they will not be able to replicate the results of a pure monopoly. Real world monopolies will still be able to control output to some degree, leading to higher prices and welfare loss.

2.3 Monopolistic Competition

In between these two ends of the spectrum or extremes, perfect competition and pure monopoly, there is a market structure called monopolistic competition. There are two major models under monopolistic competition; the representative model; where all firms compete equally for consumers, and the spatial model; where each consumer generally prefers the product of one single firm ahead of others (Carlton & Perloff, 2005).

Under monopolistic competition there are many sellers and many buyers, much like under perfect competition. Here, goods are not homogenous like under perfect competition. However the cross price elasticity of demand¹² between products in this

¹² The cross elasticity of demand measures how a price change in one product affects the demand of another product.

type of market is positive so even though they have non-price differences, they are not sufficient to completely block out other products as potential substitutes. This product differentiation will lead to firms having some market power and the ability to raise their prices without losing all of their business. Product differentiation is when a product differs from others in the market. If a firm's brand, reputation, location etc. gives them a lead on the competition it can give it market power.

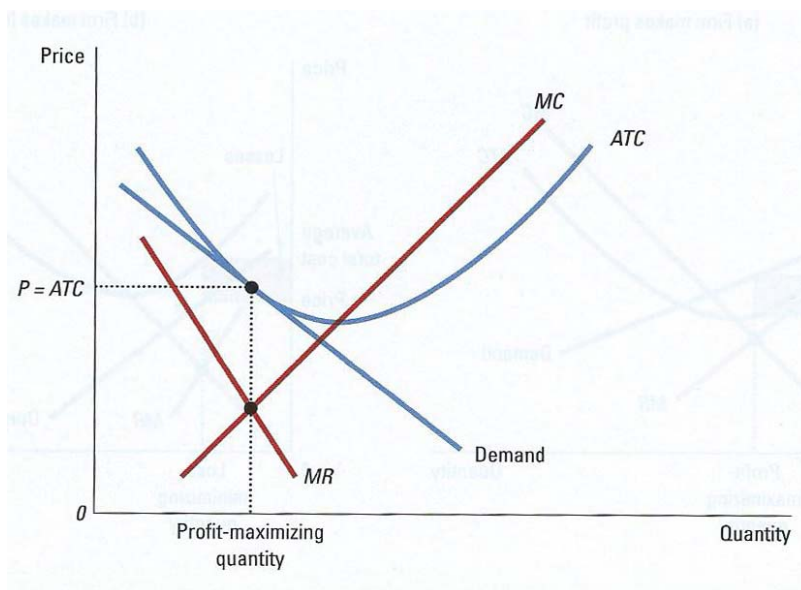


Figure 4: Long Run Equilibrium under Monopolistic Competition (Mankiw & Taylor, 2008, pp. 350).

Entry and exit in a market constrained by monopolistic competition is easy in the long run, which means the market will be saturated as there will always be plenty of firms ready on the sidelines, waiting for an opportunity to jump in. In the long run firms find themselves in the long run equilibrium shown in figure 4. There price equals average total costs (ATC) and firms will earn zero economic profit. Firms might be able to earn some excess profit over the competitive level in the short run before new entrants arrive, driving prices down.

In summary, monopolistic competition is characterized by:

- Many buyers and sellers
- Differentiated goods
- No barriers of entry or exit in the long run
- Imperfect information

When it comes to output, monopolistic competition again ends up between the two extremes previously covered, striking below the ideal mark set by perfect competition but not as far off as monopoly. This however does not have to lead to lower efficiency. This is because of the trade-off between product variety, the number of different brands, and the quantity produced of each brand. The indifference curves in figure 5 represent society's preferences concerning this choice between variety and quantity and the production possibility frontier (PPF) represents all possible combinations of number of brands and quantity per brands. We can see that society's optimal choice, point O, is preferable over all other possible combinations. At point A, there are too many brands and not enough produced of each. At point B, there are too few brands and too much produced of each (Carlton & Perloff, 2005).

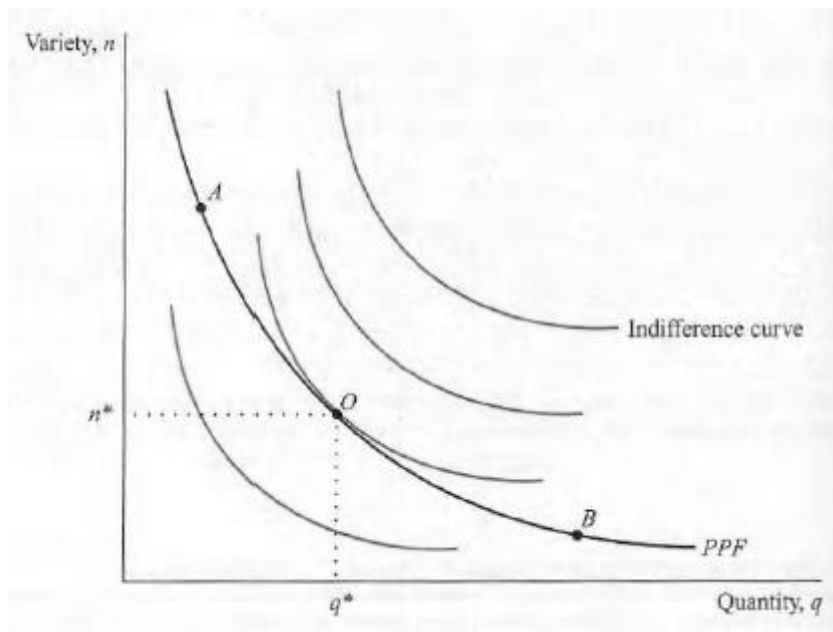


Figure 5: Possible Equilibria under Monopolistic Competition (Carlton & Perloff, 2005, pp. 214).

2.4 Market power and the price elasticity of demand

In economics, market power is a firm's ability to raise prices above marginal cost.¹³ How much market power a firm has depends on the shape of its demand curve. The demand curve represents how much consumers are willing and able to purchase of a good at different prices. Therefore it shows how consumers will react to changes in prices. How much output changes when prices are changed will depend on the price elasticity of demand. Price elasticity of demand is defined as: "the percentage change in the quantity demanded in response to a given percentage change in the price" (Perloff, 2012, pp. 67). This can be represented as:

$$\varepsilon = \frac{\Delta Q/Q}{\Delta p/p}$$

where Q is the quantity demanded and p is the market price set by the firm. The elasticity, ε , will always be a negative number as a result of the downward sloping demand curve. It is therefore common to write ε as a real number, so if $\varepsilon = -2$ it would be written as $\varepsilon = 2$, with the negative sign understood. If ε is between zero (with zero representing a perfectly inelastic demand) and one, demand is inelastic. If ε is higher than one, demand is elastic (with ∞ representing a perfectly elastic demand) (Perloff, 2012).

The Lerner index is a measurement of a firm's market power. It measures the difference between price and marginal cost, expressed as a percentage of price:

$$L = \frac{P - MC}{P}$$

¹³ Under perfect competition prices are equal to marginal cost and because perfect competition is used as a competitive benchmark, market power is simply defined as the ability to deviate from that.

For a firm under perfect competition the Lerner index is zero, as the firm cannot raise its price above marginal cost. The higher the Lerner Index, the more market power it implies. If the firm is maximizing its profit, the Lerner Index can be expressed in terms of the price elasticity of demand as shown here (Perloff, 2012):

$$L = \frac{-1}{\varepsilon}$$

This shows that if a firm faces a relatively elastic demand curve, meaning E will be very high, then the Lerner index will get close to zero, implying no market power. This fits the model of perfect competition, where demand is perfectly elastic and no firm has any market power. Similarly if a firm faces an inelastic demand curve, meaning E will be very small, the Lerner Index will imply very high market power (Perloff, 2012).

2.5 Willingness to pay

An individual's maximum willingness to pay represents the maximum amount he is willing to pay for a product or a service. The individual would be more than happy to pay any amount under his maximum willingness to pay as that would lead to consumer surplus. Consumer surplus is the difference between the individual's maximum willingness to pay and the price he pays for the product in question. Consumer surplus measures the benefit to buyers of participating in a market (Mankiw & Taylor, 2008).

3 What is price discrimination?

After going through the basics, it's time to continue into this thesis's topic; price discrimination. Earlier we saw a definition of price discrimination from the Oxford English Dictionary. But as always, matters tend to be more complicated than at first glance. The dictionary definition is too open for misinterpretation as it misses a key element of any economic situation; cost. Different prices can reflect transportation costs or other costs of selling the good. It also does not reflect the possibility that price discrimination could be present when consumers are all charged the same price (Varian, 1989) A better rounded definition, put forth by Stigler (1987) identifies price discrimination where:

...two or more similar goods are sold at prices that are in different ratios to marginal costs.

The addition of marginal costs adds another dimension to the definition, one that cannot be excluded.

In this section we will go through Pigou's (1920) three types of price discrimination. Pigou categorized price discriminating behavior into three different types, each with its own characteristics and implications.

3.1 First-degree Price Discrimination

First-degree price discrimination or perfect price discrimination is when a firm charges each of its consumers a price that equals their maximum willingness to pay for its product or service. By doing so the firm is able to capture the entire surplus for itself and no surplus will be left for the consumers. Full surplus extraction means that the firm is able to capture the surplus above and beyond the surplus that the consumer would have received had he not participated in the market for the good (Varian, 1996). Even though the firm captures the entire surplus the consumer is still better off than if he had not bought the good. In order to charge each consumer by their maximum willingness to pay the firm has to have perfect information on each and every one of its consumer. It needs to know exactly how much they are able and willing to pay, because without it

they might not manage to capture the entire surplus. This is at best, extremely hard and at worst, impossible. Perfect price discrimination is therefore generally viewed as strictly theoretical (Carlton & Perloff, 2005).

However, there are a few ways that a firm can get very close to perfect price discrimination. One way would be to present each consumer with a single take-it-or-leave-it offer that extracts the maximum amount possible from the market. The main problem with this approach is credibility, or the lack of it. A firm would generally look to bargain if the first offer would be rejected and consumers know this. Another problem is the available information because even though the firm could make the threat credible it still lacks perfect information on the consumer's willingness to pay, so making an offer would prove quite tricky. Without perfect information it would have to weight in the potential costs due to rejection, a fact that might lead the firm to offer a price that would be lower than the consumer's maximum willingness to pay. This would increase the chance of the offer being accepted but in return the firm would be forfeiting some of the surplus, thus failing to meet the criteria for perfect price discrimination (Varian, 1989).

Another way firms are able to close in on perfect price discrimination is with auctions. An auction is where possible buyers bid against each other, until only one bidder is left making sure that the one that values the product most gets it.¹⁴ One of the oldest versions of price discrimination, haggling, is one final way that has the potential to reach perfect price discrimination. By haggling, we mean that the seller bargains with each possible buyer separately in hopes of extracting the maximum surplus from each one.

3.1.1 The Internet

With technology there has emerged maybe the best possibility ever to achieve perfect price discrimination; the internet. The internet is constantly evolving and offering businesses and consumers a new way to conduct business. Originally, the internet's

¹⁴ This type of auction is one of the most commonly known, the English auction, where participants bid against each other raising the price with each new bid. But it is not the only type of auction there is. Another type is the Dutch auction, where the auctioneer starts asking for a very high price and then lowers the offer until someone accepts the price. These are just two of many auction types, each offering a chance to get close to full surplus extraction.

most appealing aspect was a user's anonymity. Individuals were able to conduct business without having to give any personal information.

With the growth of social media anonymity seems to be slowly fading away. Facebook, Twitter and Instagram have people sharing detailed information about their lives, whether it is likes, dislikes or relationship status. This information, along with search histories and online shopping shortlists is monitored and cataloged by firms. The information is then used to create and place personalized advertisement, with which consumers are bombarded every time they log onto their social media sites or search something on Google. As noted earlier one of the biggest hindrances to perfect price discrimination is the lack of perfect information on consumers' preferences and maximum willingness to pay. With the internet and today's social media, firms are as close as ever to the ability to perfectly price discriminate as they are presented with an unprecedented reach into consumers' life. That being said, firms are still not there yet. Perfect information might not prove to be the big issue. The internet is a two way horse, as it also makes it easier for consumers to keep track of prices that firms are charging making it more difficult to charge different prices to different consumers. As we will discuss in section 4.4, consumers tend to be highly sensitive to any differentiated pricing situation they deem unfair (Odlyzko, 2003).

3.2 Second-degree price discrimination

Second-degree price discrimination or nonlinear pricing is when a firm charges different prices per unit depending on how many units of the same product, or service, is bought. The prices they charge however do not change across consumers, so everyone faces the same price, given the number of units he wishes to buy. This enables the firm to sell off extra units, at a lower price, that would not have been sold at the regular price. Here the firm will not be able to collect the entire surplus like with perfect price discrimination (Carlton & Perloff, 2005).

A current example of second degree price discrimination is air travel and hotel rooms. Both of these markets have fluctuating prices and are known to offer great discounts when they cannot fill their seats/rooms. As long as they manage to sell those units above the marginal cost of supplying them they are still better off than if they leave them empty.

Another example comes from Phillip Leslie (2004) and his research into Broadway in New York. The prices of their tickets tend to be very high but then they offer ways to get them at a lower price. The TKTS booth is a prime example and one that a lot of people, especially tourists, take advantage of. There you can get tickets at up to 50% off if you are willing to show up on the day of the show and wait in line. There are pros and cons to this however. If you are dead set on a show and date this is not a good bet as tickets to shows are often limited and can sell out pretty quickly. But if people are flexible, willing to wait in line and do not mind if they have to go to their second or third pick of shows, this is a great option. By charging high prices and then offering tickets at the TKTS booth the firms on Broadway are able to sort consumers based on their willingness to pay and in doing so increasing their surplus. Note that the time spent in line is also one that these individuals could have spent elsewhere, doing something else.¹⁵ They are exchanging that time for a lower price. So it's a matter of personal preferences if this really is a deal worth making.

3.3 Third-degree Price Discrimination

Third-degree discrimination is when a firm does not manage to differentiate between individual consumers but instead separates them into groups. The firm then charges each group a certain price. Each consumer is faced with a constant price, independent of the quantity purchased. As with second degree price discrimination the firm does not capture the entire surplus under third degree price discrimination (Carlton & Perloff, 2005).

The most used examples to explain third degree price discrimination are senior and student discounts. By employing these discounts firms are able to sell to a group that could not afford the good at the normal price without having to lower the price of the good to other consumers, thus increasing their surplus.

3.4 Summary

The traditional approach is to categorize price discrimination into three types which were intended to separate the different tactics firms use to price discriminate. The three types differ in the way they segregate consumers, with first degree price

¹⁵ This is known as opportunity cost; the loss of other alternative when one alternative is chosen.

discrimination acting as the benchmark, the perfect theoretical scenario where the firm is able to capture the entire consumer surplus. It is worth highlighting again that as with the extreme models presented in section 2, it is not to be viewed as a description of reality as no firm can attain perfect information. The two types that followed have a place in reality, with uncountable firms employing different discount schemes. Even though the two types are different in their application they are not mutually exclusive. Firms are able to adopt more than one discriminatory tactic at a time and the real world offers plenty of examples. Think of your local swimming pool or gym for example. Do they not offer different prices depending on everything from your age to how long or how often you are going to come?

4 Some examples of price discrimination tactics

Second degree price discrimination tends to be the one out of the three types that is the most complicated. In order to expand on the discussing from section 3, we will be presenting some of the most common forms of second degree price discrimination. They are bundling, tie-in-sales and two-part tariffs. Although these tactics are related and all fall under second degree price discrimination there are some fundamental differences. Two-part tariffs will, along with quantity discounts, be the focus of section 10.2 where we will analyze the welfare implications of second degree price discrimination.

4.1 Bundling

Bundling is when a firm sells two or more goods together in one package. Pure bundling is when those goods are only available in a bundle and are not sold separately. Mixed bundling on the other hand is when the goods can be bought separately as well as in a bundle. A simple example of bundling is video game systems. Stores usually offer a bundle where you buy the game console, say an Xbox or a PlayStation, and with it you get the newest game on the market or an extra controller. If the stores do not offer each part individually this would be an example of pure bundling, but as it is with this case you should be able to buy all part separately making it an example of mixed bundling. According to Philips (1983) mixed bundling is most profitable when the maximum willingness to pay of some consumers for either product is lower than its marginal cost of production. In that situation mixed bundling can offer a way of extracting maximum surplus from consumers. By using mixed bundling, as opposed to pure bundling, the firm is able to attract those that only value one of the products highly in addition to those that value both products highly.

4.2 Tie-in-sales

Tie-in-sales are a common form of bundling. It is when a consumer can buy one product only if he buys another product as well. Firms that sell expensive, durable goods, e.g. refrigerator etc. have a tendency to use tie-in-sales. Because the product is expensive

they need a way to make it accessible to a bigger market. Therefore they sell it under the price they would want to charge for it and to make up for it they include a service, or an add-on, requirement to the deal. This means that the buyer will have to buy any accessories or maintenance, needed for the good to operate, from them. Polaroid cameras are a relatable example. They are relatively inexpensive but the not so subtle catch is that they only work with Polaroid film, which tends to be rather on the high side when it comes to price. Tie-in sales can therefore enable firms to effectively charge higher prices to consumers who use more of the tied product.

4.3 Two-part tariffs

A two-part tariff is when a firm charges the consumer a price that is twofold, that is, the consumer will be faced with a fixed fee for the right to buy the good and then there will be an extra fee upon each additional unit of the good. Hence the average price paid for each unit will decrease with the number of units bought. A good example is taxi fares. A taxi will usually set a fixed starting fee, one that usually depends on your location, time of day or other variables, and then for each mile, or kilometer, the meter adds another fee on top of the starting fee.

4.4 Summary

Firms like to use tactics like the ones we have gone over because by implementing them they manage to effectively price discriminate without appearing to do so. This might seem detrimental to the justification of price discrimination. Why would firms need to hide being these tactics if price discrimination is positive?

The reason for this is that consumers are highly sensitive to situations they deem unfair. In 2000, Coca Cola was experimenting with vending machines that would raise prices when the temperature rose. When this became public it sparked huge objections from consumers forcing Coca Cola to abandon the project. But imagine if Coca Cola would have managed to market its vending machine idea in the way of them lowering prices in cold weather as opposed to raising prices when it was hot. Would that have sparked the same reaction? Probably not. Economists however, were probably not among the crowd objecting Coca Cola's machines as they would have realized that the two scenarios would lead to the same result. That being one high price during warm

weather and one low price during cold weather (Odlyzko, 2003). Whether Coca Cola would raise prices on warm days or lower them on cold ones would not make a big difference. Still, to the public there seems to be one hell of a difference. So in order to keep the peace in a sense, firm's take to tactics like the ones presented above. Ever wondered why discounts are so widespread through all market types?

5 Why do firms price discriminate?

Firms look to practice price discrimination because it can increase their profits. There are two main ways in which price discrimination can lead to higher profits. One is simply that it enables the firm to charge more to consumers that value the good the most, thus capturing more of their consumer surplus. The other is that by offering more than one uniform price the firm is able to attract more consumers, increasing its sales and increasing its profits that way. Let's look at a text book example of these two ways a firm is able to increase its profits by using price discrimination.

Think of a theater that has already paid any costs relating to a show and faces no extra charges for each theater visitor. Now the theater has to figure out which price to charge for the show. The theater is the only theater in town but it is still only visited by two different groups, a group of 10 college students and a group of 20 senior citizens. The students are willing to come see the show if the price is \$10 or lower and the seniors if the price is \$5 or lower. If the theater sets its price at \$10 it is only able to sell to the students, earning it a total of \$100. If it sets its price at \$5 everybody will show up, earning it a total of \$150. Faced with a uniform price decision the theater will set its price at \$5 as it raises more revenue. However if the theater is able to price discriminate it will charge 10\$ to the students and \$5 to the seniors. Again, everyone will show up but the theater is able to charge a higher price to the students, extracting more of their consumer surplus and earning a total of \$200 (Perloff, 2012).

Imagine now that there are 10 students but only 5 seniors. Both groups still value the show the same as before. At a price of \$10 the theater's revenues will be \$100 like before as only the students will come to the show. At a price of \$5 the theater only earns a total of \$75 even though both groups turn up for the show. Without the ability to price discriminate the theater will therefore set the price at \$10 as it generates more revenue. But if the firm is able to price discriminate it will charge \$10 and \$5 to the students and seniors respectively as before. This will not only raise revenues from \$100 to \$125 it will also enable the firm to attract the seniors, customers the theater would have missed out on with a single price (Perloff, 2012).

As mentioned earlier, this practice is far from being newborn. Price discrimination has been going on for ages but it first got systematically studied in relation to railroads in the middle of the 19th century. Railroads, much like airlines today, had different classes available for passengers and charged higher for first class than it did for the second and so on (Odlyzko, 2003). Jules Dupuit ([1849] quoted by Ekelund, 1970) summarized their behavior in a classic passage:

It is not because of the few thousand francs which would have to be spent to put a roof over the third-class carriages or to upholster the third-class seats that some company or other has open carriages with wooden benches. What the company is trying to do is to prevent the passengers who can pay the second class fare from traveling third class; it hits the poor, not because it wants to hurt them, but to frighten the rich. And it is again for the same reason that the companies, having proved almost cruel to the third-class passengers and mean to the second-class ones, become lavish in dealing with first-class passengers. Having refused the poor what is necessary, they give the rich what is superfluous.

It is clear that if a firm has the ability to adopt discriminatory prices it will. The possibility of increased profit can even be so strong that it can lead firms to use the damaged goods approach. That is when firms intentionally suffer extra costs to make a product less appealing or to make sure it performs worse than it could. The best example of this is IBM's Laser Printer and Laser Printer E. Both were essentially the same, but the E model had a special chip that slowed it down. IBM actually incurred cost to make the E model worse, and then sold it for less than the other one. This allowed them to increase sales and even with the added costs those extra units increased their profits (Odlyzko, 2003).

6 Competition law

Economic policy makers face immense political pressure for measures to eliminate market power, assumed to underlie price discrimination. Market power is as previously stated, a firm's ability to raise prices above marginal cost. Under antitrust laws however, market power is more commonly looked at as the power to raise prices above costs without losing so many sales that it makes the rise unsustainable, so essentially, the power to control market prices. The difference might sound small but it is important and in order to not confuse the two the second is often, as will be done here, referred to as monopoly power. The only scenario in which monopoly power would be identical to market power is if prices charged in all competitive markets would always equal to marginal costs, which as we will see in section 8 is not the case (Wright, 2006).

It is clear that if the two definitions get mixed together it is quite understandable that one would deem price discrimination, in all cases, to be in violation of competition laws. The prevalent belief that price discrimination is unfair, along with the long held view that it in itself is anti-competitive behavior, has lead policy makers everywhere to put forth a number of laws condemning price discrimination. But these calls for price discrimination regulation generally come from buyers faced with the higher of the discriminatory prices and the measures taken in order to alleviate this pressure can produce results inferior to those they were intended to remedy (Levin, 2002).

6.1 In the United States

In the late 1800s the United States Congress responded to widespread dissatisfaction with discriminatory railroad rates by setting the Interstate Commerce Act, the first act intended to combat price discrimination. Numerous regulatory acts have followed; most notably the Clayton Act and then the Robinson-Patman Amendment (often called the "Robinson-Patman Act" or simply "The Act") (Gifford and Kudrle, 2010).

The Act forbids price discrimination:

Where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly in any line of commerce or to

injure, destroy, or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them.

With the Robinson-Patman Act congress sought to eliminate a competitive advantage it believe large chain stores unfairly had over smaller retailers. According to the act price discrimination does not constitute a violation of the act unless it hurts the market's competitiveness. Still, it has mainly been directed at practices that have very few negative effects on competition (Waldman & Jensen, 2006).

The act has protected small retailers at the expense of consumers by burdening them with higher chains store prices. The fact is that the choice of words used by congress in the making of the Robinson-Patman Act was unfortunate. It refers to injuring competition in the sense of equating harm on rivals, thus lessening competition. Most would however agree that the essence of competition is the act of trying to take business away from rivals by undercutting them or surpassing them in any way possible. But according to the act this could be deemed unlawful. The acts objectives were to secure fair competitive condition but as we have seen strict enforcement of the act could do the opposite (Gifford and Kudrle, 2010).

6.2 The European Union

The Treaty of Rome market the creation of the European Common Market. In it there are two articles, no. 81 and no. 82, which are the foundation for European competition law. These articles contain provision directly targeting price discrimination. As could be expected, the drafters of these articles drew upon the models provided by antitrust laws in the United States as widespread acceptance of the Robinson-Patman Act must have been felt in Europe. This means that articles no. 81 and no. 82 incorporate policies that are similar to those of the Robinson-Patman Act. (Gifford and Kudrle, 2010)

The European approach on price discrimination is mostly concentrated on price discrimination by dominant firms. This approach is a step up from the American approach which takes no account of the size or prominence of the discriminating firm. It is worth noting that their view on dominance is a broad one, as a firm does not need to possess monopoly power in order to be deemed dominant. This fact does provoke criticism at the hands of the European authorities, which some think misuse articles no.

81 and no. 82 to protect the rivals of dominant firms, which as noted earlier could simply be large and successful firms that hold no monopoly power. (Gifford and Kudrle, 2010)

6.3 Economic Issues

In section 2 we saw that charging different prices to different consumers might be the cause of varying costs associated with selling a product. This however, tends to elude legislative powers as competition laws have been used to punish firms for practices deemed anti competitive only on the basis of differences in prices. The intense focus on market power in determining a firm's dominant stature as well as ignorance towards the possible positive effects of price discrimination tends to lead legislative powers astray. Economically, the aforementioned laws should be used to counter practices by dominant firms that put its customers under competitive disadvantages compared to other customers (Geradin & Petite, 2007).

6.4 Summary

The legal concerns of price discrimination are quite different from the concerns of economists. Competition laws focuses on fighting unfair competition but its efforts tend to be misguided and can lead to inferior results. An economic concern is generally one of efficiency, or better, the inefficiencies price discrimination can produce (Varian, 1989).

We will therefore continue addressing these concerns in the following sections. In section 8 we will challenge the strong focus on market power that identifies legislative actions and in section 10 we analyze the welfare implications of price discrimination, focusing on efficiency.

7 Conditions of Price Discrimination

The microeconomic literature usually identifies three main conditions that need to be in place for a firm to be able to implement price discrimination. Here we will follow Carroll and Coates's (1999) presentation of these conditions.

1. The firm needs to have at least some market power and therefore it cannot be a price taker under perfect competition. What this essentially means is that it has to be faced with a downward sloping demand curve. Without this the firm would not have any room to maneuver prices around. It is therefore clear that price discrimination is not isolated to monopoly. It is even prevalent in highly competitive situations as we will see in section 8. Since the demand curve is downwards sloping the transactions will produce some consumer surplus. In essence, price discrimination is simply the firm trying to capture this surplus for itself.
2. Consumers must have varying willingness to pay. This is implied in point one with the downward sloping demand curve. As we know the demand curve represents the complete willingness to pay of all consumers. The downwards slope tells us that consumers vary in their preferences for the product in question. And this is imperative because if all consumers value the product, or service, the same the firm will not be able to charge them different prices. This also means that the firm has to be able to segment their consumers. Whether it is by person or by groups the firm has to be able to identify which consumers to charge the higher price/s and which ones to charge the lower price/s.
3. The firm needs to be able to hinder resale of their product. If a secondary market exists, arbitrage opportunities might arise. This would mean that consumers that get a lower price would be able to sell the product onward to those that face a higher price for a profit.

7.1 Ways to prevent resale

There are several ways in which a firm can prevent resale. Firms use warranties as one way to do this. By voiding the warranty if the product is resold, that is only having it valid for the first-time purchaser, it decreases the possible gains from buying the product second hand. Another example would be to make the buyer sign a contract forbidding resale, maybe within a certain time frame. This only works however if the contract is legally binding or at least easily enforceable. For services matters are greatly simplified. Since most services cannot be resold, a doctor's checkup or a haircut for example, price discrimination is more likely in the service industry than those with tradable products (Carlton & Perloff, 2005).

8 Is it possible to price discriminate without market power?

In thinking about price discrimination, economists (Levin, 2002, pp. 2) have generally constructed the following argument:

In a competitive market, price equals marginal cost. Wherever there is price discrimination, price deviates from marginal cost. Therefore, if there is price discrimination, the market must not be competitive and there must be market power.

This fits with the traditional approach in the microeconomic literature presented in the previous section. It comes from the rationale that if a firm would try to price discriminate in a competitive market its competitors would always undercut its prices making it unsustainable.

As noted earlier some confusion exists on the difference between market power in the economic sense and market power under antitrust laws. This preceding formulation can therefore prove quite dangerous in the hands of regulators and antitrust analysts. As we discussed in section 6, economic policy makers face immense political pressure for measures to eliminate the market power assumed to underlie price discrimination.

However, this connection between market power and price discrimination has recently come under scrutiny. In this section we will focus on new research showing that price discrimination is not only possible without the possession of market power but that intense competition can force companies to adopt discriminatory prices in order to survive.

Baumol and Swanson (2003) were important in changing the way many economists now think about price discrimination. Baumol and Swanson analyzed markets with substantial fixed or sunk costs and here we will therefore turn our attention to such markets with the objective of severing the connection between price discrimination and market power.

We will show that in markets with high fixed or sunk costs:

1. A firm with a negatively sloped demand curve may not possess any market power and will not be able to earn above competitive profits.
2. A firm that charges prices that are equal to marginal costs will not be able to recover its costs like one under perfect competition.
3. Firms might be forced to adopt discriminatory prices if their consumers differ in their demand.
4. In the long run, the discriminatory prices will be determined by the market, not the firms. Firms will be price takers, not price makers.

8.1 A negatively sloping demand curve does not equal market power

In order to attract customers from other firms a firm operating in a market under monopolistic competition will have to lower its price. It can therefore be expected to have a negatively sloping demand curve. Despite facing a demand curve with a negative slope, a firm under monopolistic competition is generally not able to manipulate prices in a way that will yield profits above the competitive level. This is because the economic profit would certainly attract new firms that would enter the market, expanding supply until profits are driven down to the competitive level. Therefore, no firm in this market possesses monopoly power, despite facing a demand curve that has a negative slope (Baumol and Swanson, 2003).

8.2 Charging prices equal to marginal cost will not cover costs

Prices above marginal costs do not necessarily indicate monopoly power. To see this, imagine a market where scale economies are present.¹⁶ Under these conditions a firm's average incremental costs¹⁷ goes down with increased output. This means that its marginal costs must be lower than its average incremental costs.¹⁸ Therefore if the firm

¹⁶ By economies of scale we mean that a firm has reached a size where, because of its production volume, average cost of production falls as output increases (Baumol & Swanson, 2003).

¹⁷ The average incremental cost of a product is defined as the sum of its average variable cost plus any fixed or sunk costs incurred on behalf of that product alone.

¹⁸ For a mathematical proof, see Baumol and Swanson (2003).

sets its price equal to marginal costs it will not be able to cover its costs and will be doomed to failure. Prices above marginal cost obviously cannot be deemed to constitute proof of market power when looking at firms with scale economies unless a requirement for its absence is a firms' voluntary trek towards destruction (Baumol and Swanson, 2003).

8.3 Firms might be forced to adopt discriminatory prices

In a market, where entry is quick and easy there are multiple potential entrants, meaning that an incumbent firm cannot set prices that yield economic profit. Such a market will therefore be highly competitive as the constant threat of entry forces firms to act competitively, which leads to them being unable to charge prices that would give them economic profits. Since no firm in this market can expect to earn profits above the competitive level, they cannot possess any market power. Still, prices will not be the same as they would be under perfect competition as firms will be forced to price discriminate in order to recover their fixed or sunk costs (Baumol and Swanson, 2003).

Imagine a truck delivery service that offers delivery off fresh groceries to restaurants in the area. The firm's total cost, including the driver's wages, truck maintenance and other costs, is \$10,000 a week. In the firm's area there are two high class, luxury restaurants and fifteen fast food restaurants. The luxury restaurants require four deliveries each week and are willing to pay \$1,000 for each delivery. The fast food restaurants also require four deliveries per week but are only willing to pay \$100 for each delivery. If the delivery service sets its price at \$1,000 its only customers will be the two luxury restaurants. The eight deliveries will raise revenues of \$8,000 for the firm which will not be enough to cover its costs. If the delivery service decides to sets its price at \$100 both the luxury restaurant and fast food restaurant will buy their service, the sixty-eight deliveries raising revenues of \$6,800. The delivery service is even further away from covering its costs with this price. If the firm can adopt discriminatory prices and charge both groups of restaurants by their maximum willingness to pay, it is able to earn \$8,000 from the luxury restaurants and \$6,000 from the fast food restaurants. Total revenue with discriminatory prices would therefore be \$14,000, more than enough to cover costs. In the short run the firm is able to turn a profit if it is able to price discriminate (Baumol and Swanson, 2003).

8.4 Firms are price takers in the long run

With easy entry, firms are price takers not price makers. Think back to the delivery service. It was forced to price discriminate in order to stay afloat. By adopting discriminatory pricing it was even able to turn a profit. The delivery service will not be able to maintain those prices permanently. The economic profit will attract new firms and because entry to the market is quick and easy the extra supply will quickly drop prices until total revenue will top out at \$10,000. In the long run it will therefore be the market that determines the discriminatory prices that are charged, not the firms. A firm in this market will find itself as much a price taker as a perfectly competitive firm. This is especially true when products are homogenous, as other firm's product will be perfect substitutes to the firm's products. This means that if a new entrant charges a lower price than the current market price, incumbent firms will have no other option than to follow suit if they do not want to get forced out of the market (Baumol and Swanson, 2003).

It is important to note that entry by new firms into a market is seldom completely costless and without any lag time. Thus, in practice the preceding conclusions can only be categorized as an approximation. They still shows us that in a market where entry is easy, firms cannot possess significant monopoly power and they will be price takers, even though they face a demand curve that has a negative slope (Baumol and Swanson, 2003).

8.5 Major implications

For antitrust policy, the preceding results offer a drastically revised view of the nature of monopoly power and what can legitimately be used to support or refute a claim that the incumbent firms, or firm, in a market possess such monopoly power. Up to now the underlying issue in antitrust hearings has been whether a defendant firm possessed monopoly power at the time and place in question. If it is concluded that it did not, the case is automatically dismissed on the grounds that the firm was incapable of any actions warranting antitrust intervention. (Baumol, 2005)

The all-important monopoly power has, as we now know, been defined simply as the ability to adopt prices above competitive levels and maintain it over a substantial period of time. If competitive prices are to be defined as before, equal to marginal costs, the

definition of monopoly now need modification. This is clear because if not it “would mean that the only truly competitive firms is a bankrupt firm” (Baumol, 2005, pp. 30). Instead of this, the standard for the evaluation of monopoly power should be a firm’s ability to adopt prices that promise economic profits above the competitive level and maintaining them for a substantial time (Baumol and Swanson, 2003).

8.6 Summary

We have seen that a firm can be completely constrained by market forces, therefore unable to earn anything above competitive profits,¹⁹ despite charging discriminatory prices and having a demand curve with a negative slope. The previous analysis however did not, and was not intended to say that all price discriminating firms never engage in any anti-competitive behavior. Simply that it is indefensible to claim monopoly power just because a firm charges discriminatory prices (Baumol & Swanson, 2003).

Baumol & Swanson’s objective was to try to make sure that legislative powers will not misread, and misuse the economic theories behind price discrimination to set antitrust laws to stop the practice. Laws which could in practice lower the competitiveness of the market. It is not the role of competition laws to determine how wealth is distributed or how many firms there are in a given market. We look to the market to solve these issues on its own (Wright, 2006).

These results also impact the way economists must approach effectively competitive markets. The biggest implication is that discriminatory prices should be viewed as a common occurrence in competitive markets. And this can be seen in real markets, from theater tickets and bus fares to higher education and health care (Baumol & Swanson, 2003).

We have seen in the preceding sections that price discrimination in itself is not illegal and does not imply market power. Still there remains the argument that the practice is unfair. Economists usually shy away from talk of fairness, as it is hard to measure and instead we will focus on the welfare implications of price discrimination. In section 9 we will focus on the effects on distribution and competition and in section 10 we will analyze the effects on output and efficiency

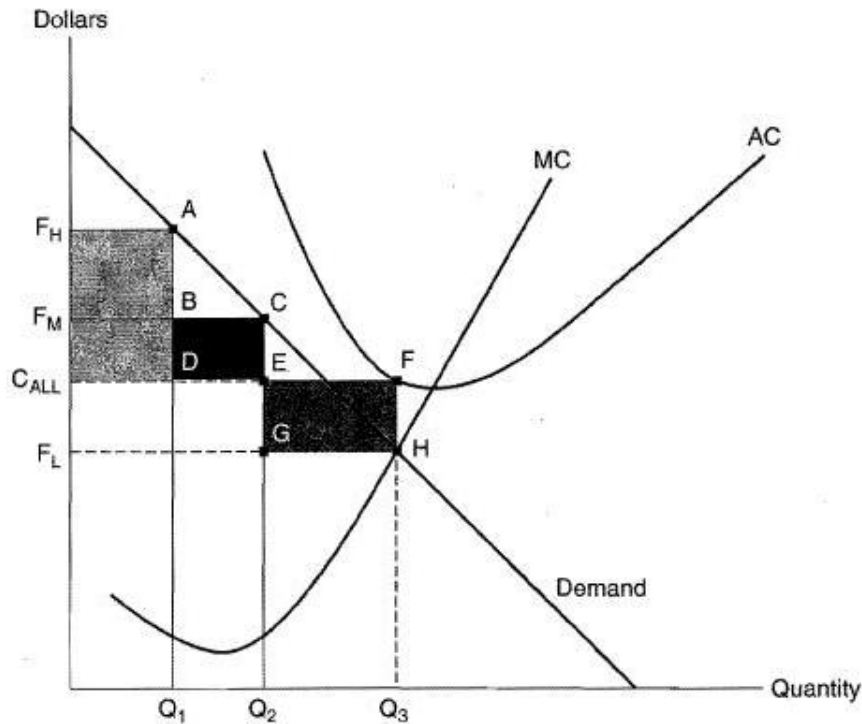
¹⁹ The rate of return on investments currently earned by firms with similar risks.

9 Price discrimination's effects on the market

Understandably, price discrimination can have quite a big impact on the market. The practice's connection to market power has led to the general conclusion that price discrimination adds to inequality and leads to decreased levels of competition. We will continue challenging these misconceptions in this section by analyzing the possible effects of price discrimination on distribution and competition with a number of examples.

9.1 Distribution effects

A common complaint against price discrimination relates to a misconception of distribution effects. The distribution effects of price discrimination are often wrongly simplified and is said to always cause producers to gain at the expense of consumers. This might originate from the incentives that lie behind a firm's decision to price discriminate. They want to increase their profits and by adopting discriminatory prices they are able to capture some of the consumer surplus for themselves. While it is true that price discrimination can increase inequality in society, its effects can also have net social benefits. A common example of how distribution effects can have a positive outcome is of a doctor in a small town that faces the demand and cost situation shown in figure 6.



The doctor's costs are too high for him to be able to cover his costs with a single fee. You can see that the average cost (AC) curve is always above the demand curve. So if the doctor is unable to price discriminate he will not be able to practice and the town will be left without a doctor. But if the doctor is able to discriminate and charge his high income patients a high price (F_H) his middle income patients a lower price (F_M) that is still above costs he can afford to charge his low income patients a price (F_L) that is below costs. This way the profits from high and middle income patients offset the loss from low income patients and the doctor manages to stay in practice, leaving everybody better off. The example of the doctor demonstrates that price discrimination can help open markets that would not be served without it (Waldman & Jensen, 2006).

9.2 How does price discrimination effect competition?

Baumol and Swanson (2003) have argued that price discrimination can be practiced without market power and that firms are often forced to price discriminate as a result of competitive pressures. But does price discrimination have an effect on competition?

The short answer is yes and price discrimination can actually have both negative and positive effects on competition. The simplest way to understand this is to look at a few examples of each scenario.

Think of a firm that has stores in cities all around the country. Now, the firm wants to know whether demand for its product is elastic or not. What it can do is cut prices in one or two cities. If it turns out that demand is more elastic than previously thought the firm might lower its price throughout the country. This behavior can be very beneficial to competition. Another example of pro-competitive effects of price discrimination comes from the airline industry. Even though some consumers might not like it, the constant changes in airfare prices tend to lead to fewer empty seats and increased competition. One final example to the positive effects of price discrimination comes from the mobile phone industry. There, a variety of different plans are on offer, plans that tend to greatly vary in prices. In that market price discrimination is fueled by stiff competition that leads to lower prices for consumers (Armstrong, 2006).

But price discrimination can also have negative effects for competition. One example of this is price matching contracts. That is when a firm promises to match the lower prices of a rival firm if consumers stumble upon them. Here firms have no incentive to undercut their rivals as it would not add to their market share and would only lead to lower revenues, as a result of the lower prices. Price matching promises are often used by cartels in order for its members to monitor each other and make sure that no one breaks the pact (Armstrong, 2006).

10 Does price discrimination improve or diminish overall welfare?

Contrary to the general literature covered in section 7, we have seen that price discrimination is possible when firms have no market power. In highly competitive markets firms are in fact forced to price discriminate in order to survive. It is obvious that under these circumstances price discrimination can be highly efficient. The discriminatory prices firms will be forced to charge under those conditions will generally be Pareto efficient if economic profit is zero. This is clear because if the discriminatory prices lead to the required economic profit of zero then there are no other prices that can benefit some individuals without hurting others and still satisfy the profit constraint of zero. Therefore these prices must be Pareto efficient²⁰ (Baumol, 2005).

But even with market power price discrimination can be efficient. Price discrimination can alleviate output reducing incentives where market power exists. This section analyses the welfare impact of the different types of price discrimination on society. Using the models for perfect competition and monopoly as benchmarks we will see what effects price discrimination has on overall welfare. As price discrimination has ambiguous effects on welfare it is best to separate the different types for clearer analysis. Therefore we will start this section with first degree or perfect price discrimination, followed by second degree, and finally third degree.

10.1 Welfare effects of perfect price discrimination

It may surprise some readers to find out that perfect price discrimination is highly efficient, even as efficient as perfect competition. Under perfect price discrimination, like with perfect competition, the firm will produce the social optimum output, meaning it will produce enough for everyone that values the good, or service, above the marginal cost the firm faces in production. Since the firm will produce the social optimum there will be no deadweight loss. So what is the difference between perfect price discrimination and its competitive counterpart? As figure 7 shows, the difference is that

²⁰ For a mathematical explanation, see Baumol (2005).

under perfect price discrimination each consumer is charged his maximum willingness to pay, leaving no consumer surplus as the firm captures the entire surplus for itself.²¹ Even though the distribution of surplus is not the same, it does not mean that perfect price discrimination is any less efficient when looking at the entire market as a whole. This result might not satisfy those that still feel that the full surplus extraction is unfair on behalf of the consumer. It should still be clear that in determining the effects of perfect price discrimination, it must be preferable to a non-discriminating monopoly as it lead to zero deadweight loss (Carroll and Coates, 1999).

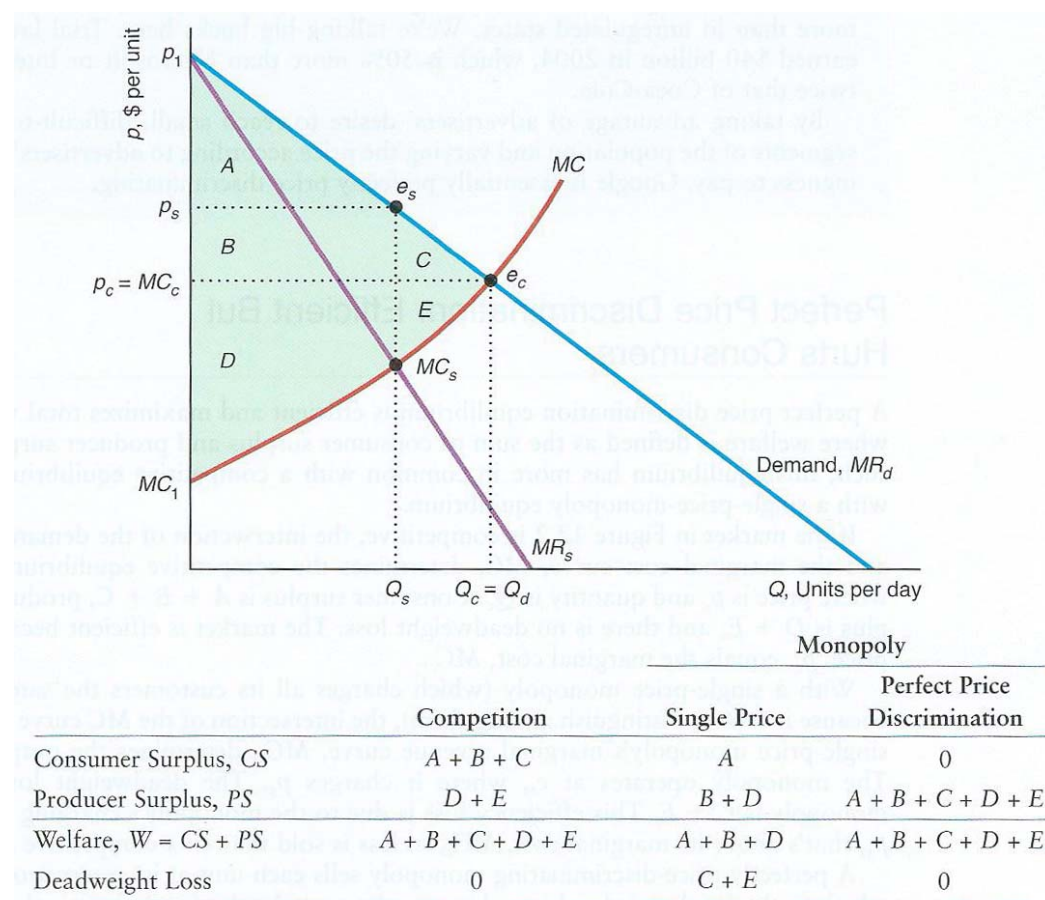


Figure 7: Perfect Degree Price Discrimination (Perloff, 2012, pp. 426).

²¹ Remember from section 3.1 that we are talking about the surplus above and beyond the surplus that the consumer would receive had he not participated in the market for the good.

10.2 Welfare effects of second degree price discrimination

Matters complicate as we move on to second degree price discrimination. The effects here will depend on which tactic the firm employs. This is best explained using examples, so we will look at two different tactics. First we will look at a two-part tariff and then quantity discounts.

For the two-part tariff case we will use a membership in a warehouse shopping club. The consumer has the option to pay a membership fee that will give him the right to shop at the warehouse. Given that there are other stores that offer the same or similar products at nondiscriminatory prices the shopping club will set its prices lower than would prevail under a nondiscriminatory monopoly.²² Therefore output should increase, meaning this tactic should prove more efficient than monopoly, and the firm also manages to capture more of the surplus. Since the firm will still charge a price that is higher than its marginal costs, output will not reach the socially optimal point and therefore it is less efficient than perfect price discrimination and perfect competition. Two-part tariffs generally work very well for a firm that sells products that are distinct in some way, so that there exist no close or apparent substitutes for the product. The consumer is therefore forced to pay the membership fee if he wants access to the product (Carroll & Coates, 1999).

Now let's see what is different about quantity discounts. Again we want to see the tactic's effect on welfare compared to monopoly and perfect competition. Figure 8 shows how a firm can increase their profits with quantity discounts. In panel b, the firm sets a single price of \$60 but in panel a, it sets a higher price (\$70), which decreases when consumers buy more units.

²² If it would charge at or over the nondiscriminatory price there would be no reason for the consumer to join the club because they could just walk into the next store and buy it cheaper there without a membership.

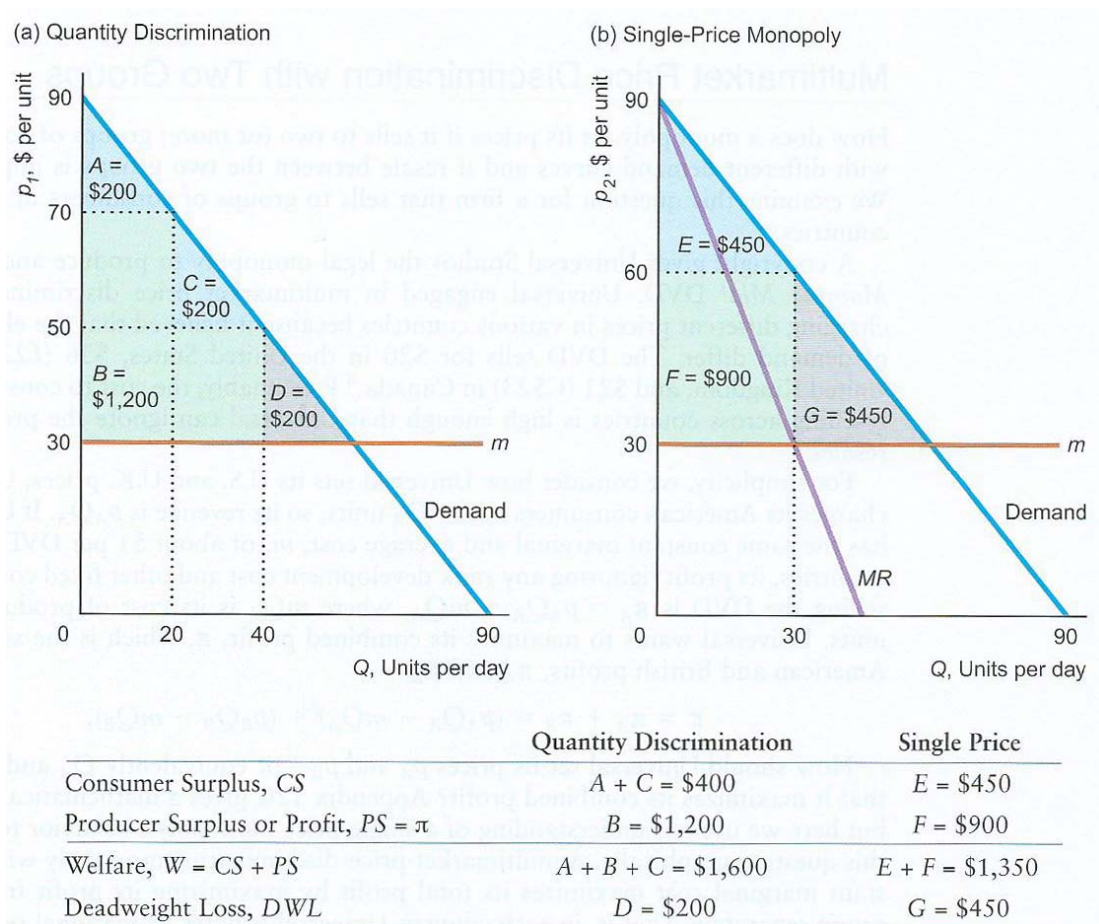


Figure 8: Quantity Discounts (Perloff, 2012, pp. 431).

This should lead to an increase in welfare as output will rise, compared to the nondiscriminatory monopoly. It will not reach the competitive output unless those charged the higher price would not have bought extra units if faced with the lower price. There might be consumers that would like to buy more, but they still don't want enough to reach the discount mark. There will therefore still be deadweight loss, but less than under a monopoly that charges a single price. Quantity discounts generally work very well for firms with a product that has close substitutes and where consumers make repeated purchases. Frequent flyer clubs are a good example as there are, in most cases, many different airlines to choose from and quantity discounts can be a great incentive to choose the same airline over and over again (Carroll & Coates, 1999).

10.3 Welfare effects of third degree price discrimination

We know that with third price discrimination the firm does not know each consumer's maximum willingness to pay. Therefore the firm separates them into groups and then charges each group a single price. In figure 9 we can see that Universal Studios charges a higher price for DVDs in the United Kingdom than in the United States. This is because the price elasticity of demand is greater in the US (Perloff, 2012).

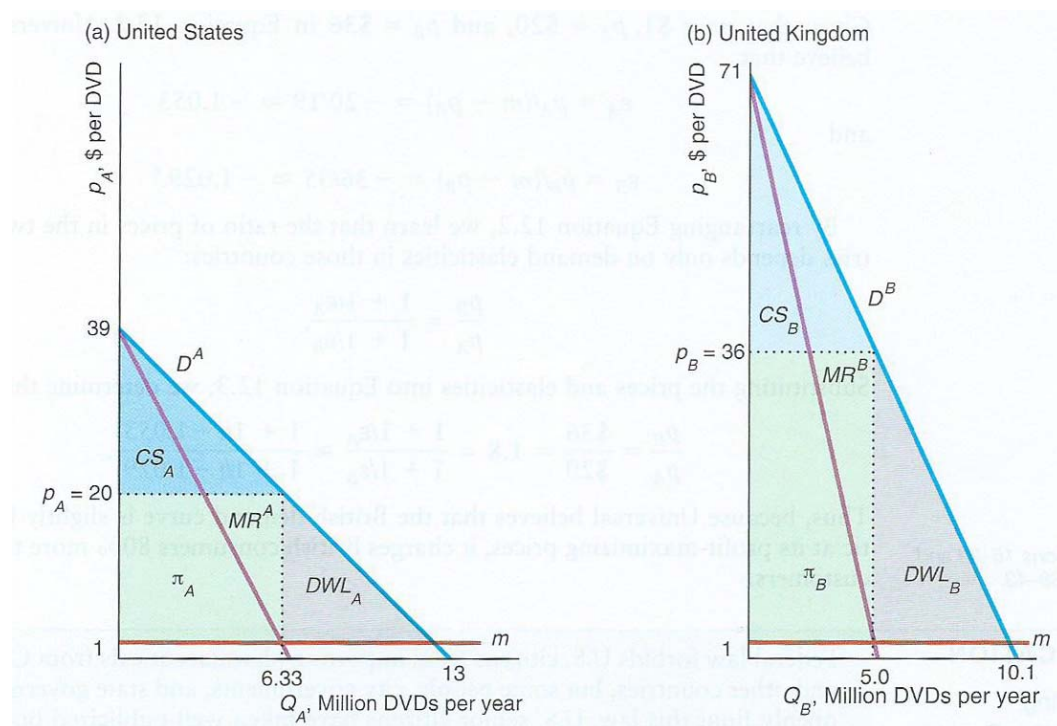


Figure 9: Third Degree Price Discrimination (Perloff, 2012, pp. 433).

Under third degree price discrimination the firm will choose a price where their marginal revenue equals their marginal cost. This means that output will most definitely be lower than under perfect competition so third degree price discrimination, like second degree, is less efficient than the extreme, perfect cases. The exact efficiency result will depend on the shapes of the cost and demand curves. If the demand curve is a straight line and costs are constant, as they are in figure 9, output will not increase, compared to a nondiscriminatory monopoly, but is merely redistributed among consumers. That means that any deadweight loss that existed without price discrimination will still exist and on top of that there will be added welfare cost caused

by the allocation of the good from those whose willingness to pay is higher to those whose willingness to pay is lower. This case then is clearly less efficient than perfect competition and it will also lead to greater inefficiencies than a nondiscriminatory monopoly. But like stated earlier this is simply one example. Welfare under third degree price discrimination can improve welfare, compared to the nondiscriminatory monopoly, if the cost and demand curves lead to an increase in output. Note that increased output is a necessary condition for increased welfare, but not a sufficient one.²³ It might seem odd that increased output is not enough to increase welfare but third degree price discrimination affects the marginal rate of substitution²⁴ and such distortion will always lead to reduced welfare compared to a uniformed price policy. If the marginal cost curve is upward sloping and if the gains from increased output offsets the losses from the redistribution of output welfare could increase (Carroll & Coates's, 1999).

10.4 Summary

The welfare effects of first degree price discrimination are straight forward. As the name implies, perfect price discrimination leads the discriminatory firm to produce at the social optimal level of perfect competition, and with it the firm manages to capture the entire consumer surplus. It does not lead to any inefficiency as every person that values the product over marginal costs is able to purchase it. Economically perfect price discrimination therefore leads to no loss in efficiency compared to perfect competition. The imperfect versions, second and third degree, however fall short of its theoretical counterpart. Second degree price discrimination will provide an efficient amount of output to large consumers, with smaller consumers instead being left with inefficient amounts. Second degree price discrimination in general provides added efficiency compared to the nondiscriminatory monopoly for society as a whole. Third degree price discrimination can increase efficiency if the shape of the cost and demand curve leads to an increase in output. So in general if price discrimination causes an increase in output it will generally enhance welfare.

²³ For a mathematical and graphical explanation on this see chapter 15's appendix in Waldman & Jensen (2006).

²⁴ The marginal rate of substitution is the amount of a good an individual is willing to give up for another good in order to feel equally satisfied.

11 Conclusion

The literature on price discrimination was turned upside down when new research showed that price discrimination does not necessarily imply market power. Without this anchor price discrimination suddenly opens up to include markets where firms possess no market power. This can explain why discriminatory prices are so widespread as more firms, than previously thought, have the ability to adopt them.

In this thesis firms have been shown to have huge incentives to adopting discriminatory prices if possible as it can help them attract more consumers, increase sales as well as extract more of the surplus from high value consumer and increase their profits. Even though firms act on the premise of increased profit for themselves, the analysis of the practice's effect on welfare generally showed positive results. Still price discrimination seems to have few friends among the public. This could be caused by the perceived lack of fairness on behalf of the practicing firms, but as we have also shown, price discrimination can benefit the public with firms offering goods to people that would not have the opportunity to acquire the good at a uniform price. It can also open up new markets where a firm might not be able to practice at all without discriminatory prices. The intense animosity might also be fueled by the word itself with prejudice discrimination being one of the biggest reoccurring topics of the last few decades.

The fact is that price discrimination generally benefits the more price sensitive low income individuals at the expense of those with higher income, as they do not tend to be as price sensitive and therefore will generally be charged the higher of the discriminatory prices. This could also be part of the problem as the higher income individuals might be more vocal and be able to make a stronger push towards regulatory advances. But it is clear that there is no justification for public policies against price discrimination in general and that future legislative action has to take into consideration more intricate details of the market when setting, and ruling on anti competitive behavior. And in doing so they should strive to heed the caution of Ronald Coase that "...if an economists finds something - a business practice of one sort or another - that he does not understand, he looks for a monopoly explanation. And as in this field we are very ignorant, the number of ununderstandable practices tends to be rather large, and the reliance on the monopoly explanation, frequent" (Coase, 1972).

References

- Armstrong, Mark. (2006). "Price Discrimination", MPRA Paper, University Library of Munich, Germany 4693, University Library of Munich, Germany.
- Baumol, William J. (2005). *Regulation Misled by Misread Theory*. Washington D.C.: AEI-Brookings Joint Center for Regulatory studies.
- Baumol, William J. and Daniel G Swanson. (2003). The new economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power. *Antitrust Law Journal* 70 (3): 661-85.
- Carlton, D. W. and Jeffrey M. Perloff. 2005. *Modern Industrial Organization*. Reading, MA: Addition Wesley Longman.
- Carroll, K. and D. Coates. (1999). Teaching price discrimination: Some clarification. *Southern Economic Journal*, 66(2), 466-480.
- Coase, R.H. "Industrial Organization: A Proposal for Research", in Fuchs, V.R., ed *Policy Issues and Research Opportunities in Industrial Organization*. pp. 67. New York: National Bureau of Economic Research.
- Ekelund, R.B. (1970). Price discrimination and product differentiation in economic theory: an early analysis, *Quarterly Journal of Economics*, (84) 268-78
- Geradin, D., & Petit, N. (2007). Price discrimination under EC competition law: The need for a case-by-case approach. *College of Europe, Brugge, GCLC Working Paper*, 7(05).
- Gifford, Daniel J and Robert T. Kudrle. (2010). The Law and Economics of Price Discrimination, *Modern Economies: Time for Reconciliation?* 43 U.C. DAVIS L. REV. 1235, 1239-40
- Leslie, Phillip. (2004). Price discrimination in Broadway theater. *RAND Journal of Economics* Vol. 35, pp. 520-541.
- Levin, Michael E. (2002). Price Discrimination Without Market Power. *Yale Journal on Regulation* 19 (1): 1-36.
- Mankiw, G and M. Taylor. (2008). *Economics*. Fourth Edition. London: Thomson.
- Nechyba, Thomas J. (2011). *Microeconomics: An Intuitive Approach with Calculus*. International Edition. South-Western Cengage Learning.
- Odlyzko, A. (2003). "Privacy, Economics, and Price Discrimination on the Internet," *ICEC2003: Fifth International Conference on Electronic Commerce*, pp. 355—366.

- Perloff, Jeffrey M. (2012). *Microeconomics*. Sixth Edition. Pearson
- Phlips, L. (1983). *The Economics of Price Discrimination*. New York: Cambridge University Press.
- Pigou, A. (1920). *The Economics of Welfare*. London: Macmillan.
- Smith, Adam (1776), *Wealth of Nations*, Penn State Electronic Classics edition, pp. 56. republished 2005
- Stigler, G. (1987). *The Theory of Price*. New York: MacMillan.
- Varian, H. (1985). "Price Discrimination", in *Handbook of Industrial Organization: Volume 1*, edited by R. Schmalensee and R. Willig. pp. 597-654. North Holland, Amsterdam.
- (1996). Differential Pricing and Efficiency. *First Monday*, 1(2).
doi:10.5210/fm.v1i2.473
- Waldman, D.E and E.J. Jensen. (2006). *Industrial Organization: Theory and Practice*. Third Edition. Boston: Addison-Wesley.
- Wright, Joshua D. (2006). Missed Opportunities in Independent Ink, *Cato Supreme Court Review*. 333, pp. 333-359.