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Price Dispersion on Payday Loan Market in Finland, a Descriptive Study

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Abstract

This thesis aims to enlighten, why there exists intense price dispersion on payday loans market in Finland, even though payday loans can be seen as a homogeneous goods. The dispersion is observed on one period between firms and is made apparent by calculating annual percentage rates for loans with different sizes and different payback times. After that the dispersion is first reflected against literature, that covers price dispersion in settings, where consumer is faced with search costs and when she suffers from biases, that lead to consistent failure in optimization. Due to the search cost consumers might search too little and this allows firms to charge higher than competitive prices, whereas behavioral issues expose consumers to pay too much, when they do not have realistic expectations for example on their future demand. Second, dispersion is covered in the light of credit screening literature, that suggests when firms screen out risky consumers based on different criterion, they naturally set rates to cover for the risk that they engage in. It is also showed, that the sales of firms are dispersed, which following the standard industrial organizations theory would suggest, that the firms do not have equal costs. Taking account Finnish collective labor agreements operational costs might be close to equal, but on the other hand the borrowing costs of firms might differ.

Contents

1 Introduction

The aim of this thesis is to describe and analyse price dispersion in payday loan market in Finland. Approach taken here is descriptive. Data of Finnish payday loan prices for different sizes of loans with different payback times have been collected, and the observed dispersion in each setting have been encapsulated in distributions. Analysis has been based on modern industrial organizations and consumer screening literature and it aims to highlight the reasons, why there exists a great deal of variation in payday loan market, and why some firms are able to charge very high rates, yet maintain profitable. First in this introductory section motivation for the study has been crystallized. Second the payday loan market in Finland is described in detail and third the reader is walked through the structure of the thesis.

1.1 Motivation

The price dispersion in payday loan market is an interesting phenomenon as it seems to persist, even though there seems to exist lot of competition on the industry of a homogeneous good. The prices in the industry can be made comparable by calculating annual percentage rates, that are covered thoroughly late in this thesis. Take for example a 500 euro loan, of which annual percentage rate can vary from around 30% all the way up to almost 2000%, when the loan is paid up one month after the withdrawal. Competition in the industry seems very fierce on the first glance, as the number of firms in the industry defined for the purpose of this thesis is around 24. In addition all the payday loan brands in this thesis are able to maintain sales and are likely to have positive profits.

The pricing schemes or pricing vectors in which firms engage in, have multiple dimensions that make the comparison of alternatives troublesome. Prices of payday loans typically vary at least in monthly rate, withdrawal fee, monthly payment and payback time, that all affect the net price the consumer faces. More accurate description of payday loans can be found in Section 2.1.1. Setting up complicated pricing schemes is also common in many other industries like for example in cell phone plans, that are many times also sold together with phones. Fruits can be sold using per kilo or per unit prices. Even online book

stores might make their pricing shady, if they take part of their profit in delivery fees. Only imagination limits the ways how one can make own price difficult to compare with the competitors.

The payday loan industry can also be seen in a social context. High prices that cannot be perceived due to obfuscation can be harmful for the consumers, who would get cheaper loans, were they able to compare prices across firms. Great proportion of consumer surplus is spent first onon searching prices and then comparing them among firms. Some legislational limitation on pricing would benefit consumers by reducing the search cost, which might in turn counter intuitively increase competition by reducing number of firms and lowering prices. Also price comparison services that might arise in the need of performing the comparison for the consumer could benefit the consumers.

1.2 Payday loan market in Finland

The Finnish payday loan market consists of at least 24 firms that offer payday loans meant in this thesis. It is difficult to say, if these are all the companies operating in this specific industry, as the firms operate in the internet and they share classification with other types of companies in public company registers. However extensive search was carried around in internet, in order to identify most of the firms of interest. Around 7/10 of the firms are based in Finland, 3 companies are branches of Swedish consumer credit companies, one of the companies is listed on London stock exchange and one of the companies is based on USA and these two have Finnish subsidiaries. The origins the companies are summarized in the appendix.

The firms chosen for analysis in this thesis go around limitation of rates by granting credit limit loans, that are at least 2000 euros. Law for interest rates in Finland assesses the upper limit of rates to be reference rate incremented at most by 50% -points, whenever the loan or credit limit is lower than 2000 euros. Now it is easy for the companies to set the credit limit to at least 2000 euros, in order to freely set the rate in the market. The consumer can than make withdrawals up to the credit limit. For some consumers of payday loans it can be difficult to get a loan from more traditional sources of financing like banks or credit card companies. On the other hand it can be difficult for anyone to be

financed quickly for a short period of time for example if car suddenly breaks down and has to be prepared. Risky customer portfolio and short period loan demand would together suggest relatively high rates to the market.

The establishment of firms in the industry is characterized by relatively low fixed costs and easiness of getting permission for lending activities. European central bank grants permissions for credit communities, that include payday loan providers, that are taken account in this thesis. According to Statistics Finland the average number of started and ended companies on financial services industry between years 2005 and 2013 have been 234 and 180 in a year respectively and no significant deviation from these figures exists during the time span. The payday loan providers that have exited the market between years 2005 and 2013, might be included in these figures beside other types of credit providers. The data does not draw accurate picture how likely it is, that the firms of interest can persist on the market. Insurance and pension activities have been excluded from the data set. Suomen virallinen tilasto (SVT) (viitattu: 4.5.2016)

Elliehausen and Lawrence (2001) have used a nationally representative sample of payday loan consumers in the U.S. to describe typical consumers on the market. According to the survey over half of payday loan customers have family incomes between $25000 and $49999, and compared to general population they are less likely to have low or higher incomes. Like in Finland, also in the area the study was conducted, it is required for payday loan customers to have a bank or checking account, which is likely to reduce number of low income consumers in the U.S.. In Finland this is not so clear, as everyone is entitled to a bank account. On the other end higher income families hold more liquid assets and have better access to other sources of credit.

The survey reveals that consumers of payday loans are relatively young. Two-thirds of the consumers are under 45-years-old and 36,4% are under 35 and only 10% of the consumers are over 55. 57% of the surveyed are either married or living with a partner. 16,8% have never been married and 23,0% were divorced or separated. Only 2,4% were widowed. Most of the consumers have acquired only a low level of education, but only 6,2% have no high school diploma at all. Almost same proportion of consumers of these loans have either

finished high school or have attended some college percentages being 38,3% and 36,1% respectively. Quite high proportion of 19,4% of the consumers have a college degree. The attitudes towards credit are positive among the surveyed. 82,3% either somewhat or strongly agree with a statement "Most people benefit from the use of credit". Only 6,8% answered that they strongly disagree with the statement. In addition it is worth mentioning that 78,2% agree with a statement "Overspending is the fault of the consumers, not the lenders".

Most of the consumers perceive the payday loans to be more expensive or equally expensive with returned check fees, late fees on rent or mortgage or late fees on credit card or other consumer debt. Return check fee is charge from not having coverage on one's check account, and the check is returned to the owner of the account. On the other hand it is bit worrying, that around 22% of the consumers thought, that the fees mentioned were actually lower compared to prices of payday loans. There were also some consumers, who were not able to tell, whether they think that the prices are lower or higher than returned check fees, late fees on rent or mortgage and late fees on other consumer debt. This could give evidence, that due to firms practicing obfuscation, some consumer are not able to perceive the prices correctly.

1.3 Structure of the thesis

In the Section 2 relevant literature on price dispersion and payday loans are introduced. Payday loans are also defined for the purpose of this thesis. A part of covered literature consists of papers concentrating price dispersion arising from search costs, that the consumers face, when they go through alternative providers. Another part takes account behavioral aspects, that can be seen inducing search costs for consumers and firms exploiting them. Also papers that cover purposeful shading of pricing, obfuscation, are introduced. Also literature on consumer screening is covered in this section, in order to show, how firms effort to screen out too risky customers might also induce price dispersion in the market.

Next in the Section 3 the methodology for making the loans with different price features comparable is described. The section enlightens, how the elements of price schemes periodical rates, withdrawal fees payback times etc. are

summed up into annual percentage rate using the formula for internal rate of return. In order to have an output of meaningful figures, some additional assumptions were made and they are described in this section. Also the strengths and weaknesses of annual percentage rate approach are evaluated.

After that in the Section 3 the price data for 100, 300, 500 and 1500 euro loans are described with different payback times. Also the corresponding price distributions are drawn from the tables and presented here. In addition the data on firm turnovers from year 2014 can be found in this section. For all the data sets also averages, medians, standard deviations and variances for all the data sets were calculated and they are also reported here.

In section 4 the data is analyzed in the light of the models described in the literature review section. First a subset of firms from different price levels are taken under a scope, in order to inspect, whether there was some price dimension, on which the firms might appear similar and misguide consumers. Second it is described, how obfuscation can be seen in the pricing, and more specifically what might be behind the firms' choice of pricing schemes. Third the ability of firms to screen out non credit worthy customers is taken account and it is considered how screening would be a source of price dispersion. Lastly welfare effects of consumer biases have been taken into consideration. Finally in section 5 conclusions are drawn from the data and the analysis.

2 Literature review

In this section relevant literature considering price dispersion in general, expanded industrial organizations and payday loans are introduced, and associated with observed price dispersion in payday loan markets in Finland. The section on expanded industrial organizations covers topics that add useful features into standard IO theory, that enables the models to capture different consumers behaviors. In this section also a distinct area, behavioral industrial organizations, is briefly covered. In the first chapter payday loans are defined, their characteristics are described and ways of obfuscation are made transparent. Different branches of industrial organizations expansions are briefly introduced, highlighting the role of obfuscation models in explaining price dispersion on payday loan

market. After that, overview on models that predict price dispersion on market is given. This is followed by more detailed presentation of three models, that represent the evolution of such models. In particular model presented in section 2.6 is used as a framework in inspecting dispersion in the payday loan market. Finally in the Section 2.7, some emphasis is given to firms screening customers in order to enhance credit portfolios, and screening giving rise to price dispersion.

2.1 Payday loans

2.1.1 Definition of a payday loan

In this thesis payday loans are defined so that they are credits provided by dedicated firms that are not banks and they usually lend to individual borrowers. Loans are either revolving or non-revolving. In revolving loans the consumer has a credit account, from which she can make withdrawals up to some limit, and the non-revolving are one time loans. The loans have payback times from few days to few years, but require periodical installments to the loan. Periodical installments can be fixed or some proportion to the loan or a mixture of these, for example 12,5 % of the remaining total amount of loan, but at least 100 euros. Total amount of loan includes interest rates and withdrawal fees in addition to the loan capital.

The upper limit of line of credit varies, but in Finland it is usually at least 2000 euros, in order to go around legal limitations on the interest rates. Also additional fees like withdrawal fees are usually included in the loan. The legislation in Finland allows the borrower to payback the loan whenever she is willing without additional cost. Legislation in many countries require providers to clearly present their annual percentage rate, that takes account also the payback schedule and additional fees included in the loan. The price of the payday loan can have many dimension, which later in this thesis is shown to be a source of confusion of consumers.

For illustration, lets see what an example loan would look like. For example a revolving loan, that has line of credit granted up to 2000 euros, can include a withdrawal fee of 5% of the withdrew amount. The loan provider might say in their marketing material, that they have a monthly rate of 6%, but usually the providers add the daily rate calculated from the monthly rate besides the

debt. It should be stated that in Finland it is not allowed to compound interest of payday loans. In the example it could be possible for the consumer to make additional withdrawals from the credit line and it is possible for her to pay back the debt in each point of time without additional costs. In the example 15% of the remaining credit has to be paid back monthly, was the remaining credit over 1000 euros otherwise 150 euros is paid monthly.

In this thesis terms borrower and consumer are used interchangeably. Consumer is the identity that consumes lending services of some payday loan firm. Terms price vector, pricing vector and price scheme all refer to multidimensionality of price. For example the price vector or price scheme of some payday loan firm might be two dimensional and include only monthly rate and a withdrawal fee. As a side note, In economics price vector usually refers to a vector of prices of competing firms on some market.

2.1.2 Complexity of price vectors

Like stated above the price vectors in these types of loans can have multiple dimension. It is common that providers do not show the whole price vector right away in the first page but instead it is hidden somewhere in the lines of credit agreement. In many cases the credit agreement are tricky to find from the company web page and the relevant information is scattered around the agreement. Extensive combining is required to draw complete picture of the price vector. The firms usually highlight the free first loans on their sites, to draw consumers' attention and disturb price comparison before the consumer takes the loan. This is further discussed later in the thesis.

Also other features are used to increase the complexity. Some providers might charge a monthly fee for having an open credit limit. Some firms promise that they will not charge interest rate for the first month but nevertheless they charge percentage withdrawal fee, which is typically higher than the monthly interest rate. On the other hand some firms do not charge withdrawal fee for the first withdrawals made by the consumer but include it to subsequent withdrawals. In some firms installments are not constant, but determined by payback time. For example the loan is not necessarily paid back in even installments in 12 months, but they somehow depend on the remaining loan capital.

Good example of an installment would be that it is 10% of the borrowed amount but at least 150 euros. This has to be taken account in annual percentage rate calculations, that are described in chapter 3.

The large number or firms is also a factor, that increases is also a problem for consumers, who face search costs. Individual can optimally search few providers, but it can be difficult to search all the prices. It is no wonder that it is nearly impossible for a consumer of payday loans to compare prices across producers, as the pricing schemes can vary in so many dimension, and after that make conclusions, which of the alternatives would be the best for ones personal needs. Annual percentage rates are usually calculated on some claimed "representative" size of loan, despite of which the rates can be very different in loans of a different size. Examples of this are presented in the later sections.

2.2 Industrial organizations expansions

Consumers are not always able to compare prices across homogeneous products, which can lead to price dispersion in the market, as firms are able to charge positive markups. Varian (1980) have argued that "the 'law of one price' is no law at all". In this section I will cover literature on expansions for industrial organizations theory, that help to understand different foundations of why it is difficult for the consumer to find and exploit best prices in the market. The literature can be divided into smaller branches according to whether consumers have non-standard preferences, consumers are overconfident or they are not able to interpret prices and product attributes between different alternatives. Literature also covers situations where consumers are not able to choose the best price as price search has frictions, the prices are set so that consumers get confused when they try to compare prices and when there exists excessive inertia on the market. First in this chapter different branches of the literature are first briefly introduced, and then the part of consumer confusion is linked to competition in payday loan market, that can be seen to benefit from systematic errors in the decision making of the consumers.

In addition there exists a separate branch of literature that covers behavioral industrial organizations. Behavioral IO focuses on consumers systematically failing to optimize their behavior whereas it is easy to include. For example

if in the following hyperbolic discounting example a naive consumer thinks on first period, that she has standard preferences and acted accordingly, observes on second period, that the preferences are in fact different, which leads to suboptimal behavior on the first period. The consumer would have Chosen differently, if she had right idea on her future behavior.

2.2.1 Taxonomy of behavioral biases

According to Grubb (2015a) the most studied non standard preferences are loss aversion and present bias, that is also related to hyperbolic discounting Frederick et al. (2002). Loss aversion means that individuals experience losses more painfully compared to gains of a same size, relative to the current reference point. Due to hyperbolic discounting present biased individuals are more impatient towards gains in near future compared to later gains. For example when asked whether one wants to have an apple today or tomorrow, individuals tend to have the apple today, whereas if asked whether individual want to have an apple 50 or 51 days from now, they tend to be more indifferent. Therefore time preferences are inconsistent. There is also evidence that individuals can indeed be loss averse Camerer et al. (2011) and present biased DellaVigna (2009). Referring to the last paragraph of last section, the model is behavioral only if consumer is naive and does not know her true behavior in the future. Otherwise the bias can be encorporated to the standard model.

Consumers can also suffer from overconfidence, overoptimism or both Grubb (2015a). Overconfident individuals tend to overestimate their ability to predict their choices in the future. Famous example of overconfidence is consumers who buys annual gym contract but fail to visit the gym often enough to be better of compared to purchasing one time tickets DellaVigna and Malmendier (2006). On the other hand overprecise individuals tend to set too wide confidence intervals around their estimations of future consumption, which for example leads too much variance of future visits in the gym. Grubb (2015a) also distinguishes three ways for firms to exploit cognitive biases of consumers. First even though markets are competitive and prices would otherwise tend to cost, due to overconfidence and overoptimism firms can exhibit complicated pricing structures that give rise to market power. Second over confidence does not necessarily

increase equilibrium mark ups but consumers suffer when they overvalue contracts Grubb (2015a). Third helping consumers to comprehend overconfidence can harm consumers, when firms adjust prices in response Grubb (2015b).

Third branch covers difficulties of consumers to choose best price on the market and act accordingly, and this in the scope of the thesis. For example Baye et al. (2006) have suggested that the search and switching costs of consumers cause prices to disperse in equilibrium, when the firms offer homogeneous goods. The intuition is that consumers face a cost to learn price of an additional firm and a fraction of the customers fail to observe lowest price, while they search too little and end up buying from a firm that charges higher than the lowest price. According to Grubb (2015a) the assumption that consumers search optimally is overly optimistic, when the search frictions stated in the first paragraph are valid.

2.3 Overview on price dispersion models

From here on the focus will be on price dispersion. In this section overview on price dispersion will be covered and in subsequent sections corresponding models are introduced and discussed. Early model of price adjustment by Diamond is a piece by piece analytical description of a monopoly on a market for some good. It aims to show, how the search cost limit the number of searches and how given parameters lead to well defined equilibrium. More recent models of Varian (1980) and Chioveanu and Zhou (2013) have their roots in industrial organizations and game theory and they are able to incorporate competition into the model. These models have equilibria, in which firms engage in strategies, where they choose best responses for their rivals actions. In some cases pure strategy equilibrium arises, whereas in many situation there exists mixed strategy equilibria, where firms choose their action according to some probability, that maximizes expected profit of the firm. In the following sections these models are covered in detail.

The idea of search costs inducing price dispersion in the market was among first suggested by Diamond (1971). From his results arise the famous Diamond's paradox, that when a consumer faces a small search cost, $\delta > 0$, there is no incentive for consumers to search for additional prices, and the firms charge a

monopoly mark-ups. This is of course a very unrealistic prediction, and later models predict more moderate effects of search cost on the competitive environment.

Also Ellison and Wolitzky (2012) suggest search cost model of obfuscations, but detailed description of the model had to be left out from the thesis. Also in their model a fraction of consumers have no search cost for the product and so they are "savvy". A fraction of consumers find it time consuming or otherwise troublesome to interpret the prices, so they are faced with a positive cost and they can be regarded as "non savvy". The consumers learn the length of the time it takes to learn the price of firm just after they have visited a it. They specify two models. In the first one obfuscation is costless for firm and in the second a cost for obfuscation is introduced and changes in equilibrium are analyzed.

Kaplan and Menzio have researched price dispersion using data from Kilts-Nielsen Consumer Panel Data set. They study the market from three angles, where the price dispersion can be observed. 1. when same good is traded in multiple stores, 2. multiple goods are traded in individual stores, 3. same good is traded in individual stores at different times. According to the authors, these three factors can all contribute in price dispersion. In payday loans market the situation is equivalent to that of same good traded in different stores. Due to lack of intertemporal data it is not possible to check, like in 3., how price dispersion in the market of interest arises from the ability of firms to change prices over time. Nor the 2. is not in interest, as there is only one individual good traded in the market.

Ellison and Ellison (2009) have studied the impact of internet price search engines on the price dispersion on market for computer memory chips. They find that internet price comparison platforms can make it drastically easier for consumers to compare across different available alternatives. Their empirical results also show, that charging a low cost on the low quality product category leads to higher sales in products with higher quality. This is intuitive as web search engines are usually able to find the cheapest products, when consumer is looking for ones with medium or high quality. Following the cheapest offers Consumer ends up searching few producers, that might charge higher prices

compared to rivals in higher quality categories. Same can be seen also in payday loan markets, where it is customary, that new customers are offered loans for free and after that they are charged high fees for new subsequent withdrawals. Comparison sites might only be able to report the first offers making it difficult to compare the real prices.

2.4 A model of price adjustment

Diamond (1971) paper have had major influence on price dispersion literature over the years. The paper is among first ones that aim to explain how prices on some market deviate from monopoly or competitive prices on equilibrium, because the consumer faces a search cost. The model does not attach search cost to any possible cause for the cost but it provides great starting points for introducing other models that highlight alternative types of consumers in the following chapters.

2.4.1 Consumer behavior

Approach taken in Diamond's paper has no foundation on game theory like in more recent models, but the dynamics on the market rely on set of assumptions, that define the equilibrium path of a monopolistic firm in the model. Consumer behavior is characterized by set of variables x, p and z at time t for quantity of the good, price of the good and the number of periods the consumer has spent checking prices. The decision to purchase is assumed to depend only on the price the consumer faces on the current period. The time consumer has spent searching does not affect the purchase decision in this model. The relationship between quantity and price is denoted by $x(p)$ and Q denotes all the prices that lead to purchase in the current period. Actual demand in the market can then be denoted by $x^*(p)$ and it satisfies

$$x^*(p) = \begin{cases} x(p) & \text{if } p \in Q \\ 0 & \text{if } p \notin Q \end{cases}$$

It is assumed, that there exists a single cut-off price q, and that consumers purchase whenever they face a price p, that is lower or equal to q, and this can also be described following way.

$$x^*(p) = \begin{cases} x(p) & \text{if } p \leq q \\ 0 & \text{if } p > q \end{cases}$$

Consumers utility depends on the purchase price p and also on the time z, that the consumer spends searching the prices and it can be denoted by $u(p, z)$. $\frac{\partial u(p,z)}{\partial p} < 0$ and $\frac{\partial u(p,z)}{\partial z} < 0$ for all p and z. Marginal disutility of search is assumed to increase without limit i.e. $\frac{\partial u(p,z)}{\partial z \partial z} > 0$. In addition it is assumed, that the demands of the consumers define a profit function $\pi(p, x(p)) = px(p)$, that is strictly quasiconcave and has a maximum at p^*. The firms are assumed to have no costs and constant costs would not affect the optimal price given quasiconcave profits. From quasiconcavity it can be seen that

$$\begin{cases} \frac{\partial \pi}{\partial p} > 0 & \text{if } p < p^* \\ \frac{\partial \pi}{\partial p} < 0 & \text{if } p > p^* \end{cases}$$

The cutoff prices of individuals of a type h, who start to search prices at time τ is identified with $q^{h\tau}$.

2.4.2 Aggregate demand

It is assumed, that each period a set of identical consumers enter the market, which means, that at every period consumers with the same characteristics from index h come to the market and so the utility functions for type h between different generations would be the same. As different generations observe different prices on the market, the cutoff prices can vary between generations.

$$u^{h\tau}(p, z) = u^{h\tau+1}(p, z) \tag{1}$$

Aggregate demand X_t at time t is described in the following equation. The number of consumers, who represent generation τ and purchase at price p in time t, is denoted by $N_t(p)$. The summation goes through all the different generations on the market. In the model it is assumed, that there are m stores in the market, and the demand on the market is divided equally among producers, and so each of them would get $\frac{1}{m} X_t(p)$ of the underlying demand.

$$X_t(p) = x(p) \sum_{\tau} N_t^{\tau}(p) \tag{2}$$

2.4.3 Firm behavior

The firm can take the price setting problem in each period separately, as the share of consumers going to each store is constant and not dependent on history, and as there is a large number of firms. The firms do not have to care for the demand of the consumers, that have walked out of the store. It is also assumed, that the firms know the demand curve. Given these assumptions, and the firms being identical they maximize aggregate profits in the market, and the firms problem would look like

$$\max_p pX_t(p) = px(p) \sum_{\tau} N_t^{\tau}(p) \tag{3}$$

Firms problem has a solution, as N_t^{τ} is continuous from he left and it is nonincreasing, $px(p)$ is continuous with a maximum at p^*.

2.4.4 Changes in cutoff price

Diamond (1971) has described reasonable restriction on the changes in cutoff prices between consumers, that enter the market in different generations, and the changes in cutoff prices of consumers, who have entered the market earlier, but decide to stay, not found suitable price. The underlying mechanism for changing cutoff prices in these two alternatives are different and must be defined separately.

In the paper it is assumed, that if a consumer decides not to purchase on one period, she raise her cutoff price for the following period, and there are two reasons for this. Whenever the consumer makes a decision not buy, she needs to revise her price expectations, and the revision is likely to increase the price, as the consumer is willing to avoid searching and make purchase as early as possible. The other reason for increasing cutoff prices is the rising marginal disutility of search, and according to the paper increased cost of searching could encourage the consumer to buy with higher price than on the previous period. The consumer who continues searching on the period $t + 1$, is assumed to have

cutoff price that follows $q_{t+1}^{h\tau} > q^{h\tau} + \mu$ for $\mu > 0$ and is independent of the other parameters.

2.4.5 Generational differences

In this subsection it is covered how consumers, who enter markets in different generations, differ in terms of cutoff prices i.e. what factors define $q_{t+1}^{h\tau+1}$ and $q_t^{h\tau}$ and how are they related. Diamond relates the difference between $q_{t+1}^{h\tau+1}$ and $q_t^{h\tau}$ to p_t and $q_t^{h\tau}$, because consumers might naturally fix their cutoffs based on how they perceive the price on the current period. Ideal cutoff price q* would be such, that the consumer would gain same utility on the current period and on the next period, when firms charge expected price p, which can be seen in the following equation.

$$u^h(q^{*h}, 1) = u^h(p, 2) \tag{4}$$

The equation defines a continuous relationship between q^* and p. In the presence of search cost it can be said, that the the ideal cutoff price of a consumer type h would always be higher than the price in the following period $q^{*h}(p) > p$. The cutoff prices always move towards the ideal one, which provides a restriction for the process. The current cutoff can be above or below the ideal and then move accordingly for the following period. Formally the situation can be one of the following.

$$\begin{aligned} &q^{*h}(p_t) \leq q_{t+1}^{h\tau+1} \leq q_t^{ht} \\ &\text{or } q_t^{ht} \leq q_{t+1}^{h\tau+1} \leq q^{*h}(p_t) \end{aligned} \tag{5}$$

Also limits are set to avoid differences of cutoffs between consecutive periods becoming vanishingly small relative to difference between cutoff and ideal cutoff.

$$|q_{t+1}^{h^\tau+1} - q_t^{ht}| \leq \epsilon min\{1, |q^{*h}(p_t) - q^{h\tau}|\},\ \epsilon \in [0, 1] \tag{6}$$

For all h and t

2.4.6 Equilibrium analysis

The set assumption determine an equilibrium, in which during time t' the market adapts to long-run equilibrium, where $p_t = p^*$ for all $t \geq t'$ In the equilibrium

consumers are willing to set their cutoff prices slightly above the long run price, as it it worth a little to purchase on this period than on the following periods. This follows from consumers expectations of price being equal to the equilibrium price on the next period. In the vicinity of the long-run price actual demand equals to the underlying demand.

2.5 Benchmark model of price dispersion

Price dispersion can arise from the intuition, that in a market of indivisible good of a known quality some consumers are "savvy", meaning that they have understanding on the prices and qualities on the market, and so they shop, wherever they can purchase the product the cheapest. On the other hand some consumers are non "savvy", as they are not able to compare prices and qualities across sellers, and so they choose randomly from which seller they make the purchase.

Model from Varian (1980) can be used as a benchmark to describe how price dispersion arises in such situation, since it is simple illustration how equilibrium is attained with two groups of consumers. In the model there are n identical firms, that supply a homogenous product with unit cost c. Consumers have different valuations, v, for the product and the fraction of consumers, that have valuations over the price, v $\geq$ p, is denoted by $q(p)$. We can write the profit of a company with a price p $\pi(p) \equiv (p-c)q(p)$. The profit function is assumed to be quasiconcave in p, and the optimal price will be denoted by p^m. The fraction of savvy consumers in the population is σ, and like stated above, they buy from the cheapest supplier. $1-\sigma$ consumers are non-savvy and they make purchase, whenever their valuation for the product is above v.

2.5.1 Equilibrium analysis

Whenever consumers are either savvy or non-savvy, there exist a pure strategy equilibrium, and no price dispersion arise. If $\sigma = 1$ and all of the customers choose to purchase from the provider selling cheapest, seller engage in Bertrand competition, so that the price will fall down to c. If $\sigma = 0$ all of the customers shop randomly and sellers are willing to charge monopoly price p^m for the product, in order to maximize their profit. In these extreme cases expected

valuations of consumer surpluses of the two consumer groups V are equal, and the same is true for the expected profits Π. So we can write $V_N = V_S$ and $\Pi_N = \Pi_S$. Expectations are taken over the idiosyncratic valuation for the product v.

Next consider market, where both savvy and non-savvy consumers exist and so $0 < \sigma < 1$. In the only static equilibrium sellers play mixed strategy for prices, which induce price dispersion in the market, and savvy consumer obtains weakly lower price compared to a non-savvy customer. In this setting $V_S > V_N$ and $\Pi_S < \Pi_N$. In the symmetric equilibrium each firm choose its price from a cumulative distribution function (CDF) $F(p)$, which satisfies the following profit function.

$$\underbrace{\sigma(1 - F(p))^{n-1}}_{1} + \underbrace{\frac{1}{n}(1 - \sigma)}_{2}](p - c)q(p) \equiv \frac{1}{n}(1 - \sigma)(p^M - c)q(p^M) \qquad (7)$$

The first part of the equation denotes the expected revenue from the savvy customers, when the company charges price p for the good. The savvy consumers whose $v \geq p$ make the purchase, when the seller charges lower price than its competitors, which happens with a probability $1 - F(p)^{n-1}$. Then the second part denotes the expected revenue from the non-savvy consumers, who have their $v \geq p$ and to whom company always sell its share of the production. It applies, that the demand from the savvy consumers is less elastic compared to the non-savvy consumers. The firm can choose to sell only to the non-savvy consumers by charging them monopoly price p^M. For a firm to be willing to play the mixed strategy $F(\bullet)$, the firm must be indifferent between all prices given $F(\bullet)$, which induces the equality with right and left hand side of the equation.

The value of $F(p)$ which solves the above profit function is an increasing function of σ, which means, that the higher the fraction of savvy consumers the more likely firms are to set low prices. We can write $F_{\sigma_1}(p) < F_{\sigma_2}(p)$ and $\sigma_2 < \sigma_1$ and say, that the distribution of prices with higher fraction of savvy consumers first order stochastically dominates the distributions of lower fraction. From this follows, that the savvy consumer who end up paying the lowest price of n sellers whose prices are independent draws from the $F(p)$ and the non-savvy consumers, who pay the price from one draw are better of the

higher σ is i.e. also V_S and V_N and so aggregate consumer surplus increases. Also industry profit $\Pi(\sigma) = (1 - \sigma)\pi(p^M)$ increase in σ, and therefore total welfare W at least weakly increases with σ.

2.5.2 Search and ripoff externalities in payday loan markets

According to Armstrong (2015) search and ripoff externalities are inflicted, when both savvy and non savvy consumers participate in the market. The savvy consumers, who search for prices and are able to compare them, help non savvy consumers by granting them a search externality. The search conducted by the savvy consumers ensure, that the firms are not able to charge monopoly prices, as firms charging lower prices lure the savvy consumers, and then the non savvy consumers benefit from this search externality by lower prices. If there existed savvy consumers on the payday loan market, it could be seen that the consumer, who pick a loan randomly from some firm, would also benefit and also face lower prices. Later in section 3 it can be seen, that price dispersion clearly arises in the Finnish market, which could be evidence of search externality.

Also ripoff externalities might arise in payday loan markets. When non-savvy consumers are not rational with their expectations on some future aspects on the pricing vector, they can be ripped off by charging low price for the product and charging high price for additional services, that non-savvy consumers did not know they had demand for ex ante. This on the other hand can be beneficial for the consumers of a savvy type, as they can buy the product at a low price knowing that they do not need the additional features or they have realistic expectation of their demand for additional services. Good example could be hotel rooms that come with mini fridges, that include highly priced beverages. This could lower the price for hotel rooms for all customers, while the non-savvy consumers endorse the savvy ones by buying the expensive beverages. The non-savvy consumers are ripped off with high beverage prices.

Consumers on market of interest might suffer from overconfidence, that Weinstein (1980) suggests to be context dependent. Grubb (2015c) suggests that firms can introduce pricing tactics to benefit, when consumers suffer from different aspects of overconfidence. They misforecast usage of the revolving credit due to overprecision and if they are overoptimistic on their capabilities on pay-

ing their installments on time, they end up paying reminder fees. This could induce a ripoff externality on the savvy types, who have rational and precise expectations on their use of the credit, when they get loans cheaper compared to a situation when there was none or a small number of non-savvy consumers paying reminders.

2.6 Consumer confusion model

Like stated earlier, payday loan providers are known to set prices in attempt to make it difficult for the consumer to compare prices across sellers. Additional costs like withdrawal fees are included, and payment schedule can be tweaked to further confuse customers. For example one of two firms might introduce monthly rate and the other might introduce annual rate and a withdrawal fee. Engaging in these price frames could be sufficient to confuse some consumers, who are not able to compare annual percentage rates for the loans, and therefore make their purchase randomly from one of the companies. A fraction of consumers are able to compare prices among the firms, despite the different framing and buy from seller charging the lowest price.

Chioveanu and Zhou (2013) have described oligopolistic price dispersion model for analyzing situations, where firms try to confuse consumers with price frame, that differs from its rivals. By a price frame is meant the way, how firms present their pricing information to the consumers. The model predicts both price and frame dispersion at the same time. The model also predicts, that the profits of the firms should be equalized in the equilibrium. Surprisingly more firms predict less tighter competition and higher prices in this setting.

2.6.1 Price frames

In the model the firms can choose from two different price frames A and B. A is always a simple frame and B can be either simple or complex frame. When both types of frames are used among firms, it is said that firms engage in frame differentiation. On the other hand firms using same but complex frames B is referred by frame complexity. Fraction of consumers that get confused, when both price frames are used among the n companies is denoted by α_1 and the fraction of consumers that get confused, when some companies use same but

complex frame B is α_2. Whenever both price frames exist in the market and are compared, it does not matter whether frame B is simple or complex, as the confusion of consumers arise from the frame differentiation.

In the oligopoly model there are four separate combinations, how the consumers can be confused. Fraction $\alpha_1\alpha_2$ of customers get confused from both frame differentiation and frame complexity. $(1-\alpha_1)(1-\alpha 2_)$ consumers are able to compare prices in both situation and though they are not affected by either framing schemes. $(1-\alpha_1)\alpha_2$ consumers are confused by frame complexity and they are able to find lowest prices, when different frames A and B are compared. Last group of consumers are $\alpha_1(1-\alpha_2)$ in numbers and they are able to compare prices among complex frames B but they get confused by frame differentiation.

2.6.2 Decision rules

In oligopoly there is now a combination of A and B frames, and a now decision rules have to be set for the consumer to make available options comparable. Firm $i's$ options can be described by the chosen frame z_i and price p_i. The domination of firm $i's$ offer is defined following way. For a consumer, firm $i's$ offer $(z_i, p_i) \in A, B \times [0,1]$ is dominated if there exists firm $j \neq i$ that has an alternative offer $z_j, p_j < p_i$ and the two offers are comparable. The consumer decision rule can now be said consists of two parts. First the consumer goes through the offers and eliminates the ones, that are dominated and second the consumers follow a stochastic purchasing rule, when they buy from the undominated firms. Whenever all firms use same frame, the demand is shared evenly among them. Whenever there exists undominated firms with both A and B frames, A is chosen with probability $\phi(n_A, n_B)$, and B is chosen with a probability $1-\phi(n_A, n_B)$, where n_A and n_B are the numbers of users of particular frame respectively. In order to describe profit functions, following notation is introduced for a probability, that the consumer decides to buy from a company, that uses frame A, when there also exists k undominated firms with frame B. The rule does not depend on the price.

$$\phi_k \equiv \phi(1,k) \tag{8}$$

For illumination how the consumers decision rule works in practice, consider

the following example. The numbers of firms using each frame respectively are $n_A = 4$ and $n_B = 3$ and they have following price vectors in the usual economics sense. $(p_A^1, p_A^2, p_A^3, p_A^4) = (2, 3, 2, 5)$ and $(p_B^1, p_B^2, p_B^3) = (4, 6, 4)$. We see that there are two firms, that use frame A, who charge the lowest price 2 and therefore are undominated. There are two firms, that use frame B and charge price of 4, and are therefore also undominated. Even though the lowest prices of frame A users are lower than the price of frame B users, they are not comparable and decision rule has to be applied. Undominated A firm is chosen with probability $\phi(2, 2) = \frac{2}{2+2} = \frac{1}{2}$ and undominated B firm is chosen with complementary probability $1 - \frac{1}{2} = \frac{1}{2}$, when uniformly random purchace rule $\phi(n_A, n_B) = \frac{n_A}{n_A + n_B}$ is applied.

2.6.3 Results when frame differentation is more confusing than frame complexity $\alpha_1 > \alpha_2$

Chioveanu and Zhou (2013) find that when $\alpha_1 = 1 > \alpha_2$ and $n \geq 2$, so that no consumers are able to compare different frames, the firms choice of different strategies depend on whether all of the price frames on the market are simple, or whether there are also complex frames beside simple ones. If there are only simple frames, $\alpha_2 > 0$, and $n \geq 4$ there always exists asymmetric pure strategy equilibrium, where each frame is used by more than one firm, and the firms set prices to equal marginal cost. There exists also a symmetric mixed strategy equilibrium, when $n \geq 2$, where firms can set higher prices and earn positive profits.

The probability that k firms among n-1 others engage in frame A in equilibrium, can be described by the following equation.

$$P_{n-1}^k \equiv C_{n-1}^k \lambda^k (1 - \lambda)^{n-k-1} \tag{9}$$

C_{n-1}^k denotes the possible combinations of how k items can be drawn from n-1 alternatives. The probability that firm adopting frame z charges the lowest price on the market, is denoted by $x_z(p) = 1 - F_z(p)$.

Equation 10 describes the profit along the equilibrium path of a firm i, if it decides to choose frame A. Similarly 11 describes profit, if firm i adopts frame B

$$\pi(A,p) = \underbrace{p\lambda^{n-1}X_A(p)^{n-1}}_{1} + p\sum_{k=0}^{n-2} P_{n-1}^{k} x_A(p)^k [\underbrace{\alpha_2\phi_{n-k-1}}_{2} + \underbrace{(1-\alpha_2)\phi_1}_{3}] \quad (10)$$

If all other $k = n-1$ rivals also play frame A, firm i's profit is like in part 1 of the equation, taken that i charges the lowest price. The summation expresses the expected revenue for i, when $k < n-1$, so there are also firms that choose frame B. Part 2 of the function gives the profit, when the fraction a_2 of the consumers are confused because of frame complexity and consumers buy from a provider that has frame A, and i charges lowest price among the firms. Part 3 in the equation shows the profit in the case, that $1-\alpha_2$ consumers are not confused and therefore they buy, wherever they see the lowest price. In next equations the profit from choosing frame B is expressed.

$$\pi(B,p) = \Big[\underbrace{\frac{a_2}{n}}_{1a} + \underbrace{(1-\alpha_2)x_b(p)^{n-1}}_{1b}\Big] + p\sum_{k=1}^{n-1} P_{n-1}^{k} x_A(p)^k \Big[\alpha_2 \underbrace{\frac{1-\phi_{n-k}}{n-k}}_{2a} + \underbrace{(a-\alpha_2)(1-\phi_1)x_B(p)^n - k - 1}_{2b}\Big] \quad (11)$$

The first parenthesis gives the profit, when also all other firms in addition to i choose frame B, and this happens with probability $(1-\lambda)^{(n-1)}$. The underbrace 1a gives the profit from the α_2 confused consumers, which divides evenly among firms, that engage in B frame. Underbrace 2b is the profit from the non-confused consumers and it goes to the firm charging the lowest price, which again happens with probability $x_B(p)^{n-1}$. The summation in second parentheses denotes the expected profit for i, whenever k firms among $n-1$ others choose frame A. From 2a it can be seen, that i sells to the non-savvy confused customers, if the consumer makes her purchase from company, that has set Frame B, instead of a company that has used an A strategy, when there are k undominated B firms, which happens with probability $1-\phi^{n-k}$. Profit in this case is divided among firms, that have played frame B. Lastly the expected profit from consumers, that are not affected by the frame confusion, can be seen in 2b. Firm i sells to this fraction, when it charges the lowest price with the probability, that consumers purchase from firm using B, instead of firm using A, when there is only one undominated B firm.

In equilibrium the profit in the symmetric mixed strategy equilibrium would

be.

$$\pi = \pi(A,1) = (1-\lambda)^{n-1}[\alpha_2\phi_{n-1} + (1-\alpha_2)\phi_1] \tag{12}$$

It was stated, that the upper bounds of price CDF's do not depend on the price and they are $p_1^A = p_2^A = 1$. Then we get the equilibrium proportion of firms adopting each frame, λ, by solving $\pi(A,1) = \pi(B,1)$. Any price drawn from distributions F_A and F_B would lead to equal profits, as they are determined by $\pi(z,p) = \pi$. The lower bound of prices from the distributions, $p_0^z < 1$, are determined by $\pi(z,p_0^z) = \pi$.

If $\alpha_2 < \alpha_1 < 1$ there can also exist price competition between firms using different frames, that is different from the case where $\alpha_1 = 1$, and there exist price competition only among firms, that have adopted same frame.

2.6.4 Results when frame complexity is more confusing than frame differentiation $\alpha_1 < \alpha_2$

Consider next the case when $\alpha_1 < \alpha_2 = 1$ and $n \geq 2$. So now none of the consumers are not able to compare prices, that are presented within frame B. Again like above, there exists only symmetric mixed strategy equilibrium. Chioveanu and Zhou (2013) report the following results from the specification. In the equilibrium frame A is chosen with probability λ, and so frame B is chosen with probability $1-\lambda$. Firm that uses frame A, draws it price from a distribution F_A, defined on $[p_0^A, 1)$. Firm that adopts frame B always charges highest possible price p=1. Last there is the case where $\alpha_1 < \alpha_2 < 1$. This specification leads to a symmetric separating equilibrium, where the users of frame A draw price from a distribution on interval $[p_0^A, \widehat{p}]$, and the users of frame B draw their price from a distribution defined on $[\widehat{p}, p_1^B]$

2.6.5 Larger number of firms

The model predicts, that larger number of firms on the market, which traditionally have implied tighter competition, can in contradiction lead to higher prices with some high α_1 and α_2 values. Increase in the number of the firms in the limit affects the companies' choise between frames A and B the following way.

$$\lim_{n\to\infty} \lambda = \begin{cases} \frac{1}{2} & \text{if } \alpha_2 = 0 \\ 0 & \text{if } \alpha_2 > 0 \end{cases}$$

$$\lim_{n\to\infty} n\pi = \begin{cases} \frac{1}{2} & \text{if } \alpha_2 = 0 \\ 0 & \text{if } \alpha_2 > 0 \end{cases}$$

If there are no consumers who are confused by frame complexity, again if frame B is also a simple frame, $\alpha_2 = 0$, and the number of firms tends to infinity, half on the firms use frame A, and the other half use frame B in the equilibrium. The profits of the firms are zero. If there is positive number of consumers who are confused by frame complexity, $\alpha_2 > 0$, all firms end up choosing frame B, and the profits are strictly positive in the market. Later in the analysis section 4 it is showed, how this can be seen in the payday loan market.

2.7 Consumer screening

Price dispersion in the Payday loan market can also arise from alternative sources. In the credit market loans should be priced so that the lender is compensated for the risk it bears Oliver and Oliver (2014). If the creditworthiness of a consumer is a random variable, and firms charge one price from all of its customers, it is possible that consumers are randomly assigned to the provider, whose price reflects the riskiness of the particular customer. In contrast to mortgage lender who might have vast number of risk categories, where customers are divided based on their credit worthiness, the payday loan market might have an in built characteristic, that determine the risk level each of the firms serve. Then it could be argued, that price dispersion arises from serving different risk groups of consumers.

Liran Einav (2012) have studied subprime loans in automobile lending and they have developed a model of consumer demand, that takes account both borrowing and repayment decisions. The model has a base on consumer theory, where the utility of a consumer is derived from individual characteristics of the consumer and the terms of contract offered by a firm. The marginal profits of the firm increase in the the terms of the contract, and the profit function can be divided in two parts similarly to standard monopoly situation. The first part

of profit function reflects the loss of a marginal buyers, and the second part reflects the effect on contract terms on inframarginal buyers. The firm would then choose contract, that balances these tradeoffs. From the model it can be seen, that marginal borrowers are generally riskier than average borrowers.

The described model can be partly applied to subprime payday loan markets, where the borrowed cash can be used to purchase a product or service, but these are not usually easy to collateralize like automobiles. The authors state, that consumer lenders screen their customers, in order to limit the access of high risk consumers to the loans. Had the company only a single offer for the consumers, it would be chosen so, that it maximizes the profit function, that was described in the previous paragraph.

3 Methodology and data

3.1 Annual percentage rate

Annual percentage rate (APR) is a measure, that can be used to make loans with different payback times and monthly rates comparable. Legislative authorities impose, that companies should have annual percentage rates visible in their marketing material, so that consumers can have idea, what are the real costs associated with the loan. There are multiple ways to calculate the APR but Finnish authorities require the calculation be carried out by the following formulation, based on internal rate of return.

$$\sum_{k=1}^{m} C_k(1+r)^{-t_k} = \sum_{l=1}^{n} D_l(1+r)^{-S_l} \tag{13}$$

Left hand side of the equations sums up the k ordinal withdrawals C_k from the line of credit and discounts them from period t to the period of taking the loan. C_k also captures the withdrawal fees, that are included in the debt capital at the withdrawal period. Similarly the right hand side sums up the l ordinal paybacks D_l discounted from period S to the period of taking the loan. The APR or the internal rate of return r is the rate, with which the present value of withdrawals and installments are equal. For the above example the APR would be around 122%, given that there was only one withdrawal in the first

period. A calculator has been applied in Excel, and solver has be used to return the APR. The Excel model is included in the appendix. Annual percentage rate calculations easily captures effect of additional payments like for instance withdrawal fees. It is also easy to use to vary payback period and installment amounts.

As payday loan providers in Finland are not able to compound interest to the capital and so the loan capital will not grow interest on interest, the annual percentage rate is enough to capture the effect of interest rates. On the contrary in mortgage lending the interest increases the capital, and this compounding was it annual, semi-annual or quarterly should be taken account in the calculations. Consumers are not likely to use extensive APR calculation as a basis for their decision making, and there might exist some individual factors of the price like monthly rate or payback time that are more important for consumers. This is further discussed in the analysis section 4.

3.2 Price data

In this section the data is introduced and its merits and shortcomings are discussed. Finnish payday loan markets consists of at least 24 firms. The decision to include a firm depends on the way payday loans were defined in the Section 2.1, which binds all the firms, that were included in the analysis. Internet search engines and payday loan comparison websites were used to identify firms, that operate in this specific industry and to calculate annual percentage rates for each of the companies. This way of finding the companies, that really operate on the market, proved more efficient compared to using some database of Finnish financial companies, as the databases tend to report all the companies, that somehow relate to this specific industry. The problem is, that they do not necessarily satisfy the set criterion. In addition the right companies would have had to be identified by visiting their website, to see what their offering really looks like to the consumer.

It was not possible to include each company for all of the datasets, as some of the companies chosen for analysis did offer only non revolving loans. These companies are marked by asterix in the tables of following chapters. The variables used were collected from company websites, and the complete documentary on

price frame was sometimes found only from the terms of agreement. Annual percentage rate is rigorously explained in the Section 3. Corresponding firms behind the credit brands are listed in the appendix.

There exists also other Firms, that offer similar service on the market but have different earnings logic or were otherwise not suitable for this analysis. For example loan services in which peers lend and borrow money were excluded, as the intermediaries collect their share from the loans provided by the users. Also consumer credit provided by banks were excluded, as they execute their own earnings logic. They collect their debt capital from savings and lend these funds to the public. It is assumed, that the customer base of these firms differ from the customer base of payday loan providers of interest.

Six data sets were developed using two approaches, that are able to separately take account consumer preferences over certain sizes of loans and different payback schedules. For 500 and 300 euro loans the inspection is conducted in two different ways, that allows to control for the payback time dimension. In the first approach 500 euro loans are assumed to be paid back in 4 months and 300 euro loans in 3 months time. The payback times where determined by assuming 150 euro monthly installments for each company. In the second approach both sizes of loans are paid back right after one month. Also 100 euro loan has been taken into account in this setting, as it was assumed that consumers do not hold this small loan for a longer than one month. The selection of the loan sizes is based on the survey of Elliehausen and Lawrence (2001), according to which 97,8% of new payday loans are less than $500 in survey made in the U.S.. The two ways used to calculate the rates complement each other and allow comparison of the prices for two types of consumers. The ones that have demand for some payback time, and the ones who are willing to pay back as soon as possible.

The 1500 euros loan was chosen to represent possible "bigger" loan, when consumer chooses to follow payment schedule given by the provider. In the 1500 euro category annual percentage rates are calculated by using the terms of payback, that the firm suggests. In this setting it is therefore assumed, that consumers are not willing to affect these matters. For example some firms might suggest payment schedule, in which it takes 12 months to pay back the debt,

whereas some other firm might collect the loan back in 18 months. The types of monthly installments also affect the payback time, as the monthly installment can be in some proportion to the total amount of debt and after some threshold they become constant or they can be constant the whole time. The total amount of debt usually includes interest and withdrawal fees in addition to the loan capital. The payback times of the loans are a factor, that have a major impact on the annual percentage rate.

There are some sources of imprecision included in the data. First, interests and withdrawal fees are not necessarily treated the same way in each of the providers. In one firm monthly installments can be firstly directed to withdrawal fees, and after that consumers is able to pay interests, and last the capital is shortened. For simplicity this order of payment allocation was assumed, when the annual percentage rates were calculated. Some other firm might direct the installments to parts of the price differently. This shortcoming should not have major effect on the relative level of APR in the companies. Nevertheless the order of allocation used in this analysis is the most common among the firms of interest.

Issues regarding the type of credit should also be taken into account. Brands Ostosraha, Credento, Credigo, Saldo and Cashbuddy offer only non-revolving loans, and among them only Credigo and Credento offer loans under 1000 euros. These brands are included in corresponding analysis. The brand "Vivus" of firm 4Finance Oy also does not offer revolving credit and its payback times vary from 3 to 30 days, so it is not possible to make straight comparisons in the categories of longer payback times. The non-revolving credits were included in the analysis to have more firms in the sample for 1500 euro loan comparison.

3.2.1 500 and 300 euro loans with monthly installments

This section emphasizes the prices and price distributions of 500 and 300 euro loans with payback times of 4 and 3 months respectively. Due to monthly installments scattering among several months, the annual percentage rates are on average lower compared to the rates of loans of the same size with a single installment.

Table 1 shows, that in 500 euro loan category the annual percentage rates vary from 27,9% to 538,2% average rating being 268,64%. Averages and standard deviations of the distribution are second lowest after 1500 euro loans with given payback times. Standard deviation is around 157%-points. Like stated above the non-revolving credits rank in the cheap end of the distribution. 3 firms were excluded from this sample, as it was not possible to possible to either get a loan of a size 500 euros, or it was not possible to divide payback over 4 months. Figure 1 describes the distribution associated with the prices in this group. The distribution for this sample could somewhat resemble normal distribution, as a large proportion of the prices is divided on the interval [150%,350%] and almost even number of firms is divided on the both sides of the this interval.

Table 1 summarizes the prices of 300 euro withdrawal with 3 month payback time across firms. Lowest rate in this category is nearly twice as high as the rate of 500 euro loans in this chapter being 49,4%. Also the highest price of the brand "Peruslaina" is clearly higher compared to the 500 euro loan, being as high as 818,7%. Average price and standard deviation also increases in this category and they are around 383% and 223%-points respectively. In this sample it can again be seen, that the non-revolving loans can be found from the cheap end of the distribution. Four Firms were excluded from this sample, for the reasons discussed earlier. Figure 2 describes the distribution associated with the prices in this group. The distribution of this sample resembles a log-normal distribution growing from the left to its peak at around 300% and having a long tail that descends to the right.

Table 1: Rates for 500 and 300 euro loan rates with monthly payments (* Non-revolving loan)

Brand	**Rate, 500e**	**Rate, 300e rate**
* Ostosraha	0,279	
* Credigo	1,570	2,287
Credit 24	0,494	0,494
* Saldo	0,616	0,617
OK money	0,616	0,616
Risicum	1,570	2,287
Laina.fi	1,807	2,577
Luottoraha	3,089	4,645
Nordcredit	2,273	3,257
Everyday.fi	1,799	2,409
Vippi	2,297	2,817
Limiitti.fi	2,297	2,817
Extraluotto	3,227	4,093
Ferratum	3,492	4,628
Flexiluotto	3,197	4,137
Suomilimiitti	4,058	5,130
Suomen tl.	4,058	5,573
Peruslaina	5,110	8,187
Get capital	4,591	6,238
Lainasto	4,591	6,238
Euro 24	5,382	7,722
Mean	2,686	3,839
Median	2,297	3,675
Std. dev.	1,569	2,229
Variance	2,461	4,970

Figure 2: Price distribution of 300 euro loans paid back in 2 months

Figure 1: Price distribution of 500 euro loans paid back in 4 months

3.2.2 1500 euro loans with given installments

Table 2: Rates of 1500 euro loans with given payback times (* Non-revolving loan)

	Brand	**Rate, 1500 euros, monthly**
*	Ostosraha	0,279477039
*	Credento	0,417770378
*	Credigo	0,467846025
	Credit 24	0,493639796
*	Saldo	0,536719696
*	Cash buddy	0,591277097
	OK money	0,616492842
	Risicum	0,689965111
	Laina.fi	0,900314445
	Luottoraha	1,405704141
	Nordcredit	1,480239951
	Everyday.fi	1,540740267
	Vippi	1,820583114
	Limiitti.fi	1,850448636
	Extraluotto	1,991452675
	Ferratum	2,230777032
	Flexiluotto	2,271319901
	Suomilimiitti	2,536795507
	Suomen tililuotto	2,749304705
	Peruslaina	3,093981527
	Get capital	3,255453323
	Lainasto	3,297805827
	Euro 24	3,67350332
*	Vivus	4,350273392
	Mean	1,772578573
	Median	1,68066169
	Std. dev.	1,187823712
	Variance	1,410925172

Figure 3: Price distribution of 1500 euro loans with given payback times

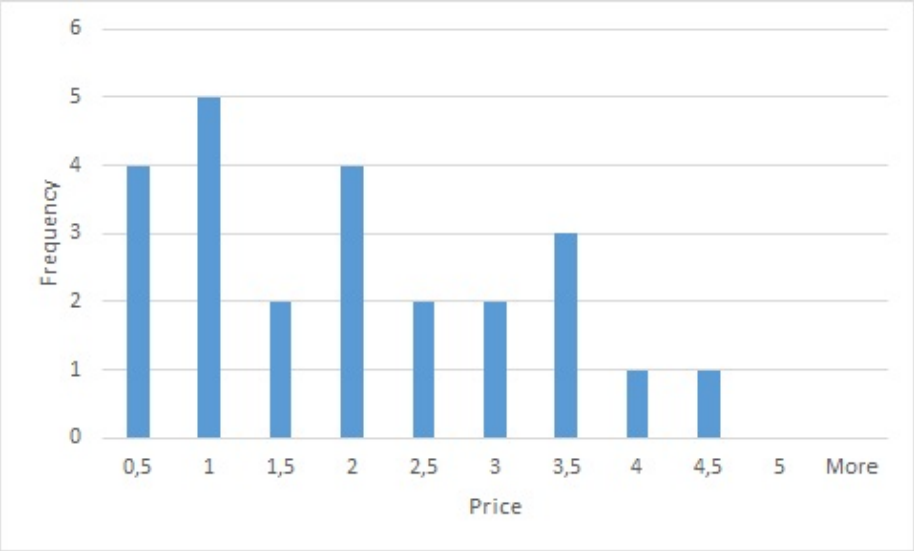

Table 2 illustrates the rates of 1500 euro loans in the market, when monthly installations are given by companies, who determine the payback times. Figure 3 shows the price distribution of corresponding prices. Rates vary between 27,9% an 446,2% and from the table it can be seen, that the standard deviation in this category is around 119 %-points. In this category the distribution seems to peak in relatively low price levels and again near the median around 250%-300%. There are also some observation of firms charging very high prices. The peak in low price region would imply, that prices are not normally distributed, even though the distribution peaks near the average, and there are smaller number of observation on both sides of the average.

3.2.3 500, 300 and 100 euro loans paid back in one month

In this section the annual percentage rates are presented for 500, 300 and 100 euro loans, when they are paid back one month after the withdrawal. Because of the way how the annual percentage rates are calculated, the rates in these categories are clearly the highest. Also as different payback times, and possible alterations in the sizes of monthly installments do not affect the rates, the rates tend to be same across the loan sizes, which can be seen in the following price

tables and distributions. As a reminder, some companies change the installment size from a percentage of the remaining capital to a constant after some threshold. In addition these rates being the highest, they are also never showed to a consumer, although according to Elliehausen and Lawrence (2001) these are loans, that consumers most often take at least in the U.S..

As these are rates, that consumers cannot straightforwardly observe in the market, and the calculation require some knowledge of algebra, obfuscation could be seen behind the higher standard deviation in these groups. The price distribution in this group are similar to each other for the reason, that annual percentage rates are in most cases same with different sizes of loans. They also resemble log-normal distributions, as they peak near the average rates and have long tails to the right. Small number of companies also charge very high prices. The standard deviations becomes so much higher compared to earlier categories, as now some firms become very expensive.

Table 3 shows the rates of 500 euro loans, when they are paid after one month. Prices in this category range from around 27,95% to 2830% and they are charged by brands "Ostosraha" and "Peruslaina" respectively. Also standard deviation of the distribution is four times higher higher compared to 4-month-payback counterpart being 680,6%-points. The average rate have ascended to 666% and it is almost 3 times higher than the average rate with longer payback time. Non-revolving loans do not rank in the lowest end of the price distribution anymore. Picture 4 describes the distribution associated with the prices in this group.

In table 3 prices of 300 euro loans, that are paid back after one month, have been listed. Now that brand "Ostosraha" have been excluded from the sample, the cheapest loan in this category is provided by brand "Credit 24" with APR of 49,3%. This also shifts the mean of the distribution higher to 734,6% and lowers the standard deviation to 666,0% percentage points.

In table 3 prices of 300 euro loans, that are paid back after one month, are presented. Brand "Ostosraha" have also been excluded from this sample. Some prices shift when moving from 300 euro loans to 100 euro loans, so that the mean of the distribution is 771,5% and standard deviation 670%-points, which is again due to a few firms, who charge very high rates.

Table 3: Rates for 500, 300 and 100 euro loans paid back after one month (* Non-revolving loan)

Brand	**Rate, 500e**	**Rate, 300e**	**Rate, 100e**
* Ostosraha	0,279		
* Credigo	4,784	4,784	4,784
Credit 24	0,494	0,494	0,494
* Saldo	0,616	0,616	0,617
OK money	0,616	0,616	0,617
Risicum	4,784	4,784	4,784
Laina.fi	5,304	5,304	5,304
Luottoraha	7,112	7,112	7,112
Nordcredit	0,616	7,064	7,064
Everyday.fi	4,350	4,350	4,350
Vippi	4,350	4,350	4,350
Limiitti.fi	4,350	4,350	4,350
Extraluotto	4,442	7,064	7,064
Ferratum	8,966	8,966	8,966
Flexiluotto	7,480	7,480	7,480
Suomilimiitti	4,350	3,281	3,281
Suomen tl.	4,350	4,350	12,088
Peruslaina	28,282	28,282	28,282
Get capital	13,413	13,413	13,413
Lainasto	13,413	13,413	13,413
Euro 24	19,845	19,845	19,845
* Vivus	4,350	4,350	4,350
Mean	6,661	7,346	7,715
Median	4,396	4,784	5,304
Std. dev.	6,806	6,660	6,700
Variance	46,325	44,360	44,893

Figure 4: Price distribution of 500 euro loans paid back in one month

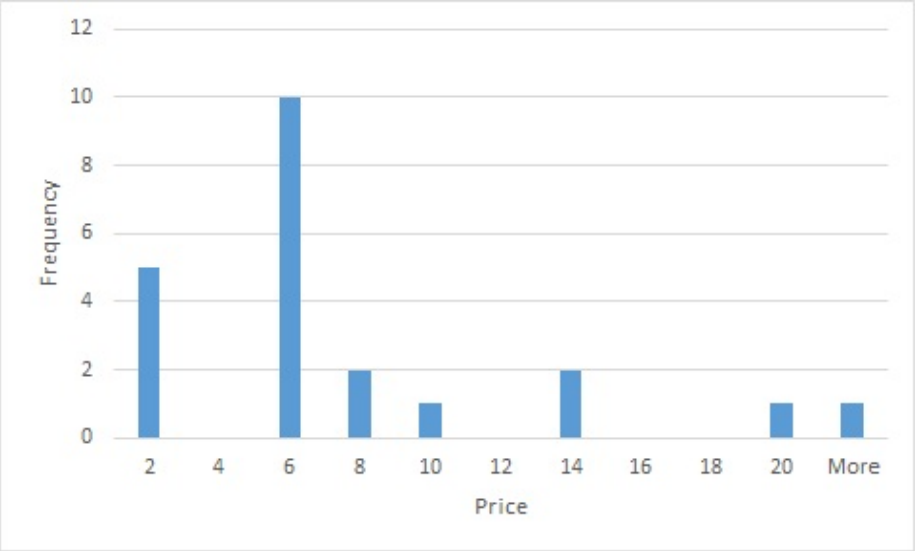

Figure 5: Price distribution of 300 euro loans paid back in one month

Figure 6: Price distribution of 100 euro loans paid back in one month

3.3 Turnover data

The table 4 on the next page shows the turnovers of the firms behind the brand names in 2014 or later, if it was available. Whenever some brands were under a specific firm, the turnover was divided equally between different titles. All these are Finnish subsidiaries and the data was collected from Orbis database.

Table 4: Firm turnovers in 2014

Brand	**Turnover 2014**
Credigo	108870
Luottoraha	1411999
Suomilimiitti	1872143
Get capital	1939030
Nordcredit	2300939,5
Lainasto	2300939,5
Euro 24	2471909
Peruslaina	3596395
OK money	4132097,333
Risicum	4132097,333
Laina.fi	4132097,333
Saldo	6068074,667
Vippi	6068074,667
Limiitti.fi	6068074,667
Suomen tililuotto	9020767
Credit 24	9337648
Everyday.fi	15224627
Extraluotto	18204224
Ferratum	18386179
Flexiluotto	24823501
Mean	7079984,35
Median	4132097,333
Std. dev.	6368847,68
Variance	3,88125E+13

4 Analysis

In this section analysis on the data is carried out and the results from the analysis are reported. In the Subsection 4.1 a subpopulation of four brands with different prices with even intervals have been chosen for comparison, in order to identify, whether they differ on some dimensions and whether they have similarities, that would affect the choice of a consumer. In 4.2 the analysis of dispersion in prices and turnovers is carried out using the dispersion figures described in the data section. After that, in the Subsection 4.3, the dispersion is analyzed in the light of the confusion model, that was described in the literature review in the Section 2.6. In the next Subsection 2.7 the ability of firms choose their customers based on some criteria are taken account as a source of dispersion in prices. Finally in section 4.5 welfare issues of comparison difficulties of prices are taken account in the analysis.

4.1 Comparison of selected firms

In this section I will perform comparison of four brands from different price categories, in order to analyze whether their price schemes share some characteristics. The loans might be similar on some some important dimension, which would make it difficult to compare the prices. For the comparison I have chosen Credit24, Risicum, Ferratum and Euro24, whose annual percentage rates are around 50%, 200%, 450% and 750% on 300 euro loans when paid back after one month.

In the firms' front pages in the internet all but Euro24, the most expensive one, reports some dimensions of the price, while Euro24 reports only absolute amounts of monthly installments and the withdrawal fee. Ferratum and Risicum reveal the yearly nominal rates, withdrawal fees and annual percentage rates right on the first page but they do not let the consumers calculate examples of the installments. Credit24 on the other hand reveals annual percentage rate for a 1500 euro loan and show what would be the monthly installment for chosen size of loan and what would be the cost when paid back after one month. All the firms are the type, that charge consumers withdrawal fees in addition to the rate. Only credit24 informs clearly how long the pay back period can be and

Ferratum has included the payback time for 1500 euro loan in the small print.

Credit24, Risicum and Euro24 have a slide switch for choosing withdrawal amount on the first page. Ferratum has this feature after choosing the standard loan from the first page. Slide switch is typical way of providers to let the consumers choose their withdrawal amount. The switches usually have steps in every 50 euros and consumers might hence take too big of a loan, as switches might make them think, that they cannot take loan of the size they really want. in addition for example Risicum do not let the consumer choose freely the exact loan amount. All but the cheapest of these four clearly highlight "Apply now" or similar buttons in the front page in order to capture consumers' attention.

The monthly rates of these firms vary from 3,4% to 9,9%. Withdrawal fees are 6,95% on Credit24, 12,5% on both Ferratum and Risicum. Euro24 has also the highest withdrawal fee of 18,9%, and like stated above the rates and withdrawal percentage is not visible in the front page of Euro24. The Euro24 brand is unambiguously the most expensive alternative among these four brands measured by the variables above, yet it has positive sales. Among Credit24, Ferratum and Risicum it is clearly more difficult to tell, which of the alternatives is most expensive. Taken 1500 euro loan the annual percentage rate of Credit24 is the cheapest, Risicum price seems second highest, were the loan amount 2050 euros and Ferratum seems the most expensive one on the first glance, when they present the annual percentage rate of 1500 euros. From these it is not possible to say, how would the brands compare, were the loan amounts different. For these four the annual percentage rates gives a good proxy, how the brands rank relative to the other three with other loan amounts.

Also google searches yield very different results depending on how the keywords are framed. It is notable that search with "Pikavippi" results only Ferratum among these alternatives, "Pikalaina" results both Ferratum and Risicum. Keyword "Halpa pikavippi" does not result in any of these alternatives in the first page. All of these keywords result also in other brands that are covered in this thesis. They also reveal price comparison sites and links sites of firms, that provide other types of loans. It is fundamental, that internet search engines yield somewhat random results, when payday loan related keywords are used. It can be, that the consumers make their price comparison based these search

results, it is possible, that consumer is not able to compare, if the search result firms present their price information very similar manner.

It seems that individuals discussing in the internet bulletboards lack expertise and financial literacy, and the discussions has quite low overall level. Very few writers seem to understand concept of annual percentage rate and be able to explain it clearly and unambiguously to their peers. Some people properly share information, from which firm they have gotten loan and do they regard it as cheap, but this information cannot be used to deduct, whether the provider is really cheap, for the same reasons that have been already discussed. Some lists of providers are linked for everyone to review the pages, but from these it is can difficult to compare alternatives, as no information is refined for consumers. Some post are heavily under purposeful try to irritate other users, namely "trolling", which makes it difficult for a reader to identify what is the real content of a thread, and what are the threads that provide useful information. It seems plausible, that also the representatives of firms try to affect how consumers reading the bullet boards view their own products, masking themselves as peers and posting messages that highlight their own products. It seems plausible assumption, that the information in internet bulletboards is not very valuable for the consumers.

All the firms also share some features. They highlight how special they are on some feature. Some claim to be inexpensive compared to rivals, some claim to be special, because they have even monthly installments and some brands highlight, that they are completely of a Finnish origin. In addition most of the firms underline their trustworthiness, as the industry has a terrible reputation. It would be interesting to see whether consumers, who lack financial literary, draw some kind of equality between trustworthiness and prices. "I can trust you to be inexpensive, because you say, that I can trust you". Declaring to be trustworthy is nothing but words. Firms must be trustworthy in a sense, that they do not engage in criminal activities and they carefully take care of customers' financials, but they certainly do no have obligation to charge low prices or overlook customer, who have trouble paying back the loan, if she has not understood the terms of an agreement. It might be, that words or stories drive the demand more than prices, when prices are difficult to comprehend.

4.2 Price and turnover dispersion

An interesting observation is that among the firms, that offer revolving credit, the order in terms of nominal monthly rate and the annual percentage rate of 1500 euro loans with given payback time is almost the same. At different price levels there are firms, that charge the same nominal rate and their reciprocal order cannot be changed without loosing the order between the two types of rates.

Also the distributions derived from different sizes of loans with different payback times are very much alike. Like argued in the data section they somewhat resemble log normal distributions, while there is some probability mass in the low price values, a peak before the mean and then a long tail to the right. The non revolving loans do not always posses the lowest prices, even thought the providers might carry lower risk compared to revolving credit providers, and so it does not make sense to exclude these values from the dataset. It is difficult to go deeper into explaining how the price distributions get this kind of form. Clearly there are some observations around the mean, where a large fraction of all observations are located. Maybe most companies think, that they should price their product somewhere near the mean. There does not seem to be much correlation in prices and turnovers, which would indicate, that this is not necessarily the best way to price, as consumers do not go to great extent in comparing prices. On the other hand if started from the peak, the distribution steadily descend to the right, which could reflect, that the distribution of riskiness of consumers would have a tail to the right. There would a greater demand from low risk consumers, and the higher risk consumers are served by the firms charging higher prices.

Major dispersion seems to arise also in firm turnovers, which can be seen from the data. Despite the limitation described in section 3.3, it can be argued, that the dispersion in the turnovers indeed exists. The theory would suggest, that the profits would be equalized among producers, when they randomize over prices and price frames was the problem symmetric. Collective labor agreements in Finland guarantee even labor costs in customer service and paying the loans to customer accounts. On the other hand it would be interesting to see, whether firms are able to borrow in equal terms. It is out of the scope of this thesis, how

for example marketing efforts and the brand equity of the companies affect the search costs of consumers. Due to major marketing efforts of some companies might they easily leave other companies in the shadows. In a sense marketing is a way to induce a cost to a consumer to find competitors or other way around paying for the consumer to avoid cost of finding firms product.

In addition the comparison of the turnovers of different brands is troublesome, as some firms have multiple firms on the market providing similar product, and it is difficult to say, what proportion of the revenues of the firm can be attributed to which subsidiary. In addition it is difficult from this data to say, whether these firms take part in other businesses in addition to payday loans, that would contribute to the total turnover numbers, that were available in database. Some very high turnovers might be explained by some other businesses, that other firms in the industry are not involved in, which makes them incomparable.

4.3 Obfuscation

In line with the consumer confusion model of Chioveanu and Zhou (2013) all of the firms are using complex price frames, as the firms include more than one dimension in the frame. It seems that assumption, that there is very large proportion of consumers, who are confused by the frame complexity, i.e. α_2 is close to 1, seems valid, as sorting the alternatives to price order requires sufficient financial literacy. The observation that all firms have chosen complex frames would imply, that the probability of using frame B, $1 - \lambda = 1$. This is again in line with the model prediction, which implies that whenever the number of firms tend to infinity, and there is positive number of consumers confused by frame complexity, the number of firms choosing complex frame tends to one. This can be seen from section 2.6.5. As the number of firms in the industry is as high as 24, this seems a plausible assumption. In addition the model predicts positive profits in the industry. It can be seen from the turnover data, that all of the firms at least are able to generate sales.

As the pricing schemes are difficult to comprehend, the consumers might anchor on some other dimension of the price, that is easier to grasp on. The anchor for comparison can be for example the monthly installment, from which

the consumers picks the lowest one, payback time, if the alternative with longest payback time is chosen, monthly rate in the case that alternative with lowest rate is chosen. Also some consumers might base their decision on the lack of withdrawal fee. On the other hand some of these consumers may not be able to avoid withdrawal fees, that are included to subsequent withdrawals following the first one, due to suffering from overprecision in estimating future consumption.

Revolving credits are based on accounts of a certain amount, from which the consumers can withdraw the amount she needs at the time. This can make changing costly. On some instances there is also a cost to have an open credit account within a firm, and in this case consumers would need to go through a troublesome process of closing the account, which could require an underwritten document sent to the firm in post. The accounts are also made easy to use on a computer or a mobile device, and switching to other provider would induce a cost in learning the new platform. Also a consumer with rational expectations on future prices might have some idea, how the current price she is paying compares to alternatives but if she is obfuscated, what is the probability changing would lead to paying a lower price.

In payday lending consumers might suffer from overprecision, when they try to estimate how many consecutive withdrawals they might make from the credit account. Many firms do not include withdrawal fee to first withdrawal, but it is included to subsequent withdrawals. The consumers who accurately estimate future withdrawals avoid these costs or they know to expect them. Consumers with naive expectations on future borrowing might end up paying these costs and they might provide a rip off externality on the consumers with rational expectations.

4.4 Consumer screening

A natural reason for price dispersion would be consumer screening carried out by the firms. The firms would prefer choosing a risk level they are willing to accept and set a price accordingly. The payday loan firms are able to some extent screen customers by observing riskiness of individuals using external services like ”Suomen Asiakastieto” in Finland or using their own riks measures. Being able to screen out some customers, that exceed the allowed risk level, might

cause consumer to try to get loan from other firm, that might allow for more risk but also charge higher price. This way companies screening out too high risks for their price might lead to price dispersion, as the set of customers that differ in riskiness are served by a set of firms, that reflect the risk taking by price.

The information among loan market participants is nearly ever perfect, and firms end up serving customers, who fail to take care of the loan payments. Liran Einav (2012) estimated, that in automobile lending market screening customers enhance firms profits by 22%, and if perfect information of the customers credit worthiness was available, the profits would increase as much as 98%. This would also imply, that the firms are not able to screen out great proportion of their lending risk.

Liran Einav (2012) also find, that larger loans decrease the likelihood of repayment substantially. Thus the analysis was conducted for automobile lending, straight connection to payday loan lending cannot be drawn, but a few confluences could be identified. Some consumers fulfill their loan demand from multiple sources, which increases the risk for each lender. Had the borrower problems with her consumption, the risk of additional lending could be even more apparent. On the other hand the high price of payday loans might cause troubles, even when borrowed amounts are for example around 2000 euros, and consumer decides to pay back in small installments during a long time period.

4.5 Welfare issues

There are competing views whether payday loans are welfare enhancing or welfare destroying. Morse (2011) has studied the relationship between foreclosures after natural disasters and existence of payday lenders in California. She concludes, that the payday lending might be beneficial for individuals who would otherwise face foreclosures or commit small property crimes in the times of financial distress. She also states, that it is likely, that if the borrowing is to finance temptation consumption, the welfare results are likely to turn out negative. O'Donoghue and Rabin (2006) argue, that payday loans are indeed used to finance temptation consumption.

The social security systems might have an effect on the payday loan markets

on both demand and supply side. Difficulties of consumers might differ to a great deal in Finland from the state of California due to differences in social security systems. For example the assistance that unemployed individuals receive in Finland might affect the demand side, as the benefits may limit the use of consumer credit. On the supply side the firms maybe willing to lend to these individuals, as firms know that these individuals get a constant flow of subsidies, that can be used to cover monthly installments.

The consumers might also suffer from insufficient financial literacy, which have been discussed earlier in this thesis, and which Stango and Zinman (2011) have showed to prevail in consumer credit market. By insufficient financial literacy is meant, that consumers are not trained to perform the necessary calculations, in order to take account the factors, that affect the net price of the product or service. The shortcomings in financial literacy give rise to firms benefiting from biases of consumers, that consumers have on some aspect of the price frame.

As the firms operate in the internet, all of them have own platforms and some of them have also expanded the platform to mobile devises for easier access. It requires effort to learn to use different platforms, so consumers might anchor to one company instead of changing for cheaper one. This can be true when prices change, and when consumers observers a better offer from other firm. Like stated earlier, also closing the account in one firm can be made troublesome, as it can be required from the customer to send underwritten documents with certain information to the firm.

Lastly there are always a small proportion of consumers, who are not able to comprehend the costs of the credit and in fear of marks in payment registry take additional credit to finance their earlier liabilities. It is possible, that these credit buildings can be maintained for an extensive period of time, until they collapse, when the amount of debt becomes too large to bear. These cases induce credit losses to loan providers, and they can be very harmful for the individuals who are not able to get insurance, rent apartment, borrow additional funds etc after the foreclosure.

5 Conclusions

In this section conclusions and discussion based on the results are covered. Also suggestions on possible actions for legislators are given based on the evidence and the corresponding literature.

Even though firms in the payday loan industry claim in their consumer communication, that they are open in their pricing, in many aspects they are not. It can be difficult to make the comparison between different sizes of loans within a single producer and even more difficult between firms. In many cases the firms hide the prices, that a typical consumer who needs up to 500 euros loan, actually faces. Instead a price for a higher amount of loan with a lower rate is communicated, without stating that the prices of different sizes of loans of a single provided might vary to a great extent. Taking a different size of loan than the one of which price is informed in the company website, is likely to lead paying too much for the service.

The assumption that obfuscation makes it difficult for consumers to compare payday loan prices seems plausible. The price dimension vectors were complicated in a way, that the typical consumers are not available to compare prices across firms, and it would be likely, that they are not able to identify the cheapest provider on the market. The comparison for this thesis was time consuming to make, and it is easy to imagine, that it would be nearly impossible for an individual without a proper training to perform calculations with annual percentage rates.

Lack of proper price comparison services, that usually are not able to take account the range of price dimensions or that muddle first time offers to the standard prices, can be very harmful for consumers. In the presence of switching costs, comparison sites can lead consumers to pick a service, that is detrimental for their well being later. Making thorough comparison among different loans can be expensive, as there are fixed costs in building the computer software for calculating the rates, and the quotes need be revised in a regular basis. If the consumers are not willing to pay for these services due to informational asymmetries, there exists no incentives for firms to provide such service. There exists also a moral hazard, as the comparison services might cooperate with the loan providers by posting price quotes for the loans that they want, and so the

incentives are not in line with the consumers.

In the likely case that consumers choose loans by comparing some factors other than annual percentage rates, it is likely that consumers are worse of. It would be easy for legislator to limit the ways the companies have to make it difficult to compose comparable prices. For example it could be imposed, that the only price dimension allowed is monthly or annual interest rate. Allowing both would already induce frame differentiation and some consumers might get confused. Limiting the dimensions by forbidding dimension one by one might not work, since it is easy for firms to come up with innovative pricing schemes. Obfuscation model would predict, that the procedure could limit the number of firms on the market as the competition becomes tighter. Another way to avoid obfuscation could be, that firms have to reveal the annual percentage rate of the loan, that consumer actually takes. For example if the firm told its APR for 1500 euro loan, it should separately calculate the APR for the consumer prior the borrowing, took she loan of another size. Now the consumer would be better equipped to compare prices for the loan size she is willing to take.

The cognitive biases are inbuilt in the human nature, and as such it is difficult to provide guidance to avoid being ripped off in consumption. The knowledge of existence of the biases is not sufficient to observe these in others and especially in one self, and changing ones behavior would prove even more difficult Kahneman (2011). Only imagination limits the ways how firms could benefit from these biases, and they are likely eat away consumer surplus in markets, where these kinds of tactics are easy to apply. In addition to payday loan industry the abuse of biases can be easily seen in mobile plans, that charge additional fees after some usage limits, insurance companies, that can benefit from consumers overestimating probabilities of rare events and also in many other industries.

The parallel comparison of selected firms showed, that firm webpages share some similarities, in addition to reporting important price factors on the front page and they were a proxy for the price level of the firms. Unfortunately most of the firm webpages are stacked with irrelevant information, that easily distracts consumers. It can be, that consumers are affected by the quality of the firm website, as it might draw a picture of a firm that handles consumers financials with care, which can be seen increase in quality of the service. The

attention of consumers is drawn away from the price information, and in many cases the complete information can be found in the terms of agreement, that are hidden in the firm webpages. This is likely to make it very difficult to find and exploit relevant information.

Marketing efforts of companies reduce the cost for consumers to find their products and they are also likely to increase the perceived quality of the service. In addition consumers might think, that the service has high quality, as the firm is able to advertise in the television. Based on personal experience, It seems that only a small proportion of payday loan firms actually advertise on television and little higher proportion on the radio. This might create an illusion, that there are only a small number of firms in the industry to choose from. The firms that spend heavily on advertising might be able to charge higher prices, as they pay something, in order to reduce search cost of the consumers.

6 Appendix

In this section the excel formulas for annual percentage rate calculations are given in 6.1 for those, who wish to replicate the study. In the excel sheet on row 3 the changing variables: rate, withdrawal fees, withdrawal and installment sizes are described. From left to right the capital column refers to amount of remaining capital in each period, withdrawal fees to remaining withdrawal fees and interest to remaining interest. The total column calculates the sum of these. Minimum installment column shows the installment of the period. The formulations are such that installments are first directed to withdrawal fees, then to interest and finally to remaining capital. Remaining capital grows interest each period. In the sheet at page 54 also the formulas that are used to run excel solver are presented. In Column G the powers for discount factor of each period are calculated and the discounted cash flows can be found in column H. The sum of these cash flows are in column I. The changing cell which refers to the rate, that equalizes withdrawals and paybacks is in cell H5. Also the origins of the firms used in this thesis are given in 7.2.

6.1 Excel formulas in APR calculations

Figure 7: Excel formulas

	A	B	C	D
1				
2		**Monthly rate %**	**Withdraw amount**	**Minimum installation %**
3		=0,29/12	1500	0,125
4				
5	**Month**	**Capital**	**Withdrawal fees**	**Interest**
6	1	=IF(C6+D6<=F6;E6-F6;C3)	=C3*F3	=B3*C3+4,9
7	2	=IF(C7-D7-F7<=0;IF(D7-F7<0;B6-(F7-D7);B6))	=IF(C6>0;IF(C6<F6;0;C6-F6);0)	=IF(C7=0;IF(D6-(F6-C6)>0;D6-(F6-C6)+B6*$B$3;B6*$B$3);D6+B6*$B$3)+4,9
8	3	=IF(C8-D8-F8<=0;IF(D8-F8<0;B7-(F8-D8);B7))	=IF(C7>0;IF(C7<F7;0;C7-F7);0)	=IF(C8=0;IF(D7-(F7-C7)>0;D7-(F7-C7)+B7*$B$3;B7*$B$3);D7+B7*$B$3)+4,9
9	4	=IF(C9-D9-F9<=0;IF(D9-F9<0;B8-(F9-D9);B8))	=IF(C8>0;IF(C8<F8;0;C8-F8);0)	=IF(C9=0;IF(D8-(F8-C8)>0;D8-(F8-C8)+B8*$B$3;B8*$B$3);D8+B8*$B$3)+4,9
10	5	=IF(C10-D10-F10<=0;IF(D10-F10<0;B9-(F10-D10);B9))	=IF(C9>0;IF(C9<F9;0;C9-F9);0)	=IF(C10=0;IF(D9-(F9-C9)>0;D9-(F9-C9)+B9*$B$3;B9*$B$3);D9+B9*$B$3)+4,9
11	6	=IF(C11-D11-F11<=0;IF(D11-F11<0;B10-(F11-D11);B10))	=IF(C10>0;IF(C10<F10;0;C10-F10);0)	=IF(C11=0;IF(D10-(F10-C10)>0;D10-(F10-C10)+B10*$B$3;B10*$B$3);D10+B10*$B$3)+4,9
12	7	=IF(C12-D12-F12<=0;IF(D12-F12<0;B11-(F12-D12);B11))	=IF(C11>0;IF(C11<F11;0;C11-F11);0)	=IF(C12=0;IF(D11-(F11-C11)>0;D11-(F11-C11)+B11*$B$3;B11*$B$3);D11+B11*$B$3)+4,9
13	8	=IF(C13-D13-F13<=0;IF(D13-F13<0;B12-(F13-D13);B12))	=IF(C12>0;IF(C12<F12;0;C12-F12);0)	=IF(C13=0;IF(D12-(F12-C12)>0;D12-(F12-C12)+B12*$B$3;B12*$B$3);D12+B12*$B$3)+4,9
14	9	=IF(C14-D14-F14<=0;IF(D14-F14<0;B13-(F14-D14);B13))	=IF(C13>0;IF(C13<F13;0;C13-F13);0)	=IF(C14=0;IF(D13-(F13-C13)>0;D13-(F13-C13)+B13*$B$3;B13*$B$3);D13+B13*$B$3)+4,9
15	10	=IF(C15-D15-F15<=0;IF(D15-F15<0;B14-(F15-D15);B14))	=IF(C14>0;IF(C14<F14;0;C14-F14);0)	=IF(C15=0;IF(D14-(F14-C14)>0;D14-(F14-C14)+B14*$B$3;B14*$B$3);D14+B14*$B$3)+4,9
16	11	=IF(C16-D16-F16<=0;IF(D16-F16<0;B15-(F16-D16);B15))	=IF(C15>0;IF(C15<F15;0;C15-F15);0)	=IF(C16=0;IF(D15-(F15-C15)>0;D15-(F15-C15)+B15*$B$3;B15*$B$3);D15+B15*$B$3)+4,9
17	12	=IF(C17-D17-F17<=0;IF(D17-F17<0;B16-(F17-D17);B16))	=IF(C16>0;IF(C16<F16;0;C16-F16);0)	=IF(C17=0;IF(D16-(F16-C16)>0;D16-(F16-C16)+B16*$B$3;B16*$B$3);D16+B16*$B$3)+4,9
18	13	=IF(C18-D18-F18<=0;IF(D18-F18<0;B17-(F18-D18);B17))	=IF(C17>0;IF(C17<F17;0;C17-F17);0)	=IF(C18=0;IF(D17-(F17-C17)>0;D17-(F17-C17)+B17*$B$3;B17*$B$3);D17+B17*$B$3)+4,9
19	14	=IF(C19-D19-F19<=0;IF(D19-F19<0;B18-(F19-D19);B18))	=IF(C18>0;IF(C18<F18;0;C18-F18);0)	=IF(C19=0;IF(D18-(F18-C18)>0;D18-(F18-C18)+B18*$B$3;B18*$B$3);D18+B18*$B$3)+4,9
20	15	=IF(C20-D20-F20<=0;IF(D20-F20<0;B19-(F20-D20);B19))	=IF(C19>0;IF(C19<F19;0;C19-F19);0)	=IF(C20=0;IF(D19-(F19-C19)>0;D19-(F19-C19)+B19*$B$3;B19*$B$3);D19+B19*$B$3)+4,9
21	16	=IF(C21-D21-F21<=0;IF(D21-F21<0;B20-(F21-D21);B20))	=IF(C20>0;IF(C20<F20;0;C20-F20);0)	=IF(C21=0;IF(D20-(F20-C20)>0;D20-(F20-C20)+B20*$B$3;B20*$B$3);D20+B20*$B$3)+4,9
22	17	=IF(C22-D22-F22<=0;IF(D22-F22<0;B21-(F22-D22);B21))	=IF(C21>0;IF(C21<F21;0;C21-F21);0)	=IF(C22=0;IF(D21-(F21-C21)>0;D21-(F21-C21)+B21*$B$3;B21*$B$3);D21+B21*$B$3)+4,9
23	18	=IF(C23-D23-F23<=0;IF(D23-F23<0;B22-(F23-D23);B22))	=IF(C22>0;IF(C22<F22;0;C22-F22);0)	=IF(C23=0;IF(D22-(F22-C22)>0;D22-(F22-C22)+B22*$B$3;B22*$B$3);D22+B22*$B$3)+4,9
24	19	=IF(C24-D24-F24<=0;IF(D24-F24<0;B23-(F24-D24);B23))	=IF(C23>0;IF(C23<F23;0;C23-F23);0)	=IF(C24=0;IF(D23-(F23-C23)>0;D23-(F23-C23)+B23*$B$3;B23*$B$3);D23+B23*$B$3)+4,9
25	20	=IF(C25-D25-F25<=0;IF(D25-F25<0;B24-(F25-D25);B24))	=IF(C24>0;IF(C24<F24;0;C24-F24);0)	=IF(C25=0;IF(D24-(F24-C24)>0;D24-(F24-C24)+B24*$B$3;B24*$B$3);D24+B24*$B$3)+4,9
26	21	=IF(C26-D26-F26<=0;IF(D26-F26<0;B25-(F26-D26);B25))	=IF(C25>0;IF(C25<F25;0;C25-F25);0)	=IF(C26=0;IF(D25-(F25-C25)>0;D25-(F25-C25)+B25*$B$3;B25*$B$3);D25+B25*$B$3)+4,9
27	22	=IF(C27-D27-F27<=0;IF(D27-F27<0;B26-(F27-D27);B26))	=IF(C26>0;IF(C26<F26;0;C26-F26);0)	=IF(C27=0;IF(D26-(F26-C26)>0;D26-(F26-C26)+B26*$B$3;B26*$B$3);D26+B26*$B$3)+4,9
28	23	=IF(C28-D28-F28<=0;IF(D28-F28<0;B27-(F28-D28);B27))	=IF(C27>0;IF(C27<F27;0;C27-F27);0)	=IF(C28=0;IF(D27-(F27-C27)>0;D27-(F27-C27)+B27*$B$3;B27*$B$3);D27+B27*$B$3)+4,9
29	24	=IF(C29-D29-F29<=0;IF(D29-F29<0;B28-(F29-D29);B28))	=IF(C28>0;IF(C28<F28;0;C28-F28);0)	=IF(C29=0;IF(D28-(F28-C28)>0;D28-(F28-C28)+B28*$B$3;B28*$B$3);D28+B28*$B$3)+4,9
30	25	=IF(C30-D30-F30<=0;IF(D30-F30<0;B29-(F30-D30);B29))	=IF(C29>0;IF(C29<F29;0;C29-F29);0)	=IF(C30=0;IF(D29-(F29-C29)>0;D29-(F29-C29)+B29*$B$3;B29*$B$3);D29+B29*$B$3)+4,9
31	26	=IF(C31-D31-F31<=0;IF(D31-F31<0;B30-(F31-D31);B30))	=IF(C30>0;IF(C30<F30;0;C30-F30);0)	=IF(C31=0;IF(D30-(F30-C30)>0;D30-(F30-C30)+B30*$B$3;B30*$B$3);D30+B30*$B$3)+4,9
32	27	=IF(C32-D32-F32<=0;IF(D32-F32<0;B31-(F32-D32);B31))	=IF(C31>0;IF(C31<F31;0;C31-F31);0)	=IF(C32=0;IF(D31-(F31-C31)>0;D31-(F31-C31)+B31*$B$3;B31*$B$3);D31+B31*$B$3)+4,9
33	28	=IF(C33-D33-F33<=0;IF(D33-F33<0;B32-(F33-D33);B32))	=IF(C32>0;IF(C32<F32;0;C32-F32);0)	=IF(C33=0;IF(D32-(F32-C32)>0;D32-(F32-C32)+B32*$B$3;B32*$B$3);D32+B32*$B$3)+4,9

E	F	G	H	I
Minimum installatio	**Withdrawal fee %**			
150	0,1			
			Annual percentage rate	
Total	**Minimum installation**	**Month/12**	**0,670509084640317**	=SUM(H6:H19)
=C3+C6+D6	150	=A6/12	=F6/((1+$H$5)^G6)	
=B6+C7+D7	150	=A7/12	=F7/((1+$H$5)^G7)	
=B7+C8+D8	150	=A8/12	=F8/((1+$H$5)^G8)	
=B8+C9+D9	150	=A9/12	=F9/((1+$H$5)^G9)	
=B9+C10+D10	150	=A10/12	=F10/((1+$H$5)^G10)	
=B10+C11+D11	150	=A11/12	=F11/((1+$H$5)^G11)	
=B11+C12+D12	150	=A12/12	=F12/((1+$H$5)^G12)	
=B12+C13+D13	150	=A13/12	=F13/((1+$H$5)^G13)	
=B13+C14+D14	150	=A14/12	=F14/((1+$H$5)^G14)	
=B14+C15+D15	150	=A15/12	=F15/((1+$H$5)^G15)	
=B15+C16+D16	150	=A16/12	=F16/((1+$H$5)^G16)	
=B16+C17+D17	150	=A17/12	=F17/((1+$H$5)^G17)	
=B17+C18+D18	150	=A18/12	=F18/((1+$H$5)^G18)	
=B18+C19+D19	=E19	=A19/12	=F19/((1+$H$5)^G19)	
=B19+C20+D20	150	=A20/12	=F20/((1+$H$5)^G20)	
=B20+C21+D21	150	=A21/12	=F21/((1+$H$5)^G21)	
=B21+C22+D22	150	=A22/12	=F22/((1+$H$5)^G22)	
=B22+C23+D23	150	=A23/12	=F23/((1+$H$5)^G23)	
=B23+C24+D24	=E24	=A24/12	=F24/((1+$H$5)^G24)	
=B24+C25+D25	150	=A25/12	=F25/((1+$H$5)^G25)	
=B25+C26+D26	150	=A26/12	=F26/((1+$H$5)^G26)	
=B26+C27+D27	150	=A27/12	=F27/((1+$H$5)^G27)	
=B27+C28+D28	150	=A28/12	=F28/((1+$H$5)^G28)	
=B28+C29+D29	150	=A29/12		
=B29+C30+D30	150	=A30/12		
=B30+C31+D31	150	=A31/12		
=B31+C32+D32	150	=A32/12		
=B32+C33+D33	150			

Figure 8: Ecxel formulas continued

6.2 Firm origins

Table 5: Firm origins

Brand	**Firm**	**Location**
Ostosraha	Opr vakuus	FIN
Saldo	Tact Finance Oyj	FIN
Luottoraha	C Finance Oy	FIN
Nordcredit	Lainasto Oy	FIN
Everyday.fi	Opr vakuus	FIN
Vippi	Tact Finance Oyj	FIN
Limiitti.fi	Tact Finance Oyj	FIN
Extraluotto	J.W.-Yhtiöt Oy	FIN
Ferratum	Ferratum OYJ	FIN
Flexiluotto	4Finance Oy	FIN
Suomilimiitti	J.W.-Yhtiöt Oy	FIN
Suomen tililuotto	NDN-Yhtiö Oy	FIN
Peruslaina	TOP Finance Oy	FIN
Get capital	Get Capital Oy	FIN
Lainasto	Lainasto Oy	FIN
Euro 24	Euro24 Finance Oy	FIN
Vivus*	4Finance Oy	FIN
Credit 24	International Personal Finance Plc	GBR
Credento	TF Bank AB	SWE
Credigo	Northmill AB	SWE
Cash buddy	JSM Financial Groupiin	SWE
OK money	Dollar Financial Group	USA
Risicum	Dollar Financial Group	USA
Laina.fi	Dollar Financial Group	USA

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