Unexplained Pawn Pricing Behavior:

A Study of Las Vegas Pawnshops*

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Abstract

Pawnshops provide short-term loans to millions of individuals excluded from mainstream financial markets, yet little is known about pawn pricing behavior. I conduct a field study to test whether pawnshops in Las Vegas price pawns based on factors other than collateral value. I find that these pawnshops use distance to "the Strip" as a sorting mechanism to differentiate inelastic and elastic pawn customers, then offer higher pawn loans to the latter. The ability of each pawnshop to third-degree price discriminate, however, is constrained by the amount of competition it faces.

1 Introduction

While many economists have studied the mechanisms of most financial institutions, and have produced numerous papers on the banking systems and credit markets of America, pawnshops remain widely ignored in the academic community. The pawnbroking practice may not be as esteemed today as in the 15th century when the Medici families of Italy engaged in extensive money-lending and when Queen Isabella propitiously pawned her jewels to finance Columbus's expedition; nevertheless, pawnshops still play an important role as a lending institution for many individuals who do not participate in mainstream credit markets. While mainstream credit markets conduct background credit checks before issuing loans, pawnshop customers do not need to have good credit to obtain a loan, and are instead given money generally based on the value of their pawned item.

However, is collateral value the sole determinant of pawn prices? I argue that while pawnbrokers do not use the customer's credit history to determine loan amounts (such as a typical bank), pawnbrokers do have incentives to gather information on customers' pawn demand elasticity, and will therefore price discriminate across customers pawning identical items. Moreover, competition and market power will play a role in the ability of a pawnshop to lower pawn prices.

I conduct a field study to test the hypothesis that pawn prices are partly determined by factors other than collateral value. I collect pawn prices at individual pawnshops in Las Vegas and study how these prices vary with different distances to "The Strip" while holding collateral value fixed.

In Las Vegas, there are a large number of pawnshops distributed throughout the city.Pawnshops very near "The Strip" primarily draw customers who are tourists, in town to gamble in local casinos. These customers will typically have a high need for money in the form of cash, may need this cash quickly, and will have high search costs. Conversely, pawnshops located further from the strip service Las Vegas residents, who are less time-sensitive and have lower search costs than tourists. Residents and tourists will thus have different willingnesses to pawn, or pawn elasticities. Las Vegas pawnshops may use distance from "The Strip" as a sorting mechanism between tourists and residents, and can therefore third-degree price discriminate accordingly.

I find that pawn prices are significantly higher in pawn shops located further from "The Strip", indicating that the Las Vegas pawn industry offers smaller loans to inelastic pawn customers (tourists) and higher loans to more elastic pawn customers (residents). Additionally, geographic and general market power also affect an individual pawnshop's ability to price discriminate. Therefore, this paper offers evidence that pawn prices are determined by factors other than collateral value.

The remainder of this paper is organized as follows. Section 2 provides background on existing research on pawnshops. In Section 3, I develop a model of pawn pricing that demonstrates how third-degree price discrimination may occur when the model is applied to the Las Vegas pawn market. I describe my method of data collection and provide an overview of the data itself in Sections 4 and 5, respectively. In Section 6 I discuss possible limitations of my study before presenting my empirical results in Section 7. Interpretation of these results are offered in Section 8. Section 9 concludes.

2 Review of Existing Literature

There exists extremely scarce information on the economics of current pawnshops in the United States. While Samuel Levine (1913) produced an in-depth description of the pawnbroking business, his characterization of the pawnshop market is largely outdated. Other than John P. Caskey's (1994) didactic overview of the U.S. pawnbroking industry and its recent development, there have been no additional economic studies of pawnbroking in North America during the past 50 years.

*I am thankful for the helpful comments and guiding suggestions of my advisors Nancy Rose and Sendhil Mullainathan.

Pawnshops offer customers a quick and convenient way to borrow money. Pawn customers bring in items of value, typically durables, and are immediately lent money based on these goods. Commonly pawned items include jewelry, electronic devices, musical instruments, and firearms. In exchange for their loan, the customer will provide their item of value as collateral, which the pawnbroker holds until the loan and its interest has been repaid within the specified maturity date. In the event that the customer defaults, the collateral becomes the property of the pawnshop and may be resold to any consumer. The customer also has the option to renew the loan by paying its interest. The typical pledge, however, is redeemed in two to three months, while default rates range between about 10 to 30 percent in states for which there are data (Caskey, 1991). Most states regulate the interest rate and maturity terms of pawn contracts; in Nevada, all pawn loans have a 10% interest rate per month and are due in 4 months.

Despite its academic neglect, pawnshops are much like other lending institutions, except for a couple of key differences.First, pawnshop loans are generally small; Caskey reports the national average pawn at $50. Secondly, pawnbrokers are generally thought of as "collateral loan brokers" because their loans are not based on the customer's credit history. Lastly, since no credit history or background checks are performed, pawnshop transactions are carried out quickly with very few questions asked. For these reasons, pawnshops generally draw customers whose credit constrains their ability to obtain conventional loans, in addition to customers who may want the discretion and convenience pawnshops offer. Although no economic study has qualified these statements, many believe that pawnshops are very important to millions of low income Americans who are excluded from mainstream credit markets. Indeed, the pawnshop is "the bank for the little man".

While pawnshop credit accounted for only .1% of total consumer credit in 1988, this measure of the pawnshop's importance as a financial institution is deceptively low. In the same year, there were almost 6900 pawnshops in the U.S., more than twice the number of banks. Additionally, pawnshops made about 35 million loans in that year, serving an estimated 10% of the adult population. If one looks exclusively at the social segment of households below the poverty line, the percentage of these adults who use pawnshops is likely to be much larger.

Despite its general decline in Great Britain, the U.S. pawnbroking industry has greatly expanded during the last couple of decades. In addition, the distribution of pawnshops across the United States has drastically changed since Levine's (1913) report on pawnbroking. Levine notes that pawnshops were heavily concentrated in the major urban areas in 1911. Since then, the number of pawnshops has more than tripled (exceeding population growth) and pawnshops are no longer concentrated in urban cities. Today, the Central Mountain and Sunbelt states have the highest numbers of pawnshops per capita. Moreover, within these states, the majority of towns over ten thousand have at least one pawnshop. The development of this current distribution may be due in part to the decrease in transportation costs during the past century. Customers must physically transport themselves and their collateral to the pawnshop, thus transportation costs will motivate the consumer's decision between competing pawnshops. Moreover, since pawn loans are generally small, the transportation cost per dollar of credit is high. For this reason, customers will generally patronize the closest shop. Therefore, as transportation costs have greatly decreased over the past century, it has become more profitable for pawn shops to open up in less urban areas. Additionally, strong demand for pawnshop services across a geographic area is often met by a number of dispersed shops (Caskey, 1991).

An estimated 17% of American families do not have a bank account (Caskey, 1994); these individuals often rely on pawnshops to meet unexpected short-term loan needs. The growing importance of pawnshops as an alternative credit market, and its position as perhaps the primary financial institution for millions of Americans, as well as the subject's general neglect in academic circles, motivate my study on pawn shop pricing. While Caskey offers a relatively recent and extensive description of the pawnbroking industry, no economic study has studied pawn pricing behavior. This paper offers evidence that there are additional determinants of pawn loan prices other than collateral value, causing pricing behavior to take the form of third-degree price discrimination.

3 Pricing Behavior

In this section I propose a pawn pricing model that demonstrates how pawnbrokers may price discriminate in the Las Vegas pawn market.

3.1 Pawn Demand

Assume the pawnor's utility has the form of the Cobb-Douglas Utility function:

$$U(x, y) = x^{1-\alpha} y^{\alpha}$$

where $\alpha \in (0, 1)$

The pawnor chooses his consumption of x and y. x is the potential pawn item and it is a discrete good; specifically $x = 0$ or 1. y is cash. Pawnors are endowed with initial income, or cash-on-hand, y_0 and with 1 unit of good x. Thus, the pawnor budget constraint takes the form:

$$y_0 + p_x(1) = p_x x + p_y y$$

Since y is cash, $p_y = 1$.

$$\Rightarrow y_0 + p_x = p_x x + y$$

is the pawnor's budget constraint.

The pawnor maximizes his utility over x and y:

$$\max U(x,y) = x^{1-\alpha} y^{\alpha} \text{ subject to } y_0 + p_x = p_x x + y$$

This maximization[1] yields Utility Maximizing condition:

$$\left(\frac{1-\alpha}{\alpha}\right)\frac{y}{x} = p_x$$

The pawnor will choose $x = 1$ (i.e. pawnor will not pawn item) iff:

$$\left(\frac{1-\alpha}{\alpha}\right)\frac{y}{x}\bigg|_{x=1} > p_x$$

Conversely, the pawnor will choose $x = 0$ (i.e. pawnor will pawn good x) iff:

$$\left(\frac{1-\alpha}{\alpha}\right)\frac{y}{x}\bigg|_{x=1} < p_x$$

If $x = 1$ then $y = y_0$. Therefore, the pawnor will pawn good x iff:

$$\left(\frac{1-\alpha}{\alpha}\right) y_0 < p_x$$

Thus the price $\bar{p}$ where

$$\bar{p} = \left(\frac{1-\alpha}{\alpha}\right) y_0$$

is the pawnor's reservation price for pawning item x.

What is α? α is how much the pawnor values good y. Since y is cash, α may be thought of as the pawnor's "liquidity need". The higher a pawnor's α, the more he values having cash. Moreover, $\frac{1-\alpha}{\alpha}$ is how much the pawnor values cash relative to the good x.

Assume α is time-sensitive: $\alpha = \alpha(t)$ where t is the amount of time left before cash is needed. We would expect $\alpha'(t) < 0$. An agent's "liquidity need" or valuation of cash increases as the time allotted to get the cash decreases. For example, if cash is needed tomorrow, the individuals "liquidity need" is much higher than if the cash is needed in two months because within two months the individual can potentially obtain cash from other sources.

The pawnor's reservation price is decreasing in α.

$$\frac{\partial \bar{p}}{\partial \alpha} = -\frac{y_0}{\alpha^2} < 0$$

This is an intuitive result: the pawnor will settle for lower pawn prices as his "liquidity need" increases.[2]

In a market with imperfect competition between pawnshops, the pawnor may want to check if he can get a higher pawn price from alternative pawnbrokers. This is characteristic of a "Search Model" in which agents shop around for better prices. Thus, we can write individual i's true reservation pawn price for good x at a current pawnshop j as

$$p^*_{ij} = max\{\bar{p}_{ij}, E_{ij}(pk_1), E_{ij}(pk_2), \ldots, E_{ij}(pk_r)\}$$

where $E_{ij}(pk_n)$ is the expected price agent i will get from alternative pawnshop k_n.

Let $R = \{k_1, k_2, \ldots, k_r\}$ be the set of all pawnshops other than pawnshop j. Let zk_n be the event that the agent visits pawnshop $k_n \in R$. $zk = 0$ or 1. Then let us write $\Phi_{ij}(zk_n) \in [0,1]$ as the probability that agent i visits pawnshop k_n given that he is currently at shop j. Lastly, let pk_n be the price offered by store k_n. The expected price from alternative pawnshop k_n is:

$$E_{ij}(pk_n) = \Phi_{ij}(zk) pk_n$$

The expected price from alternative pawnshop k_n is the probability that the pawnor will visit pawnshop k_n multiplied by the price offered by pawnshop k_n.

The probability $\Phi_{ij}(zk)$ that agent i will visit shop k given that he is currently at shop j will be dependent on a number of factors. Specifically, $\Phi_{ij}(zk)$ will depend on the distance between pawnshops j and k, individual i's search costs (Sorensen, 2001), and the time left for individual i to obtain money. To illustrate this, let us write this probability as a function of C_{ijk} and t_i where t_i is as before: the time left before individual i needs cash, and C_{ijk} is the total search cost for individual i to visit store k given that he is at store j. Thus:

$$\Phi_{ij}(zk) = f(C_{ijk}, t_i)$$

Moreover, the total search cost of visiting store k is

$$C_{ijk} = d_{jk}\mu_i$$

where d_{jk} is the distance between stores j and k, and μ_i is the marginal search cost for agent i. Assume d, $\mu > 0$ $\forall i, j, k$. We would expect $\Phi_{ij}(zk)$ to be decreasing in C_{ijk}.

$$\frac{\partial \Phi}{\partial C} < 0 \Rightarrow \begin{array}{l} \frac{\partial \Phi}{\partial d} = \frac{\partial \Phi}{\partial C}\frac{\partial C}{\partial d} = \frac{\partial \Phi}{\partial C}\mu < 0 \\ \frac{\partial \Phi}{\partial \mu} = \frac{\partial \Phi}{\partial C}\frac{\partial C}{\partial \mu} = \frac{\partial \Phi}{\partial C} d < 0 \end{array}$$

Thus, the probability individual i will visit store k given he is currently at store j is decreasing in the distance between stores k and j. For example, an agent will be more likely to go to a pawnshop across the street than a pawnshop 15 miles away. Moreover, the probability individual i will visit store k given he is currently at store j is decreasing in the marginal search cost for individual i. An agent with access to a car and familiarity with the area will have lower search costs than an agent who does not have a car and isn't familiar with the area, thus the former will be more likely to participate in search.

One would also expect $\Phi_{ij}(zk)$to be increasing in t_i $(\frac{\partial \Phi}{\partial t} > 0)$. In other words, the probability individual i will search is greater for pawnors who have a lot of time left before cash is needed.

In summary,[3] an individual pawnor i's reservation pawn price for good x, given that he is at store j is:

$$p_{ij}^* = max\{\bar{p}_i, E_{ij}(pk_1), E_{ij}(pk_2), \ldots, E_{ij}(pk_r)\}$$

where

$$\bar{p_i} = \left(\frac{1-\alpha_i(t_i)}{\alpha_i(t_i)}\right) y_{0i}$$

$\alpha_i(t_i)$ is individual i's liquidity need evaluated at t_i (the amount of time left before cash is needed) and $E_{ij}(pk_n)$ is the expected price agent i will get from alternative pawnshop $k_n \in R$.

3.2 Pawn Supply

In this section I will outline the pawnbrokers' behavior.

Let p be the price offered for a pawn loan, r be the resale value for the pawned item, q be the probability the individual repays the loan in a given month, i be the interest rate per month, m be the maturity (number of months before default), and δ be the discount rate.

The pawnshop's profit π from a given pawn is:

$$\pi = -p + qp(1+i) + (1-q)qp(1+i)^2\delta + \ldots +$$

$$(1-q)^{m-1}qp(1+i)^m\delta^{m-1} + r[1 - (q + (1-q)q$$

$$+ (1-q)^2q + \ldots + (1-q)^{m-1}q)] = -p +$$

$$p\sum_{n=1}^{m} q(1-q)^{n-1}(1+i)^n\delta^{n-1} +$$

$$r[1 - \sum_{n=1}^{m} q(1-q)^{n-1}]$$

If pawnbrokers assume the loan is "paid in full" at the time of the transaction, i.e. a pawn transaction is analogous to buying the pawned item, then brokers are essentially assuming $q \approx 0$.[4] My study offers some evidence of this claim: most sell prices (prices offered to me by pawnbrokers for ownership of my good) were very close to the offered pawn prices. In many cases these prices were the same. This implies that in the eyes

of the pawnbroker, offering a pawn loan is equivalent to buying the collateral. This assumption of $q = 0$ may be true for first time pawnors, but may change for repeated pawnors.

Let π_0 denote the profit brokers assume with first time pawnors. Then

$$\pi_0 = \pi|_{q=0} = -p + r$$

Thus, to maximize π_0, pawnbrokers will minimize the pawn price offered, p, because r is exogenously given. Pawnshops will want to charge

$$p = p^*$$

where p^* is the pawnor's reservation price.

If pawnbrokers can find a way to identify the pawnor's reservation price, the pawnbroker will want to offer this price. This practice of first-degree price discrimination is rare, due to the fact that identifying each individual's exact reservation price is usually extremely difficult. However, if pawnbrokers can identify a way to sort customers into groups with different reservation prices, they may be able to offer disparate pawn prices to individuals in these groups. This is characterized as third-degree price discrimination.

3.3 The Model applied to the Las Vegas Pawn Market

Assume there are 2 types of pawnshop customers in Las Vegas:

A. Tourists. These customers are characterized by high liquidity needs, possibly due to gambling. Tourists also have high search costs due to their low familiarity with the city and possible lack of transportation, and are relatively time-sensitive (they may be leaving the city soon).

B. Residents of Las Vegas. These customers have lower liquidity needs and are less time-sensitive than the tourists. Residents also have low search costs due to their familiarity with the area and high probability of having a car.

We would expect:

$$\alpha_A(t) > \alpha_B(t)$$
$$t_A < t_B$$
$$\mu_A > \mu_B$$

These conditions are based on assumptions that tourists' "liquidity needs" are greater than those of local residents, tourists are more time constrained than residents, and locals have lower search costs, respectively.

All other things being equal, these conditions imply

$$\frac{y_0(1-\alpha_A(t_A))}{\alpha_A(t_A)} < \frac{y_0(1-\alpha_B(t_B))}{\alpha_B(t_B)}$$

and $E_{Aj}(pk_n) < E_{Bj}(pk_n)\ \forall k_n \in R$

$$\Rightarrow p^*_A < p^*_B$$

Therefore, on average, Las Vegas tourists have lower reservation prices than Las Vegas residents *ceteris paribus*. Similarly, residents have relatively elastic pawn demands while tourists have very inelastic pawn demands.

Pawnshops would like to charge each pawnor his or her reservation price. Pawnbrokers will do this in order to decrease each pawn customer's surplus and increase their own profits. Since tourists are generally located on "The Strip" and do not stray far from this area, while residents occupy areas further away from downtown Vegas, Las Vegas pawnshops may use distance from "The Strip" as a mechanism to sort gambling tourists and residents of the city. In other words, distance from "the Strip" may indicate a pawn customer's elasticity of pawn demand. Pawnshops may then be able to offer lower pawn loan prices to the tourists, but must maintain higher loan prices for the locals. Thus, I predict high loan prices from pawnshops located far from "The Strip", and low prices from pawnshops near "The Strip".

3.3.1 Other predictions

In addition, since the customer's reservation price is increasing in the expected prices from alternative pawnshops, I would expect to see higher prices at pawnshops located near other pawnshops, and lower prices at pawnshops owned by large franchises.

Geographic Market Power: Pawnshops located further away from other shops should be able to offer lower prices because pawnors are less likely to search This is based on the assumption that $\Phi_{ij}(zk)$ is decreasing in the distance between pawnshops j and k. In other words, the probability the pawnor will check prices in another shop increases as the distance between stores j and k decreases. Thus, for pawnshop j within close proximity to alternative shop $k \in A$, $\Phi_{ij}(zk)$ is high $\Rightarrow E_{ij}(pk)$ is high $\Rightarrow p^*$ is high $\Rightarrow$ offered p_j is high.[5]

Franchise Market Power: If a franchise owns the majority of pawnshops then $E_{ij}(pk)$ is lower because the price offered by other pawnshops can be coordinated to be low for all pawnshops owned by the franchise.[6] For franchised pawnshops: $E_{ij}(pk)$ is low $\Rightarrow p^*$ is low $\Rightarrow$ offered p_j is low.

4 Method

This field study took place in Las Vegas on March 25-27, 2004. During this time period, I visited 32 different pawnshops in Las Vegas and the section of unincorporated Clark County south of the city of Las Vegas containing "The Strip". At each pawnshop, pawnbrokers were asked to price a single item: round diamond earrings. The purpose of the study was to isolate the effect of distance from the Strip on pawnshop prices.

Each pawnbroker was informed that I planned to pawn my earrings and would like to know how much money I could obtain. The pawnbroker then took the earrings, tested whether the diamond and gold backing were real, and examined the diamond's physical attributes such as clarity, color, cut, and carat weight. Most brokers wanted to know how much money I wanted, to which I replied each time: "I don't know. I just want to know how much I can get." After evaluating the earrings, each pawnbroker offered me some dollar amount for the potential loan. I then asked for a sale price, i.e. how much they would give me if I sold them the item, which they then disclosed. Once given this information, I asked for the earrings back, thanked the broker, and exited the pawnshop without completing any transaction.

Immediately after leaving each pawnshop, I recorded the pawn price and sell price given, as well as the business name, street address, and time of day. In addition to these variables, I recorded the pawnbroker's gender, age, and ethnicity from

what I could observe. Almost all of my interactions with pawnbrokers were straight forward with small variations in their questions.

Since the same earrings were used for each observation, and did not physically change during the study, collateral value of the pawn item was held fixed.

Another potentially important determinant of pawn pricing may be the contractual agreements of each pawn. However, the state of Nevada mandates that each pawn be issued at a 10% interest rate per month for 4 months. Therefore, the pawn contract terms are also constant for all 32 observations.

5 Data

The street address of each pawnshop was used to calculate a number of variables, such as the Distance to "The Strip", "half-mile concentration" of pawnshops, and regional location. First of all, I should note that "The Strip" is the name for a particular stretch of South Las Vegas Boulevard where a large number of hotels are situated. Since "The Strip" technically begins at the corner of Sahara and S. Las Vegas Boulevard and continues southward on Las Vegas Boulevard through unincorporated Clark County, the distance variable was calculated in one of two ways. First, if the pawnshop was located south of Sahara (or on Sahara), its distance to "The Strip" was calculated as the distance between the pawnshop location and the nearest intersection on S. Las Vegas Blvd. Secondly, if the pawn shop was located north of Sahara, its distance to the strip was calculated as the distance between the pawnshop location and the intersection of Sahara and Las Vegas Blvd.

To measure market power, I drew a circle of a half-mile radius centered on each pawnshop; the variable "half-mile concentration" is number of other pawnshops within that circle. Since most pawnshop customers utilize their closest shop due to the high transportation cost to loan value ratio, the "half-mile concentration" variable will be indicative of each pawnshop's relative geographical market power. Another measure of market power is the percentage of all pawnshops owned by a particular company. There were three franchises that owned more than one store. Together they accounted for about 78% of all pawnshops. However, there was one franchise, namely EZ Cash Superpawn, which owned about 56% of all pawnshops in the area. I include an indicator variable for this franchise in the dataset.

In addition, I included dummies for regions of the geographical space: north, east, and the interaction north*east. Like most cities, Las Vegas has neighborhoods of different socioeconomic status, possibly affecting differences in price across the city. Region dummies may assist in controlling for this unobservable variable. North indicates locations north of Sahara Ave. East indicates pawnshops located directly on or east of Las Vegas Blvd. Another dummy is included for locations directly on Las Vegas Blvd.

Lastly, the data set contains information on broker characteristics for each observation. Gender was recorded as male or female. Ethnicity was recorded as one of the following: White (non-Hispanic), Black, Hispanic, or Asian; those who looked mixed I categorized in the nationality that seemed predominant. For age, brokers were placed in one of three groups: those who looked definitely younger than 40, those who looked definitely older than 40, and those in between. While these characteristics were merely obtained from my perception of each broker, I felt reasonably confident in my ability to identify approximate age, gender, and nationality. My observations of gender are probably 100% correct; however, age and nationality were more difficult to discern. My regressions would later show that these broker characteristic variables did not have any observable effects on price, and are then omitted in order to preserve the power of the tests.[7]

Table 1: Price and Distance Summary Statistics

	Sample Mean (std. dev.)	Minimum	Maximum
Prices (in dollars)			
Pawn Price	614.84 (264.94)	125	1000
Sell Price	659.68 (279.31)	125	1100
I Sell Price - Pawn Price I[1]	65.63 (90.74)	0	300
Distance to Strip (in miles)	4.42 (2.90)	.49	11.03

Sample Size: 32

Notes: Table reports sample means , with standard deviations in parenthesis. Also gives minimum and maximum values for each variable.

1. There were 2 observations where sell price was less than pawn price, and 14 observations in which sell price was equal to pawn price. In all other observations, sell price was greater than pawn price.

The key variables in the data set are Pawn Price, Sell Price, and Distance to "The Strip". Table 1 reports summary statistics on these variables. The average pawn price offered was $614.84, with a standard deviation of $265. Offered sell prices had a slightly higher mean at $659.67, and a greater standard deviation: $279. These standard deviations may seem surprisingly high. Indeed, the range of pawn prices I was offered is substantial: the minimum was $125 and the maximum was $1000.

The lowest pawn price and sell prices were the same: $125, while the highest sell price was greater than the highest pawn price, $1100 and $1000 respectively. In general, at each location, the offered sell price was greater than the offered pawn price.[8] However, the mean difference in sell price and pawn price offered at each pawnshop was quite low: $65.63, with a standard deviation of $90.74. At 14 locations the sell price was identical to the pawn price; moreover, the greatest difference between sell price and pawn price was $300. Again, this agrees with the theory that pawnbrokers feel their loan is "paid in full" at the time it is made, and offering a pawn at the risk of customer default is equivalent to buying the good (i.e. probability of customer default is negligent).

The dependent variable of interest is Distance to "The Strip". Table 1 shows that the mean distance to the strip was

Table 2. Pawnshop Characteristics

Characteristic:	Frequency in Sample	Approximate Percent of Sample
GEOGRAPHIC LOCATION		
Northwest	14	44%
Northeast	10	31%
Southwest	6	19%
Southeast	2	6%
BROKERS		
Gender:		
Male	17	53%
Female	15	47%
Approx. Age:		
Young	16	50%
Middle	4	12.5%
Old	12	37.5%
Ethnicity:		
Caucasian (non-hispanic)	19	59%
African-American	5	16%
Hispanic	6	19%
Asian	2	6%
FRANCHISES		
All	25	78%
PawnPlus	3	9%
Pawn Place	4	13%
EZ-Cash Superpawn	18	56%
HALF-MILE CONCENTRATION (number of other pawnshops within half-mile radius)		
0 other pawnshops	21	66%
1 other pawnshop	4	12.5%
2 other pawnshops	3	9%
3 other pawnshops	4	12.5%

Sample Size: 32

4.42, and distance ranged between .50 to 11 miles. "half-mile concentration" and the "EZ Cash Superpawn" dummies are also used to show interesting determinants of pawn prices. The extra variables included in my regressions merely control for other possible factors affecting price. Summary statistics of pawnshop characteristics are provided in Table 2.

6 Limitations

The main weakness in this experiment is the variation in the pawnbrokers' valuations of the collateral. Specifically, a broker's valuation may depend on his or her ability to identify the diamond's clarity or cut, as well as the store's resale value of the earrings, which may vary across locations. Ideally the sample size normalizes broker's ability to identify the diamond's 4 C's, though this cannot be assumed. However, the regional dummies assist in controlling for resale value differences. In addition, there may be different degrees of adverse selection across locations.

Another limitation is the variation in brokers' evaluations of the customer, not due to the Distance to "The Strip" mechanism. To limit this variation, I was the customer in every encounter, and my physical appearance did not change (including my clothes). Additionally, brokers did not know my name or exact age in all but two encounters.[9] Although the broker changes in each observation, I tried to control for these differences using the age, gender, and ethnicity variables. However, my regressions show that these broker characteristics have basically no effect on offered prices.

In addition, in my model I assume the location of pawnshops to be exogenously imposed. This is perhaps a faulty assumption: firms may choose where to locate, and thus enter profitable niches. Endogenous pawnshop locations will imply that not only are prices dependent on location, but location may also be dependent on prices. Therefore, there is potential for reverse causality.[10]

After two and a half days, I obtained 32 observations. Although 32 observations may seem like a small sample size, it seems fully representative of Las Vegas pawnshops. Judging from the information I found in the two most recent Las Vegas phone books, I was able to reach nearly every pawnshop in town as well as the section of unincorporated Clark County south of the city of Las Vegas containing "The Strip".[11] I did not go to any pawnshops in the neighboring cities, namely North Las Vegas and Henderson.

7 Results

I analyze the effect of Distance to "The Strip", as well as other variables, on Pawn Price, by estimating the following:

$$\ln(\text{price}_j) = \alpha + \beta_0(\text{distance to the strip}_j) + \beta_1(\text{half-mile concentration}_j) + \beta_2(\text{EZCash Superpawn}_j) + \gamma X_j + \delta B_j + \epsilon_j$$

The X matrix contains locational information for each store j. The B matrix is composed of broker characteristic dummies, as described in the above data section.

Table 3 reports results from OLS regressions of ln(pawn price) on ln(distance to the strip), omitting all other variables. Table 3 shows that a pawnshop's distance from "The Strip" greatly affects the pawn price offered. Column 1 indicates that a 1% increase in distance raises pawn price by 38%. In other words, the coefficient on ln(distance)is the elasticity of Pawn Price with respect to Distance from "The Strip". In this case, the elasticity is .38 with a standard error of .125, making this effect significant at the 1% level.

In columns 3 and 5, market power variables are introduced. The positive coefficient on the "half-mile concentration" variable indicates that as the number of pawnshops within a half-mile radius increases, pawn price also increases. More specifically, column 5 reports that an increase of one pawnshop within a half-mile radius, increases expected pawn price by 8%. Additionally, the negative coefficient on the "EZ Cash Superpawn" dummy shows that a pawnshop belonging to this franchise offers pawn prices which are on average 28% less than if it was not owned by EZ Cash Superpawn. However, these market power effects are not significant.

In column 6, indicators for Las Vegas regional locations are included in the OLS regression. It is evident that pawn prices are generally higher in the Southwest region of Las Vegas; pawnshops located on and east of Las Vegas Blvd. offer significantly lower pawn prices. More importantly, including location

dummies dramatically increases the distance effect, as well as its significance. Column 6 reports that a 1% increase in distance from "The Strip" increases pawn prices by 52%! This effect is still significant at the 1% level.[12]

Lastly, when adding dummy variables for broker gender, age, and ethnicity in columns 2 and 4, statistical precision becomes a concern. While the size of the coefficient on each explanatory variable remains roughly the same, these effects are less significant. From column 1 to column 2, adding too many regressors causes the standard error to increase to the point that the coefficient on ln(distance) is no longer significant at the 1% level. For the regression reported in column 6 in which many variables are included, the original inclusion of these broker dummies decreases the significance of particular effects. Therefore, this implies that increasing distance has a positive effect on pawn prices but that although the point estimate is robust to the inclusion of other relevant variables it is not precisely estimated because of the small sample size (n=32). Since the effect of these broker dummies on price and on the included variables are negligent (i.e. there is no discernible omitted variable bias), the regressions I report in columns 5 and 6 omit broker dummies in order to preserve power.

Table 4 presents OLS regressions of ln(sell price) on ln(distance to the strip). The coefficients on the explanatory variables are very similar to those founding Table 3, in magnitude and sign, as well as significance. For example, column 1 of Table 4 shows that the elasticity of sell price with respect to distance is .37, similar to the .38 elasticity of pawn price to with respect to distance reported in column 1 of Table 3. This is again significant at the 1% level.

Key differences between Table 3 and Table 4 are as follows. First, market power effects are greater on expected sell price than on expected pawn price. In Table 4, the coefficients on half-mile concentration and the EZ Cash Superpawn dummy are greater in magnitude than in Table 3, and are also marginally significant. Secondly, location effects are greater on expected pawn price than on expected sell price. In column 6 of Table 4, the coefficients on the location dummies are smaller in magnitude than in column 6 of Table 3, as well as less significant.

Results in both Table 3 and Table 4 display significant effects of ln(Distance) on ln(Price) at the 1% level for all regressions that omit the broker characteristic dummies. The elasticity of price with respect to distance ranges between .36 and .52 in all regressions.

Table 3. OLS Estimates of the Effect of Distance from Strip on Pawn Prices

	Dependent Variable: ln(Pawn Price)					
Variable	(1)	(2)	(3)	(4)	(5)	(6)
ln(distance)	.380	.368	.404	.396	.435	.524
	(.125)***	(.140)**	(.124)***	(.141)***	(.124)***	(.125)***
Half Mile concentration	–	–	.127	.114	.080	.146
			(.087)	(.098)	(.092)	(.092)
EZCash Superpawn	–	–	–	–	–.288	–.283
Dummy					(.201)	(.188)
Location Dummies:						
North	–	–	–	–	–	–.118
						(.242)
East	–	–	–	–	–	–.934
						(.392)**
North*East	–	–	–	–	–	1.01
						(.505)*
Las Vegas Blvd.	–	–	–	–	–	–.674
						(.326)**
Broker Dummies	not included	included	not included	included	not included	not included
N	32	32	32	32	32	32
R-Squared	.234	.319	.286	.357	.335	.565

Notes: Single, double, and triple asterisks indicate significant coefficients at the 10 percent, 5 percent, and 1 percent levels respectively.

Table 4. OLS Estimates of the Effect of Distance from Strip on Sell Prices

	Dependent Variable: ln(Sell Price)					
Variable	(1)	(2)	(3)	(4)	(5)	(6)
ln(distance)	.366	.341	.395	.371	.436	.517
	(.122)***	(.131)**	(.118)***	(.131)***	(.114)***	(.124)***
Half Mile concentration	–	–	.151	.120	.088	.136
			(.083)*	(.091)	(.084)	(.091)
EZCash Superpawn	–	–	–	–	–.384	–.401
Dummy					(.184)**	(.185)**
Location Dummies:						
North	–	–	–	–	–	–.039
						(.239)
East	–	–	–	–	–	–.711
						(.387)*
North*East	–	–	–	–	–	.877
						(.499)*
Las Vegas Blvd.	–	–	–	–	–	–.569
						(.322)*
Broker Dummies	not included	included	not included	included	not included	not included
N	32	32	32	32	32	32
R-Squared	.232	.363	.310	.407	.403	.548

Notes: Single, double, and triple asterisks indicate significant coefficients at the 10 percent, 5 percent, and 1 percent levels respectively.

8 Discussion and Interpretation of Results

These results demonstrate that Las Vegas pawn prices (as well as sell prices) increase as the distance from "The Strip" increases, while collateral value is held constant. This indicates that the Las Vegas pawnshop industry uses distance to "The Strip" to sort inelastic pawn customers, tourists, from more elastic pawn customers, residents, and offers significantly higher loans to the latter group. Therefore, pawnbrokers take into account the customers pawn demand elasticity when pricing pawns.[13] Prices also depend on a pawnshop's relative market power. Greater numbers of nearby pawnshops increase competition, thus increasing loan price. Similarly, increases in market share decrease competition, thereby decreasing loan prices.

Thus, pawnshops do not lend solely on collateral value. Other factors such as inferred customer pawn elasticity and reservation price affect the value of loan offers. Moreover, the

amount of competition each pawnshop faces limits its ability to price discriminate.

9 Conclusion

In this paper, I address pawn pricing behavior and ask whether there are other determinants of pawn prices aside from collateral value. I hypothesize that pawnshops may have an incentive to infer customer pawn elasticity, and thus vary prices across customers accordingly. I conduct a field study in Las Vegas to test this theory. My results for pawnshop prices in Las Vegas show evidence of price discrimination based on customer pawn elasticities. Using distance to "The Strip" as a mechanism to sort tourists with low reservation prices from residents with high reservation prices, Las Vegas pawnshops indeed charge lower prices to the former and higher prices to the latter. Additionally, a pawnshop's ability to price discriminate is determined by its relative market power. Thus, I find that pawnshops do indeed vary prices across customers pawning identical items, indicating that pawn prices are not solely based on collateral value.

My results imply that customers who have relatively high needs for short-term loans may in fact receive lower loan offers from pawnshops than customers with more elastic pawn demand. It would be worthy to find and study other determinants of pawn pricing and pawn market structure, such as the effect of default probabilities on loan offers, the pawn pricing behavior for repeated customers, or other ways in which pawnshops infer individual customer pawn demand elasticity.

Furthermore, this research may also be extended and applied to more mainstream forms of financial institutions that may engage in predatory loaning.

10 Appendix

$$U(x, y) = x^{1-\alpha} y^{\alpha}$$

where $\alpha \in (0, 1)$ Agent chooses to consume x and y. x is a discrete good; specifically $x = 0$ or 1. y is cash. Pawnors are endowed with initial income y_0 and with 1 unit of good x. Thus, the pawnor budget constraint: $y_0 + p_x(1) = p_x x + p_y y$ Since y is cash, $p_y = 1$.

$$\Rightarrow y_0 + p_x = p_x x + y$$

is the pawnors budget constraint.

Pawnors maximize their utility over x and y:

$\max_{x,y} U(x, y) = x^{1-\alpha} y^{\alpha}$ subject to $y_0 + p_x = p_x x + y$

$$\Lambda = x^{1-\alpha} y^{\alpha} - \lambda(p_x x + y - y_0 - p_x)$$

$$\frac{\partial \Lambda}{\partial x} = (1-\alpha) x^{-\alpha} y^{\alpha} - \lambda p_x = 0$$

$$\frac{\partial \Lambda}{\partial y} = \alpha x^{1-\alpha} y^{\alpha-1} - \lambda = 0$$

$$\frac{\partial \Lambda}{\partial \lambda} = p_x x + y - y_0 - p_x = 0$$

$$\Rightarrow \left(\frac{1-\alpha}{\alpha}\right) \frac{x^{-\alpha} y^{\alpha}}{x^{1-\alpha} y^{\alpha-1}} = p_x$$

yields Utility Maximing Condition:

$$\left(\frac{1-\alpha}{\alpha}\right) \frac{y}{x} = p_x$$

Notes

1. see Appendix
2. Additionally, $\frac{\partial \bar{p}}{\partial y_0} = \frac{1-\alpha}{\alpha} > 0 \Rightarrow$ Reservation price is increasing in pawnors's amount of "cash on hand".
3. Lastly, there is probably very little to zero arbitrage in the pawn market.
4. According to the National Pawnbroker Association, a loan of about 50% of the resale value of the collateral is typical. Thus, the probability of a customer defaulting supposedly does not affect pawn pricesbecause pawnbrokers feel their loan is "paid in full" at the time it is made. The pawnor is then free to choose whether he will repay the loan and take back his collateral.
5. And vice versa: for pawnshop j far from alternative shops $k \in A$, $\Phi_{ij}(zk)$ is low $\Rightarrow E_{ij}(pk)$ is low $\Rightarrow p^*$ is low $\Rightarrow$ offered p_j is low.
6. Most franchises keep detailed records of pawns that are accessible to all stores owned by the franchise.
7. Also, the inclusion of these variables in the regressions does not indicate any possible omitted variable bias.
8. There were only two locations where pawn price was greater than sell price.
9. Two different pawnshops asked for my drivers license and would not give me a valuation otherwise.
10. Endogenouslocation decisions may result in minimal differentiation in locations to increase market size. This may explain why there were two pawnshops next door to each other in Old Vegas, one being the oldest pawnshop in the city.
11. The only shops I missed in Las Vegas were three that I could not find and perhaps are out of business.
12. It may be noted that the R-Squared of this regression is quite high: .565, but this may be mainly due to the large ratio of explanatory variables to the number of observations.
13. My results are analogous to Scott Morton, Zettelmeyer, and SilvaRisso's (2001) results in which that show that women and minorities pay higher prices for cars(approximately 2.3% more) due to their relatively inelastic demand and high search costs.

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