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Payment Plans and Veterinary Services: Do They Reduce the Pain of Pet Owner Payment?

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The pain of payment—a negative feeling consumers experience during the process of paying for a good or service—can reduce access to the veterinary services market. We examine the potential of payment plans to reduce pain of payment among pet owners from a theoretical and empirical perspective. We find that payment plans reduce pain of payment by decreasing the price and income effects of purchasing veterinary services. An important, additional finding is that some consumers discount the payment plan option. We suggest that payment plan options should be carefully considered for different groups of consumers.

Key words: consumer choice, demand, pain of payment

Introduction

Paying for healthcare is often viewed as an expensive endeavor that complicates decision making around choosing the optimal scenario for one's health or making the same choice conditional on affordability. While this choice is partially alleviated by insurance in humans, the vast majority of dogs, cats, and other companion animals do not have that same luxury. Pet insurance has suffered low adoption rates due to a lack of product diversity and the inadequacy of cost-covering (Access to Veterinary Care Coalition, 2018). Thus, veterinary medicine is a predominately cash-for-services industry, with limited insurance and alternative payment options (Brockman, Taylor, and Brockman, 2008). Because of this, the most significant barrier to seeking routine veterinary care for pets is a question of affordability (Stull et al., 2018). This is especially poignant given that veterinary medicine closely follows the technological advances of human medicine, which increases the potential cost of providing veterinary care (Clark, 2002; Brockman, Taylor, and Brockman, 2008). This paper tests the effects of payment plans as one of the solutions to the affordability on the demand for veterinary care.

Given recent growth in pet adoptions (Larkin, 2021) and the fact that many owners view them as family members (Gilly, 2008; Holbrook and Woodside, 2008), it is critical that the veterinary industry find solutions to affordability concerns (Holbrook, 2008). The affordability issue also means that the lifetime healthcare spending on pets follows an inefficient pattern: Pet owners underspend early in the pet's life, but end-of-life expenditures are much higher (Einav, Finkelstein, and Gupta, 2017). Currently, pet owners have a limited set of options to afford veterinary care. The two most discussed options are cash for services and pet insurance. While insurance adoption rates are increasing given the introduction of a wider range of products (Bonafire Research, 2021), the fact remains that less than 10% of pet owners purchase pet insurance. Other options include healthcare-specific credit cards (e.g., CareCredit) that cover both pet and human healthcare expenditures (Jenkinson, 1989); payment plans, either through third parties or clinic-backed

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(Bir, Wolf, and Widmar, 2020); and (in rare cases) bartering (Heinke and McCarthy, 2012). Among the alternative payment options, the most used are payment plans (Access to Veterinary Care Coalition, 2018). In theory, payment options alleviate the "pain of payment" (PoP) experienced when paying for services.

Our objective is to determine consumers' willingness to pay (WTP) for payment plans and investigate whether payment plans reduce PoP. By addressing PoP, the hope is to increase the number of pet owners who purchase routine services and increase pet owners' overall WTP for veterinary care by alleviating concerns related to owner income. We explore this from both a theoretical and an empirical perspective. Our theoretical hypotheses are made by comparing purchase utility and PoP in a consumption-saving model; our empirical method includes two stated preference experiments with a choice-based conjoint experiment and a sequential choice experiment.

The PoP phenomenon is a negative feeling consumers experience during the process of paying for a good or service (Zellermayer, 1996; Prelec and Loewenstein, 1998). As most people are loss averse when they make purchases (Brooks and Zank, 2005), they experience emotional distress as they think about spending money (Knutson et al., 2007). The root of emotional distress during purchases is the perception of opportunity cost: Spending money now means less money to be spent in the future (Frederick et al., 2009). Accordingly, consumers experience more PoP when the product is more expensive and the opportunity cost is larger (Raghubir and Srivastava, 2008). An important aspect of PoP is that the phenomenon is psychological rather than physical in nature and is associated with brain regions including the insula and medial prefrontal cortex (Kuhnen and Knutson, 2005; Knutson et al., 2003). This suggests that simply analyzing income as the basis of PoP may not be sufficient. Based on the mental accounting literature, when consumers make payments they open a mental account, which links costs to their associated benefits (Johnson, Anderson, and Fornell, 1995). In the mental account system, higher costs increase PoP; PoP reduces the utility of consumption and, in turn, the satisfaction of consumption. As a result, PoP reduces spending.

PoP has been tested in several contexts and has been found to vary by payment method. Prelec and Loewenstein (1998) propose that PoP explains why people spend more when they make purchases using credit cards than when they use cash or check. Credit cards are ranked as the least painful, and cash is ranked as the most painful (Zellermayer, 1996; Thomas, Desai, and Seenivasan, 2011; Shah, Eisenkraft, Bettman, and Chartrand, 2016). Soster, Gershoff, and Bearden (2014) argue that people are against spending their last dollar as it generates more PoP. Sheehan and Van Ittersum (2018) and Choe and Kan (2021) explore the relationship between budgeting and PoP. From our search of the literature, we did not find any work related to how payment plans affect PoP.

Payment plans have been treated as a way to adjust risks (Shavell, 1976) and have been widely used in a variety of consumption domains, including grocery, services, loan repayment, and health care (Garfinkel et al., 1986; Geruso and McGuire, 2016; Schmid, Beck, and Kauer, 2018; Cox, Kreisman, and Dynarski, 2020). Payment plans defer part of the monetary cost and reduce opportunity costs at the time of purchase. For the same good or service consumption, we believe that PoP is different when consumers choose to pay using a payment plan. In this paper, we propose that payment plans can influence spending on veterinary services by reducing price and income effects, thereby reducing PoP, which should increase expenditures/WTP and overall demand for services. The results of our two stated preference experiments suggest that payment plans reduce PoP and increase demand for veterinary care, but the effects are differential for consumers with different income levels.

This study contributes to several strands of literature. First, this work adds to the growing body of work on "pain of payment" within consumer research (Rick, Cryder, and Loewenstein, 2008; Scott, Cayla, and Cova, 2017). Specifically, our study formalizes the theoretical hypotheses in terms of a consumption saving approach via Massenot (2021). Moreover, we add to the general work on choices and payment mechanisms to relieve the PoP effect (Chatterjee and Rose, 2012; Yeung, 2014; Soster, Gershoff, and Bearden, 2014, among others). A second area of literature to which we contribute relates to payment plans (Kamien and Schwartz, 1973; Levy, Bagley,

and Rajkumar, 2018): We provide insights about how payment plans reduce PoP. Finally, this work contributes to the general literature surrounding veterinary services and healthcare. Among other issues, veterinary services offer an opportunity to examine healthcare markets in relation to inefficiencies (Einav, Finkelstein, and Gupta, 2017), market structure with little to no interference from insurance (Neill, Holcomb, and Brorsen, 2018; Neill, Holcomb, Raper, and Whitacre, 2019), cash-for-services healthcare models (Brockman, Taylor, and Brockman, 2008), well-being (Staats and Horner, 1999), and labor issues (Smith, 2002; Neill, Holcomb, and Brorsen, 2017; Neill, Kakpo, and Mack, 2021).

Theoretical Hypotheses

We develop two theoretical hypotheses about the effect of payment plans on demand for veterinary services based on the comparison between the purchase utility and the PoP. Massenot (2021) builds a new consumption-saving model in which consumers experience the PoP when making purchases. In general, Massenot suggests that this model predicts a higher marginal propensity to consume (MPC) that more closely approximates empirical estimations of MPC than the predictions made by standard models. We follow this approach based on the PoP in Massenot and incorporate the payment plan into the model to predict the effects of payment plans on the purchase of veterinary services.

The most important assumption that Massenot (2021) makes is that PoP is decreasing and convex in the consumption budget. This assumption is formalized from the idea that PoP depends on the perceived price–budget ratio. When the consumer perceives the price to be smaller compared to their budget, they feel less pain. For example, a millionaire feels less pain compared to someone living below the poverty line when buying a cup of coffee), but a millionaire and a billionaire would feel similar PoP from the same purchase. This assumption matches findings in the theoretical and empirical literature (Morewedge, Holtzman, and Epley, 2007; Soster, Gershoff, and Bearden, 2014; Massenot, 2021). To explore the differential effects of payment plans on demand among people with different income levels, we also make the assumption that PoP is decreasing and convex in disposable income.

In our case, consumers make the decision whether to purchase a veterinary service at time t. The total price of the veterinary service is P. The utility of purchasing a veterinary service is U, with $U = \bar{U} + \epsilon$, where $\bar{U}$ is the mean utility and ϵ is an independent and identically distributed (*i.i.d.*) random variable with mean 0 and cumulative distribution function F. The consumer with disposable income I chooses to buy a veterinary service with price P and utility U if $U > PoP(P,I)$, where PoP is the pain of payment. Note that we follow Massenot (2021) by comparing utility with PoP to construct the demand function rather than maximizing the utility. We present the total consumption, C, of a consumer at time t as follows:[1]

$$C_t(P,I) = F(\bar{U} - PoP(P,I)), \tag{1}$$

where consumption, C_tm decreases with PoP, and PoP is affected by price P and disposable income I. The pain of paying is suggested to be increasing in the price and decreasing and convex in the disposable income. Thus, we adopt the following functional form for PoP:

$$PoP = 2a\lambda\frac{P}{I} \quad (P > 0, I > 0), \tag{2}$$

where a is a constant for the calculation purpose later and λ is a preference parameter that measures consumers' frugality, which could be affected by present bias or self-control.

[1] Note that in the PoP-based consumption model, consumers ignore opportunity costs.

Now we provide the payment plan to consumers. The payment plan changes the price at t; we denote the price that the consumer needs to pay at time t under the payment plan as $\bar{P}_t$, $\bar{P}_t < P$. Thus, the PoP decreases with the payment plan: $PoP(\bar{P}_t, I) < PoP(P, I)$.[2]

Following Massenot (2021), we assume that F is uniform with support [−a, a], with $PoP - a < U < PoP + a$. Consumption at t under the payment plan becomes

$$C_t(\bar{P}_t, I) = (\upsilon - \lambda \frac{\bar{P}_t}{I}) \tag{3}$$

where $\upsilon = (\bar{U} + a)/2a$. Since $\bar{P}_t < P$, we have $C_t(\bar{P}_t, I) > C_t(P, I)$. Thus, our first hypothesis is:

Hypothesis 1. *The payment plan reduces the price at the time of purchase, PoP decreases, and expenditure (consumption) increases.*

In addition to increases in consumption, the payment plan has differential effects on demand for consumers with different levels of disposable income. This can be viewed from a continuous income perspective or from a categorical/discrete perspective. Note that we examine both, but the categorical perspective in our study is based on psychological perceptions about one's budget and perceived affordability (e.g., illiquid and insolvent consumers). To begin, suppose there are two consumers, A and B, with disposable income levels I_A and I_B, where $I_A > I_B$. Assume that the price of the veterinary service is the same for consumers A and B. PoP is decreasing in income levels, so consumer A's PoP is less than consumer B's ($PoP_A < PoP_B$). When we provide payment plans to A and B, PoP decreases for both A and B, but the degree of reduction in PoP is different for consumer A than for consumer B:

$$\begin{aligned} |2a\lambda \frac{\bar{P}_t - P}{I_A}| &< |2a\lambda \frac{\bar{P}_t - P}{I_B}| \\ \Rightarrow |\Delta PoP_A| &< |\Delta PoP_B|, \end{aligned} \tag{4}$$

where ΔPoP is the amount of change in PoP. Consumption decreases with PoP. Thus, consumer A's consumption increases less than consumer B's:

$$\begin{aligned} (C_{tA}(\bar{P}_t, I_A) - C_{tA}(P, I_A)) &< (C_{tB}(\bar{P}_t, I_B) - C_{tB}(P, I_B)) \\ \Rightarrow |\Delta C_{tA}| &< |\Delta C_{tB}|. \end{aligned} \tag{5}$$

The PoP in our model setup is not only decreasing in income levels but also convex in income levels:

$$PoP''(I) > 0. \tag{6}$$

Thus, we argue that the degree of increase in expenditure/consumption caused by the payment plan is lower among consumers with higher perceived budgets:

Hypothesis 2. *The increase in expenditure caused by the payment plan is higher for consumers with lower perceived budgets than for consumers with higher perceived budgets; the increase in expenditure is similar for consumers with similar perceived budget constraints.*

To the best of our knowledge, our paper is the first to study the effects of payment plans on reducing PoP within veterinary medicine. We incorporate the payment plan into the PoP model presented by Massenot (2021) and provide theoretical hypotheses about individual-level consumption changes. Specifically, payment plans change the amount of expenditure at the time of purchases and, in turn, change the PoP at that time. In addition, the alleviation of PoP affects both income and price effects, which also leads to increases in demand/purchase rates. This is deduced from the hypothesis about differential effects of the payment plan on consumption among people with different levels of disposable income.

[2] If we include the PoP of future payment in the model, we would add a discount factor to future PoP, which would not change the results of the model. Thus, we only consider current PoP for simplicity.

Summary Statistics and General Survey Design

In this study, we investigate the effects of payment plans on demand for veterinary services. We conducted two online experiments with 548 pet owners. Appendix Table A1 presents demographic information for these experiment participants. We present the design, model, and results of the two experiments separately. This study was conducted on Qualtrics and approved by Cornell IRB.

Before the two experiments, we screened potential participants on the basis of age, responsibility for purchasing decisions, and pet ownership. Subjects had to be at least 18 years old, responsible for at least 50% of household purchasing decisions (e.g., groceries, pet food), and own at least one pet currently living in the household.

A majority of respondents (72%) have one or two pets, with the remainder having three or more. Dog ownership is the most popular, at 45%, and having both dogs and cats is the second most popular pet ownership scenario (32%). The remainder (23%) have only cats in the household. In 2020, 32.3% of surveyed pet owners took their pets to the veterinarian once and 9.6% never took their pets to the veterinarian. The most common reason for not taking pets to the veterinarian was because it was too expensive.[3]

In addition to pet owner and pet demographics, we also inquired about the owner–pet relationship, information on veterinary service usage, and perceptions. Most pet owners in our sample (78%) view their pets as family members, but there is variation to this classification. 54% of the sample view pets as human-equivalent family members, while 24% of the sample view their pets as nonhuman-equivalent family members. Within our sample, 16.3% of pet owners utilized a payment plan option to pay for veterinary services in 2020. Cash (including credit/debit card) options are still the most popular, at 76% of transactions.

We also discovered that the "illiquid" group of pet owners—those who feel as though they cannot afford veterinary care sometimes to most of the time but not "always" or "never"—makes up about 60% of the sample.[4] Similarly, when asked "If you were deciding between two veterinarians, how much more likely are you to choose a veterinarian that offers payment plans than one who does not?" 61% of the sample said they would be somewhat or much more likely to choose the veterinarian that offers payment plans than the veterinarian that does not. It was surprising to find a similar quantity of responses between these two groups. More importantly, clinics that offer payment plans could potentially increase their customer base if they were to advertise their payment options.

The remainder of the survey consisted of two economic experiments to better extract the value placed on payment plans. Specifically, we analyzed demand via a choice-based conjoint experiment to determine how consumers choose from among veterinarians of equal quality based on trade-offs between payment options and number of services. This type of experiment allows us to extract increases in consumption/expenditure under the PoP alleviation treatment. The second experiment is a sequential choice game to determine whether offering a payment plans increases purchase rate as a follow-up option. This experiment determines changes in demand at the point of transaction when participants are first asked to pay in cash, with a follow-up option of a payment plan conditional on not paying in cash. The two experiments allow for a look at *a priori* payment choices and *post hoc* offering of alternative payment options. Additionally, both experiments were specific to whether the participant owned a dog or cat. If they owned both, they were randomly assigned to the dog or cat scenario. The following two sections discuss each experiment in its entirety.

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[3] 2020 is an unusual year due to the COVID-19 pandemic. People skipped many medical routines in 2020. For example, there was a substantial reduction in pediatric vaccine ordering after the COVID-19 pandemic (Santoli et al., 2020). In our survey, we asked pet owners "How often did you take your pets to the veterinarian in the last year (2020)," and we provided choice options including "Never because it was too expensive" and "Never for other reasons, please explain." We found 7% of our subjects selected "Never because it was too expensive, and 2% selected "Never for other reasons, please explain." Of the 2% subjects who did not take their pets to veterinarians for other reasons, 25% of them indicated it was because of COVID-19.

[4] The full question is "How often do you feel that you cannot afford veterinary care for your pet?" and the choice list consists of "Never," "Sometimes," "About half the time," "Most of the time," and "Always."

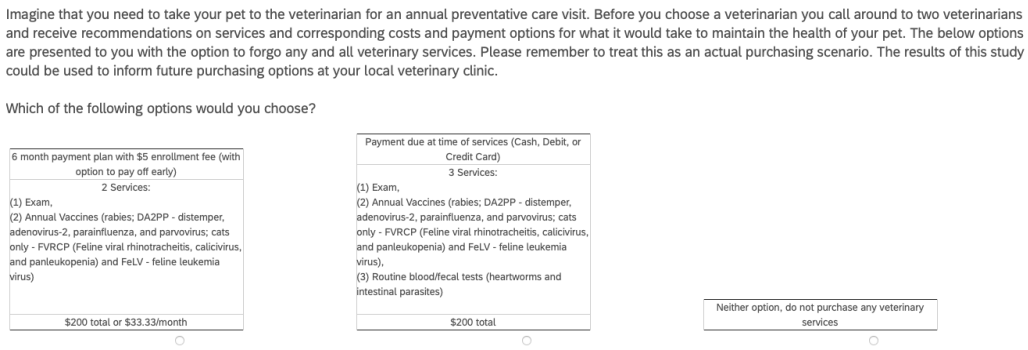

Figure 1. Example of Repeated Choice Question Presented to Participants

In both experiments, we also implement a between-subject treatment with another 543 subjects to test whether framing the cost in terms of monthly payments only or cost per day, but still monthly payments, is more effective in marketing. In the treatment group, we calculated the daily payment for each veterinary service and presented the payment plan using daily charge in each choice set (e.g., $1.11/day, billed monthly). This is the only difference compared to the primary experimental design. The motivation of the treatment is that the detailed daily cost information may generate different cognitive costs for consumers (Jarvenpaa, 1989; Milburn and McGrail, 1992), and we are interested in whether presenting the payment plan in different ways can affect the effects of payment plans on demand. We did the same data analysis for the treatment group, and the results are similar to the baseline group. Appendix Table A1 reports all results for the treatment group.

Experiment 1: Choice-Based Conjoint Experiment

The first experiment is a choice experiment that asks participants to repeatedly choose between two veterinarians that offer a different number of services at a given price and may or may not offer a 6-month payment plan. We use a fractional factorial design with two attributes varying at three levels (price and number of services) and one attribute with two levels (cash only or payment plan option). The design resulted in 11 choice questions that were answered by all participants with a D-efficiency of 91.74. Every choice question also had the option of "choose neither," which is used as the base in the analysis. Price levels were $100, $200, and $300. The number of services offered was cumulative in options. For example, the "two services" option, which was the minimum, offered a wellness exam and annual vaccinations. The "three services" option offered the same services and added routine blood/fecal testing. The "four services" option added flea/tick preventatives. This type of tiered offerings is common among veterinary services, and the more enhanced testing is usually not offered unless veterinarians are also allowed to do the basic wellness exam and routine vaccinations. Figure 1 presents an example of a choice question.

In reality, prices of veterinary care vary across states, markets (urban, suburban, and rural), and animal species. In addition, pricing is done via monopolistic competition, so two different veterinarians may offer a different number of services for the same price. Thus, we chose the prices in our experiment based on the 2022 AVMA pet demographic survey (American Veterinary Medical Association, 2022) to represent the possible range of prices faced across a wide range of markets. According to this survey, dog owners spend an average $367 on veterinary care per year, and cat owners spend an average $253. The price range in our experiment covers normal expenditures for both dogs and cats.

A mixed logit model (MLM) was used for analysis of the choice experiment. MLM relaxes the assumption of independence of irrelevant alternatives (IIA) and allows the coefficients in the utility function to vary over decision makers (McFadden and Train, 2000). MLM is more flexible compared

to the conditional logit, which restricts consumers to homogeneous preferences in estimation. As such, we allow for heterogeneity among consumers by allowing for random parameters in each of the choice attributes: number of services, price, and whether a payment plan is offered. The mixed logit choice probability of individual i choosing alternative n is given by

$$P_{in} = \int \left(\frac{e^{\beta' x_{in}}}{\sum_j e^{\beta' x_{im}}}\right) f(\beta) d\beta, \tag{7}$$

where $\beta' x_{in}$ is the portion of the utility function for individual, i, which is determined by observed variables of each alternative, x_{in}, and depends on the parameters β; and $f(\beta)$ is the density function of β. The mixed logit probability is an unconditional choice probability, as we do not know β_i. Equation (7) is therefore the integral over all possible variables of β_i.

Given the aforementioned utility function, individual i choosing veterinary service alternative n in our context is defined as

$$U_{in} = \beta_{i1} Price_n + \beta_{i2} No.Service_n + \beta_{i3} PP_n + \beta_4 PP_n \times Inc + \epsilon_{in}, \tag{8}$$

where PP is a dummy variable indicating the payment plan option is available. We also include the interaction term of payment plan and income ($PP_n \times Inc$) to explore the heterogeneous effects of the payment plan on consumers with different budgets, as indicated in the theoretical hypotheses. The interaction term parameter is fixed to be nonrandom. The "choose not to buy" option of each choice set in our experiment is normalized to 0 for identification purposes. Thus, the individual-specific parameter β_i in the utility function indicates the utility of alternative n relative to the utility of "choose not to buy." The model was estimated by maximizing the simulated log-likelihood function with 1,000 Halton draws.

Table 1 shows the MLM estimation results. All parameters were statistically significant. Our results suggest that consumers' utility increases with the number of service and the payment plan option. As expected, when the price of veterinary service increases, consumers' utility decreases. The negative coefficient of the interaction term ($PP \times Inc$) confirms the convex budget assumption that the effect of the payment plan decreases with income levels. For those with higher incomes, the payment plan option is not as attractive (i.e., does not have the same PoP alleviation effect) as it is to lower-income consumers.

Based on the MLM estimated parameters, we estimate the WTP for different number of services and the payment plan option of a veterinary service. The results in Table 2 suggest that WTP increases with the number of services. The average WTP for 2, 3, and 4 services is \$354, \$427, and \$444, respectively. The average WTP for the payment plan is also positive, \$53.

As previously discussed, we hypothesize that pet owners who identify as "illiquid" and "insolvent" are the populations that find veterinary care inaccessible and experience higher rates of PoP. This is due to perceived, psychological constraints on one's budget. Within the survey, we asked subjects "How often do you feel that you cannot afford veterinary care for your pet?" Subjects made a choice on a Likert-type scale labeled as"Never," "Sometimes," "About half the time," "Most of the time," "Always." From this question we coded two dummy variables based on subjects' answers to this question: *Illiquid* equals 1 if they answered "Sometimes," "About half the time," or "Most of the time" and 0 otherwise; *Insolvent* equals 1 if the answer is "Always" and 0 otherwise. Those that chose "Never" were considered as having no financial barriers to accessing veterinary care and used as the base of comparison. We then estimated a second MLM with two interaction terms, $PP \times$ *Illiquid* and $PP \times$ *Insolvent*. This allows us to examine the nuances of perceived budget constraints when paying for services. Table 3 suggests that payment plans have positive effects on the utility of purchasing veterinary services for both the illiquid and the insolvent group, and the effects are stronger for the insolvent group. The insolvent group consists of consumers who always feel they cannot afford veterinary services, and their PoP is higher compared to that of the illiquid group. These results are in line with the estimated average WTP for payment plans for consumers in the

Table 1. Mixed Logit Estimation Results for Payment Plan on Veterinary Service Purchase (N = 18,084)

	Parameter Estimate	Standard Error	Statistic	$P > z$
Mean				
Price	−0.012	0.001	−17.94	0.000
2 services	4.236	0.134	31.70	0.000
3 services	5.142	0.144	35.74	0.000
4 services	5.341	0.146	36.65	0.000
Payment plan	0.643	0.123	5.23	0.000
$PP \times Inc$	−0.073	0.017	−4.32	0.000
SD				
Price	0.013	0.001	19.74	0.000
2 services	0.786	0.088	8.97	0.000
3 services	−0.010	0.146	−0.07	0.943
4 services	0.739	0.108	6.85	0.000
Payment plan	1.123	0.080	14.05	0.000
Log-likelihood	-4,490.623			

Table 2. Willingness to Pay ($) for Different Numbers of Services and Payment Plan

	No. Service 2	No. Service 3	No. Service 4	Payment Plan
WTP	353.577	427.206	443.723	53.420
	[319.13, 388.02]	[387.24, 467.17]	[401.83, 485.62]	[32.77, 74.07]

Notes: Values in brackets are 95% confidence intervals.

illiquid and insolvent groups, shown in the last two rows of Table 3. We also find that the coefficient of *PP* becomes insignificant when we add the two interaction terms in Table 3. This indicates that the payment plan itself does not affect the purchase utility unless consumers experience PoP when they make purchases.

Comparing these results to the base model in Table 1, we find that a continuous measure of income may mask the true extent of the PoP phenomenon as it relates to payment plans. Empirically, income has the expected, theoretical effect of a convex budget response to the PoP. However, nuances of income viewed from perceived/psychological effects of affordability reveal that payment plans are not universally better, as they have no effect on those who can always afford veterinary care. To further investigate this effect, we estimate a latent class model with four latent classes, removing all income variables. We find one class that actually discounts the payment plan (see Class 2 in Table 4).The coefficient of *PP* and the average WTP for payment plans are negative for Class 2. The negative valuation of payment plans is counterintuitive to our theoretical hypotheses. This indicates that payment plans reduceutility for some customers, and this group of customers is less likely to use payment plans or choose veterinarians with forced payment plans. The latent class models suggest caution in how payment alternatives are advertised based on existing customer base.

Our results contribute to the literature on demographic heterogeneity among pet owners. Pet owners with different ages, income levels, education levels, and types of pets also differ in their likelihood of visiting a veterinarian (Lue, Pantenburg, and Crawford, 2008; Kogan, Schoenfeld-Tacher, and Viera, 2012; Gates et al., 2019; Bir et al., 2020). We further test whether payment plans have differential effects on dog owners versus cat owners. Dog owners in our analysis are those who have dogs and other animal species, excluding cats; cat owners are those who have cats and other

Table 3. Mixed Logit Estimation Results for Payment Plan on Veterinary Service Purchase (illiquid and insolvent groups) (N = 18,084)

	Parameter Estimate	Standard Error	Statistic	$P > z$
Mean				
Price	−0.012	0.001	−17.98	0.000
2 services	4.257	0.134	31.69	0.000
3 services	5.141	0.144	35.75	0.000
4 services	5.341	0.146	36.65	0.000
Payment plan	−0.119	0.127	−0.94	0.346
PP × *Illiquid*	0.413	0.152	2.72	0.006
PP × *Insolvent*	0.628	0.237	2.65	0.008
SD				
Price	0.013	0.001	19.76	0.000
2 services	0.785	0.088	8.94	0.000
3 services	−0.006	0.146	−0.04	0.969
4 services	0.738	0.109	6.76	0.000
Payment plan	1.136	0.081	14.09	0.000
Log-likelihood	−4, 494.988			
WTP of *PP* × *Illiquid*	$34.35 [$9.43, $59.27]			
WTP of *PP* × *Insolvent*	$52.24 [$13.36,$91.12]			

Notes: Values in brackets are 95% confidence intervals of willingness to pay (WTP).

Table 4. Latent Class Model with Four Latent Classes of Consumers

	Class 1	Class 2	Class 3	Class 4
Price	−0.013***	−0.027***	−0.023***	−0.001
2 services	1.091***	7.654***	4.825***	2.830***
3 services	1.571***	11.819***	5.848***	2.991***
4 services	1.199***	11.177***	6.005***	3.180***
Payment plan	−0.253	−0.538***	2.493***	0.016
WTP for payment plan	−$4.81	−$10.39	$48.10	$0.38
	[−$10.88, $1.26]	[−$23.50, $2.72]	[$12.6, $108.80]	[$0.10, $0.87]
Class share	0.117	0.311	0.162	0.411

Notes: Values in brackets are 95% confidence intervals. Single, double, ad triple asterisks indicate significance at the 10%, 5%, and 1% level, respectively.

animal species, excluding dogs.[5] Recall that the price range chosen in our experiment covers normal expenditures for both dogs and cats. Our results suggest that the effects of payment plans on WTP for veterinary services are similar for dog and cat owners (Appendix A2). Studies on veterinary services provide an opportunity to examine healthcare markets, and payment models have received a great deal attention in healthcare (Lieber, 2017; Siddiqi et al., 2017; Grennan and Swanson, 2020; Prager, 2020). Our results have implications for the usage of payment plans in healthcare.

[5] In the experiment, the survey question is "What type of pets do you currently own? (Check all that apply)," and the choice options are "Dog, Cat, Other (please specify)."

Table 5. Percentage of Choosing to Buy Veterinary Services in the First Stage of Experiment 2

	Number of Services	Price ($)	Percentage of Purchase (%)
Choice set 1	2	100	94.62
Choice set 2	3	100	92.86
Choice set 3	4	100	95.73
Choice set 8	2	200	78.36
Choice set 6	3	200	79.07
Choice set 4	4	200	77.27
Choice set 9	2	300	64.06
Choice set 7	3	300	71.19
Choice set 5	4	300	69.47

Experiment 2: Sequential Choice Experiment

Our second experiment consists of a sequential choice experiment. In the first stage, participants were presented with a choice between purchasing veterinary services or not. The veterinary services option varied among nine possible combinations that reflect those constructed in Experiment 1 when the payment plan option was not present. Thus, each participant was randomly assigned to one of the combinations and asked to make a purchase decision. From their choice to this first question, participants who chose not to buy the veterinary services were then directed to a follow-up question. In this second stage, the participant was faced with the same veterinary services option as in the first stage, except that they were now offered a payment plan. Those who purchased the services in the first stage were not shown the follow-up question and continued on with the rest of the survey.[6]

We used a conditional (recursive) mixed-process (CMP) modelto analyze the data from Experiment 2. In our experiment, most subjects (64.06%–94.62%) chose to buy veterinary services in the first stage, and the percentage who purchased decreased inversely with price. Table 5 shows the detailed distribution of the percentage of consumers choosing to buy in the first stage.

Only a small proportion of participants proceeded to the second stage. Thus, using traditional selection models (Heckman, 1976) will lead to low power in the second stage of the estimation.[7] The strength of a CMP model is that it allows equations to be estimated jointly using a systems approach rather than a two-step process (Roodman, 2011; Porgo et al., 2018). This gives us the power of the entire sample for the estimation. The CMP model fits sets of equations with distinct stages and related error terms. The dependent variables of individual equations can be continuous or discrete (binary), and each of the equations may use a different estimation technique. In our case, we have an equation for each stage, and the dependent variable for both stages is a binary variable indicating whether the consumer chooses to buy the veterinary service. As such, we estimate a probit model for each stage and use a maximum likelihood approach to estimate the two equations jointly. We present the probit model as a latent variable model:

$$Y^* = X^T\beta + \varepsilon \tag{9}$$

$$Y = \begin{Bmatrix} 1 & Y^* > 0 \\ 0 & \text{otherwise} \end{Bmatrix} = \begin{Bmatrix} 1 & X^T\beta + \varepsilon > 0 \\ 0 & \text{otherwise} \end{Bmatrix}. \tag{10}$$

[6] If the subject was in the treatment group, only the service option in the second stage included the daily charge information.

[7] In Heckman selection model, a probit is first used to estimate the probability of selection, and a regression is then estimated for only the subsample selected.

Table 6. CMP Model Estimation Results (N = 1,091)

	Parameter Estimate	Standard Error	Statistic
Stage 1			
Price	−0.005***	0.001	−8.45
Number of services	0.080	0.059	1.37
Age	−0.073***	0.016	−4.47
Female (vs. male)	−0.169*	0.098	−1.74
Education	0.113***	0.032	3.50
Income	0.042***	0.014	3.10
Number of pets	0.036	0.034	1.07
Constant	1.657***	0.354	4.68
Stage 2			
Price	−0.003	0.003	−1.33
Number of services	0.085	0.082	1.04
Treatment	−0.008	0.111	−0.07
Age	−0.089***	0.022	−4.05
Female (vs. male)	0.067	0.165	−0.41
Education	0.144	0.113	0.13
Income	0.032	0.022	1.45
Number of pets	0.049	0.048	1.04
Constant	1.884**	0.936	2.01
$atanhrho_{12}$	1.524	2.120	0.72
LR $\chi^2(15)$	151.19		
Prob > χ^2	0.000		

Notes: The dependent variable is a binary variable indicating whether the consumer chose to buy veterinary services. The coefficient of $atanhrho_{12}$ indicates the correlation between the error terms of the two equations. Single, double, and triple asterisks (*, **, ***) indicate significance at the 10%, 5%, and 1% level, respectively.

In the first stage of our experiment,

$$Y_1^* = Price\beta_{11} + NoS\beta_{12} + X'\beta_{1n} + \epsilon_1, \tag{11}$$

where NoS is number of services. In the second stage of our experiment, when the payment plan option is offered,

$$Y_2^* = Price\beta_{21} + NoS\beta_{22} + Treat\beta_{23}X'\beta_{2n} + \epsilon_2 \tag{12}$$

where X' is the control variables, $Treat$ is the daily cost information treatment, and $Cov(\epsilon_1,\epsilon_2) \neq 0$.

Table 6 shows the estimation results of the CMP model. The results suggest that in the first stage, the price has a negative effect on the purchase decision. However, in the second stage, which offers the payment plan with each veterinary service, the effect of price becomes insignificant. This is in line with our theoretical hypothesis that the payment plan reduces PoP. We also find that older people are less likely to buy veterinary services regardless of payment plan conditions. The insignificant coefficient on "income" in the second stage shows that the payment plan also mitigates the effect of income on veterinary service purchases—again, in line with our theoretical hypotheses. Thus, once again, we find that income/budget plays a critical role in consumer decision making around PoP.

The CMP process also allows for us examine demand/consumption shifts in aggregate purchase decisions. As such, we calculate the average probability of purchase in each stage of the experiment (see Table 7). Since we only provide the payment plan option in the second stage, the predicted purchase probability without payment plan is based on the first-stage estimation in the CMP; the predicted purchase probability with payment plan is based on both the second-stage and first-stage

Table 7. Predicted Mean Probability of Purchasing Veterinary Service Based on CMP

By Number of Services	Two Services	Three Services	Four Services
Without payment plan	80.1%	81.0%	81.8%
With payment plan	88.2%	89.1%	90.1%
p-values	< 0.001	< 0.001	< 0.001
By Price	**\$100**	**\$200**	**\$300**
Without payment plan	92.5%	81.9%	65.9%
With payment plan	95.1%	89.5%	81.4%
p-values	< 0.001	< 0.001	< 0.001

estimations in the CMP. The results in Table 7 suggest that demand for veterinary services under each number of service and price setup is higher when payment plans are provided. We find a similar increase of about 8% in purchase rates when we examine the problem based on the number of services offered. This suggests that payment plans are associated with a consistent increase in purchase rate when price is averaged. However, as expected, the increase in purchase rate is much greater at higher prices. This again supports the hypothesis that price/budget ratios are convex and reduce the PoP at time t.

Conclusion

The pain of payment (PoP) is a phenomenon that contributes to pet owners' ability to seek routine veterinary care, especially among illiquid and insolvent consumers. When access to routine healthcare, whether in pets or humans, is restricted for any reason, inefficiencies arise and result in increased end-of-life spending (Einav, Finkelstein, and Gupta, 2017). While insurance helps alleviate these costs in humans, pet insurance has not been widely adopted, leading to increased financial strain for pet owners. One way to alleviate this issue is to offer alternative payment options that address PoP.

This study examines one such option: payment plans. Using two stated preferences experiments, we find that payment plans do alleviate PoP. Our first experiment uses a choice-based conjoint design for choosing veterinarians based on payment options (i.e., only cash or payment plan options). Unsurprisingly, we find that PoP is predominately alleviated for higher-priced options via payment plans, but it has little effect on the lowest price options. However, the amount of expenditure (i.e., WTP) for routine services is markedly increased. This matches our theoretical hypothesis that the income effects from PoP are reduced. However, we find that payment plans are not viewed equally among all consumers. Specifically, rather than purely examining income, pet owners whom we define as "illiquid" or "insolvent" value payment plans significantly more. On the other hand, some groups of consumers actually discount payment plans, which has implications for marketing such payment alternatives.

From the second experiment, we find that sequential option mechanisms—payment plans that are only offered after the pet owner declines cash payment—significantly increase/shift demand. From the first stage to the second-stage choice, the price and income effects are no longer significant and demand increases by 2.5%–15.5% depending on price. The purchase rate for all services increases by about 8%. Both experiments support the theoretical models and hypotheses that reducing PoP increases demand and reduces the income and price effects of purchase.

Our results have implications for veterinary businesses that hope to increase demand by offering alternative payment options. First, payment plan options have the ability to increase demand among illiquid and insolvent pet owners. Given that the illiquid group accounts for about 60% of our sample, this is a large portion of the potential market with which to expand demand. Second, these same groups value the up-front offering or marketing payment plans, but some pet owners discount

payment plan offerings and may choose veterinary clinics that do not offer them. This could be a perception of quality on the part of the consumer. From the latent class models in Experiment 1, the group that discounts payment plans is the second largest share of participants but makes up only about 30% of the sample. As such, sequential offering of payment options (i.e., cash option followed by the payment plan option) still alleviates the PoP and decreases the effect of price and income on the pet owner. Clinics would likely see an increase in demand by offering a payment plan option, but how and when it is offered or marketed is up to the clinic.

There is an inherent risk in offering payment plans due to the potential for pet owners to default on payments. Studies on default rates among healthcare-related payment plans should be explored in the veterinary context to help business owners make informed decisions about payment option offerings. Finally, as noted in some literature, many veterinary practices often feel as though they cannot offer payment plans due to lack of staff or systems in place to offer such financial assistance (Coe, Adams, and Bonnett, 2007). While this may be true for some clinics, payment plans are not completely absent from veterinary medicine, and future research should focus on possible business models that could be adapted by more practices to include payment plan offerings.

Our findings confirm the prior literature that reducing the PoP is key to increasing consumer demand for various goods and services. In the context of healthcare, reducing PoP could help reduce inefficiencies in the healthcare spending. From the payment method literature, we examine payment plans as an option to relieve PoP, while many other studies have solely focused on credit cards and other types of payment options. Future work should compare how payment plans compare to credit cards, insurance, and other options in reducing PoP, especially in the veterinary healthcare market.

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References

Access to Veterinary Care Coalition. 2018. *Access to Veterinary Care: Barriers, Current Practices, and Public Policy*. Knoxville, TN: University of Tennessee Knoxville.

American Veterinary Medical Association. 2022. *Pet Ownership and Demographics Sourcebook*. AVMA.

Bir, C., M. Ortez, N. J. Olynk Widmar, C. A. Wolf, C. Hansen, and F. B. Ouedraogo. 2020. "Familiarity and Use of Veterinary Services by US Resident Dog and Cat Owners." *Animals* 10(3):483. doi: 10.3390/ani10030483.

Bir, C., C. A. Wolf, and N. O. Widmar. 2020. "Dog and Cat Owner Demand for Veterinary Service Payment Plans." *Journal of Agricultural and Resource Economics* 46(2):308–324. doi: 10.22004/ag.econ.304765.

Bonafire Research. 2021. *North America Pet Insurance Market Outlook, 2026*. Research and Markets. Available online at https://www.researchandmarkets.com/reports/5401712/.

Brockman, B. K., V. A. Taylor, and C. M. Brockman. 2008. "The Price of Unconditional Love: Consumer Decision Making for High-Dollar Veterinary Care." *Journal of Business Research* 61(5):397–405. doi: 10.1016/j.jbusres.2006.09.033.

Brooks, P., and H. Zank. 2005. "Loss Averse Behavior." *Journal of Risk and Uncertainty* 31(3): 301–325. doi: 10.1007/s11166-005-5105-7.

Chatterjee, P., and R. L. Rose. 2012. "Do Payment Mechanisms Change the Way Consumers Perceive Products?" *Journal of Consumer Research* 38(6):1129–1139. doi: 10.1086/661730.

Choe, Y., and C. Kan. 2021. "Budget Depreciation: When Budgeting Early Increases Spending." *Journal of Consumer Research* 47(6):937–958. doi: 10.1093/jcr/ucaa049.

Clark, J. B. 2002. "Cover Your Tail." *Kiplinger's Personal Finance* 56(1):108–108.

Coe, J. B., C. L. Adams, and B. N. Bonnett. 2007. "A Focus Group Study of Veterinarians' and Pet Owners' Perceptions of the Monetary Aspects of Veterinary Care." *Journal of the American Veterinary Medical Association* 231(10):1510–1518. doi: 10.2460/javma.231.10.1510.

Cox, J. C., D. Kreisman, and S. Dynarski. 2020. "Designed to Fail: Effects of the Default Option and Information Complexity on Student Loan Repayment?" *Journal of Public Economics* 192: 104298. doi: 10.1016/j.jpubeco.2020.104298.

Einav, L., A. Finkelstein, and A. Gupta. 2017. "Is American Pet Health Care (Also) Uniquely Inefficient?" *American Economic Review* 107(5):491–495. doi: 10.1257/aer.p20171087.

Frederick, S., N. Novemsky, J. Wang, R. Dhar, and S. Nowlis. 2009. "Opportunity Cost Neglect." *Journal of Consumer Research* 36(4):553–561. doi: 10.1086/599764.

Garfinkel, S. A., W. E. Schlenger, K. R. McLeroy, F. A. Bryan Jr, B. J. G. York, G. H. Dunteman, and A. S. Friedlob. 1986. "Choice of Payment Plan in the Medicare Capitation Demonstration." *Medical Care* 24(7):628–640. doi: 10.1097/00005650-198607000-00006.

Gates, M. C., J. Walker, S. Zito, and A. Dale. 2019. "Cross-Sectional Survey of Pet Ownership, Veterinary Service Utilisation, and Pet-Related Expenditures in New Zealand." *New Zealand Veterinary Journal* 67(6):306–314. doi: 10.1080/00480169.2019.1645626.

Geruso, M., and T. G. McGuire. 2016. "Tradeoffs in the Design of Health Plan Payment Systems: Fit, Power and Balance." *Journal of Health Economics* 47:1–19. doi: 10.1016/j.jhealeco.2016.01.007.

Gilly, M. C. 2008. "The Price of Peace in the Household: A Commentary on 'The Price of Unconditional Love: Consumer Decisions Concerning High-Dollar Veterinary Care'." *Journal of Business Research* 61(5):406–407. doi: 10.1016/j.jbusres.2007.04.012.

Grennan, M., and A. Swanson. 2020. "Transparency and Negotiated Prices: The Value of Information in Hospital-Supplier Bargaining." *Journal of Political Economy* 128(4):1234–1268. doi: 10.1086/705329.

Heckman, J. J. 1976. "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models." In S. Berg, ed., *Annals of Economic and Social Measurement,* Vol. 5(4). Cambridge, MA: National Bureau of Economic Research, 475–492.

Heinke, M. L., and J. B. McCarthy. 2012. *Practice Made Perfect: A Complete Guide to Veterinary Practice Management*. Lakewood, CO: American Animal Hospital Association Press.

Holbrook, M. B. 2008. "Pets and People: Companions in Commerce?" *Journal of Business Research* 61(5):546–552. doi: 10.1016/j.jbusres.2007.07.010.

Holbrook, M. B., and A. G. Woodside. 2008. "Animal Companions, Consumption Experiences, and the Marketing of Pets: Transcending Boundaries in the Animal–Human Distinction." doi: 10.1016/j.jbusres.2007.06.024.

Jarvenpaa, S. L. 1989. "The Effect of Task Demands and Graphical Format on Information Processing Strategies." *Management Science* 35(3):285–303. doi: 10.1287/mnsc.35.3.285.

Jenkinson, S. 1989. "Medical Credit Cards." *British Medical Journal* 299(6697):472. doi: 10.1136/bmj.299.6697.472.

Johnson, M. D., E. W. Anderson, and C. Fornell. 1995. "Rational and Adaptive Performance Expectations in a Customer Satisfaction Framework." *Journal of Consumer Research* 21(4):695–707. doi: 10.1086/209428.

Kamien, M. I., and N. L. Schwartz. 1973. "Payment Plans and the Efficient Delivery of Health Care Services." *Journal of Risk and Insurance* 40(3):427–436. doi: 10.2307/252228.

Knutson, B., G. W. Fong, S. M. Bennett, C. M. Adams, and D. Hommer. 2003. "A Region of Mesial Prefrontal Cortex Tracks Monetarily Rewarding Outcomes: Characterization with Rapid Event-Related fMRI." *Neuroimage* 18(2):263–272. doi: 10.1016/S1053-8119(02)00057-5.

Knutson, B., S. Rick, G. E. Wimmer, D. Prelec, and G. Loewenstein. 2007. "Neural Predictors of Purchases." *Neuron* 53(1):147–156. doi: 10.1016/j.neuron.2006.11.010.

Kogan, L. R., R. Schoenfeld-Tacher, and A. R. Viera. 2012. "The Internet and Health Information: Differences in Pet Owners Based on Age, Gender, and Education." *Journal of the Medical Library Association* 100(3):197–204. doi: 10.3163/1536-5050.100.3.010.

Kuhnen, C. M., and B. Knutson. 2005. "The Neural Basis of Financial Risk Taking." *Neuron* 47(5): 763–770. doi: 10.1016/j.neuron.2005.08.008.

Larkin, M. 2021, November 17. "Pet Population Still on the Rise, with Fewer Pets per Household." *JAVMA News*. Available online at https://avmajournals.avma.org/view/news/pet-population-still-on-the-rise-with-fewer-pets-per-household.xml.

Levy, S., N. Bagley, and R. Rajkumar. 2018. "Reform at Risk-Mandating Participation in Alternative Payment Plans?" *New England Journal of Medicine* 378(18):1663–1665. doi: 10.1056/NEJMp1800483.

Lieber, E. M. J. 2017. "Does It Pay to Know Prices in Health Care?" *American Economic Journal: Economic Policy* 9(1):154–79. doi: 10.1257/pol.20150124.

Lue, T. W., D. P. Pantenburg, and P. M. Crawford. 2008. "Impact of the Owner-Pet and Client-Veterinarian Bond on the Care that Pets Receive." *Journal of the American Veterinary Medical Association* 232(4):531–540. doi: 10.2460/javma.232.4.531.

Massenot, B. 2021. *Pain of Paying in Consumption-Saving Decisions*. Working Paper 3820097. SSRN. doi: 10.2139/ssrn.3820097.

McFadden, D., and K. Train. 2000. "Mixed MNL Models for Discrete Response." *Journal of Applied Econometrics* 15(5):447–470. doi: 10.1002/1099-1255(200009/10)15:5<447::AID-JAE570>3.0.CO;2-1.

Milburn, M. A., and A. B. McGrail. 1992. "The Dramatic Presentation of News and Its Effects on Cognitive Complexity." *Political Psychology* 13(4):613–632. doi: 10.2307/3791493.

Morewedge, C. K., L. Holtzman, and N. Epley. 2007. "Unfixed Resources: Perceived Costs, Consumption, and the Accessible Account Effect." *Journal of Consumer Research* 34(4): 459–467. doi: 10.1086/518540.

Neill, C. L., R. B. Holcomb, and B. W. Brorsen. 2017. "Starting on the Right Foot: Does School Choice Affect Veterinarian Starting Salaries?" *Journal of Agricultural and Applied Economics* 49(1):120–138. doi: 10.1017/aae.2016.28.

———. 2018. "Current Market Conditions for Veterinary Services in the US." *Applied Economics* 50(60):6501–6511. doi: 10.1080/00036846.2018.1489518.

Neill, C. L., R. B. Holcomb, K. C. Raper, and B. E. Whitacre. 2019. "Effects of Spatial Density on Veterinarian Income: Where Are All of the Veterinarians?" *Applied Economics* 51(14): 1532–1540. doi: 10.1080/00036846.2018.1527461.

Neill, C. L., A. T. Kakpo, and R. Mack. 2021. "The Role of Experience, Specialty Certification, and Practice Ownership in the Gender Wage Gap for Veterinarians in the United States." *Journal of the American Veterinary Medical Association* 258(6):591–600. doi: 10.2460/javma.258.6.591.

Porgo, M., J. K. Kuwornu, P. Zahonogo, J. B. D. Jatoe, and I. S. Egyir. 2018. "Credit Constraints and Cropland Allocation Decisions in Rural Burkina Faso." *Land Use Policy* 70:666–674. doi: 10.1016/j.landusepol.2017.10.053.

Prager, E. 2020. "Healthcare Demand under Simple Prices: Evidence from Tiered Hospital Networks." *American Economic Journal: Applied Economics* 12(4):196–223. doi: 10.1257/app.20180422.

Prelec, D., and G. Loewenstein. 1998. "The Red and the Black: Mental Accounting of Savings and Debt." *Marketing Science* 17(1):4–28. doi: 10.1287/mksc.17.1.4.

Raghubir, P., and J. Srivastava. 2008. "Monopoly Money: The Effect of Payment Coupling and Form on Spending Behavior." *Journal of Experimental Psychology: Applied* 14(3):213–225. doi: 10.1037/1076-898X.14.3.213.

Rick, S. I., C. E. Cryder, and G. Loewenstein. 2008. "Tightwads and Spendthrifts." *Journal of Consumer Research* 34(6):767–782. doi: 10.1086/523285.

Roodman, D. 2011. "Fitting Fully Observed Recursive Mixed-Process Models with CMP." *Stata Journal* 11(2):159–206. doi: 10.1177/1536867X1101100202.

Santoli, J. M., M. C. Lindley, M. B. DeSilva, E. O. Kharbanda, M. F. Daley, L. Galloway, J. Gee, M. Glover, B. Herring, Y. Kang, P. Lucas, C. Noblit, J. Tropper, T. Vogt, and E. Weintraub. 2020. "Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration-United States, 2020." *Morbidity and Mortality Weekly Report* 69(19):591–593. doi: 10.15585/mmwr.mm6919e2.

Schmid, C. P. R., K. Beck, and L. Kauer. 2018. "Health Plan Payment in Switzerland." In T. G. McGuire and R. C. van Kleef, eds., *Risk Adjustment, Risk Sharing and Premium Regulation in Health Insurance Markets: Theory and Practice,* Elsevier, 453–489. doi: 10.1016/B978-0-12-811325-7.00016-6.

Scott, R., J. Cayla, and B. Cova. 2017. "Selling Pain to the Saturated Self." *Journal of Consumer Research* 44(1):22–43. doi: 10.1093/jcr/ucw071.

Shah, A. M., N. Eisenkraft, J. R. Bettman, and T. L. Chartrand. 2016. "Paper or Plastic?: How We Pay Influences Post-Transaction Connection." *Journal of Consumer Research* 42(5):688–708. doi: 10.1093/jcr/ucv056.

Shavell, S. 1976. "Sharing Risks of Deferred Payment." *Journal of Political Economy* 84(1): 161–168. doi: 10.1086/260418.

Sheehan, D., and K. Van Ittersum. 2018. "In-Store Spending Dynamics: How Budgets Invert Relative-Spending Patterns." *Journal of Consumer Research* 45(1):49–67. doi: 10.1093/jcr/ucx125.

Siddiqi, A., P. B. White, J. B. Mistry, C. U. Gwam, J. Nace, M. A. Mont, and R. E. Delanois. 2017. "Effect of Bundled Payments and Health Care Reform as Alternative Payment Models in Total Joint Arthroplasty: A Clinical Review." *Journal of Arthroplasty* 32(8):2590–2597. doi: 10.1016/j.arth.2017.03.027.

Smith, D. M. 2002. "Pay and Productivity Differences between Male and Female Veterinarians." *ILR Review* 55(3):493–511. doi: 10.1177/001979390205500306.

Soster, R. L., A. D. Gershoff, and W. O. Bearden. 2014. "The Bottom Dollar Effect: The Influence of Spending to Zero on Pain of Payment and Satisfaction." *Journal of Consumer Research* 41(3): 656–677. doi: 10.1086/677223.

Staats, S., and K. Horner. 1999. "Allocating Time to People and Pets: Correlates with Income and Well-Being in a Midwest Community Sample." *Journal of Psychology* 133(5):541–552. doi: 10.1080/00223989909599761.

Stull, J. W., J. A. Shelby, B. N. Bonnett, G. Block, S. C. Budsberg, R. S. Dean, M. R. Dicks, B. W. Forsgren, G. C. Golab, J. A. Hamil, P. H. Kass, L. J. King, E. M. Lund, M. L. Maddux, J. M. McFarland, B. A. McKenzie, M. R. Moyer, P. N. Olson, and T. E. Wittum. 2018. "Barriers and Next Steps to Providing a Spectrum of Effective Health Care to Companion Animals." *Journal of the American Veterinary Medical Association* 253(11):1386–1389. doi: 10.2460/javma.253.11.1386.

Thomas, M., K. K. Desai, and S. Seenivasan. 2011. "How Credit Card Payments Increase Unhealthy Food Purchases: Visceral Regulation of Vices." *Journal of Consumer Research* 38(1): 126–139. doi: 10.1086/657331.

Yeung, K. L. 2014. *Exploring the Origin of Pain of Payment in Cash and Its Relevance to Computer Payment Interface*. PhD Dissertation. Iowa State University.

Zellermayer, O. 1996. *The Pain of Paying*. PhD Dissertation. Carnegie Mellon University.

Appendix: Framing Treatment

Example Question in the Treatment Group

Figure A1 shows an example of the choice experiment question in the treatment group. In the treatment, the payment plan is presented using daily cost.

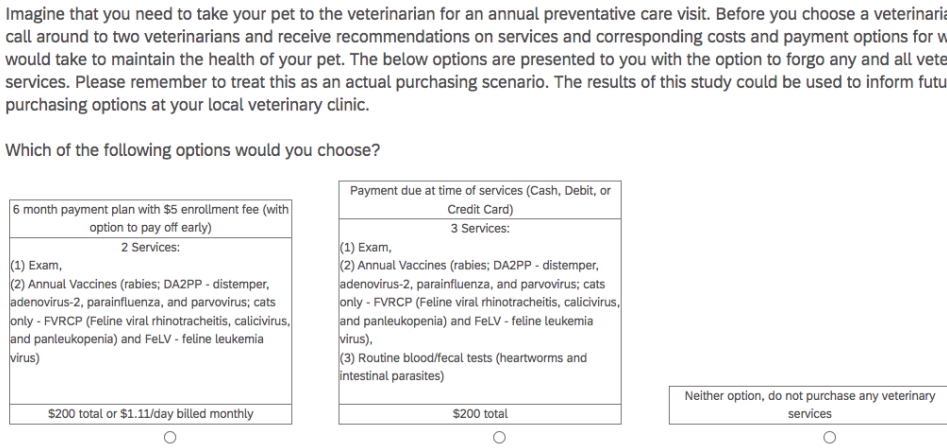

Figure A1. Example of Repeated Choice Question Presented to Participants (Treatment)

Demographic Characteristics of Baseline and Treatment Groups

Table A1 shows the balanced demographic information for the baseline and treatment groups.

Table A1. Balanced Demographic Characteristics between Control and Treatment Group

	Baseline (***N* = 548**)	**Framing Treatment** (***N* = 543**)	***p*-Values**
Age (median)	40–44	40–44	0.975
Gender			
Female	51.5%	50.5%	0.634
Male	47.8%	48.4%	
Household (mean)	2.8	2.8	0.654
Education			
Not a high school graduate	2.0%	2.6%	0.631
High school graduate or equivalent	20.4%	22.4%	
Some college or associate degree	31.6%	29.3%	
Bachelor's degree or higher	46.0%	45.7%	
Income (median)	$70,000–$79,999	$70,000–$79,999	0.287
No. of pets (mean)	2	2	0.543

Notes: The *p*-values are from two-sided Mann–Whitney *U*-Tests (age, household, income, no. of pets) and χ^2 tests (gender, education).

MLM Estimation Results of the Treatment Group

Table A2 shows the results of MLM estimation for the treatment group. The results are similar to the results of the baseline group. The utility of purchasing veterinary services increases with the number of services but decreases with the price. The effects of the payment plan decrease with income level.

Table A2. Mixed Logit Estimation Results for Payment Plan on Veterinary Service Purchase (treatment) (N = 17,919)

	Parameter Estimate	Standard Error	Statistic	$P > z$
Mean				
Price	−.0122	0.001	−19.09	0.000
2 Services	3.818	0.117	32.71	0.000
3 Services	4.422	0.123	35.99	0.000
4 Services	4.553	0.127	35.93	0.000
Payment Plan	0.349	0.125	2.79	0.005
Payment Plan × Inc	−0.058	0.018	−3.27	0.001
SD				
Price	0.012	0.001	20.53	0.000
2 Services	−0.660	0.092	−7.15	0.000
3 Services	−0.010	0.117	−0.09	0.930
4 Services	0.809	0.101	8.04	0.000
Payment Plan	1.271	0.080	15.93	0.000
Log-likelihood	−4, 741.734			

Treatment Effects

Table A3 shows the results of ordinary least squares (OLS) regressions for the effects of "daily charge information" treatment on the average purchase rate. The dependent variable is the average purchase rate of each subject over the 11 choice sets in our survey design. The independent variable is a dummy variable, "treatment": the baseline group is coded as 0, and the treatment group is coded as 1. We include results with control variables in the second column of Table A3. The significant negative coefficients of the independent variable suggest that presenting payment plans using daily charge reduces the purchase rate of veterinary services. One possible explanation is that the detailed daily charge information makes the choice set more complicated and requires more cognitive resources. Consumers prefer simpler information when they make purchases.

Table A3. OLS Regression of Treatment Effects (N = 1,091)

	Average Purchase Rate	Average Purchase Rate
Treatment	−0.043***	−0.044***
	(0.014)	(0.014)
Female vs. male		−0.011
		(0.016)
Age		−0.010***
		(0.002)
Education		0.008
		(0.005)
Income		0.005***
		(0.002)
Household size		0.017***
		(0.006)
Number of pets		0.003
		(0.005)
Constant	0.903***	0.847***
	(0.010)	(0.034)
Controls	No	Yes
Adjusted R^2	0.008	0.048

Notes: Dependent variable is the average purchase rate. Standard errors are in parentheses. Single, double, and triple asterisks indicate significance at the 10%, 5%, and 1% level, respectively.

Differential Effects of Payment Plans on Dog Owners and Cat Owners

Table A4. Mixed Logit Estimation Results for Payment Plan on Veterinary Service Purchase (dog owners vs. cat owners) (N = 12,408)

	Parameter Estimate	Standard Error	Statistic	$P > z$
Mean				
Price	−0.014	0.001	−15.54	0.000
2 services	4.285	0.160	26.83	0.000
3 services	5.249	0.175	30.08	0.000
4 services	5.383	0.176	35.57	0.000
Payment plan	0.248	0.145	1.70	0.088
Payment plan × dog owners	−0.095	0.178	−0.53	0.594
Standard Deviation				
Price	0.134	0.001	16.42	0.000
2 services	−0.702	0.117	−6.00	0.000
3 services	−0.072	0.213	−0.34	0.734
4 services	−0.768	0.130	−5.91	0.000
Payment plan	−1.221	0.101	−12.12	0.000
Log-likelihood	−3, 078.901			