

# Why Are People So Prone to Steal Software? The Effect of Cost Structure on Consumer Purchase and Payment Intentions

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*Intellectual property piracy is a significant global problem and an enormous problem for U.S. companies and policymakers. This article examines why typically law-abiding people are more inclined to steal intellectual property products than more tangible, material products. The authors propose that the inclination to pay for certain types of goods and services is greater than for other types, and what distinguishes the two classes is their cost structure. They document how consumers are more or less inclined to pay for goods and services as a function of whether the product's cost is principally attributable to variable cost (VC) or fixed cost (FC). The authors' central thesis is that consumers (1) believe that they cause less harm if their failure to pay prevents a seller from recovering FC than if their failure to pay helps a seller recoup VC; (2) are more likely to risk not paying for a product the less harm they perceive that not paying would cause; and (3) therefore feel less obligated and are less likely to pay voluntarily for a high-FC, low-VC product than for a high-VC, low-FC product, when total cost and average cost are held constant. This research is particularly relevant in the information age, because it helps explain why consumers appear to be more inclined to risk stealing software and other intellectual property products with relatively high FC and little or no VC. It also allows for the creation of marketing remedies that do not involve further legal enforcement.*

To promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

—U.S. Constitution, Article 1, Section 8, Clause 8

**T**he United States' founders placed such a high value on the preservation and protection of individual creativity that they not only gave Congress the power to grant authors and inventors exclusive property rights for their intellectual efforts but also enjoined Congress with the obligation to police and defend that monopoly. Over time, Congress has enacted increasingly more-restrictive copyright laws to protect the rights of content producers, leading up to the 1998 Digital Millennium Copyright Act (Pub. Law No. 105-304, 112 Stat. 2860), which outlaws most attempts to remove copy protection from books, music, videos, or other works.

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The free-market rationale for such potent protection of intellectual property is straightforward: Businesses will be more inclined to develop and produce these types of goods if they are assured the financial reward. The result has been that core U.S. copyright industries (e.g., filmmaking, television broadcasting, recording, publishing, software) produce the majority of the world's most popular movies, videos, music, books, software, and games. Yet advances in communication and information technologies (e.g., software applications, networking, digital formats for compression) have made counterfeiting cheap and easy, thereby siphoning off the rewards from such creative endeavors. Piracy in 56 countries of U.S. music, films, books, and other intellectual content cost U.S. firms approximately \$9.2 billion in 2002, according to a study by the International Intellectual Property Alliance (Legard 2003).

Although in the generic sense "piracy" refers to any type of illegitimate copying, we consider two different types of piracy. The first occurs when someone makes it his or her business to copy and sell another person's intellectual product, such as a program or an audio or video recording. Public policy remedies typically attempt to stop this from occurring through various legal means (e.g., laws, enforcement, penalties, international agreements for prosecution). Our article is not about this. The second type of piracy occurs when someone duplicates or purchases intellectual property strictly for personal use. Otherwise honest citizens have been found to constitute a significant market for stolen intellectual property (Cromwell, Olson, and Avary 1993). Henry (1978, p. 12), who studied property crimes committed by ordinary people, observed that taking and using stolen intellectual property is an "everyday feature of ordinary people's

lives.” Such transgressions at the individual level have profound consequences when they become a mass phenomenon, such that in 1997, President Clinton signed the No Electronic Theft Act (17 U.S.C. § 101), which makes sharing software with friends or family members (even when there is no profit involved) a federal felony.

## The Effect of Cost Structure

What is it that makes someone who would never consider departing a restaurant without leaving a tip or keeping a package they received inadvertently decide to risk the legal and other potential negative repercussions of duplicating software and music without paying? We propose that the inclination to pay for certain types of goods and services is greater than for others, and what distinguishes the two classes is their cost structure. We use the term “cost structure” to describe the composition of a product’s cost; that is, whether it principally comprises fixed costs (FCs) or variable costs (VCs). The FCs are the upfront costs, which include capital expenditures such as research and development, buildings, and equipment. These costs typically do not vary with the number of units produced. The VCs are the costs ascribed to producing a single unit of the product above and beyond the FC; they typically include such things as raw materials, packaging, and direct labor.

Our central thesis is that consumers believe that they are less obligated and thus are less likely to pay voluntarily for a high-FC, low-VC product (e.g., software) than for a high-VC, low-FC product (e.g., jewelry), when total cost and average cost (AC) are held constant. Our reasoning is as follows: First, the less harm that consumers believe the seller would incur from their failure to pay, the less likely they are to pay for a product. In general, consumers consider reciprocity and equity in any exchange, including purchases (Bagozzi 1975). The amount that people believe they are obliged to pay is affected by what they perceive as the gain-loss ratio of both exchange partners (i.e., buyer and seller) and their efforts to achieve equity in the exchange (Walster, Walster, and Berscheid 1978). If consumers believe that they are paying less than what the seller has expended, they will believe that they are harming the vendor by causing him or her to incur a loss. In this way, the risk of guilty feelings or the potential emotional repercussions of not paying often outweigh the other uncertainties associated with purchase. Therefore, considerations of responsibility and evenhandedness mediate the effect of cost structure on payment intentions.

Second, consumers believe that they bring about less harm when their failure to pay prevents a seller from recovering FCs than when it prevents a seller from recouping

VCs. This is partly because a product’s FC is not easily attributable to individual consumption, and consumers are prone to perceive amounts paid in excess of VC as a *gain* to the seller. Conversely, consumers would perceive failure to cover the seller’s VC as inflicting a *loss* on the seller. According to prospect theory (Kahneman and Tversky 1979), foregone gains and losses are evaluated differently. A loss of a particular magnitude has a larger negative utility than a foregone gain of the same magnitude (Kahneman and Tversky 1984; Tversky and Kahneman 1981). In other words, consumers perceive the chance of inflicting harm as greater when they fail to contribute to VC (a loss) than when they fail to contribute to FC (a foregone gain).<sup>1</sup> Consequently, all else being equal, consumers are less inclined to pay for products with a relatively large FC component and a small VC component than vice versa. In this way, payment and purchase intentions often depend on a product’s perceived cost structure. This hypothesized relationship is shown in Figure 1.

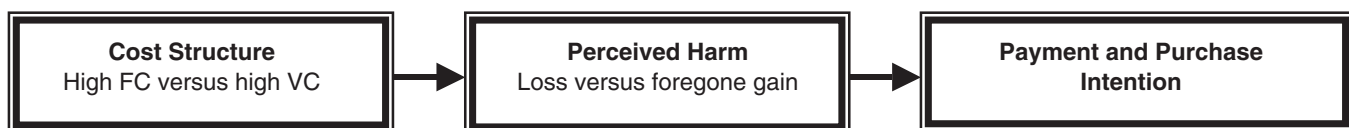
To date, despite that cost-plus pricing is routine at many firms (Cyert and March 1963; Levy and Weitz 1998), little work has explored how consumers perceive costs, much less how inferences about costs can influence price perceptions and buyer behavior.<sup>2</sup> When judging the appropriateness of current prices, the existing research in marketing typically assumes that consumers rely on previous or current shelf prices in a category (Briesch et al. 1997; Rajendran and Tellis 1994) and, in turn, use current prices to forecast future prices (Jacobson and Obermiller 1990). Other research (e.g., Kalwani et al. 1990; Nunes and Boatwright, in press; Winer 1986) has documented the effect of contextual factors (e.g., prices of unrelated, alternative products; a brand’s market share and frequency of promotion; various store characteristics) on price perceptions and willingness to pay. This is the first research we know of to examine the effect of perceived costs, and particularly cost structure, on buyer behavior.

Software is an example of a product that possesses a cost structure with a relatively low VC and a high FC. The same is true for a music compact disc (CD) that sells for \$15.99 or more and often has a VC of less than \$1 but includes promotional expenses and other FCs that are quite high. Likewise, an author may be paid millions of dollars to write a book that costs pennies to print, and medicine that costs lit-

<sup>1</sup>As described by prospect theory, how people perceive change relative to a reference point typically involves losses or foregone gains incurred by the decision maker, not by a third party. We assume that consumers are also subject to framing effects for outcomes that occur to others (e.g., failure to pay the firm can be subject to framing effects).

<sup>2</sup>In cost-plus pricing, also called “markup pricing,” the seller adds a standard markup to the product’s cost.

**Figure 1. The Mediating Effect of Perceived Harm on Payment Intentions**



tle to manufacture per pill usually involves extensive investments in research and development as well as sales support and marketing. According to the Harvard doctor Lester Grinspoon (Alter 1999), research and development for each new drug can cost upward of \$300 million, yet only approximately one in five drugs ever make it to market. Many other products, such as board games, fashion apparel, and luxury items (e.g., perfume), have relatively low per-unit costs but high FCs. Most service businesses (e.g., telecommunications, hotels, banks, car washes) have relatively low VCs and high FCs (Guiltinan 1987). Now consider the relatively high VCs and low FCs associated with customized or unique goods or services that require intense amounts of labor, such as handcrafted furniture, commissioned artwork, and automobile restoration. Products such as jewelry, quality leather goods, computers, and a host of packaged goods for which expensive materials make up the bulk of the cost have relatively high VCs compared with their FCs.<sup>3</sup>

However, from the perspective of the manufacturer or seller, cost is cost, be it fixed or variable. As are VCs, FCs are the cost of doing business and must be recouped for profits to be made. A product's AC includes the VC and an amortized portion of the FC, and it is the minimum amount that needs to be charged to the consumer in order not to lose money. Any firm that prices below AC cannot stay in business in the long run (Tellis 1986). However, as our research points out, consumers do not always perceive costs this way, which effectively reduces a product's perceived cost from its AC toward its VCs, and they avoid responsibility for helping a firm recover its FCs.

It is not that consumers are entirely insensitive to FCs and unwilling to pay higher prices to sellers with sizable startup costs or overhead. Consider Thaler's (1985, 1995) notion of transaction utility, which is illustrated in the now-classic beer-on-the-beach scenario. In Thaler's experiment, respondents stated a higher willingness to pay or reservation price for a beer when it came from a fancy hotel than when it came from a rundown grocer, despite that the consumption experience would be identical and there was no chance for negotiation. This example is cited frequently to illustrate the effect of a reference price on willingness to pay, because beer typically is perceived as higher priced at hotels than at grocery stores. Intuition suggests that fancy hotels have higher FCs, but in Thaler's experiments, respondents never described what influenced their reservation price. Consumers can be more or less sensitive to either type of cost, particularly when one is especially salient, as FCs are in Thaler's example. We argue that, *ceteris paribus*, buyers are

more sensitive to and believe that they are more personally responsible for compensating the seller for VCs than for FCs. The subsequent studies support our thesis.

## Overview

The rest of the article is organized as follows: Study 1 consists of two parts that are exploratory in nature and use a within-subjects design. Study 1 tests our prediction that consumers indeed are more likely to perceive a failure to pay for a product with a relatively high VC as inflicting a loss, whereas a failure to pay for a product with a relatively high FC is more likely to be perceived as causing the seller to forgo a gain. Consistent with prospect theory, respondents consider failing to pay for a product more harmful when the VCs are high (loss) and less harmful when the FCs are high (foregone gain), and therefore they report being both less likely to evade payment when VCs are high and FCs are low and more likely to avoid paying when VCs are low and FCs are high.

Although participants compare different cost-structure scenarios directly in Study 1, in Study 2 we test the effect of cost structure on payment intentions using a between-subjects design. In addition, rather than vary the VCs and FCs, we simply reframe costs as either entirely FC or VC and hold AC constant. In this way, we demonstrate the robustness of the effect while illustrating a practical aspect of this research: Firms can often reframe costs to consumers in an effort to make them believe they are more accountable. Study 2 also provides significant evidence of the mediating effect on consumers' payment intention of the harm they believe they would inflict by not paying.

Finally, in Study 3, we illustrate how decreasing the perceived VC in the mind of the consumer can lead to a decrease in the harm that consumers believe they would cause a seller by taking and not paying for a product. For half of the participants, we made conspicuous the ability to produce infinite quantities of a program at no cost by allowing them to download the software themselves. For the other half, we handed them a disk preloaded with the same software. Respondents who downloaded the program viewed not paying for the product they kept as inflicting less harm and were less likely to pay (real money) than were respondents who received a preloaded disk.

It appears that by simply changing the way it distributes software, a firm can alter consumers' perceptions of the harm associated with failure to pay for the program and thus their payment intentions. Thus, our psychological explanation for intellectual property theft leads to prescriptions for how such behavior might be minimized by means of novel marketing (i.e., economic and psychological) rather than further legislation and stricter enforcement. We conclude by discussing some of the limitations of our work as well as avenues for further research. We also discuss the implications for marketing managers and offer some suggestions for changing consumers' perceptions and behavior toward relatively low-VC, high-FC products.

Throughout the article, we use the term "payment intention" to describe the price a consumer would willingly pay for a product if he or she was not obligated to pay anything. Payment intention is conceptually different from willing-

<sup>3</sup>As a reviewer pointed out, a key difference between software and more tangible goods such as jewelry may be the counterfactual created in the mind of the consumer. A consumer might believe that he or she would not buy the software if he or she needed to pay for it. Therefore, some consumers perceive taking a piece of jewelry as precluding the seller from selling the jewelry to someone else (a loss), whereas they perceive taking the software as depriving the seller of the sale neither to someone else nor to the person who takes the software (neither a loss nor a foregone gain). Thus, we carefully control for this in our experiments. There are many consumers who take software they would have otherwise bought, which is the focus of this work.

ness to pay; the latter typically refers to the notion of reservation price, or the most a consumer would pay. A consumer may be willing to pay more but may not intend or offer to do so. Payment intention is meant to capture what consumers would freely offer to pay, not necessarily the most they would pay. Ultimately, if we can affect what people believe is appropriate to pay for intellectual property, this work may present a more effective method of ensuring compliance than additional legal recourse. Although our proposed explanation certainly does not wholly account for all such behavior, it appears to be a major contributing factor.

## Study 1

In Study 1, we explore how different cost structures lead consumers to make vastly different inferences about their ability to harm sellers by depriving them of their due. This study tests the contingent relationship between cost structure and perceived harm inflicted (i.e., the perception of having taken something from someone, including the ability to sell that something to another person). It also examines the relationship between the perceived harm to the seller and the consumer's intention to pay (or not to pay). Study 1's primary purpose is to confirm our prediction that consumers perceive not paying for something with a high VC as inflicting greater harm to a seller than failure to pay for something with a high FC; therefore, all else being equal, consumers are more apt to pay when the VC is high.

## Method

Study 1 comprises two parts, each of which includes a separate scenario-based questionnaire. Participants in the first part of Study 1 were 128 undergraduate business students enrolled in an introductory marketing course at a major West Coast university. Participants in the second part of Study 1 were 119 students from the same pool of students but who had not participated in Part 1. Throughout the study, we openly provided all the cost information to prevent respondents from drawing their own idiosyncratic conclusions about costs. We told participants the FC, VC, and total expected number of users, from which they could easily derive the AC.

In Part 1, the scenario instructed respondents to imagine they were in need of a certain product (e.g., software) that they could use without paying (e.g., shareware). Participants read the following statement:

You are learning Russian and need a word-processing program that includes the Cyrillic alphabet called RussianStar. You search the Internet and find that the program can be downloaded from the Web site of a software vendor. When you are about to download the program, you see the following message: "If you download this software, we ask that you register your copy for \$75."

The message includes information on how to pay the vendor. However, a friend has told you that you can actually download the program and use it forever without paying the \$75.

You remember reading in a computer magazine that about 10,000 copies of RussianStar are expected to be downloaded from this Web site. You've also learned about the costs of the

program to the software vendor. Consider the two alternative scenarios below.

Respondents then read both a high-FC/low-VC scenario and a high-VC/low-FC scenario. In both cases, the total cost (\$610,000) and AC (\$61) to the provider of the software they required was identical.<sup>4</sup>

Scenario A: The software vendor paid the original programmers of RussianStar an initial royalty of \$600,000. That was a one-time lump-sum payment that would not change no matter how many copies of the program are downloaded. In addition, for every copy of the program downloaded, the software vendor has to pay the original RussianStar programmers an additional royalty of \$1.

Scenario B: The software vendor paid the original programmers of RussianStar an initial royalty of \$10,000. That was a one-time lump-sum payment that would not change no matter how many copies of the program are downloaded. In addition, for every copy of the program downloaded, the software vendor has to pay the original RussianStar programmers an additional royalty of \$60.

Note that in Scenario A, the product has a high FC and a low VC; in Scenario B, the opposite is true. Each respondent was asked the following four questions:

- For this question, focus on Scenario A only. Suppose you have downloaded the program without paying the \$75 in Scenario A. Which of the following is the more accurate description of the effect of your behavior on the vendor?
  - My behavior would cause the vendor to forgo the opportunity to gain \$75.
  - My behavior would cause the vendor to lose \$75.
- For this question, focus on Scenario B only. Suppose you have downloaded the program without paying the \$75 in Scenario B. Which of the following is the more accurate description of the effect of your behavior on the vendor?
  - My behavior would cause the vendor to forgo the opportunity to gain \$75.
  - My behavior would cause the vendor to lose \$75.
- In which scenario would you do a greater harm to the vendor if you downloaded the program without paying the \$75? Please circle your response.
 

Scenario A	Scenario B
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- In which scenario are you more likely to download the program without paying the \$75, which the vendor asks for? Please circle your response.
 

Scenario A	Scenario B
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The scenarios were rotated, and the question order was counterbalanced. On the basis of our principal hypothesis, we made the following predictions for this study: In the high-FC scenario (A), participants are more likely to perceive a failure to pay as a foregone gain to the vendor rather than a loss, and in the high-VC scenario (B), participants are more likely to perceive a failure to pay as a loss to the vendor. Therefore, in accordance with prospect theory, participants would believe that they would cause less harm to the

<sup>4</sup>In our calculation of AC, we implicitly assume that all people who download will pay. Violations of this assumption make the AC higher in the high-FC/low-VC condition. We also assume that people can and will divide the FC by the number of users.

vendor in the high-FC scenario (A) than in the high-VC scenario (B); thus, they would be more likely to download the program without paying in Scenario A than in Scenario B. The data were coded using dummy variables such that if a participant responded as we predicted, the response was coded as 1; otherwise it was coded as 0. Similarly, respondents who stated that they would cause more harm and were more likely to evade payment in the high-VC scenario were coded as 1.

In Part 2 of Study 1, we use the fundamental design of Part 1 in a different context and employ a more conservative method of arriving at VCs and FCs. In Part 2, the cost sustained by the seller is actually higher in the high-FC scenario (A) than in the high-VC scenario (B). Yet, in both scenarios, the seller expects the participant to pay the same amount. If respondents were sympathetic to the seller's expenses, regardless of their origin, they should be more willing to pay in the high-FC scenario, in which the total costs and AC are actually higher than in the high-VC scenario. Our cost structure hypothesis predicts the opposite result. In Part 2, each participant read the following:

It is 8:01 P.M. now. A popular singer invited by the student association of your university has just started a concert in a big lecture hall. There are roughly 100 students in there. Every person who attends the concert is supposed to pay the student association \$15 at the gate. You are interested in attending the concert but don't have any cash on you. Because the concert has already started and it is unlikely that more people will show up, the person who collected money at the door has just left. So, you can safely enter the lecture hall without paying the \$15 and nobody will ever catch you.

They then read two alternative cost-structure scenarios that manipulated the cost structure by the way the student association paid the singer.

Scenario A: The student association will pay the singer a lump sum of \$2,000. The singer will not charge the student association any more or less than that amount no matter how many people enter the lecture hall and attend the concert.

Scenario B: An automatic counter at the door (as in supermarkets) counts the number of people who enter the lecture hall to attend the concert. For every single person who enters, the singer will charge the student association \$15.

Participants were then asked in which scenario they would be more likely to enter the lecture hall without paying, in addition to being asked questions about framing and perceived harm as in Part 1. Note that there was only an FC, not a VC in Scenario A, and there was only a VC, not an FC in Scenario B. The product (a concert) was identical in both scenarios. What differed was only how the student association was billed: strictly in terms of either VC (\$15 per student) or FC (a lump sum of \$2,000). The actual cost the student association needed to sustain, both in total and per attendee (AC), was higher in Scenario A, in which the student association paid \$2,000. If the respondent were to enter, there would be 101 people in the audience, which implies that the student association would pay roughly \$19.80 per head. In Scenario B, the student association pays \$15 per student, or \$1,515 for 101 attendees. In either scenario, the student association expects that the participant

pays only \$15. If asking price (\$15) were all that mattered, there would be no difference between the scenarios. If AC were all that mattered, respondents should be more inclined to pay in Scenario A. However, if our hypothesis is correct, participants should be more inclined to pay when the VC is relatively high, as it is in Scenario B.

## Results and Discussion

There were no significant effects based on the order of the questions, so we combined the data in each part and analyzed them as such. The percentage of respondents choosing each option is summarized in Table 1. As we expected, when the primary cost of the RussianStar software was described as its initial investment (FC), the vast majority of respondents perceived a failure to pay as either a foregone gain to the vendor or lost profits. Similarly, when the primary cost of the software was described as a sizable royalty (VC), a significant majority of the respondents perceived a failure to pay as a loss to the vendor. Also as we predicted, and in conformance with prospect theory, respondents who perceived a failure to pay in the high-VC scenario as a loss also believed that it would cause more harm ( $\chi^2 = 55.97, p < .001$ ) and were less likely to download the software without paying ( $\chi^2 = 55.97, p < .001$ ). In addition, respondents who perceived a failure to pay in the high-VC scenario as a loss were also highly likely to perceive failure to pay in the high-FC scenario as a foregone gain ( $\chi^2 = 54.00, p < .001$ ).

**Table 1. Study 1: Percentage of Respondents Choosing Each Option**

Part 1 (N = 128)	Foregone	
	Gain	Loss
1. In the high-FC scenario, failure to pay is perceived as a...	66% <sup>a</sup>	34%
2. In the high-VC scenario, failure to pay is perceived as a...	34% <sup>a</sup>	66%
	Scenario A (High-FC)	Scenario B (High-VC)
3. Failure to pay would do more harm in...	30% <sup>a</sup>	70%
4. More likely to evade payment in...	68% <sup>a</sup>	32%
Part 2 (N = 119)	Foregone	
	Gain	Loss
1. In the high-FC scenario, failure to pay is perceived as a...	89% <sup>a</sup>	11%
2. In the high-VC scenario, failure to pay is perceived as a...	12% <sup>a</sup>	88%
	Scenario A (High-FC)	Scenario B (High-VC)
3. Failure to pay would do more harm in...	17% <sup>a</sup>	83%
4. More likely to evade payment in...	86% <sup>a</sup>	14%

<sup>a</sup>Percentage is significantly different from 50% at the  $p < .01$  level.

In Part 2, the general results supported our predictions again (see Table 1), replicating the principal findings of Part 1 and providing stronger support in two ways. First, the choice proportions in the direction of our prediction were even larger. Second, the preference for the high-VC option needed to overcome a total-cost advantage of the high-FC option. Again, respondents who perceived a failure to pay in the high-VC scenario as a loss also believed that it would cause more harm ( $\chi^2 = 24.05, p < .001$ ) and were less likely to enter the theater without paying ( $\chi^2 = 39.18, p < .001$ ). Again, respondents who perceived a failure to pay in the high-VC scenario as a loss were likely to perceive a failure to pay in the high-FC as a foregone gain ( $\chi^2 = 42.23, p < .001$ ).

Taken together, the results from Parts 1 and 2 of Study 1 show that when the total cost (and therefore AC) of a product is held constant, cost structure has a significant impact on the harm consumers believe that not paying would inflict and on their intentions to pay. It seems clear that people view costs differently depending on whether they are directly and explicitly associated with individual-level consumption (VC) or are part of what can be construed as the cost (FC) of doing business. It also appears that people perceive failure to pay VC as inflicting more harm and thus are more likely to pay the costs that they associate with the specific unit they use or possess. Although Study 1 confirms our predictions, because of our reliance on discrete measures (i.e., in which scenario is a consumer more likely to download a program), we were not able to test effectively or directly for the mediating effect of perceived harm. However, we do so in Study 2, in which we also test our thesis more conclusively using continuous measures and a between-subjects design.

## Study 2

In Study 1, both cost-structure scenarios were given to the same participants. This draws attention to the difference in cost structure and may result in demand effects. In Study 2, we wanted to determine whether we would obtain the same effect of cost structure with a between-subjects manipulation. Moreover, the cost-structure manipulation in Study 2 is far more subtle than that in Study 1. In Study 2, we merely reframe costs: In one case, we describe the seller as charging an intermediary for something tailored to the individual consumer and thus as more VC-like; in the other case, the seller charges a set fee, and thus the same cost is more FC-like. In addition, in Study 2, our dependent variable is a direct measure of payment intentions for a product and service bundle.

## Method

Participants in this study were 200 undergraduate students from a large West Coast university. Respondents were asked to imagine the following:

A few weeks ago, a student organization at your university invited a Chinese chess player to give a lecture on how to play Chinese chess. One hundred people, which includes you, attended the talk. The talk lasted one hour, and at the end the speaker gave each attendee a Chinese chess set. The student organization did not charge attendees anything on the day of the talk, but now hopes that attendees will pay retroactively. The

organization does not specify the amount of payment but asks each attendee to pay the amount they deem appropriate.

It was explained to respondents that *Xiangqi*, or Chinese chess, should not be confused with Chinese checkers and it is not the same as Western-style chess, though the two are similar in many respects.<sup>5</sup> We achieved the cost-structure manipulation by varying how the chess player charged the student organization. Half of the participants (in the high-FC condition) were told the following:

The speaker charged the student organization \$1,000 for his talk but did not charge them anything for the Chinese chess sets.

The other half of respondents (in the high-VC condition) were told the following:

The speaker did not charge the student organization anything for his talk but charged them \$10 for each of the 100 Chinese chess sets.

We hypothesized that respondents would perceive the total cost of the chess sets as more dependent on individual attendees and thus more similar to a VC. In contrast, the talk would be delivered regardless of how many people attended, and thus respondents would perceive its cost as more similar to an FC. In other words, the cost-structure manipulation in Study 2 is essentially a framing manipulation; that is, whether the cost is allocated to the individual attendees through the charge for the chess sets or to the group as a whole. Both groups of participants were then asked the following:

You attended the talk and received a Chinese chess set from the speaker. How much would you pay if you could pay anything you desire and your payment was anonymous?

Respondents were given four discrete choices: \$0, \$5, \$10, and “more than \$10,” and they were asked to circle the choice that most approximated what they would be willing to pay. They were then asked to specify the exact amount they would pay as well as what they believed the average student would pay. We predicted that respondents in the FC condition (in which the speaker charged for the talk) would be less likely to pay or would pay less than respondents in the VC condition (in which the speaker charged for the chess sets).

Finally, participants were asked to indicate on a seven-point scale the loss (1 = “no loss” and 7 = “a significant loss”) that they believed they would inflict on the student organization if they failed to pay anything at all. They also indicated the extent to which failure to pay would deprive the organization of its due for arranging the speaker (1 = “to a great extent” and 7 = “not at all”). We reverse-scored the second item and averaged the two items for a reliable scale of perceived harm ( $r = .84, p < .001$ ). We expected that respondents in the high-VC condition would believe that they would inflict a greater loss and deprive the seller to a greater extent. In addition, we collected individual difference measures of age and sex.

<sup>5</sup>Although Chinese chess has a rook, a king, a pawn, and a bishop, each of which occupies the same place on the board and has the same movement as in Western-style chess, differences in pieces include a river, a cannon, and a knight that cannot jump, and pieces are placed on points rather than squares.

## Results and Discussion

The percentage of respondents in each condition that chose each payment option and the average amount they would be willing to pay if they could name their price are summarized in Table 2. As we predicted, on average, respondents in the FC condition chose to pay lesser amounts than did respondents in the VC condition ( $\chi^2 = 19.72, p < .001$ ). Note that the percentage of people not willing to pay anything (\$0) was more than five times as large in the FC condition (55%) than in the VC condition (10%), and the percentage of respondents willing to spend \$10 and more than \$10 (i.e., the two choice options combined) was four times as large in the high-VC condition (84%) than in the high-FC condition (20%).

We included the specific amount that respondents said they intended to pay in a general linear model analysis, which included the cost frame (high FC or high VC) as well as the covariates of sex and age as independent variables. Neither of the individual characteristics was significant, so we dropped them from the analysis. The model confirmed the results from our discrete measures (see Table 2). In a comparison of the average amount that respondents would pay without being compelled, we determined that they would pay significantly more in the high-VC condition ( $\mu_{VC} = \$6.54$ ) than in the high-FC condition ( $\mu_{FC} = \$4.85, F_{1, 99} = 1.94, p < .05$ ). We were not surprised that participants believed that they would pay more than others who attended the presentation ( $\mu_{Self} = \$5.70, \mu_{Others} = \$3.67, F_{1, 199} = 1.87, p < .01$ ).<sup>6</sup> This difference suggests that respondents were not depending on other attendees to cover any shortfall that their own failure to pay might create, in general, because they believed that they would pay more than others would. Nevertheless, the amount that they believed others would pay was highly correlated with what they said they would pay themselves ( $r = .80$ ).

Finally, in a comparison of the harm that respondents reported they would cause if they failed to pay, we deter-

mined that the respondents in the high-VC condition believe that they would inflict a greater loss ( $\mu_{VC} = 4.02, \mu_{FC} = 3.51, t_{198} = -2.18, p < .05$ ) and deprive the seller to a greater extent ( $\mu_{VC} = 4.63, \mu_{FC} = 3.62, t_{198} = -2.43, p < .01$ ). We added the combined measure of perceived harm to the analysis.

Using the methodology recommended by Baron and Kenny (1986), we tested whether perceived harm mediated the impact that perceived cost structure had on payment intention. As is shown in Figure 2, a simple regression model showed that perceived cost had a significant impact on the amount that consumers intended to pay. A separate simple regression model confirmed that perceived cost structure significantly affected perceived harm. In turn, perceived harm significantly predicted payment intentions. In a multiple regression model, the predictive power of perceived harm on payment intentions remained high, and the predictive power of cost structure on payment intentions dropped substantially (to the point of being not significant), thereby implying that perceived harm acted as a mediating variable. We further tested whether perceived harm carried the influence of cost structure to payment intention using the Goodman (I) test that Baron and Kenny (1986) discuss. We found the indirect effect to be statistically significant ( $z\text{-value} = 2.30, p < .03$ ).

In Study 2, the student organization spent \$1,000 for 100 attendees in both conditions, and it should be irrelevant whether that money covered the cost of the talk or the cost of the chess sets. Either way, respondents received both: They sat in on the talk and received a Chinese chess set. However, respondents were willing to pay 35% more to the student organization when the speaker was paid for the sets than they were when he was paid for the talk. This study also demonstrates that failure to pay for a high-VC good is perceived as inflicting greater harm to the provider, even if the total cost and AC are the same. Again, there appears to be a sense that consumers should cover the cost that can be ascribed to their individual consumption.

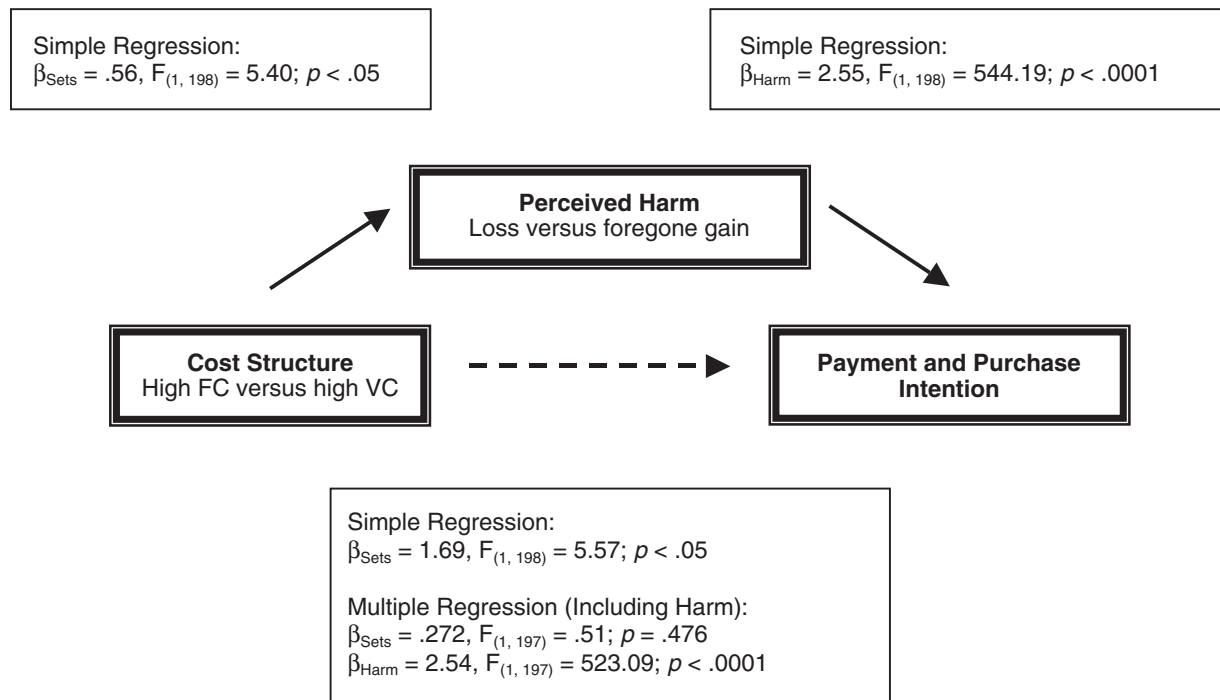
It is possible that for some goods respondents assume that the firm can recoup FCs by selling the assets or through tax savings by depreciating their assets and other investments that are considered FCs. However, in our scenario, the FC is a service fee that already has been paid to the speaker. There

<sup>6</sup>The effect was similar for respondents' reports of what they themselves would pay or what they expected the average student would pay. The difference between conditions (high-VC versus high-FC) statistically was not significantly different ( $F = 2.55, p = .111$ ) for the two judgments.

**Table 2. Study 2: Intended Payments for Chinese Chess Speaker/Sets**

Amount	High-FC (Talk)	High-VC (Sets)	Combined
\$0	55%	10%	32%
\$5	25%	6%	16%
\$10	18%	48%	33%
>\$10	2%	36%	19%
	100%	100%	100%
Average self	\$4.85	\$6.54	\$5.70
Average others	\$3.27	\$4.07	\$3.67
Significant loss	3.51	4.02	3.77
Deprive others	3.62	4.23	3.93
Combined	3.57	4.13	3.85

Notes: N = 100. We reverse-coded deprivation: 7 = "a significant loss" and deprived seller "to a great extent."

**Figure 2. Study 2: Mediation Analysis**

is nothing left to sell or depreciate. When several respondents in the high-FC condition were informally queried, they suggested that the speaker's fee was not something for which they believed they were responsible. This attitude may be a remnant of a more general philosophy that a person should pay for what he or she takes and that there is a cost to the firm (or student organization) of doing business, which presumably is an FC. It is possible that respondents in the high-FC condition believed that other people were more responsible for covering the speaker's fee. If so, they did not expect their cohorts to live up to their responsibility; as they predicted, others would pay even less than they did.

### Study 3

We designed Study 3 to add further realism to our experiments by allowing participants to express their intent to pay with real money, which would otherwise stay in their wallets. In Study 3, instead of manipulating the cost structure of a product and communicating the costs directly, we manipulated peoples' perceptions of the cost structure by making it especially salient to half of the participants that the VC associated with the product is essentially \$0. We reasoned that if people copy a computer file themselves, it is transparent that the VC of what they receive is \$0. However, if people receive a premade disk, they are more likely to amortize the FC of the program spontaneously into their copy and perceive the seller's cost as higher. Therefore, the latter group is more likely to perceive a failure to pay for the good as depriving the seller of something or as inflicting harm; consequently, this group would be both more willing to pay and willing to pay more than the group that downloaded the program. Study 3 should be of particular interest to sellers

of information goods and digital products, especially those that sell their wares over the Internet, because it illustrates how channels of distribution can influence buyers' inferences about cost and thus payment intentions.

### Method

Respondents were 140 undergraduate business students from a major West Coast university who were compensated to participate in this and several other studies. Students arrived in groups of 20 to 40 at a computer lab at preassigned times. They then completed a series of paper-and-pencil tasks as well as another computer-based study before Study 3 began. At the conclusion of the tasks, participants received an envelope with \$6 in promised compensation: three \$1 bills, eight quarters, five dimes, and ten nickels.

They were also told that they would receive a copy of a computer game (called "Five") created by a programmer who was not the experimenter and who had invested \$500 worth of time developing the software, which would be given as a premium to research participants. It was explained that 100 people would participate in the experiment and that each would receive the game as well as the promised compensation. Participants were shown how the game was played on a video screen in the front of the room, and they were given the opportunity to try the game themselves on the computer terminal in front of them.

At the end of Study 3, half of all participants (70) were given a blank disk and instructed to download the game onto the disk. The other half were given a disk with the game already on it and were told that the experimenter (not the programmer) had already copied the game onto the disk. Entire groups of respondents either downloaded the soft-



ware or received a disk (i.e., neither occurred simultaneously). In this way, the ability to create endless copies of the game (i.e., a VC of \$0) was made especially salient to participants who downloaded the program.

Participants were told that if they wanted, they could put some money into a second envelope that was provided, which would go entirely to the programmer as compensation for the game. It was made explicit that all the funds they provided would go to the programmer (and not the experimenter), such that participants would not be compelled to compensate the experimenter for downloading the software onto the disk on their behalf. They were also told that they were not obligated to pay and that they should take the game regardless of how much they chose to pay or not to pay.

Because all the participants had previously agreed to participate in a follow-up e-mail study, each received a series of questions one week later. Participants were asked to recall how much they had paid, if they had paid anything. They were also provided a series of statements with which they were to either agree or disagree, and they indicated the extent of their agreement on a seven-point scale, where 7 indicated complete agreement. First, participants were asked whether people who had not paid the full AC of \$5 had deprived the programmer of anything. Because no participant had paid close to that amount (the maximum was \$1.10), participants were actually describing their own behavior in their responses.

Second, participants were asked whether they believed that failure to pay the \$5 AC had caused the programmer to incur a loss. They were also asked whether failure to pay made the programmer worse off and whether participants who kept the disk without paying the full amount had "taken" anything from the programmer. Again, recall that no respondent paid close to \$5, and every respondent took home a disk. They were also asked to assess the quality of the game on a seven-point scale, where 7 = "superior" and 1 = "inferior."

We hypothesized a priori that respondents who downloaded the game themselves would be less likely to believe that they were depriving the programmer of anything. Conversely, we expected that respondents who received a disk with the game already on it would believe that they were more obligated to pay and would pay more. Members of this group had not copied the program themselves, and it would be less evident how the variable cost involved in providing an additional copy was essentially zero (i.e., the price of a blank disk).

## Results and Discussion

First and foremost, many more participants chose not to pay the programmer anything (\$0) when they downloaded the software themselves (54%) versus when they were handed a disk (37%), and this difference is significant ( $z = 2.07, p < .05$ ). In other words, 63% voluntarily paid something when handed a disk, compared with 46% of participants who downloaded the software themselves. As we expected, participants who were handed the disk paid significantly more on average than did participants who downloaded the program themselves ( $\mu_{\text{handed}} = \$ .21$  versus  $\mu_{\text{download}} = \$ .09, t = 2.89, p < .01$ ). The difference is also similar in a comparison only of participants who paid something ( $\mu_{\text{handed}} = \$ .33$  versus  $\mu_{\text{download}} = \$ .20, t = 2.16, p < .02$ ).

Second, in terms of the subsequent e-mail survey, 64% of participants replied, and there was a negligible difference in response rates between conditions (46 people who were handed a disk responded, and 44 people who downloaded the software responded). Of the 46 people who were handed a disk, 5 recalled what they paid incorrectly (average difference =  $-\$.17$ ), and more than twice as many people (13) who downloaded the file recalled incorrectly (average difference =  $-\$.18$ ). We were not surprised that everyone who remembered incorrectly said they had paid more than they actually did.

When asked whether paying less than the average cost of \$5 deprived the seller of anything, people who were handed a disk were more likely to agree ( $\mu_{\text{handed}} = 4.39$  versus  $\mu_{\text{download}} = 3.59, t = 3.04, p < .01$ ). Similarly, when asked whether not paying \$5 caused the programmer to incur a loss, people who were handed a disk were more likely to agree ( $\mu_{\text{handed}} = 4.35$  versus  $\mu_{\text{download}} = 3.11, t = 4.58, p < .01$ ). People who were handed a disk also were more likely to believe that failure to pay made the programmer worse off ( $\mu_{\text{handed}} = 4.98$  versus  $\mu_{\text{download}} = 3.50, t = 2.02, p < .05$ ) and to believe that they had taken something ( $\mu_{\text{handed}} = 4.28$  versus  $\mu_{\text{download}} = 3.91, t = 1.51, p = .06$ ). Taken together, the results from the follow-up survey imply that participants were less likely to believe that they deprived the programmer of something when they downloaded the software themselves than when they were handed a disk. Finally, there was no difference in the perceived quality of the video game across conditions ( $\mu_{\text{handed}} = 3.85$  versus  $\mu_{\text{download}} = 3.73, t = .52, p = .30$ ).

In Study 3, by making the programmer's ability to produce and distribute copies of the game without cost more salient, we were able to influence how much respondents were willing to pay for the software. In addition, the method of product delivery also influenced how much harm participants believed that they would inflict if they paid less than the ideal amount (\$5, the average cost as described in the e-mail survey). Thus, clarification that the VC was essentially \$0 decreased the perceived harm associated with taking the program and not paying and lowered payment intention as measured with actual cash outlays. The implication for software vendors seems to be straightforward: Distribution of software over the Internet may reduce distribution costs, but it can also degrade the value of the product in the consumer's mind by making the fact that the VC is essentially \$0 especially salient to consumers.

## General Discussion

The objective of this research was to demonstrate how a product's perceived cost structure affects consumers' inclination to pay, such that consumers believe that they are less obligated and thus are less likely to pay voluntarily for a high-FC, low-VC product (e.g., software) than for a high-VC, low-FC product (e.g., jewelry). To the best of our knowledge, the work presented in this article is the first to examine the effect of a product's cost structure on consumer judgment and decision making. We show that consumers are much less intent on paying for or willing to pay less for products with relatively low VC and high FC, such as information products, than for products with a high ratio of VC to FC, such as more conventional tangible products. This

finding may help explain why ordinarily law-abiding people are more likely to risk stealing intangible products than material goods.

Study 1 illustrates how consumers perceive failure to pay for a high-VC product as inflicting greater harm to a seller than failure to pay for a high-FC product. This is because consumers perceive amounts paid in excess of VC as a gain to the seller, and they perceive failure to cover the seller's VC as inflicting a loss. The results show that consumers are more likely to pay for a product the more harm they believe that not paying would cause. Study 2 further shows that consumers perceive failure to pay for a high-VC product as inflicting greater harm, even when the same total cost is simply reframed as having a higher VC and a lower FC. In addition, Study 2 provides direct evidence of the mediating effect of the harm consumers believe that they would inflict by not paying on their payment intentions. In Study 3, the extent to which the VC component of a computer game is near \$0 is made especially salient to one group of participants by having them download the game themselves. We found that members of this group were less willing to pay and would pay less for the game than would members of a group that received the game preloaded on a disk, even though costs never changed (FCs were \$500; 100 copies were distributed for an AC of \$5). Study 3 adds a degree of realism to the results of the previous studies by having participants spend their own money.

### Limitations and Implications

Our studies are not without their limitations. In Study 1 and Study 2, we prompted respondents to consider costs explicitly through our manipulations of cost structure. In Study 3, we announced FCs and did not vary the cost structure; instead, we made the near-\$0 VC more salient. Although this research assumes that consumers are conscious that most information goods (e.g., software, music CDs), most services, and many conventional goods (e.g., pharmaceuticals) have relatively low VCs, further research might examine when consumers spontaneously consider costs and assess payment intentions and willingness to pay.

A major change that the computer era and information age has brought about is in the products that all consumers see and use. Increasingly, products consist almost exclusively of intellectual property, which includes software, music CDs, digital videodisc movies, and a host of products and services available online. A key difference between these information products and tangible, material products is often the cost structure. Information products typically have a relatively high FC and little or no VC, which online delivery makes particularly salient.

Our research may help provide alternatives to the costly enforcement associated with legal remedies by providing practical ideas for ways firms can foster greater payment intentions among consumers. A prescription for marketers (manufacturers and sellers) of high-FC products is to better communicate a more accurate representation of total costs to consumers. For example, firms with large research-and-development budgets (e.g., pharmaceutical companies) may consider communicating that, for example, \$20 million worth of research was devoted to bringing a particular product to market. The firm may even translate FC into VC for consumers, stating that amortized FC would approach \$100

per bottle. In situations in which the seller can easily frame the cost as either a fixed lump sum or a per-person charge, such as in the concert study and the Chinese chess study, our findings imply that it is better for the seller to frame the cost as a per-person charge.

Another way to increase consumers' payment and purchase intentions is simply to increase the recognizable VC and thus to increase the ratio of VC to FC. For example, suppose that a toy company invented a game and possessed the exclusive right to manufacture the game. Suppose also that a basic game set (the board and the pieces) is made of plastic and costs only \$2 to produce but that the game company spent a fortune designing the game (or buying the rights). To recoup the high FC, the company must set the price of the game at a minimum of \$22 (\$20 to recoup the FC and \$2 for the VC [board and pieces]) before it can make any profits. In this scenario, chances are that consumers would not be happy with the price. They may ask themselves, "Why would I pay \$20 for some cheap plastic pieces?" A way to make consumers less averse to paying for the FC is simply to increase the VC.

Instead of using plastic that costs only \$2 per set, the company might consider using mahogany that costs \$40 per set, which will bring the ratio of VC to FC from \$2:\$20 to \$40:\$20 and will bring the price from  $\$2 + \$20 = \$22$  to  $\$40 + \$20 = \$60$ . Even if the price is much higher, consumers may actually be happier with it. In other words, charging \$60 for a product whose VC is \$40 may be perceived as more favorable than charging \$22 for a product whose VC is only \$2, when the amortized FC is held constant. Consider the Monopoly Deluxe addition (\$19.99), which has wooden houses and hotels, and the Heirloom Edition (\$105), which has a mahogany case and brass pieces. Although these products may appeal to people with higher reservation prices (premium pricing à la the work of Tellis [1986]), they may also attract consumers who believe that \$14.99 is too much to pay for the cardboard and plastic in the standard edition. A downside of this strategy is that there will be fewer customers who can afford a more expensive game. However, we posit that when setting a list price or developing a product line, the seller should simultaneously consider the elasticity of demand and the ratio of VC to FC. Similarly, when software is packaged with preprinted manuals and other accoutrements, not only does the ratio of VC to FC change, but also the VC increases above \$0. There appears to be a qualitative difference between \$0 VC and some VC, as Study 3 illustrates.

Finally, we believe that our research has important implications for consumer perceptions of fair price. We find that consumers consider the ramifications of their actions to the extent that their failure to pay would cause the seller to incur a loss rather than a foregone gain. Prospect theory suggests that the differential impact is due to loss aversion, such that the loss of a certain amount is psychologically more influential than is forgoing an equivalent gain. In all our experiments, the impact of failure to pay is negative, and the unpaid revenues are equivalent. However, in each study, we measured self-assessments of the impact of not paying on the seller, not whether consumers perceived a particular pricing structure as more fair or different in other ways. People are often unwilling to pay a price that they deem unfair (Martins and Monroe 1994; Urbany, Madden, and

Dickson 1989), though research on the specific determinants of price fairness is sparse (Bolton, Warlop, and Alba 2003).

Much of what consumers perceive as fair has been shown to depend on how they believe that prices and a firm's motive for charging prices affect firm or producer profitability (Campbell 1999). A price increase without a cost increase raises profits and is considered less fair than is a price increase associated with a cost increase (Campbell 1999; Kahneman, Knetsch, and Thaler 1986a, b). We speculate that what people believe is the fair price of a product also depends on the product's cost structure. Furthermore, we suspect that the relationship between payment intention (the construct we study herein) and perceived fair price is that the latter is the upper bound of the former. That is, people would not be willing to voluntarily pay more for a product than what they consider the fair price of the product. Further research might continue to develop how cost structure influences perceptions of fairness as well as other inherent factors associated with the VC-FC cost-structure distinction we created.

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