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As firms seek ways to manage customer relationships over the long term, understanding the dynamics of the service provider–customer relationship becomes a key priority. In this article, the authors develop and test a dynamic model of customer usage of services, identifying causal links between customer's prior usage levels, satisfaction evaluations, and subsequent service usage. The authors quantify the (heretofore anecdotal) relationship between customer satisfaction and subsequent service usage and provide new theoretical insights into the antecedents of customer satisfaction by introducing the concept of perceived payment equity. The primary contribution of the article is an understanding of how service usage changes over time, and particularly, how the consumer's view of the fairness or "equity" of the exchange over time affects the consumer's usage of services. Specifically, payment equity represents the customer's changing evaluation of the fairness of the level of economic benefits derived from usage in relation to the level of economic costs, that is, the customer's evaluation of the fairness of the exchange. By examining the antecedents of payment equity, it can be determined how customers use price and usage over time to update their evaluations of the fairness of the exchange. This evaluation affects overall satisfaction, which in turn affects future usage. The results suggest that customers' usage levels can be managed through pricing strategies, communications, and more generally dynamic customer satisfaction management.

A Dynamic Model of Customers' Usage of Services: Usage as an Antecedent and Consequence of Satisfaction

Successful marketing requires that managers understand how customers' relationships with an organization change over time. The dynamic nature of customer relationships is especially important in industries that offer continuously provided services, such as public utilities, health care, financial services, computing services, insurance, and other professional, membership, or subscription services. In these industries, customers choose future service usage levels on the basis of their evaluations of their current service experiences, and these usage levels have a substantial impact on the long-term profitability of the organization. Therefore, marketing managers for continuously provided services must address the following questions: How does a customer decide how much to use a service? What factors influence this usage decision? How does customer usage change over time? How does a customer's usage level affect his or her overall evaluations of the service? Moreover, do these overall evaluations, particularly customer satisfaction, affect subsequent usage? Finally, how do elements of the marketing mix, such as price, influence customer usage levels and customer satisfaction over time?

In this article, we develop and test a dynamic model of customer usage of continuously provided services, identifying causal links among customers' prior usage levels, satisfaction evaluations, and subsequent service usage. A dis-

tinctive feature of continuously provided services is that the customer typically enters into a formal relationship with the service provider and, subsequently, consumes or uses the service (continuously or intermittently) for an extended time period. The formal relationship includes a payment plan, which can entail an initial payment (e.g., a membership fee or retainer); a fixed, periodic fee (e.g., a monthly service charge); a variable fee (e.g., a usage-based fee); or some combination of the aforementioned payments. This formal relationship distinguishes continuously provided services from transaction-based services, such as restaurants, in which there is no payment plan and repeat purchases are discrete exchanges. To capture this distinctive feature, we introduce the notion of payment equity to explain how customers' satisfaction evaluations and service usage levels vary over time. Payment equity is the customer's perception of the fairness of the exchange of payment for service usage. Intuitively, it is the customer's answer to the question, "Am I using this service enough, given what I pay for it?" Pay-

ment equity is the customer's changing evaluation of the fairness of the level of economic benefits derived from usage in relation to the level of economic costs. Payment equity plays a key role in explaining how usage levels and price influence customer satisfaction, and thereby influence subsequent usage levels.

Our model proposes that customers make judgments about payment equity by comparing their current payment and usage levels with normative ("should") expectations. These judgments affect their satisfaction with the service and influence subsequent usage. Thus, our model describes how customers' usage of services changes over time through payment equity, satisfaction evaluations, and subsequent usage of the service (see Figure 1). By focusing on the role of payment equity, we integrate diverse research streams pertaining to pricing, mental accounting, perceived justice, and customer satisfaction into a unified model that explains service usage over time. The model has implications for how service organizations should manage customers' usage lev-

Figure 1
DYNAMIC MODEL OF CUSTOMER USAGE
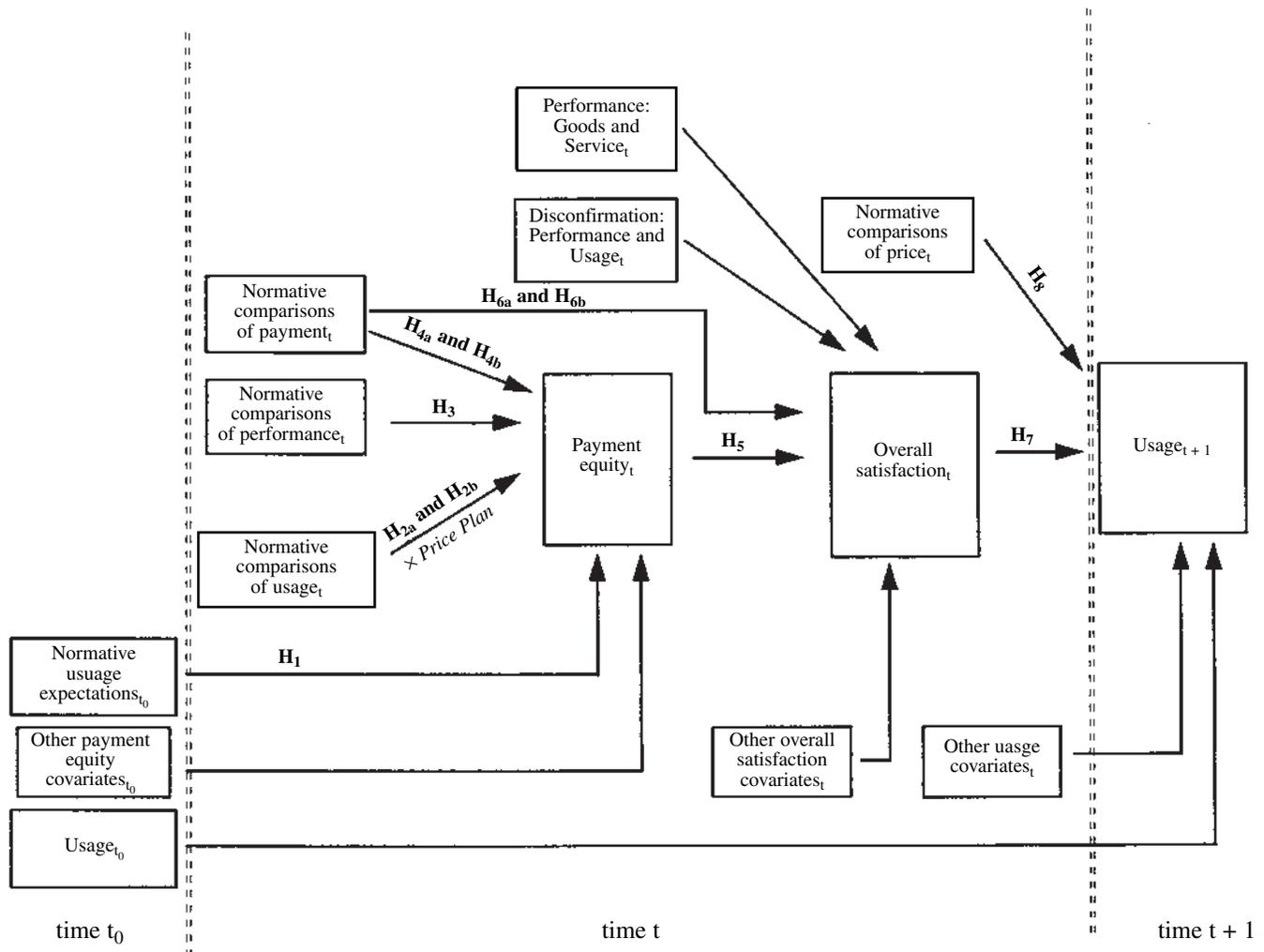
els through pricing strategies, communications that influence customers' formation of appropriate normative expectations regarding service usage, and customer satisfaction management.

The dynamic model shown in Figure 1 is estimated with two different databases that describe customers' experiences with and assessments of an interactive entertainment service and a cellular communications service over time. Both databases were assembled using a panel design, in which the same customers were reinterviewed over time, so that changes in customers' opinions could be measured. Both databases also contain actual measures of usage levels. For each service, the model is estimated with multiple waves of survey and usage data from the same customers, making causal inferences possible.

Our findings suggest that customers decide how much to use the service in the future by considering how resources currently are exchanged within the provider–customer relationship. Customers seek to maintain payment equity in the service relationship over time, adjusting items under their control (usage levels) in response to changes made by the firm (price changes, changes in service quality). The adjustment mechanism is guided by mental accounting principles (i.e., budgeting, encoding of gains and losses) and mediated by a service pricing structure (i.e., whether total cost is dependent on or independent of usage level). Across two service contexts in two distinct industries, there is remarkable consistency in the model results.

The article is organized in the following way: In the next section, we provide background and an overview of the conceptual framework. In the following section, we discuss the antecedents of the key dependent variables in the model—payment equity, satisfaction, and customer usage—and develop a dynamic model of customers' usage behavior. We estimate the model with panel data from two different service contexts. In the remaining sections, we discuss results and implications.

PERSPECTIVE

We consider the individual customer's usage of a continuously provided service after he or she has entered into a formal relationship with the provider. After consuming the service, he or she forms an evaluation of his or her satisfaction with the hedonic and utilitarian aspects of the service. Anecdotal evidence suggests that a customer who is more satisfied with a service will have higher subsequent usage levels, but there is little empirical evidence regarding this issue (Danaher and Rust 1996; Ram and Jung 1991; Taylor and Todd 1994). In contrast, the influence of price on usage levels has been documented widely in economics (e.g., Einhorn 1994; Goldman, Leland, and Sibley 1984; Ng and Weisser 1974). Broadly, this area of research suggests that the utility-maximizing consumer will "rationally respond to changes in incremental price by marginally changing his usage level" (Einhorn 1994, p. 105). Thus, we believe that a customer who is more satisfied with a service or receives a price decrease will use the service more in the subsequent time period.

Our model introduces the notion of payment equity to explain how customers' satisfaction evaluations and service usage levels vary over time. Several studies have shown that equity influences satisfaction (e.g., Oliver and Swan

1989b),[1] but we focus on a specific dimension of the equity construct. Equity is the customer's evaluation of what is "fair," "right," or "deserved." It is the distributive dimension of perceived justice, involving a comparison of outcomes to inputs (e.g., Fisk and Young 1984; Huppertz, Arenson, and Evans 1978; Oliver and DeSarbo 1988). We define *payment equity* (narrowly) as the customer's changing evaluation of the fairness of the level of economic benefits derived from usage, in relation to the level of economic costs (payment). Note that a customer may perceive payment equity to be low yet be satisfied and perceive the value of the service to be high (or vice versa). Satisfaction and value are much broader constructs than payment equity. Satisfaction is a fulfillment response, and perceived value is the customer's judgment of the maximum amount he or she will pay. Both are based on customer assessments of all utilitarian and hedonic benefits received from the service relative to associated monetary and nonmonetary acquisition costs (cf. Oliver 1996, p. 28).[2]

We theorize that price operates through payment levels to influence payment equity and that it also influences satisfaction directly, thereby (indirectly) influencing usage in the subsequent period. In other words, price influences satisfaction and usage in multiple ways, both directly and indirectly. Payment equity plays a key role in our dynamic model, explaining how usage levels and price influence customer satisfaction, thereby influencing subsequent usage levels. This feature of the model enables us to consider explicitly how customers' formation of their assessments of payment equity and satisfaction, as well as their actual usage levels, will differ depending on the services' price structure. This issue is important because continuously provided services can be priced so that the customer's total cost is independent of usage (usually a prepaid fixed payment) or so that his or her total cost depends on usage (usually a two-part price plan with a fixed and variable component). These issues are explored as we develop our model in the following section.

## A DYNAMIC MODEL OF CUSTOMER USAGE BEHAVIOR

In this section, we develop a dynamic model of usage behavior. We review the relevant literature and identify the antecedents of the following three dependent variables:

1. Customer perceptions of payment equity of the service measured at time t,

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[1] Customer satisfaction research virtually has been defined by the disconfirmation paradigm. However, many researchers have emphasized that customer satisfaction arises from multiple standards of comparison (e.g., Boulding et al. 1993; Spreng, MacKenzie, and Olshavsky 1996; Swan and Trawick 1980). Oliver and Swan (1989b) have shown that customer satisfaction depends on both disconfirmation and equity. As discussed in the text, payment equity represents a new dimension of equity that has not been examined in prior research focusing on fairness, probably because of the predominance of cross-sectional models of customer satisfaction and purchase intentions that focus on goods or discrete services.

[2] For example, a healthy customer may believe it is unfair to pay substantial premiums to a health maintenance organization when he or she rarely has used its services in the past year. However, he or she may derive a high "net benefit" from access to convenient, high quality health care services at a premium price. Therefore, despite low payment equity, the customer has a high perceived value for the service. The explanation is that low payment equity (i.e., unfairness) represents an nonmonetary acquisition cost that is offset by other utilitarian and hedonic benefits.

Figure 2
TIMELINE OF DATA MEASUREMENT
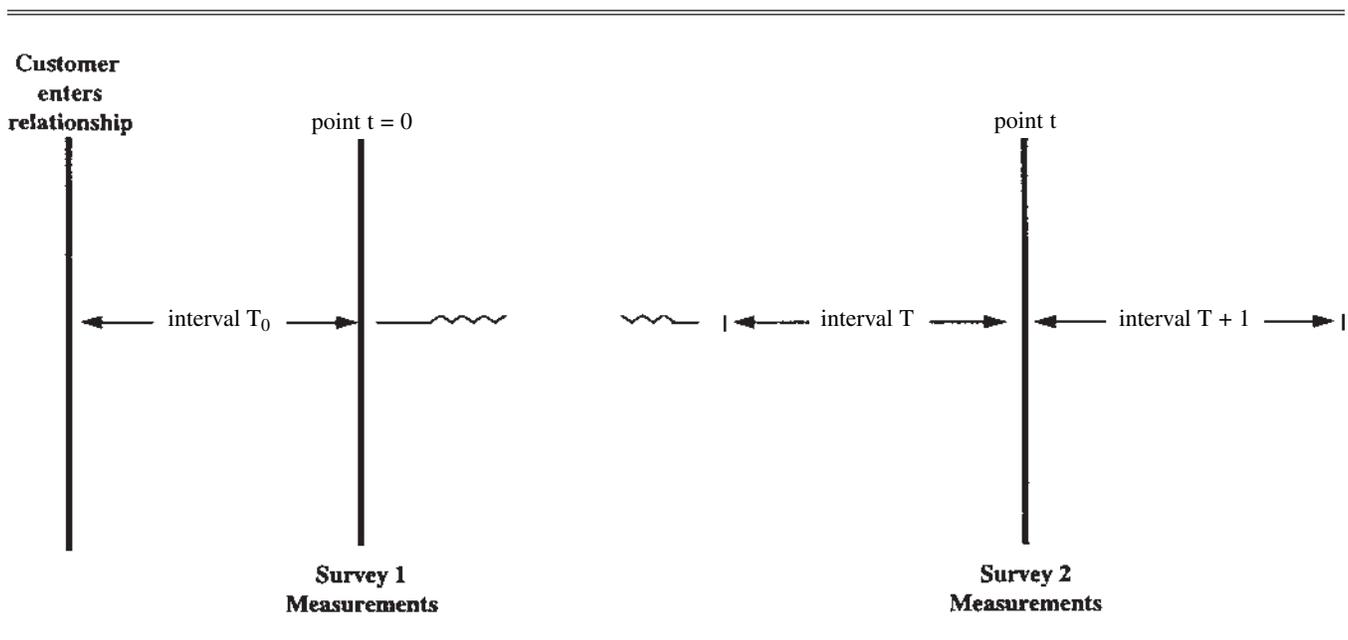
2. Customer assessments of satisfaction with the service, measured in time t, and
3. Customer usage of the service, measured in time t + 1.

In developing the dynamic model, we adopt the following notation: The baseline time period, in which the customer develops initial normative baseline expectations for the service, is denoted by the subscript $t = 0$. The present time period, somewhat subsequent to $t = 0$, in which the customer evaluates payment equity and satisfaction, is denoted by the subscript t. The subsequent time period, in which the customer continues to use the service, is denoted by the subscript $t + 1$ (see Figure 2).

Antecedents of Payment Equity

In evaluating payment equity, we postulate that customers' initial normative expectations will influence their perceptions of equity. In addition, we expect customers to make three comparisons. Customers will compare their current usage levels with their normative expectations of usage. Customers also will compare their current payment levels with their normative expectations of payment. Finally, customers will compare the current performance of the service with their normative expectations of the service. We examine each of these antecedent variables.

Usage: Initial normative expectations. Traditional equity theory proposes that parties to an exchange will feel equitably treated if the ratio of their outcomes to inputs is "fair," in other words, when the outcome to input ratio is proportionate for participants in the exchange (Adams 1965; Deutsch 1975). When a customer subscribes to a service, he or she evaluates the exchange by weighing outcomes, such as expected future usage levels, versus inputs, such as expected future payments for the service, and then commits to the relationship if the cumulative exchange is perceived as equitable. We propose that customers' expected future usage and budget levels act as normative expectations for subse-

quent assessments of equity. In other words, initial normative expectations (formed at the beginning of the relationship) act as a reference value or base level for the customers' subsequent evaluation of payment equity. Specifically, customers' current evaluations of equity ($PayEquity_t$) are hypothesized to be related positively to their initial normative expectations.[3]

H_1: A customer will evaluate an exchange as more equitable when his or her initial normative expectations regarding usage levels ($NExpect_{t = 0}$) are high.

Usage: Comparison of actual usage with normative expectations. We believe that customers update equity judgments throughout the service relationship. The customer should perceive the relationship as most fair when actual usage is equal to normative usage expectations. Mental accounting principles suggest that the relationship between equity and this comparison may depend on the manner in which a service is priced or on the total cost implications for the customer. Fixed price plans unbundle the cost of service from its benefits, leading customers to segregate the cost of the service from the gains or benefits derived from usage. Two-part price plans bundle the costs and benefits derived from service usage, leading customers to integrate the cost and benefits of usage. Customers will evaluate a given exchange as more equitable when the costs and benefits are segregated (Heath and Fennema 1996; Thaler 1980, 1985). The segregation of costs (i.e., price) and benefits (i.e.,

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[3]All hypotheses are stated with ceteris paribus conditions. Subscripts denote time periods. With respect to H_1, for some types of exchanges, the customer may believe that the exchange is inequitable if he or she receives too much, relative to the service provider. However, this situation seems unlikely to occur in market exchanges at equilibrium. Oliver and Swan (1989a) find that fairness (buyer and seller enjoy maximal outputs from minimal inputs) affects satisfaction, whereas preference (advantageous inequity) does not.

usage) does not imply that resources are not (ultimately) weighed using the same function; it simply implies that price and usage are assessed separately (in comparison with normative standards) before they are weighed. Thus, customers should evaluate an exchange as more equitable when the total cost is a prepaid, fixed amount rather than when the (same) total cost is determined by customer usage level.

This discussion suggests the subsequent hypotheses regarding the relationship between payment equity and usage. If the total cost of the service is independent of usage (cable television, American Automobile Association membership, child care), the customer evaluates the exchange as a better deal or more equitable, because his or her outcomes, such as usage levels, increase relative to his or her normative expectations (a normative comparison, $NCUsage_t$). In contrast, if the total cost of the service depends on usage levels (cellular telephones, online services, financial investment services), customers will integrate their variable costs with the benefits derived from usage to evaluate the equity of the exchange (Thaler 1985). In other words, if a customer uses a service more than he or she expected (but had to pay for the additional use), the customer will not focus on the extra benefits that were received but rather will balance this against the additional cost incurred. Therefore, in the case of two-part pricing, current usage levels, relative to the customer's normative usage expectations, should be unrelated to customer equity.

H$_{2a}$: If the total cost of a service is independent of usage, a customer will evaluate the exchange as more equitable when current usage levels are higher than the customer's normative expectations of usage ($NCUsage_t$).

H$_{2b}$: If the total cost of a service depends on customer usage, the customer's comparison of current usage to normative usage expectations ($NCUsage_t$) will not affect his or her evaluation of the equity of the exchange.

Payment: Comparison of actual payments with normative expectations. Payment equity also should decrease as the customer's inputs, that is, total costs or payments, increase relative to his or her normative expectations. Prior research has shown that customers often set budgets for categories of future expense (Heath and Soll 1996; Kahneman and Tversky 1984; Thaler 1980, 1985). In the case of continuously provided services, these budgets serve as normative price expectations for the service. The customer will evaluate the exchange as a better deal or as more equitable when payments are lower than expected or budgeted. In other words, the customer's assessment of equity depends on the difference between payments and budgeted amount (i.e., on perceived gains and losses), as well as on absolute payment levels. Thaler's (1985) model of consumer choice postulates that people will be more sensitive to losses than to gains, which suggests that customers may weigh payments that are overbudget more heavily than payments that are underbudget in assessing equity.

H$_{3a}$: A customer will evaluate an exchange as more equitable when the payment is less than his or her normative expectations ($NCPay_t$: Gain).

H$_{3b}$: A customer will evaluate an exchange as less equitable when the payment is greater than his or her normative expectations ($NCPay_t$: Loss).

In the case of two-part pricing, these hypotheses may apply to both the fixed and variable components of the payment.

Performance: Comparison of actual performance with normative expectations. Equity theory recognizes that outcomes and inputs can be multidimensional, including outcomes such as perceptions of the caliber of service performance during usage, which is another economic benefit. Payment equity should increase as the customer's perception of service performance increases relative to his or her normative expectations. In other words, the customer evaluates the exchange as a better deal or more equitable when service performance is higher than expected (a normative comparison of performance at time t with expectations of performance formed in a prior period, $NCPerf_t$). Conversely, the customer evaluates the exchange as less equitable when service performance is lower than normative expectations. For example, suppose a customer experiences frequent disruptions in the electric power provided by the local utility company, so that he or she cannot operate equipment appropriately and, consequently, cannot derive economic benefits from electric power usage. He or she is likely to evaluate the exchange with the electric utility as less equitable.

H$_4$: A customer will evaluate an exchange as more equitable when current service performance is better than his or her normative expectations ($NCPerf_t$).

The payment equity equation. These hypotheses are summarized in the following equation, which describes the antecedents of equity:

$$(1) \quad PayEquity_t = G(NExpect_{t=0}, NCUsage_t, NCPay_t,$$
$$NCPerf_t, \mathbf{Z_{Equity}}),$$

where $\mathbf{Z_{Equity}}$ is a vector of cross-sectional variables representing baseline usage and payments, as well as tangible factors. Equation 1 postulates that customers' current evaluations of equity ($PayEquity_t$) depend on their initial normative expectations ($NExpect_{t=0}$) and deviations from these expectations ($NCUsage_t$, $NCPay_t$, $NCPerf_t$). This structure is consistent with Hogarth and Einhorn's (1992) anchoring and adjustment model. Customers' evaluation of payment equity should affect their satisfaction with the service. We now focus on this aspect of our model.

Antecedents of Satisfaction

In the classic customer satisfaction–dissatisfaction paradigm (cf. Oliver 1996), predictive expectations, performance, and disconfirmation are antecedents of satisfaction. Because these constructs are well established in prior research, we include them in our model without further discussion. Oliver and Swan (1989b) have shown that equity is also an antecedent of satisfaction, for which equity entails a comparison with normative expectations. We extend their model by including usage-related antecedents of customer satisfaction that are particularly relevant to continuously provided services. Specifically, we propose that the customer's perception of payment equity and his or her comparison of actual payments with normative expectations will influence satisfaction.

Payment equity. Extending the well-recognized expectancy–disconfirmation paradigm, customer satisfaction also should depend on the perceived fairness of the price/usage trade-off, herein termed "payment equity." Specifically, the more equitable a customer believes the

price/usage trade-off to be, the more satisfied he or she will be with the service:

> H₅: A customer will be more satisfied when he or she perceives the price/usage exchange as more equitable (PayEquity$_t$).

Comparison of actual payments with normative expectations or budgets. Our theory suggests that the customer compares his or her current payment with normative expectations, evaluating whether the payment is higher or lower than the customer thinks it should be (a normative comparison, denoted NCPay$_t$). Prior research has shown that customer satisfaction is related positively to higher levels of perceived control (Bolton and Drew 1994; Hui and Bateson 1991). We postulate that the customer experiences higher levels of perceived control when payments are lower than expected or budgeted (i.e., lower than the customer believes they should be) and predict that the customer will be more satisfied with the exchange. In other words, we predict that, after controlling for payment equity, the customer's assessment of satisfaction depends on the difference between his or her payments and the budgeted amount (operating through perceived control), as well as on absolute price levels.

> H₆ₐ: A customer will be more satisfied when the payment is less than his or her normative expectations (NCPay$_t$: Gain).
>
> H₆ᵦ: A customer will be less satisfied when the payment is greater than his or her normative expectations (NCPay$_t$: Loss).

The overall satisfaction equation. The antecedents of customer satisfaction for a continuously provided service can be described algebraically, as follows:

$$(2) \qquad \text{Ovsat}_t = H(\text{PayEquity}_t, \text{NCPay}_t, \mathbf{Z_{Ovsat}}),$$

where $\mathbf{Z_{Ovsat}}$ is a vector of cross-sectional variables representing performance, disconfirmation of performance expectations, and price variables. Equation 2 states that cumulative satisfaction depends on payment equity, the difference between total cost and budgeted cost, and constructs from the expectancy–disconfirmation paradigm. Because customers prefer different price plans, price is included as a cross-sectional covariate. In the section that follows, we examine the factors that influence the customer's subsequent usage decision.

A Customer's Usage Decision

We seek to understand how customers use information and experience (from a prior period) in deciding levels of usage (in a subsequent period). Following Winer (1985), our model postulates that individual customers seek to maximize their subjective expected value from the service (i.e., similar to utility). The usage level of each customer is an observed indicator of the unobserved perceived value of usage that customer derives from service usage. The customer will use the service only if the perceived value is greater than some (unobserved) threshold value of usage. We use a tobit model to characterize the customer's decision of how much to use the service (Tobin 1958; also see Judge et al. 1988). We observe zero usage for those customers for whom the value from using the service is less than some (unobserved) threshold value. We observe positive usage for those customers for whom the value from using the service

is greater than this threshold. In other words, for any customer, there is some minimum (unobserved) level of usage value associated with use of the service at all, say c. The amount of usage actually observed (Usage$_{t+1}$) can be written as follows:

$$(3) \quad \text{Usage}_{t+1} = \text{UsageValue}_{t+1}^* \text{ if UsageValue}_{t+1}^* > c, \text{ and}$$

$$= 0 \text{ if UsageValue}_{t+1}^* \leq c,$$

where UsageValue$_{t+1}^*$ represents the usage level that maximizes the (unobserved) value of usage of the service in time $t+1$. Thus, the observed amount of service usage may be greater than zero or zero. The following paragraphs specify a model of the customer's future usage value (UsageValue$_{t+1}$) as the underlying construct for observed future usage (Usage$_{t+1}$). Our theoretical discussion focuses on the dynamic inputs to the customer usage decision. For clarity, we use the term "future usage" in the subsequent model. When estimating the model, we control for differences between customers by adding cross-sectional measures as well.

Satisfaction. The customer's prediction of his or her future usage should be relatively straightforward for continuously provided services because he or she has recent usage experiences. This prediction should depend on his or her prior satisfaction with the service because empirical evidence indicates that people predict future preferences on the basis of current preferences and do not incorporate future taste changes (Kahneman and Snell 1992; Luce 1992; Simonson 1990). This notion is consistent with adaptive expectations theory and other "extrapolative expectations" models (Oliver and Winer 1987). Thus, customers with higher levels of satisfaction (in time t) will have higher usage (in time t + 1) than customers with lower levels of satisfaction (e.g., Collopy 1996). Danaher and Rust (1996) find support for such a relationship across firms, but there is no evidence of this relationship at the individual customer level. We predict that a customer's level of usage (in time t + 1) will depend primarily on his or her cumulative satisfaction formed in the prior time period, in addition to the effects of prior usage levels.

> H₇: Customers' future usage of the service will be related positively to cumulative satisfaction in the current period (Ovsat$_t$).

Normative comparisons of price. In addition to the effects of prior period satisfaction on usage levels, we also examine the impact of price changes on customer usage, because economic theory suggests that usage should be influenced by price. When a person chooses to subscribe to a service, he or she must believe the price is equitable or fair. Therefore, initial price serves as the customer's normative expectation of price, created at the beginning of the service relationship. Prices, however, might change in two different situations. First, in fixed price plans, the firm might increase (or decrease) the price of the service. Classic demand theory suggests that service usage should be lower for customers who have experienced price increases and higher for those who have experienced price decreases.

However, traditional equity theory suggests that customers attempt to maintain equity in the relationship by keeping their inputs proportionate to outcomes (Adams

1965; Deutsch 1975). If a customer experiences a rise in his or her inputs due to an exogenously imposed price increase, he or she is likely to attempt to generate proportionate outcomes by increasing usage. Therefore, we may see the following: Some customers (e.g., those customers for whom the new price is less than some reservation price) actually may increase usage to maintain equity in the relationship. Other customers (for whom the new price is greater than some reservation price) may discontinue the service or drop usage levels to zero. Consistent with the traditional downward-sloping demand curve, we expect more people to choose the "exit or drop usage to zero" option when prices increase. For those who choose to continue to use the service, however, we expect their usage levels to increase to compensate for the increase in price; that is, price will have a stimulating effect on usage for these customers, ceteris paribus.

Second, when two-part price plans are available, customers can choose to change their price plan to match their usage levels better. In other words, a customer might choose a higher fixed price plan (with a lower variable-cost component) because he or she plans to use it more. Therefore, with two-part price plans, we expect future service usage to be higher when there are self-selected increases in price. For both fixed and two-part price plans, we propose the following hypothesis regarding the effect of a price change relative to the initial normative price (i.e., a normative comparison of current price with normative expectations of price, denoted $NCPrice_t$) on subsequent usage:

> H_8: Customers' future usage of the service will be related positively to increases in price relative to the customer's (initial) normative price expectations ($NCPrice_t$).

When the service has a fixed price only, $NCPrice_t$ is algebraically equivalent to $NCPay_t$. However, the two constructs are conceptually distinct and $NCPrice_t$ is not the same as $NCPay_t$ when the service has a two-part price structure. Although the variable rate remains the same, the payment amount varies with usage.

The future usage equation. In summary, the customer's perceived value of future usage of the service can be specified as follows:

$$(4) \qquad UsageValue_{t+1} = F(Ovsat_t, NCPrice_t, \mathbf{Z_{Usage}}),$$

where $\mathbf{Z_{Usage}}$ represents a vector of cross-sectional economic variables: baseline price and baseline usage. Substituting Equation 4 into Equation 3, the tobit formulation provides the following equation for future usage:

$$(5) \qquad If\ F(Ovsat_t, NCPrice_t, Usage_t, \mathbf{Z_{Usage}}) + e_{t+1} > 0,$$

$$Usage_{t+1} = F(Ovsat_t, NCPrice_t, \mathbf{Z_{Usage}}) + e_{t+1};\ otherwise$$

$$Usage_{t+1} = 0.$$

Recent research has shown that, though usage segments have high size stability over time, significant numbers of customers shift from one usage segment to another (Hu and Rau 1995). The preceding hypotheses explain why these shifts might occur. It is important to note that the model assumes knowledge of the values of the explanatory variables for customers whose observed usage level is zero. In the case of continuously provided services, usage may be zero for two types of customers: those who still subscribe to the service but do not use it in the given time period and those who no longer subscribe to the service.

A Dynamic Model of Service Usage: System of Equations

In summary, the model equations are as follows:

$$(6) \qquad PayEquity_t = G(NExpect_{t=0}, NCUsage_t,$$

$$NCPerf_t, NCPay_t, \mathbf{Z_{Equity}}).$$

$$(7) \qquad Ovsat_t = H(PayEquity_t, NCPay_t, \mathbf{Z_{Ovsat}}).$$

$$(8) \qquad If\ F(Ovsat_t, NCPay_t, \mathbf{Z_{Usage}}) + e_{t+1} > 0,$$

$$Usage_{t+1} = F(Ovsat_t, NCPrice_t, \mathbf{Z_{Usage}}) + e_{t+1};\ otherwise,$$

$$Usage_{t+1} = 0.$$

THE RESEARCH DESIGN AND THE TWO STUDY CONTEXTS

Equations 6, 7, and 8 specify a dynamic model of the relationships among customers' perceptions of payment equity, their assessments of satisfaction, and their future usage of a continuously provided service. This model is estimated with two different survey databases that describe customers' assessments of services. The databases describe customers' experiences with and assessments of an interactive television entertainment service and a cellular communications service. Both services are service bundles for which the nature and extent of usage varies over time. In addition, economic barriers to exiting the relationship are low, with no long-term contracts, so usage levels of zero can be observed. However, the services differ with respect to the level of maturity and degree of competition in the industry. The entertainment service represents a new industry, with no direct competition but some close substitutes. The communication service is in a more mature industry with strong competition. This difference is useful to demonstrate the generalizability of the model.

The two services also differ on a key dimension: pricing. The entertainment service is sold for a fixed price, whereas the communications service is sold with a two-part pricing plan (i.e., with a fixed and variable—per minute of use—component). In the entertainment database, price differences occur across individuals and within individuals (over time), due to changes in the organization's pricing policy. In contrast, in the communications database, price differences occur across and within individuals due to customers' decisions to subscribe to different rate plans. These features will make it possible to test hypotheses that predict different outcomes depending on whether price is independent of or dependent on usage.[4]

Both databases were assembled using a panel design in which the same customers are reinterviewed over time so that changes in customers' opinions can be measured. Both databases also contain actual, as well as self-reported, mea-

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[4]For the entertainment service, changes in price were imposed exogenously by the firm and were unrelated to customer usage levels or satisfaction levels. For the communications service, the customer can change rate plans over time. For this service, there is no evidence that customers changed rate plans on the basis of anticipated future usage changes.

sures of usage levels. This feature is important because light users typically overreport usage, whereas heavy users underreport usage, and because actual usage, rather than self-reported usage, is related statistically to satisfaction measures (Collopy 1996). For both services, the model is estimated with multiple waves of survey and usage data from the same customers, making causal inferences possible.

In both databases, we consider three distinct time periods (see Figure 2). The initial time interval (T_0) corresponds to a three-month base time period early in the customer's service relationship.[5] The base period (interval T_0) concludes with the first wave of surveys in both studies (administered at point t = 0). The next time interval (T) corresponds to a second three-month period, approximately six months later. It concludes with the second wave of surveys in both studies (administered at point t). The last time interval (T + 1) corresponds to a third three-month period, immediately subsequent to the second wave of surveys.

Entertainment Service

The database for the first study is a probability sample of customers from an interactive television entertainment service. Customers choose to subscribe to the service and have the opportunity to continue or discontinue the service on a monthly basis. Customers choose the level of usage and specific service aspects that suit their needs, and usage levels are monitored by the firm. Customers pay a monthly fee for this service; they also pay an initial fee to purchase necessary hardware. The monthly fee does not vary by usage level. A probability sample of 490 households was selected from a sampling frame of all current subscribers. The first wave of questionnaires was mailed to the sample in November 1993. Respondents were made aware that the firm had authorized the study but that their responses would remain confidential. They were offered a small gift as an incentive to participate. In April 1994, a second wave of the survey was mailed to those who had responded to the first survey and who were still subscribers of the service as of April 1, 1994. One hundred ninety-one households completed both waves of the survey for a two-wave response rate of 40%. Seven households were dropped from the study because of insufficient information on the second survey. Therefore, data from 184 households were used in estimating the model. The firm also provided customer usage data for each household in the sample throughout this period (from the beginning of customer subscription through June 30, 1994).[6]

Communications Service

The database for the second study is a probability sample of customers subscribing to service from a single cellular communications firm. Similar to the entertainment service, customers choose the level of usage and specific service fea-

tures that suit their needs. They can discontinue the service at any time. The firm monitors customer feature choices and usage levels. Customers pay a monthly and a usage-based fee for cellular service according to the rate plan they have chosen; they also pay an initial fee to purchase the handset. The rate plans tend to be tailored to different usage patterns. The sample was drawn from the company's records in December 1991. To be eligible for the study, a customer must have subscribed to the service for at least three months. In addition, customers were administered telephone surveys that elicited satisfaction measures at three points in time. The survey response rate at each wave was approximately 44%.[7] Customers first were surveyed in January through March 1992. Each customer was interviewed by telephone using the company's standard customer satisfaction survey (which is administered quarterly to a new probability sample). A randomly chosen subset of customers was reinterviewed approximately six months after the first survey, that is, in July through September 1992. The same subset of customers was reinterviewed approximately six months after the second survey, that is, in January through March 1993. Usage was determined from company monthly billing records (from December 1991 through September 1993).

Construct Operationalization

The constructs and their associated measures in each study are displayed in Table 1. Some selected descriptive statistics are displayed in Table 2. Due to space limitations, we discuss only the dependent measures here. Payment equity and satisfaction are modeled and measured for the time period just prior to the second survey (t = 1). Both studies operationalize payment equity with a single self-report, but the measures are different.[8] Payment equity is measured in the entertainment survey by a question referring to value ("worth more [less] than the amount I pay"), whereas it is measured in the communications survey by a question referring to price ("satisfied with the prices charged"). These measures are roughly consistent with prior research, which has measured equity using items that tap customers' perceptions of the fairness of the exchange (i.e., what is "right" or "deserved," typically implicitly or explicitly mentioning price; Oliver and Swan 1989b). In addition, both studies operationalize satisfaction with a single self-report measure, a conventional cumulative measure using a satisfied/dissatisfied scale.

In both studies, usage levels are based on the firm's records regarding the customer's actual usage behavior,

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[5]Note that customer's initial experiences with a service can be highly variable, so the base time period was selected to be a three-month period some time after the customer's initial four months of service.

[6]To examine the possibility of nonresponse bias, we compared the customer retention rate for the respondents with the firm's overall retention rate for the same time period. For both the entertainment and communications databases, the two retention rates were not significantly different, suggesting that the sample did not differ markedly from the overall customer base in terms of the continuation/discontinuation decision.

[7]This rate is reasonably good for such a highly mobile group, particularly because the surveys were conducted over the wireline telephone (so that the customer would not incur a charge for receiving the interviewer's call on his or her cellular telephone).

[8]We would prefer to measure both payment equity and satisfaction with multiple-item scales. However, a field study (rather than a laboratory study) was necessary to observe actual usage of services. This design led to certain measurement constraints. For example, the communications survey was administered over the telephone, using a limited number of questions to keep the interview short and a limited number of response formats to aid respondent comprehension. Therefore, we were constrained to use similar response formats for some constructs (e.g., PayEquity$_t$ and OvSat$_t$ in the communications study). Also, we were constrained to use simple response formats (e.g., the dichotomous variables used to operationalize NCPerf$_t$) in both the telephone survey (for communications) and the mail survey (for entertainment). Despite the differences in construct operationalization across the two databases, we obtain remarkably similar results, indicating that our findings are robust.

Table 1
CONSTRUCT OOPERATIONALIZATION[a]

Construct and Variable Name	Hypothesis	Entertainment Service Measure	Communication Service Measure
Dependent Variables			
Payment equity ($PayEquity_t$)		Please rate the overall value of XXX to your household. Worth much less/more that the amount I pay (measured at point t).	How satisfied were you with the prices charged by XXX? Very dis/satisfied (measured at point t).
Cumulative satisfaction ($Ovsat_t$)		How satisfied are you with XXX overall? Extremely dis/satisfied (measured at point t).	Overall, how satisfied were you with the services you received from XXX? Very dis/satisfied (measured at point t).
Usage ($Usage_{t+1}$)		Minutes of use per month, averaged across the three-month time interval T + 1, obtained from company records.	Minutes of use per month, averaged across the three-month time interval T + 1, obtained from company records.
Payment Equity Equation (6) Predictor Variables			
Normative usage expectation ($Nexpect_{t=0}$)	H_1	Relative to your experience of the last three months, please indicate how much you intend to play XXX in the next three months. Much less/more (measured at point t = 0).	Zero minus the variable rate during the base time interval T_0 (–$x.xx/minutes of use).[b]
Normative comparison: Usage ($NCUsage_t$)	H_{2a} H_{2b}	Compared with your expectations when you became a member, do you play XXX more or less than you expected? Much less/more than expected (measured at point t).	Would you say you used the service much more/less than expected (measured at point t)?
Normative comparison: Payment ($NCPay_t$)	H_{3a} H_{3b}	Since you have been a XXX member, do you feel the cost of being a member has decreased/increased significantly?[c] (variable component not applicable, measured at point t).	Absolute value of the percentage change in payment, calculated by comparing the three-month interval T with the base period (T_0). Calculated separately for fixed and variable components.[e]
Normative comparison: Performance ($NCPerf_t$)	H_4	Have you ever called XXX with a problem (yes/no)? If yes, was problem resolved (yes/no; measured at point t)?[d]	Overall, would you say that XXX's service is much better/worse than expected? Did you report a problem (yes/no)? Rating of handling (both measured at point t).[d]
Base usage levels (Z_{equity})	Covariate	Minutes of use per month, averaged across the three-month base time period (T_0).	Minutes of use per month, averaged across the three-month base time period (T_0).
Base payment levels (Z_{equity})	Covariate	Dollars per month, averaged across the three-month base time period (T_0).	Dollars per month, averaged across the three-month base time period (T_0).
Perceptions of tangibles (Z_{equity})	Covariate	How satisfied are you with the XXX control unit? Extremely dis/satisfied (measured at point t).	Two measures: How satisfied are you with your XXX equipment? Very dis/satisfied. Two-item index created from questions about the bill as "an accurate record of your usage" and "easy to understand." Very dis/satisfied (measured at point t).
Satisfaction Equation (7) Predictor Variables			
Payment equity ($PayEquity_t$)	H_5	Same as dependent variable.	Same as dependent variable.
Normative comparison payment ($NCPay_t$)	H_{6a}/H_{6b}	Same as predictor variables for Equation 6.[e]	Same as predictor variables for Equation 6.[e]
Performance: Service (Z_{ovsat})	Covariate	How would you rate your experience playing XXX on an overall basis? Not/very good (measured at point t).	Four-item index created from questions pertaining to call connection, clarity, dropped calls, and geographic coverage. Very dis/satisfied (measured at point t).
Performance: Good (Z_{Ovsat})	Covariate	How satisfied are you with the XXX control unit? Extremely dis/satisfied (measured at point t).	How satisfied are you with your XXX equipment? Very dis/satisfied (measured at point t).
Disconfirmation: Performance (Z_{Ovsat})	Covariate	Have you ever called XXX with a problem (yes/no, measured at point t)?	"Have you personally called [the company's] customer service in the last three months (yes/no)? Overall, how satisfied were you with the representative you spoke with" (measured at point t)?[e]

Table 1
CONTINUED

		Future Usage Equation (8) Predictor Variables	
Disconfirmation: Usage (Z_{Ovsat})	Covariate	Average minutes of use in current three months (T) less average minutes of use in three months prior to T (from firm records).	Average minutes of use in current three months (T) less average minutes of use in three months prior to T (from firm records), expressed as %.
Price (Z_{Ovsat})	Covariate	Fixed charge ($xx.xx/month). Variable charge not applicable (measured at point t).	Fixed charge ($xx.xx/month). Variable charge ($x.xx/minutes of use)(both measured at point t).
Satisfaction ($Ovsat_t$)	H_7	Same as dependent variable.	Same as dependent variable.
Normative comparison: Price ($NCPrice_t$)	H_8	Since you have been a XXX member, do you feel the cost of being a member has decreased/increased significantly[c] (measure of variable component not applicable, measured at point t)?	Measures for fixed and variable components: Percentage change in the fixed charge (or variable rate) at point t compared with the base three-month period T_0.
Price$_t$ (Z_{Usage})	Covariate	Fixed charge ($xx.xx/month). Variable charge not applicable (measured at point t).	Fixed charge ($xx.xx/month). Variable charge ($x.xx/minutes of use) (both measured at point t).
USAGE$_t$ (Z_{Usage})	Covariate	Minutes of use per month, averaged across the three-month time interval T, obtained from company records.	Minutes of use per month, averaged across the three-month time interval T, obtained from company records.

[a]Entertainment service variables are measured with a seven-point scale. Communication service variables are measured with a five-point scale. All variables are coded so that a high value is more favorable (e.g., 7 represents extremely satisfied).

[b]This measure is created on the basis of the assumption that customers who expect to have high usage levels choose price plans with a low per minute charge.

[c]A separate variable for losses (gains) is created by multiplying the described difference measure by an indicator variable that takes on the value 1 for loss (gain) and 0 otherwise.

[d]Problem resolution/handling is coded 0 if there was no problem.

[e]Satisfaction with the representative is coded 0 if there was no call to customer service.

Table 2
DESCRIPTIVE STATISTICS

	Entertainment Service		*Communications Service*	
Variable	Mean	Standard Deviation	Mean	Standard Deviation
Payment equity ($PayEquity_t$)	4.360	1.504	3.531	1.271
Cumulative satisfaction ($Ovsat_t$)	5.084	1.477	4.171	1.115
Future usage ($Usage_{t+1}$)	1782.00	1933.00	76.233	134.514
Current usage ($Usage_t$)	1867.00	1938.00	112.530	174.413

Note: Usage is measured in minutes per month.

measured in minutes of use per month, averaged across a three-month time period. This measure was calculated at three points in time: the base time period (several months after the customer first subscribed to the service), prior to the second survey, and subsequent to the second survey. Future usage is modeled and measured for the three-month time period subsequent to the second survey (T + 1).

The variables representing the hypothesized dynamic effects have time subscripts that match the subscripts on the constructs in Equations 6, 7, and 8. The measurement descriptions in Table 1 indicate the specific point or time interval at (or over) which each variable was measured. In addition, each equation includes a vector of variables to account for cross-sectional differences ($\mathbf{Z_{Usage}}$, $\mathbf{Z_{Equity}}$, $\mathbf{Z_{Ovsat}}$). Specifically, the classic economic paradigm predicts that usage should differ across customers because of differences in tastes and price levels. Therefore, the payment equity equation, Equation 6, includes measures that control for differences across customers in usage and payment levels during the base period. Similarly, the customer satisfaction/dissatisfaction paradigm predicts that satisfaction levels should differ across customers because of differences in perceptions of current performance and disconfirmation of performance expectations. Therefore, the satisfaction equation, Equation 7, includes these perceptual measures, as well as measures of current price (i.e., both fixed and variable components). Finally, the usage equation, Equation 8, includes measures of prior (i.e., lagged) usage and current price.

ESTIMATION PROCEDURE

Equations 6, 7, and 8 specify a comprehensive model of the relationships among customer perceptions of payment equity, overall satisfaction, and subsequent usage behavior. In the payment equity and customer satisfaction equations (6 and 7), payment equity appears as both a dependent and a predictor variable. The measurement errors in these equa-

tions are likely to be correlated positively because of questionnaire effects, so two-stage least squares estimation procedures are used for these equations (Johnston 1984). The usage equation, Equation 8, is estimated using a maximum likelihood procedure found in Time Series Processor (Hall 1995), which follows Amemiya's (1986) Type I Tobit. This equation is estimated using single equation estimation techniques because there is no reason to believe that errors in the usage equation will be correlated with errors in the satisfaction and equity equations.

RESULTS

Overall, we find strong support for our dynamic model. The proposed relationships among payment equity, satisfaction, and subsequent customer usage are supported. The least squares results for the payment equity and satisfaction equations are shown in Table 3. For the payment equity equation, the adjusted R^2 is .39 in the entertainment database and .25 in the communications database ($p < .01$ for both). For the satisfaction equation, the adjusted R^2 is .53 in the entertainment database and .34 in the communications database ($p < .01$ for both). The Tobit model results for the future usage equation are shown in Table 4. The log-likelihood ratio test is statistically significant ($p < .01$) for both databases. Thus, the overall fit seems reasonably good for equations estimated with cross-sectional panel data. We find strong support for the specific hypotheses as well.

It is interesting to compare the results of the proposed model with the results from a comparison model. We chose to compare the estimated satisfaction and usage equations (i.e., Equations 7 and 8) with conventional satisfaction and usage equations. In other words, the comparison model consists of Equations 7 and 8 excluding the predictor variables described in H_5–H_8. (The retained variables can be identified by examining the list of covariates.) Note that the comparison model includes variables that have been identified as theoretically important in prior research. For example, the satisfaction equation includes disconfirmation and performance variables, and the usage equation includes price terms. We find that the proposed model explains significantly more variance in both the satisfaction and usage equations than the comparison model does. An F-test (Johnston 1984) rejects the comparison model for the satisfaction equation for both services ($p < .01$). A log-likelihood ratio test also rejects the comparison model for the future usage equation for both services ($p < .05$).[9] In other words, the incorporation of these constructs in the customer satisfaction and usage framework explains significantly more variance than traditional models of customer satisfaction and usage do. Thus, as illustrated by Figure 1, the proposed model substantially expands our understanding of the dynamic behavior of the customer in the provider–customer relationship. We present an overview of the results in Table 5, outlining the support for each hypothesis across the two industry contexts. The findings discussed subsequently are statistically significant (at levels described in Tables 3 and 4) and hold for both the entertainment and communications service.

Determinants of payment equity. The findings indicate that customers' assessments of payment equity are influenced by their initial expectations (H_1) and comparisons with three types of normative expectations. They compare their current usage levels with their normative expectations of usage (H_2), their current payment levels with their normative expectations of payment (H_3), and their perceptions of current service performance with their normative expectations for the service (H_4). These results are consistent for both the entertainment and communications services (see Table 3).

Determinants of customer satisfaction. The antecedents of customer satisfaction/dissatisfaction are well established, so we focus here on findings that are new to the marketing literature. It is important to note that these effects are statistically significant, after controlling for performance and disconfirmation of performance expectations. There is a strong relationship between customers' assessments of payment equity ($PayEquity_t$) and satisfaction (H_5). This finding is consistent with prior research regarding the role of equity in influencing satisfaction (e.g., Oliver and Swan 1989b), but it highlights the impact of the construct we have called "payment equity," which has not been examined elsewhere. As hypothesized ($H_{6a, b}$), customers evaluate the exchange as more satisfactory when payments ($NCPay_t$) are lower than expected or budgeted (see Table 3).

Determinants of usage. Customers who have high levels of cumulative satisfaction ($Ovsat_t$) with a continuously provided service in the current time period will have higher usage levels of the service in a subsequent time period (H_7, see Table 4). The other key factor affecting the customer's usage of a service is price. As the fixed portion of price rises relative to the customer's normative expectations ($NCPrice_t$), he or she compensates by increasing subsequent usage (H_8). This behavior is not irrational, nor does it contradict the conventional notion of a downward-sloping demand curve, because price also operates indirectly on usage through payment equity and satisfaction. For example, this usage increase may be offset by a simultaneous usage decrease if the price increase (through lower payment equity) leads to lower satisfaction levels and, consequently, lower usage. (These effects are discussed in more detail subsequently.) Overall, the customer maintains an internal sense of what makes the relationship equitable and satisfactory and adjusts his or her (controllable) usage appropriately.[10] In the section that follows, we discuss the results and focus on the implications of these results for theory and practice.

DISCUSSION

In this study, we have identified causal links among customer's prior usage, satisfaction evaluations, and subsequent usage. By introducing (and examining) the concept of pay-

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[9]The antecedents of payment equity have not been examined in prior research; therefore, there is no null model comparison for this equation.

[10]Given this surprising result, it is important to examine whether the causality could be reversed; that is, the firm increases price in response to increased usage or the customer anticipates increased usage and, therefore, changes pricing plan. For the entertainment service, this is not the case, because prices are set exogenously by the firm and do not depend on customer usage. For the communications service, though customers do migrate to other pricing plans, prior research suggests that consumers do not predict their future behavior well (Kahneman and Snell 1992; Simonson 1990). In this study, it seems most likely that customers either were placed initially on the wrong rate plan for their usage level or became aware of the existence of a rate plan they believed to be preferable for their level of usage. In both databases, therefore, the results appear to support H_8.

Table 3

EQUITY AND SATISFACTION LEAST SQUARES ESTIMATION RESULTS

Predictor Variable and Hypothesis		Entertainment		Communications	
		Payment Equity Equation			
Predictor Variable	Hypothesis	Coefficient	% Explained Variance†	Coefficient	% Explained Variance†
Intercept		1.154***		1.108***	
NExpect$_{t=0}$	H$_1$	.131**	.092	.994***	.065
NCUsage$_t$	H$_{2a}$/H$_{2b}$	.363***	.628	−.022	.002
NCPay$_t$: Fixed Loss	H$_{3a}$	−.005	.000	−.264*	.014
Gain	H$_{3b}$	.372***	.0899	−.586	.038
NCPay$_t$: Variable Loss	H$_{3a}$	N/A	N/A	−.018	.000
Gain	H$_{3b}$			−.018	.010
NCPerf$_t$	H$_4$	.070 (Called)	.001	.398***	.478
		.241** (Resolved)	.039		
Base usage level	Z$_{Equity}$	.000	.000	.001	.022
Base payment level	Z$_{Equity}$	−.022**	.039	−.005**	.106
Tangibles	Z$_{Equity}$	.231***	.111	.360***	.259
				.030	.007
R squared		.39*** (n = 184)		.25*** (n = 409)	
		Satisfaction Equation			
Intercept		.519		.149	
PayEquity$_t$	H$_5$	.684***	.821	.809***	.697
NCPay$_t$: Fixed Loss	H$_{6a}$	−.208**	.027	.228*	.006
Gain	H$_{6b}$	−.172	.010	−.079	.000
NCPay$_t$: Variable Loss	H$_{6a}$	N/A	N/A	−.022	.003
Gain	H$_{6b}$			−.027	.000
Performance: Service	Z$_{Ovsat}$	.064***	.027	.314***	.059
Performance: Goods	Z$_{Ovsat}$	.231***	.060	−.038	.001
Disconfirmation: Performance	Z$_{Ovsat}$	−.867***	.037	−.864*** (Called)	.127
				.168** (Resolved)	.099
Disconfirmation: Usage	Z$_{Ovsat}$	.000	.000	−.015	.002
Price: Fixed	Z$_{Ovsat}$	.017**	.018	.005*	.006
Price: Variable				−.007	.000
R squared		.53*** (n = 184)		.34*** (n = 409)	

*p < .15.
**p < .10.
***p < .01, two-tailed tests.
†This column shows the percentage of explained variance in the dependent variable that is accounted for by the predictor variable, and the values sum to 1 within each equation. Values are rounded to three decimal places, so very small values are shown as .000.

ment equity, we were able to investigate the ways in which usage and price influence the provider–customer relationship (over time) through usage, equity, satisfaction, and subsequent usage. Most important, the study provides an in-depth examination of the dynamic relationship between customer satisfaction and customer usage.

By using insights from the customer satisfaction, mental accounting, and perceived justice literature, we can explain the dynamics of the service provider–customer relationship in several important ways. The findings show that the customer assesses the subjective expected value of his or her future usage of the service by considering how resources currently are exchanged in the provider–customer relationship, specifically, the fairness or equity of the exchange of

resources in the relationship. Across two service contexts, in two distinct industries, we find remarkable consistency in the model results.

Theoretical Implications

The findings suggest that customers seek to maintain payment equity in the service relationship, adjusting items under their control (usage levels) in response to changes made by the firm (price changes, perceived changes in service quality). Customers evaluate the fairness of the exchange of inputs (primarily payments) for outcomes (primarily service usage and performance) in the relationship. Customers appear to assess payment equity by encoding their experiences in terms of gains or losses relative to their

Table 4
FUTURE USAGE TOBIT RESULTS

Predictor Variable and Hypothesis	Hypothesis	Entertainment		Communications	
		Coefficient	% Explained Variance†	Coefficient	% Explained Variance†
Intercept		−2052.08***		−203.555***	
$Ovsat_t$	H_7	310.501***	.125	34.600 ***	.173
$NCPrice_t$: Fixed	H_8	260.024***	.062	30.140**	.021
$NCPrice_t$: Variable	H_8	N/A	N/A	−4.608	.022
Price: Fixed	Z_{Usage}	−3.903	.001	1.818***	.164
Price: Variable	Z_{Usage}	N/A	N/A	47.987	.209
Prior Usage	Z_{Usage}	.602***	.812	.337***	.412
Log-likelihood (model)		−1413.75***		−2101.68***	
Log-likelihood (null model)		−1465.06		−2188.48	
Observations		180		447	

*$p < .15$.
**$p < .05$.
***$p < .01$, two-tailed tests.
†This column shows the percentage of explained variance in the dependent variable that is accounted for by the predictor variable, so the values sum to 1.

Table 5
SUMMARY OF HYPOTHESIS TEST RESULTS

Hypothesis	Brief Summary	Entertainment Result	Communications Result
H_1	A customer will evaluate the exchange as more equitable when his or her initial expectations regarding usage levels are high.	Supported	Supported
H_{2a} and H_{2b}	If the total cost of the service is independent of usage, a customer will evaluate the exchange as more equitable when current usage levels are higher than his or her normative expectations. Otherwise, he or she will not be influenced by them.	Supported	Supported
H_{3a} and H_{3b}	A customer will evaluate the exchange as more (less) equitable when the payment is less (more) than his or her normative expectations.	Supported (gains)	Supported for fixed payment (losses)
H_4	A customer will evaluate the exchange as more equitable when current service performance is better than his or her normative expectations.	Supported	Supported
H_5	A customer will be more satisfied when he or she perceives the price/usage exchange to be more equitable.	Supported	Supported
H_{6a} and H_{6b}	A customer will be more (less) satisfied when the payment is less (greater) than his or her expectations.	Supported (losses)	Not supported for fixed payment (losses weak reversal)
H_7	A customer's perceived value for usage in a subsequent period will be related positively to overall satisfaction in the current period.	Supported	Supported
H_8	A customer's perceived value for usage in a subsequent period will be related positively to increases in price relative to his or her initial normative expectations.	Supported	Supported

normative expectations of themselves and the service. These personal normative expectations of usage levels are related strongly to customer equity of the service relationship, but customers' actual usage levels are not. Rather, customers compare their actual usage, payments, and service performance with their normative expectations of these aspects of the service relationship. For example, this study suggests that customers with low (actual) levels of use may perceive a service as highly equitable and may be satisfied because it is customer expectations of use that are critical, not actual use.

By incorporating the concept of payment equity into a dynamic model of customer usage and satisfaction, we can begin to determine how the effects of customer usage and firm pricing levels affect the customer–provider relationship over time. We find that payment equity has a strong effect on customer satisfaction, in addition to the effects of performance and disconfirmation. Customers' comparison of current payments with normative expectations has a direct effect on customer satisfaction as well. Finally, the results provide causal evidence that high customer satisfaction leads to high usage levels in future periods.

The most surprising theoretical insight resides in the multiple effects of price on the customer–provider relationship. Specifically, we find that the effect of price on usage levels is complex; this study has shown that it operates in four different ways. First, price operates through payment levels to influence payment equity. Second, price appears to affect satisfaction as well, in addition to its effects through payment equity, thereby (indirectly) influencing usage in the subsequent period. Third, customers compare price with their normative expectations to decide the level of future use, increasing service usage as price increases to maintain equity in the relationship. Fourth, price appears to have a (traditional) direct effect on subsequent usage as well; we find that higher price, cross-sectionally, is associated with lower usage.

Customers appear to evaluate payment levels in a service relationship from both hedonic and utilitarian perspectives. For fixed price services, changes in payment (relative to normative expectations) affect equity and satisfaction in different ways. Customers appear to be more sensitive to gains (price decreases) when evaluating equity, yet more sensitive to losses (price increases) when evaluating overall satisfaction. For two-part pricing contexts, the customer's need to budget and control expenditures appears to drive the results. In this case, higher fixed payments, relative to normative expectations, have a positive effect on cumulative satisfaction (which includes a relatively hedonic component). Customers may prefer payments to match budgeted levels and be controllable. In contrast, higher fixed payments, relative to normative expectations, have a negative effect on payment equity, which is a relatively utilitarian evaluation. Cross-sectionally, we also find that price operates differently on equity and satisfaction. Higher price is associated with lower payment equity but higher satisfaction. Overall, the model provides a framework within which we can begin to examine the dynamic nature of the relationships among price, customer usage, and customer evaluations of a service relationship.

Strategic Implications

In its broadest sense, the key implication of this research for marketing managers is that managing customer usage levels may be as important as managing customer satisfaction for long-term customer profitability. In this research, we begin to understand that customer usage of the service and customer expectations of such usage can be managed. They are key variables in customer relationship management, affecting equity, customer satisfaction, and, ultimately, customer retention. Because we have found these causal links in two different industries, we believe they are likely to generalize to other continuously provided services.

The study's findings provide several actionable insights for managers in service organizations. First, many organizations segment the market on the basis of usage, implicitly assuming that customer usage levels are determined exogenously and/or are relatively stable. Yet this study highlights that usage is a decision the customer makes on the basis of his or her experiences with the service provider. Customers appear to manage usage to maintain payment equity and cumulative satisfaction in the service relationship. This finding suggests that service marketers should be equally proactive in managing their resources to maintain payment equity and satisfaction, for example, customizing service bundles,

migrating customers to more attractive price plans, and so forth. The goal of these efforts should be to create a high level of consistency among marketing mix elements, which should lead to payment equity and satisfaction. The danger to the organization of failing to manage the relationship proactively is that customers may stop using the service, which implies that they have exited from the relationship with the service organization, possibly to use another organization's services.

Second, the findings suggest that pricing strategy for services may be much more complex than previously believed. Marketing managers should weigh the effects of pricing policy on equity, satisfaction, and future usage when setting prices for continuously provided services. Although price increases may lead to decreases in payment equity, organizations may be able to introduce pricing plans that increase (net) overall satisfaction and usage of the service. In addition, managers should monitor how their pricing policies are influencing customer evaluations and actions over time.

Third, we find significant differences in the impact of price and price changes for fixed price and two-part pricing services, which suggests that pricing strategies may play an important role in long-term customer satisfaction, usage, and loyalty. Although there are highly sophisticated models of the effect of price on short-run behavior (e.g., trial or choice behavior), managers to date have paid much less attention to the effect of price on long-run behavior with respect to continuously provided services. Our results suggest that organizations should include measures of customers' perceptions of the fairness of the exchange relationship in their customer satisfaction or service quality monitoring programs and attempt to account for the effects of price in understanding how customer evaluations and usage levels change in the long run.

Fourth, and perhaps most important, we have attempted to create a framework that will enable marketing managers to examine the state of the relationship with their customers over time. Implicit in this framework is the idea that we must understand not only customers' reactions to the firm's actions (changes in price, marketing communications, or the service itself), but also customers' reactions to their own decisions and actions (usage levels, normative comparisons). By understanding how the actions and reactions of both parties in the relationship affect the customer–provider relationship over time, we can begin to manage these relationships in much more effective ways.

CONCLUSION

This study has sought to integrate the expectancy disconfirmation and equity streams in consumer behavior research to examine the relationships among customer usage levels, equity, satisfaction, and subsequent usage. The findings suggest several avenues for further research. First, it would be interesting to examine how customers determine the threshold value of usage and how this threshold value might vary across customers. Second, additional research might investigate the antecedents of equity, satisfaction, and usage behavior in markets in which normative expectations are driven strongly by marketing communications, service enhancements, or competitive behavior. Third, the finding that higher prices are related to lower payment equity, yet higher satisfaction, could be explored in other study contexts. Fourth, the distinctions between fixed price services and

two-part price services should be examined in greater detail. Specifically, now that we have uncovered a more complex relationship between pricing and usage, this may call for a fresh look at optimal two-part pricing policies for maximizing long-term profitability that incorporates the effects of price on customer usage levels and customer retention. Fifth, though the model is supported with data from two distinct services, these relationships should be investigated in other services (and perhaps goods) settings as well.

In summary, managing customers' assessments of payment equity and satisfaction may have positive benefits for the organization downstream, in terms of usage, loyalty, and profits. Recently, Blattberg and Deighton (1996, p. 137) stated that "growing a business can therefore be framed as a matter of getting customers and keeping them so as to grow the value of the customer base ... to its fullest potential." It is critical to understand the drivers of customer value, such as equity, satisfaction, and usage, and to recognize that marketing activities can affect these value drivers in disparate ways. By applying these insights, marketing managers can more effectively grow the value of each customer.

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