Customer Franchise—A Hidden, Yet Crucial, Asset*

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1. Introduction

The role of non-GAAP information in firm valuation has attracted strong interest from both academics and practitioners. Extant research explores a breadth of non-GAAP indicators, such as order backlog (Lev and Thiagarajan 1993), customer satisfaction (Ittner and Larcker 1998; Banker and Mashruwala 2007), wireless phone metrics (Amir and Lev 1996; Livne, Simpson, and Talmor 2011; Simpson 2010), web usage data (Trueman, Wong, and Zhang 2000), brand values (Barth, Clement, Foster, and Kasznik 1998), biotech companies' product pipeline content (Guo, Lev, and Zhou 2004; Hand 2005), and firms' patent attributes (Deng, Lev, and Narin 1999). These studies typically examine the association between such non-GAAP indicators and contemporaneous stock prices and returns, or, in few cases, future performance. While the authors provide institutional details justifying the link between the individual metrics and firm value, they generally stop short of fleshing out the crucial mechanism by which the examined non-GAAP variables interact to jointly affect a firm's earnings and, ultimately, its stock price.

In contrast, we start our examination of the fast-growing group of subscription-based enterprises (SBEs)—companies that offer a for-fee-per-period access to products or services—by identifying the major elements of their business model: new customer acquisition, retention of existing customers, maximizing revenues, and minimizing operating costs.[1] We then use these business process fundamentals to construct a comprehensive measure which values the firm's customer franchise—a major, yet undisclosed asset of these firms. For the sample companies, we find that, on average, our estimate of customer value is approximately 2.2 times book value of equity and 80 percent of the recognized assets.

The omission of customer value from the balance sheet raises various accounting reliability and asset recognition issues which are not the focus of this study. Rather, we are interested in the information content of the customer equity metric and whether statement users utilize it efficiently. To this end, we raise two questions within the

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1. As we discuss later, the approach we propose in this study extends to most industries. We focus on SBEs as their business model allows for an easy identification and relatively accurate measurement of the necessary model inputs and, as SBEs are quickly expanding their role in the economy, they are likely to attract attention from both investors and regulators.

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framework of SBEs: Is customer value incrementally informative about firm value, controlling for other financial and nonfinancial data?; and, is customer value useful in predicting future profitability? Importantly, we also examine whether our aggregate measure provides information incremental to the individual components of the customer equity model.

Our results provide affirmative answers to each of the questions above. Controlling for self-selection, we find that our measure of customer value is positively associated with share price, and the association is incremental to both GAAP and non-GAAP variables commonly used in equity valuation. Results also indicate that customer equity is an important predictor of future profitability. Notably, we demonstrate that the relation is incremental to analysts' earnings forecasts and, in fact, the metric predicts earnings forecast errors, providing evidence that the link is not mechanical. Consistent with the conjecture that accounting for the interaction among the individual components of customer value provides important information, we find that the documented results remain after augmenting the regression models with the individual variables used to calculate the value of customer equity.

We believe that our findings are relevant to academics, investors, practitioners, and regulators. Our evidence is consistent with the conjecture that the value of customer equity provides important insights into a firm's economic position and performance, which is incremental to GAAP data, and auditors can use the measure to assess customer-related intangible assets and goodwill impairment. Standard setters should also find our analysis helpful in identifying and recommending new disclosure items (Wiesel, Skiera, and Villanueva 2008). This issue is particularly salient as, in practice, an increasing number of companies are voluntarily disclosing certain customer base-related data in financial statements, press releases, and conference calls. However, there is no uniformity or consistency in these disclosures, making an efficient analysis and valuation of SBEs challenging and, in the case of nondisclosers, nearly impossible. Our study, therefore, informs both regulators and SBEs on disclosure useful to statement users and provides an algorithm for summarizing these data into a measure of customer value. Importantly, our findings highlight the need to go beyond the evaluation of individual value drivers and also consider their dynamic interaction.

The rest of the paper is organized as follows. Section 2 discusses the characteristics of subscription-based enterprises; section 3 outlines the algorithm for calculating customer equity value; section 4 describes the sample; section 5 discusses the regression models and summarizes the empirical findings; and, section 6 provides concluding remarks.

2. Characteristics of subscription-based enterprises

We apply the "SBE" moniker to companies that structure their operations so that a customer pays a fee for the right to access products or services for a period of time. While pioneered by magazine and newspaper publishers, this business model is quickly spreading across industries including, among others, Internet service providers, telecom, and software. An attractive feature of SBEs is that the acquisition and departure of customers are clearly observable, allowing companies to track closely the composition and profitability of their customer base.[2]

Companies employing subscription-based models benefit from acquiring customers at the lowest possible cost, increasing the monthly average margin per user, and

2. The subsequent analysis could be extended to noncontractual settings, for example, restaurants, retailers, or airlines. This, however, requires modeling the probability of repeat purchases (Borle, Singh, and Jain 2008; Fader, Hardie, and Shang 2010; Wübben and Wangenheim 2008), which unnecessarily complicates the analysis.

retaining existing profitable customers. Importantly, these drivers are not independent: As an example, while increasing price or decreasing quality, hence cost of service, increases margin, both lead to higher customer turnover. Following this rationale, the economics of subscription-based models are driven by four key factors: (i) average revenue per customer, (ii) cost per customer acquisition, (iii) cost of service, and (iv) churn. Consistent with this notion, the majority of companies we identify as SBEs provide data for at least one of these customer metrics. Specifically, the most widely, albeit not uniformly, disclosed customer performance metrics in our sample are:

- Number of subscribers: Number of active customers at the end of the period.
- Gross customer additions: Number of new customers that joined the company during the fiscal period.
- Net customer additions: Gross number of new customers acquired during the period, less the number of deactivated customers.
- Churn: Rate of customer attrition, measured as cancellations per user per period. Churn rates are generally presented on a monthly basis.
- Average revenue per customer: Average monthly service revenue per subscriber.
- Cost of service: Average monthly cost of providing services and support to existing customers per subscriber.
- Cost per gross addition: Average cost incurred to acquire new customers. This measure is used to evaluate how effective marketing programs are in bringing in new subscribers. It is also commonly referred to as subscriber acquisition costs.

Notably, a large number of the companies we identify as subscription-based businesses disclose only a subset of these customer-related metrics. While a discussion of the full set of drivers of the heterogeneous disclosure practices among SBEs is beyond the scope of this paper, potential reasons for the lack of uniformity include competitive pressures and the voluntary nature of the disclosure. As a practical matter, however, both the choice of whether to disclose and the level of detail provided determine the structure of our sample, as we require a minimum level of disclosure to estimate the value of customer equity (we describe the model in the next section). In Appendix 1, we provide an example of the disclosure we use in applying the customer equity valuation model.

3. The valuation of customer equity

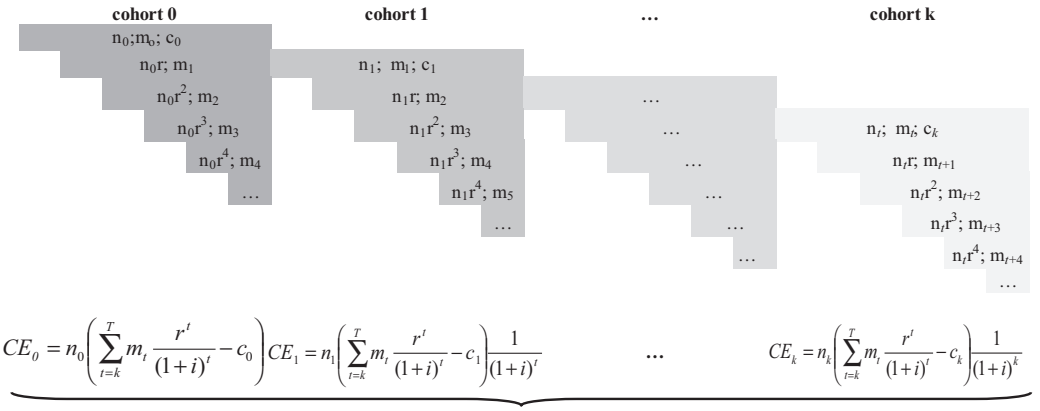
The fundamentals for valuing customer equity (*CE*) have been developed in the customer lifetime value (CLV) literature, which we extend to the accounting field.[3] Extant research proposes several methods for estimating *CE*, which, while analytically elegant, are generally complex and call for numerous inputs. This, in turn, has constrained the empirical examination of *CE* to very small samples, often individual companies, in very specific settings (e.g., Fader, Hardie, and Lee 2005; Gupta, Lehmann, and Stuart 2004; Kumar and Shah 2009; Lewis 2005; Reinartz and Kumar 2000; Rust, Lemon, and Zeithaml 2004; Silveira, de Oliveira, and Luce 2012; Venkatesan and Kumar 2004; Schulze, Skiera, and Wiesel 2012).

Building on prior work, we refer to two concepts that can be used when evaluating the expected profitability of a firm's customer base (Villanueva and Hanssens 2007):

3. *CLV* is the disaggregated measure and *CE* is the aggregate measure of customer value (Gleaves, Burton, Kitshoff, Bates, and Whittington 2008; Pfeifer, Haskins, and Conroy 2005). In essence, *CLV* is the present value of expected future profit margins for each customer and *CE* is the sum of the lifetime values of all customers.

- Current customer equity (*CEcur*): The sum of the future profit margins generated from the customers that have already been acquired by the end of the period (Villanueva and Hanssens 2007, 5).
- Total customer equity (*CEtot*): The sum of the future profit margins generated from current and future customers of the firm (Hogan et al. 2002; Kumar and Shah 2009).

Figure 1 Theoretical model for deriving the value of customer equity



where:

n_k = number of customers acquired in the k_{th} cohort at time t
$n_k r^{(t-k)}$ = remaining customers at the end of period t
m_t = profit margin for each period t
T = horizon of the valuation
t = time period
k = cohorts
r = monthly retention rate
i = cost of capital for the firm
c_k = cost of customer acquisition

In the marketing literature, it is common to estimate the lifetime value of actual and future customers by tracking the evolution of each "customer cohort," that is, group of customers acquired during a particular period (e.g., Gupta et al. 2004). The general process underlying the models is: The firm initially acquires n_0 customers at time t_0 at an acquisition cost of c_0 per customer; then, over time, customers defect at a fixed defection rate, $(1-r)$, such that the firm is left with $n_0 r$ customers at the end of period 1, $n_0 r^2$ customers at the end of period 2, and so on (Figure 1). The value of the firm's customer base is then estimated as the sum of the discounted customer lifetime values of all cohorts (Berger and Nasr 1998; Gupta and Lehmann 2005; Gupta et al. 2004). The customer equity value, therefore, is expressed as:

$$CEtot = \sum_{k=0}^{T} n_k \left(\sum_{t=k}^{T} m_t \frac{r^{t-k}}{(1+i)^{t-k}} - c_k \right) \frac{1}{(1+i)^k}, \quad (1)$$

where t is the unit of time in the analysis; T is the horizon of the valuation; k is the cohort; n is the number of customers; m is the profit margin; r is the retention rate (1 minus the churn rate); c is the acquisition cost; and i is the weighted-average cost of capital.

In our analyses, we focus on the value of the current customer base, which derives from a simplified version of (1) (Gupta et al. 2004).[4] Specifically, under the assumptions that the profit margin and customer churn are constant and the acquisition of future customers is a zero net present value project, customer equity could be expressed as:[5,6]

$$CE = CEcur = n\sum_{t=1}^{T} m\frac{r^t}{(1+i)^t} \rightarrow n\left[m\frac{r}{(1+i-r)}\right], \quad \text{as } T \rightarrow \infty. \tag{2}$$

To estimate the value of a firm's customer base, we require several inputs: the number of customers, margin per customer, customer retention rate, and cost of capital for the firm. Number of customers refers to the active customer base at the end of the fiscal quarter. Margin per customer is measured as the difference between average revenue per customer ($ARPU$) and cost of service. Similar to the number of customers, most companies that disclose customer-related metrics provide sufficient data to infer revenue per customer. That is, when a company does not disclose the figure directly, we derive it by dividing subscriber revenues by the weighted-average number of customers for the period. Some companies, however, do not disclose cost of service per customer. In these cases, we estimate the metric by applying to $ARPU$ the ratio of "cost of service" to "service revenue" from the income statement. When companies provide the disclosure by segment (e.g., U.S. and non-U.S.), we use the weighted average of the reported customer metrics.

Turning to the customer retention rate, its estimation plays a critical role in the model, as it reflects the likelihood that a customer will leave the company in a future period. Analyses of parametric and nonparametric models to calculate customer lifetime (i.e., how long a customer is expected to stay with the firm and create value) are beyond the scope of this study, so we assume the historical churn rate will persist in the future.[7] In practical terms, we derive the probability of a current customer to remain active during the next period as (1 minus the churn rate).

The last model input is cost of capital. To measure cost of capital, we apply the model proposed by Lyle, Callen, and Elliott (2013). This model builds on the Ohlson (1995) framework and derives dynamic discount rates at the firm-period level. In particular, the model demonstrates that cost of capital can be represented as a linear function of book value of equity, dividends, current and expected earnings, and firm size (equation 13 in the paper).

4. For the remainder of the paper, we use *CE*, *CEcur*, customer equity, and customer franchise value interchangeably.
5. The zero NPV assumption could be considered problematic for growing companies. As a robustness test we partition the sample by firm age and find that, consistent with theory, the association between customer equity and market value is higher for growing firms.
6. The constant profit and retention rate assumptions, while not too strong (Gupta and Lehmann 2005), allow for the generation of a parsimonious model that is easily implementable in practice. In addition, we do not introduce taxes in the model: While the extension is analytically straightforward, the practical implementation presents challenges without contributing to the insights.
7. Examples of projecting retention rate are offered in Fader and Hardie (2007) and Rosset, Neumann, Eick, and Vatnik (2003).

To empirically implement the model, we apply a modified version of the methodology proposed by Lyle et al. (2013).[8] These modifications address issues arising from the relatively small size of our sample, the high frequency of observations with negative book value of equity, net income, and earnings forecasts, and the use of the customer equity metric in the empirical analysis. Our first modification is to estimate the model as industry-level time series. The model takes the form:

$$Ret_{q,q+4} = \mu_0 + \mu_1 \frac{1}{Size_q} + \mu_2 \frac{BVE_q}{Size_q} + \mu_3 \frac{\sum_{t=q-3}^{q} NI_t}{Size_q} + \mu_4 \frac{AF_{t+1}}{Size_q} + \mu_5 \frac{\sum_{t=q-3}^{q} DIV_t}{Size_q} + \varepsilon_{q,q+4}, \quad (3)$$

where $Ret_{q,q+4}$ is the dividend-adjusted percentage change in market value of equity for the subsequent four quarters, *Size* is market value of equity, *BVE* is book value of equity, *NI* is net income before extraordinary items, AF_{t+1} is the consensus analysts' annual earnings forecast calculated as the time-weighted average of the forecasts for years $T + 1$ and $T + 2$, and *DIV* is dividends. All variables are aggregated at the industry level and q is the measurement quarter. We estimate the model as 10-year (40 quarters) rolling regressions and apply the estimated coefficients to the firm-level fundamentals to calculate the firm-quarter cost of capital. Our second modification deals with missing estimates: If a firm-quarter does not have sufficient data to estimate the cost of capital, we assign to this firm-quarter the cost of capital value of the firm-quarter-industry observation which has the closest book-to-market value of equity and total assets.

Finally, to mitigate the impact of cost of capital outliers, we winsorize the cost of capital estimates at the minimum of the risk-free rate (3-month T-bill) and the maximum of risk-free rate plus 30 percent per annum. We verify that the results are not sensitive to our empirical implementation of the model or the winsorization thresholds. As examples, we repeat the analysis using annual time-series regressions and winsorizing at 50 percent per annum. As robustness check, we also repeat all analyses using a constant annual discount rate of 12 percent (e.g., Frankel and Lee 1998; Gupta et al. 2004). We find consistent evidence across all approaches.

As described in the preceding paragraphs, in the empirical analysis we focus on *CEcur* instead of *CEtot*, that is, we assume that the acquisition of new customers is a zero NPV project. This design choice is driven primarily by the fact that forecasting future customer acquisitions and their outcomes requires a high degree of subjectivity. Among the practical challenges, three stand out:

(i) Customer growth: A diffusion model is a natural candidate for estimation of the growth of the customer base (Gupta et al. 2004; Kim, Mahajan, and Srivastava 1995). Such an approach requires the solution of nonlinear differential equations, and the resulting model is too complex to operationalize for a large sample (e.g., Pfeifer 2011).
(ii) Acquisition cost: Within our sample more than one-third of the companies do not report these data. While, in some cases, total marketing costs could be used to derive a crude proxy for the metric, the nonrandom loss of observations is likely to bias the reported results.
(iii) Discount rate: Theoretically, the discount rate for future customers' cash flow should be higher than the discount rate used for the current customers' cash flows. The discount rate is supposed to capture the risk inherent in the customer type: A current customer is more likely to stay with the company through good times and bad. Furthermore, whether or not a company can acquire new customers is strongly impacted by macro- and microeconomic factors.

8. We thank Matt Lyle for sharing his code. As we discuss next, we estimate the model using industry-level time series. However, inferences are similar if we use a cross-sectional estimator instead (untabulated).

In summary, by focusing on the current customers of a company, we obtain a parsimonious and easy-to-implement model of customer equity. Despite the fact that our estimate likely understates the customer franchise intangible asset, we demonstrate that it is a useful practical valuation tool which provides a summary performance metric which managers and investors can track over time.[9]

4. Sample selection and descriptive statistics

Sample selection

We conduct the empirical analysis using a sample of U.S. companies that employ a subscription-based business model and disclose the necessary inputs for estimating the value of customer equity, *CEcur* (we provide a list of the sample companies in Appendix 2). To identify the candidate companies, we use the *advanced search* function on EDGAR Full-Text, searching for the keywords "churn" and "arpu" ("churn" and "average revenue per user"). Expecting that companies may discuss the customer-related metrics outside the 10-Q filings, we also search conference call transcripts obtained from Thomson Street Events.[10] We supplement this examination with a review of the analysts' reports from Investext® for the company-quarters with less than complete data on the customer metrics necessary to calculate *CE*. Interestingly, we find that the conference calls and analysts' reports do not reflect customer-related data beyond those available in the companies' SEC filings. In fact, we do not find company-quarters with customer-related data in the analysts' reports or conference calls that are not already disclosed in the SEC filings.

We obtain the necessary data from company filings and, when possible, machine-readable sources. Specifically, for the companies identified to disclose customer-related metrics, we hand-collect the inputs for the customer equity model from the 10-Qs filed with the SEC. We obtain the rest of the financial data for the empirical tests from the COMPUSTAT Xpressfeed Quarterly Tapes. We also obtain stock prices from the CRSP Daily Tapes and analysts' consensus earnings and long-term growth forecasts from I/B/E/S. We provide variable definitions in Appendix 3.

Our search and additional data requirements—stock price one business day after the 10-Q filing date, net income, book value of common equity, and inputs to the cost of capital and the disclosure selection models (discussed in the next section)—result in a sample of 576 firm-quarter observations for 31 companies. As some of the analyses require additional data, the number of observations varies across tests. Our sample period spans 2002 through 2010. We start the sample in 2002 for two reasons: Prior to 2002 very few companies disclose the data necessary to calculate *CE*; and, to avoid potential bias stemming from the Internet bubble.

Descriptive statistics

Table 1 presents descriptive statistics for the sample. The average company is relatively large ($6.1 billion in total assets and $0.97 billion in net sales). However, the sample is skewed ($1.4 and $0.25 billion in assets and sales for the median company, respectively). While the average company-quarter is profitable, 42 percent of the observations reflect loss before extraordinary items during the period. More so, 20 percent of the observations have negative book value of equity, characteristics typical of emerging, early-stage, firms.

The average (median) book-to-market value of equity ratio for the sample is 0.16 (0.28), notably below 1, suggesting that the balance sheet omits a substantial portion of

9. Recent empirical work documents that, in practice, current customer equity is a sufficiently close approximation of total customer equity (Silveira et al. 2012).

10. In this study, we refer to forms 10-Q and 10-K jointly as "10-Q."

TABLE 1
Descriptive statistics

	# Obs.	Mean	$Q1$	Median	$Q3$	SD
Assets	576	6,118	460.3	1,431	5,738	14,046
Sales	576	968.7	118.0	251.6	786.1	1,880
NI	576	6.040	−15.33	2.699	35.73	167.2
BVE	576	2,222	30.14	226.3	1,707	6,891
MVE_{10Q}	576	4,764	340.7	1,167	4,475	8,752
LTG	428	21.49	11.50	20.00	30.00	15.09
Sales Growth	576	0.223	0.013	0.122	0.268	0.427
Loss	576	0.422	0.000	0.000	1.000	0.494
negBVE	576	0.198	0.000	0.000	0.000	0.399
Age	576	13.02	6.000	10.00	15.00	10.93
Analyst Following	576	10.01	3.000	8.000	16.00	7.960
Churn	576	0.028	0.017	0.023	0.037	0.015
Margin	576	41.15	9.72	23.25	34.85	78.30
Subscribers	576	6.278	0.701	3.379	6.790	9.402
Cost of capital	576	0.016	0.004	0.022	0.024	0.010
CE	576	4,822	303.4	975.3	5,842	9,205
CV	576	7,116	426.9	1,032	7,277	16,135
BM	576	0.159	0.056	0.276	0.602	1.307
CV/MVE_{10Q}	576	1.983	0.668	1.205	2.026	2.597
$CE/Assets_{q-1}$	576	1.100	0.364	0.795	1.410	1.061
$\Sigma OpInc_{q+1,\ q+4}/Assets_{q-1}$	539	0.056	−0.008	0.075	0.159	0.159
$\Sigma FE_{q+1,\ q+4}/Assets_{q-1}$	489	0.009	−0.015	0.002	0.019	0.084

Notes:

All variables are as defined in Appendix 3. All continuous variables, except for *Cost of capital*, are winsorized at 1 percent and 99 percent.

the firms' value drivers. Interestingly, when book value of equity is converted to comprehensive value, defined as the sum of the estimated value of customer equity, *CE*, and the reported book value of equity (Gu and Lev 2011), the ratio increases to 1.98 (1.21) for the average (median) firm-quarter. Turning to the Spearman correlations (Table 2), it is notable that *CE* is significantly positively correlated with current market value of equity. More so, *CE* is significantly correlated with both operating income and the analysts' earnings forecast error for the subsequent four quarters. These univariate results are consistent with the notion that our measure of customer equity is informative and the equity market incorporates in stock price (at least some of) the information embedded in *CE*.

While our estimate of *CE* is significantly correlated with measures of current value and future operating performance, the results for the individual model inputs are less straightforward. Focusing again on the Spearman correlations, *Churn*, *Margin*, and *Subscribers* are each associated with current market value of equity in the expected direction. Turning to future profitability, however, while the correlation coefficients on all three metrics are significant, the sign on *Churn* is opposite to the expected one. Focusing on the cost of capital estimate, it is significantly negatively correlated with our measure of customer equity, as expected. It is also significantly positively correlated with *Churn* and negatively correlated with *Margin*. These observations reinforce the importance of focusing on the customer franchise value, the intangible derived from the business model, as a whole rather than the individual performance metrics.

TABLE 2
Spearman (Pearson) correlations are below (above) the diagonal

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	MVE_{10Q}	–	0.808	0.240	0.894	−0.057	0.011	−0.235	−0.061	0.774	−0.051	0.082	−0.072
			(0.01)	(0.01)	(0.01)	(0.17)	(0.80)	(0.01)	(0.14)	(0.01)	(0.22)	(0.06)	(0.11)
(2)	*BVE*	0.623	–	−0.056	0.875	−0.101	−0.046	−0.087	−0.024	0.791	−0.105	−0.032	−0.062
		(0.01)		(0.18)	(0.01)	(0.02)	(0.27)	(0.04)	(0.57)	(0.01)	(0.01)	(0.45)	(0.17)
(3)	*NI*	0.398	0.318	–	0.053	0.091	−0.190	−0.086	0.030	−0.135	−0.065	0.356	0.034
		(0.01)	(0.01)		(0.21)	(0.03)	(0.01)	(0.04)	(0.47)	(0.01)	(0.12)	(0.01)	(0.46)
(4)	*CE*	0.758	0.447	0.369	–	−0.001	−0.084	−0.254	−0.048	0.882	−0.119	0.087	−0.085
		(0.01)	(0.01)	(0.01)		(0.98)	(0.04)	(0.01)	(0.25)	(0.01)	(0.01)	(0.04)	(0.06)
(5)	CE/ATQ_{t-1}	0.091	−0.113	0.268	0.380	–	−0.041	−0.236	−0.031	−0.046	−0.046	0.040	0.265
		(0.03)	(0.01)	(0.01)	(0.01)		(0.32)	(0.01)	(0.46)	(0.27)	(0.27)	(0.36)	(0.01)
(6)	*Sales Growth*	0.215	−0.051	−0.111	0.038	0.047	–	−0.032	−0.118	−0.062	−0.005	−0.382	−0.042
		(0.01)	(0.22)	(0.01)	(0.36)	(0.26)		(0.45)	(0. 01)	(0.14)	(0.91)	(0.01)	(0.35)
(7)	*Churn*	−0.330	−0.096	−0.119	−0.410	−0.238	−0.065	–	0.511	−0.159	0.213	0.064	−0.040
		(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.12)		(0.01)	(0.01)	(0.01)	(0.14)	(0.38)
(8)	*Margin*	0.124	0.157	0.285	0.386	0.283	−0.113	−0.083	–	−0.117	0.061	−0.099	−0.095
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.05)		(0.01)	(0.15)	(0.02)	(0.04)
(9)	*Subscribers*	0.808	0.439	0.339	0.818	0.242	0.061	−0.228	−0.029	–	0.116	0.108	−0.052
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.15)	(0.01)	(0.48)		(0.01)	(0.01)	(0.25)
(10)	*Cost of capital*	0.087	−0.102	−0.025	−0.198	−0.030	0.077	0.105	−0.137	0.092	–	−0.062	0.001
		(0.04)	(0.01)	(0.55)	(0.01)	(0.47)	(0.07)	(0.01)	(0.01)	(0.03)		(0.15)	(0.98)
(11)	$\Sigma OpInc_{q+1,\ q+4}$	0.193	0.034	0.607	0.235	0.302	−0.105	0.081	0.110	0.248	−0.069	–	−0.005
		(0.01)	(0.43)	(0.01)	(0.01)	(0.01)	(0.02)	(0.06)	(0.01)	(0.01)	(0.11)		(0.92)
(12)	$\Sigma FE_{q+1,\ q+4}$	−0.076	−0.138	0.122	−0.098	0.230	−0.062	0.092	−0.262	0.053	0.064	0.226	–
		(0.10)	(0.01)	(0.01)	(0.03)	(0.01)	(0.17)	(0.04)	(0.01)	(0.24)	(0.16)	(0.01)	

Notes:

MVE, *BVE*, *NI*, $\Sigma FE_{q+1,\ q+4,}$ and $\Sigma CoreNI_{q+1,\ q+4}$ are scaled by total assets at the beginning of the quarter. All variables are as defined in Appendix 3 and, except for *Cost of capital*, are winsorized at 1 percent and 99 percent.

5. Empirical analysis

In the first part of the study, we outline a parsimonious model aggregating a set of customer base metrics into a measure of customer franchise value, *CE*. To validate the model and shed light on the place of customer equity in the investors' information set, we next examine the association of the derived metric with stock price and future profitability. We start with value-relevance tests, as they are fairly standard in the accounting literature and mimic the empirical analysis in the marketing studies we use as a base for the customer equity valuation model. We then demonstrate that our measure of customer franchise value plays a role in predicting future profitability even after controlling for current and past profitability and the analysts' consensus earnings forecast. Importantly, we verify that the conjectured relationships hold after controlling for the individual inputs to the customer equity model, confirming the informativeness of *CE*.

Self-selection

In this study, we rely on voluntary disclosure of customer-related data to implement the proposed customer equity measure and examine its characteristics. The voluntary nature of the disclosure, however, raises concerns about self-selection bias. To address this issue, we conduct the analysis using a two-stage selection model (Heckman 1979).[11] Specifically, we identify the companies from the same industry group (six-digit GICS code) as the sample firms, which, over the sample period, do not disclose any of the necessary *CE* inputs. Next, we model the propensity to disclose customer-related metrics, considering measures of incentives and demand for disclosure, and calculate the Inverse Mills' ratio (*IMR*) which we include as additional control in the second-stage models. The selection model takes the form:

$$\begin{aligned}\Pr(Disclose = 1) = {} & \delta_0 + \delta_1 \ln\left(MVE_{10Q}\right) + \delta_2 BM + \delta_3 SalesGrowth + \delta_4 Loss \\ & + \delta_5 negBVE + \delta_6 \ln(Age) + \delta_7 Follow + \sum_{j=8}^{12} \delta_j IndFE_j + \varphi,\end{aligned} \tag{4}$$

where $\ln(MVE_{10Q})$ is the log-transformed market value of equity one day after the 10-Q filing date, *BM* is the book-to-market value of equity, *Sales Growth* the seasonally adjusted percentage change in sales revenue, *Loss* (*negBVE*) is an indicator variable set to one if net income (book value of equity) is negative, ln(*Age*) is one plus the number of years for which the company has data in COMPUSTAT, transformed to natural logs, and *Follow* is an indicator variable set to one if there is at least one earnings forecast for the firm during the quarter, as reported by I/B/E/S. The Disclosure and non-Disclosure samples are winsorized individually at 1 percent and 99 percent.

Our choice of explanatory variables reflects previous findings that information asymmetry, proprietary costs, and firm characteristics are important determinants of voluntary disclosure (e.g., Healy and Palepu 2001). Specifically, we include firm size and an indicator for analyst following, as extant research documents that large companies face lower cost and higher demand for disclosure, and the informativeness of disclosure policies increases in analyst following (Lang and Lundholm 1993, 1996).[12] We also consider measures of financial-statement informativeness (*BM*, *Loss*, and *negBVE*), as companies with less informative statements are more likely to provide voluntary disclosure (e.g., Tasker 1998). Last,

11. While propensity score matching has gained popularity as a tool for addressing self-selection bias, we cannot apply it in this setting as we require estimates of customer equity in the regression models, which are not available for the control group.

12. We include in the model *Follow*, an indicator variable reflecting whether or not the firm is followed by at least one analyst, instead of the log-transformed number of analysts following the company, since the latter is highly positively correlated with firm size. Results are not sensitive to this design choice.

we include sales growth, firm age, and industry fixed effects to capture remaining life-cycle and industry-level drivers of disclosure.

We present the regression results in Table 3. Consistent with prior research, we find that large companies and companies covered by sell-side analysts—that is, firms facing higher demand for information—are more likely to disclose the necessary inputs to estimate the value of customer equity. While statistically weaker, we also note that firms with negative book value of equity are more likely to disclose the metrics of interest.

Customer equity and stock price

We begin our analysis by examining the market assessment of the value-relevance of customer equity. Specifically, we model market value of equity as a function of net income and book value of equity (e.g., Ohlson 1995, 2001) and include our estimate of customer franchise value as an additional parameter. Accounting for the fact that we use voluntarily disclosed data to measure *CE*, we also include the Inverse Mills' ratio from (4) as a self-selection control (Heckman 1979). The model takes the form:

$$MVE_{10Q} = \alpha_0 + \alpha_1 BVE + \alpha_2 NI + \alpha_3 CE + \gamma IMR + Controls + \varepsilon, \quad (5)$$

where *BVE* is book value of equity; *NI* is net income before extraordinary items; *IMR* is the Inverse Mill's ratio from the first-stage model (4); and *CE* is our estimate of the value of customer equity.[13] The dependant variable, MVE_{10Q}, is the firm's market value of equity, measured one business day after the 10-Q filing date, accounting for the fact that the sample firms typically disclose the *CE* model inputs in the financial statements filed with the SEC. Following Barth, Beaver, and Landsman (1998), we estimate the model as an unscaled specification.[14] We allow the errors to cluster by company and fiscal quarter-year (Petersen 2009) and, to mitigate the influence of potential outliers, we winsorize the regression variables at 1 percent and 99 percent. If our measure of customer equity captures information deemed useful by equity investors, we expect to be significantly positive.

The vector of controls includes a set of variables identified by prior research on the valuation role of net income and book value of equity. One stream of the literature documents that the association between *MVE*, *BVE*, and *NI* varies predictably with the financial health of the firm (Barth et al. 1998; Collins, Pincus, and Xie 1999). In particular, these studies highlight that the information content of profit and loss observations is economically different. For this reason, we augment (5), allowing the coefficients on *BVE* and *NI* to vary between positive and negative values of these variables. Specifically, we include *negBVE*, an indicator variable set to one if the firm's book value of equity at the end of the quarter is negative, and *Loss*, an indicator variable set to one if net income for the quarter is negative, and interact them with *BVE* and *NI*, respectively. Since Barth et al. (1998) further demonstrate that the valuation coefficients on *BVE* and *NI* are driven by industry characteristics, we also include industry fixed effects as controls. Another stream of research underscores the importance of firm growth in equity valuation (e.g., Liu and Ohlson 2000). Thus, we include as additional control *Sales Growth*, measured as the seasonally adjusted percentage change in sales. As an alternative measure of growth we consider *LTG*, the analysts' median long-term growth forecast as reported by I/B/E/S. While this variable is not available for all firms, it is an attractive control in our setting as it provides a forward-looking measure of growth and imposes a high hurdle for our tests since,

13. We do not include time subscripts in the model as we measure all variables at time *t*. Since extant value-relevance studies differ in measuring *BVE* (*t*−1 versus *t*), we examine whether our results are sensitive to this choice. We find that the documented relations are robust to using BVE_{t-1} in place of BVE_t (not tabulated).

14. As additional analysis, we verify that the inferences are not sensitive to this design choice.

TABLE 3
Propensity to disclose the inputs for the customer equity model

	Dependant variable = Pr(*Disclose* = 1)		
	Coefficient	*z*-statistics	Marginal effect
ln(MVE_{10Q})	0.155	3.34	0.004
BM	−0.065	−0.94	−0.002
Sales Growth	0.102	0.72	0.003
Loss	0.074	0.48	0.002
negBVE	0.485	1.79	0.021
ln(*Age*)	0.021	0.17	0.001
Follow	0.500	2.66	0.010
Industry FE		Yes	
# Obs.		17,183	
# Firms		975	
Pseudo. R^2		32.42%	

Notes:

The sample consists of firm-quarters with sufficient information to estimate *CE* (*Disclose* = 1) and an industry-matched sample (6-digit GICS) of firms that do not disclose or discuss *CE* inputs (*Disclose* = 0). The two samples are individually winsorized at 1 percent and 99 percent. The regressions are estimated using a probit model, as the errors are allowed to cluster by company and fiscal quarter-year. ln(.) is the natural logarithm operator. All other variables are as defined in Appendix 3.

by construction, it incorporates the vector of financial and nonfinancial information considered by sell-side equity analysts. Finally, in an effort to address the frequently expressed concern that price-level models such as (5) are particularly vulnerable to correlated omitted variables, we reestimate the model substituting the industry fixed effects with firm fixed effects.[15]

We report the regression results in Table 4. Consistent with prior research, we document a positive and significant association between MVE_{10Q} and both *BVE* and *NI*. This positive association remains after including the vector of controls and substituting the industry fixed effects for firm fixed effects. Turning to the variable of interest, the estimated coefficients on *CE* are consistently positive and statistically significant.[16] Importantly, when firm fixed effects are added to the model, the positive and significant association between MVE_{10Q} and *CE* remains unaffected. This finding suggests that while the base specification likely suffers from correlated omitted variables, the results are not driven by this source of endogeneity. Interestingly, the *CE* coefficient is significantly lower than 1 in all specifications, consistent with the notion that the market impounds in stock price some, but not all, of the information from our measure of customer equity.[17]

15. In the specifications with firm fixed effect, we cluster the standard errors by fiscal quarter-year only (Petersen 2009).
16. When *CE* is added to the model, the adjusted R^2 increases in each specification (untabulated).
17. This test cannot rule out that equity investors use a more accurate estimate of customer equity. As we discuss in section 4, however, a search of analysts' reports and conference call transcripts fails to identify discussions of aggregating the individual metrics into a single measure reflecting the value of customer equity. More so, as additional analysis (not reported), we find that *CE* is significantly positively associated with stock returns one, two, and three years after the measurement date. Together with the results from the future profitability and forecast error analyses, this finding provides support for our interpretation of the evidence.

TABLE 4
Regressing market value of equity on book value of equity, net income, and customer equity

		Dependant variable = MVE_{10Q}							
	E(sign)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BVE		0.446	0.617	0.444	0.663	0.422	0.654	0.425	0.642
		(2.08)	(4.86)	(2.42)	(5.27)	(2.34)	(5.17)	(2.48)	(5.62)
NI		11.34	7.236	26.32	14.26	26.38	14.14	29.49	15.67
		(4.43)	(4.63)	(4.28)	(3.37)	(4.33)	(3.34)	(4.79)	(3.97)
CE	+	0.513	0.349	0.434	0.357	0.459	0.359	0.449	0.322
		(2.67)	(3.37)	(2.65)	(3.53)	(2.84)	(3.53)	(2.93)	(3.89)
negBVE				469.0	−1,386	598.5	−1,262	509.8	−7,020
				(0.79)	(−3.81)	(0.99)	(−3.54)	(0.59)	(−7.09)
BVE × *negBVE*				3.793	1.192	3.697	1.143	3.974	0.845
				(3.40)	(2.62)	(3.19)	(2.50)	(4.04)	(1.93)
Loss				800.5	21.62	682.6	−9.181	829.8	−276.7
				(2.00)	(0.10)	(1.74)	(−0.05)	(1.70)	(−0.94)
Loss × *NI*				−20.46	−11.67	−20.19	−11.34	−24.92	−14.23
				(−2.59)	(−2.25)	(−2.61)	(−2.17)	(−3.06)	(−2.60)
Sales Growth						901.2	320.2	892.5	−717.6
						(1.87)	(1.50)	(1.65)	(−1.59)
LTG								23.74	5.979
								(1.30)	(0.93)
IMR		−619.8	−3,610	−788.2	−5,317	−631.2	−5,144	−1,193	−19,049
		(−0.99)	(−6.80)	(−1.38)	(−6.93)	(−1.11)	(−6.73)	(−1.38)	(−8.46)
Industry FE		Yes	No	Yes	No	Yes	No	Yes	No
Firm FE		No	Yes	No	Yes	No	Yes	No	Yes
# Obs.		576	576	576	576	576	576	428	428
# Firms		31	31	31	31	31	31	29	29
Adj. R^2 (%)		86.50	94.40	89.36	94.90	89.48	94.90	89.73	95.89

Notes:

The dependent variable is market value of equity one day after the 10-Q filing date. All variables are as defined in Appendix 3 and are winsorized at 1 percent and 99 percent. The standard errors are allowed to cluster by fiscal quarter-year (company and fiscal quarter-year) in the specifications with company (industry) fixed effects.

As discussed in the Introduction, a feature of extant research on nonfinancial information is the identification and examination of the information content of individual performance proxies. To verify that the aggregate measure of the value of customer equity, rather than one (or more) of the model inputs drives the results, we modify (5) by including the *CE* model inputs—*Churn*, *Margin*, and *Subscribers*—as regressors. If the individual inputs as disclosed by the companies, rather than their aggregation into a measure of customer franchise value, are deemed informative, then we would expect significant positive (negative) coefficients on *Margin* and *Subscribers* (*Churn*) and an insignificant coefficient on *CE*. Turning to Table 5, we find that while some of the model inputs are associated with MVE_{10Q} with the expected sign, these associations vary across specifications. The coefficient on *CE*, however, remains positive and significant in the presence of the model inputs.[18]

These results are consistent with the conjecture that our measure of customer equity captures information deemed useful by equity investors. Importantly, these findings also underscore the value of considering the dynamics of the customer base of an SBE instead of focusing on stand-alone variables: While, unconditionally, high margin is good news, this holds true only if it does not come at the cost of lost customers. More generally, these results provide evidence on the importance of aggregating individual performance metrics into a single measure of value, which accounts for the dynamic relation among the individual drivers.

Customer equity and future earnings

The association between market value of equity and *CE* provides evidence that investors use some of the information embedded in our measure of customer franchise value. It does not, however, speak to the mechanism through which the metric provides information about firm value: In fact, value-relevance tests have been criticized as a mere association exercise (e.g., Holthausen and Watts 2001).

To alleviate such concerns, we next examine whether our measure of customer equity is associated with future profitability, a key input to investors' valuation models. This link reflects our hypothesis that customer equity aggregates information on the expected profitability of a firm's customer base.

To test the conjecture that *CE* conveys information about future profitability beyond other financial and nonfinancial data, we regress cumulative operating income for the subsequent one, two, and three years on *CE*, controlling for current profitability. To allay concerns that the relationship between *CE* and future profitability is mechanical, we also include in the regression the analysts' consensus earnings forecast, as extant research suggests that equity analysts incorporate in their estimates a rich set of forward-looking data, extending beyond current and past period GAAP earnings.[19] Including the consensus analysts' forecast as a control variable also sheds light on whether analysts use all the information reflected in our measure of customer equity. The model takes the form:

$$\sum_{N=1}^{N'} Profit_{q+N} = \beta_0 + \beta_1 CE_q + \beta_2 Profit_q + \beta_3 \sum_{T=-3}^{-1} Profit_{q+T} + \beta_4 \sum_{H=1}^{4} AF_{q+H} + \gamma IMR + \sum_{j=5}^{J} \beta_{4+j} FE_j + \mu_{q+N}, \qquad (6)$$

18. As robustness test, we repeat the analysis by (i) disaggregating *Margin* into its components: average revenue and service cost per customer; and (ii) including the model inputs one at a time (untabulated). The results remain qualitatively similar.

19. Indeed, Livne et al. (2011) and Simpson (2010) provide evidence that for wireless companies, certain customer-related metrics are informative about future profitability.

TABLE 5
Regressing market value of equity on book value of equity, net income, and customer equity model inputs

	E(sign)	Dependant variable = MVE_{10Q}							
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BVE		0.803	0.502	0.889	0.635	0.822	0.510	0.879	0.638
		(5.43)	(2.14)	(10.86)	(5.33)	(7.61)	(2.57)	(12.02)	(5.89)
NI		14.15	11.22	6.735	6.820	34.15	29.47	14.31	14.27
		(4.40)	(3.56)	(4.22)	(5.23)	(5.05)	(4.63)	(3.66)	(3.86)
CE	+		0.457		0.318		0.426		0.306
			(3.04)		(3.16)		(3.62)		(3.91)
Churn	−	−92,047	−39,063	−35,117	−27,300	−93,401	−38,016	23,767	33,693
		(−2.35)	(−1.17)	(−2.77)	(−2.38)	(−2.04)	(−0.99)	(1.28)	(2.07)
Subscribers	+	207.4	1.518	171.1	104.3	73.50	−72.74	211.6	139.6
		(1.41)	(0.01)	(2.38)	(1.54)	(0.63)	(−0.75)	(2.77)	(1.96)
Margin	+	11.02	3.680	−0.454	−3.948	9.645	2.688	−9.144	−20.84
		(2.24)	(1.12)	(−0.07)	(−0.73)	(1.81)	(0.68)	(−0.42)	(−1.31)
IMR		−1,408	−916.3	−3,915	−3,750	−2,369	−1,729	−20,186	−19,908
		(−1.92)	(−1.13)	(−6.32)	(−6.47)	(−2.02)	(−1.47)	(−8.40)	(−9.02)
Controls		No	No	No	No	Yes	Yes	Yes	Yes
Industry FE		Yes	Yes	No	No	Yes	Yes	No	No
Firm FE		No	No	Yes	Yes	No	No	Yes	Yes
# Obs.		576	576	576	576	428	428	428	428
# Firms		31	31	31	31	29	29	29	29
Adj. R^2 (%)		84.60	86.64	93.93	94.47	88.18	89.92	95.44	95.98

Notes:

The vector of controls includes *negBVE*, *BVE* × *negBVE*, *Loss*, *Loss* × *NI*, *Sales Growth*, and *LTG*. All variables are as defined in Appendix 3 and are winsorized at 1 percent and 99 percent. The standard errors are allowed to cluster by fiscal quarter-year (company and fiscal quarter-year) in the specifications with company (industry) fixed effects.

where *Profit* is operating income after depreciation; N' takes values of 4, 8, and 12 quarters; *CE* is our estimate of customer equity; *AF* is the earliest median consensus analysts' earnings forecast for quarter $Q + H$ after the earnings announcement date for the current quarter; *IMR* is the Inverse Mills' ratio estimated using (4) (Heckman 1979) and *J* is either 2 (industry fixed effects) or 29 (firm fixed effects). Since *CE* derives from the company's business model and is measured pretax, in this analysis we focus on operating income, which does not include the effects of peripheral, nonrecurring transactions, or taxes. We cumulate the dependent variable over the subsequent one, two, and three years: The sample average monthly churn rate of 0.028 implies that the current customer base will turn over in three years ($1/0.028 \approx 36$ months), however, inferences based only on the three-year window could be influenced by survivorship bias. As partial control for size, we deflate all continuous variables by the total assets at the beginning of the quarter. This rescaling also allows for an intuitive interpretation of the results: Since *CE* as a fraction of assets captures the relative magnitude of the customer franchise value relative to the asset base recognized under U.S. GAAP, the estimated coefficient on the variable of interest reflects the portion of future return on assets attributable to *CE* not captured by the GAAP and non-GAAP predictors of profitability.[20] Finally, we allow the standard errors to cluster by company and fiscal quarter-year.

Regression results are presented in Table 6. Consistent with prior research, we document an economically and statistically significant positive association between current and future profitability. When the analysts' consensus forecast is added as an explanatory variable, its coefficient is significantly positive, consistent with the idea that analyst forecasts reflect information incremental to current and past profitability.

Turning to *CE*, the estimated coefficients are positive and significant across specifications, and increase with the accumulation period. The effect persists in the presence of the individual inputs to the customer equity model (*Churn*, *Margin*, and *Subscribers*) and is robust to substituting the industry fixed effects for firm fixed effects. Using the year $T + 1$ as an example, while numerically small, the estimated coefficients on *CE* are comparable in magnitude to the average analysts' forecast error in the sample. These results support our conjecture that customer equity is informative about future profitability over and above mechanical (e.g., past and current operating income) and sophisticated (analysts' forecasts) predictors and, importantly, the firm's customer margin.

To shed more light on the link between analysts' forecasts and *CE*, we next regress future earnings forecast errors on our estimate of customer franchise value, controlling for factors shown to impact forecast accuracy (e.g., Simpson 2010). Specifically, we cumulate quarterly forecast errors, defined as the difference between actual earnings as reported by I/B/E/S and the earliest median consensus forecast after the 10-Q filing date for the prior quarter, over one, two, and three years. Turning to Table 7, the coefficient on *CE* is positive and significant across the three measurement windows and the relationship is robust to the inclusion of the individual *CE* model inputs and firm fixed effects. The magnitude of the *CE* coefficient estimates ranges from 0.014 and 0.062 between specifications and aggregation windows. These results provide additional support for the conjectured link between our measure of customer equity informs and future profitability. Importantly, they also imply that although sell-side equity analysts aggregate a wealth of information

20. As a robustness check, we deflate the model variables by market value of equity one day after the 10-Q filing date (i.e., we convert the model from future return on assets to forward earnings to price specification). We find that the results are qualitatively similar and, in fact, the estimated coefficients on *CE* are notably larger (untabulated).

TABLE 6
Regressing cumulative core earnings on customer equity, customer equity model inputs, and controls

		Dependant variable = *Cumulative Future Core Earnings*									
		$Q+1$ to $Q+4$						$Q+1$ to $Q+8$		$Q+1$ to $Q+12$	
	E(sign)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CE	+	0.020	0.012			0.015	0.031	0.059	0.109	0.087	0.186
		(2.93)	(2.67)			(2.23)	(3.97)	(3.63)	(7.96)	(2.46)	(6.33)
OpInc		2.042	1.143	1.101	0.690	1.118	0.655	2.076	1.354	2.000	1.704
		(6.74)	(2.27)	(2.10)	(2.32)	(2.24)	(2.18)	(2.23)	(2.38)	(1.46)	(2.12)
Σ*PastOpInc*		0.490	0.398	0.351	0.288	0.412	0.346	0.787	0.775	1.147	1.069
		(4.31)	(3.72)	(3.37)	(3.14)	(3.82)	(3.25)	(3.18)	(4.32)	(2.81)	(3.12)
Σ*AF*			0.410	0.470	0.446	0.407	0.407	0.725	0.358	1.462	0.700
			(4.22)	(4.41)	(4.38)	(3.64)	(3.92)	(2.84)	(1.99)	(3.19)	(2.57)
Churn	−			0.165	−1.038	0.745	0.041	3.494	3.282	6.901	7.419
				(0.31)	(−1.34)	(1.05)	(0.06)	(1.98)	(2.16)	(2.14)	(2.52)
Subscribers	+			−0.000	0.008	−0.000	0.007	−0.000	0.016	−0.002	0.030
				(−0.19)	(4.14)	(−0.01)	(4.07)	(−0.13)	(4.31)	(−0.81)	(3.53)
Margin	+			−0.000	−0.001	−0.000	−0.001	−0.001	−0.002	−0.001	−0.002
				(−2.40)	(−1.42)	(−2.44)	(−1.70)	(−2.39)	(−2.50)	(−2.45)	(−1.32)
IMR		0.004	−0.008	0.000	−0.046	−0.001	−0.026	0.024	−0.047	0.012	−0.184
		(0.20)	(−0.53)	(0.03)	(−1.45)	(−0.13)	(−0.89)	(0.55)	(−0.72)	(0.15)	(−1.57)
Industry FE		Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Company FE		No	No	No	Yes	No	Yes	No	Yes	No	Yes
# Obs.		527	444	444	444	444	444	389	389	326	326
# Firms		30	30	30	30	30	30	28	28	26	26
Adj. R^2 (%)		77.25	80.41	80.22	86.65	80.85	87.84	74.14	87.85	72.46	87.20

Notes:

The dependent variable is *Cumulative Future Core Earnings* (COMPUSTAT item *OIADPQ*) beginning in quarter $Q+1$. All variables are as defined in Appendix 3 and are winsorized at 1 percent and 99 percent. All continuous variables, except for *Churn*, *Subscribers*, and *Margin* are scaled by total assets at the beginning of the quarter. The standard errors are allowed to cluster by fiscal quarter-year (company and fiscal quarter-year) in the specifications with company (industry) fixed effects.

TABLE 7
Regressing analysts' forecast errors on customer equity and controls

	Dependant variable = *Cumulative Future Forecast Error*									
	$Q+1$ to $Q+4$						$Q+1$ to $Q+8$		$Q+1$ to $Q+12$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CE	0.020	0.016			0.014	0.014	0.031	0.033	0.062	0.045
	(2.15)	(2.52)			(2.37)	(2.14)	(2.06)	(2.10)	(2.48)	(1.59)
ln(*Follow*)		0.022	0.028	0.002	0.024	0.002	0.067	0.042	0.102	0.049
		(1.95)	(2.30)	(0.16)	(2.26)	(0.21)	(3.21)	(4.38)	(2.96)	(2.22)
ln(MVE_{10Q})		−0.006	−0.012	−0.007	−0.011	−0.002	−0.038	−0.010	−0.072	−0.020
		(−1.06)	(−4.01)	(−0.85)	(−2.22)	(−0.23)	(−3.40)	(−0.87)	(−3.86)	(−0.94)
BM		−0.020	−0.021	−0.031	−0.019	−0.032	−0.058	−0.109	−0.102	−0.139
		(−1.84)	(−2.07)	(−1.76)	(−1.82)	(−1.80)	(−1.91)	(−6.91)	(−1.99)	(−3.42)
FE		0.152	0.246	−0.221	0.142	−0.254	0.129	−0.494	0.873	−0.372
		(0.85)	(1.08)	(−1.19)	(0.93)	(−1.38)	(0.39)	(−1.26)	(1.69)	(−0.76)
Churn			−0.827	−0.273	−0.361	0.351	−1.079	0.481	−1.226	5.324
			(−1.33)	(−0.33)	(−0.61)	(0.44)	(−0.79)	(0.43)	(−0.54)	(3.23)
Subscribers			0.000	−0.000	0.000	−0.000	0.001	−0.004	0.003	−0.004
			(1.21)	(−0.05)	(1.18)	(−0.52)	(1.76)	(−3.01)	(2.10)	(−1.62)
Margin			−0.000	0.000	−0.000	0.000	−0.000	0.000	−0.001	−0.002
			(−1.88)	(1.34)	(−2.09)	(1.06)	(−2.91)	(0.52)	(−2.82)	(−1.00)
IMR	−0.025	−0.019	−0.009	−0.036	−0.019	−0.011	−0.048	0.207	−0.119	0.037
	(−1.68)	(−0.93)	(−0.47)	(−0.60)	(−0.97)	(−0.16)	(−0.81)	(2.67)	(−1.21)	(0.21)
Industry FE	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No
Company FE	No	No	No	Yes	No	Yes	No	Yes	No	Yes
# Obs.	489	479	479	479	479	479	397	397	327	327
# Firms	30	30	30	30	30	30	25	25	24	24
Adj. R^2 (%)	9.36	14.93	14.33	23.55	16.23	24.25	39.77	57.70	50.94	70.33

Notes:

The dependent variable is cumulative *Analysts' Forecast Error* beginning in quarter $Q+1$. The dependent variable, *CE* and *FE* are scaled by total assets at the beginning of the quarter. ln(*Follow*) is the log-transformed number of analysts covering the company plus one. All other variables are as defined in Appendix 3 and are winsorized at 1 percent and 99 percent. The standard errors are allowed to cluster by fiscal quarter-year (company and fiscal quarter-year) in the specifications with company (industry) fixed effects.

into their earnings projections, they do not account fully for the implications of customer equity.[21]

Although there may be other mechanisms through which customer equity conveys information about firm value, these findings indicate a clear link between *CE* and market value of equity via future profitability, alleviating concerns associated with conventional value-relevance tests.

Additional analysis: Scaling

To test the association between market value of equity and our measure of customer equity, we use an unscaled specification. As we discuss in the future profitability analysis section, deflating by total assets offers both a control for size and an intuitive interpretation of the coefficients of interest.[22] To this end, we scale (5) by total assets at the beginning of the quarter, effectively capturing the magnitude of the unrecognized asset—customer franchise value—relative to the assets recognized under U.S. GAAP. Turning to Table 8, inferences remain qualitatively unchanged: The association between MVE_{10Q} and *CE* is economically and statistically significant in all specifications, even after including the *CE* model inputs as controls.[23]

An alternative deflator often employed in extant value-relevance research is the number of shares outstanding (e.g., Collins et al. 1999). As a robustness test, we verify that our inferences are not sensitive to such scaling. In particular, we reestimate the firm fixed effects specification of (5), converting MVE_{10Q}, *CE*, and the GAAP variables to "per share" basis, and find that the estimated coefficient on *CE* remains significantly positive (untabulated).

Additional analysis: Growth

The association between *CE* and market value of equity in the presence of GAAP metrics is likely to be a function of the life cycle of the firm. In particular, for steady-state firms net income likely captures a large portion of the information contained in the unrecognized customer franchise intangible asset. This, however, is not likely to be the case for growing and shrinking firms. While our regression models include growth metrics and firm fixed effects as controls, up to this point we do not explicitly condition the association between market value of equity and *CE* on whether or not the firm is in a steady state.

To explore this relation, we condition the analysis on absolute sales growth.[24] Specifically, we estimate (5) separately for steady-state ("low absolute growth") and growth/decline firms ("high absolute growth"), measured relative to the sample median for the quarter. Turning to Table 9, we find that while the association between MVE_{10Q} and *CE* is positive in all specifications, consistent with expectations it is more statistically significant in the "high absolute growth" subsample. More so, the estimated *CE* coefficients are notably larger in that subsample while the association between MVE_{10Q} and the GAAP performance metrics is muted.

21. An examination of analysts' reports reveals that sell-side equity analysts discuss and project some of the data we use as inputs to the customer franchise value model (e.g., churn rates and customer base). However, we did not encounter a systematic discussion of algorithms used to transform the customer metrics into a measure of value of customer equity.
22. We do not consider book value of equity as a deflator as 20 percent of our sample firms have negative *BVE*.
23. Results are qualitatively similar if we scale by lagged total assets only the dependent variable, *CE*, and the GAAP variables (untabulated). We thank the anonymous reviewer for suggesting the full-scaling approach as means to mitigating concerns about the interpretation of the regression coefficients when market value of equity is deflated by total assets.
24. We focus on the absolute value of sales growth as a partitioning variable since the distribution of sales growth in the sample is heavily skewed.

TABLE 8
Regressing market value of equity on book value of equity, net income, and customer equity: Deflating by total assets

		Dependant variable = MVE_{10Q}							
	E(sign)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BVE		0.647	2.105	0.229	1.084	0.627	0.931	0.414	0.877
		(1.87)	(6.45)	(0.46)	(2.84)	(0.99)	(2.02)	(0.60)	(2.15)
NI		0.934	7.179	17.14	12.02	19.81	14.84	16.54	11.41
		(0.22)	(5.53)	(1.82)	(2.02)	(2.04)	(2.02)	(1.88)	(2.01)
CE	+	0.443	0.759	0.369	0.800			0.347	0.829
		(3.04)	(5.47)	(2.57)	(4.82)			(2.30)	(5.12)
Churn	−					−8.953	12.52	−0.853	21.81
						(−0.80)	(1.49)	(−0.07)	(2.94)
Subscribers	+					0.002	0.031	−0.003	0.011
						(0.32)	(3.14)	(−0.47)	(1.17)
Margin	+					−0.002	−0.001	−0.002	−0.001
						(−1.03)	(−1.15)	(−0.89)	(−0.60)
IMR		0.370	−0.042	0.158	−0.000	0.378	−0.140	0.188	−0.401
		(2.14)	(−0.30)	(1.05)	(−0.00)	(2.01)	(−1.08)	(1.13)	(−3.31)
Controls		No	No	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE		Yes	No	Yes	No	Yes	No	Yes	No
Company FE		No	Yes	No	Yes	No	Yes	No	Yes
# Obs.		576	576	428	428	428	428	428	428
# Firms		31	31	29	29	29	29	29	29
Adj. R^2 (%)		68.39	81.86	78.66	87.60	77.44	86.08	78.77	87.83

Notes:

The dependent variable is market value of equity one day after the 10-Q filing date. The vector of controls includes *negBVE*, *BVE* × *negBVE*, *Loss*, *Loss* × *NI*, *Sales Growth*, and *LTG*. All variables are as defined in Appendix 3 and are winsorized at 1 percent and 99 percent. MVE_{10Q}, the intercept, *BVE*, *NI*, *CE*, *negBVE*, *BVE* × *negBVE*, *Loss*, *Loss* × *NI*, and the *Industry*/*Firm FE* are scaled by total assets at the beginning of the quarter. The standard errors are allowed to cluster by fiscal quarter-year (company and fiscal quarter-year) in the specifications with company (industry) fixed effects.

6. Conclusion

In this paper, we argue that customer equity, a metric summarizing the state of the fundamental business process of subscription-based enterprises, embeds important information pertaining to firm value. To this end, we begin by introducing a model translating the main drivers of the business model of subscription-based enterprises into a unique measure of customer franchise value. We then apply the estimation algorithm to a sample of companies that voluntarily disclose customer-related metrics, and show that the value of the customer equity measure is positively and significantly associated with the market value of the firm, as well as with future earnings and analysts' forecast errors. We document that these results persist even after the individual model inputs disclosed by the sample firms and used by analysts are included as competing explanatory variables in the regression models.

Our results should be interpreted with caution: The analyses are based on a relatively small sample of companies that voluntary disclose the necessary customer metrics, and

TABLE 9
Regressing market value of equity on book value of equity, net income, and customer equity: Growth

	Dependant variable = MVE_{10Q}					
	Low absolute growth			High absolute growth		
	(1)	(2)	(3)	(4)	(5)	(6)
BVE	0.530	0.558	0.560	0.169	0.287	0.290
	(2.26)	(2.39)	(2.50)	(0.81)	(2.49)	(2.40)
NI	14.81	25.40	29.12	6.037	27.92	30.23
	(4.07)	(3.74)	(4.44)	(1.55)	(3.49)	(3.32)
CE	0.493	0.396	0.386	0.733	0.542	0.529
	(2.25)	(1.84)	(1.84)	(4.50)	(5.68)	(5.03)
negBVE		1,031	1,478		−273.1	−855.1
		(1.03)	(1.19)		(−0.37)	(−1.28)
BVE × *negBVE*		4.436	5.367		2.108	2.033
		(3.85)	(5.12)		(2.67)	(2.85)
Loss		1,088	1,058		258.2	303.3
		(2.13)	(1.65)		(0.55)	(0.45)
Loss × *NI*		−14.93	−20.10		−32.17	−39.98
		(−1.77)	(−2.27)		(−3.54)	(−4.53)
Sales Growth		2,703	3,477		219.4	−23.63
		(0.54)	(0.49)		(0.37)	(−0.05)
LTG			0.635			25.39
			(0.03)			(1.47)
IMR	−162.8	−479.0	−759.3	−1,066	−996.3	−1,725
	(−0.22)	(−0.58)	(−0.59)	(−1.79)	(−2.20)	(−2.29)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
# Obs.	288	288	200	288	288	228
# Firms	28	28	25	29	29	25
Adj. R^2 (%)	87.17	89.82	89.78	87.92	91.34	92.08

Notes:

The dependent variable is market value of equity one day after the 10-Q filing date. The observations in the low (high) growth specifications have below (above) the sample median absolute *Sales Growth*. All other variables are as defined in Appendix 3 and are winsorized at 1 percent and 99 percent. The standard errors are allowed to cluster by company and fiscal quarter-year.

our measure of customer equity relies on estimates of future margin, retention, and discount rates. Despite these limitations, we believe that our findings provide important insights about a major intangible asset missing from the balance sheet: customer equity.

Our findings are relevant to a wide audience, including researchers, investors, accountants, and regulators. Our analysis reveals that while the conventional outputs of the accounting system—earnings and book values—play an important role in communicating a firm's performance and prospects, the meaningful aggregation of nonfinancial business fundamental metrics provides a significant improvement, particularly for nonsteady-state firms. In particular, we introduce to the accounting literature a parsimonious, easy-to-implement measure of customer equity (franchise) for subscription-based enterprises, and highlight the importance of analyzing the company's business model as a value-generating

mechanism. Auditors can use this measure of customer value to determine customer-related intangible assets impairment, and standard setters could consider our analysis in recommending useful disclosure items for subscription-based enterprises. Importantly, our customer equity measure can also aid investors and equity analysts in forecasting earnings, a key input in firm valuation.

Appendix 1

Disclosure example

The following is an excerpt from Leap Wireless International's 10-Q for the period ending June 30, 2008 (filing date: 8/7/2008) as an example of disclosure of the necessary customer metrics to calculate customer equity.

			Change	
For the three months ended June 30:	2008	2007	Amount	Percent
Gross customer additions	542,005	462,434	79,571	17.2
Net customer additions	171,171	126,791	44,380	35.0
Weighted-average number of customers	3,162,028	2,586,900	575,128	22.2
As of June 30:				
Total customers	3,305,251	2,674,963	630,288	23.6

The following table shows metric information for the three months ended June 30, 2008 and 2007:

	Three months ended June 30,	
	2008	2007
ARPU	$43.97	$44.75
CPGA	$205	$182
CCU	$21.01	$19.87
Churn	3.8%	4.3%

Appendix 2

Sample companies and metrics

			Churn		*Margin*		*# Customers*	
Company name	GICS	# Obs.	Avg.	SD	Avg.	SD	Avg.	SD
8X8 INC	5010	14	0.03	0.01	160.08	9.20	0.02	0.00
ALLTEL CORP	5010	23	0.02	0.00	32.76	3.44	9.32	1.84
AUDIBLE INC	2550	11	0.04	0.01	36.94	10.99	0.32	0.10
CLEARWIRE CORP	5010	3	0.03	0.00	−21.26	12.88	1.84	0.94

(The appendix is continued on the next page.)

Appendix 2 (continued)

			Churn		*Margin*		*# Customers*	
Company name	GICS	# Obs.	Avg.	SD	Avg.	SD	Avg.	SD
DIRECTV	2540	32	0.02	0.00	34.63	6.13	19.49	3.13
DISH NETWORK CORP	2540	28	0.02	0.00	29.66	2.50	12.67	1.48
DOBSON COMMUNICATIONS CORP	5010	18	0.02	0.00	29.10	2.60	1.56	0.19
EARTHLINK INC	4510	32	0.04	0.01	14.23	1.05	4.22	1.31
ESCHELON TELECOM INC	5010	8	0.01	0.00	26.17	0.89	0.52	0.10
GLOBALSTAR INC	5010	15	0.01	0.00	7.20	4.72	0.34	0.05
HUGHES COMMUNICATIONS INC	5010	15	0.02	0.00	23.89	2.87	0.44	0.07
IPCS INC	5010	15	0.02	0.00	19.75	3.15	0.62	0.07
LEAP WIRELESS INTL INC	5010	25	0.04	0.01	21.37	2.96	3.03	1.37
MARKET LEADER INC	4510	24	0.07	0.01	399.88	59.45	0.01	0.00
METROPCS COMMUNICATIONS INC	5010	14	0.05	0.01	23.14	1.23	5.61	1.47
NETFLIX INC	2550	34	0.05	0.01	6.62	2.05	5.86	4.33
NII HOLDINGS INC	5010	32	0.02	0.00	39.39	4.24	3.95	2.35
NTELOS HOLDINGS CORP	5010	10	0.03	0.00	22.71	1.07	0.39	0.03
RURAL CELLULAR CORP	5010	19	0.02	0.00	44.95	3.36	0.72	0.02
SHENANDOAH TELECOMMUN CO	5010	23	0.02	0.00	8.33	4.17	0.12	0.04
SIRIUS XM RADIO INC	2540	25	0.02	0.00	9.19	1.17	9.93	7.27
SPRINT NEXTEL CORP	5010	20	0.03	0.00	36.13	6.32	47.06	5.83
SUNCOM WIRELESS HOLDINGS INC	5010	21	0.03	0.00	15.91	6.40	0.93	0.11
TIVO INC	4510	23	0.01	0.00	7.07	1.09	3.62	0.68
UNITED ONLINE INC	4510	15	0.04	0.00	3.80	0.70	5.79	0.43
US CELLULAR CORP	5010	35	0.02	0.00	36.37	4.50	5.35	0.87
VIRGIN MOBILE USA INC	5010	8	0.05	0.00	7.29	0.94	5.10	0.18
VONAGE HOLDINGS CORP	5010	18	0.03	0.00	21.24	1.22	2.43	0.20
WEB.COM GROUP INC	4510	2	0.02	0.01	14.10	4.30	0.63	0.49
WEB.COM INC	4510	2	0.03	0.00	22.12	0.08	0.16	0.01
XM SATELLITE RADIO HLDGS INC	2540	12	0.02	0.00	3.54	0.94	6.76	1.68

Notes:

Obs. is the number of quarters with sufficient data for the empirical tests for the firm in the sample and # Customers is the number of customers in millions. All other variables are as defined in Appendix 3.

Appendix 3

Variable definitions

Age	Current year minus the first year with nonmissing Total Assets data in COMPUSTAT
Analyst Following	Number of analysts providing earnings forecasts for the firm during the quarter, as reported by I/B/E/S
Assets	Total assets, COMPUSTAT item ATQ
BM	Book-to-market value of equity; BVE/MVE_{10Q}
BVE	Book value of common equity, COMPUSTAT item CEQQ
CE	Equity in current customers, calculated using the proposed model, (2)
Churn	Average monthly churn rate for the quarter, as reported by the company
Cost of capital	Monthly cost of capital, estimated using (3)
CV	Comprehensive value; $BVE + CE$
FE	Analysts' forecast error measured as the difference between actual earnings as reported by I/B/E/S and the earliest median consensus forecast after the 10-Q filing date for the prior quarter, converted to million $
Follow	An indicator variable set to 1 if the firm has at least one earnings forecast during the quarter
IMR	Inverse Mills' ratio, estimated using the first stage, selection, model (4)
LTG	I/B/E/S median consensus long-term growth earnings forecast
Margin	Average monthly revenue–service cost per customer for the quarter, as reported by the company
MVE_{10Q}	Market value of equity one business day after the 10-Q filing date
NI	Net income before extraordinary items, COMPUSTAT item IBQ
OpInc	Operating income after depreciation, COMPUSTAT item OIADPQ
Sales	Net sales, COMPUSTAT item SALEQ
Sales Growth	Percentage change in sales over the prior four quarters, COMPUSTAT items ($SALEQ_t + SALEQ_{t-4}/SALEQ_{t-4}$)
$\Sigma AF_{q+1,\ q+N}$	Sum of the earliest median consensus earnings forecasts for quarters $Q + 1$ through $Q + 4$ after the earnings announcement date for the quarter, converted to million $
$\Sigma OpInc_{q+1,\ q+N}$	Cumulative future operating income, measured between quarters $Q + 1$ and $Q + N$
$\Sigma PastOpInc$	$OpInc_{q-1} + OpInc_{q-2} + OpInc_{q-3}$
Subscribers	Total subscribers at the end of the quarter in million, as reported by the company

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