Do investments in intangible customer assets affect firm value?

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ARTICLE INFO

ABSTRACT

This paper develops a simple model of investment by service firms in intangible customer assets, and tests whether the model identifies some critical drivers of firms' stock returns. Similar to firms with significant research and development (R&D) expenditures, we argue that firms in fast-growing service industries with few tangible assets can increase firm value by investing in customer acquisition and service (A&S) expenditure. Using a unique hand-collected data set, we show that per-customer changes in firms' revenues, customer acquisition costs, and customer service costs help to explain their abnormal stock returns.

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1. Introduction

An increasing number of firms today invest in intangible assets such as research and development (R&D), brand, and customer loyalty (attraction and retention), rather than physical assets. Intangible assets typically do not appear on corporate balance sheets, making traditional financial measures of firm value such as book-to-market ratios less meaningful. Indeed, Morris and Alam (2012) confirm a breakdown in the relation between firms' stock market values and traditional accounting values during the 1990s, and suggest that earnings quality could explain part of the breakdown.

This paper models intangible customer asset investment and tests whether measures derived from the model help to explain firm value. It contributes to the finance literature by treating firms' spending on customer relationships much like traditional investment, but in this case, the investment creates an intangible asset.

Because the asset does not appear on the balance sheet, traditional measures of value can be biased. Indeed, Gleason and Klock (2006) find that intangible assets created from advertising and R&D spending can help explain why pharmaceutical stock prices look overvalued based on traditional value measures.

The two largest forms of corporate spending on intangible capital are R&D spending and customer acquisition and service (A&S) spending. Advertising and marketing spending are primarily used for customer acquisition, and service spending is used primarily for customer retention. Researchers have explored the effects of R&D investment on firm value, but the effects of A&S have attracted less attention.

Eberhart, Maxwell, and Siddique (2004) find that significant changes in R&D spending are impounded into future stock prices. Chauvin and Hirschey (1993) find that R&D and advertising spending have large, positive impacts on firm value. Chan, Lakonishok, and Sougiannis (2001) find that stocks accurately reflect the level of a firm's investment in R&D and advertising, and that high R&D firms do not on average outperform low R&D firms.

Other studies find that output measures of R&D investments, such as patents or Food and Drug Administration (FDA) drug approvals, are related to firm value. Hall, Jaffe, and Trajtenberg (2005) and Hirschey, Richardson, and Scholz (2001) show that

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"knowledge stock"[2] or innovation output, measured by patent counts or patent citations, are significantly related to firm value. Ahmed, Gardella, and Nanda (2002) find that withdrawals of drugs in advanced stage clinical trials, reduce firm values, and Bosch and Lee (1994) and Alefantis, Kulkarni, and Vora (2004) find that FDA decisions about new drug candidates impact stock prices.

Similar to firms with significant R&D expenditures, we argue that firms in fast-growing service industries invest through A&S expenditure in intangible customer assets. Intangible customer assets are the capitalized value of the expected future net cashflows that accrue to the firm from these customers.

Many high-growth companies track customer value through customer metrics such as per-customer acquisition and service expenses. Wall Street analysts pay close attention to these numbers and the Securities and Exchange Commission (SEC) has started to examine the accuracy of these figures. Our model shows that these are also theoretically important value drivers. We believe that the number of customers, customer acquisition spending, and customer service spending, are more precise investment measures than those used to study R&D. For example, a firm's customers are typically added in bunches, hence the average value and acquisition cost of a new customer is likely to be relatively precise compared to R&D projects which are typically idiosyncratic and added in small numbers.

In this paper, we develop a simple model to value service firms using their customers as an important value source. We use the model to identify several critical drivers of stock returns among the various customer metrics disclosed by firms. Research by Szewczyk, Tsetsekos and Zantout (1996) and Chen and Ho (1997) suggest that changes in investment impacts the value of high-growth-opportunity firms more than others. A differential impact on high-growth firms could also be explained by financing-related underinvestment problems explained by Myers (1977). This implies that the value effects of our customer metrics could differ between high- and low-growth-opportunities firms. Therefore, we account for growth opportunities in our empirical work.

Our study adds to the evolving literature on intangible assets. We develop a simple theoretical model using the traditional investment models of Jorgenson (1963) and Abel (1990) to explain customer investment. We also identify metrics and generate hypotheses based on the model, and gather a unique set of data to test the hypotheses. To our knowledge, no other study relates these customer metrics to firm values.

The data sample is limited because accounting rules do not require firms to disclose customer figures, or use a standard format when they do report them. This means that some firms that disclose customer-related figures do so sporadically or change computation methods over time, making their data unusable. Nevertheless, we are able to collect enough data to test our model and find support for it.

We find that changes in per-customer revenue (not just total revenue) are positively related to a firm's abnormal stock return, and that the relation is much stronger for low-growth firms. Conversely, we find that per-customer acquisition cost negatively impacts abnormal returns, and that the effects are stronger for high-growth firms. These results imply that investors care more about the revenue per customer of low-growth firms, perhaps because they are not adding many new customers. Investors penalize high-growth firms more heavily when their costs of customer acquisition increase. Accounting for the difference in effects

between high- and low-growth firms substantially improves the model fit.

The paper is organized as follows. Section 2 lays out the theoretical and empirical models and develops hypotheses. Section 3 describes the data and the measures used to test the model. Section 4 presents the empirical results and Section 5 is a conclusion.

2. Theoretical model and hypothesis development

First, we develop a theoretical model that relates current stock returns to various customer metrics. Next, we construct an empirical model based on the theory to test whether the metrics that we identify help explain stock returns. Finally, we present hypotheses regarding the expected signs of the relations between stock returns and changes in the metrics such as per customer service and acquisition expenditures.

2.1. Theoretical model

We will use the basic model of investment under certainty developed by Jorgenson (1963) and others to illustrate the relation between the return on a stock and the value of its investment over time. We follow Abel's (1990) exposition while adapting terminology specific to investment in customers made by service firms. We define the model variables as follows:

N_t, the number of new customers at time t (equivalent to units of new investment); C_t, the number of current customers at time t (equivalent to units of capital stock); $R(C_t)$, a function describing the revenue generated by current customers at time t; s_t, customer service expenditure per current customer; a_t, customer acquisition expenditure per new customer (equivalent to the unit price of uninstalled capital); $I(C_t, N_t)$, the cost of setting up a new customer account (equivalent to installation cost).

Then, the net real cash flow of the firm at time t ($\prod_t$) is

$$\prod_t R(C_t) - s_t C_t - a_t N_t - I(C_t, N_t)$$

Also, the value of the firm at time t can be stated as

$$V_t = \max \int_t^\infty \prod_t D(t, u) du \qquad (1)$$

where $D(t, u) = e^{-\int_t^u r_v dv}$, the factor discounting net real cash flows at time u back to time t at the rate r_v.

One can think of the firm managers purchasing new customers (N_t) in each future time period to maximize the present value of future cash flows. The number of current customers at time t is an initial condition. The net change in the number of customers each period equals the number of new customers minus the number of lost customers.

Much like physical capital depreciates, we assume that the firm loses customers at a rate of δ_t, so that the number of current customers evolves according to

$$\Delta C_t = \frac{dC_t}{dt} = N_t - \delta_t C_t. \qquad (2)$$

Therefore, managers choose an optimal time path of new customer investment to maximize (1) subject to the dynamic constraint (2), with the initial condition of a given number of current customers at time t. This maximization problem can be solved by defining

$$H_t = \Pi_t + qt\Delta Ct, \qquad (3)$$

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[2] Hall et al. (2005) define "knowledge stock" as the intangible asset obtained as the output from investment in R&D.