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Brand Perceptions and the Market for Common Stock

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Abstract

Brand Perceptions and the Market for Common Stock

This paper investigates the effect of company brand perceptions on investor incentives to hold stocks. We find that, after controlling for other postulated determinants of stock-holdings, there is a negative and significant cross-sectional relation between percentage institutional holdings and brand visibility. This result is consistent with the notion that individual investors prefer to invest in stocks with easily-recognized products. Furthermore, we find that institutional holdings are positively related to firm size and beta. These results are intertemporally stable. Our analysis supports the notion that institutional portfolios eschew the relatively neglected small firm sector, whereas individual investors prefer holding stocks with high recognition and consequently, greater information flows and smaller parameter estimation risk. The analysis contributes to our understanding of how investors form their equity portfolios.

An important concept in marketing is the role of brand value or brand equity. Kotler (2000) describes the concept of "brand" as follows:

> A *brand* is a name, term, sign, symbol, or design, or a combination of them, intended to differentiate the goods or services of one seller or group of sellers and to differentiate them from those of competitors.

He adds that "the most enduring meanings of a brand are its values, culture, and personality." For years, marketing scholars have recognized the importance of maintaining a brand presence and cultivating a brand awareness in order to induce consumers to develop loyalty to a company's products.

In this paper, we conduct a first exploration of whether brand perceptions of companies' products spill over to investment decisions in the market for companies' stock. A recent incident (March 2000) raises the possibility that branding may be more important in finance than was previously believed. Specifically, in the first few days after Palm was spun off from 3COM, it was priced by the market at a high level relative to 3COM's valuation before the spinoff.[1] An important factor in the purchase appears to be the satisfaction obtained from holding stock in a company with a brand-name product (Palm Pilots). A number of other companies have either spun off or contemplated spinning off divisions with strong brand recognition or have issued tracking stocks of such divisions. Examples are the spinoffs of Nabisco by RJR, of Kraft by Philip Morris, and of Borders by Kmart; more recently, Volkswagen has considered spinning off Audi.[2]

[1] See Lamont and Thaler (2003) and "Deals and Deal Makers: Palm Soars as 3Com Unit Makes Its Trading Debut," by Scott Thurm, *Wall Street Journal*, March 3, 2000, p. C20.

[2] See "Target Stock is Under Fire from Investors," by Susan Pulliam and Steven Lipin, *Wall Street Journal*, May 11, 1995, p. C1, "Kraft Offering Priced at $31, Above Estimate," by Floyd Norris and Greg Winter, *New York Times*, June 13, 2001, p. C1, and "Volkswagen Would Consider Audi Spinoff to Boost Shares and Discourage Takeovers," by Scott Miller, *Wall Street Journal*, May 25, 2001, p. A3.

One motivation in such spinoffs appears to be the high brand recognition of the division that is separated from the parent company.[3]

We analyze the relation between consumer perceptions of brand awareness of a company and institutional holdings in the company's stock.[4] We note that recent empirical literature has enhanced our understanding on the rationales for holding specific categories of stock. For instance, Coval and Moskowitz (1999) document that mutual fund investors exhibit a home bias by tilting their domestic investments in favor of locally headquartered companies, and Huberman (2001) indicates that individual investors exhibit a penchant for phone-companies centered in their own geographic region.

Our study furthers these analyses on investors' propensities towards certain stocks. We construct a theoretical model that formalizes informational rationales for agents' stock demands. We find that, in equilibrium, agents wish to hold stocks in which the precision of their information about cash flows is high (so that information asymmetries are lower). Also, in previous literature, Klein and Bawa (1976, 1977) and Merton (1987) argue that agents exhibit a proclivity to invest in opportunities with high information flows.

The above arguments lead to our first hypothesis for why individuals may prefer brand-name stocks. Specifically, we propose that individual investors may optimally prefer the stock of companies with high-visibility brands because, as per Kent and Allen (1994), high brand recognition serves as a focal point for information about such com-

[3]A reverse argument also holds: for example, mergers such as DaimlerChrysler appear to be driven by the desire to exploit brand recognition in one firm to benefit another firm.

[4]Institutional ownership is obtained from Standard & Poor's. According to this company, the ownership variable is measured as the percentage of common shares outstanding held by a comprehensive set of institutional investors (investment companies, banks, insurance companies, college endowments, and 13F money managers). As a matter of policy, the preceding is the only information the company provides about the data (private correspondence of the authors with Richard Albanese, a Standard Poor's representative). These data have also been used in Grinblatt and Moskowitz (2003).

panies. Our second hypothesis on the holdings-brand recognition relation is based on evidence that individuals use simple rules of thumb when making decisions under uncertainty (Kahneman and Tversky, 1982; Tversky and Kahneman, 1973, 1982). In turn, we propose that these agents may naïvely associate product quality with superior stock price performance, and hence use the heuristic of investing in stocks with highly-regarded products.[5]

In contrast to the above reasons which address why individual investors may prefer brand-name stocks, such investments could also be regarded as safer bets by *institutions* in the context of their fiduciary and legal obligations to clients. These hypotheses on the propensity of individuals vis-à-vis institutions to hold brand-name stocks are the primary focus of our work.

To investigate our hypotheses, we use a set of data yet to be used by finance researchers. In particular, we employ the Landor Image Power Survey data. These data were collected in 1990 through a consumer survey and provide different attributes of a product's brand recognition.[6] Brand quality perception is captured by a variable called ESTEEM, and brand familiarity is captured by a variable called SHAREOFMIND. Finally, IMAGE POWER is an overall ranking of brand strength.[7]

We relate our measures of brand perceptions to institutional holdings in companies' stock. In order to obtain a relation between brand perceptions and institutional holdings,

[5]Lakonishok, Shleifer, and Vishny (1994, p. 1575) make the related argument that "individuals might just equate well-run firms with good investments, regardless of price."

[6]The Landor survey was repeated in 1997, but we do not use these data. In 1997, Landor focused on a specific market sector, so there was not enough overlap between the companies in the 1990 and 1997 surveys to justify the cost.

[7]When multiple brands are associated with a single company, we assign brand perception values associated with the strongest overall brand (as measured by IMAGE POWER). We choose this procedure because we believed ex ante that the demand for the company's stock would be driven by that brand of the company which has the strongest image. We discuss the effects of this procedure in Section II to follow.

we control for a number of variables that have been shown to influence the holdings of professional money managers (Kang and Stulz, 1996, and Falkenstein, 1996). Our analysis, which accounts for book/market, firm size, measures of operating performance, and stock riskiness, advances our understanding of how financial market investors construct their portfolios.

For our sample of stocks, we find that institutional holdings are significantly and negatively related to a term that captures brand recognition; however, there is no significant relation between institutional holdings and perceived brand quality. The former result implies a proclivity towards visible, brand-name stocks in individual investors' equity portfolios and supports the notion that individuals prefer investing in stocks with greater information flows. The analysis does not support the behavioral hypothesis that investors misperceive firms with quality products as desirable investments.

We also find that the aggregate holdings of U.S. institutions are tilted towards large capitalization stocks with low total volatility. These results are consistent with the notion that institutions eschew investing in relatively neglected stocks, which are discussed in more detail in Arbel and Strebel (1983). Further, we find an intriguing positive relation between institutional holdings and beta, which is consistent with the following notions. First, our theoretical model suggests that individuals avoid high beta stocks because they have more imprecise information about the macroeconomy than institutions. Second, as per Barry and Brown (1985), stocks with high estimated betas have low information flows; thus, this finding can be interpreted as a desire by individuals to avoid low-information stocks. Finally, both year-by-year regressions as well as a panel data estimation indicate that our results are intertemporally robust.

This paper is organized as follows. Section I provides a brief theoretical motiva-

tion for our study and details the various hypotheses explored in the paper. The data and methodology are described in Section II. Section III provides our central empirical results, Section IV offers robustness checks, and Section V concludes.

I. Theoretical Motivation and Hypotheses

Only recently has the finance literature begun to analyze investors' propensity to hold certain categories of stocks. For example, Kang and Stulz (1997) examine foreign stock ownership in Japan and show that accounting fundamentals such as return on assets and financial leverage help explain the investment choices of foreign investors. Falkenstein (1996) investigates the cross-section of mutual fund holdings and finds that mutual fund holdings are affected by return volatility and price level. Coval and Moskowitz (1999) and Huberman (2001) document a "home bias" wherein agents exhibit a penchant for companies headquartered in their own geographic region. We contribute to the literature on the determinants of stock holdings by examining the effect of brand recognition on investors' preferences to hold certain stocks over others.

Before proceeding to our empirical study, in the next subsection, we introduce a theoretical model with informational asymmetries across agents. In our model, two classes of agents, "individuals" and "institutions," possess differing information about a security's cash flows. The distinguishing feature of institutions is that their information (owing to economies of scale in information collection) is more precise than that of individuals. The model provides specific implications for the relations between asset holdings and cash flow variance as well as the quality (precision) of information about the asset. These relations serve to motivate our principal hypotheses, which are detailed in Section I.B.

A. The Model

Consider a risky financial asset that has a final payoff of $F = \theta + \epsilon$, where $\theta \equiv \beta\gamma + \delta$ captures a linear combination of the systematic component of the payoff as well as the idiosyncratic component of the payoff on which information is available.[8] We assume that there are two classes of agents, one of which has superior information about the risky asset's payoff. More specifically, the first class (termed "institutions") is a proportion m of the population and possesses perfect information about the realization of θ. The second (termed "individuals") has noisy information about θ represented by $\theta + \eta$. Both classes of agents are competitive price-takers, and have negative exponential utility with risk aversion levels denoted by R_1 and R_2, respectively. The supply of the risky asset is $\bar{X}$. No agent has any information about ϵ, the second component of the idiosyncratic payoff. The total idiosyncratic component of the payoff is denoted $u \equiv \delta + \epsilon$. To prevent full revelation of private information, we also assume that there is a random liquidity demand in the amount of z. All of the random variables γ, δ, ϵ, η, and z are normally distributed and mutually independent with mean zero and variance v_y, where the subscript y indicates the relevant variable. Each agent can shift wealth back and forth between the risky asset and a riskless bond with a zero rate of return. We confine the technical details of the solution process to the appendix.

We denote the demands of the two classes of agents by d_i, $i = 1, 2$. The combination of exponential utility and normal distributions allow one to use standard mean-variance arguments which dictate that

$$d_1 = \frac{\theta - P}{R_1 v_\epsilon}, \tag{1}$$

[8] For simplicity, we consider the case of a single risky asset, though the intuition applies for a portfolio problem as well.

and

$$d_2 = \frac{\mu - P}{R_2 v}, \tag{2}$$

where $\mu = E(\theta|\theta + \eta, P)$ and $v = var(\theta|\theta + \eta, P)$ represent the conditional mean and variance for the second class of agents. The market clearing condition for this model is given by

$$m\frac{\theta - P}{R_1 v_\epsilon} + (1 - m)\frac{\mu - P}{R_2 v} + z = \bar{X} \tag{3}$$

Using standard results on normal distributions, the conditional expectation and the variance can be calculated and substituted into Eq. (3), yielding an expression for the equilibrium price P. This exercise involves some tedious algebra owing to the fixed-point problem induced by the fact that demands depend on the equilibrium price which, in turn, influences demand through its effect on the conditional mean and variance.[9] Substituting this equilibrium price into the expressions for Eqs. (1) and (2), we obtain equilibrium expressions for d_1 and d_2. We are interested in the unconditional expectations of holdings, represented by $E(d_i)$, $i = 1, 2$.

Even in this relatively simple setting, deriving unambiguous relations between expected holdings and the exogenous parameters is quite difficult. Hence we impose the reasonable parameter restriction of assuming equal masses ($m = 0.5$) for each type of utility-maximizing agent (individuals and institutions). This assumption can be motivated from information on the NYSE website[10] that suggest the proportion of stock held by institutions has varied from 42% to 51% over the period 1990-2000. Under this assumption, the following propositions obtain.

[9] Our model extends Grossman and Stiglitz (1980) to the case where two classes of agents have information of differing quality.

[10] The specific URL is http://www.nyse.com/pdfs/06_institutionalinvestors.pdf.

Proposition 1 *In equilibrium, expected individual (institutional) stockholdings are increasing (decreasing) in the precision of the individual investor signal,* v_η^{-1}*, and decreasing (increasing) in the factor loading,* β*.*

Proposition 2 *The sign of the derivative of individual holdings with respect to total risk,* $\text{var}(F)$*, is ambiguous.*

The key result for our purposes is that the greater the precision of individual investor information, the smaller is the conditional risk of holding the asset, and the greater is the individual investor holding. Further, individual stockholdings decrease in the factor loading, because they have imprecise information about the market factor, and the risk of holding a high-factor loading security is large. Finally, no agent fully knows the idiosyncratic noise u; therefore, its impact and, in turn, the total risk is ambiguous and depends on the relative risk aversion levels of the two classes of agents as well as on the levels of the other parameters.

B. Hypotheses

Our theoretical model suggests the quality of information positively influences investor holdings. In a related vein, Klein and Bawa (1976, 1977) argue that agents prefer to invest in "high-information" opportunities (i.e., those which allow more reliable estimation of the parameters that govern portfolio choice),[11] and Merton (1987) postulates that agents invest only in opportunities of which they are cognizant. In addition, search costs of information acquisition are likely lower for companies with familiar brand names. These arguments all indicate that individual investors would invest more heavily in the

[11] Coles, Loewenstein, and Suay (1995) and Barry and Jennings (1992) also provide perspectives on estimation risk.

stock of companies with high-visibility brands because information flows about such companies are greater (Kent and Allen, 1994, and Hoch and Deighton, 1989). We denote this as the "recognition hypothesis."

Second, psychological evidence suggests that individuals often use simple heuristics when making decisions in a complex and uncertain environment (Kahneman and Tversky, 1982; Tversky and Kahneman, 1982). Faced with the daunting prospect of choosing among numerous publicly-traded companies, individuals may use the heuristic of investing in stocks with highly-regarded products, because they may naïvely perceive product quality as signifying superior risk-adjusted return performance. Furthermore, investors may assume that firms with quality products are well-run firms and therefore invest in them disproportionately in the mistaken expectation of superior investment performance (this argument is suggested by Lakonishok, Shleifer, and Vishny, 1994). We term this the "quality" hypothesis. Since our data include separate measures for perceived brand quality and brand awareness, and also include an interaction variable which jointly captures quality and recognition, they permit us to distinguish between the quality and recognition hypotheses, and also allow for testing of mutual non-exclusivity of these hypotheses.

The arguments above indicate why individual investors may exhibit a propensity to invest in brand-name stocks. Our alternative hypothesis is that brand-name stocks are safer investments for *institutions* (as opposed to individuals) because such stocks are less prone to alienate their clients in the event of poor performance. This hypothesis is based on the legal and fiduciary duties of institutions towards their clients (see O'Brien and Bhushan, 1990, Arbel, Carvell, and Strebel, 1983, Young and Lombard, 1985, and El-Gazzar, 1998). In particular, given below par returns, a money manager is less likely

to be penalized by a client for holding a visible stock such as Coca-Cola or a quality stock such as Johnson & Johnson, than a little-known technology stock. Although this argument does not indicate whether institutions would prefer stocks with quality brands or stocks with well-known brands, it nonetheless suggests that career concerns of institutional money managers may cause them to tilt their portfolios towards stocks whose products rank high in terms of brand perception.[12]

Our analysis of the cross-sectional relation between percentage institutional holdings and brand perceptions represent a test of the competing hypotheses above. In addition to controlling for market beta and idiosyncratic risk as suggested by Proposition 1, we also control for other determinants of holdings. For example, as liquidity considerations, growth/value preferences, and a propensity towards profitable stocks (because of specific fund objectives) may also drive aggregate institutional holdings (viz. Chan, Chen, and Lakonishok, 2002), we include variables such as firm size, book-to-market ratio, and a profitability measure, return on assets, in order to account for such effects. In Section II.B, we describe our control variables in more detail.

II. Data and Methodology

A. Brand Perception Data

The data on brand perceptions are obtained from Landor Associates, which is regarded as one of the world's leading branding consultancy firms.[13] Their most recent comprehensive survey, conducted in October 1990, reports the results of a self-administered

[12]Indeed, Chevalier and Ellison (1998) find not only that portfolio choices have some predictive power for whether a manager is terminated from his position, but also that young managers are less likely to hold risky positions.

[13]See, for example, "Form+Function," *Wall Street Journal*, September 28, 1989, p. A1, or "When Companies Take Center Stage, Landor Handles the Props," *Ad Forum*, January 1984, p. 10.

questionnaire where 5000 subjects indicated on a five-point scale (0, 2.5, 5, 7.5, and 10) (1) their awareness of/familiarity with each brand and (2) their personal regard for the brand. The familiarity with a brand is represented by a variable SHAREOFMIND (henceforth, SOM)[14] and the regard of a brand's quality by a variable ESTEEM. IMAGE POWER (henceforth, IP) is an overall ranking of brand strength. While the precise calculation of IP is proprietary to Landor, we find a correlation of 0.95 between IP and the product of SOM and ESTEEM. This indicates that IP combines the information in SOM and ESTEEM into a single measure.[15]

The data provided to us cover the 300 strongest brands in the survey, as ranked by IP.[16] We match the brands with the stock of publicly traded companies as of the time of the survey. Of course, some companies have multiple brands. As our hypotheses center on investors' association of brand quality with company quality, we assign the brand perception measures corresponding to the company's strongest brand (as measured by IP) to the company's stock.

The above method of assigning ESTEEM, SOM, and IP values to a company creates an issue if a firm produces a significantly heterogeneous set of products or if the brands they produce have large variation in quality perceptions. As an alternative to assigning the maximum value, we contemplated using a weighted average across all products, but

[14]The survey measures "aided" awareness wherein consumers rank a given list of brands, as opposed to "unguided recollection" where they are asked to provide a list of the brands with which they are most familiar. The latter seems to be a more reliable way to measure brand awareness. Analysis of survey data on unaided awareness, when available, would be an interesting extension of our study.

[15]The Landor data have previously been used in the marketing literature; for example, Lane and Jacobson (1995) use it to explore the effect of brand extension announcements on stock returns.

[16]More recent data, for instance, the American Customer Satisfaction Index (ACSI), are, in fact, available. In these data, however, there are not separate measures for quality and familiarity. Furthermore, only users of a particular product are surveyed for rating that product. This issue is important for our purposes, as indicated in the following example: a habitual consumer of Pepsi could recognize Coke as a quality product.

given that our data do not cover all the products under a company's umbrella, using a weighted average could potentially introduce additional noise. Furthermore, an average creates a bias when the principal product is highly regarded. For example, Campbell's Soup has an IP ranking of 2, and V8, also a Campbell's product, has an IP ranking of 196. When considering investing in Campbell's stock, it seems that an investor would be more concerned with the earnings generated by Campbell's Soup, its principal product, than V8. Similarly, Hershey's is more likely to be associated with its milk chocolate products, in general, as opposed to a specific product (such as Almond Joy), and Procter & Gamble is most likely to be associated with its most highly regarded brand, Crest toothpaste.

We also considered looking at the companies with only one product in the sample, but this, too, is problematic. Not only does it significantly reduce the sample size, but it also assumes that if the company has only one product in our sample, it has, in fact, only one product. For example, Kodak has a single product in our sample, Kodak film. Kodak also produces disposable cameras, among other products. Disposable cameras, however, either did not rank in the top 300 or were not surveyed at all; therefore, we do not have their brand perception rankings.

Although our procedure undoubtedly introduces noise, we believe that for our sample of relatively large, visible companies, the advantages of assigning the maximum value outweigh the noise induced by the procedures of assigning an average value or only using relatively smaller companies with a single product. This is because the incentives to hold a company's stock are more likely to arise from how reputable the company is, and from investors' familiarity with the company's most highly regarded products, as opposed to

relatively minor products of which investors are not cognizant at all.[17] For these reasons, we report results from the procedure of assigning the maximum brand-strength ranking in the paper.[18]

The data provided to us give us the numerical ranking of the top 300 brands; therefore, a higher numerical value attached to the brand indicates a lower rank ordering. We felt this method of ranking the brands would obfuscate interpretation of the results. Therefore, the results reported here are those using the original ranking multiplied by -1 (we retain the same variable names for these transformed variables for convenience). This allows a higher numerical value to be associated with a higher rank ordering.[19]

Table 1 provides the names of the firms in our sample, along with their highest-IP brands.

Please insert Table 1 here.

The sample we consider consists of 91 firms for which we have data available on all the variables we consider (including the variables used as regression controls, whose descriptions follow). The sample size reflects the reliance on the limited Landor survey, yet contributes to an initial attempt at addressing the connection between brand appeal and financial investment decisions. Also, we believe that since we have the *top* 300 brands ranked by IP, our sample size is not as significant an issue as it may seem, since the explanatory power of brand perceptions for holdings can be expected to taper off

[17] Based on this observation, we believe that the selection bias introduced by the fact that only the most visible brands are included in the data available to us, while worth noting, is unlikely to significantly influence our conclusions.

[18] This design choice notwithstanding, we have verified that our principal results continue to obtain when the maximum ranking method is replaced with a method that uses the average values of SOM, ESTEEM, and IP for each company; details can be made available upon request.

[19] We also use an alternative variable, defined as the difference between 301 and the original ranking (e.g., we would attach the value of 222 to the firm ranked 79 by ESTEEM, as $222 = 301 - 79$). The results are qualitatively unchanged using these alternative variables, and are available upon request.

beyond the top-ranked brands. We propose that cognitive limitations (documented by Kahneman and Tversky, 1974) make it less likely that one would recall all brands ranked to, say, 1000.

We investigate whether measures of brand familiarity and perceived quality are important determinants of institutional holdings, after controlling for other firm-specific characteristics. In the next subsection, we describe these controls.

B. Cross-sectional Determinants of Institutional Holdings

Our first two determinants are return on assets (ROA) and leverage. ROA proxies for a firm's profitability, while leverage is taken as a measure of the likelihood of financial distress. Kang and Stulz (1997) show ROA to be a positive determinant of foreign institutional holdings in Japan and leverage to have the opposite effect. On the other hand, in a sample studied by Coval and Moskowitz (1999), managers of investment funds favor stocks with low ROAs and high leverage. Nonetheless, in both studies, ROA and leverage are influential determinants of holdings. Thus, we employ these as explanatory variables for institutional holdings. We also include firm size as a regressor for the following reasons. First, institutions may prefer large stocks to avoid investing in small, neglected stocks that are regarded as excessively speculative (Arbel and Strebel, 1983). Second, investing in large companies may allay liquidity concerns in the event of unexpected trading needs.[20]

Since growth/value considerations could influence the choice of stocks among insti-

[20]While the liquidity argument applies to both institutional and individual investors; on account of more frequent trading needs due to pooling of money flows across investors (and hence, larger trade sizes), institutions may be more concerned about the liquidity issue. As we will see, the sign of the coefficient is positive, suggesting that institutional propensity towards large stocks is dominant in the data.

tutional investors (see Brown and Goetzmann, 1997, or Chan, Chen, and Lakonishok, 2002), we use the book-to-market ratio as a determinant of institutional holdings. Next, as Falkenstein (1996) credits price level with being the driving force behind the significance of market capitalization in explaining mutual fund holdings, we also use the price level as an explanatory variable in our regressions. Finally, to ascertain whether institutions consider return momentum (Jegadeesh and Titman, 1993), we include the average monthly return over the past 12 months.

We also employ two risk measures. First, our theoretical model suggests that high beta stocks would be avoided by individuals. Furthermore, Barry and Brown (1985) argue that the measured betas of securities with low information flows would be higher, whereas Klein and Bawa (1976, 1977) show that investors would tend to underweight such securities in their portfolios. Therefore, we include beta as a risk measure in our regressions. In addition, we use total volatility (measured by return variance) on the grounds that excessively volatile stocks may be avoided by either class of investors, as suggested by our theoretical model. This variable is also used by Falkenstein (1996) in his study of mutual fund holdings.

Since the sample of stocks for which we have data on brand perceptions is only a subset of traded stocks, we perform our analysis of the influence of brand perceptions on holdings in two stages. We first use the non-marketing firm characteristics described above to explain institutional holdings for a large cross-section of firms (a first-stage regression). Using a large sample enables us to determine our regression coefficients with maximal precision. We then look at whether the brand perception data of the 91 firms from can explain the residuals from the institutional holdings regressions (the second-stage regression). (For robustness, we also confirm that our results hold while employing

a single-stage regression, using the 91 firms for which we have brand perception data available. Details are presented in Table 7 later in the paper.)

For the first-stage regression, we consider two samples. The first includes all firms for which we have the necessary data. Estimation from this sample, however, raises the possibility that the coefficients could be estimated inaccurately because of the presence of several small, closely-held, and illiquid companies. We therefore employ a second sample of larger companies. Too stringent a size cutoff for this sample results in a loss of firms from our brand perception sample. Taking this issue into account, our second sample consists of the largest 2000 firms (ranked by market capitalization as of December 1990).

The non-marketing variables are obtained from Standard and Poor's (institutional holdings), CRSP, and COMPUSTAT. Institutional holdings, size, price, and the book-to-market ratio are measured as of December 1990. Foreign firms with U.S. operations present a problem in terms of the calculation of market capitalization, because the number of shares available for trading in the U.S. is, on occasion, quite small. For these firms, we use their U.S. market capitalization because our data represent holdings of U.S. shares. Institutional liquidity concerns about holding a large fraction of the outstanding shares would thus be reflected in the U.S. capitalization of these companies.

Return on assets (defined as net income divided by total assets) and leverage (defined as long-term debt divided by total assets) are calculated for the year 1990. We require at least 36 months of data to be available for the calculation of beta and total volatility. Firms that do not satisfy this criterion are omitted from the analysis. Our beta estimate is calculated using between 36 to 60 months of data ending in December 1990, using as much data as available (so is volatility, measured by return variance), and is based on

the CRSP value-weighted index. Also, we report results from using Dimson (1979) betas with one lead and one lag to account for non-synchronous price adjustment across firms, but virtually identical results are obtained using simple beta coefficients. The variable Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December 1990.[21]

Table 2 presents summary statistics for the variables we consider. The statistics are provided for the full sample of 3324 firms (Panel A), the 2000-largest firm sample (Panel B), and the sample of firms for which we have brand perception data (Panel C).

Please insert Table 2 here.

In Panels A and B, we see the divergence between the summary statistics of the largest firms and the entire sample. In particular, the average value of institutional holdings is over 10% higher for the smaller sample than for the entire sample of firms. Additionally, in the subsample, price and size are higher. Book-to-market and leverage are similar across the two samples. Return on assets is significantly higher for the group including only large firms. For the full sample, the median value of ROA is positive, while the mean value is negative. However, both the mean and median values of ROA are positive for the 2000 firm subsample. This implies that a number of small firms performed poorly in our sample period. The mean value of institutional holdings for firms with brand perception data is about 49%, with much higher size levels. This is reasonable given that we would expect companies with well-known products to be well-capitalized.

We present the correlation matrix for institutional holdings and our explanatory variables for the full sample and the largest 2000 firms in Panels A and B of Table 3.

[21] We required an exact eight-digit CUSIP match across the COMPUSTAT, CRSP, and institutional holdings databases for inclusion of a firm in our sample.

Please insert Table 3 here.

We find that institutional holdings are highly positively correlated with size, and negatively correlated with total volatility. At the same time, the holdings of institutions appear to be tilted slightly towards high beta stocks (especially in the 2000 firm subsample), suggesting that the complementary sector, individual investors, prefer low exposure to systematic risk. We will discuss these relations in more detail when we present results of multivariate regressions in the next section.

Panel C of Table 3 presents the correlations between the explanatory variables as well as the brand perception variables for the subsample of firms in Table 1. The significant correlations between holdings and the explanatory variables do not switch signs in Panel C. The variable SOM, which measures brand familiarity, is negatively and significantly correlated with institutional holdings, suggesting that brand perception affects incentives to hold a company's stock. The holdings of institutions are also negatively correlated with IP, with a point estimate of -0.16; however, the estimate is not significant. There is no material correlation between ESTEEM and institutional holdings. Thus, individuals appear to prefer stocks with greater brand visibility, but are seemingly unconcerned with the regard in which a brand is held.[22] In the next section, we more rigorously examine the impact of the marketing variables on institutional holdings, after controlling for the effects of the other variables.

[22]Given that our measure of institutional holdings encompasses a comprehensive set of institutions (see Footnote 4), we represent individual investor holdings as 100% less institutional holdings, though we revisit this assumption in Section IV.

III. Regression Results

A potential issue in our regressions stems from the fact that for 49 firms in the sample provided to us by Standard and Poor's, institutional holdings equal zero. The relevant question is whether this indicates censorship of the data at zero because many institutions are constrained from shorting stock, or whether it reveals a true preference for zero holdings of these stocks. We prefer the latter interpretation and therefore report OLS estimates. However a censored Tobit estimation provides results virtually identical to the ones provided here, principally because the number of stocks with zero holdings is small relative to the total sample size of 3324.[23] To account for heteroskedasticity, we use White (1980)-corrected standard errors in our cross-sectional regressions. We use the logarithmic transformation of firm size to account for non-linear effects on firm size on institutional holdings, though similar conclusions are obtained when unlogged size is used. We employ linear specifications for all other variables; neither the explanatory power of the regression nor our conclusions are materially affected by alternative specifications.

We first report the results of our first-stage regressions that use institutional holdings as the dependent variable, using the non-marketing attributes as explanatory variables. Besides indicating a strong correlation between firm size and holdings, Table 3 suggests that size is significantly correlated with several other regressors. Not surprisingly, an exploratory analysis indicates that size has a material impact on some of the other regression coefficients. (This is not the case for our other explanatory variables.)

We observe that institutions have a strong preference for large stocks (see Table 4). This finding is consistent with the notion that institutional investors eschew small firms

[23]Institutional holdings are strictly positive for all firms on which we have brand perception data.

to avoid perceptions that they are speculating excessively in the relatively neglected small-firm sector. The fact that institutions avoid small company stock suggests they have a preference for cost-reducing liquidity obtained through holding larger stocks. The propensity towards stocks with low leverage in the full sample, but not in the 2000-firm sample, is consistent with avoidance of possibly distressed stocks in the small-cap sector (Fama and French, 1993). Institutional holdings are weakly and positively related to ROA in the full sample, but the effect of this variable disappears in the subsample of the largest 2000 firms. Overall, the impact of book-to-market ratios on institutional holdings is not strong for the full sample of firms.[24] For the subsample of the 2000 largest firms, institutions appear to lean towards value stocks. Given the large sample size, it is reasonable to conclude that institutions do not exhibit a strong propensity towards either growth or value stocks. This, of course, does not preclude the possibility that subgroups of institutions exhibit preferences for low or high book-to-market ratios. We also see that institutions prefer low-price stocks after controlling for size. This may indicate a desire to avoid very high-priced stocks, because lower-priced stocks may be more actively traded by small investors, and may thus facilitate institutional trades with a smaller price impact.

Please insert Table 4 here.

Our results point to the strong influence of firm size, price level, and the effect of beta in both samples, and the impact of return volatility in the full sample. The holdings-beta relation reflects the preference of individual investors for portfolios with low measured systematic risk, consistent with our theoretical model as well as the differential informa-

[24]Trimming the book-to-market ratios at the 99th and 1st percentiles made no material difference to this conclusion.

tion hypothesis developed by Barry and Brown (1985) and Klein and Bawa (1976). The return volatility effect in the full sample is consistent with the notion that institutions wish to avoid small, neglected stocks with greater value uncertainty induced by the lack of readily-accessible public information. Interestingly, our determinants explain a larger fraction of variation in holdings for the full sample than for the subsample (in Table 4, the adjusted R^2 in the first column is nearly 22% higher than that in the second column). This indicates that our accounting and financial variables matter more to institutions when investing in small-capitalization stocks.

We now turn to using ESTEEM, SOM, and IP as explanatory variables for our residuals from the above regressions. Of course, since the explanatory power of the regression which includes firm size is far greater, we use residuals from this regression. To ascertain that our marketing variables are not too correlated with firm size in our subsample of firms with brand perception data, we calculate the correlations of the residuals with firm size as well as the marketing variables (These correlations are not reported for brevity, but are available upon request.) We find that the brand perception variables SOM and IP are strongly and negatively correlated with the residuals, but firm size has no significant correlation with these unexplained portions of institutional holdings. This is not surprising, because, by definition, our regression residuals are orthogonal to firm size for the full sample; the correlations merely confirm that this property holds for the subsample. Further, firm size is not significantly correlated with any of the marketing variables.

The results from regressing the residuals from the full sample and the subsample of 2000 firms are presented respectively in Panels A and B of Table 5.[25]

[25]We lose one firm from the sample with brand perception data when we consider the 2000-firm subsample because this firm (Nissan Motor Company ADRs) is not in the top 2000 by U.S. market

Please insert Table 5 here.

Since extreme observations in our moderately-sized brand perception sample could potentially impact the OLS estimation, we present results both from OLS and from the robust regression technique of reweighted least squares/least trimmed squares (RLS/LTS), developed by Rousseeuw (1984) and Rousseeuw and Leroy (1987).[26] For both the full sample and the 2000-firm subsample, SOM and IP are significantly and negatively associated with institutional holdings. ESTEEM is not significant.[27] The results are qualitatively similar for both the OLS and RLS/LTS methods, except that the R^2's of the RLS/LTS regressions are greater than those for OLS. This suggests that accounting for extreme observations increases the explanatory power of the brand perception variables. The term SOM explains a reasonable portion of the residual variation in institutional holdings, as indicated by R^2's approaching 11 and 16 percent for the OLS and RLS/LTS cases, respectively.

To further analyze the holdings-brand perception relation, we also perform the regressions of Table 5 on two subsamples stratified by firm size; these results are reported in Table 6. Given the marked decrease in sample size, we report RLS/LTS estimates, though qualitatively similar results are obtained using OLS. We present results only for the full sample and not for the subsample of the 2000 largest firms; the results are materially unaltered for the latter subsample.

capitalization.

[26]LTS estimation consists of minimizing the h smallest squared residuals, where $h = (N + n + 1)/2$, N and n being the numbers of observations and regressors, respectively. The LTS estimation method does not provide standard errors. Hence, following the LTS estimation, a weighted least-squares regression, which assigns zero weight to the observations with extreme LTS residuals (standardized absolute residuals which exceed 2.5), is performed.

[27]While we include the brand perception variables one at a time in the second-stage regression to account for potential multicollinearity, including SOM and ESTEEM together makes no material difference to the conclusions. For example, when ESTEEM is included along with SOM, its OLS t-statistic is only -0.11, whereas SOM remains strongly significant with a t-statistic of -3.02.

Please insert Table 6 here.

SOM and IP are significant in every case, but SOM is more significant for smaller firms, whereas IP is more significant for larger firms. Also, the R^2 for the SOM regression corresponding to the smaller firm group is as high as 29%. These results are consistent with the notion that large firms may have visibility independent of their brands, and for these firms, it is the interaction of product quality and brand awareness that matters for holdings. In contrast, for smaller firms, brand visibility alone can significantly impact the attractiveness of a stock to an individual investor.

In regressions not reported for brevity, we also perform regressions on the subsample of companies whose principal product coincides with the product name. This is to ascertain the impact of excluding some large firms such as American Home Products or Unilever which have several divisions and brands. In both the OLS as well the RLS/LTS procedures, the results are not materially altered (SOM and IP continue to be significant, and ESTEEM is never significant). This finding indicates that large firms with several brands do not appear to drive the results, and is consistent with the notion that product surveys (such as Landor) indeed map into investor perceptions of companies.

The consistently significant and negative coefficients of SOM and IP suggest that individuals exhibit a propensity towards stocks whose products have strong brand appeal and awareness.[28] Thus, our results are consistent with the general notion that investors prefer to invest in stocks with high information flows, as suggested by our theoretical

[28]Two potential issues are that our result may reflect cross-sectional variation in executive holdings, and that our results may reflect the notion that institutions may prefer to make speculative investments in non-branded stocks given asymmetric payoff functions that limit penalties for losses. Within the constraints imposed by data limitations, we control for stock held by executives within the company, and also use another measure of ownership (namely, the total number of shareholders) to address these issues; results are discussed in the penultimate section on robustness checks.

model as well Klein and Bawa (1976, 1977) and Merton (1987). Further, since IP is less significant for the overall sample than SOM, and ESTEEM is never significant, it can be inferred that investors are more concerned about brand visibility than perceptions of brand quality. Therefore the data do not support the behaviorally-motivated "quality" hypothesis that investors may prefer stocks with good products in the mistaken expectation of superior long-run performance.[29]

Traditional finance arguments dictate that stocks are overweighted in portfolios primarily for the superior risk-adjusted returns they are expected to deliver. Thus, it is natural to examine how the stocks of branded firms perform on a risk-adjusted basis, after controlling for other factors that are known to influence returns. Unfortunately, any returns we could perform would lack power due to the small number of years following the brand perception survey, which would preclude analyses of the type conducted by Gompers and Metrick (2001) or Badrinath and Wahal (2002). In addition, a reliable analysis of dynamic shifts in institutional preferences such as that in Bennett, Sias, and Starks (2003) is also impeded because our sample begins in 1990. We believe that as time accrues, future studies will shed more reliable light on the relation between brand perceptions and stock returns, and on dynamic shifts in the holdings-brand perception relation.

[29]We perform one-pass regressions involving the firms in the sample for which marketing data is available. In these regressions, just as in Table 5, SOM and IP are strongly significant, whereas ESTEEM is not significant. The version of this regression with SOM is reported in the second column of Table 7, Panel A, and is discussed in the next section. Also, there is a potential issue of reverse causality and endogeneity (e.g., investors may be more aware of brands of stocks that they hold because they conduct more research on such stocks). To address this question, we perform two-stage least squares regressions (using only the brand perception subsample) in which institutional holdings are modeled as a function of all of our independent variables including SOM. In turn, SOM is modeled as a function of holdings and IP. In the first regression, SOM is negative and significant; in the second regression, holdings are not significant. Similar results hold when IP is treated as the endogenous variable whereas SOM is treated as exogenous (IP is negative and significant in the first equation whereas holdings are not significant in the second). This is suggestive evidence that reverse causality is not a likely driver of our results.

IV. Robustness Checks

In this section, we investigate the robustness of our results with various alternative procedures. In much of the results to follow, we omit the ESTEEM and IP variables for brevity, since SOM is the more significant variable in Table 5. However, largely similar results are obtained as earlier with the other two brand perception variables.

First, we recognize that hitherto, our analysis has addressed a single cross-section in 1990. Based on the conclusions of Lane and Jacobson (1995, p. 68) that brand perceptions do not change much over time, we examine regressions using annual institutional holdings from the years 1991 through 1999. We initially perform a panel data regression for the firms that remain in our brand perception subsample throughout this period and in 1990. In constructing this sample we follow the rule that if a firm drops out during later years because of a merger, we do not replace that firm with the merged firm but omit the original firm from our sample. This guards against the possibility that the merged firm may have more visible brands and hence could be erroneously associated with the brand of the original firm. Our sample so constructed consists of 79 firms.

In the panel regression, the non-marketing variables are updated each year but the brand perception variables are kept constant throughout the period. We use the random effects method of Fuller and Battese (1974), which allows for firm-specific shocks for each time-period, an overall firm-specific shock across time, and an overall time-specific shock across firms. The results appear in Panel A of Table 7.

Please insert Table 7 here.

For comparison, we also provide the OLS results for 1990 alone. In both of these regressions, the coefficient on SOM is negative and strongly significant, and firm size continues

to exert a dominant influence. Note that the low R^2 estimate for the panel regression relative to the cross-sectional regression indicates that our variables do not fully capture time-series variation in holdings. Further, the role of beta is more apparent in the panel regressions, presumably because the increase in the number of cross-sections enhances the explanatory power of this variable. It is worth noting that SOM is the second-most significant variable in both of these regressions. Indeed, in the panel regression, SOM is even more significant than firm size. As further evidence of robustness, we also provide the year-by-year cross-sectional regression coefficients of SOM in Panel B of Table 7. In this panel, we omit the coefficients of the other explanatory variables for brevity. The coefficients on SOM are stable in sign as well as significance over the period, lending confidence to our results.[30]

In our next robustness check, we revisit the two-pass procedure of Tables 4 and 5 by performing yearly first-stage regressions on all firms with non-marketing data for the 1991-1999 period,[31] followed by annual second-stage regressions on firms with brand perception data. We also address the issue that our dependent variable, namely, institutional holdings, takes values over a restricted range. To allay this concern, we apply a logistic transform to proportional institutional holdings, omitting the firms with zero institutional holdings. Results are given in Table 8.

Please insert Table 8 here.

As can be seen, the significance pattern of the coefficients of our non-marketing variables is largely unchanged from Table 4. Specifically, the major determinants of institutional

[30]We also try including a time trend in the panel regression but find it to be insignificant. Further, though the panel approach does not lend itself to RLS/LTS estimation, adopting the latter approach to the other regressions in Table 7 preserves the strong significance of SOM.

[31]Unfortunately, a panel data estimation for all of these firms is infeasible, given our computational resources.

holdings show stability over time in that size, beta, and total volatility exert strong influences on holdings in virtually every year of the sample period.

The coefficients of our marketing variable, SOM, in the yearly second-stage regressions, maintain their signs and indeed, increase in significance over the latter half of the sample period.[32] Thus, the impact of the marketing variables are robust to both the sample period as well as the transformation on institutional holdings.[33] To get a feel for the numerical magnitude of the effect of brand perceptions on holdings, we also use the results of Table 8 to examine the pattern of the average residual across firms with differing levels of brand perceptions. Specifically, we divide the firms which are present every year of the sample into two groups based on their SOM ranking (with the second group having one extra firm due to the sample size being an odd number), and calculate the average residual institutional holdings for the two groups over the 1991-1999 period. We find the difference in residual holdings between the low SOM and high SOM group to be about seventeen percent, which is statistically significant at the 5% level. This provides the reader a feel for the magnitude of the impact of brand perception on institutional holdings.[34]

Of course, consumer opinions of brands are formed, in part, by the processing of information, so it is worth considering the relationship of holdings with more primitive variables that influence information flow and, in turn, brand perceptions. Indeed, Ackerberg (2001) indicates that advertising is linked to brand perceptions because advertising

[32]This increase in significance could have arisen because individual investor activity in equity markets has been positively influenced by access to inexpensive on-line trading technologies in the late 90s.

[33]While, for brevity, we only report first-stage regression results for all firms with data availability in 1991 through 1999, when we look at the subset of the largest 2000 firms in each year, our results are largely unaffected in that the marketing variables do not lose significance. Also, year-by-year RLS/LTS estimation in the second stage leads to similar conclusions. These results are available upon request.

[34]As another indicator of economic significance, we note that a move from rank 1 to rank 300 of SOM, based on the coefficient of 0.05 in Table 5, represents a change in holdings of about 15%.

plays the dual role of disseminating information and promoting brand prestige. Concurrent and independent research by Grullon, Kanatas, and Weston (GKW) (2003) and Zhu (2003) shows that advertising expenses do influence stock ownership. In light of this work, it is a worthwhile exercise to explore how our results are influenced by advertising expenses. Since such expenses are subject to discretionary reporting by companies, data on them are missing for a large number of firms (GKW also note this issue). In particular, the size of our full sample drops to 1126 when we require advertising expenses to be nonmissing. Furthermore, only 35 of our original 91 firms with brand perception data have nonmissing values of advertising expenses. The mean advertising expense in our sample is \$49.2 million, while the median is \$3.1 million, with a standard deviation of \$186.7 million, indicating high skewness. Following GKW, we use the logarithm of advertising expenses in the first stage regression and find a t-statistic of -2.03 on this variable, suggesting that advertising expenses indeed have a significant effect on institutional holdings. In the second stage regression, the t-statistics on the coefficients of SOM, ESTEEM, and IP are -2.43, -1.98, and -3.41, respectively.[35] Though the modest sample size in this case precludes strong conclusions, these results are consistent with those of GKW and suggest that even after controlling for advertising expenses, the brand perception variables have explanatory power. We postulate that brand perceptions may influence holdings independent of advertising expenses, because SOM can be influenced by the number of retail outlets, for example. Thus, the sheer number of McDonald's restaurants may influence SOM independent of advertising expense.

[35]Including advertising expenses in the second stage leaves the results materially unaltered. We also included annual share turnover, membership in the S&P 500, and an NYSE/AMEX versus Nasdaq dummy as liquidity and visibility controls in the first-stage regression and found that the results remained largely unchanged: all three marketing variables remained negative and significant in both the OLS and the robust regression approaches. Details are available from the authors.

Another robustness check consists of excluding a few large firms whose principal products appear to be the ones other than those perceived to be the strongest brands. Ex ante, we decided to exclude the following firms (with assigned brands in parentheses): Phillip Morris (General Foods), General Motors (Chevrolet), General Electric (General Electric), and Pfizer (BenGay). Thus, some consumers may more usually associate Philip Morris with tobacco products than food products, General Motors has a number of automobile brands under its umbrella, General Electric is a well-diversified company with several lines of business, and Pfizer is known more for its prescription drugs than the ointment BenGay which was the company's most highly rated brand. We re-run all the regressions excluding these firms from the sample. Although the results are not reported for brevity, they are qualitatively unchanged in every major respect. In particular, none of the key variables lose significance and the explanatory power is not altered to any material degree.

There is a potential concern with our interpretation of individual investor holdings as the complementary proportion of institutional holdings. Specifically, our results could reflect the notion that brand perceptions influence executive holdings. For example, agency reasons could dictate stock held by managers (see, e.g., Ofek, 1993), and these considerations may be influenced by our explanatory variables. To address this, we obtain holdings of top executives from the *Execucomp* database disseminated by Standard & Poor's (S&P). As per private correspondence with Bill Griffis, Product Manager for S&P, the first year of reliable data from this source is 1993. For this year, there are 1044 firms in our full sample and 63 firms in our brand perception subsample with data on executive holdings. The mean (median) level of executive holdings is a rather small 5.5% (1.2%). Nonetheless, we perform first and second-stage regressions using 1993 data

on executive holdings, and all other data (except the 1990 brand perception data) as of the end of 1993. Results are reported in Table 9.

Please insert Table 9 here.

The results indicate that executive holdings are higher in well-performing firms with high market/book ratios and high price levels, and lower in large firms with low systematic risk. Executives own more stock in small, volatile firms that are more difficult to monitor, and the ownership structure indeed appears to support the notion that incentives in the form of higher stockholdings do indeed enhance corporate performances as measured by ROA or market/book ratios. These findings generally accord with the incentive arguments for executive ownership provided by Jensen and Meckling (1976) and developed further, for example, by Core and Guay (1999).[36] More relevant to our study is that the coefficients on SOM, ESTEEM, and IP are insignificant with respective t-statistics of 0.38, 0.38, and 0.61. On the other hand, in regressions not reported for brevity, when our dependent variable is defined as institutional holdings plus executive holdings, the t-statistics on the marketing variables are -2.25, -1.44, and -2.30, respectively. While there is a decline in significance relative to our earlier results (viz. Table 5), likely due to a smaller sample size, the basic conclusion is that our results do not appear to be driven by cross-sectional variation in executive holdings.

We also re-run our first and second-stage regressions using the (log) number of shareholders as the dependent variable. This partially mitigates another concern with our interpretation of the relation between holdings and brand perceptions. Specifically, asymmetric payoff functions for institutional money managers (viz. Starks, 1987), wherein

[36]See also Demsetz and Lehn (1985), Himmelberg, Hubbard, and Palia (1999), and Aggarwal and Samwick (2003).

losses are less costly than in a linear contract, may cause such institutions to take excessive risk and thereby eschew high-information, brand-name stocks, so that our finding could reflect institutional propensities to avoid such stocks, as opposed to individual investor tendencies to invest in such stocks. While the number of individual investors would be the ideal variable to rule out the preceding interpretation, this variable is not available. Nonetheless, we motivate this robustness check by appealing to the notion that the total number of shareholders is likely to capture the breadth of the appeal of the stock to all investing sectors, as opposed to cross-sectional variation in institutional or executive holdings. We find that 1717 firms (68 firms) in our full sample (brand perception subsample) have non-missing values for the number of shareholders as of December 1990 (from Compustat).

The results from the first and second-stage regressions are reported in Table 10.

Please insert Table 10 here.

Compared to the 2000-firm subsample in Table 4, most of the coefficients for the first-stage regression in Table 10 have a sign opposite to that for holdings, except price and book/market, which are insignificant. Thus, our variable appears to measure dispersion of ownership among individual shareholders, as opposed to concentration of ownership among institutions. As can be seen, the second stage regression yields t-statistics of 3.59, -0.34, and 2.46 on SOM, ESTEEM, and IP, respectively, and the R^2 for the SOM regression is close to 13%. These results support the notion that stocks with high-visibility brands are held by more shareholders. They also indicate that our findings are not likely to be due to the propensity of institutions to avoid brand-name stocks but, rather, a result of investor proclivity towards stocks with visible brands.

On a final note, we repeat our analysis using brand data from another survey conducted by the firm Total Research Corporation (TRC). In this survey, the terms "salience" and "quality" serve as analogs to the terms SOM and ESTEEM from the Landor survey. This survey does not appear to be as comprehensive in its coverage of top brands as Landor, but we replicate our study using updated perception data for the available years 1996 and 1999, using the sample common to Landor and TRC, and find the results to be qualitatively unchanged in that the awareness term continues to be negatively and significantly related to institutional holdings, but the quality term is never significant; results are not reported because of the even smaller sample size, but can be provided upon request.

An issue for future research is to examine whether the qualitative nature of the results changes for relatively less visible firms with lower rankings than the ones covered by extant surveys. We note that the explanatory power of brand perceptions for institutional holdings will tail off for brands with relatively low visibility. Since individual investors do not hold a large number of stocks in their portfolios (Goetzmann and Kumar, 2002) and cognitive limitations cause them to focus on visible companies (Barber and Odean, 2001), potentially those with top-ranked brands, we believe that it is unlikely that holdings will differ significantly across firms with brands ranked from say, 500 to 1000. Nonetheless, as more data on brand perception surveys become available, additional light will be shed on this issue.

V. Concluding Remarks

A growing literature addresses determinants of investor holdings. We contribute to this literature by addressing how brand perceptions influence the incentive to hold a

company's stock. Our aim is to address the previously unexplored issue of whether the well-developed positive association between brand recognition and product choice carries over to investor interest in a stock. We find that institutional holdings are significantly influenced by a term that captures brand perception, though brand awareness is more important than overall brand image in determining holdings. Our findings suggest a preference for visible, brand-name stocks in individuals' decisions to hold stocks, which supports the hypothesis that individual investors exhibit a propensity towards companies with easily recognizable products. This preference is consistent with the notion developed in our theoretical model that individuals prefer to invest in stocks for which they have more higher-quality information (because of greater familiarity with the firm's products). The result also accords with the notion that investors prefer stocks of which they are cognizant or those in which they face lower parameter estimation risk, in the sense of Barry and Brown (1985) and Merton (1987). The analysis does not support the "behavioral" hypothesis that investors confuse high-quality products of a firm with the expectation of superior risk-adjusted returns from that firm's stock.

Through our cross-sectional study, we also obtain insights on other variables that influence how financial market investors form their stock portfolios. We find an interesting positive relation between institutional holdings and beta. Again, this is consistent with our theoretical model, which indicates that individuals avoid stocks with high loadings on the market factor because their precision of information about the macroeconomy is lower. Further, given prior literature which suggests hat stocks with high measured betas are those with high estimation risk (see Barry and Brown, 1985), we would expect individual investors to eschew them. We also discover that the aggregate holdings of U.S. institutions are tilted towards large stocks with low total volatility. These results are

consistent with the notion that institutions shun the relatively "neglected" sector of the stock market for liquidity reasons. Our results are intertemporally robust throughout the 1990s.

We believe there is room for more work in understanding why the composition of holdings and, perhaps more importantly, trading activity, vary from stock to stock.[37] An issue is to provide stronger conceptual underpinnings for the factors that influence the desire of individuals to hold certain categories of stocks over others. For example, it would be interesting to explore whether the bias towards brand-name stocks arises because consumer loyalty to brands spills over to investment decisions or because individuals prefer stocks with high brand visibility regardless of whether they consume the branded product.

By employing the Landor survey, we rely on the ability of the subjects to clearly separate brand quality from brand familiarity/awareness.[38] In addition, we have addressed the issue of multiple brands under one company's umbrella by assigning the score associated with the strongest brand for that company. Our motivation for not using average brand image in such cases is that brand coverage for an umbrella company in the survey is not necessarily exhaustive. Lack of comprehensive survey data also limits our ability to analyze many cross-sections. As more extensive brand survey data become

[37]Our analysis does not consider firms with low brand image that were discontinued, because our sample is restricted to the relatively more visible firms. Presumably low-image firms would be avoided by both individuals and institutions, hence who ends up holding them would be an interesting issue to analyze. Such firms, however, are likely to become speculative investments ("penny stocks") that would be held by individuals for reasons unrelated to brand recognition.

[38]From a marketing standpoint, brand familiarity is distinct from brand awareness. But in implementing their survey, Landor treats them as one. Indeed, the well-known anecdote of Peter Lynch investing in L'Eggs hosiery because his wife liked the product, and further advising investors to hold stock in firms that produced products familiar to them, illustrates this point. This approach is fundamentally different from investing in a company whose product one is aware of but not familiar with. Surveys to bring out this distinction would appear to be desirable.

available, brand coverage will become more complete, which will enable us to address these shortcomings.

Our analysis underscores the relevance of understanding the characteristics of stocks that individual investors and mutual funds hold, as opposed to analyzing whether investors can successfully choose stocks that deliver superior risk-adjusted returns. This issue is also mentioned by Statman (2000), who calls for more analysis of portfolio characteristics that are not directly related to future expected returns. Because effects identified by our work as well as Coval and Moskowitz (1999) and Huberman (2001) could be reflected in mutual fund managers' stock preferences, an interesting extension of our study would be to look at the relation between mutual fund holdings in a company's stock and brand perceptions of a company's products.

We have examined the cross-sectional relationship between institutional holdings and brand perceptions of company products. Another topic for research suggested by our study is the issue of whether time-series variations in institutional holdings are correlated with changes in brand perceptions. Future availability of more frequent data on brand awareness could shed further light on this topic.

Appendix

Proof of Propositions 1 and 2: Each agent maximizes the expected utility of final wealth. Given that agents have exponential utility and that the final wealth is normally distributed, each agent belonging to class i maximizes $E(W_i) - (R_i/2)\text{var}(W_i)$, where W_i is the wealth of the agent. Eqs. (1) and (2) follow from noting that $W_i = (\theta + \epsilon - P)d_i$, where d_i denotes the holdings of agent i.

From the market clearing condition represented in Eq. (3), observing the price P is equivalent to observing the variable $\tau \equiv \theta + (R_1 v_\epsilon/m)z$, so that

$$\mu = E(\theta|\theta + \eta, \tau),$$

and

$$v = \text{var}(\theta|\theta + \eta, \tau).$$

We use the well-known result (e.g., Anderson, 1984) that if there exist random vectors $\upsilon_{\mathbf{1}}$ and $\upsilon_{\mathbf{2}}$ such that

$$(\upsilon_{\mathbf{1}}, \upsilon_{\mathbf{2}}) \sim \mathbf{N}\left[(\mu_{\mathbf{1}}, \mu_{\mathbf{2}}), \begin{pmatrix} \Sigma_{11} & \Sigma_{12} \\ \Sigma_{21} & \Sigma_{22} \end{pmatrix}\right] \tag{4}$$

then the conditional distribution of $\upsilon_{\mathbf{1}}$ given $\upsilon_{\mathbf{2}} = \mathbf{X_2}$ is normal with a mean given by the vector

$$E(\upsilon_{\mathbf{1}}|\upsilon_{\mathbf{2}} = \mathbf{X_2}) = \mu_{\mathbf{1}} + \mathbf{\Sigma_{12}\Sigma_{22}^{-1}}(\mathbf{X_2} - \mu_{\mathbf{2}}) \tag{5}$$

and the variance-covariance matrix given by

$$\text{var}(\upsilon_{\mathbf{1}}|\upsilon_{\mathbf{2}} = \mathbf{X_2}) = \mathbf{\Sigma_{11}} - \mathbf{\Sigma_{12}\Sigma_{22}^{-1}\Sigma_{21}}. \tag{6}$$

In our case, $\upsilon_1 = \theta$ and $\upsilon_2 = [\theta + \eta, \tau]$, and the relevant unconditional means are all zero. Thus, we have

$$\mu = \frac{R_1^2 v_\epsilon^2 v_\theta v_z(\theta + \eta) + m^2 v_\eta v_\eta \tau}{\Delta}$$

and

$$v = \frac{R_1^2 v_\epsilon^2 v_\eta v_\theta v_z}{\Delta},$$

where $\Delta \equiv m^2 v_\eta v_\theta + R_1^2 v_\epsilon^2 v_z (v_\eta + v_\theta)$.

Substituting μ and v into the market-clearing condition (3), we find that the price P can be written as

$$P = a_1\theta + a_2\eta + a_3 z + a_4 \bar{X},$$

where

$$\begin{aligned}
a_1 &= \frac{v_\theta(m^3 v_\eta - m^2 v_\eta + m R_2 v_\epsilon v_z (R_1 v_\epsilon - R_2 v_\eta) - R_1^2 v_\epsilon^2 v_z}{D}, \\
a_2 &= \frac{R_1^2 v_\epsilon^2 v_\theta v_z (m-1)}{D}, \\
a_3 &= \frac{R_1 v_\epsilon v_\eta v_\theta (m^2 - m - R_1 R_2 v_\epsilon v_z)}{D}, \\
a_4 &= \frac{R_1^2 r_2^2 v_\epsilon^2 v_\eta v_\theta v_z}{D}, \text{ and} \\
D &= m^3 v_\eta v_\theta - m^2 v_\eta v_\theta + m R_1 v_\epsilon v_z [R_1 v_\epsilon (v_\eta + v_\theta) - R_2 v_\eta v_\theta] - R_1^2 v_\epsilon^2 v_z (v_\eta + v_\theta).
\end{aligned}$$

Substituting the equilibrium P into Eqs. (1) and (2), we obtain closed-form expressions for the expected institutional and individual holdings:

$$\begin{aligned}
E(d_1) &= -\frac{m^2 v_\eta v_\theta + R_1^2 v_\epsilon^2 v_z (v_\theta + v_\theta)}{D} \text{ and} \\
E(d_2) &= -\frac{R_1 R_2 v_\eta v_\theta v_z \bar{X}}{D}.
\end{aligned}$$

Proposition 1 follows from substituting $v_\theta = \beta^2 v_\gamma + v_\delta$ and $m = 0.5$ into the above expressions, and differentiating the resulting expressions with respect to β, v_η, and v_ϵ. For example, the derivative of expected institutional holdings with respect to β is given by

$$\frac{64\beta R_1^3 R_2 v_\epsilon^3 v_\eta^2 v_\gamma v_z^2 \bar{X}}{D'},$$

where

$$D' \equiv \Big[\beta^2 v_\gamma(4r_1^2 v_\epsilon^2 v_z + 4R_1 R_2 v_\epsilon v_\eta v_z + v_\eta) + 4R_1^2 v_\epsilon^2 v_z(v_\eta + v_\delta) + 4R_1 R_2 v_\epsilon v_\eta v_\delta v_z + v_\eta v_\delta\Big]^2,$$

proving that expected institutional holdings increase in β. Similarly, the derivative of expected individual holdings with respect to the variance of signal noise, v_η, is given by

$$-\frac{32R_1^3 R_2 v_\epsilon^3 v_z^2 \bar{X}(\beta^4 v_\gamma^2 + 2\beta^2 v_\gamma v_\delta + v_\delta^2)}{D'},$$

which is negative. This proves Proposition 1.

With regard to Proposition 2, the derivative of expected individual holdings, $E(d_1)$ with respect to $\text{var}(F) = v_\theta + v_\epsilon$ is given by $1/[\{dE(d_1)/dv_\theta\}^{-1} + \{dE(d_1)/dv_\epsilon\}^{-1}]$, and reduces to A/B where

$$A = 32R_1^3 R_2 v_\epsilon^3 v_\eta^2 v_\theta v_z^2 \bar{X}(\beta^2 v_\gamma + v_\delta)[\beta^2 v_\gamma(4R_1^2 v_\epsilon^2 - v_\eta) + 4R_1^2 v_\epsilon^2 v_z(v_\eta + v_\delta) - v_\eta v_\delta],$$

and B is given by $G \times H$, where

$$G \equiv \beta^4 v_\gamma^2(4R_1^2 v_\epsilon^2 v_z - v_\eta) + 2\beta^2 v_\gamma[2R_1^2 v_\epsilon^2 v_z(v_\eta + 2v_\delta) - v_\eta v_\delta] + v_\delta[4R_1^2 v_\epsilon^2 v_z(v_\eta + v_\delta) - v_\eta v_\delta]$$

and

$$H \equiv [\beta^2 v_\gamma(4R_1^2 v_\epsilon^2 v_z + 4R_1 R_2 v_\epsilon v_\eta v_z) + 4R_1^2 v_\epsilon^2 v_z(v_\eta + v_\delta) + 4R_1 R_2 v_\epsilon v_\eta v_\delta v_z + v_\eta v_\delta]^2.$$

It is easy to see that the above derivative is of ambiguous sign. For example, when all parameters except v_η and v_δ are set to unity, and v_η is set to 16, the sign of the derivative is the same as the sign of the expression $(13 - 3v_\delta)/(3v_\delta^2 - 10v_\delta + 3)$. Thus, in this case, the derivative is positive for $v_\delta < 1/3$ and $3 < v_\delta < 13/3$, and negative for $1/3 < v_\delta < 3$ as well as $v_\delta > 13/3$.

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Table 1
Firm names
This table lists the names of the 91 firms in the sample for which brand perception data are available, together with their principal brand.

Company Name	Product
Allied Signal	Prestone
American Express	American Express
American Home Products	Anacin
American Telephone & Telegraph	AT&T
AMR	American Airlines
Anheuser Busch	Budweiser
Apple Computer	Apple
Avon Products	Avon
BIC	BIC
Black & Decker	Black & Decker
Borden	Borden
Bristol Myers	Excedrin
Burger King	Burger King
Campbell Soup	Campbell's
CBS	CBS
Chiquita Brands	Chiquita
Chrysler	Dodge
Church & Dwight	Arm & Hammer
Clorox	Clorox
Coca Cola	Coke
Colgate Palmolive	Colgate
Conagra	Hunt's
Corning	Pyrex
Deere & Co	John Deere
Dial Corporation	Dial
Dole	Dole
Du Pont E I De Nemours	Du Pont
Eastman Kodak	Kodak
Federal Express	Federal Express
Fruit Of The Loom	Fruit Of The Loom
General Electric	GE
General Mills	Betty Crocker
General Motors	Chevrolet
Gerber Products	Gerber
Gillette	Gillette
Goodyear Tire & Rubber	Goodyear
Hasbro	Playskool
Hershey Foods	Hershey's
HJ Heinz	Heinz
Honda Motor	Honda

Table continued on next page

Table 1, continued

Company Name	Product
International Business Machines	IBM
International Dairy Queen	Dairy Queen
JC Penney	Penney's
JM Smucker	Smucker's
Johnson & Johnson	Johnson & Johnson
K Mart	Kmart
Kellogg	Kellogg's
Kimberly Clark	Kleenex
Matsushita Electric	Panasonic
Mattel	Fisher Price
Maytag	Maytag
McDonald's	McDonald's
Minnesota Mining & Manufacturing	3M
Mobil	Mobil
Monsanto	Nutrasweet
Nike	Nike
Nissan Motors	Nissan
Pennzoil	Pennzoil
Pepsico	Pepsi
Pfizer	BenGay
Philip Morris	General Foods
Polaroid	Polaroid
Procter & Gamble	Crest
Quaker Oats	Quaker Oats
Quaker State	Quaker State
Ralston Purina	Purina
Reebok International	Reebok
Rubbermaid	Rubbermaid
Sara Lee	Sara Lee
Sears Roebuck	Sears
Sherwin Williams	Sherwin Williams
Sony	Sony
Tandy	Radio Shack
Texaco	Texaco
Texas Instruments	Texas Instruments
Time Warner	Warner Brothers
Tootsie Roll	Tootsie Roll
Toyota Motor	Toyota
Turner Broadcasting	CNN
UAL	United Airlines
Unilever	Lipton
Union Carbide	Energizer
Walt Disney	Disney

Table continued on next page

Table 1, continued

Company Name	Product
Warner Lambert	Certs
WD-40	WD-40
Wendy’s International	Wendy's
Westinghouse Electric	Westinghouse
Whirlpool	Whirlpool
Wrigley	Wrigley
Xerox	Xerox
Zenith Electronics	Zenith

Table 2
Summary Statistics
Institutional holdings (Hld), size, price, book/market ratio (book value of equity /market value of equity), return on assets (ROA=Net income/Total assets) and leverage (LEV=Long-term debt/total assets) are calculated as of December 1990. The beta is calculated using 60 months of data ending in December 1990, and is based on the CRSP value-weighted index (Dimson betas with one lead and one lag are used). Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December 1990. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December 1990. Panels A, B, and C respectively present summary statistics for the entire sample, the top 2000 firms ranked by market capitalization as of December 1990, and the firms for which brand perception data are available.

Panel A: All firms (number of firms = 3324)

Variable	Mean	Median	Standard deviation
Hld (%)	29.54	25.67	22.47
ROA (%)	-0.660	3.03	27.67
LEV (%)	19.17	14.94	19.80
Size ($bill.)	0.786	0.067	3.19
Book/Market	0.778	0.848	7.13
Price	16.97	9.13	117.02
Ret12 (%)	-1.64	-1.22	4.20
Beta	1.22	1.19	0.656
VAR	0.0203	0.0140	0.0235

Panel B: Largest 2000 firms

Variable	Mean	Median	Standard deviation
Hld (%)	39.56	39.50	21.51
ROA (%)	4.73	4.33	13.96
LEV (%)	19.19	16.65	18.69
Size ($bill.)	1.298	0.227	4.031
Book/Market	0.813	0.719	0.875
Price	25.57	17.50	150.18
Ret12	-0.604	-0.452	3.09
Beta	1.16	1.13	0.588
VAR	0.0136	0.0103	0.0115

Panel C: 91 firms with brand perception data

Variable	Mean	Median	Standard deviation
Hld (%)	48.76	51.95	21.18
ROA (%)	6.95	6.25	6.16
LEV (%)	19.08	17.27	13.64
Size ($bill.)	8.062	3.360	1.187
Book/Market	0.602	0.471	0.473
Price	44.10	37.75	29.00
Ret12	-0.287	-0.315	2.22
Beta	1.11	1.02	0.51
VAR	0.0088	0.0073	0.0053

Table 3
Correlation Matrix
Institutional holdings (Hld), size, price, book/market ratio (book value of equity /market value of equity), return on assets (ROA=Net income/Total assets) and leverage (LEV=Long-term debt/total assets) are calculated as of December 1990. The beta is calculated using 60 months of data ending in December 1990, and is based on the CRSP value-weighted index (Dimson betas with one lead and one lag are used). Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December 1990. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December 1990.The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM) and the personal regard for a brand by a variable ESTEEM. IMAGE POWER (IP) encompasses both SOM and ESTEEM. The sample in Panel C consists of 91 firms for which we have data available on all the variables we consider. P-values are in parentheses.

Panel A: All firms (number of firms=3324)

	Hld	ROA	LEV	Size	Book/ Market	Price	Ret12	Beta
ROA	0.173 (0.00)							
LEV	-0.028 (0.11)	-0.005 (0.75)						
Size	0.207 (0.00)	0.066 (0.00)	-0.006 (0.75)					
Book/ Market	0.001 (0.96)	0.106 (0.00)	-0.028 (0.11)	-0.007 (0.67)				
Price	0.050 (0.00)	0.031 (0.07)	-0.014 (0.44)	0.104 (0.00)	-0.001 (0.96)			
Ret12	0.134 (0.00)	0.262 (0.00)	-0.063 (0.00)	0.112 (0.00)	0.081 (0.00)	0.044 (0.01)		
Beta	0.043 (0.01)	-0.124 (0.00)	0.006 (0.72)	-0.100 (0.00)	-0.020 (0.25)	-0.027 (0.12)	-0.195 (0.00)	
VAR	-0.290 (0.00)	-0.235 (0.00)	-0.008 (0.65)	-0.133 (0.00)	-0.051 (0.00)	-0.059 (0.00)	0.012 (0.47)	0.315 (0.00)

Panel B: Largest 2000 firms

	Hld	ROA	LEV	Size	Book/ Market	Price	Ret12	Beta
ROA	0.055 (0.01)							
LEV	-0.054 (0.02)	-0.146 (0.00)						
Size	0.135 (0.00)	0.049 (0.03)	-0.008 (0.72)					
Book/ Market	0.018 (0.42)	-0.119 (0.00)	-0.118 (0.00)	-0.094 (0.00)				
Price	-0.001 (0.96)	0.014 (0.54)	-0.018 (0.42)	0.088 (0.00)	-0.025 (0.26)			
Ret12	0.027 (0.23)	0.177 (0.00)	-0.078 (0.00)	0.093 (0.00)	-0.329 (0.00)	0.021 (0.34)		
Beta	0.154 (0.00)	-0.102 (0.00)	-0.011 (0.62)	-0.114 (0.00)	-0.031 (0.17)	-0.019 (0.39)	-0.088 (0.00)	
VAR	-0.090 (0.00)	-0.133 (0.00)	0.007 (0.74)	-0.173 (0.00)	-0.086 (0.00)	-0.056 (0.00)	0.119 (0.47)	0.466 (0.00)

Table continued on next page

Table 3, continued

Panel C: 91 firms with brand perception data

	Hld	SOM	Esteem	IP	ROA	LEV	Size	Book/ Market	Price	Ret12	Beta
SOM	-0.207 (0.05)										
Esteem	-0.043 (0.68)	0.320 (0.00)									
IP	-0.158 (0.14)	0.855 (0.00)	0.751 (0.00)								
ROA	0.002 (0.99)	-0.024 (0.83)	0.116 (0.28)	0.051 (0.63)							
LEV	0.067 (0.53)	0.040 (0.70)	0.046 (0.66)	0.052 (0.63)	-0.473 (0.00)						
Size	0.161 (0.13)	0.242 (0.02)	0.159 (0.13)	0.253 (0.02)	0.099 (0.35)	-0.064 (0.55)					
Book/ Market	-0.004 (0.97)	0.072 (0.50)	-0.186 (0.08)	-0.028 (0.79)	-0.594 (0.00)	0.069 (0.52)	-0.203 (0.05)				
Price	0.178 (0.09)	0.060 (0.57)	0.026 (0.81)	0.032 (0.77)	0.139 (0.19)	-0.124 (0.24)	0.341 (0.00)	-0.310 (0.00)			
Ret12	0.166 (0.12)	-0.058 (0.58)	0.110 (0.30)	0.018 (0.87)	0.464 (0.00)	-0.281 (0.01)	0.270 (0.01)	-0.572 (0.00)	0.340 (0.00)		
Beta	0.165 (0.12)	-0.156 (0.14)	-0.065 (0.54)	-0.120 (0.26)	-0.112 (0.29)	0.254 (0.02)	-0.138 (0.19)	0.147 (0.16)	-0.271 (0.01)	-0.263 (0.01)	
VAR	-0.157 (0.14)	-0.243 (0.02)	-0.095 (0.37)	-0.220 (0.04)	-0.202 (0.06)	0.320 (0.00)	-0.389 (0.00)	0.098 (0.36)	-0.308 (0.00)	-0.289 (0.01)	0.646 (0.00)

Table 4
Regressions for Institutional Holdings
Institutional holdings, size, price, book/market, ROA, and leverage (LEV) are calculated as of December 1990. The beta is calculated using 60 months of data ending in December 1990, and is based on the CRSP value-weighted index (Dimson betas with one lead and one lag are used). Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December 1990. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December 1990. The second column shows the results of using all firms for which the necessary data are available, while the third gives the results for the largest 2000 firms for which all data are available. The dependent variable in this regression is percentage institutional holdings of each stock as of December 1990. Heteroskedasticity-corrected t-statistics are in parentheses.

Variable	All firms (number of firms=3324)	2000 largest firms
Intercept	-47.83 (-24.24)	-43.90 (-9.47)
ROA	1.71 (1.79)	5.28 (1.54)
LEV	-4.57 (-3.10)	-4.79 (-1.91)
Log(size)	6.49 (38.98)	5.81 (17.63)
Book/Market	-0.066 (-2.00)	1.81 (3.38)
Price*100	-0.747 (-8.39)	-0.723 (-7.27)
Ret12	-30.04 (-4.18)	7.46 (0.49)
Beta	5.43 (9.92)	9.55 (8.84)
VAR	-76.60 (-4.04)	-125.25 (-1.71)
Adjusted R^2 (%)	42.00	20.15

Table 5
Regressions for Residual from Institutional Holdings Regression
The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM) and the personal regard for a brand by a variable ESTEEM. The variable IMAGE POWER (IP) captures a combined effect of SOM and ESTEEM. Estimates are presented both for Ordinary Least Squares (OLS) with heteroskedasticity-corrections, and the Reweighted Least Squares/Least Trimmed Squares (RLS/LTS) method of Rousseeuw (1984) and Rousseeuw and Leroy (1987). T-statistics are in parentheses.

Panel A: Dependent variable is residual from regression of institutional holdings on the full sample

	OLS			RLS/LTS		
	SOM *100	ESTEEM *100	IP *100	SOM *100	ESTEEM *100	IP *100
Intercept	-9.80 (-4.05)	-5.80 (-2.38)	-10.03 (-3.53)	-9.95 (-4.37)	-4.84 (-2.08)	-10.52 (-4.07)
Coefficient	-4.40 (-3.10)	-1.21 (-1.06)	-4.51 (-2.33)	-5.13 (-3.99)	-1.12 (-1.03)	-5.87 (-3.42)
R^2 (%)	10.52	1.25	6.52	15.45	1.21	14.91
N	91			91		

Panel B: Dependent variable is residual from regression of institutional holdings on the largest 2000 firms

	OLS			RLS/LTS		
	SOM *100	ESTEEM *100	IP *100	SOM *100	ESTEEM *100	IP *100
Intercept	-8.66 (-3.54)	-4.96 (-2.03)	-9.81 (-3.68)	-9.72 (-4.22)	-4.69 (-1.97)	-9.70 (-3.79)
Coefficient	-4.08 (-3.01)	-0.61 (-0.45)	-4.88 (-2.78)	-5.33 (-4.06)	-1.30 (-1.15)	-5.96 (-3.44)
R^2 (%)	9.32	1.17	7.99	15.94	1.50	11.97
N	90			90		

Table 6

Regressions for Residual from Institutional Holdings Regression, for Subsamples of Firms Stratified by Size

The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM) and the personal regard for a brand by a variable ESTEEM. The variable IMAGE POWER (IP) captures a combined effect of SOM and ESTEEM. The sample of 91 firms with brand perception data is divided into two groups by firm size (with 45 and 46 firms in the larger and smaller firm groups, respectively) and estimates are presented for each subsample. The dependent variable is the residual from regression of institutional holdings on the full sample of 3324 firms. The Reweighted Least Squares/Least Trimmed Squares (RLS/LTS) method of Rousseeuw (1984) and Rousseeuw and Leroy (1987) is used for estimation. N denotes the number of observations, and t-statistics are in parentheses.

	Larger firm group			Smaller firm group		
	SOM *100	ESTEEM *100	IP *100	SOM *100	ESTEEM *100	IP *100
Intercept	-6.99 (-3.02)	-5.90 (-2.38)	-7.70 (-3.17)	-16.20 (-3.98)	-2.62 (-0.61)	-11.21 (-2.33)
Coefficient	-3.01 (-2.26)	-2.19 (-1.77)	-5.22 (-2.99)	-9.16 (-4.12)	0.051 (0.03)	-7.21 (-2.32)
R^2 (%)	11.10	6.91	17.93	29.23	0.00	11.35

Table 7
One-Pass Regressions for Subsample of Firms with Brand Perception data
Institutional holdings (in percentage points), size, price, book/market, ROA, and leverage (LEV) are calculated as of December of the relevant year. The beta is calculated using 60 months of data ending in December of the relevant year, and is based on the CRSP value-weighted index (Dimson betas with one lead and one lag are used). Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December of the relevant year. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December of the relevant year. The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM). The second column of Panel A shows the heteroskedasticity-corrected OLS results of using all firms for which the necessary data are available as of 1990, while the third column gives the results for a panel data estimation for firms for which all data are available in every year from 1990 to 1999 (the Fuller-Battese method is used). Panel B shows the heteroskedasticity-corrected SOM coefficients of regressions that use all firms for which the necessary data are available as of December for the years 1991 to 1999. The dependent variable in this regression is percentage institutional holdings of each stock as of December of the relevant year. All variables are updated annually except SOM. N denotes the number of observations, and t-statistics are in parentheses.

Panel A: Cross-sectional regression for 1990 and Panel data regression for 1990-1999

Variable	1990 only	Panel data estimation, Fuller-Battese method, 1990-1999
Intercept	-82.42 (-3.90)	21.71 (2.24)
ROA	39.48 (0.98)	18.74 (3.56)
LEV	16.18 (1.06)	10.23 (2.88)
Log(Size)	7.23 (5.55)	1.67 (2.87)
Book/Market	13.01 (2.45)	-4.58 (-3.30)
Price*100	1.68 (0.26)	0.021 (1.61)
Ret12	67.45 (0.68)	4.96 (0.42)
Beta	4.78 (0.97)	1.83 (3.23)
VAR	-280.93 (-0.55)	-761.79 (-5.56)
SOM*100	-5.07 (-3.61)	-5.32 (-3.68)
R^2 (%) Adjusted R^2 (%)	48.35 42.62	14.15 -
N	91	79

Panel B: Yearly cross-sectional regression coefficients on SOM, 1991-1999 (coefficients on other explanatory variables in Panel A are omitted for brevity)

Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999
SOM*100	-4.81 (-3.17)	-4.79 (-3.15)	-3.82 (-2.57)	-3.41 (-2.03)	-4.71 (-2.93)	-4.74 (-3.59)	-4.61 (-2.96)	-3.58 (-2.33)	-4.57 (-3.47)
N	91	91	91	90	87	86	85	81	79

Table 8
1991-1999 Regressions for Institutional Holdings
Institutional holdings, size, price, book/market, ROA, and leverage (LEV) are calculated as of December of the relevant year. The beta is calculated using 60 months of data ending in December of the relevant year, and is based on the CRSP value-weighted index. Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December of the relevant year. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December of the relevant year. Return on assets (ROA) and leverage (Lev) are calculated as of December of the relevant year. The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM). The dependent variable in the first-stage regression is a logistic transformation of the institutional holdings of each stock as of December of the relevant year. All variables are updated annually except SOM. The second-stage regression uses the residuals from the first stage regression as the dependent variable. N denotes the number of observations, and heteroskedasticity-corrected t-statistics are in parentheses.

	Variable	1991	1992	1993	1994	1995	1996	1997	1998	1999
First-stage regression	Intercept	-6.88 (-35.8)	-7.53 (-45.1)	-7.54 (-45.1)	-7.71 (-42.1)	-7.54 (-45.7)	-8.40 (-43.2)	-7.83 (-41.2)	-8.04 (-42.9)	-8.00 (-33.5)
	ROA	0.049 (2.41)	0.111 (0.92)	0.043 (0.55)	0.268 (2.88)	0.399 (4.89)	0.252 (2.67)	0.134 (2.15)	0.172 (2.59)	0.414 (3.41)
	LEV	-0.066 (-0.56)	-0.392 (-3.06)	-0.166 (-1.37)	0.015 (0.12)	0.045 (0.34)	0.381 (3.00)	0.419 (3.73)	0.479 (4.41)	0.510 (4.92)
	Log(Size)	0.455 (33.0)	0.516 (41.7)	0.527 (42.5)	0.537 (39.6)	0.538 (41.8)	0.578 (42.6)	0.531 (39.3)	0.540 (40.2)	0.543 (34.7)
	Book/Market	-0.004 (-2.59)	0.021 (0.98)	0.001 (0.03)	0.042 (1.09)	0.008 (0.45)	0.096 (1.61)	0.141 (2.31)	0.126 (2.83)	0.034 (0.43)
	Price*100	-0.044 (-7.10)	-0.031 (-13.71)	-0.023 (-13.44)	-0.018 (-10.19)	-0.011 (-11.81)	-0.013 (-10.90)	-0.008 (-13.40)	-0.006 (-21.34)	-0.007 (-14.16)
	Ret12	-1.13 (-2.05)	-1.95 (-3.29)	-4.15 (-6.14)	-1.27 (-2.00)	-5.82 (-9.56)	-3.24 (-5.19)	-2.78 (-4.90)	-3.58 (-6.40)	-4.86 (-10.78)
	Beta	0.513 (11.48)	0.243 (10.02)	0.183 (8.38)	0.192 (8.58)	0.102 (5.47)	0.071 (4.33)	0.176 (8.43)	0.231 (9.52)	0.236 (9.20)
	VAR	-11.94 (-8.02)	-0.718 (-2.74)	-0.866 (-5.61)	-1.00 (-5.97)	-0.839 (-5.63)	-0.517 (-1.83)	-5.03 (-4.82)	-3.69 (-4.09)	-2.68 (-3.39)
	N	3288	3345	3599	3746	4136	4764	5000	4933	4983
Second-stage regression	SOM*1000	-3.10 (-2.75)	-3.21 (-2.97)	-3.40 (-2.98)	-3.39 (-3.12)	-3.88 (-3.71)	-3.53 (-3.52)	-3.66 (-3.53)	-3.53 (-3.16)	-3.71 (-3.60)
	N	91	91	91	90	87	86	85	81	79

Table 9
Regressions for Executive Holdings
Executive holdings, size, price, book/market, ROA, and leverage (LEV) are calculated as of December 1993. The beta is calculated using 60 months of data ending in December of the relevant year, and is based on the CRSP value-weighted index. Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December of the relevant year. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December of the relevant year. Return on assets (ROA) and leverage (Lev) are calculated as of December of the relevant year. The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM) and the personal regard for a brand by a variable ESTEEM. The variable IMAGE POWER (IP) captures a combined effect of SOM and ESTEEM. The dependent variable in the first-stage regression is a logistic transformation of the executive holdings of each stock as of December 1993. The second-stage regressions use the residuals from the first stage regression as the dependent variable, and, in turn, SOM, ESTEEM, and IP as explanatory variables. N denotes the number of observations, and t-statistics are in parentheses.

	Variable	Coefficient (t-statistic)
First-stage regression	Intercept	4.81 (7.04)
	ROA	3.07 (4.59)
	LEV	-0.931 (-2.48)
	Log(Size)	-0.656 (-14.79)
	Book/Market	-1.28 (-5.45)
	Price*100	0.038 (35.59)
	Ret12	1.28 (0.65)
	Beta	0.296 (4.68)
	VAR	-1.73 (-0.37)
	N	1044
	Adjusted R^2	25.18
Second-stage regressions	SOM*1000	0.705 (0.38)
	R^2	0.00
	ESTEEM*1000	0.541 (0.38)
	R^2	0.00
	IP*1000	1.38 (0.61)
	R^2	0.00
	N	63

Table 10
Regressions for Number of Shareholders

Number of shareholders, size, price, book/market, ROA, and leverage (LEV) are calculated as of December of 1990. The beta is calculated using 60 months of data ending in December of the relevant year, and is based on the CRSP value-weighted index. Ret12 is designed to capture momentum effects and is the average of the twelve-month return ending December of the relevant year. VAR is calculated as the variance of returns over the 60 months preceding and inclusive of December of the relevant year. Return on assets (ROA) and leverage (Lev) are calculated as of December of the relevant year. The data on brand perceptions is collected from Landor Power Image Survey conducted by Landor Associates in October 1990. The familiarity with a brand is represented by a variable SHAREOFMIND (SOM) and the personal regard for a brand by a variable ESTEEM. The variable IMAGE POWER (IP) captures a combined effect of SOM and ESTEEM. The dependent variable in the first-stage regression is a log transformation of the number of shareholders of each stock as of December 1990. The second-stage regressions use the residuals from the first stage regression as the dependent variable, and, in turn, SOM, ESTEEM, and IP as explanatory variables. N denotes the number of observations, and heteroskedasticity-corrected t-statistics are in parentheses.

	Variable	Coefficient (t-statistic)
First-stage regression	Intercept	-3.64 (-17.46)
	ROA	-0.376 (-2.36)
	LEV	0.379 (2.85)
	Log(Size)	0.446 (26.55)
	Book/Market	0.002 (0.33)
	Price*100	-0.002 (-0.74)
	Ret12	-6.86 (-9.85)
	Beta	-0.388 (-9.07)
	VAR	11.54 (5.64)
	N	1717
	Adjusted R^2	46.02
Second-stage regressions	SOM*1000	3.10 (3.59)
	R^2	12.87
	ESTEEM*1000	-0.290 (-0.34)
	R^2	0.00
	IP*1000	3.10 (2.46)
	R^2	7.08
	N	68