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From Customers to Shareholders: The Effect of Product Market Choices on Investment Decisions

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Abstract

This paper shows that individuals' product market choices influence their investment decisions. Using microdata from the brokerage and automotive industries, we find a strong positive relation between customer relationship, ownership of a company, and size of the ownership stake. Investors also are more likely to purchase and less likely to sell shares of companies they frequent as customers. These effects are stronger for individuals with longer customer relationships. A merger-based natural experiment confirms our main findings. A setup in which customer-investors regard stocks as consumption goods, not just as investment goods, seems to best explain our results.

Keywords: Investor behavior, product market, ownership
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If you like the store, chances are you'll love the stock.

—Peter Lynch (1993, p. 152)

This paper identifies a strong link between individuals' choices in the product market and those in the stock market. Analyzing daily panel data on stock holdings, trades, and broker-customer relationships of Finnish investors, we find that patronage of a given broker is associated with a 74-percent increase in the likelihood of investing in the corresponding broker stock, and a 13-percent increase in ownership size conditional on investment. Our results also apply to the automobile industry, where owners of a given make are more than twice as likely as owners of other makes to own shares in the respective car company. Taken together, our evidence suggests a customer relationship with a company influences stock selection about as much as the home bias.[1]

Our analyses on the brokerage industry control for omitted company- and investor-level factors and take advantage of time-series variation in both patronage and ownership. A natural experiment using two insurance company−bank mergers yields estimates similar to those obtained in a full sample. Our results are robust to a wide array of alternative specifications and apply regardless of whether we study stock ownership, purchase, or sale decisions. Moreover, our key results hold for all sample brokers and different investor categories, including institutional investors.

The extraordinary detail in our data allows us to explore many potential explanations for these findings, including home bias, awareness, private information, and beliefs on information precision and valuation. None of these explanations appear to be fully satisfactory. Home bias is

[1] Grinblatt and Keloharju (2001b) use a subsample of our data set and document that households are 81 percent more likely to hold local stocks than domestic stocks at large. Hong et al. (2008) report that U.S. households are 116 percent more likely to hold local stocks.

an unlikely explanation for our results, which remain unchanged even when we limit our sample to investors who live far away from the headquarters of any of the companies. Cross-sectional differences in awareness cannot easily explain why we find customers are less willing to *sell* their broker's stock; investors are, after all, aware of the stocks in their portfolio. We also find no evidence that investors have private information on the companies with which they do business, or that they behave as if they had private information: customers' investment performance in broker stocks and their behavior around earnings announcements is no different from that of other investors. Finally, an analysis of the prices at which investors place their limit orders suggests customers value stocks similar to other investors.

A theory in which individuals' product market choices influence their preferences in the stock market seems to best explain our results. Such preferences could affect individuals' decision making both directly and indirectly.

A patron could derive *direct* utility from owning shares of a company she supports as a customer, just as a fan of a sports team could derive direct utility from her investment in the team.[2] Apart from explaining the effects patronage has on ownership and trades, we would expect such affection for a company to increase in the length of the customer relationship. The data support this expectation: individuals with a longer customer relationship with a broker are more likely to own and buy and less likely to sell the broker's stock. Investors who remain *loyal* to a broker thus display that same loyalty in their investment decisions.

Loyalty could also have another, *indirect* effect on portfolio choice: a patron may wish to *avoid being disloyal* to a company she frequents as a customer. In essence, a patron could adjust her investment choices to avoid feelings of logical inconsistency (i.e., cognitive

[2] The Green Bay Packers of the NFL has been a publicly owned company since 1923 and has more than 100,000 shareholders today. Yet a dividend has never been paid and the stock does not appreciate in value. Shares can only be sold back to the team, and then at a fraction of the original purchase price. See Sweet (2008).

dissonance) caused by supporting a company's business as a consumer and investing in one of its rivals.[3] We test this hypothesis by studying whether patronage of a given broker decreases the likelihood of investing in a direct competitor of that broker vis-à-vis a broker that is not a direct competitor. Our results offer strong support for the hypothesis that patrons avoid investing in direct competitors' stock.

Our paper relates to and builds on four strands of literature.

First, we contribute to the literature studying the effect of geographical and professional proximity on investing (see, e.g., Coval and Moskowitz 1999; Grinblatt and Keloharju 2001b; Benartzi 2001; and Cohen 2009). The paper most closely related to ours is Huberman (2001) who finds that Regional Bell Operating Companies tend to have more investors in their service area. Huberman's findings are consistent with a portfolio bias induced by product market choices, but they can also reflect a preference for geographically proximate companies. The most important difference between his analyses and ours lies in our ability to attribute investing directly to product market choices. Access to microdata allows us to observe heterogeneity in investment decisions even at the local level and to exclude home bias as an explanation for the link between patronage and ownership.

Second, our paper is related to the literature analyzing the influence of advertising and brand visibility on individual investor behavior (Grullon, Kanatas, and Weston 2004; Frieder and Subrahmanyam 2005; Lou 2010; Billett, Jiang, and Rego 2010). The key innovation in our paper is a focus on a different channel of influence from the product market to investing: actual product market choices. Past product market choices are known to have a strong and persistent effect on

[3] See, for example, Brehm (1956) and Festinger (1957).

consumer behavior, stronger and more persistent than advertising.[4] Moreover, and importantly for the analysis of causality, they can be observed at the level of an individual, and at high frequency, whereas advertising and brand visibility can only be observed in aggregate and generally at a much lower frequency.

Third, we add to the ongoing debate on whether geographically or professionally close investors enjoy an information advantage that allows them to beat the market. The literature can be divided into two broad camps: studies that find close investors outperform more distant investors, and those that do not.[5] Our paper falls into the second camp: although customers are likely to be more knowledgeable about the company than non-customers, we find they do not exhibit superior performance.

Finally, our analysis sheds light on the determinants of investors' behavioral biases. Although previous work has made significant progress in deciphering the underlying forces behind these biases (Cohen 2009 is worthy of special mention), we know of no other work that makes an effort to disentangle the relative contribution of preferences and beliefs to portfolio bias. Our results on loyalty, perceived information precision, and private valuation are consistent with the idea that preferences figure more importantly than beliefs in inducing customers to become and remain investors. As in Fama and French (2007), many customers appear to regard stocks as consumption goods, not just as investment goods.

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[4] See Bagwell (2007) for an excellent summary of the literature.

[5] For example, Coval and Moskowitz (2001), Hau (2001), Choe, Kho, and Stulz (2005), Dvořák (2005), Ivković and Weisbenner (2005), Massa and Simonov (2006), and Baik, Kang, and Kim (2010) find geographically close investors beat more distant investors whereas Grinblatt and Keloharju (2000), Froot and Ramodarai (2008), and Seasholes and Zhu (2010) do not. Massa and Simonov (2006) and Døskeland and Hvide (2010) find no information edge for professionally close investors.

We organize the remainder of this paper as follows. Section I describes the data and methods. Section II presents the results from our analyses. Section III evaluates alternative explanations for our findings. Section IV concludes.

I. Data and Methods

A. Data Sources

We merge four datasets for our analysis.

Finnish Central Securities Depository (FCSD) registry. This registry contains the daily portfolios and trades of all Finnish investors, both households and institutions, from January 1, 1995, through November 29, 2002. The electronic records we use are exact duplicates of the official certificates of ownership and trades and hence are reliable. Grinblatt and Keloharju (2000) report details on this dataset, which includes information about each investor's attributes, date-stamped trades, holdings, and execution prices of registry-listed stocks on the Helsinki Exchanges.

HEX transactions data. This dataset is a record of all trades executed at the Helsinki Exchanges from January 1, 1995, through December 31, 2001. Each record indicates which brokerage firms the buyer and the seller used. We match these data against the FCSD registry to obtain information on investors' brokerage-firm choices as well as on individuals switching from one broker to another. Linnainmaa (2010) provides details of the match.

HEX microstructure data. This dataset is a September 18, 1998, through October 23, 2001, record of every order submitted to the fully electronic, consolidated limit order book of the Helsinki Exchanges. The dataset tracks the life of each order submitted to the Exchanges, indicating when the order is executed, modified, or withdrawn. We first reconstruct second-by-

second limit order books for all HEX-listed stocks, paying special attention to orders that are executed. Only executed orders contain certain markers that enable us to combine the limit order book with FCSD trading records to precisely identify the investor placing the executed order. Ultimately, we construct a dataset that contains each investor's executed order type and what the limit order book (including unexecuted orders) looked like at any instant prior to, at, and after the moment of order execution. Linnainmaa (2010) provides details.

Automobile Purchase Data. The Finnish Vehicle Administration (FVA) provided data on automobile purchases and ownership. The dataset records the type of personal automobile each car-owning resident owned on June 10, 2002, for all purchases made prior to 2002, and the exact date of purchase. The data are comprehensive for residents in the provinces of Uusimaa and East Uusimaa, which contain Greater Helsinki and the most densely populated areas in Finland. Grinblatt, Keloharju, and Ikäheimo (2008) report details on this dataset.

We match the automobile purchase data with stock-ownership records for Ford Finland (Ford Motor Company's Finnish subsidiary), a listed company and part of the FCSD registry. The automobile data are similar to the broker data in that we can identify changes in car- and stock-ownership statuses. These panel features in the data allow us to study whether an individual's decision to buy a Ford car is associated with the same individual's decision to own or buy Ford shares.

B. Variables and Methods

From the broker dataset, we extract information on the key variables for every investor at the end of each year and on each day they trade. The unit of observation is an investor *i*-day *t*-broker *j* triplet, where the number of broker stocks listed on the stock exchange on day *t* determines the number of elements. In total, eight brokers were publicly listed for at least part of

the sample period. Two sample brokers were listed throughout the sample period. Other, unlisted firms offering brokerage services do not enter our analyses, except when we record broker changes from listed brokers to unlisted ones, and vice versa.

We populate the investor-day-broker triplets with dummy variables that measure ownership (or purchases and sales) and patronage. The share-ownership dummy takes the value of one if an individual owns shares in a broker stock at the end of year. We replace the ownership dummy with the log of the value of holdings in the specifications that analyze the determinants of the size of the holding in broker stock.

We measure changes in ownership status by identifying instances in which an investor either buys shares in a broker she does not currently hold or sells all her shares in a broker stock she currently holds. A share-purchase dummy takes the value of one in the first case, and a share-sale dummy takes the value of one in the second case.

We measure patronage decisions and changes in them with a dummy variable that takes the value of one if an investor has traded through a broker and zero otherwise. We restrict our sample to those investors who have traded at least once during the six months immediately preceding the ownership snapshot or the equity trade. This restriction reduces the likelihood that the recorded customer relationships are stale.

II. Results

This section studies, first, whether an individual who uses services or consumes the products of a company is more likely to own shares in the same company and whether the size of the holding in the stock differs across customers and non-customers. Second, we decompose the patronage-ownership effect into two parts, one for purchases and the other for sales. Third, we

investigate the effect of the length of a customer relationship on investment. Fourth, we report results on a natural experiment where customer relationships experienced exogenous changes due to mergers of the companies in our sample.

A. Ownership Decisions in the Brokerage Industry

Table 1 Panel A reports descriptive statistics on the characteristics of the sample investors who own stock in at least one of the brokers. The median (mean) investor has a portfolio worth 15,000 euros (81,000 euros) of which broker stocks account for about one-quarter (38%). The average investor is about 50 years old. Males account for two-thirds of the investors.

Panel B reports descriptive statistics on trading activity and broker use. The median (mean) investor traded on three (11) days during the sample period and is surprisingly disloyal to her broker: in only 67 percent (63%) of the trades does she use the same broker she used in the past 120 days. Mergers or the emergence of new brokers do not drive customers' disloyalty to their brokers, as we exclude the first 120 days of trades with each new broker. Given that we base our identification strategy on changes in customer status, frequent broker switches allow us to arrive at more precise estimates of the influence of patronage on ownership.

Table 2 reports on descriptive analyses on individuals' patronage and ownership decisions. We aggregate the information on ownership and patronage to investor-year-broker (i, t, j) triplets by each year t in Panel A and by each broker j in Panel B. This aggregation results in estimates of the probability that an individual owns shares in a brokerage firm at the end of the year conditional on whether the individual has been a customer of the same brokerage firm within the past six months.

Panel A shows the probability of purchasing broker company shares is statistically significantly higher for broker customers in all eight sample years. The difference is

economically impressive: on average, a customer has a 58.1-percent likelihood of owning the broker stock, whereas the corresponding probability is only 17.5 percent for non-customers. Significant variation in the patronage-ownership relation also exists across time, driven largely by listings that change the composition of the brokers represented in the sample. For example, the listing of two brokers with a lower-than-average link between patronage and ownership drives the significant drop in the relation from 1998 to 1999, whereas the listing of a broker with an unusually strong patronage-ownership link drives the increase in the relation from 1999 to 2000.

Panel B shows that the probability of owning broker shares is statistically significantly higher for broker customers for all eight brokers in the data. For the customer of the average (median) broker, the probability of becoming an owner is 2.1 (2.9) times higher than it is for a non-customer. The customer-ownership relation also exhibits significant variation across brokers. Whereas the customers of broker number seven are 11.5 times more likely than non-customers to become owners, this ratio is only 1.2 for broker number one.

The first two columns in Table 3 build on the descriptive analysis of Table 2 and estimate a set of linear probability models that control for broker-year fixed effects (column 1) or broker-year and investor fixed effects (column 2). The broker-year fixed effects control for any events that change the unconditional propensity to own a particular broker in a given year, such as past returns on the broker stock. Investor characteristics in column 1 and investor fixed effects in column 2 address the possibility that customers are systematically different from other investors and that these differences make customers more likely to invest in any of the broker stocks. In essence, the inclusion of fixed effects forces the regression to identify the patronage-ownership link solely from within-broker and within-investor variation in the key variables.

The first column runs a regression that examines the decision to own broker stock, controlling for broker-year fixed effects and observable investor characteristics, that is, financial

wealth, gender, and age. The coefficient estimates and reference probabilities indicate the probability of owning the stock of a given broker is 25.4 percent for non-customers and 42.2 percent (25.4% + 16.8%) for broker customers. Thus, same-firm customers are 1.66 times more likely than non-customers to purchase brokerage firm shares. This effect is highly significant (*t*-value = 100.6) even though we adjust the standard errors for investor-level clustering.

The second column replaces the time-invariant investor characteristics with investor fixed effects. This specification captures any unobservable influences on ownership probability that go beyond gender and age. The results from this specification are even stronger, suggesting a customer is 1.74 times more likely than a non-customer to own brokerage-firm shares. The effect of patronage on ownership propensity dominates the effect of wealth and demographic variables on ownership propensity. In the investor fixed-effects regression, for example, a customer's ownership probability is 18.9 percent higher than that of a non-customer, whereas a one-standard deviation change in logged financial wealth changes ownership probability only by 2.5 percent (1.80×0.014).

We estimate our results on the association between patronage and ownership for a subsample of investors who hold at least one broker stock. The purpose of this restriction is to make it easier to compare the ownership results to buy, sell, and size of ownership stake results, which include similar restrictions by construction. As a precautionary measure, we also estimate the patronage-ownership relation for a much larger (unconditional) sample that does not impose this restriction. Although we do not report them formally, the results from this analysis suggest that patronage is associated with a 104-percent increase in unconditional ownership, more than the 74-percent increase in conditional ownership we report in the main line of the analysis. This difference suggests the results we report in the paper err on the side of caution.

The association between patronage and ownership decisions is strong enough to influence the overall explanatory power of the regression. The R^2 for the full regression, which includes the patronage dummy, is 0.362 in column 1. Omitting the patronage dummy would decrease the explanatory power of the regression to 0.343, or by 5.2 percent. This computation suggests information on investors' patronage decisions can predict what stocks investors choose to hold.

Customer relationships influence not only the decision to invest in a broker stock, but also the amount invested. The two rightmost columns in Table 3 replace the dependent variable by the log of the value of the holdings in the broker stock. Restricting the sample to investors with any holdings in broker stock, we gauge the extent to which the size of the holding differs across customers and non-customers. Given that our regressions control for the log of wealth, the coefficient estimate on the patronage dummy can be interpreted as the effect a customer relationship has on portfolio weight. As shown in column 3, the coefficient estimate on the patronage dummy is 0.207 (*t*-value = 31.03) without investor fixed effects, whereas it is 0.121 (*t*-value = 16.56) in column 4 with investor fixed effects. The results are economically significant: conditional on investment, an average customer invests almost a quarter (exp(0.207) – 1 = 23.0%) more than the average non-customer in the broker stock. The comparable effect is 12.9 percent when we estimate the effect of a customer relationship solely from within-investor variation in column 4.

B. Purchase and Sale Decisions in the Brokerage Industry

The remarkable economic significance of patronage begs the question of causality. We address this question in this subsection by studying purchases and sales of broker stocks. We analyze the purchase decisions in Table 4, columns 1 and 2, which report a set of linear

probability models explaining the decision to buy broker stock. The unit of observation is an investor-day-broker triplet (i, t, j) and the vectors of explanatory and independent variables are populated with dummy variables measuring, first, which broker stock j investor i purchases on day t and, second, which broker j the investor has used in the 120 days preceding day t.

Similarly to the ownership regressions, column 1 controls for observable investor characteristics while column 2 replaces the time-invariant investor characteristics with investor fixed effects. Apart from broker fixed effects, both regressions also control for past returns that are an important determinant of purchase and sell decisions.[6]

The regressions in Table 4 show how much a broker's patronage increases an investor's likelihood of purchasing the broker's shares, conditional on her purchase of shares of any of the sample brokers. This increase in purchase probability can be inferred directly from the coefficient estimate on the patronage dummy. The reference probability in column 2 indicates individuals who are not customers of a given broker have a 17.7 percent likelihood of investing in the broker's stock, but for customers this probability is 24.9 percent (17.7% + 7.2%). This 41 percent (24.9%/17.7%-1) increase in purchase probability is both economically and statistically (t-value = 26.6) highly significant.

The sell regressions reported in the two last columns of Table 4 follow the structure of the purchase regressions, with the exception that the observations are now generated for days on which an investor sells broker stocks and, consequently, the dependent variable is a sale dummy. These regressions assess how patronage of a broker influences the likelihood of selling the shares of the broker. The slope estimates in column 4, which are statistically significant, indicate customers are 3.6 percent less likely, or 0.96 times as likely, to part with their shares.

[6] See, for example, Grinblatt and Keloharju (2001a).

C. Patronage, Ownership, and Length of Customer Relationship

We have thus far measured patronage over a relatively short, six-month period. In this section, we extend this time window to analyze how the duration of a customer relationship influences investment decisions. We expect individuals who have been more loyal to a broker (i.e., by having a longer customer relationship) to show that same loyalty in their investment decisions. Specifically, a freshly acquired customer is expected to behave differently from an individual who has used the broker for a long time. Similarly, an investor who has not traded through a particular broker recently, but who used it in the past, is likely to differ from a customer who has been consistently loyal to the broker.

We extend the time window used to infer customer relations to 12 months and divide it into two six-month periods. We use these two windows to classify investors into four groups. The first group consists of investors who start using a new broker. These investors are those who traded through a particular broker in months *m*-1 through *m*-6 ("recent past") but did not trade through it in months *m*-7 through *m*-12 ("distant past"). The other three groups consist of investors who (1) continue using an old broker from the distant-past period, (2) stop using an old broker from the distant-past period, and (3) did not use a particular broker in either six-month period.

Table 5 presents the decomposed results for the ownership probability, portfolio weight, purchase probability, and sale probability regressions. These regressions replace the patronage dummy with dummy variables for the aforementioned investor groups. The omitted reference category consists of investors who did not use the broker in either of the six-month periods.[7] The sample sizes are smaller than in tables 3 and 4 because we also require an investor to have traded

[7] The reference category accounts for 66.1% of the observations. Continuing investors account for 15.3%, starting investors for 6.7%, and stopping investors for 12% of the sample.

through a particular broker in the distant-past period. This restriction ensures the customer relationship is not stale in either period.

Column 1 shows the results of the ownership regressions. The reference probability of owning shares of a broker is 26.2 percent. This probability applies to the (omitted) group of investors who have neither used the broker recently nor in the more distant past. The coefficient on the first row of the table shows the ownership probability is twice as high (52.4%) for investors who used the broker in both periods. In other words, individuals who have remained loyal to a broker during the past year are twice as likely to own the stock of the broker in comparison to individuals who have not been customers in either six-month period. Investors who just started or stopped using a broker have ownership probabilities of 39.2 and 38.1 percent, respectively.

These estimates imply the following temporal pattern in ownership probabilities. Suppose an individual starts using a broker she has not used before. During the first six months, the ownership probability increases from the baseline probability of 26.2 percent to 39.2 percent. If she stays with the broker for a full year, this probability increases to its peak of 52.4 percent. Now suppose the individual stops using the broker. The ownership probability drops to 38.1 percent during the first six months after the break-up. The ownership probability falls back to the baseline probability of 26.2 percent after the first year. This pattern is consistent with the hypothesis that the length of the customer relationship amplifies the influence patronage has on ownership. The estimates in column 2, which replaces the ownership dummy with the value of holdings, exhibit the same relation between the duration of the customer relationship and investment decisions as column 1.

The patterns are similar in the purchase and sale regressions in columns 3 and 4. For example, the probability of purchasing shares is 23 percent lower for new broker customers than

for those who continue as customers of the same broker ((0.173 + 0.036)/(0.173+0.098) = 0.771). These results suggest new customers are less likely than customers who have been consistently loyal to their broker to purchase and to retain shares of their new broker. The same applies to individuals who leave their broker for another broker.

D. Merger-Based Natural Experiment

To further analyze the causality from product market choice to investment, we study two mergers of a publicly listed insurance company (with no brokerage business) with a publicly listed investment bank (with prominent brokerage business).[8] These mergers allow us to investigate the impact a plausibly exogenous shock to customer relationship has on portfolio choice.

The details of the natural experiment are as follows. The merger between insurance company Sampo and investment bank Mandatum was announced on December 4, 2000, and the merger between insurance company Pohjola and investment bank Conventum was announced on June 13, 2001. In both mergers, the insurance companies offered the banks' shareholders payment either in cash or shares. A small minority of the shareholders of both banks declined to tender their shares. As a consequence, Conventum retained its separate listing on the stock exchange for 259 days after the announcement of the merger, and Mandatum for 361 days.

We examine how patronage of the broker changes an individual's likelihood of becoming a shareholder of the insurance company once the merger makes a customer of the broker a customer of the insurance company as well. In other words, we analyze individuals who

[8] Several other studies, such as those by Garmaise and Moskowitz (2006) and Hong and Kacperczyk (2010), employ merger data to identify and measure causal effects.

inadvertently become customers of the insurance company as a result of having been customers of the broker.

The mergers were well publicized in the national media and created a transitory shock to the visibility of the companies involved. This shock itself may have increased share purchases of the insurance company (Barber and Odean, 2008). We use a difference-in-difference design to isolate the pure effect of patronage from any market-wide developments surrounding the mergers. This design controls for the behavior of broker customers and other individuals before and after the merger. The "before" period consists of the one-year period before the merger announcement, whereas the "after" period consists of the one-year period after the announcement.

We form our sample by imposing the following restrictions. First, we exclude investors who own shares in the broker at the time of the merger. This exclusion ensures that our results are not affected by broker shareholders investing the cash received in the tender offer in the shares of the insurance company. It also ensures that conversion of the broker shares to insurance company shares does not influence our results. Second, we omit investors who own shares in the insurance company at the beginning of the before period. This restriction corresponds to the criteria we use in our previous share-purchase regressions to identify true changes in ownership. Finally, we narrow down the sample to investors who have traded at least once during the one-year period immediately preceding the merger. We use these trades to determine the brokerage-customer relationships of the investors.

The unit of observation in our regression is an investor-merger-period (i, j, t) triplet. Each investor has four observations representing two periods and two mergers. The first merger-specific observation corresponds to the before period and the second observation corresponds to the after period. The dependent variable takes the value of one if investor i makes positive net purchases in the shares of the insurance company in merger j in period t, i.e. the number of shares

bought exceeds the number of shares sold. A treatment dummy takes the value of one for investor *i* in merger *j* if investor *i* has traded through the broker involved in merger *j* during the one-year period immediately preceding the merger announcement. The regression also includes a dummy variable for the after period, an interaction variable for the product of the treatment and after dummies, and—to control for differences in observable characteristics of customers and other investors—age, gender, and past trading activity. Our results are highly similar if we control for wealth instead of past trading activity.

The after dummy measures the overall change in the probability that an individual purchases shares of the post-merger insurance company. This estimate is measured relative to the pre-merger share-purchase probability, and it captures, for example, the effect of the merger on the overall visibility of the insurance company. The interaction term measures differences in this post-merger purchase probability between customers and non-customers of the brokerage firm. This interaction term identifies the effect of patronage on share ownership.

The estimates in Table 6 support the hypothesis that patronage increases the likelihood of ownership. The negative coefficient estimate for the after-dummy variable, -0.008 (*t*-value = -31.6), suggests the merger decreased the likelihood that untreated individuals (i.e., those who are not customers of the broker) purchase shares of the insurance company. The positive coefficient for the treatment dummy, 0.019, indicates customers of the broker were more likely than non-customers to purchase insurance-company shares before the merger. The interaction term, which measures the influence of the exogenous change in the ownership-patronage on individuals' portfolio choices, takes the value of 0.015 (*t*-value = 6.2). This positive estimate shows that, unlike the untreated individuals, the treated individuals became more likely to purchase shares in the post-merger insurance company. The change in the purchase probability over the merger for the treated individuals is an economically significant 0.7 percent (-0.008 + 0.015). This number

represents a 39-percent (0.7%/1.8%) increase over the reference probability to purchase shares in the insurance company.

The results of this natural experiment offer independent support for the hypothesis that individuals are more likely to invest in companies they frequent as customers. More importantly, they strengthen the argument that our results go beyond documenting a simple correlation between patronage and ownership.

E. Evidence from the Automotive Industry

Table 7 uses data from the automotive industry to revisit the purchase decisions with another, independent data set. These data contain records on whether individuals own Ford cars or Ford shares. We use these data to examine whether the ownership of a Ford car alters the probability of owning or purchasing Ford shares.

The descriptive analysis in Table 7 Panel A suggests the effect in the automotive industry is similar to that in the brokerage industry. Panel A shows that owners of Ford cars are more likely than non-Ford-car owners to own shares in Ford. The difference in ownership probabilities is 0.76 percent, suggesting Ford-car owners are 2.19 times more likely than non-owners to own Ford shares. The difference is statistically significant at the 5-percent level (z-value = 2.00).

Column 1 of Panel B reports on estimates of a model that examines the relationship between Ford-car ownership and stock ownership.[9] The regression estimates tell a story similar to the descriptive statistics in Panel A: Ford-car owners are more likely than owners of other cars to purchase shares in Ford. Ownership of a Ford car increases the share ownership probability by

[9] Unlike in the brokerage firm data, the car regressions do not have enough within-investor variation for us to be able to control for individual-level fixed effects.

0.81 percent, suggesting Ford-car owners are 2.15 times more likely than others to own Ford shares. This result is statistically significant at the 5-percent level (*t*-value = 2.15). Column 2 repeats the analysis for purchases of Ford shares. The coefficient for the Ford-car-owner dummy is of the expected sign but not significant at conventional levels (*t*-value = 1.48).

Although the estimates from the automotive industry in Table 7 are not nearly as significant as the brokerage-industry estimates reported in the first part of the study, they are valuable as they constitute an independent test of the hypothesis that patronage decisions influence ownership decisions. The results in Table 7 support this hypothesis, perhaps remarkably so given the small sample size.

F. Patronage and Ownership for Institutional and Wealthy Investors

Do institutional investors, including mutual fund managers, exhibit patronage-ownership patterns similar to the patterns we document for individual investors? Individuals ultimately make the decisions for institutional investors, and these individuals may be subject to the same biases as individual investors trading on their own accounts. For example, Grinblatt and Keloharju (2001a) and Frazzini (2006) report that institutional investors sell winners too early and hold on to losers for too long ("the disposition effect"). In addition to studying institutional investors, we also study whether the influence patronage has on ownership extends to wealthy investors.

Table 8 repeats the regressions reported in tables 2 and 3 separately for institutional investors and for individuals who have above-median wealth. The link between patronage and ownership is highly significant and roughly of the same magnitude as for the full sample for each of these categories. In the buy regression, for example, the coefficient for the patronage dummy takes the value 0.065 for institutional investors, whereas it is 0.072 for individuals at large. In the

ownership regression, the institutional coefficient is even larger than the corresponding coefficient for individuals.

The sensitivity of professional money managers' portfolio choices on their patronage decisions is of separate interest given the amount of assets they manage. Although a single individual investor is an inconsequential part of a company's shareholder base, many institutional investors are not. Portfolio managers tend to belong to the same socioeconomic strata and are likely to display similar tastes and share similar consumption experiences. If these experiences shape portfolio managers' investment decisions, they may influence not only institutions' portfolio holdings but also companies' shareholder bases.

III. Explanations

In this section, we discuss the channels through which product market experiences can influence investment decisions. We consider five channels and, where data permit, expose them to empirical scrutiny.

A. Institutional Factors

Three institutional factors could explain why investors tilt their portfolios toward brokers they support as customers. First, brokers may recommend their firms' stocks to their customers. The evidence against this explanation comes from our analysis of the automotive industry, in which we find results similar to those in the brokerage firms. Moreover, this story predicts that the patronage-ownership link would be stronger for a full-service broker than for a discount broker, because the former would be much more likely to offer financial advice and stock recommendations to its customers. This prediction does not carry to the data; if anything,

the patronage-ownership is stronger for the discount broker (broker number 3 in Table 2 Panel B) than for the full-service brokers (all other brokers in Table 2 Panel B). This pattern casts further doubt on the hypothesis that brokers recommending their own stock to investors would drive our results.

Second, bank employees may use their own companies' services and simultaneously invest in bank stock via an employee stock option or ownership plan. This explanation could influence the link between patronage and ownership but not between patronage and open market buy transactions our paper analyzes. Nevertheless, we address this explanation by discarding finance professionals from the brokerage-firm analysis. Limiting our sample to those individuals for whom we have information on their profession gives us a sample size of about 350,000 investors in the holdings regression similar to the one reported in column 2 of Table 3. The slope coefficient estimate is 0.207 (t-value = 57.2) in this alternative sample. This number, as well as the coefficients from the buy and sell regressions, are similar to our baseline estimates.

Third, shareholders could receive consumption perks from the firms in which they invest. Such practices are common in United States and in the UK, where companies such as Berkshire Hathaway, Starbucks, Marks & Spencer, and British Airways provide shareholders with discounted products and services. We are not aware of any perks (e.g., free custodial services for the customers of brokers) our sample companies would have offered their shareholders.

B. Home Bias

This subsection investigates whether the link between patronage and ownership is driven by home bias: the tendency of consumers and investors to favor local companies. At the outset, home bias would seem an unlikely explanation for our results, because all sample brokers (but

one) are headquartered in Helsinki, the capital city of Finland, and tend to serve customers in the whole country. As a consequence, there is almost no variation in "localness," and thus very little room for home bias to explain why consumers and investors would favor one broker over another.

Table 9 repeats the regressions from tables 3 and 4 for three subsamples in which we would expect home bias to have a negligible effect on the link between patronage and ownership. The first subsample (in Panel A) controls for home bias by excluding all investors who live within 250 kilometers of any sample broker. The second subsample (in Panel B) controls for home bias by excluding the broker headquartered outside Helsinki. The third subsample (in Panel C) controls for home bias by excluding all but three brokers with a nationwide branch network, and adds distance to the nearest branch as an additional control. If home bias were the cause of the link between patronage and ownership, we would expect the estimates on the patronage dummy in Table 9 to be significantly lower than the corresponding estimates in tables 3 and 4.

We find, however, that the baseline estimates on the patronage dummy reported in tables 3 and 4 are close to the restricted estimates reported in Table 9. For example, the baseline estimate in the ownership regression in Table 3 column 2 is 0.189—not much higher than the corresponding Table 9 estimate with a distance restriction (0.177), Helsinki restriction (0.174), and branch network restriction (0.155). The similarity of the restricted and full-sample estimates suggests the effect of home bias on the patronage-ownership relation is small. A comparison of Table 4 against the restricted-sample estimates in Table 9 supports the same conclusion.

C. Private Information

Customers may have an informational advantage over non-customers that could contribute to the customer-ownership link in two ways. First, customers (who receive private

signals) would be more likely to invest in the company when there are constraints on short sales. Second, non-customers could avoid investing in the company because of the asymmetric information problem, thus giving customers a disproportionate share of the company stock.

We test this asymmetric information story by analyzing the return difference on customers' and non-customers' purchases and sales of broker stocks. We analyze the returns on purchases and sales by using the calendar-time methodology of Jegadeesh and Titman (1993). We use a one-month formation period and hold the portfolio for three months. (The results in this section are not sensitive to the choices of the lengths of the formation and holding periods.) We compute the returns as follows. First, for each month *t*, we compute the returns on three long-short portfolios: a portfolio formed in month *t*-1, a portfolio formed in month *t*-2, and a portfolio formed in month *t*-3. The month-*t* return on the one-month formation/three-month holding strategy is the average return over these three portfolio returns. This strategy in effect rebalances one-third of the portfolio each month. By computing averages of different strategies for each month, we avoid the overlap in returns that would otherwise arise when studying three-month holding periods using monthly data.

We report the returns on six different long-short portfolios (and for their long and short components) in Table 10. Panel A reports on a strategy that buys the broker stocks broker customers buy and finances these purchases by selling the broker stocks non-customers buy; Panel B reports on a strategy that sells the broker stocks broker customers sell and buys the broker stocks non-customers sell; and Panel C first computes the buy-minus-sell returns for customers and non-customers and then examines the return on a strategy that takes a long position in the customers' buy-minus-sell portfolio and a short position in the non-customers' buy-minus-sell portfolio. Finally, we repeat each of these computations by defining the portfolio

either in terms of the number of transactions (the left-hand side of the table) or in terms of the value of transactions (the right-hand side of the table).

The results in Table 10 do not support the information asymmetry story. The returns on each of the three strategies are negligible. Although the relatively short sample period and the low number of broker stocks may contribute to this result, the mean estimates in the difference column are remarkably close to zero. For example, the return on the double-difference portfolio in Panel C is just 0.01 percent per month. These results suggest customers' informational advantage over non-customers is unlikely to explain why customers are more likely to invest in the company stock and less likely to sell their holdings.

D. Information Sets and Beliefs

We have established so far that institutional factors and private information are unlikely explanations for the relation between product market experiences and investment. In what follows, we consider whether we can reconcile our results with systematic differences in the information sets and beliefs between customers and other investors.

C.1. Awareness Hypothesis

Barber and Odean (2008) find that individual investors tend to be net buyers of attention-grabbing stocks, such as stocks in the news and stocks with extreme one-day returns. Attention-driven buying results from the difficulty investors have in searching the thousands of stocks they can potentially buy. An investor may end up buying a stock simply because a customer relationship with the company makes her aware of the stock. We call this explanation the awareness hypothesis.

The awareness hypothesis can reconcile an investor's tendency to own and purchase shares of a broker she frequents as a customer, but it cannot explain why customers are less willing to part with the shares of their broker. Given that our sample excludes short sales, an investor cannot sell a stock unless she has first acquired and become aware of that stock. Moreover, awareness does not, by itself, explain why customers tend to have larger ownership stakes conditional on investment or why the patronage-ownership relationship is stronger for individuals with longer customer relationships. Thus, although the awareness hypothesis could amplify some of the effects we observe on the buy side, alone it cannot sufficiently explain all the patronage-ownership patterns we document.

C.2 Perceived Information Hypothesis

Even though no evidence suggests customers would have an informational advantage over non-customers, their trading decisions may nevertheless differ from that of other investors because of differences in perceived information. Frequent encounters with the company may make customers perceive their private signals about the company as more precise than those of non-customers, in the spirit of Kyle and Wang (1997). We test this perceived-information hypothesis by studying customers' and non-customers' trading behavior before and after earnings announcements.

The first column in Table 11 estimates a regression that measures how customers and non-customers time their trades relative to earnings announcements. If customers believe they are better informed than the rest of the market about corporate matters, they would be expected to be disproportionately present in the order flow in the days leading up to an earnings announcement. These are the days when the information asymmetry between market participants arguably is at its largest.

In the regression that we estimate, the dependent variable takes the value of one if an investor trades in a broker stock during the month before a scheduled quarterly earnings announcement. If the investor trades in the stock during the month after the announcement, the dependent variable takes the value of zero. Given that many earnings announcements are made during trading hours, we exclude trades that take place on the day of the earnings announcement. As in our other tests, the key explanatory variable in the regression is the patronage dummy variable. A positive slope coefficient would indicate customers' trading activity is concentrated in the days leading up to an earnings announcement. In this regression, as in our other regressions explaining trading decisions, we also control for investors' wealth and the past returns of the broker stock.

The results do not support the perceived-information hypothesis. The slope coefficient estimate for the patronage dummy variable is small (-0.001) and statistically insignificant (*t*-value = -0.16). The coefficient remains insignificant (-0.004; *t*-value = -0.67) even if we expand the pre-announcement period from [-20,-1] to [-20,2] to allow the announcement information to get incorporated in prices (see Lee, Mucklow, and Ready, 1993; Kim and Verrecchia, 1994; and Krinsky and Lee, 1996). Because the sample consists of 131 quarterly earnings announcements and thousands of trades, we are quite confident about the robustness of our findings. Customers and non-customers do not appear to time their trades differently relative to earnings announcements.

C.3. Private Valuation Hypothesis

Research on social psychology has documented that people tend to think more positively of things merely because they are familiar.[10] It is therefore worthwhile to study whether product market experiences lead consumers to have a more favorable view of the companies they frequent as customers. Such optimism may spill over to return expectations of assets, leading customers to consider the firms with which they do business to be undervalued in the stock market. We test the hypothesis that customers have higher private valuations of assets than investors at large by studying how customers and non-customers place their limit orders. If customers have higher private valuations, they should be standing ready to buy stocks at prices that are closer to the prevailing market price and sell at prices that are further away from the market price. In other words, if both a customer and a non-customer place a limit buy order for a stock, we would expect the customer's order to be closer to the market.

We base our test on the private valuation hypothesis on a three-year period (1998-2001) for which we have limit-order data. We measure how investors place their limit orders by comparing the limit price to the bid and ask prices that prevailed at the time the order was initially submitted. In the results we report in Table 11, columns 2 and 3, we study purchases and sales separately. For sell limit orders, we compute the percentage difference between the limit-order price and the best ask price in the market. The larger this difference is, the further away the limit order is placed from the current market price. For buy limit orders, we compute the difference between the best bid price and the price of the limit order. We use these distance variables as dependent variables in the buy and sell regressions. A negative coefficient estimate

[10] For a review of the literature of this so-called exposure effect, see Zajonc (1968), Bornstein (1989), and Zajonc (2001).

on the patronage dummy would indicate customers place their limit orders closer than non-customers to the prevailing market price.

The estimation results in columns 2 and 3 do not support the private valuation hypothesis. The economically and statistically insignificant patronage dummy estimates suggest customers and non-customers do not make markedly different choices in the limit-order book. This result is robust to how we measure distances. For example, the results remain unchanged if we measure distances not to the bid and ask price but to the midpoint of the bid-ask spread. The insignificant estimates in Table 11 suggest the patronage-ownership effect is unlikely to arise from differences in private values customers and non-customers assign to assets.

E. Investor Preferences

The remaining explanation for the link between patronage and ownership involves preferences product market choices influence. A lasting preference for the products and services of a company may translate into a direct preference for its stock; a patron could derive direct utility from owning stocks of a company she supports as a customer. One plausible reason for a patron to become a shareholder is loyalty to the company. Cohen (2009) finds that employees invest in employer stock because of loyalty.

Our results on customer loyalty have already shown that patronage-ownership links are stronger for customers with longer relationships with the company. But loyalty could also have another, indirect effect on portfolio choice: a patron may wish to avoid being disloyal to a company she frequents as a customer. In effect, she could adjust her investment choices to avoid feelings of logical inconsistency (i.e. cognitive dissonance) caused by supporting the company's business as a consumer and investing in one of its rivals. It is therefore of interest to study whether investors are less likely to invest in direct competitors than indirect competitors of their

brokers. The cognitive dissonance hypothesis predicts that investors would not only overweight their own brokerage firm in their portfolios, but that they would also underweight their brokers' direct competitors more than indirect competitors.

We test the cognitive dissonance hypothesis by following the structure of the analysis in Table 3, specification 2, which studies how patronage decisions influence investment decisions. As before, we generate as many observations for each investor as there are brokerage firms. Three brokers that are part of large retail banks with nationwide presence are considered direct competitors of one another, but not of other brokers. Likewise, the remaining brokers, which are largely competing for wealthy customers, are considered direct competitors of one another, but not of brokers with nationwide retail presence. Based on these broker groupings, we can identify, for each investor, whether she is a customer of a broker, a customer of a direct competitor of a broker, or a customer of an indirect competitor.

The regressions differ from the baseline analysis by adding a direct-competitor customer dummy as an independent variable. The direct-competitor dummy is assigned the value of one for customers of direct competitors. The other explanatory variable is again the patronage dummy variable. The reference category consists of the customers of the indirect competitors.

The results in the four rightmost columns in Table 11 support the cognitive dissonance hypothesis. The regressions repeat the baseline results on the positive influence patronage has on investment. In addition, they show that an investor is less likely to invest in a company if she is a customer of a direct competitor of that company than if she is a customer of an indirect competitor. The coefficient in the ownership regression indicates the probability of owning a stock is 3.9 percentage points lower for customers of a direct competitor. This decrease represents a 15-percent drop from the reference probability and is statistically significant with a *t*-value of -32.7. The results from the buy and portfolio weight regressions tell a similar story:

being a customer of a direct competitor lowers the probability to invest in a company by 8.5 percent (*t*-value = -6.73) and the size of the investment by 4.1 percent (*t*-value = -5.89). The sale regression produces an insignificant coefficient on the direct-competitor dummy, perhaps because patronage has a smaller influence on sales than on ownership, size of holdings, or buys.

These results have both independent and interpretational value. On the one hand, they suggest that winning a customer on the product or service market not only adds to the real business of a company but can also bring in an investor and deprive a competitor of one. On the other hand, the results help identify the root cause behind the relationship between patronage and ownership. Preferences that are difficult to reconcile with a standard neoclassical framework seem to shape patrons' stock-selection decisions. The important role these preferences appear to play in investment suggests patrons regard stocks as consumption goods, not just as investment goods.

IV. Conclusion

Individuals' consumer experiences influence their portfolio choices. We show that banks' brokerage customers are significantly more likely than non-customers to acquire shares in the bank and then less likely to part with them. Patronage also increases the size of the ownership stake, conditional on investment, and its effects on investment are stronger for individuals with longer customer relationships. A natural experiment using two insurance company−bank mergers yields estimates similar to those obtained in a full sample.

We believe our evidence suggests a causal link from patronage to investing. This interpretation considers a customer relationship that comes with the usual baggage of increased marketing exposure. The empirical estimates of the influence of patronage on ownership could

thus be viewed as a composite measure of all the factors that change when an investor becomes a customer. These factors include any of the investor's own investments in information acquisition and also firms' marketing efforts toward their customers. This interpretation applies to the results from the natural experiment as well. The treated individuals, that is, the broker customers, were more likely marketing targets for the insurance company after the merger. We think these considerations are an advantage, as our estimates represent the true effect of patronage an investor would experience when becoming a customer of a company.

Our results are difficult to explain by home bias, customers' real or perceived information advantage, greater awareness of the stock, higher private valuation, or many other hypotheses. Instead, our results are most consistent with a preference-based setup in which customer-investors regard stocks as consumption goods, not just as investment goods. This setup could explain why patronage influences buys and sells, why its effect is stronger for individuals with longer customer relationships, and why patrons tend to have larger stockholdings than non-patrons. Moreover, it could account for customers' reluctance to invest in companies that are direct competitors of those with which they do business.

Although data restrictions ultimately impose our focus on brokerage and automotive industries, both of these industries also are exceptionally well suited for an analysis of the patronage-ownership link. Both are prime examples of industries in which consumers are the end users of products and services in which one would hence expect the link between patronage and ownership to be the strongest. An additional benefit of having data on the brokerage industry is that it is natural to extend the examination of the patronage-ownership link to professional money managers.

Despite using data on only two industries, our results lead us to believe individuals' consumer experiences and stock-selection decisions also interact in other industries. In those

industries in which individuals constitute the end users of the company products, we would expect to find an equally strong patronage-ownership link. By contrast, we would expect to find a weaker patronage-ownership relation in those industries in which companies do not service individuals directly. An interesting avenue for future research that would require more data would be to test whether the visibility of the company's brand affects the patronage-ownership link.

References

Bagwell, Kyle, 2007, The economic analysis of advertising, in Mark Armstrong and Rob Porter (eds.), *Handbook of Industrial Organization*, Vol. 3, North-Holland: Amsterdam, 1701-1844.

Baik, Bok, Jun-Koo Kang, and Jin-Mo Kim, 2010, Local institutional investors, information asymmetries, and equity returns, Journal of Financial Economics 97(1), 81-106.

Barber, Brad and Terrance Odean, 2008, All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors, Review of Financial Studies 21(2), 785-818.

Benartzi, Shlomo, 2001, Excessive extrapolation and the allocation of 401(k) accounts to company stock, Journal of Finance 56(5), 1747-1764.

Billett, Matthew, Zhan Jiang, and Lopo Rego, 2010, Does customer sentiment contribute to investor sentiment: Glamour brands and glamour stocks?, University of Iowa working paper.

Bornstein, Robert F., 1989, Exposure and affect: Overview and meta-analysis of research, 1968–1987, Psychological Bulletin 106(2), 265-289.

Brehm, Jack, 1956, Post-decision changes in desirability of alternatives, Journal of Abnormal and Social Psychology 52, 384-389.

Choe, Hyuk, Bong-Chan Kho, and René Stulz, 2005, Do domestic investors have an edge? The trading experience of foreign investors in Korea, Review of Financial Studies 18(3), 795-829.

Cohen, Lauren, 2009, Loyalty based portfolio choice, Review of Financial Studies 22(3), 1213-1245.

Coval, Joshua and Tobias Moskowitz, 1999, Home bias at home: Local equity preference in domestic portfolios, Journal of Finance 54(6), 2045-2073.

Coval, Joshua and Tobias Moskowitz, 2001, The geography of investment: Informed trading and asset prices, Journal of Political Economy 109(4), 811-841.

Døskeland, Trond and Hans Hvide, 2010, Do individual investors have asymmetric information based on work experience?, Journal of Finance, forthcoming.

Dvořák, Tomáš, 2005, Do domestic investors have an information advantage? Evidence from Indonesia, Journal of Finance 60(2), 817-839.

Fama, Eugene F. and Kenneth R. French, 2007, Disagreement, tastes, and asset prices, Journal of Financial Economics 83(3), 667-689.

Festinger, Leon, 1957, *A Theory of Cognitive Dissonance*, Stanford University Press.

Frazzini, Andrea, 2006, The disposition effect and underreaction to news, Journal of Finance 61(4), 2017-2046.

Frieder, Laura and Avanidhar Subrahmanyam, 2005, Brand perceptions and the market for common stock, Journal of Financial and Quantitative Analysis 40(1), 65–85.

Froot, Kenneth A. and Tarun Ramadorai, 2008, Institutional portfolio flows and international investments, Review of Financial Studies 21(2), 937-971.

Garmaise, Mark and Tobias Moskowitz, 2006, Bank mergers and crime: The real and social effects of credit market competition, Journal of Finance 61(2), 495-539.

Grinblatt, Mark and Matti Keloharju, 2000, Momentum investing and performance using Finland's unique data set, Journal of Financial Economics 55(1), 43-67.

Grinblatt, Mark and Matti Keloharju, 2001a, What makes investors trade? Journal of Finance 56(2), 589-616.

Grinblatt, Mark and Matti Keloharju, 2001b, How distance, language, and culture influence stockholdings and trades, Journal of Finance 56(3), 1053-1073.

Grinblatt, Mark, Matti Keloharju, and Seppo Ikäheimo, 2008, Social influence and consumption: Evidence from the automobile purchases of neighbors, Review of Economics and Statistics 90(4), 735–753.

Grullon, Gustaf, George Kanatas, and James P. Weston, 2004, Advertising, breadth of ownership, and liquidity, Review of Financial Studies 17(2), 439–461.

Hau, Harald, 2001, Location matters: An examination of trading profits, Journal of Finance 56(5), 1959-1983.

Hong, Harrison, Jeffrey D. Kubik, and Jeremy Stein, 2005, Thy neighbor's portfolio: Word-of-mouth effects in the holdings and trades of money managers, Journal of Finance 60(6), 2801-2824.

Hong, Harrison and Marcin Kacperczyk, 2010, Competition and bias, Quarterly Journal of Economics 125(4), 1683–1725.

Huberman, Gur, 2001, Familiarity breeds investment, Review of Financial Studies 14(3), 659-680.

Ivković, Zoran and Scott Weisbenner, 2005, Local does as local is: Information content of the geography of individual investors' common stock investments, Journal of Finance 60(1), 267-306.

Jegadeesh, Narasimhan and Sheridan Titman, 1993, Returns to buying winners and selling losers: Implications for stock market efficiency, Journal of Finance 48(1), 65-91.

Kim, Oliver and Robert E. Verrecchia, 1994, Market liquidity and volume around earnings announcements, Journal of Accounting and Economics 17(1-2), 41-67.

Krinsky, Itzhak and Jason Lee, 1996, Earnings announcements and the components of the bid-ask spread, Journal of Finance 51(4), 1523-1535.

Kyle, Albert S. and F. Albert Wang, 1997, Speculation duopoly with agreement to disagree: Can overconfidence survive the market test? Journal of Finance 52(5), 2073-2090.

Lee, Charles M.C., Belinda Mucklow, and Mark J. Ready, 1993, Spreads, depths, and the impact of earnings information: an intraday analysis, Review of Financial Studies 6(2), 345-374.

Linnainmaa, Juhani, 2010, Do limit orders alter inferences about investor behavior and performance? Journal of Finance 65(4), 1473-1506.

Lou, Dong, 2009, Attracting investor attention through advertising, London School of Economics working paper.

Lynch, Peter, 1993, *Beating the Street*, Simon and Schuster.

Massa, Massimo and Andrei Simonov, 2006, Hedging, familiarity and portfolio choice, Review of Financial Studies 19(2): 633-685.

Seasholes, Mark and Ning Zhu, 2010, Individual investors and local bias, Journal of Finance 65(5), 1987-2010.

Sweet, David, 2008, Packers shareholders (all 122,000) are smiling, msnbc.com, January 16.

Zajonc, Robert, 1968, Attitudinal effects of mere exposure, Journal of Personality and Social Psychology 9(2), 1-27.

Zajonc, Robert, 2001, Mere exposure: A gateway to the subliminal, Current Directions in Psychological Science 10(6), 224-228.

Table 1

Descriptive statistics on investors and their broker use and trading activity

Panel A reports descriptive statistics on the characteristics of the sample investors. Investor characteristics are averaged first across all years for each investor and then across all investors. An investor is selected in the sample if she owns shares in at least one of the brokerage firms at the end of a year and has traded in any publicly listed stock in the 120 days prior to the end of that year. Financial wealth is measured as the sum of the value of all holdings in publicly listed stocks, holdings in broker stocks is the value of all holdings in publicly listed banks with a brokerage arm, and weight in broker stocks equals holdings in broker stocks divided by financial wealth. Panel B reports the distribution of the number of days an investor trades and the influence of past customer status on current customer status. An investor appears in the sample if she has any trading activity in the 120 days prior to the day of trading. The probability of using an old broker is the proportion of trades an investor executes using a broker she has used in the past 120 days. The sample is larger than in Panel A because it does not require ownership of a broker stock at the end of a year.

Panel A: Investor characteristics conditional on ownership of a broker (N = 107,419)					
Variable	Mean	Sd	25%	Median	75%
Financial wealth (1000 euros)	81.38	906.80	4.86	15.13	44.19
Holdings in broker stock (1000 euros)	9.34	61.32	0.94	3.07	8.30
Portfolio weight in broker stock (%)	38.00	33.90	9.63	25.66	61.05
Age	47.72	17.19	35.00	49.50	59.50
Female dummy	0.33	0.47	0.00	0.00	1.00

Panel B: Broker use and trading activity (N = 235,782)					
Variable	Mean	Sd	25%	Median	75%
Number of days traded	11.16	31.07	1.00	3.00	8.00
Probability of using an old broker (%)	63.33	35.26	38.22	66.67	100.00

Table 2

Descriptive statistics on ownership of brokerage firm stocks by customer status

Panels A and B report the probability that an investor owns shares in a brokerage firm conditional on patronage of that firm. An investor is selected in the sample if she owns shares in at least one of the brokerage firms at the end of a year and has traded in some stocks in the 120 days prior to the end of that year. An investor is classified as a customer of a brokerage firm if she has traded through it in the 120 days prior to the end of a year. The *z*-values are for tests of differences in proportions, assuming unequal variances.

Panel A: Results by year

Customer of a broker	Year								
	Ownership probability (%)								
	1995	1996	1997	1998	1999	2000	2001	2002	Total
Yes	85.8	82.1	78.1	72.4	33.9	51.8	47.5	48.7	58.1
No	34.3	36.7	21.6	15.3	15.7	14.2	16.9	18.8	17.5
Difference	51.5	45.4	56.5	57.1	18.2	37.6	30.6	30.0	40.6
z-value	(108.06)	(94.17)	(164.16)	(174.28)	(47.81)	(144.03)	(109.09)	(99.60)	(335.19)
N	30,130	32,664	73,539	99,036	100,176	251,293	194,532	196,230	977,600

Panel B: Results by broker

Customer of a broker	Broker								
	Ownership probability (%)								
	1	2	3	4	5	6	7	8	Total
Yes	76.5	28.0	41.7	44.6	31.1	28.2	56.6	26.2	58.1
No	61.6	11.6	7.4	25.6	23.2	12.8	4.9	12.5	17.5
Difference	14.9	16.4	34.3	18.9	7.9	15.4	51.6	13.7	40.6
z-value	(72.07)	(69.33)	(89.36)	(34.86)	(11.61)	(23.02)	(70.61)	(11.31)	(335.19)
N	198,391	198,391	101,026	65,127	52,595	77,354	166,994	117,722	977,600

Table 3

Regressions of ownership

At the end of each sample year, the value of holdings in each brokerage firm stock is calculated for every investor. An investor is selected in the sample if she owns shares in at least one of the brokerage firms at the end of a year and has traded in some stocks in the 120 days prior to the end of that year. Ownership dummy takes the value of one if an investor owns a brokerage firm stock, zero otherwise. Ln (Value of holdings) is the value of an investor's holdings in a broker stock. Patronage dummy equals one if the investor has traded through a broker in the 120 days prior to the end of a year. Control variables include logged financial wealth measured as the sum of the value of all holdings in publicly listed stocks, a dummy for female investors, age/100, and age/100 squared. Columns 3 and 4 restrict the sample to cases in which an investor owns a broker stock. Columns 2 and 4 drop the time-invariant investor characteristics and add investor fixed effects. All the regressions include broker-by-year fixed effects. The *t*-values, reported in parentheses below coefficients, are robust for heteroskedasticity and are adjusted for clustering at the investor level.

Dependent variable	Ownership dummy (0/1)		Ln (Value of holdings)	
Specification	1	2	3	4
Patronage dummy	0.168	0.189	0.207	0.121
	(100.60)	(101.57)	(31.03)	(16.56)
Ln (Wealth)	0.012	0.014	0.490	0.339
	(51.52)	(24.48)	(175.31)	(54.21)
Female dummy	-0.006		-0.057	
	(-8.94)		(-6.61)	
Age	0.00036		0.008	
	(4.26)		(8.03)	
Age^2	-0.0000006		-0.00003	
	(-0.68)		(-2.44)	
Investor fixed effects	No	Yes	No	Yes
Broker-year fixed effects	Yes	Yes	Yes	Yes
Reference probability	0.254	0.254		
Overall R^2	0.362	0.403	0.465	0.850
Number of investors	107,419	107,419	107,419	107,419
Number of observations	977,600	977,600	248,353	248,353

Table 4

Regressions of purchases and sales

An observation is an investor-brokerage firm stock pair. On each day an investor trades in a brokerage firm stock, the investor is assigned one observation for the stock she trades in, and observations for each brokerage firm stock she chooses not to trade in. Columns 1 and 2 restrict the sample to investor-days on which an investor purchases any of the brokerage firm stocks but does not own the purchased stock at the time of the purchase. The dependent variable takes the value of one for the purchased stock and zero for all the other broker stocks. Columns 3 and 4 restrict the sample to investor-days on which an investor sells all shares in any of the brokerage firm stocks and to brokerage firm stocks in which the investor has a position on the day. The dependent variable takes the value of one for the sold stock and zero for all other brokerage firm stocks in the investor's portfolio. Patronage dummy equals one if the investor has traded through a broker in the past 120 days. Control variables are logged financial wealth, measured as the sum of the value of all holdings in publicly listed stocks, a dummy for female investors, age/100, age/100 squared, and past returns on the broker stock, measured over four non-overlapping periods. Columns 3 and 4 also include unreported dummy variables for the number of broker stocks in an investor's portfolio, divided into dummy variables for one through four and more than five broker stocks. Columns 2 and 4 drop the time-invariant investor characteristics and add investor fixed effects. All the regressions include broker fixed effects. The *t*-values, reported in parentheses below coefficients, are robust for heteroskedasticity and are adjusted for clustering at the investor level.

Dependent variable	Purchase dummy (0/1)		Sale dummy (0/1)	
Specification	1	2	3	4
Patronage dummy	0.043	0.072	-0.011	-0.036
	(17.87)	(26.61)	(-5.49)	(-5.35)
Ln (Wealth)	-0.002	-0.004	-0.003	-0.001
	(-9.57)	(-10.91)	(-10.36)	(-0.89)
Female dummy	0.007		-0.0004	
	(5.28)		(-0.50)	
Age	-0.009		-0.028	
	(-0.46)		(-2.60)	
Age^2	0.085		0.032	
	(4.48)		(2.98)	
Return [-1, -30]	-0.003	-0.029	0.076	0.245
	(-0.64)	(-5.35)	(12.21)	(12.70)
Return [-31, -60]	0.029	0.029	0.047	0.090
	(6.30)	(5.43)	(7.41)	(4.62)
Return [-61, -90]	0.000	-0.016	0.023	0.051
	(-0.09)	(-3.09)	(3.98)	(2.62)
Return [-91, -120]	0.002	0.003	-0.004	-0.047
	(0.44)	(0.60)	(-0.70)	(-2.37)
Investor fixed effects	No	Yes	No	Yes
Broker fixed effects	Yes	Yes	Yes	Yes
Reference probability	0.177	0.177	0.863	0.863
Overall R^2	0.101	0.133	0.431	0.484
Number of investors	25,256	25,256	84,729	84,729
Number of observations	231,216	231,216	119,273	119,273

Table 5

Decomposing the effect of patronage on investment

Columns 1 and 2 correspond to regressions in columns 2 and 4 in Table 3. Columns 3 and 4 report regressions similar to columns 2 and 4 in Table 4. All the regressions restrict the samples used in tables 3 and 4 further by discarding investors who have not traded in 121 through 250 days preceding the day of the analysis. This restriction enables the calculation of a customer relationship from both the recent period of six months (recent) and the more distant period of six to 12 months (past). Continue using dummy takes the value of one if an investor has traded recently through a broker she has also used in the past. Start using dummy takes the value of one if an investor has recently started trading through a broker not used in the past. Stop using dummy takes the value of one if an investor does not currently trade through a broker used in the past. The coefficient estimates of these variables tell the increase in ownership probabilities and portfolio weights, and purchase and sale probabilities, compared to the reference category of not having used a broker recently or in the past. Control variables and estimation methods are identical to those in tables 3 and 4. The *t*-values, reported in parentheses below coefficients, are robust for heteroskedasticity and are adjusted for clustering at the investor level.

Dependent variable	Ownership dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
Specification	1	2	3	4
Continue using	0.262	0.205	0.098	-0.072
	(87.05)	(15.17)	(24.03)	(-6.38)
Start using	0.130	0.122	0.036	-0.032
	(49.77)	(9.37)	(9.87)	(-2.70)
Stop using	0.119	0.116	0.031	-0.043
	(51.67)	(9.95)	(7.70)	(-3.37)
Ln (Wealth)	0.017	0.360	-0.003	-0.008
	(19.96)	(40.17)	(-6.93)	(-3.98)
Return [-1, -30]			-0.043	0.227
			(-6.76)	(9.96)
Return [-31, -60]			0.010	0.087
			(1.54)	(3.80)
Return [-61, -90]			-0.016	0.033
			(-2.52)	(1.42)
Return [-91, -120]			0.006	-0.022
			(0.87)	(-0.94)
Investor fixed effects	Yes	Yes	Yes	Yes
Broker-year fixed effects	Yes	Yes	No	No
Broker fixed effects	No	No	Yes	Yes
Reference probability / value	0.262	8.017	0.173	0.762
Overall R^2	0.365	0.836	0.133	0.433
Number of investors	63,604	63,604	16,932	24,342
Number of observations	579,871	151,929	170,418	48,212

Table 6

Natural experiment with mergers

Two mergers of a publicly listed insurance company (without a brokerage arm) and a publicly listed brokerage firm provide a setting in which a link between ownership and patronage is exogenously established. "Before" and "After" refer to 250-day periods before and after the merger announcement (Sampo-Mandatum on December 4, 2000, and Pohjola-Conventum on June 13, 2001). The sample includes investors who have had some trading activity but do not own shares in either of the companies involved in the merger 250 days prior to the merger announcement. The dependent variable takes the value of one if an investor has made positive net purchases in the insurance company stock. Treatment status is defined as having traded through the brokerage firm in the 250 days preceding the merger. Control variables are logged trading activity, calculated as the combined value of all trades in the 250-day period prior to the merger, age/100, age/100 squared, and a dummy for female investors. Standard errors are adjusted for clustering at the investor level.

Dependent variable	Purchase dummy (0/1)
Specification	1
After	-0.008
	(-31.58)
Treatment	0.019
	(10.40)
After × Treatment	0.015
	(6.24)
Ln (Trading activity)	0.011
	(85.13)
Female	-0.003
	(-10.30)
Age	0.006
	(2.20)
Age^2	-0.004
	(-1.15)
Reference probability	0.018
Overall R^2	0.028
Number of observations	923,878

Table 7

Car purchases

Panel A reports the association between Ford-car and Ford-stock ownership. Ownership of cars is measured from the period up to the end of 1998, whereas ownership of stocks is measured in the beginning of 1999. Panel B reports regressions of the stock ownership and purchases that control for financial wealth, gender, age, and age squared. The sample includes residents of Uusimaa and East Uusimaa provinces and includes the most recent purchase of a given car as of June 10, 2002. The *t*-values, reported in parentheses below coefficients, are robust for heteroskedasticity. The table multiplies the original regressions coefficients by 100.

Panel A: Car ownership and stock purchases

Ford-car owner	Number of investors			Ownership probability (%)
	Ford stock owner			
	No	Yes	Total	
No	11,593	75	11,668	0.64
Yes	986	14	1,000	1.40
Total	12,579	89	12,668	0.70
Difference (Yes - No)				0.76
z-value				(2.00)

Panel B: Regressions

Dependent variable	Ownership dummy (0/1)	Share purchase dummy (0/1)
Specification	1	2
Ford-car owner	0.811	0.334
	(2.15)	(1.48)
Ln (Wealth)	0.412	0.066
	(7.21)	(2.55)
Female dummy	0.168	0.140
	(0.99)	(1.91)
Age	-3.768	-0.324
	(0.91)	(0.21)
Age^2	5.057	0.050
	(1.14)	(0.03)
Reference probability (%)	0.703	0.197
Adjusted R^2	0.010	0.001
Number of observations	12,668	12,668

Table 8

Cross-sectional patterns

Regressions in tables 3 and 4 are re-estimated separately for institutions and wealthy investors. Columns 1 and 2 correspond to regressions in Table 3, columns 2 and 4, whereas the remaining columns repeat regressions in Table 4, columns 2 and 4. Financial wealth is measured as the sum of the value of all holdings in publicly listed stocks. Wealthy investors are defined as investors that have above-median wealth.

Panel A: Institutions				
Dependent variable	Ownership dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
Specification	1	2	3	4
Patronage dummy	0.261	0.282	0.065	-0.080
	(23.21)	(4.45)	(5.31)	(-2.54)
Number of investors	3,157	3,157	1,117	2,943
Number of observations	24,217	6,563	13,318	4,743

Panel B: Wealthy investors				
Dependent variable	Ownership dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
Specification	1	2	3	4
Patronage dummy	0.155	0.149	0.039	-0.049
	(60.60)	(14.26)	(11.00)	(-5.98)
Number of investors	44,960	41,892	11,782	32,725
Number of observations	488,798	124,174	115,527	59,319

Table 9

Patronage effect controlling for home bias

Columns 1 and 2 correspond to regressions in columns 2 and 4 in Table 3. Columns 3 and 4 report regressions similar to columns 2 and 4 in Table 4. Panel A reports results for the investors who live more than 250 kilometers away from the headquarters of any of the sample banks. Panel B reports regressions that leave out the bank not headquartered in Helsinki (the capital). Panel C runs the regressions for the three banks that have nationwide branch networks. The regressions include an additional explanatory variable that is the (log) distance from an investor's place of residence to the nearest branch of a bank. The distances are based on the population centroids of each zip code. Following Grinblatt and Keloharju (2001b), we define distance as one-quarter of the distance between the centroids of the zip code and the nearest zip code for investors living in the same zip code as the branch. The branch and investor locations are from the end of year 2000.

Panel A: At least 250 km away from bank headquarters				
Dependent variable	Ownership dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
Specification	1	2	3	4
Patronage dummy	0.177	0.109	0.072	-0.038
	(48.05)	(7.61)	(13.59)	(-2.78)
Overall R^2	0.360	0.460	0.120	0.428
Number of investors	24,805	24,805	6,189	22,693
Number of observations	225,575	57,342	57,499	31,442

Panel B: Banks with headquarters in Helsinki				
Dependent variable	Ownership dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
Specification	1	2	3	4
Patronage dummy	0.174	0.092	0.075	-0.027
	(93.16)	(12.70)	(25.53)	(-3.89)
Overall R^2	0.349	0.435	0.072	0.420
Number of investors	107,419	105,495	25,256	84,072
Number of observations	810,606	237,742	192,438	116,634

Panel C: Banks with nationwide branch networks				
Dependent variable	Ownership dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
Specification	1	2	3	4
Patronage dummy	0.155	0.078	0.063	-0.030
	(74.58)	(10.57)	(16.39)	(-3.62)
Ln (Distance to nearest branch)	-0.011	-0.012	0.002	0.003
	(-9.04)	(-1.13)	(1.00)	(0.50)
Overall R^2	0.353	0.402	0.070	0.423
Number of investors	105,020	95,193	24,674	78,008
Number of observations	503,411	194,609	114,387	98,876

Table 10

Performance of purchases and sales in brokerage firm stocks

Returns over 20-day periods are estimated separately for customers (investors who have traded through a broker in the past 120 days) and other investors. The sample includes investors who have traded during the 120-day period preceding a trade. Portfolios are formed in each 20-day period and held for three consecutive periods with equal weighting. Each portfolio has 81 observations. Panel A uses number and value of purchases, Panel B uses number and value of sales, and Panel C takes the difference between the purchase and sale portfolios. The table multiplies the original returns by 100.

Panel A: Purchases						
	Number of transactions			Value of transactions		
	Customers	Others	Difference	Customers	Others	Difference
Mean return, %	1.27	1.23	0.04	1.39	1.28	0.11
Standard deviation	5.39	4.75	1.55	5.64	4.90	1.67
t-value	(2.12)	(2.32)	(0.24)	(2.22)	(2.36)	(0.59)

Panel B: Sales						
	Number of transactions			Value of transactions		
	Customers	Others	Difference	Customers	Others	Difference
Mean return, %	1.08	1.05	0.03	1.12	1.13	0.00
Standard deviation	5.19	4.64	1.32	5.48	5.03	1.18
t-value	(1.87)	(2.03)	(0.20)	(1.84)	(2.01)	(-0.04)

Panel C: Purchases less sales						
	Number of transactions			Value of transactions		
	Customers	Others	Difference	Customers	Others	Difference
Mean return, %	0.19	0.18	0.01	0.27	0.16	0.11
Standard deviation	1.12	1.05	0.93	1.23	1.06	1.17
t-value	(1.54)	(1.54)	(0.12)	(1.99)	(1.33)	(0.89)

Table 11

Testing additional predictions of the belief- and preference-based hypotheses

Column 1 tests the perceived-information hypothesis by investigating whether customers are more likely to trade before an earnings announcement. The dependent variable takes the value of one if an investor trades in a broker stock in trading days [-20,-1] before a scheduled quarterly earnings announcement of the broker and zero if the investor trades in the stock in trading days [1,20] after the announcement. The analysis determines the value of the dependent variable and the independent variables (defined as in Table 3) each day an investor trades in the broker stock. The sample consists of 131 quarterly earnings announcements made by the sample companies. Columns 2 and 3 test the private valuation hypothesis by comparing the behavior of customers in the order book to that of investors at large. Column 2 uses purchase limit orders and divides the price of the limit offer by the ask price prevailing in the market at the time of entering the order, whereas column 3 uses sale limit orders and divides the limit price by the prevailing bid. Columns 4 through 7 test the cognitive dissonance hypothesis by estimating the regressions in Table 3, columns 2 and 4, and Table 4, columns 2 and 4, respectively, but adding a dummy variable that takes the value of one if an investor is a customer of a direct competitor of a broker (see text for details). The reference category consists of investors who are customers of indirect competitors. The *t*-values, reported in parentheses below coefficients, are robust for heteroskedasticity and are adjusted for clustering at the investor level.

Dependent variable	Trade before announ-cement dummy (0/1)	Limit price relative to ask	Limit price relative to bid	Owner-ship dummy (0/1)	Ln (Value of holdings)	Purchase dummy (0/1)	Sale dummy (0/1)
		Purchases	Sales				
Specification	1	2	3	4	5	6	7
Patronage dummy	-0.001	-0.0001	0.001	0.178	0.115	0.068	-0.036
	(-0.20)	(-0.10)	(1.01)	(97.33)	(16.14)	(25.91)	(-5.62)
Direct-competitor dummy				-0.039	-0.041	-0.015	0.003
				(-32.68)	(-5.89)	(-6.73)	(0.30)
Ln (Wealth)	-0.004	-0.0001	-0.0003	0.015	0.340	-0.004	-0.001
	(-2.98)	(-0.90)	(-0.84)	(26.72)	(54.38)	(-10.68)	(-0.86)
Return [-1, -30]	-0.304					-0.030	0.245
	(-18.28)					(-5.63)	(12.70)
Return [-31, -60]	-0.045					0.028	0.090
	(-2.69)					(5.25)	(4.62)
Return [-61, -90]	0.285					-0.016	0.051
	(15.55)					(-3.11)	(2.62)
Return [-91, -120]	0.035					0.004	-0.047
	(1.80)					(0.66)	(-2.37)
Ownership dummy		-0.001	-0.001				
		(-1.62)	(-1.35)				
Spread over last 20 days		-0.897	0.895				
		(-13.98)	(10.95)				
Investor fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Broker fixed effects	Yes	Yes	Yes	No	No	Yes	Yes
Broker-year fixed effects	No	No	No	Yes	Yes	No	No
Reference prob. / value	0.503	0.983	1.016	0.254	7.910	0.177	0.863
Overall R^2	0.478	0.726	0.730	0.404	0.850	0.134	0.484
Number of investors	48,317	5,651	5,879	107,419	107,419	25,256	84,729
Number of observations	115,870	10,692	10,110	977,600	248,353	231,216	119,273