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**Friends Do Let Friends
Buy Stocks Actively**

Rawley Z. Heimer



FEDERAL RESERVE BANK OF CLEVELAND

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Friends Do Let Friends Buy Stocks Actively

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This research is the first to provide empirical evidence that social interaction is more prevalent amongst active rather than passive investors. While previous empirical work, spearheaded by Hong, Kubik, and Stein (2004), shows that proxies for sociability are related to participation in asset markets, the literature is unable to distinguish between the types of participants because of data limitations. I address this shortcoming by using data from the Consumer Expenditure Quarterly Interview Survey on individual holdings, and buying and selling of financial assets as well as expenditure variables which imply variation in the level of social activity. My findings support a new explanation for the active investing puzzle in which informal communication tends to promote active rather than passive strategies (Han and Hirshleifer 2012).

Keywords: behavioral finance, individual investors, social interaction.

JEL Codes: G02; G11.

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1 Introduction

This paper is the first to provide empirical evidence that social interaction is more prevalent among active rather than passive investors. By using data from the Consumer Expenditure Quarterly Interview Survey (CEQ) on individual holdings, and buying and selling of financial assets as well expenditure variables which imply variation in the level of social activity, I show that conditional on owning securities, the odds of being an active investor increase by about twenty percent if the individual is social. While this finding has previously gone undocumented, existing theoretical and empirical literature hints at the possibility of this relationship. As suggested by Becker (1991), one’s financial wheeling and dealings may be a more robust topic of conversation than the strategy recommended by economists, buying and holding the market portfolio.¹ Otherwise, why would investment clubs, such as those documented in Barber and Odean (2000a) continue to exist despite underperforming relative to a broad-based market index?

First demonstrated by Barber and Odean (2000b) and Grinblatt and Keloharju (2000), individual investors trade actively and lose thereby. Commonly referred to as the over-trading or active investing puzzle, standard theory has difficulty reconciling why an investment style associated with higher opportunity cost corresponds with lower risk-adjusted returns. Behavioral-based explanations for this phenomena rely on investor overconfidence (Barber and Odean (2001)) and sensation seeking (Grinblatt and Keloharju (2009)). On the other hand, works such as Linnainmaa (2011) and, to a lesser extent Barber, et al. (2012), posit that individual investors rationally trade to learn about their own skill. Thus, the observed aggregate performance of individual investors is downwardly biased by the inclusion of active traders that have not yet quit.

A new, non-preference based explanation, is that a bias in the way individuals communi-

¹Becker (1991) observes that prices will remain at levels that appear to be not be profit-maximizing when the good provided by the firm is more enjoyable when more people consume the good. This explains why long lines persist at some restaurants and the owners do not raise prices, a phenomena that does not appear to occur amongst firms that do not provide “social” goods.

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4 cate is able to sustain the prevalence of active strategies despite their underperformance (Han
5 and Hirshleifer (wp, 2012)). Individuals exhibit the propensity to broadcast their successes
6 while downplaying their failures. Since active strategies are characterized as having a higher
7 variance than passive ones, they tend to be the most talked about, and subsequently adopted
8 at a higher frequency. The Han and Hirshleifer (wp, 2012) modeling assumptions are verified
9 empirically in a companion paper (Heimer and Simon (wp, 2012)). The authors examine
10 the patterns of communication within a Facebook-like social network for retail investors and
11 find that increased returns cause traders to initiate more conversation with others. Likewise,
12 recipients of communication increase their trading intensity in response to hearing of high
13 returns.
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25 By using a representative household survey to show that social individuals are more
26 likely to be active investors, this research provides support for the social transmission-based
27 explanation for the active investing puzzle. The Han and Hirshleifer (wp, 2012) story predicts
28 that social individuals are more likely to be active market participants, all else equal. Further,
29 it bolsters the empirical findings in Heimer and Simon (wp, 2012). This paper addresses a
30 concern in the work of Heimer and Simon (wp, 2012), that traders self-select into the social
31 network and their sample may be biased towards the set of investors most susceptible to
32 social influence.
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42 The empirical work in this paper is a decedent of Hong, Kubik, and Stein (2004), hereafter
43 HKS. Their study, which uses Health and Retirement Survey (HRS) data, a representative
44 sample of elder households, shows that social individuals – those who claim to “know their
45 neighbors”, “visit their neighbors”, or “attend church” – are more likely to be stock market
46 participants. Similar to the HRS, the CEQ also contains variables related to social activity,
47 the amount spent in the last three months on church donations, admission to sporting events,
48 and participation sports.
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57 For the purpose of this research, there are advantages to using the CEQ, a repeated cross-
58 sectional household survey administered by the U.S. Census Bureau, underutilized in the
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4 finance literature. Most notably, the HRS does not provide ways to infer frequent turnover
5 or active management of an individual's portfolio while the CEQ asks respondents to report
6 how much they have spent on assets over the previous year and to separately identify how
7 much they have bought and how much they have sold. Furthermore, the HRS only samples
8 a cohort born between 1931 and 1941, while the CEQ is representative in respondent age.
9 Malmendier and Nagel (2011) find that the macroeconomic conditions experienced during an
10 individual's lifetime influence their willingness to participate in stock markets highlighting
11 the importance of negating the confounding influence of cohort and age effects.
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21 My empirical strategy for identifying if sociability is related to active management is as
22 follows. I replicate and verify the HKS results showing that increased sociability is related
23 to participation in asset markets. I create proxies for active management, new to the finance
24 literature, using the portfolio turnover variables in the CEQ. The proxies – individuals
25 who buy and/or sell assets are deemed more likely to be active investors – are found to
26 be consistent with known characteristics of active investors drawn from external sources.
27 Namely, they are male, urban, and educated, they skew younger, and are technologically
28 savvy and risk-seeking. Lastly, multivariate logistic regression analysis, conditioning on
29 asset market participation, unveils an empirical relationship between active management
30 and the propensity to be social.
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42 Beyond controlling for observable household characteristics, I rule out several alternative
43 explanations for the empirical relationship between social interaction and active investing.
44 First, a falsification exercise using CEQ expenditure variables unrelated to sociability demon-
45 strates that the results are unlikely to be driven by unobservable shocks such as disposable
46 income. Secondly, controlling for aggregate returns and return volatility, as well as idiosyn-
47 cratic expectations of future returns, yields similar results. Lastly, I use data provided by
48 the survey-taker about the interview process to account for survey response propensity.
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57 In a final empirical test, I provide an alternative specification of the relationship between
58 social interaction and active versus passive investing. To the extent that the type of asset
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4 class an individual purchases is indicative of their tendency towards active management,
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6 I find that social interaction is less strongly related to ownership of U.S. savings bonds –
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8 considered to be an extremely passive form of investing – than to other forms of security
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10 ownership. Taken together, these results suggest informal communication between investors
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12 can explain the active investing puzzle.
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15 The paper is organized as follows. The following section outlines related literature. Sec-
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17 tion 3 describes the data as well as confirms that the proxies for active investing are con-
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19 sistent with known facts. Section 4 presents baseline results on the relationship between
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21 active investing and social interaction. Section 5 addresses several concerns about the ob-
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23 served empirical relationship and provides an alternative specification of active versus passive
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25 investing. Section 6 concludes the article.
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30 **2 Related Literature**

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33 The role of social networks in areas outside of finance is well-known. Bayer, Ross, and
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35 Topa (2008) use U.S. Census data to document the role of neighborhood referrals on labor
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37 market outcomes.² Christakis and Fowler (2007), in an epidemiological study conducted in
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39 Massachusetts between 1971 to 2003, find that obesity appears to spread through social ties.
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41 Social influences are also found to have an impact on educational outcomes. Calvó-Armengol
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43 et al. (2009), using data on friendships from the National Longitudinal Survey of Adolescent
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45 Health, find a relationship between the centrality of a student within a network and their
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47 performance in school. Social interactions can explain the cross-city variance of crime rates
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49 (Glaeser et al. (1996)) and a recent string of “flash mob” robberies organized through social
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51 media offers support for this theory (Jouvenal and Morse (2011)).
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55 It is a natural extension to believe that social interaction can have an effect on invest-
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57 ment behavior as well. In fact, there is substantial evidence that participation and investor

58 ²Calvó-Armengol and Jackson (2004) provide a model of the role of social interaction on labor market
59 outcomes.
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4 behavior in financial markets are influenced by social interaction (Shiller (1984, 1989) and,
5 Shiller and Pound (1989)). Brown et al. (2008) identifies a causal effect of the level of stock
6 ownership in a community on the individual’s decision to own stock. Among mutual fund
7 managers, Hong, Kubik, and Stein (2005) demonstrate that portfolios exhibit higher corre-
8 lation if they are from the same town while Cohen, Frazzini, and Malloy (2008) show that
9 they place greater bets on firms whose board members are from their education network.
10 Shive (2010) uses an epidemic model and data on Finnish stock-holdings to study how social
11 contact can predict investor trading. Correlation across investments in retirement accounts
12 are also observed by Madrian and Shea (2000) and Duflo and Saez (2002, 2003). Researchers
13 document that investors are influenced by the investment decisions of others including fa-
14 mous investors like Warren Buffett (Sandler and Raghavan (1996)), insiders (Givoly and
15 Palmaon (1985)), and readers of the Wall Street Journal’s Dartboard column (Barber and
16 Loeffler (1993)).

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19 In addition to explaining the over-trading puzzle, there are several reasons why it is
20 important to distinguish between the types of asset market participation associated with
21 social interaction. First, there are welfare considerations since active individual investors
22 are unprofitable on average and at an information disadvantage in most financial markets.
23 Barber, et al. (2009) find that Taiwan’s retail investors underperform the market by 3.8
24 percent and accumulate losses that sum to 2.2 percent of Taiwan’s GDP annually, stressing
25 the importance of having financial literacy educational programs (van Rooij, Lusardi, and
26 Alessie (2011)) rather than informal word-of-mouth communication promote participation in
27 financial markets. This research is useful for theoretical work that directly models the flow of
28 information between investors, either through word-of-mouth (Ellison and Fudenberg (1993,
29 1995)) or observation (Banerjee (1992) and Bikchandani, Hirshleifer, and Welch (1992)).³
30 Models concerned with the role of non-participation on asset prices (Allen and Gale (1994),
31 among others) may wish to consider shocks to the participation rate that are skewed towards

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59 ³It justifies an extension of these models in which certain “forceful” agents dominate the spread of infor-
60 mation (Acemoglu, Ozdaglar, and ParandehGheibi (2010)).
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4 certain groups of investors. Active retail investors are found to behave as noise traders
5 and their activity has an impact on market liquidity and volatility (Foucault, Sraer, and
6 Thesmar (2011) and DeLong, et al. (1990)).⁴ Also, Kaustia and Knüpfer (2011) note the
7 positive correlation between new stock market entrants and asset price bubbles. If entry
8 is driven through informal communications between individuals and new entrants brought
9 about through such channels are tilted towards active investing then it further justifies the
10 notion that social interaction plays a role in the formation of bubbles.
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21 **3 Data**

22 **3.1 The Consumer Expenditure Quarterly Interview Survey**

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25 This research uses data from the CEQ, a nationwide household survey conducted by the U.S.
26 Census Bureau and used by the U.S. Bureau of Labor Statistics (BLS) to estimate household
27 expenditures. The interview survey is a rotating panel survey and approximately 15,000
28 households are visited each quarter of the year, with roughly half participating (Chopova, et
29 al. (2008)). Households are contacted for an interview every three months for five consecutive
30 quarters. The first interview is not used in the public data nor in the published estimates
31 of national and regional aggregates; it is used for bounding purposes which counteracts the
32 problem of “telescoping” or the tendency of survey respondents to report expenditures to
33 have been made more recently than they actually were. While the CEQ has been in existence
34 on a yearly basis since 1980, I use years 2000Q2 - 2010Q1 of the CEQ public micro-use survey
35 data because the survey is relatively unchanged over this period. The sample used herein is
36 restricted to respondents who complete the fifth interview because it is the only wave to ask
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53 ⁴In DeLong et al. (1990), noise traders impact liquidity and the volatility of assets, and their presence
54 can explain how prices can persistently diverge from fundamental values. The link between noise trading and
55 individual investors has been justified by a number of empirical studies. Foucault, Sraer and Thesmar (2011)
56 find that increasing the cost associated with active retail trading on Euronext Paris reduces the volatility
57 of daily returns by about a quarter of its standard deviation, while Barber, Odean, and Zhu (2009), Kumar
58 and Lee (2006), and Hvidkjaer (2008) document that trades of individual investors tend to be correlated and
59 may affect asset prices.
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4 about asset holdings.
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6 The interview is conducted by an interviewer and the respondent or “reference person”
7 provides information about the household. The CEQ includes data on the age, years of
8 education, race/ethnicity, and marital status of both the respondent and his or her spouse.
9 It also includes information on household income and composition such as the number of
10 dependent individuals, as well as the place of residence, U.S. state and an indicator variable
11 for urban or rural residence. The data may be biased by the possibility that respondents are
12 non-income earning members of the household and thus less aware of the family finances.
13 Accordingly, I refer to the demographic characteristics of the respondent when they are also
14 one of the income earning members of the household. When the respondent does not earn
15 income, I refer to the demographic characteristics of the spouse.⁵
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28 29 **3.1.1 Financial variables** 30

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32 The fifth interview of the CEQ asks respondents to provide information about their finances
33 and asset holdings. Interviewees are asked, “what was the estimated value of securities, such
34 as stocks, mutual funds, private bonds, government bonds or Treasury notes owned by you
35 (or any members of your CU) on the last day of (last month)?”. In addition, respondents
36 are separately asked the value of securities purchased and the value of securities sold within
37 the last twelve months.
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44 Summary statistics on participation rates and the value of securities are reported in
45 Tables 1 and 2 respectively. Of the approximately 75,000 respondents in the sample, 12.8
46 percent of respondents report owning securities with 1.8 percent declaring both buying and
47 selling of securities. Furthermore, 8.8 percent of respondents own securities but neither
48 bought or sold any in the preceding period and individuals purchase securities more often
49 than they sell them (3.8 versus 2.7 percent). It is worth mentioning that, as expected, all of
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57 ⁵The CEQ contains the variable “earncomp” which asks for the composition of earners. Answers 1 through
58 4 of this variable include the reference person as an earner. When the respondent answers “spouse only”
59 (answer 5) or “spouse and others” (answer 6), I use the demographic characteristics of the respondent’s
60 spouse.
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4 the aforementioned rates are increasing in household income and that there is a downward
5 trend in security ownership over the sample period – roughly 14 percent of respondents
6 owned securities in the early years of the 2000s, a rate that drops to around 11 percent in
7 2008 and 2009. The median value of securities owned (conditional on ownership) is about
8 40,000 USD in 2010 prices, but the median value of that bought and sold is much smaller –
9 roughly 5,500 and 7,500 USD respectively.⁶

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11 The questions in the CEQ related to securities are not disaggregated enough to infer the
12 composition of asset holdings per household.⁷ Fortunately, by using additional data from
13 the Survey of Consumer Finances (Bucks et al. (2009)), I can deduce that the majority of
14 households who report owning securities hold stocks, but not bonds or treasury notes. As
15 reported in Table 3, the percentage of households that owned stocks was 20.7 and 17.9 in
16 2004 and 2007 respectively. Meanwhile, bonds were owned by only 1.8 percent of families in
17 2004 and 1.6 percent in 2007. Pooled investment funds – held by 11.4 percent of families in
18 2007 – are also found to typically contain stocks. 10.2 percent of families in 2007 owned a
19 pooled investment fund with just stocks. Tax-free bond, government bond, and other bond
20 pooled investment funds are held by 2.1, 1.2, and 1.0 percent of households respectively.
21 Johnson and Li (2009) compare the CEQ with the Survey of Consumer Finances and find
22 that the former provides accurate measure of household debt and asset holdings.

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24 I use the variables in the CEQ to create three indicator variables establishing the respon-

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⁶I normalize all reported dollar amounts into March 2010 dollars using the Consumer Price Index (*CPI*) for all urban consumers produced by the BLS. Nominal amounts X on item j in time t are adjusted as follows:

$$X_{j,t} * \frac{CPI_{3/2010}}{CPI_t} = \bar{X}_{j,t}$$

where \bar{X} indicates the real price of expenditures.

⁷Vissing-Jørgensen (2002) attempts to distinguish between stock and bond owners. While her measure of stock ownership is in line with other sources (21.75 percent of her sample), she classifies 31.40 percent of her sample as bond owners. First, this is not consistent with external, representative surveys such as the SCF. By restricting the sample to those who participate in all five interviews, she likely over-samples the higher income classes and homeowners (Heimer (2011) shows that complete respondents are found to be wealthier and homeowners), categories which are positively correlated with bond ownership. Even the weights published by the BLS do not take into account longitudinal attrition and not adjusting them for attrition leads to over-sampling these strata. Secondly, the fact that her sample yields a 50 percent greater amount of households who own bonds versus stocks is strongly inconsistent with other sources and suggests it may be inappropriate to replicate her methods.

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4 dent’s status as an investor. The first variable, $investor_i$, is equal to one if respondent i
5 reports having securities valued above zero, zero otherwise.⁸ The second variable, $active_i$, is
6 equal to one if i reports having either bought or sold securities, zero otherwise. The third is
7 called $very\ active_i$ and is equal to one if i reports both buying and selling securities. This
8 variable lessens the concern that buying or selling represents liquidity needs or provision.
9 When conditioning on being an investor, the two “active” variables imply that the respon-
10 dent is either an active or passive investors. My strategy for verifying that these variables
11 are indicative of active investing is to examine if known characteristics about active investors
12 are associated with them, a task accomplished in Section 3.2.

23 24 25 **3.1.2 Social expenditures**

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27 The primary purpose of the CEQ is to estimate U.S. aggregate and regional expenditures by
28 households. For instance, the survey is currently used to generate expenditure weights for use
29 in the U.S. Consumer Price Index and to make cost of living adjustments for military families.
30 The list of items for which respondents are asked to report expenditures on is exhaustive
31 and detailed, from necessities such as food and clothing to luxury items such as aircraft,
32 purchases required by law such as vehicle registrations and those related to entertainment
33 such as “dating services”. In particular, several of the items in which respondents are asked
34 to report on, namely “cash contributions to churches/religious organizations”, “admission to
35 sporting events (out-of-town)”, and “fees for participant sports (out-of-town)”,⁹ are related
36 to their propensity to be engaged in social activity.

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38 Church attendance is indicative of exposure to social situations and is a key explanatory
39 variable in HKS. Similarly, the CEQ asks respondents to reveal the amount of “Cash contri-
40 butions to churches/religious organizations” made in the previous three months. Therefore,
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44 ⁸Only 12 out of a possible 75,189 respondents report having securities valued zero. The rest of the
45 observations are recorded as missing observations.

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48 ⁹The CEQ asks respondents to report expenditures on admissions to sporting events and fees for par-
49 ticipant sports both in the location of residence and while out-of-town. I combine in-town and out-of-town
50 expenditures per CU for each of these two variables.

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4 I use this survey question to create an indicator variable called $church_i$ that is equal to one
5 if i reports non-zero expenditures and equal to zero otherwise.
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8 Participation sports are also a popular way to engage socially. Scholarly literature such
9 as “Bowling Alone: The Collapse and Revival of American Community” (Putnam (2000))
10 chronicles how participation sports play an important role in community formation. Thus,
11 the second proxy for sociability is $part\ sport_i$, an indicator variable equal to one if respondent
12 i has spent at least one dollar on participation sports.
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19 The third proxy for sociability is called $adm\ sport_i$. It is equal to one if respondent i has
20 at least one dollar in expenditures on admissions to sporting events. While individuals may
21 attend sporting events alone and refrain from communication with others in attendance, the
22 experience – be it collegiate or professional athletics, or an international amateur competition
23 – is clearly designed to inspire a shared sense of fandom and comradery. A common anecdote
24 is that the best U.S. stock tips are shared in box seats at Yankee Stadium, home to Major
25 League Baseball’s most recognizable franchise, the New York Yankees.
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33 Table 4 offers an overview of the social variables used in this study. Around 16 percent
34 of respondents claim to have had expenditures on admissions to sporting events or partici-
35 pation fees for sports. Seventeen percent of CEQ respondents report having made donations
36 to churches or religious organizations.¹⁰ Meanwhile, HKS report that 76 percent report at-
37 tending church at least once a year in the HRS. However, the difference is not surprising
38 considering that those donating to church are likely a subset of those who attend and the
39 CEQ asks for expenditures made within the last three months, while the HRS assesses at-
40 tendance over the preceding year. Not surprisingly, all variables are increasing in household
41 income indicating that expenditures on all items are at least partly explained by the presence
42 of disposable income.
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54 The correlations between these variables are presented in Table 5. The strongest cor-
55 relation between pairs of items occur between $part\ sport_i$ and $adm\ sport_i$ with a Pearson’s
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59 ¹⁰26 percent report making donations when the data is restricted to respondents who consult records.
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4 correlation coefficient of around 31 percent. The correlation between $church_i$ and the sports
5 variables is around 10 percent which implies there is relatively independent information on
6 the propensity to be social across most variables. For the most part, the correlation between
7 variables falls when the relationship between them is estimated conditional on being a re-
8 spondent who consults their records at least half the time. This suggests that at least part
9 of the correlation is driven by individual response propensity a feature I control for in all of
10 the empirical analysis. Likewise, the correlation between the variables falls when analyzed
11 within income classes, suggestive of the need to control for disposable income.
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22 23 **3.2 Facts about active investing**

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25 The purpose of this section is to ensure that I am correctly identifying proxies for active and
26 passive investing, a task accomplished by verifying that they are consistent with known facts
27 about active investing.¹¹ To do so, I run three logistic regressions of the following form:
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$$32 \quad \text{logit}(p_i) = \beta \cdot \text{Individual}_i \quad (1)$$

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34 where p_i captures the probability that investor i falls under the different investor categories,
35 $investor_i$, $active_i$, or $very\ active_i$, respectively. The set of independent variables in matrix
36 Individual_i include age and household income before taxes, as well as indicator variables for
37 gender, marital status, whether or not a member of the household is college educated, and
38 if they live in a rural setting. It also includes categorical variables for respondent race and
39 geographic region of the country, and variables intended to capture individual risk tolerance
40 and willingness to use technology. The regressions control for year fixed effects, and response
41 propensity measured in two ways: whether an individual consulted records while answering
42 the survey and the number of items the respondent reports expenditures on.¹²
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57 ¹¹This method is similar to that of Kumar (2009), in which the demographic characteristics of those who
58 purchase lottery tickets are compared with those who buy “lottery-type” stocks.

59 ¹²The number of items the respondent reports expenditures on may also capture disposable income.
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4 Table 6 presents estimation results in the form of implied odds-ratios associated with
5 each covariate. The regressions in Columns II and III are conditional on $investor_i = 1$,
6 while Column III excludes those who only buy or sell securities but not both. To summarize
7 the results, discussed in greater detail below, active investors are more likely to be male,
8 younger, urban, educated, technologically savvy, and risk seeking, all of which are consistent
9 with external sources.

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17 One of the established facts about active investing is its relationship with overconfi-
18 dence and since men are more overconfident than women, they are more likely to be ac-
19 tive traders. Specifically, Barber and Odean (2001) document that men trade 45 percent
20 more than women. The regression results are consistent with this fact. In Column I, the
21 odds of being an investor are about 16 percent lower for females. Secondly, conditional on
22 $investor_i = 1$, men are more likely to be active investors. The odds of reporting buying
23 or selling are about 28 percent lower for a female (Column II) and about 40 percent lower
24 for reporting both buying and selling (Column III), both statistically significant at the one
25 percent error level. One concern is that this result may simply reflect a tendency for males to
26 have more control over household finances and thus a better knowledge of the ins-and-outs of
27 their family's portfolio. As mentioned previously, the demographic characteristics belong to
28 those of the wage-earner. This concern is addressed by restricting the regressions to include
29 only unmarried respondents, an exercise that fails to change the results (regression results
30 are unreported, but available upon request).

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46 Linnainmaa (2003) finds that active investors are more likely to be younger and urban
47 individuals.¹³ According to Column I, the probability of being an investor is increasing in age,
48 a result in accordance with the accumulation of assets over the life-cycle. However, similar to
49 Linnainmaa (2003), the probability of being an active investor is decreasing in age (Columns
50 II and III). Furthermore, investors are no more or less likely to be urban individuals (Column
51 I), but urban individuals are about one-third more likely to be active investors (Columns II
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59 ¹³Linnainmaa (2003) is specifically concerned with documenting facts about day-traders. I assume that
60 day-traders and active investors are interchangeable.
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4 and III). One other relationship between security ownership and demographic characteristics
5 is that Caucasians are more likely than all other races/ethnicities to own securities (odds-
6 ratios unreported, but available upon request), a fact also documented in HKS. There are
7 no studies linking active investing to race/ethnicity. Similarly, there is no evidence of this
8 relationship in the CEQ data.
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11 To the best of my knowledge, there are also no existing studies linking education and ac-
12 tive investing. The closest substitute for this missing strand of literature is that linking SAT
13 scores (Gottesman and Morey (2006)) and IQ (Grinblatt et al. (2010, 2011)) to participation
14 and performance as an investor. These studies find a positive relationship between intelli-
15 gence and both participation and performance. Considering the likely correlation between
16 intelligence and educational attainment, there is a positively and statistically significant re-
17 lationship at the one percent error level between being college educated and ownership of
18 financial assets, as well as the proxies for active investing.
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22 Another established relationship is between investing and the use of technology. HKS find
23 that individuals who report not being able to use a computer or word processor are less likely
24 to be investors. The results in Column I imply the individuals are more likely to be investors
25 if they have expenditures on personal computer hardware or software. Furthermore, Barber
26 and Odean (2002) find that investors trade more frequently, speculatively, and less profitably
27 upon switching from phone-based to online trading. The odds-ratios in Columns II and III
28 imply personal computer users are more likely to be active investors, a relationship that is
29 statistically significant when the dependent variable is *very active_i*.
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33 Individual risk tolerance is captured by including a variable indicating whether or not
34 the respondent has expenditures on either renter's or life insurance. Not owning insurance
35 is indicative of increased willingness to take risk. HKS find that individuals who are risk
36 tolerant are more likely to be stock market participants. Their finding makes sense amongst
37 an older cohort of individuals such as those in the HRS. However, the theory behind this
38 relationship when extended to individuals of all age groups is less clear since a standard
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4 intertemporal consumption/savings model predicts that a risk averse agent will invest in the
5 asset to buffer against shocks to their earnings potential. This is evident in the fact that
6 those who purchase insurance are more likely to be investors (Column I). On the other hand,
7 it is clear that active investors engage in risk seeking behavior. The relationship between
8 active investing and insurance is negative in both specifications (Columns II and III) and
9 statistically significant at the one percent level when the dependent variable is *very active*_{*i*}.
10 In the latter specification, the odds of being an active investor are about 22 percent lower
11 for an individual who purchases insurance.¹⁴
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23 4 Regression Analysis

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27 This section assesses the relationship between investing and social propensity by estimating
28 a logistic model similar to Equation 1:
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$$32 \text{logit}(p_i) = \beta_0 + \beta_1 \cdot \text{social}_i + \beta \cdot \text{Individual}_i + \varepsilon_i$$

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37 The proxies for sociability, introduced in Section 3.1.2, *part sport*_{*i*}, *adm sport*_{*i*}, and *church*_{*i*}
38 are illustrated above by the nomenclature, *social*_{*i*}. Each regression is estimated separately
39 with the variables in *social*_{*i*} included one at a time to avoid potential collinearity. This yields
40 nine total regressions, each of the three investor types captured by the probability *p*_{*i*} regressed
41 on each of the three explanatory variables in *social*_{*i*}. Furthermore, the control variables
42 outlined in *Individual*_{*i*} are included throughout and all regressions include heteroskedastic
43 consistent standard errors.
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52 Baseline regression results are presented in Table 7. The first column presents the rela-
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¹⁴It could also be argued that having insurance is actually a proxy for the financial sophistication of the individual. If this is the case, the expected results would be the same. A financially sophisticated individual understands the value of holding securities and would also understand that active investing is an unprofitable venture on average.

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4 of securities, $investor_i$. The relationship is positive and statistically significant at the 99 per-
5 cent error level for all three social variables. The log-odds of owning securities are around
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7 25 to 40 percent higher for those who report expenditures on social activities. This verifies
8
9 and provides robustness to the empirical results in HKS.

10
11 By conditioning on $investor_i = 1$, the second and third columns assess whether the
12 investor is of the active or passive type. As demonstrated in Column II, the $social_i$ variables
13 all lead to a positive increase in the likelihood of being $active_i$. The odds-ratios associated
14 with $part\ sport_i$ and $church_i$ are statistically significant at the one percent error level, while
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 $adm\ sport_i$ is at ten percent.

The regressions in Column III excludes those who for which $active_i = 1$, but $veryactive_i =$
0 so as to mitigate concern over the variables capturing household liquidity needs rather than
portfolio turnover. The dependent variable in this specification is $very\ active_i$. Similarly,
all three variables in $social_i$ are positively related to an increased propensity to be an active
investor. The regressors $adm\ sport_i$ and $church_i$ are statistically significant at the one percent
error level. The coefficient on $part\ sport_i$ is not statistically significant.

The magnitude of the relationship between sociability and active management is eco-
nomicallly large; however, the odds-ratios are smaller than that of the pure participation
regressions with $investor_i$ as the dependent variable. The odds of being $active_i$ are about
nine percent larger for those who purchase admission to sporting events, while the largest
coefficient, that on $church_i$ in the $very\ active_i$ specification, implies that the log-odds of
being a very active investor are 26 percent greater.

It should also be noted that there is an increase in the fit of the model when The Pseudo
R-squared is around five percent in the $active_i$ regression and seven percent in the regressions
with $very\ active_i$ as the dependent variable. It implies that individuals who buy or sell but
not both confound the empirical analysis as they may be more likely to do so for liquidity
reasons rather than the purpose of active management.

5 Concerns and Robustness

This section rules out several alternative explanations for the empirical relationship between social interaction and active investing. First, active investing could simply arise because of shocks to disposable income which would also increase expenditures regardless of whether or not they are related to social activity. Secondly, the regression results may capture response propensity and an interviewee’s willingness to document expenditures on social activities is associated with an increased likelihood of responding to questions about their financial activity. Third, aggregate returns and volatility as well as idiosyncratic expectations of future returns are not the driving force behind the relationship. It also provides an alternative specification of active versus passive investing, namely that social interaction is more strongly related to other forms of security ownership than to a relatively passive form of investing, ownership of U.S. savings bonds.

5.1 Is it disposable income?

The regression results may be driven by unobservable shocks to disposable income that lead to increases in both investment activity and expenditures on non-essential items regardless of whether or not they are social in nature. To address this concern, all regressions include before tax income as a control variable. Presumably, those with more income have the opportunity to purchase more items including securities. However, simply controlling for income may not be sufficient since other revenue sources, including the removal of debt, are possible.

Furthermore, I employ a falsification exercise using non-social expenditure variables in order to rule out spurious factors and ensure proper identification of the relationship between active investing and sociability. Table 8 presents regression results using the methodology outlined in Section 4, but with other expenditure variables from the CEQ that do not have a clear relationship to one’s propensity to be engaged in social activity as independent

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4 variables. This includes items such as online entertainment and television purchases as well
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6 as photographic equipment and musical instruments.
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9 The estimation results illustrated in Table 8 imply it is difficult to exclude the disposable
10 income explanation when $investor_i$ is the dependent variable – five of the eleven non-social
11 independent variables are statistically significant and positively related to being an investor.
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13 However, the expenditure variables fail to exhibit correlation with active investing when
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15 the regressions are conditioned on $investor_i = 1$. Only one of the twenty-two possible
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17 regressions ($very\ active_i$ regressed on an indicator for *stamps or coin collecting*) yields a
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19 statistically significant odds-ratio above one. In fact, three of the expenditure variables
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21 namely *photographer fees*, *musical instruments*, and *hunting and fishing*, exhibit a negative
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23 and statistically significant relationship with the probability of active investing. This suggests
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25 that conditioning on whether or not an individual owns securities adequately identifies the
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27 empirical model.
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33 **5.2 Is it response propensity?**

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36 Another possibility is that the relationship between investing and the proxies for sociability
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38 is driven by survey response propensity. In other words, having provided information about
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40 their expenses on social activity makes the individual more likely to respond to questions
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42 about their finances.
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45 By showing that non-social expenditure variables are unrelated to investing activity, the
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47 falsification exercise in Section 5.1, refutes this argument. These variables would display a
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49 positive relationship with investing throughout if response propensity explains the empirical
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51 results.
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53 Additionally, two variables are used in the regression analysis to control for the interviewee's
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55 likelihood of responding to any given question. The first variable is a simple count
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57 of the number of items the household reports expenditures on. The second variable is documented
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59 by the survey taker and asks, “[i]n answering questions about expenses, did the
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4 respondent consult bills, receipts, check stubs, expense books, tax returns, or other records,
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6 90 percent, 50 to 90 percent, 10 to 40 percent, or less than 10 percent of the time?”. It
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8 proxies for the respondent’s enthusiasm towards participating in the survey and its inclusion
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10 in the regression analysis controls for a spurious correlation between social interaction and
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12 investing caused by individual response propensity.
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15 16 **5.3 Are asset returns driving both investment activity and social** 17 18 **expenditures?** 19 20 21

22 Asset prices potentially drive both increased investment activity and expenditures on items
23 related to social activity. The baseline specifications presented in Section 4, include year
24 fixed effects to capture general macroeconomic conditions common to all individuals. To
25 add robustness, I include measures of excess returns (the return on the S&P 500 minus U.S
26 Treasury bonds of different maturity) and realized volatility of the S&P 500 in a given month
27 of a given year. The empirical results are unchanged and the relationship between aggregate
28 returns and volatility with household investing style is not strong (regressions results are
29 available upon request).
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39 Unfortunately, the year fixed effects and aggregate market statistics are common to all
40 individuals at a given point in time and may not capture expectations of future returns and
41 volatility idiosyncratic to individual i . I proxy for the expectation of future returns by in-
42 cluding a variable calculating the sum of durable goods purchases per household, normalized
43 by income.¹⁵ Using the logistic regression framework of Section 4, this variable is positively
44 related to $investor_i$ and statistically significant at one percent. Furthermore, it is positive
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51 ¹⁵The durable goods variable is the sum of household expenditures on: “mattress and springs”, “other
52 bedroom furniture”, “sofas”, “living room chairs”, “living room tables”, “kitchen/dining room furniture”,
53 “purch/inst refrig/freezer rnr (ownd)”, “purch/inst clothes washer rnr (ownd)”, “purch/inst clothes dryer
54 rnr (ownd)”, “stoves, ovens rnr (ownd)”, “lawn and garden equipment”, “power tools”, “office furniture
55 home use”, “watches”, “jewelry”, “new cars”, “new trucks”, and “new motorcycles”, divided through by
56 before tax income. All items are converted to March 2010 prices. I attribute Daniel L. Tortorice with sug-
57 gesting this proxy who notes that durable goods consumption increases in anticipation of positive economic
58 shocks.
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4 and statistically significant at the ten percent level when the dependent variable is *active_i*,
5 but positive and statistically insignificant when it is *very active_i*. However, the inclusion of
6 durable goods consumption in the regression analysis fails to negate the relationship between
7 social propensity and investing behavior (regressions results are available upon request).
8
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14 5.4 U.S. bonds versus other securities

17 This section presents an additional test of the relationship between social interaction and
18 active investing. While active investing is typically associated with portfolio churning it
19 may also represent the aggressive pursuit of high returns with little regard for the riskiness
20 of the asset or strategy. Therefore, I create a variable *US Bonds_i* that is equal to one if *i*
21 owns U.S. savings bonds, zero otherwise,¹⁶ which captures information independent of that
22 in *investor_i*. This presents the opportunity to test via regression analysis the strength of
23 the relationship between the social proxies and *investor_i* relative to that of *US Bonds_i*.
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32 Table 9 presents estimation results using the logistic regression framework established
33 in Section 4. By using the same set of covariates and varying the dependent variable be-
34 tween *investor_i* and *US Bonds_i*, the table compares the relationship between the indicators
35 for sociability and asset ownership. Consistent with literature suggesting social interaction
36 increases asset market participation, *church_i*, *part sport_i*, and *adm sport_i* are all found to
37 positively relate to the propensity to own U.S. savings bonds. Furthermore, when I compute
38 the marginal effect of the social variables (evaluated at the means of all other covariates), the
39 discrete change from non-social to social has a larger impact on *investor_i* than on *US Bonds_i*
40 in all specifications. The difference is statistically significant except when the dependent vari-
41 able is *part sport_i*. This implies that social interaction has a larger impact on active forms
42 of investing.
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55 ¹⁶Specifically, the CEQ asks the question, “[o]n the last day of (last month), what was the total amount
56 your CU had in U.S. Savings bonds?”
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6 Conclusion

This research reinforces existing literature on the relationship between social interaction and asset market participation, and goes one step further by showing that social interaction is biased towards active investing. It does so by showing that those with expenditures on items related to social activity are positively associated with active investing conditional on participation in asset markets. Several other potential explanations are excluded; the relationship is unlikely to be driven by the spurious presence of disposable income, aggregate returns or the expectations of future returns, or response propensity. Furthermore, an alternative specification shows that the relationship between social interaction and ownership of U.S. savings bonds while also positive, is smaller than that of other securities.

This finding has many implications. First, much of the research that looks under the hood at the participation rate has the normative implication that most households would benefit from increased use of asset markets. If informal communications motivate participation then my findings call into question whether or not they improve investor welfare. Secondly, the empirical results can be viewed in the context of many models that include speculators or noise traders. Asset price bubbles may also be driven by word-of-mouth between active investors. Lastly, and most central to the goals this research, it offers an explanation for the active investing puzzle, one that lacks strong explanations rooted in rational behavior.

While other research has identified a causal relationship from sociability to participation in asset markets (Brown, et al. 2008), this research is limited in its ability to identify the direction of causality in the relationship between social interaction and active investing. Furthermore, theory fails to point definitively in one direction or the other. For one, models such as Han and Hirshleifer (2012) show that behavioral biases may make individuals susceptible to conversation with active investors. On the other hand, individual investors may seek information about asset returns through informal communication with others (Ellison and Fudenberg (1995)). This would lead active investors to court informed traders.

Regardless, identifying the presence of this relationship is valuable for several reasons.

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It reinforces the notion that education about financial markets should occur through formal means. Models that include informal communication between investors should be cognizant of this empirical relationship. Most importantly, it demonstrates that the tendency for individual investors to trade too much despite underperforming, is still a puzzle in need of solving.

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[51] Annette Vissing-Jorgensen, *Limited asset market participation and the elasticity of intertemporal substitution*, Journal of Political Economy **110** (2002), no. 4, 825–853.

Table 1: Financial Participation

Variable	income, X, (in March 2010 USD)			
	all income	X < 50k	50k ≤ X < 100k	X ≥ 100k
% own securities	12.78%	6.29%	17.27%	30.25%
% buy securities	3.83%	1.35%	4.94%	11.50%
% sell securities	2.70%	1.31%	3.30%	7.02%
% buy or sell securities (active management)	5.36%	2.26%	6.86%	14.75%
% buy and sell securities (very active management)	1.08%	0.49%	1.38%	3.77%
% own securities, no buy or sell (passive management)	8.82%	4.85%	12.23%	18.44%
Observations	75,189	44,614	18,845	11,730

Table 2: Summary Statistics on Finances

Variable	Nominal Expenditures (USD)			
	Obs	Mean	Median	Std. Dev.
amount owned in securities	9,619	183,435.5	35,000	498,140.6
amount bought securities	2,890	59,023.82	5,000	422,393.3
amount sold securities	2,044	77,083.07	6,600	606,236
income before taxes	75,189	49,209.67	34,000	56,194.57
income before taxes (if own securities)	9,619	87,672.27	69,690	78,464.65

Variable	Expenditures in March 2010 Prices (USD)			
	Obs	Mean	Median	Std. Dev.
amount owned in securities	9,619	204,683.9	40,232.45	548,683.2
amount bought securities	2,890	70,067.47	5,683.432	521,752.4
amount sold securities	2,044	91,713.89	7,413.461	749,493.7
income before taxes	75,189	55,007.19	38,375.57	62,142.85
income before taxes (if own securities)	9,619	98,522.49	78,520.85	86,249.72

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Table 3: Financial Participation, Survey of Consumer Finances

		Percentage of families holding asset		
		Bonds	Stocks	Pooled Investment Funds
year	2004	1.8%	20.7%	15.0%
	2007	1.6%	17.9%	11.4%

Note: Data comes from the Survey of Consumer Finances, Bucks et al. (2009)

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Table 4: Social Participation

Variable	income, X, (in March 2010 USD)			
	all income	X < 50,000	50,000 ≤ X < 100,000	X ≥ 100,000
% Church Donations	17.14%	11.87%	20.80%	31.28%
% Admission to Sports	15.79%	10.21%	20.19%	29.92%
% Participation in Sports	15.60%	9.68%	19.84%	31.28%
Observations	75,189	44,614	18,845	11,730

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Table 5: Social Participation Correlation

	$adm\ sport_i$	$part\ sport_i$	$church_i$
$adm\ sport_i$	1		
$part\ sport_i$	0.315	1	
$church_i$	0.119	0.124	1

Note: This table presents Pearson's correlation coefficients for variables outlined in Section 3.1.2.

Table 6: The Facts About Investing

	<i>investor_i</i>	conditional on investing	
		<i>active_i</i>	<i>very active_i</i>
	I	II	III
age	1.018*** (0.001)	0.991*** (0.002)	0.997 (0.003)
female	0.791*** (0.021)	0.709*** (0.035)	0.543*** (0.050)
married	0.941* (0.032)	0.930 (0.058)	0.863 (0.095)
college educated	1.687*** (0.055)	1.377*** (0.085)	1.684*** (0.198)
rural	0.943 (0.047)	0.885 (0.089)	0.648** (0.142)
log income	1.490*** (0.029)	1.211*** (0.045)	1.464*** (0.113)
technology	1.163*** (0.043)	1.096 (0.066)	1.219** (0.122)
insured	1.151*** (0.030)	0.968 (0.048)	0.780*** (0.066)
race	yes	yes	yes
region fixed effects	yes	yes	yes
year fixed effects	yes	yes	yes
<i>N</i>	67,501	9,441	7,260
pseudo <i>R</i> ²	0.19	0.05	0.07

Odds ratios; Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Description: This table presents implied odds-ratios from the following logistic regression:

$$\text{logit}(p_i) = \beta \cdot \text{Individual}_i$$

The data comes from the Consumer Expenditure Quarterly Interview Survey (CEQ), 2000Q2 - 2010Q1. The dependent variables in Column I is *investor_i*, a zero/one indicator, equal to one if the consumer unit (CU) reports ownership of stocks, mutual funds, private bonds, government bonds or Treasury notes. In Column II, *active_i* is equal to one if *investor_i* = 1 and *i* reports either buying or selling assets. *very active_i* is equivalent to *active_i* except the respondent reports both buying and selling. Column III excludes observations in which *active_i* = 1, but *very active_i* = 0.

Table 7: Baseline Regressions

depend var = $social_i$	conditional on investing		
	$investor_i$	$active_i$	$very\ active_i$
	I	II	III
$church_i$	1.375*** (0.0408)	1.181*** (0.0607)	1.264*** (0.113)
$adm\ sport_i$	1.272*** (0.0395)	1.091* (0.0563)	1.188** (0.105)
$part\ sport_i$	1.262*** (0.0388)	1.164*** (0.0593)	1.126 (0.0994)
control variables (Table 6)	yes	yes	yes
race	yes	yes	yes
region fixed effects	yes	yes	yes
year fixed effects	yes	yes	yes
N	67,501	9,441	7,260
pseudo R^2	0.19	0.05	0.07

Odds-ratios; Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Description: This table presents implied odds-ratios from the following logistic regressions:

$$\text{logit}(p_i) = \beta_0 + \beta_1 \cdot social_i + \beta \cdot Individual_i + \varepsilon_i$$

The data comes from the Consumer Expenditure Quarterly Interview Survey (CEQ), 2000Q2 - 2010Q1. The dependent variable in Column I is $investor_i$, a zero/one indicator, equal to one if the respondent reports ownership of stocks, mutual funds, private bonds, government bonds or Treasury notes. In Column II, $active_i$ is equal to one if $investor_i = 1$ and i reports either buying or selling assets in the previous sample period. $very\ active_i$ is equivalent to $active_i$ except the respondent reports both buying and selling. Columns II and III are estimated conditional on $investor_i = 1$ in order to exclude non-market participants from the analysis. Column III excludes observations in which $active_i = 1$, but $very\ active_i = 0$. All logistic regressions are estimated with only one social variable at a time, yielding nine total regressions, and the pseudo R^2 is an average from the three regressions in each respective column.

Table 8: Is it Disposable Income?

	$investor_i$	conditional on investing	
		$active_i$	$very\ active_i$
stamps or coins collecting	0.957 (0.135)	0.957 (0.237)	1.845* (0.634)
photograph equipment	1.121* (0.0693)	1.070 (0.104)	0.964 (0.163)
photographer fees	1.045 (0.0626)	0.900 (0.0864)	0.542*** (0.105)
legal fees	1.216*** (0.0764)	1.181 (0.123)	1.208 (0.209)
vehicle inspection	1.133*** (0.0490)	0.967 (0.0742)	0.973 (0.127)
musical instruments	0.987 (0.0806)	0.721** (0.0962)	0.920 (0.191)
hunting and fishing	1.137* (0.0802)	0.803* (0.0939)	0.956 (0.190)
winter sports	1.041 (0.146)	0.931 (0.191)	0.530 (0.214)
water sports	1.407** (0.189)	0.744 (0.146)	1.121 (0.331)
online entertainment	0.997 (0.155)	0.970 (0.273)	1.199 (0.497)
television	0.984 (0.078)	1.123 (0.166)	1.132 (0.52)
control variables (Table 6)	yes	yes	yes
race	yes	yes	yes
region fixed effects	yes	yes	yes
year fixed effects	yes	yes	yes
N	67,501	9,441	7,260
pseudo R^2	0.19	0.05	0.07

Odds ratios; Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Description: The data comes from the Consumer Expenditure Quarterly Interview Survey (CEQ), 2000Q2 - 2010Q1. The dependent variable in Column I is $investor_i$, a zero/one indicator, equal to one if the respondent reports ownership of stocks, mutual funds, private bonds, government bonds or Treasury notes. In Column II, $active_i$ is equal to one if $investor_i = 1$ and i reports either buying or selling assets in the previous sample period. $very\ active_i$ is equivalent to $active_i$ except the respondent reports both buying and selling. Columns II and III are estimated conditional on $investor_i = 1$ in order to exclude non-market participants from the analysis. Column III excludes observations in which $active_i = 1$, but $very\ active_i = 0$. All logistic regressions are estimated with only one of the disposable income variables at a time. The reported Pseudo R^2 come from the regressions that include “stamps or coin collecting” as an explanatory variable. The other variables related to social interaction do not have a significant impact on the Pseudo R^2 .

Table 9: Securities versus US bond ownership

indep var	depend var	dy/dx	se	95% confidence interval	
$church_i$	$investor_i$	0.0280***	0.00286	0.0224	0.0336
	$US Bonds_i$	0.0134***	0.00224	0.00875	0.0175
$adm sport_i$	$investor_i$	0.0208***	0.00288	0.0151	0.0264
	$US Bonds_i$	0.00860***	0.00221	0.00427	0.0129
$part sport_i$	$investor_i$	0.0201***	0.00284	0.0146	0.0257
	$US Bonds_i$	0.0117***	0.00226	0.00732	0.0162

Marginal effects; Robust standard errors

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Description: The data comes from the Consumer Expenditure Quarterly Interview Survey (CEQ), 2000Q2 - 2010Q1. The dependent variables are: $investor_i$, a zero/one indicator, equal to one if the respondent reports a non-zero value to the question, “what was the estimated value of securities, such as stocks, mutual funds, private bonds, government bonds or Treasury notes owned by you (or any members of your [household]) on the last day of (last month)?” and, $US Bonds_i$, a zero/one indicator equal to one if they report a non-zero value to, “[o]n the last day of (last month), what was the total amount your [household] had in U.S. Savings bonds?”. The coefficient values are estimated using separate logistic regressions.