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Smoking Hot Portfolios? Self-Control and Investor Decisions

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Smoking hot portfolios?
Self-control and investor decisions

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ABSTRACT

Self-control failure is among the major pathologies (Baumeister et al. (1994)) affecting individual investment decisions which has hardly been measurable in empirical research. We use cigarette addiction identified from checking account transactions to proxy for low self-control and compare over 5,000 smokers to 14,000 nonsmokers. Smokers self-directing their investment trade more frequently, exhibit more biases and achieve lower portfolio returns. We also find that smokers, some of which might be aware of their limited levels of self-control, exhibit a higher propensity than nonsmokers to delegate decision making to professional advisors and fund managers. We document that such precommitments work successfully.

JEL classification: G41; D14, G21; G11

Keywords: self-control; portfolio allocation; individual investor; trading behavior

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1 Introduction

I count him braver who overcomes his desires than him who overcomes his enemies, for the hardest victory is victory over self.

Aristotle.

"I shouldn't …" is the thought that crosses one's mind while on a diet before ordering a heavy chocolate fudge at dinner. "Next time, I'll start earlier …" is said when on an assignment and "I am going to stop tomorrow …" is what a smoker thinks while lighting another cigarette.

Using drugs, smoking cigarettes, or eating unhealthy food are the most prominent examples of habits usually attributed to an incapacity to resist, often referred to as a failure to engage in self-control. Self-control is defined as an individual's ability to break bad habits, to overcome initial impulses (Baumeister (2002)), and to control one's emotions and behavior (Baumeister, Heatherton, and Tice (1994)) while self-control failure results in individuals engaging in suboptimal behaviors (Ariely and Wertenbroch (2002)). Self-control failure, viewed as the major social pathology of present times (Baumeister, Heatherton, and Tice (1994)), appears in light of considerable individual heterogeneity in the ability to resist temptations that is accompanied by helplessness to resist the dictates of one's impulses (Rook (1987)) and it is even more likely to take place in the absence of standards, monitoring or capacities to alter one's behavior (Baumeister (2002)). A higher degree of self-control predicts positive outcomes (Tangney, Baumeister, and Boone (2004)), beneficially affects an individual's ability to resist temptations over the long-term and, therefore, serves as a stable and powerful aspect of one's personality (Mischel, Shoda, and Peake (1988)). In addition to the behavioral life-cycle hypothesis according to which individuals are faced an ongoing conflict between the planner caring about the long run and the doer caring about the current situation, self-control is a necessary resource for financial decision making (e.g., Thaler and

Shefrin (1981); Shefrin and Thaler (1988); Leonard (2008)). Although attributes related to self-control are essential determinants of decision making, we still know surprisingly little about the impact of self-control and the failure thereof on household finance and investor behavior.

While it is relatively easy to observe self-control failure when counting calories or when attempting not to smoke, self-control for an investor is more reflective of a sum of "should not's" encountered in the face of critical financial decision making. A straightforward yet underresearched conjecture to make would be that investors with low self-control are more prone to make investment mistakes: they overspend, resulting in undersaving and overindebtedness (e.g., Benhabib and Bisin (2005); Gathergood (2012); Adams, Bose, and Rustichini (2014)) and forfeit typical wealth accumulation, as shown by Ameriks et al. (2007).

No empirical study outside of an experimental lab study has far investigated whether securities trading decisions can be empirically linked to self-control. This might be due to inherent dificulties to measure self-control without taking the shortcomings of the commonly used personality traits with little empirical support, experimental settings missing time-dimensions or questionnaires distorted by social-desirability bias. We introduce the individual's decision to smoke as an indicator of a lower degree of self-control. Therefore, we infer engagement in smoking from current account transactions of tobacco product purchases, which is made possible due to the tobacco tax law applied in Germany. Cigarettes of the same brand and quantity are required to be assigned the same price across all retail outlets. In addition, prices are set at ten cent increments. Thus, prices are set at 5.50€, 8.40€, or 9.20€, for example, while retail prices are typically set just below the next ten cent mark, leading to prices such as 5.49€, 8.95€ or 9.99€. This allows one to identify smokers relatively clearly

and to then measure the impact of lower levels of self-control on investors' financial and trading decisions from their trading records. We thus use the trading records of clearly identified smokers (N = 5'370) and nonsmokers (N = 14'001) and analyze their trading behavior, portfolio allocation habits and performance for 2012 to 2018. The data on private investors used stem from a German online brokerage and include information on every trade taking place during that period. While the length of the time series and the ability to observe trading behavior and asset allocations are clear advantages of the dataset, one disadvantage remains. Because we focus on participating investors only, our investors have positive savings and hold equity, preventing us from examining participation decisions. A comparison of these data to federal statistics shows that sociodemographic data are comparable to the average German stock market participant.

Whereas smokers are found to trade more, they somewhat surprisingly are better diversified, hold a lower stock share and present no significant preferences for lottery stocks. Does this mean that smoking is hazardous to their health but not as much to their wealth? This answer is no. Smokers being better off in terms of decisions requiring self-control tends to be a direct result of their significantly higher demand for delegation on financial decision making. Smoking strongly and significantly predicts investors taking financial advice and/or maintaining a higher fund share. When we account for these factors and run the same regression for smokers with and without delegation, we find that nondelegating smokers tend to overtrade more, are less diversified and show a lower return.

Our findings show that smokers, as examples of investors with lower self-control, appear to be well aware of their predispositions and are hence more likely to deploy precommitment devices and to delegate their financial decision making to a professional financial advisor or fund manager. While individuals normally prefer to be presented with several options and to

follow more-is-more reasoning, constraining one's own choices and remaining with fewer opportunities might be sensible when an individual benefits from fewer options. This might occur when fewer choices improve one's ability to resist desires by excluding otherwise desirable choices and/or by avoiding exposure to an overload of options. Smokers appear to frequently precommit in several ways, and this habit helps them to overcome the unwanted consequences of limited self-control in their investment decisions and to sometimes even overcompensate for the negative consequences of lacking self-control by delegating decisions.

To strengthen our findings on smokers being characterized by lower self-control and using delegation as precommitment device, we analyze their saving plans and find that investors with low self-control exhibit a significantly higher probability to use saving plans (7.5%) but experience difficulties maintaining them. Furthermore, we check the robustness of our results by examining the consequences of self-control depletion that result when investors attempt to stop smoking and by discussing a comment repeatedly made that smokers are more sociable, which (if they indeed are) might create an endogeneity issue. Our results are robust in both cases. Clearly, trading does not represent an easy means to reach a substitute drug, such as food, as we do not find any particularly interesting differences between those who have quit smoking and regular smokers. In the second case, smokers merely view themselves as more sociable, which is not true relative to the overall population, as research psychology shows. Consequently, from our empirical tests, we do not find that smokers use financial advising for socializing or adhere more closely to the advice given.

2 Data

2.1 Investor data

We collaborated with an online brokerage bank that offers brokerage accounts in combination with current accounts and debit and credit cards. Of their several hundreds of thousands of customers, we received data on a randomly chosen subset of 113,000 investors. For these investors, we received data on time-stamped security transactions, monthly portfolio holdings, time-stamped current account bookings with the value of transactions, and transaction types (wire and point-of-sale-transactions (debit and credit cards) and ATM withdrawals). We were also granted access to a file listing sociodemographic information for the investors, a file that describes the securities they hold in terms of security types and asset classes and a third file outlining whether a client has received financial advice and how often clients and advisors have interacted.

For this study, we only use clients who make at least two ATM withdrawals or point-of-sale transactions per year, which leaves us with 19,371 investors. These investors can be described as follows: The average investor included in our sample is 49 years old, has an annual income of 50,483 Euros, and holds a portfolio of 48,187 Euros. The average investor is married (52%) and male (87%). Most investors work as employees (52%), whereas 9% are retired and 19% are self-employed.

[Insert Table I about here]

These descriptive statistics are closely comparable to those reported in household finance studies based on US data (cp. Odean (1998); Barber and Odean (2001)). Brokerage clients are generally expected (Cole, Paulson, and Shastry (2014)) and found to be more sophisticated than the overall population (Dorn and Huberman (2005)). Therefore, it is not surprising that

5% of our investors hold a doctoral degree. This value is higher than that of the German population (1.1%, German Federal Bureau of Statistics (2011)).

Investor panel data sets based on administrative data are usually subject to the concern that they in fact only observe play money accounts. To address this concern, we compare average portfolio values to official statistics. Deutsche Bundesbank (2013) reports the average portfolio value of a German stock market investor as roughly 48,000 Euros. This value seems comparable to the average values observed in our sample. Additionally, we compare portfolio holdings to self-reported gross annual household incomes for investors reporting these data. Since income is reported within several ranges, we use the midpoint of each range as a proxy for investor income. The mean ratio of the average portfolio value (for the entire sample period) to annual income is close to 1.0. For a comparison, the ratio of total financial assets to gross household income for the German population is roughly 1.1 (German Federal Bureau of Statistics (2008a); German Federal Bureau of Statistics (2008b); Deutsche Bundesbank (2013)).

2.2 Identification of Smokers

Although attributes related to self-control are essential determinants of decision making, we still know surprisingly little about the impact of self-control and its failure from field data due to inherent difficulties to measure self-control in a clean and reliable way. Commonly used measures for self-control like the big five personality traits or directly asking in questionnaires are known to have limited empirical support (e.g., Block (1995)) or strongly suffer from social-desirable bias when asked for behavior indicative of lacking self-control. We propose to measure self-control and lacking self-control using revealed preference of people. Therefore, we make use of the unique features of tobacco product pricing in Germany. Tobacco products trade at prices set at increments of ten cents, i.e., 6.40€, 7.50€,

etc., whereas prices are usually set to x Euros and 95 or 99 cents to signal lower values in retail sales to customers (Holdershaw, Gendall, and Garland (1997); Sonnemans (2006)). Additionally, according to the German "Tobacco tax law", prices of tobacco products must be set by producers for single boxes of cigarettes and must be the same across all retailing outlets in Germany. Both of these features set these products apart from other retail products and allow us to identify smokers. We use an item list of all tobacco products sold at a large supermarket chain including price histories from January 2016. As cigarettes are the top selling tobacco product, we exclude all other products, such as cigars, cigarillos, fine cuts and accessories, and use the remaining 935 products of 45 brands for our analysis.

We use the current credit and debit card transactions of a German discount brokerage including information on every transaction made during the period and we identify smokers when account transaction prices correspond with a multiple of one cigarette box. We collected a total of 8 million credit and debit card transactions made by 19,371 investors after excluding all investors from our sample of over 100,000 clients who do not make at least two ATM withdrawals or point-of-sale transactions per year. An investor is defined as a smoker when he/she makes more than two purchases per year that can be linked to a multiple of the price of a cigarette box over the observation period of January 2016 to June 2018. The total value of a purchase must be less than 100 Euros. This procedure may still identify investors as smokers by chance for those making two or more purchases each year at the price of a multiple of a cigarette box. If this is true, the results that we report may underestimate the effects of being a smoker due to including nonsmokers in our smoker sample. We report the number of purchases identified as tobacco purchases per year in figures I and II and indeed find a large number of purchases of less than twelve, which might reflect periodic dues. With our initial approach, we find 5,370 people to be smokers. This means that the share of smokers is 27.7%. This value is comparable to a value reported by the OECD, which reports

a smoker share of slightly above 20% for Germany (Statista (2018)). However, the OECD refers to smokers as those who smoke daily. Therefore, in further analyses, we also investigate heavy smokers and find our results to become stronger when we restrict our sample to investors purchasing cigarettes more than 21 times over the sample period. Note that after applying additional restrictions, we draw the same conclusions. This finding also shows that potentially incorrectly identified smokers would underestimate our results while reducing the risk of discriminating against smokers who pay less frequently with their credit or debit cards.

[Insert II about here]

2.3 Measurement of investment mistakes and portfolio performance

To measure whether and how self-control affects investor behavior, we consider measures of trading behavior, asset allocation and investor portfolio performance.

To quantify trading behavior, we measure four variables. First, we identify whether an investor has traded in a given month. This variable, *trade month*, is equal to 1 when an investor makes one trade in a given month. The second variable, *trade size*, measures the absolute size of trades made in a given month conditional on an investor trading. We use the absolute value of trade to treat purchases and sales equally. We follow Barber and Odean (2001) for the third proxy of *portfolio turnover* and compute it for investor *i* for month *t*:

$$Portfolio\ turnover_{i,t} = 0.5 * \frac{purchases_{i,t}}{portfolio\ value_{i,t}} + 0.5 * \frac{sales_{i,t}}{portfolio\ value_{i,t-1}} \quad (1)$$

When monthly portfolio turnovers are larger than 1, the turnover is set to 1 (= 100%) for that specific month. As the fourth trading measure we also compute the disposition effect as the difference between the proportion of realized gains and the proportion of realized losses

following procedures described by Odean (1998). We use trading executed in all twelve months of the year to compute the disposition effect. Note that the results remain qualitatively unaltered when exclusively examining the period running from January to November.

With respect to the asset allocation decisions of investors we also consider established measures. These measures are the *HHI* (Herfindahl-Hirschmann index) as a measure of diversification, the *fund share*, the single *stock share* and the share of lottery stocks (*lottery stock share)*. The HHI is a measure of portfolio concentration.[4] It is calculated as the sum of squared portfolio weights of each asset (identified by its ISIN) of a portfolio at each month end. Following Dorn, Huberman, and Sengmueller (2008), mutual funds are counted as 100 different securities. The lower the value of this measure, the higher the degree of diversification. The *fund share* is the value held in mutual funds relative to the total portfolio value at the end of each month, and the *stock share* is the value of single stocks (national and international) relative to the total portfolio value. Finally, we use the *lottery share* to proxy for the potential gambling motives of private investors. To compute the lottery share, we follow Kumar (2009) and define as lottery stocks, those stocks with higher than median idiosyncratic volatility, higher than median skewness, and lower than median prices even when these stocks have lower mean returns.

The bottom line of investment success is measured by portfolio performance. We follow Bhattacharya et al. (2012) and compute daily portfolio performance. We average this portfolio performance for the 2012 to 2018 observation period and compute average Sharpe Ratios (returns divided by volatility) to account for potentially different levels of risk-taking engaged in the investor groups in our sample.

[4] The HHI is a measure of diversification widely used in the finance literature (Ivković, Poterba, and Weisbenner (2005); Dorn, Huberman, and Sengmueller (2008); Ivković, Sialm, and Weisbenner (2008)).

3 Empirical analysis and discussion

3.1 Self-control and individual investment decisions

We start this section with a brief discussion of the anatomy of a smoker as the individual representing an investor with self-control issues in our sample. In a linear probability model, we find that smokers identified in our sample are younger, wealthier, and more likely to be male, married and more risk-averse. With respect to occupation, smokers are typically employees or retired. We do not find holding a doctoral degree to affect the propensity to smoke. The r-squared of 10% is relatively high for studies of household finance.

[Insert III about here]

To test differences in trading behavior, asset allocation and portfolio performance among investors with (smokers) and without (nonsmokers) self-control issues, we run the following cross-sectional or pooled cross-sectional regressions defined as follows:

$$TM_{i,t} = \alpha + \beta_1 SMOKER\ dummy_i + \beta_2 C_{i,t} + \varepsilon_{i,t}\ . \quad (2)$$

TM represents the measures of trading behavior, asset allocation or portfolio performance. $SMOKER\ dummy$ is our measure of smoking set to 1 when we identify an investor as a smoker. C is a vector of the control variables. As control variables we include gender, age, risk class, ln of the portfolio value, length of the relationship between a bank and client, and a dummy equal to one for investors with doctoral degrees, who are employees, who are self-employed and who are retired investors. For the pooled cross-sections, we also include year-fixed effects. The effect we are interested in is β_1.

Our results are robust to using different methods of clustered standard errors at the level of individual investors in case we have repeated observations for each person to account for heteroscedasticity and autocorrelation in the residuals. An alternative approach would involve

clustering at the zip code level to reflect regional commonalities between the portfolios of investors due to a local bias (Ivković, Poterba, and Weisbenner (2005)) or the word-of-mouth effect (Hong, Kubik, and Stein (2004)). Using zip code clusters does not qualitatively affect the significance reported. As they all yield qualitatively unaltered results, we only use heteroscedasticity robust standard errors.

We start by discussing our results on the trading behaviors of investors with and without self-control issues (table IV). Column 1 shows the regression for the variable *trade month*, which is equal to one when an investor makes a trade in a given month. Independent of the specification used, this result is consistent with the theory that investors with lower self-control are prone to trading more.

[Insert IV about here]

To determine whether smokers trade more but with less volume, we run the same regression for the proxy *trade size* (column 2). Contrary to our expectations, smokers are not only more likely to trade but also trade in larger volumes once we control for portfolio size.

Against the backdrop of the previous results, we also find that lacking self-control is positively related to portfolio turnover (column 3). Indeed, the turnover of smokers is roughly 0.55% per month (6.6% p.a.) higher than it is for nonsmokers. Note that magnitudes for smokers and male investors are roughly the same. This indicates that both self-control proxied by smoking and overconfidence proxied by being male have roughly the same impact on trading volume. Baumeister, Heatherton, and Tice (1994) find that anxious individuals tend to prefer speed over accuracy, as they make relatively more decisions with poorer results rather than making the right decision the first time, implying the hope that more exerting effort should improve overall performance. Regarding this finding from psychology and

based intuition, a lack of self-control appears to increase the trading volumes of private investors.

This picture, however, changes when we look at the disposition effect and measures of asset allocation (table V). People who lack self-control do not tend to realize gains more quickly than losses (column 1), hold portfolios that are better diversified when considering the HHI as a measure of portfolio diversification (column 2), or hold portfolios with a larger fund share (column 3).

[Insert Table V about here]

Note that using an alternative HHI that treats funds as just one asset does not alter our results qualitatively (column 4). In addition, smokers exhibit a lower single stock share (column 5).

Furthermore, smokers earn higher average returns (table VI, column 1 and 2) and Sharpe ratios (table VI, columns 3 and 4) and are less likely to buy lottery stocks (table V, column 6). We do not find an increase in volatility for smokers.

[Insert Table VI about here]

These results indicate that in contrast to expectations, investors with lower self-control appear to be impatient, as they trade more frequently, but appear to be better investors when taking all evidence together[5].

This unexpected finding is understandable when considering the fact that investors with a lack of self-control tend to delegate their financial decisions to a professional financial

[5] Related literature shows that smokers are generally viewed as exhibiting low self-control which comes with higher discount factors (Bickel et al. (2007)) relative to nonsmokers. While Harrison, Lau, and Rutström (2010) and Harrison et al. (2018) also find significantly higher discount rates for smokers relative to nonsmokers, Harrison et al. (2018) do not find additional evidence for smokers being less risk-averse than nonsmokers in a field experiment.

advisor. In table VII, we indeed find smokers to be significantly more likely to use advisory services offered by the bank.

[Insert Table VII about here]

3.2 Delegation as a precommitment device

To isolate the impact of delegation decisions, we run a specification in which we interact the smoker dummy[6] with a delegator dummy of equal to one when an investor either employs a financial advisor or has a mutual fund share of above 50%. In this specification β_1 measures the behaviors of smokers without precommitment and β_2 denotes the difference and its significance for this behavior. Accordingly, when individuals precommit and this turns out to be successful, we expect the coefficient of β_2 to have the opposite sign of β_1 and to be statistically significant.

$$TM_{i,t} = \alpha + \beta_1 SMOKER\ dummy_i + \beta_2 SMOKER\ dummy_i * Delegator_i + \beta_3 C_{i,t} + \varepsilon_{i,t}\ . \qquad (2)$$

These regressions show that nondelegating investors with a lack of self-control tend to trade more (table VIII, column 1), to trade in higher volumes (column 2) and to end up presenting a significantly higher level of turnover (column 3). Relative to the results that do not account for the interaction, the effects for nondelegating smokers become stronger and support the hypothesis that investors with a lack in self-control are more impatient and impulsive (Mitchell (1999)). The monthly turnover for a nondelegating smoker is 1.09% (13.08% per year) higher than that for a nonsmoker and therefore nearly double the previous size. The

[6] Note that we identify smokers as those making two or more purchases per year that can be linked to the price of cigarette boxes or to its multiple and thus, we may identify investors as smokers, running the risk of identifying nonsmoking investors as smokers. In contrast to the logic applied to our analyses to this point, falsely classifying a nonsmoker as a smoker would overestimate our results on delegation. We therefore analyzed the sample of delegating smokers and found them to show a higher number of tobacco-related transactions than the entire sample of smokers. This mitigates this concern to the greatest extent. Furthermore, running the same regressions for investors purchasing cigarettes more than 21 times over the sample period does not qualitatively alter our results.

value is clearly also higher than it is for delegating smokers. These findings offer further support for the speed over accuracy hypothesis from the research in psychology.

[Insert Table VIII about here]

We no longer find a significant effect for the proportion of realized gains and losses for nondelegating smokers (table IX, column 1). However, the HHI as our measure of portfolio diversification indicates that nondelegating smokers hold less diversified portfolios (columns 2 and 3). The same observation holds for portfolio performance (table X, columns 1 and 2). Nondelegating smokers also maintain a significantly lower net Sharpe ratio (columns 3 and 4).

[Insert Table IX and X about here]

These findings support the expectation that investors with a lack of self-control who do not deploy precommitment devices are prone to make investment mistakes and to hold portfolios with lower performance. Their tendency to act impatiently and impulsively also affects their trading behavior. Thus, our findings support the notion of smokers being characterized by lower net worth than nonsmokers (Zagorsky (2007)) only with regard to nondelegating investors and not for smokers in general. The significantly negative effect of lower self-control on performance-related figures is in line with Lo, Repin, and Steenbarger (2005) who show that attributes related to self-control are important determinants of success in trading[7]. Our findings indicate that untreated self-control issues lead to a significantly lower propensity

[7] Fenton-O'Creevy et al. (2011) report correlations for professional traders' financial success and for the effectiveness of their emotional regulation strategies while controlling for different experiences and performance levels from qualitative interviews.

to gamble [8] (table IX, column 4), an increase in volatility and a generally higher level of risk-aversion.

These results are in line with the findings of Strömbäck et al. (2017), who find that investors who lack self-control may become aware of their respective predisposition and are anxious about self-control failures affecting their financial wealth. The realized failure creates a sorry state and the investor experiences a loss of self-esteem, which may cause a decline in self-control strength and thus increase the probability of future self-control failure (Baumeister, Heatherton, and Tice (1994)). After repeated failure, it is common for individuals is to give up and withdraw effort, as the future probability of failing is subjectively perceived to be higher. In contrast, Roth and Bootzin (1974) show that individuals faced with a situation in which they have failed are even more likely to attempt to achieve control as a direct result of their strong desire to protect their battered self-esteem from further injury.

When investors with low self-control anticipate that a self-control failure may harm their financial wealth, they make use of professional financial advisory and/or higher fund shares as a precommitment devices to address their self-control issues with financial decision making. From a desire to make healthy decisions or to avoid dissonance, individuals commonly use self-imposing and costly deadlines or externally imposed deadlines to control impulses by precommitting their choices to improve their task performance (Ainslie (1987); Ariely and Wertenbroch (2002)). Such commitment devices are defined as individual arrangements seeking to realize future plans or to ensure future behavior that is otherwise

[8] Higher levels of risk aversion in financial decision making and the finding of investors with self-control issues being more heavily invested in gambling assets might appear to contradict smokers' generally lower levels of risk aversion reported in the literature (e.g., Barsky et al. (1997); Adams, Bose, and Rustichini (2014)) on first sight. While they realize the risks that come with smoking even when they rate the risk as lower for themselves than for others (Arnett (2000)), the decision to continue to smoke indicates their preference for gambling. However, smokers aware of their predisposition to fail in self-control tasks appear to be anxious about their potential failure in other domains such as financial decision making, which comes with a higher degree of risk aversion.

difficult to carry out due to intrapersonal shortcomings such as a lack of self-control (Bryan, Karlan, and Nelson (2010))[9]. Fishbach and Trope (2005) find that externally imposed control and self-control serve as substitutes for engagement in activities with long-term benefits and short-term costs using an experimental approach.

The willingness to use precommitment devices in a financial context when correctly anticipating future self-control issues comes as no surprise. The current literature provides evidence showing that individuals commonly use illiquid accounts to avoid the temptation to spend money that they have planned to save (e.g., Beshears et al. (2011)), and Laibson et al. (1998) and Thaler and Benartzi (2004) show that individual investors use commitment devices for retirement savings and are aware of their self-control limitations. When the underlying reasoning for this decision is rooted in a desire to precommit to overcome the realized self-control issue, the delegation decision should come with other means of precommitting in a financial context (e.g., for saving purposes). To test this hypothesis, we analyze whether smokers exhibit a greater willingness to use saving plans.

Each transaction is flagged in terms of whether a purchase was made as part of a savings plan. We classify an investor as a savings plan user when he or she makes one or more saving plan purchase after the 1st of January 2012. We additionally measure the number of months during which an investor contributes to a savings plan and the average monthly contribution made by saving plan users. We find that smokers show a 7.5% higher likelihood of using saving plans (table XI, column 1) with a higher monthly saving rate (column 3) than

[9] Amador, Werning, and Angeletos (2006) use a theoretical framework to identify the optimal balance between commitment and flexibility in a consumption-savings model when full commitment and thus the elimination of all options is not necessarily optimal. Although it is unlikely that smoking is a good idea for the future self, it is still imaginable that preferences, variables or external shocks change the valuation of future actions (e.g., for savings or investments) and that the individual needs the flexibility to change their commitments afterwards.

nonsmokers. While this savings amount is not significant, smokers show adhere (contribute) to a savings plan over significantly fewer months (column 2).

[Insert Table XI about here]

This indicates that smokers are aware of their shortcomings but fail to adhere to their precommitments when given the opportunity to opt out of them[10]. Nevertheless, their higher tendency to use saving plans seems to drive the overall higher fund share found for smokers than for nonsmokers. This line of reasoning is consistent with the findings of Beshears et al. (2011) who show that individuals with lower self-control select (potentially costly) illiquid and highly restrictive saving accounts. Following this premise, investors with low self-control are willing to use commitment devices to overcome or rather substitute their self-control issues, but they experience a hurdle in terms of adhering to them. However, the higher probability of joining a savings plan and the marginally higher contributions made may have positive effects for the group of smokers in absolute terms and relative to nonsmokers.

Our findings illustrate the significant impact of self-control on individual decision making in finance. Smokers, as examples of investors with lower self-control, seem to be well aware of their predispositions and are hence more likely to deploy precommitment devices and thus to delegate their financial decision making to a professional financial advisor or fund manager. Smokers appear to frequently precommit in several ways and this habit helps them overcome unwanted consequences of exerting limited self-control over their investment decisions and to sometimes overcompensate for the negative consequences of their lack of self-control by delegating decisions. These precommitments need to be binding, as they exhibit shortcomings in adhering to their plans.

[10] Romal and Kaplan (1995) find from questionnaires that individuals with more self-control are characterized by higher savings and lower spending. Our findings might provide further evidence for this hypothesis when investors are not given an opportunity to pre-commit.

3.3 Does quitting smoking remove the positive impact of smoking on portfolio allocation and performance?

Some smokers who are aware of the health risks of smoking and/or concerned about mounting stigma from society decide to quit smoking. Laibson (2001) shows with a rational choice model that even the physiological presence of cigarettes influences preferences to smoke and concludes that smokers may benefit from actively avoiding such pitfalls. Consequently, smokers are willing to use valuable resources to commit. For example, they tend to regulate their consumption by purchasing smaller packs of cigarettes even when the price per cigarette is relatively higher (Wertenbroch (1998)). Furthermore, Giné, Karlan, and Zinman (2010) show that smokers are willing to use costly contracts as a precommitment device and to make monthly deposits into a savings account that returns the money after six months when they successfully quit and that donates the money accumulated in the savings account to a charity if they fail[11].

As we identify engagement in smoking as an indication of low self-control, self-control is required for a smoker to quit smoking. A widely discussed topic in psychological research on self-control is that of self-control depletion where self-control is viewed as a limited resource that resembles a muscle. Muraven and Baumeister (2000) find that individuals show a reduced level of self-control strength and a higher probability of failing to engage in self-control after completing a task requiring self-control. Their physical performance declines, they are more likely to fail in controlling their emotions, and they are less motivated to resist temptations (Muraven, Tice, and Baumeister (1998)). Shmueli and Prochaska (2009) analyze the effect of low self-control on the probability of smoking and find that smokers are more

[11] Commitment saving products are popular and successful tools used to manage self-control issues as shown by Ashraf, Karlan, and Yin (2006). The authors offered a commitment product with individually determined and then unchangeable restrictions to 710 randomly chosen clients, of which 28.4% finally subscribed to the product. Clients given this treatment achieved an 81% higher average savings balance after twelve months compared to the control group.

likely to smoke after they resist eating sweets, which supports the self-control depletion theory. Smokers who wish to quit smoking are often recommended to turn to substitute drugs such as physical activity to bolster self-control capacity (Hagger et al. (2009)). For example, Daniel, Cropley, and Fife-Schaw (2006) analyze the effect of moderate-intensity exercise on the desire to smoke in acutely abstinent smokers and show that brief periods of exercise rapidly reduce the desire to smoke and that this is not caused by the distracting effects of exercise or by the effect of mood. Faced with this theory, there is reason to assume that smokers tend to fail in completing unrelated tasks requiring self-control after abstaining from smoking and may use trading as a substitute drug.

To address this conjecture in relation to our context, we identify smokers who are trying to quit as those smokers who continue use debit and credit cards to purchase point-of-sale goods but who stop purchasing boxes of cigarettes. A person who has quit smoking is defined as an individual making purchases at a point of sale in any year of our sample period but who purchases his or her last box of cigarettes in 2017 or 2016. This procedure allows us to create a time series of quitters that is long enough support a sensible analysis. We find that 506 of the investors examined have quit smoking, representing 10% of the smokers included in our sample.

We then run regressions on becoming a person who has quit smoking and on the propensity to use financial advice when later becoming someone who has quit smoking. Both regressions are not free of look-ahead bias. However, because we can only use cross-sectional specifications, we are presented with few opportunities to overcome this caveat. Nevertheless, the regressions show that it is extremely difficult to predict the likelihood of quitting, as none of our predictors is significant with a very small r-squared value. We find relatively weak evidence for an individual who has quit smoking being more likely to

delegate. This is consistent with the idea that smokers who are aware of their self-control issues and they consequences are both more willing to use precommitment devices measured by taking advice and as ultimately trying to quit smoking in the first place.

To analyze whether self-control depletion affects financial decision making, we run difference-in-difference tests according to formula (3). The variable $stopped_{i,t}$ takes a value of one for the month after a smoker has stopped smoking. C is again our vector of control variables.

$$TM_{i,t} = \alpha + \beta_1 SMOKER\ dummy_i + \beta_2 SMOKER\ dummy_i * stopped_{i,t} + \beta_3 C_{i,t} + \varepsilon_{i,t}\ . \qquad (3)$$

We report the results in table XII and begin by examining the trading behavior of private investors (table XI, columns 1 and 2). Investors who have stopped smoking present a lower degree of turnover and trade less frequently than investors who continue to smoke. We also find no effect on the disposition effect for smokers (column 3).

[Insert Table XI about here]

In all, we find a slightly significant effect (disposition effect) and a significantly negative effect (trading activity) of resisting temptation on our trading measures. Therefore, our results are stronger than those of O'Connell, Schwartz, and Shiffman (2008), who find little support for the resource depletion model for quitting smokers. Additionally, regarding asset allocation (diversification and fund share) or portfolio performance we find hardly any effects of relevant economic magnitude or statistical significance[12].

This phenomenon may be attributable to occurring costs such as participation and information costs (Alan (2006); Vissing-Jorgensen (2002); Vissing-Jorgensen (2003)). These

[12] If quitting smokers use trading as substitute drug, the usage should be highest directly after quitting when they are commonly known as most depleted. Note that we still do not find effects when running the same regressions as above and focus on the first or second month following their last tobacco product purchase.

costs are not decreased by quitting smoking and while sourcing requires even more self-control (which is depleted), other temptations, such as chocolate fudge, may be comparatively easy to access. Such temptations may be used as substitute drugs for smoking while smokers try to quit. Trading according to our results is rather avoided the same way in which smoking is avoided.

3.4 Do smokers delegate because they are more sociable and prefer to socialize rather than trying to precommit?

Most of the smokers who we spoke to made an interesting point in arguing that smokers may be more prone to delegate their financial decisions to a professional advisor not only to deal with their self-control issues but also as a result of their higher levels of sociability.

Smokers rate smoking as a generally sociable activity (Huijding and Jong (2006)) and therefore commonly view themselves as being more sociable (Moran, Wechsler, and Rigotti (2004)). However, Vries and Kok (1986) show that smokers only perceive themselves to be more sociable, while according to nonsmokers, there is no effect that contributes to social conflicts between smokers and nonsmokers regarding social representations of smoking (Echabe, Guede, and Castro (1994)). The belief that smoking peers are more sociable is a predictor of engagement in smoking behavior (van den Eijnden, Spijkerman, and Engels (2006)). Equally important determinants are having smoking parents or friends (Tyas and Pederson (1998)) and exposure to social pressure (Stacy et al. (1992)). However, there is no evidence of smokers being more sociable or of individuals becoming more sociable when they decide to smoke. Thus, psychological research does not support the conjecture that delegation is caused by smokers being more sociable.

However, to analyze whether demand for financial advice emerges as part of a realized self-control issue and not only as a result of smokers being more sociable and communicative, we

investigate the number of contact points. We also find no evidence for smokers using financial advising for socializing. Furthermore, adherence to advisor recommendations is not statistically significant.

[Insert Table XIII about here]

4 Conclusion

Even among wise men and women, there is no doubt that self-control is of great importance and that self-control failure affects human well-being in different ways. Nevertheless, little was known about the impact of self-control on portfolio allocation, trading patterns and portfolio performance as self-control has been a difficult-to-measure determinant in empirical settings. Faced by the shortcomings of commonly used personality traits (little empirical support), experimental settings (no time-dimension) or questionnaires (social-desirability bias), we clearly identify self-control issues in our empirical data set by analyzing purchases for tobacco products to determine smokers. This approach allows us to find smokers being prone to trade more, exhibit investment biases and achieve lower returns. Furthermore, we find that smokers might be aware of their predispositions and deal with them by delegating their financial decisions to fund managers or professional advisors.

We opened with a quote from Aristotle and we can't help but concluding with Homer's Ulysses pact to overcome future self-control failures through pre-commitment devices. Ulysses who wished to hear the sirens sing instructed his men to tie him to a ship's mast to hear them without risking jumping into the sea and dying. The same holds for individual investors who realize that they are faced with self-control issues in making financial decisions. Rather than acting on their own, they tie themselves closely to a professional advisor or fund manager and therefore participate in financial markets without taking the risk of jumping into a wild sea of investment mistakes.

References

Adams, Scott, Niloy Bose, and Aldo Rustichini, 2014, How Different are Smokers? An analysis based on personal finances, *Journal of Economic Behavior & Organization* 107, 40–50.

Ainslie, George, 1987, Self-Reported Tactics of Impulse Control, *International Journal of the Addictions* 22, 167–179.

Alan, Sule, 2006, Entry costs and stock market participation over the life cycle 9, 588–611.

Amador, Manuel, Ivan Werning, and George-Marios Angeletos, 2006, Commitment vs. Flexibility, *Econometrica* 74, 365–396.

Ameriks, John, Andrew Caplin, John Leahy, and Tom Tyler, 2007, Measuring Self-Control Problems, *American Economic Review* 97, 966–972.

Ariely, Dan, and Klaus Wertenbroch, 2002, Procrastination, Deadlines, and Performance: Self-Control by Precommitment, *Psychological Science* 13, 219–224.

Arnett, Jeffrey J., 2000, Optimistic bias in adolescent and adult smokers and nonsmokers, *Addictive Behaviors* 25, 625–632.

Ashraf, Nava, Dean. Karlan, and Wesley Yin, 2006, Tying Odysseus to the Mast: Evidence From a Commitment Savings Product in the Philippines, *The Quarterly Journal of Economics* 121, 635–672.

Barber, Brad M., and Terrance Odean, 2001, Boys will be boys: Gender, Overconfidence, and common stock investment, *The Quarterly Journal of Economics* 116, 261–292.

Barsky, Robert B., Thomas F. Juster, Miles S. Kumball, and Mathhew D. Shapiro, 1997, Preference parameters and behavioral heterogeneity: an experimental approach in the health and retirment study, *The Quarterly Journal of Economics* 112, 537–579.

Baumeister, Roy F., 2002, Yielding to Temptation: Self-Control Failure, Impulsive Purchasing, and Consumer Behavior, *Journal of Consumer Research* 28, 670–676.

Baumeister, Roy F., Todd F. Heatherton, and Dianne M. Tice, 1994, *Losing Control*. *How and Why People Fail at Self-Reguation* (Academic Press, San Diego, California).

Benhabib, Jess, and Alberto Bisin, 2005, Modeling internal commitment mechanisms and self-control: A neuroeconomics approach to consumption–saving decisions, *Games and Economic Behavior* 52, 460–492.

Beshears, John, James J. Choi, Christopher Harris, David Laibson, Brigitte C. Madrian, and Jung Sakong, 2011, Self Control and Liquidity: How to Design a Commitment Contract.

Bhattacharya, Utpal, Andreas Hackethal, Kaesler Simon, Benjamin Loos, and Steffen Meyer, 2012, Is unbiased financial advice to retail investors sufficient? Answers from a large field study, *The Review of Financial Studies* 25, 975–1032.

Bickel, Warren K., Michelle L. Miller, Richard Yi, Benjamin P. Kowal, Diana M. Lindquist, and Jeffery A. Pitcock, 2007, Behavioral and neuroeconomics of drug addiction: competing neural systems and temporal discounting processes, *Drug and Alcohol Dependence* 90, 85-91.

Block, Jack, 1995, A contrarian view of the five-factor approach to personality description, *Psychological Bulletin* 117, 187.

Bryan, Gharad, Dean Karlan, and Scott Nelson, 2010, Commitment Devices, *Annual Review of Economics* 2, 671–698.

Cole, Shwan, Anna Paulson, and Gauri Shastry, 2014, Smart money? The effect of education on financial behavior, *The Review of Financial Studies* 27, 2022–2051.

Daniel, James Z., Mark Cropley, and Chris Fife-Schaw, 2006, The effect of exercise in reducing desire to smoke and cigarette withdrawal symptoms is not caused by distraction, *Addiction* 101, 1187–1192.

Deutsche Bundesbank, 2013, *Statistik über Wertpapierinvestments*. https://www.bundesbank.de/de/statistiken/geld--und-kapitalmaerkte/wertpapierbestaende/statistik-ueber-wertpapierinvestments-650748.

Dorn, Daniel, and G. U.R. Huberman, 2005, Talk and action: What individual investors say and what they do, *Review of Finance* 9, 437–481.

Dorn, Daniel, G. U.R. Huberman, and Paul Sengmueller, 2008, Correlated Trading and Returns, *The Journal of Finance* 63, 885–920.

Echabe, Augustin E., Emilia F. Guede, and J. L. G. Castro, 1994, Social representations and intergroup conflicts: Who's smoking here?, *European Journal of Social Psychology* 24, 339–355.

Fenton-O'Creevy, Mark, Emma Soane, Nigel Nicholson, and Paul Willman, 2011, Thinking, feeling and deciding: The influence of emotions on the decision making and performance of traders, *Journal of Organizational Behavior* 32, 1044–1061.

Fishbach, Ayelet, and Yaacov Trope, 2005, The substitutability of external control and self-control, *Journal of Experimental Social Psychology* 41, 256–270.

Gathergood, John, 2012, Self-Control, Financial Literacy and Consumer Over-Indebtedness, *Journal of Economic Psychology* 33, 590–602.

German Federal Bureau of Statistics, 2008a, *Einkommens- und Verbrauchsstichprobe 2008. (Einkommen, Einnahmen & Ausgaben)*. https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/EinkommenKonsumLebensbedingungen/EinkommenEinnahmenAusgaben/Tabellen/Deutschland.html.

German Federal Bureau of Statistics, 2008b, *Einkommens- und Verbrauchsstichprobe 2008. (Vermoegen, Schulden)*. https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/EinkommenKonsumLebensbedingungen/VermoegenSchulden/Tabellen/Bruttogeldvermoegen EVS.html.

German Federal Bureau of Statistics, 2011, *Bildungsstand*. https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/BildungForschungKultur/Bildungsstand/Tabellen/Bildungsabschluss.html.

Giné, Xavier, Dean Karlan, and Jonathan Zinman, 2010, Put Your Money Where Your Butt Is: A Commitment Contract for Smoking Cessation, *American Economic Journal: Applied Economics* 2, 213–235.

Hagger, Martin S., Chantelle Wood, Chris Stiff, and Nikos L.D. Chatzisarantis, 2009, The strength model of self-regulation failure and health-related behaviour, *Health Psychology Review* 3, 208–238.

Harrison, Glenn W., Andre Hofmeyr, Don Ross, and J. T. Swarthout, 2018, Risk Preferences, Time Preferences, and Smoking Behavior, *Southern Economic Journal* 85, 313–348.

Harrison, Glenn W., Morten I. Lau, and Elisabet E. Rutström, 2010, Individual discount rates and smoking: Evidence from a field experiment in Denmark, *Journal of Health Economics* 29, 708–717.

Holdershaw, Judith, Philip Gendall, and Ron Garland, 1997, The Widespread Use of Odd Pricing in the Retail Sector, *Marketing Bulletin-Department Of Marketing Massey University* 8, 53–58.

Hong, Harrison, Jeffrey D. Kubik, and Jeremy C. Stein, 2004, Social interaction and stock-market participation, *The Journal of Finance* 59, 137–163.

Huijding, Jorg, and Peter J. de Jong, 2006, Automatic associations with the sensory aspects of smoking: positive in habitual smokers but negative in non-smokers, *Addictive Behaviors* 31, 182–186.

Ivković, Zoran, James Poterba, and Scott Weisbenner, 2005, Tax-Motivated Trading by Individual Investors, *The American Economic Review* 95, 1605–1630.

Ivković, Zoran, Clemens Sialm, and Scott Weisbenner, 2008, Portfolio Concentration and the Performance of Individual Investors, *The Journal of Financial and Quantitative Analysis* 43, 613–655.

Kumar, Alok, 2009, Who Gambles In The Stock Market?, *The Journal of Finance* 64, 1889–1933.

Laibson, David, 2001, A cue-theory of consumption, *The Quarterly Journal of Economics* 116, 81–119.

Laibson, David I., Andrea Repetto, Jeremy Tobacman, Robert E. Hall, William G. Gale, and George A. Akerlof, 1998, Self-Control and Saving for Retirement, *Brookings Papers on Economic Activity*, 91–196.

Leonard, Thomas C., 2008, Richard H. Thaler, Cass R. Sunstein, Nudge: Improving decisions about health, wealth, and happiness, *Constitutional Political Economy* 19, 356–360.

Lo, Andrew W., Dimitri V. Repin, and Brett N. Steenbarger, 2005, Fear and Greed in Financial Markets: A Clinical Study of Day-Traders, *American Economic Review* 95, 352–359.

Mischel, Walter, Yuichi Shoda, and Philip K. Peake, 1988, The nature of adolescent competencies predicted by preschool delay of gratification, *Journal of Personality and Social Psychology* 54, 687–696.

Mitchell, Suzanne H., 1999, Measures of impulsivity in cigarette smokers and non-smokers, *Psychopharmacology* 146, 455–464.

Moran, Susan, Henry Wechsler, and Nancy A. Rigotti, 2004, Social smoking among US college students, *Pediatrics* 114, 1028–1034.

Muraven, Mark, and Roy F. Baumeister, 2000, Self-regulation and depletion of limited resources: Does self-control resemble a muscle?, *Psychological Bulletin* 126, 247–259.

Muraven, Mark, Dianne M. Tice, and Roy F. Baumeister, 1998, Self-control as a limited resource: Regulatory depletion patterns, *Journal of Personality and Social Psychology* 74, 774–789.

O'Connell, Kathleen A., Joseph E. Schwartz, and Saul Shiffman, 2008, Do resisted temptations during smoking cessation deplete or augment self-control resources?, *Psychology of Addictive Behaviors* 22, 486.

Odean, Terrance, 1998, Are investors reluctant to realize their losses?, *The Journal of Finance* 53, 1775–1798.

Romal, Jane B., and Barbara J. Kaplan, 1995, Difference in self-control among spenders and savers, *Psychology: A Journal of Human Behavior*.

Rook, Dennis W., 1987, The buying impulse, *Journal of Consumer Research* 14, 189–199.

Roth, Susan, and Richard R. Bootzin, 1974, Effects of experimentally induced expectancies of external control: an investigation of learned helpnlessness, *Journal of Personality and Social Psychology* 29, 253–264.

Shefrin, Hersh M., and Richard H. Thaler, 1988, The behavioral life-cycle hypothesis, *Economic Inquiry* 26, 609–634.

Shmueli, Dikla, and Judith J. Prochaska, 2009, Resisting tempting foods and smoking behavior: Implications from a self-control theory perspective, *Health Psychology* 28, 300–306.

Sonnemans, Joep, 2006, Price clustering and natural resistance points in the Dutch stock market: A natural experiment, *European Economic Review* 50, 1937–1950.

Stacy, Alan W., Steve Suassman, Clyde W. Dent, Dee Burton, and Brian R. Flay, 1992, Moderators of Peer Social Influence in Adolescent Smoking, *Personality and Social Psychology Bulletin* 18, 163–172.

Statista, 2018, *Anteil der Raucher an der Bevölkerung ausgewählter OECD-Länder in den Jahren 2009 bis 2015*. https://de.statista.com/statistik/daten/studie/214300/umfrage/anteil-der-raucher-an-der-bevoelkerung-ausgewaehlter-laender/.

Strömbäck, Camilla, Thérèse Lind, Kenny Skagerlund, Daniel Västfjäll, and Gustav Tinghög, 2017, Does self-control predict financial behavior and financial well-being?, *Journal of Behavioral and Experimental Finance* 14, 30–38.

Tangney, June P., Roy F. Baumeister, and Angie L. Boone, 2004, High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success, *Journal of Personality* 72, 271–324.

Thaler, Richard H., and Shlomo Benartzi, 2004, Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving, *Journal of Political Economy* 112.

Thaler, Richard H., and Hersh M. Shefrin, 1981, An Economic Theory of Self-Control, *Journal of Political Economy* 89, 392–406.

Tyas, Suzanne L., and Linda L. Pederson, 1998, Psychosocial factors related to adolescent smoking: a critical review of the literature, *Tobacco Control* 7, 409–420.

van den Eijnden, Regina J. J. M., Renske Spijkerman, and Rutger C. M. E. Engels, 2006, Relative contribution of smoker prototypes in predicting smoking among adolescents: a comparison with factors from the theory of planned behavior, *European Addiction Research* 12, 113–120.

Vissing-Jorgensen, Annette, 2002, Towards an explanation of household portfolio choice heterogeneity: Nonfinancial income and participation cost structures, *National Bureau of Economic Research*.

Vissing-Jorgensen, Annette, 2003, Perspectives on Behavioral Finance: Does "Irrationality" Disappear with Wealth? Evidence from Expectations and Actions, *NBER Macroeconomics Annual* 18, 139–194.

Vries, H. d., and G. J. Kok, 1986, From determinants of smoking behaviour to the implications for a prevention programme, *Health Education Research* 1, 85–94.

Wertenbroch, Klaus, 1998, Consumption Self-Control by Rationing Purchase Quantities of Virtue and Vice, *Marketing Science* 17, 317–337.

Zagorsky, Jay L., 2007, Do you have to be smart to be rich? The impact of IQ on wealth, income and financial distress, *Intelligence* 35, 489–501.

Figures

Figure I. Cigarette purchases made in 2016

This bar chart presents the fraction of cigarette purchases made with a debit or credit card in 2016 for investors identified as smokers. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. Investor data are obtained from one of the largest German discount brokerages and cigarette prices stem from a German supermarket chain.

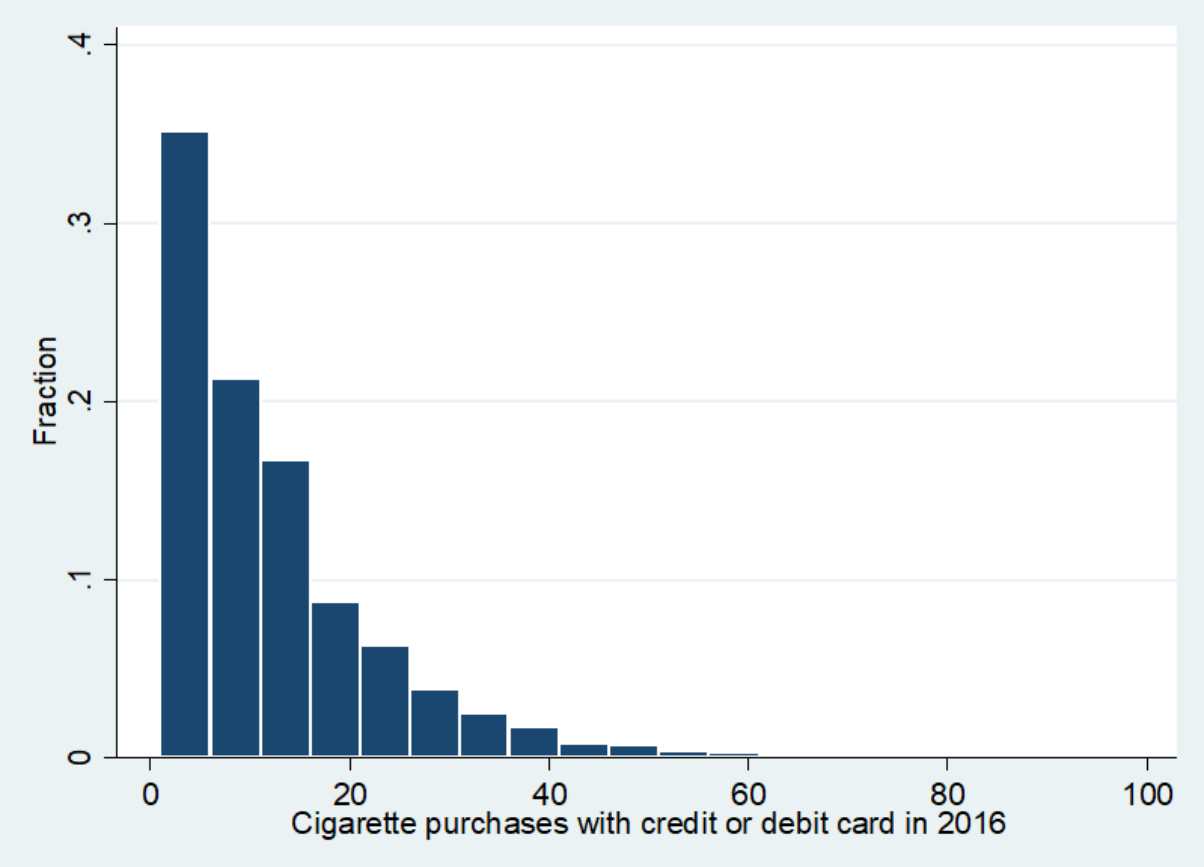
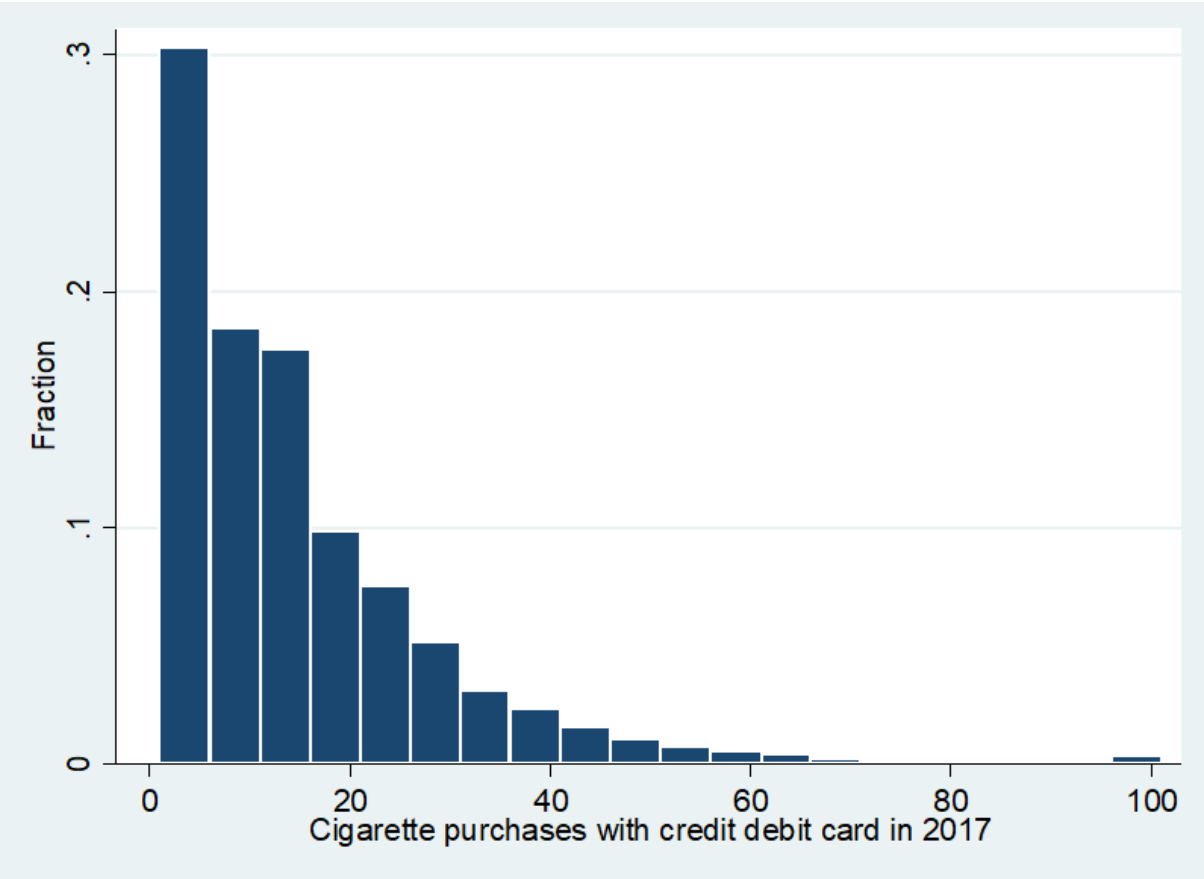


Figure II. Cigarette purchases made in 2017

This bar chart presents the fraction of cigarette purchases made with a debit or credit card in 2017 for investors identified as smokers. A smoker is defined as a person who more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. Investor data are obtained from one of the largest German discount brokerages and cigarette prices stem from a German supermarket chain.



Tables

Table I. Investor data

This table presents summary statistics for our retail investor data. The data were obtained from one of the largest German discount brokerages. We include investors who make two or more ATM withdrawals or point-of-sales transactions per year and who reside in Germany.

	N	Mean	p50	p25	p75	SD
Usage of advice (1 = adviced client)	19371	49.04	49.00	40.00	58.00	13.39
Total wealth (EUR)	19371	41977.70	20000.00	20000.00	45000.00	43265.27
Income after tax (EUR)	19371	50483.20	50000.00	30000.00	80000.00	24817.22
Client risk aversion (low = 1 and high = 5)	19371	3.68	4.00	3.00	5.00	1.57
Employed (1 = employed)	19371	0.52	1.00	0.00	1.00	0.50
Self-employed (1 = self-employed)	19371	0.19	0.00	0.00	0.00	0.39
Retired (1 = retired)	19371	0.09	0.00	0.00	0.00	0.29
Gender (1 = male)	19371	0.87	1.00	1.00	1.00	0.34
Ph.D. (1 = investor holds doctoral degree)	19371	0.05	0.00	0.00	0.00	0.23
Length of relationship between bank and client	19371	12.44	12.00	12.00	13.00	3.98
Married (1 = married investor)	19371	0.52	1.00	0.00	1.00	0.50
Usage of advice (1 = adviced client)	19371	0.05	0.00	0.00	0.00	0.21
Average portfolio value (EUR)	19371	48186.70	23898.69	7906.62	56601.31	90910.59

Table II. Summary statistics for Smokers and Nonsmokers

This table presents summary statistics for smokers and nonsmokers. The data originate from a large German discount brokerage. We include investors who make two or more ATM withdrawals or point-of-sales transactions per year and who reside in Germany.

	Non-Smokers						Smokers							
	N	Mean	p50	p25	p75	SD	N	Mean	p50	p25	p75	SD	Diff	Pval
Usage of advice (1 = adviced client)	14001	51.20	50.00	43.00	59.00	12.73	5370	43.40	43.00	33.00	52.00	13.42	7.80	0.00
Total wealth (EUR)	14001	42375.19	45000.00	20000.00	45000.00	42003.30	5370	40941.34	20000.00	5000.00	45000.00	46382.48	1433.85	0.05
Income after tax (EUR)	14001	53203.34	50000.00	30000.00	80000.00	24517.97	5370	43391.06	50000.00	30000.00	50000.00	24184.79	9812.28	0.00
Client risk aversion (low = 1 and high = 5)	14001	3.86	5.00	3.00	5.00	1.48	5370	3.22	4.00	1.00	5.00	1.71	0.64	0.00
Employed (1 = employed)	14001	0.49	0.00	0.00	1.00	0.50	5370	0.58	1.00	0.00	1.00	0.49	-0.08	0.00
Self-employed (1 = self-employed)	14001	0.21	0.00	0.00	0.00	0.41	5370	0.15	0.00	0.00	0.00	0.35	0.06	0.00
Retired (1 = retired)	14001	0.10	0.00	0.00	0.00	0.30	5370	0.06	0.00	0.00	0.00	0.24	0.04	0.00
Gender (1 = male)	14001	0.86	1.00	1.00	1.00	0.34	5370	0.89	1.00	1.00	1.00	0.32	-0.02	0.00
Ph.D. (1 = investor holds doctoral degree)	14001	0.06	0.00	0.00	0.00	0.23	5370	0.04	0.00	0.00	0.00	0.20	0.02	0.00
Length of relationship between bank and client	14001	13.00	12.00	12.00	13.00	3.60	5370	10.98	12.00	7.00	12.00	4.52	2.01	0.00
Married (1 = married investor)	14001	0.55	1.00	0.00	1.00	0.50	5370	0.44	0.00	0.00	1.00	0.50	0.11	0.00
Usage of advice (1 = adviced client)	14001	0.04	0.00	0.00	0.00	0.21	5370	0.06	0.00	0.00	0.00	0.23	-0.01	0.00
Average portfolio value (EUR)	14001	51174.95	26379.74	9563.93	59883.70	96213.98	5370	40395.53	17602.41	4524.52	47365.34	74796.65	10779.42	0.00

Table III. Demographics of Smokers

This table presents results drawn from pooled cross-sectional regressions of smokers' demographics. The dependent variable is a dummy variable equal to one when an investor is classified as a smoker. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Age (years)	-0.0089***	-0.0077***	-0.0085***
	(0.0003)	(0.0003)	(0.0003)
Total wealth (EUR)	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Income after tax (EUR)		-0.0000***	-0.0000***
		(0.0000)	(0.0000)
Gender (1 = male)	0.0164*	0.0601***	0.0594***
	(0.0091)	(0.0091)	(0.0093)
Married (1 = married investor)	0.0043	0.0214***	0.0226***
	(0.0067)	(0.0067)	(0.0067)
Ph.D. (1 = investor holds doctoral degree)	-0.0155	0.0086	0.0109
	(0.0130)	(0.0129)	(0.0136)
Client risk aversion (low = 1 and high = 5)		-0.0335***	-0.0325***
		(0.0021)	(0.0020)
Employed (1 = employed)			0.0443***
			(0.0081)
Self-employed (1 = self-employed)			0.0154
			(0.0101)
Retired (1 = retired)			0.1013***
			(0.0144)
Constant	0.6852***	0.8045***	0.8009***
	(0.0153)	(0.0160)	(0.0167)
Observations	19,371	19,371	19,371
R-squared	0.0691	0.1011	0.1043

Table IV. The effect of low self-control on trading patterns

This table presents results drawn from pooled cross-sectional regressions on trades made per month, trade size and turnover. The dependent variable given in column (1) is a dummy variable for trades made per month and is equal to one when an investor makes a trade in a month. The dependent variable shown in column (2) is a variable for the absolute trade size in Euros and measures the absolute value of trades made in a given month to treat purchases and sales equally. The dependent variable shown in column (3) is the portfolio turnover and is set to one (=100%) for a given month when the monthly turnover is larger than one. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. All regressions incorporate year-fixed effects. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Trades per month	Trade size	Turnover
Smoker dummy (1 = smoker)	0.0228***	224.2957***	0.0055***
	(0.0010)	(20.3176)	(0.0003)
Gender (1 = male)	0.0542***	143.8233***	0.0116***
	(0.0011)	(24.2888)	(0.0003)
Client risk aversion (low = 1 and high = 5)	0.0424***	13.0069**	0.0097***
	(0.0003)	(6.2701)	(0.0001)
Age (years)	0.0011***	28.8392***	0.0002***
	(0.0000)	(0.8995)	(0.0000)
ln of the portfolio value	0.0339***	1,146.6181***	0.0019***
	(0.0002)	(10.9623)	(0.0000)
Number of securities in portfolio	0.0048***	-44.4694***	-0.0003***
	(0.0000)	(0.6451)	(0.0000)
Length of relationship between bank and client	-0.0080***	-8.5557***	-0.0018***
	(0.0001)	(2.3805)	(0.0000)
Ph.D. (1 = investor holds doctoral degree)	-0.0361***	342.0764***	-0.0109***
	(0.0018)	(52.6743)	(0.0004)
Employed (1 = employed)	-0.0142***	-368.3885***	-0.0042***
	(0.0011)	(24.9049)	(0.0003)
Self-employed (1 = self-employed)	-0.0081***	173.5203***	-0.0020***
	(0.0013)	(34.3197)	(0.0004)
Retired (1 = retired)	0.0264***	-24.8302	0.0038***
	(0.0019)	(39.9525)	(0.0006)
2013 fixed-effects	0.0327***	191.2662***	0.0069***
	(0.0015)	(26.4908)	(0.0004)
2014 fixed-effects	0.0295***	204.2329***	0.0066***
	(0.0015)	(28.5834)	(0.0004)
2015 fixed-effects	0.0351***	262.3300***	0.0095***
	(0.0015)	(28.5771)	(0.0004)
2016 fixed-effects	0.0058***	-19.3223	0.0002
	(0.0014)	(35.7480)	(0.0004)
2017 fixed-effects	0.0044***	73.4674**	0.0012***
	(0.0015)	(99.1593)	(0.0004)
2018 fixed-effects	-0.0008	52.7765	0.0005
	(0.0018)	(35.7480)	(0.0005)
Constant	-0.2652***	-10,112.8201***	-0.0052***
	(0.0029)	(99.1593)	(0.0008)
Observations	1,119,401	505,281	1,119,401
R-squared	0.1255	0.0931	0.0193

Table V. The effect of low self-control on investment biases

This table presents the results drawn from pooled cross-sectional regressions of several investment biases. The dependent variable shown in column (1) is the disposition effect defined as the difference between the proportion of gains and losses realized. The dependent variable shown in column (2) (and column (4)) is the Herfindahl-Hirschmann index (HHI) as a measure of portfolio concentration with mutual funds counted as 100 different securities (one security). The dependent variable given in column (3) is defined as the value of mutual funds relative to the total portfolio value at the end of each month. The dependent variable shown in column (5) is a variable for stock share defined as the value of single stocks (national and international) relative to the total portfolio value. The dependent variable lottery stock share shown in column (6) is defined as the monthly value of all stocks with higher than median idiosyncratic volatility, higher than median skewness, and lower than median prices relative to the total portfolio value. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Disposition Effect	HHI 100	Fund share	HHI 1	Stock share	Lottery stocks
Smoker dummy (1 = smoker)	-0.0124**	-0.0111***	0.0055***	-0.0011**	-0.0157***	-0.0213***
	(0.0052)	(0.0006)	(0.0008)	(0.0005)	(0.0009)	(0.0014)
Gender (1 = male)	0.0179**	0.0293***	-0.0653***	-0.0019***	0.0613***	0.0104***
	(0.0070)	(0.0007)	(0.0011)	(0.0007)	(0.0011)	(0.0018)
Client risk aversion (low = 1 and high = 5)	0.0002	0.0078***	-0.0304***	-0.0081***	0.0107***	0.0135***
	(0.0016)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0004)
Age (years)	0.0010***	0.0016***	-0.0016***	0.0004***	0.0033***	0.0003***
	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
ln of the portfolio value	-0.0225***	-0.0572***	0.0173***	-0.0665***	-0.0246***	-0.0715***
	(0.0014)	(0.0002)	(0.0001)	(0.0002)	(0.0002)	(0.0002)
Number of securities in portfolio		-0.0030***	-0.0019***	-0.0053***	0.0020***	
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Length of relationship between bank and client	0.0006	-0.0006***	0.0085***	0.0021***	-0.0052***	-0.0021***
	(0.0006)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Ph.D. (1 = investor holds doctoral degree)	-0.0303***	-0.0166***	0.0292***	-0.0109***	-0.0678***	-0.0051**
	(0.0096)	(0.0009)	(0.0014)	(0.0008)	(0.0015)	(0.0024)
Employed (1 = employed)	-0.0022	-0.0062***	0.0216***	-0.0042***	-0.0276***	-0.0009
	(0.0059)	(0.0007)	(0.0009)	(0.0006)	(0.0010)	(0.0015)
Self-employed (1 = self-employed)	0.0025	0.0187***	-0.0127***	0.0158***	0.0059***	0.0215***
	(0.0073)	(0.0008)	(0.0011)	(0.0007)	(0.0012)	(0.0017)
Retired (1 = retired)	-0.0206**	-0.0038***	-0.0271***	-0.0070***	0.0087***	-0.0066***
	(0.0100)	(0.0011)	(0.0014)	(0.0010)	(0.0017)	(0.0023)
2013 fixed-effects		0.0047***	-0.0055***	0.0062***	0.0093***	-0.0106***
		(0.0009)	(0.0012)	(0.0008)	(0.0014)	(0.0013)
2014 fixed-effects		0.0091***	-0.0171***	0.0115***	0.0138***	-0.0106***
		(0.0009)	(0.0012)	(0.0008)	(0.0014)	(0.0013)
2015 fixed-effects		0.0098***	-0.0273***	0.0164***	0.0112***	-0.0043
		(0.0009)	(0.0012)	(0.0008)	(0.0014)	(0.0035)
2016 fixed-effects		0.0092***	-0.0419***	0.0139***	0.0230***	
		(0.0009)	(0.0012)	(0.0008)	(0.0014)	
2017 fixed-effects		0.0153***	-0.0532***	0.0221***	0.0274***	
		(0.0009)	(0.0012)	(0.0008)	(0.0014)	
2018 fixed-effects		0.0173***	-0.0679***	0.0216***	0.0371***	
		(0.0011)	(0.0015)	(0.0010)	(0.0017)	
Constant	0.2138***	0.7114***	0.3044***	1.0579***	0.5713***	0.7950***
	(0.0175)	(0.0021)	(0.0026)	(0.0020)	(0.0029)	(0.0044)
Observations	15,042	1,119,401	1,119,401	1,119,401	1,119,401	186,485
R-squared	0.0186	0.2762	0.0493	0.4634	0.0401	0.3861

Table VI. The effect of low self-control on portfolio performance

This table presents the results drawn from pooled cross-sectional regressions on returns and Sharpe ratios. The dependent variable return given in column (1) is measured as the average daily portfolio performance for 2012 to 2016. Net returns shown in column (2) are measured as the average daily portfolio performance after incurred costs (e.g., brokerage fees or front-end loads). The dependent variable given in column (3) is the average Sharpe ratio (portfolio returns divided by portfolio volatility). The dependent variable given in column (4) is the average net Sharpe ratio (portfolio net returns divided by portfolio volatility). A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Return	Net Return	Sharpe Ratio	Net Sharpe ratio
Smoker dummy (1 = smoker)	0.0001***	0.0001*	0.0021**	-0.0012
	(0.0001)	(0.0001)	(0.0009)	(0.0012)
Gender (1 = male)	-0.0001	-0.0002**	-0.0034***	-0.0063***
	(0.0001)	(0.0001)	(0.0012)	(0.0015)
Client risk aversion (low = 1 and high = 5)	-0.0003***	-0.0003***	-0.0056***	-0.0053***
	(0.0000)	(0.0000)	(0.0003)	(0.0003)
Age (years)	-0.0000***	-0.0000***	-0.0001***	-0.0001*
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
ln of the portfolio value	0.0004***	0.0005***	0.0070***	0.0111***
	(0.0000)	(0.0000)	(0.0002)	(0.0003)
Length of relationship between bank and client	0.0000*	0.0000***	0.0007***	0.0013***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Ph.D. (1 = investor holds doctoral degree)	0.0000	0.0000	0.0025	0.0018
	(0.0001)	(0.0001)	(0.0017)	(0.0022)
Employed (1 = employed)	-0.0000	-0.0000	-0.0004	0.0011
	(0.0001)	(0.0001)	(0.0010)	(0.0013)
Self-employed (1 = self-employed)	-0.0002***	-0.0002**	-0.0049***	-0.0032*
	(0.0001)	(0.0001)	(0.0013)	(0.0016)
Retired (1 = retired)	0.0003**	0.0002**	-0.0004	-0.0020
	(0.0001)	(0.0001)	(0.0018)	(0.0023)
Constant	-0.0026***	-0.0038***	-0.0260***	-0.0791***
	(0.0002)	(0.0002)	(0.0028)	(0.0037)
Observations	17,505	17,505	17,498	17,498
R-squared	0.0751	0.0931	0.0766	0.0955

Table VII. The effect of low self-control on demand for advice

This table presents the results drawn from pooled cross-sectional regressions on demand for advice. The dependent variable is a dummy variable for advice and is equal to one when an investor makes use of financial advice during the observation period. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Smoker dummy (1 = smoker)	0.0186***	0.0158***	0.0155***
	(0.0037)	(0.0039)	(0.0036)
Age (years)	0.0008***	0.0008***	0.0007***
	(0.0001)	(0.0001)	(0.0002)
Total wealth (EUR)	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Income after tax (EUR)		-0.0000***	-0.0000***
		(0.0000)	(0.0000)
Gender (1 = male)	-0.0123**	-0.0088*	-0.0089*
	(0.0049)	(0.0050)	(0.0046)
Married (1 = married investor)	0.0043	0.0060*	0.0062*
	(0.0034)	(0.0034)	(0.0033)
Ph.D. (1 = investor holds doctoral degree)	0.0057	0.0082	0.0085
	(0.0076)	(0.0076)	(0.0068)
Client risk aversion (low = 1 and high = 5)		-0.0017*	-0.0016
		(0.0010)	(0.0010)
Employed (1 = employed)			0.0028
			(0.0040)
Self-employed (1 = self-employed)			0.0003
			(0.0050)
Retired (1 = retired)			0.0114
			(0.0072)
Constant	-0.0013	0.0100	0.0118
	(0.0078)	(0.0081)	(0.0088)
Observations	19,371	19,371	19,371
R-squared	0.0094	0.0104	0.0106

Table VIII. The effect of low self-control on trading patterns for nondelegating investors

This table presents the results drawn from pooled cross-sectional regressions of trades made per month, trade size and turnover. The dependent variable shown in column (1) is a dummy variable for trades made per month and is equal to one when an investor makes a trade in a given month. The dependent variable shown in column (2) is a variable for the absolute trade size in Euros and measures the absolute value of trades made in a given month to treat purchases and sales equally. The dependent variable given in column (3) is the portfolio turnover and is set to one (=100%) for a given month when the monthly turnover is larger than one. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. All regressions incorporate year fixed effects. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Trades per month	Trade size	Turnover
Smoker dummy (1 = smoker)	0.0520***	590.8517***	0.0107***
	(0.0011)	(25.4360)	(0.0003)
Delegating investor (dummy) x smoker (dummy)	-0.0972***	-1,115.3383***	-0.0174***
	(0.0017)	(27.9552)	(0.0004)
Gender (1 = male)	0.0530***	130.9000***	0.0114***
	(0.0011)	(24.2514)	(0.0003)
Client risk aversion (low = 1 and high = 5)	0.0419***	2.8871	0.0096***
	(0.0003)	(6.2658)	(0.0001)
Age (years)	0.0011***	29.3177***	0.0002***
	(0.0000)	(0.9004)	(0.0000)
ln of the portfolio value	0.0340***	1,140.7542***	0.0019***
	(0.0002)	(10.9502)	(0.0000)
Number of securities in portfolio	0.0048***	-44.7509***	-0.0003***
	(0.0000)	(0.6477)	(0.0000)
Length of relationship between bank and client	-0.0077***	-4.7375**	-0.0017***
	(0.0001)	(2.3956)	(0.0000)
Ph.D. (1 = investor holds doctoral degree)	-0.0357***	341.9603***	-0.0109***
	(0.0017)	(52.6527)	(0.0004)
Employed (1 = employed)	-0.0131***	-344.4232***	-0.0040***
	(0.0011)	(24.8679)	(0.0003)
Self-employed (1 = self-employed)	-0.0085***	170.1102***	-0.0021***
	(0.0013)	(34.2915)	(0.0004)
Retired (1 = retired)	0.0251***	-44.9111	0.0036***
	(0.0019)	(40.0018)	(0.0006)
2013 fixed-effects	0.0326***	189.8523***	0.0068***
	(0.0015)	(26.4459)	(0.0004)
2014 fixed-effects	0.0292***	200.1724***	0.0065***
	(0.0015)	(28.5428)	(0.0004)
2015 fixed-effects	0.0347***	257.2355***	0.0094***
	(0.0015)	(28.5299)	(0.0004)
2016 fixed-effects	0.0052***	-26.2860	0.0001
	(0.0014)	(30.9017)	(0.0004)
2017 fixed-effects	0.0038***	67.2637**	0.0011***
	(0.0015)	(29.6313)	(0.0004)
2018 fixed-effects	-0.0015	45.5097	0.0004
	(0.0018)	(35.6999)	(0.0005)
Constant	-0.2674***	-10,073.8672***	-0.0056***
	(0.0029)	(98.8958)	(0.0008)
Observations	1,119,401	505,281	1,119,401
R-squared	0.1279	0.0951	0.0204

Table IX. The effect of low self-control on investment biases for nondelegating investors

This table presents the results drawn from pooled cross-sectional regressions on several investment biases. The dependent variable given in column (1) is the disposition effect as the difference between the proportion of gains and losses realized. The dependent variable given in column (2) (and column (3)) is the Herfindahl-Hirschmann index (HHI) as a measure of portfolio concentration with mutual funds counted as 100 different securities (one security). The dependent variable lottery stock share given in column (4) is defined as the monthly value of all stocks with higher than median idiosyncratic volatility, higher than median skewness, and lower than median prices relative to the total portfolio value. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. All regressions incorporate year fixed effects. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Disposition Effect	HHI 100	HHI 1	Lottery stocks
Smoker dummy (1 = smoker)	0.0049	0.0586***	0.0065***	-0.0114***
	(0.0059)	(0.0007)	(0.0006)	(0.0015)
Delegating investor (dummy) x smoker (dummy)	-0.0584***	-0.2316***	-0.0254***	-0.0527***
	(0.0094)	(0.0009)	(0.0009)	(0.0031)
Gender (1 = male)	0.0174**	0.0265***	-0.0022***	0.0109***
	(0.0070)	(0.0007)	(0.0007)	(0.0018)
Client risk aversion (low = 1 and high = 5)	-0.0004	0.0066***	-0.0083***	0.0133***
	(0.0016)	(0.0002)	(0.0002)	(0.0004)
Age (years)	0.0010***	0.0016***	0.0004***	0.0003***
	(0.0002)	(0.0000)	(0.0000)	(0.0001)
ln of the portfolio value	-0.0225***	-0.0568***	-0.0665***	-0.0714***
	(0.0014)	(0.0001)	(0.0002)	(0.0002)
Number of securities in portfolio		-0.0031***	-0.0053***	-0.0021***
		(0.0000)	(0.0000)	(0.0002)
Length of relationship between bank and client	0.0008	-0.0000	0.0021***	-0.0058**
	(0.0006)	(0.0001)	(0.0001)	(0.0024)
Ph.D. (1 = investor holds doctoral degree)	-0.0302***	-0.0158***	-0.0109***	-0.0008
	(0.0096)	(0.0009)	(0.0008)	(0.0015)
Employed (1 = employed)	-0.0015	-0.0035***	-0.0039***	0.0213***
	(0.0059)	(0.0007)	(0.0006)	(0.0017)
Self-employed (1 = self-employed)	0.0022	0.0176***	0.0157***	-0.0065***
	(0.0073)	(0.0008)	(0.0007)	(0.0023)
Retired (1 = retired)	-0.0212**	-0.0067***	-0.0073***	-0.0106***
	(0.0100)	(0.0011)	(0.0010)	(0.0013)
2013 fixed-effects		0.0044***	0.0062***	-0.0107***
		(0.0009)	(0.0008)	(0.0013)
2014 fixed-effects		0.0084***	0.0114***	-0.0044
		(0.0009)	(0.0008)	(0.0035)
2015 fixed-effects		0.0088***	0.0163***	0.7942***
		(0.0009)	(0.0010)	(0.0044)
2016 fixed-effects		0.0077***		
		(0.0009)		
2017 fixed-effects		0.0139***		
		(0.0009)		
2018 fixed-effects		0.0155***		
		(0.0011)		
Constant	0.2137***	0.7062***	1.0574***	0.2900***
	(0.0175)	(0.0021)	(0.0020)	(0.0053)
Observations	15,042	1,119,401	1,119,401	186,485
R-squared	0.0210	0.3053	0.4638	0.0198

Table X. The effect of low self-control on portfolio performance for nondelegating investors

This table presents the results drawn from pooled cross-sectional regressions on returns and Sharpe ratios. The dependent variable return given in column (1) is measured as the average daily portfolio performance for 2012 to 2016. Net return in column (2) is measured as the average daily portfolio performance after incurred costs (e.g., brokerage fees or front-end loads). The dependent variable given in column (3) is the average Sharpe ratio (portfolio returns divided by portfolio volatility). The dependent variable given in column (4) is the average net Sharpe ratio (portfolio net returns divided by portfolio volatility). A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	Return	Net Return	Sharpe Ratio	Net Sharpe ratio
Smoker dummy (1 = smoker)	0.0001	-0.0000	0.0004	-0.0036***
	(0.0001)	(0.0001)	(0.0010)	(0.0013)
Delegating investor (dummy) x smoker (dummy)	0.0003***	0.0004***	0.0056***	0.0080***
	(0.0001)	(0.0001)	(0.0016)	(0.0021)
Gender (1 = male)	-0.0001	-0.0002**	-0.0034***	-0.0062***
	(0.0001)	(0.0001)	(0.0012)	(0.0015)
Client risk aversion (low = 1 and high = 5)	-0.0003***	-0.0003***	-0.0055***	-0.0053***
	(0.0000)	(0.0000)	(0.0003)	(0.0003)
Age (years)	-0.0000***	-0.0000***	-0.0001***	-0.0001*
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
ln of the portfolio value	0.0004***	0.0005***	0.0070***	0.0111***
	(0.0000)	(0.0000)	(0.0002)	(0.0003)
Length of relationship between bank and client	0.0000*	0.0000***	0.0007***	0.0012***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)
Ph.D. (1 = investor holds doctoral degree)	0.0000	0.0000	0.0025	0.0018
	(0.0001)	(0.0001)	(0.0017)	(0.0022)
Employed (1 = employed)	-0.0000	-0.0000	-0.0004	0.0010
	(0.0001)	(0.0001)	(0.0010)	(0.0013)
Self-employed (1 = self-employed)	-0.0002***	-0.0002**	-0.0049***	-0.0032*
	(0.0001)	(0.0001)	(0.0013)	(0.0016)
Retired (1 = retired)	0.0003**	0.0002**	-0.0003	-0.0019
	(0.0001)	(0.0001)	(0.0018)	(0.0023)
Constant	-0.0026***	-0.0038***	-0.0259***	-0.0790***
	(0.0002)	(0.0002)	(0.0028)	(0.0037)
Observations	17,505	17,505	17,498	17,498
R-squared	0.0756	0.0940	0.0772	0.0962

Table XI. The effect of low self-control on saving plans

This table presents the results drawn from pooled cross-sectional regressions on saving plans. The dependent variable of saving plans given in column (1) is a dummy variable for saving plan purchases and is equal to one when an investor makes one or more saving plan purchases after the 1st of January 2012. The dependent variable of the number of months using a saving plan employed in column (2) is a dummy variable for saving plan purchases made per month and is equal to one when an investor makes a saving plan purchase in a given month. The dependent variable of saving plan value used in column (3) is defined as the absolute value of saving plan purchases made in Euros. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Saving plans	Months	Value
Smoker dummy (1 = smoker)	0.0750***	-1.9993***	91.5361
	(0.0076)	(0.7311)	(64.5469)
Age (years)	-0.0060***	0.1985***	7.2495**
	(0.0003)	(0.0362)	(3.1953)
Total wealth (EUR)	-0.0000***	-0.0000***	0.0015**
	(0.0000)	(0.0000)	(0.0007)
Income after tax (EUR)	0.0000	0.0000***	0.0020
	(0.0000)	(0.0000)	(0.0014)
Gender (1 = male)	0.0094	-0.7872	46.4955
	(0.0096)	(1.0304)	(90.9666)
Married (1 = married investor)	0.0513***	0.7209	86.1996
	(0.0071)	(0.7295)	(64.4076)
Ph.D. (1 = investor holds doctoral degree)	-0.0011	2.5217	607.6622***
	(0.0143)	(1.5568)	(137.4460)
Client risk aversion (low = 1 and high = 5)	0.0250***	0.9840***	-40.2261*
	(0.0022)	(0.2393)	(21.1246)
Employed (1 = employed)	0.0420***	0.9475	39.4338
	(0.0085)	(0.8580)	(75.7518)
Self-employed (1 = self-employed)	-0.0347***	-1.7206	56.4505
	(0.0106)	(1.1432)	(100.9250)
Retired (1 = retired)	-0.0073	-9.9563***	15.9605
	(0.0150)	(1.8518)	(163.4853)
Constant	0.4720***	26.1953***	-86.0128
	(0.0185)	(1.9360)	(170.9204)
Observations	20,594	6,790	6,790
R-squared	0.0470	0.0236	0.0081

Table XII. The effect of self-control depletion on trading patterns and disposition effect

This table presents the results drawn from pooled cross-sectional regressions on trades per month, turnover and disposition effects. The dependent variable given in column (1) is a dummy variable for trades made per month and is equal to one when an investor makes a trade in a given month. The dependent variable used in column (2) is a dummy variable for turnover and is equal to one (=100%) for a given month when the monthly turnover is larger than one. The dependent variable used in column (3) is the disposition effect as the proportion of gains and losses realized A person who has quit smoking is defined as a person who makes purchases at the point-of-sale in any year of our sample but who purchases his or her last box of cigarettes in 2017 or 2016. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5), the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Trades per month	Turnover	Disposition Effect
Stopped smoking (dummy)	0.0317***	0.0035***	0.0277*
	(0.0029)	(0.0008)	(0.0143)
Stopped smoking (dummy) x Post-stopping	-0.0389***	-0.0093***	
	(0.0075)	(0.0019)	
Gender (1 = male)	0.0593***	0.0124***	0.0161
	(0.0024)	(0.0006)	(0.0186)
Client risk aversion (low = 1 and high = 5)	0.0342***	0.0092***	-0.0003
	(0.0005)	(0.0001)	(0.0034)
Age (years)	0.0008***	0.0003***	0.0009*
	(0.0001)	(0.0000)	(0.0005)
ln of the portfolio value	0.0334***	-0.0000	-0.0161***
	(0.0004)	(0.0001)	(0.0031)
Number of securities in portfolio	0.0059***	-0.0003***	
	(0.0001)	(0.0000)	
Length of relationship between bank and client	-0.0091***	-0.0020***	-0.0004
	(0.0002)	(0.0001)	(0.0012)
Ph.D. (1 = investor holds doctoral degree)	-0.0563***	-0.0148***	-0.0313*
	(0.0037)	(0.0009)	(0.0190)
Employed (1 = employed)	-0.0335***	-0.0086***	0.0121
	(0.0021)	(0.0006)	(0.0120)
Self-employed (1 = self-employed)	-0.0215***	-0.0041***	0.0161
	(0.0029)	(0.0008)	(0.0149)
Retired (1 = retired)	0.0212***	0.0020	-0.0064
	(0.0042)	(0.0013)	(0.0201)
2013 fixed-effects	0.0388***	0.0086***	
	(0.0031)	(0.0008)	
2014 fixed-effects	0.0430***	0.0108***	
	(0.0030)	(0.0008)	
2015 fixed-effects	0.0486***	0.0141***	
	(0.0030)	(0.0008)	
2016 fixed-effects	0.0080***	0.0025***	
	(0.0029)	(0.0008)	
2017 fixed-effects	0.0049*	0.0039***	
	(0.0029)	(0.0008)	
2018 fixed-effects	0.0022	0.0041***	
	(0.0036)	(0.0010)	
Constant	-0.1921***	0.0234***	0.1487***
	(0.0055)	(0.0016)	(0.0384)
Observations	286,231	286,231	3,980
R-squared	0.1157	0.0200	0.0104

Table XIII. The effect of low self-control on advisor contacts

This table presents the results drawn from pooled cross-sectional regressions on the number of contact points made with a financial advisor. The dependent variable of the number of contact points given in column (1) is defined as the absolute number of contacts made between advisors and customers over the observation period. The dependent variable of the number of contact points made per day given in column (2) is defined as the number of contacts made between advisors and customers per day after an advisory service is adopted over the observation period. A smoker is defined as a person who makes more than two purchases of tobacco products per year over the observation period of January 2016 to June 2018. As control variables, we further include gender, age, the level of client risk aversion (low = 1 and high = 5);,the ln of the portfolio value, the length of the relationship between a bank and client, and a dummy equal to one for investors with PhDs, who are employees, who are self-employed or who are retired. ***, **, and * indicate that the coefficient estimates are significantly different from zero at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	Contacts (total)	Contacts (day)
Smoker dummy (1 = smoker)	-2.6890	-0.0004
	(8.5318)	(0.0043)
Age (years)	0.1325	0.0001
	(0.3946)	(0.0002)
Total wealth (EUR)	0.0000	0.0000
	(0.0001)	(0.0000)
Income after tax (EUR)	-0.0001	-0.0000
	(0.0002)	(0.0000)
Gender (1 = male)	1.6409	0.0015
	(10.4761)	(0.0053)
Married (1 = married investor)	5.5122	0.0023
	(8.4909)	(0.0043)
Ph.D. (1 = investor holds doctoral degree)	43.1779***	0.0209***
	(15.7867)	(0.0080)
Client risk aversion (low = 1 and high = 5)	7.7464***	0.0040***
	(2.7698)	(0.0014)
Employed (1 = employed)	4.1126	0.0023
	(10.9392)	(0.0055)
Self-employed (1 = self-employed)	6.6037	0.0030
	(13.1871)	(0.0067)
Retired (1 = retired)	-13.5506	-0.0067
	(15.7494)	(0.0080)
Constant	51.5093**	0.0276**
	(24.3210)	(0.0123)
Observations	938	938
R-squared	0.0201	0.0201

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