Research Report

What Does Your Personality Reveal about Your Financial Behavior? Evidence from a FinTech Experiment

WE CO-OPERATE WITH A GERMAN FINANCIAL ACCOUNT AGGREGATOR (FAA) AND CONDUCT A PERSONALITY SURVEY WITH 1,700 APP USERS. WE COMBINE THE SURVEY RESULTS WITH THEIR ANONYMIZED TRANSACTION DATA AND INVESTIGATE LINKS BETWEEN PERSONALITY TRAITS AND SPENDING BEHAVIOR. OBSERVING MANY LOTTERY WINDFALLS IN OUR DATASET AND TREATING THESE INCIDENTS AS REAL-LIFE EXPERIMENTS, WE ASK: WHAT DO INDIVIDUALS DO WITH UNEXPECTED INCOME CHANGES? OUR FINDINGS SUGGEST THAT HIGHLY EXTRAVERTED INDIVIDUALS TEND TO OVERSPEND IN RESPONSE TO LOTTERY WINDFALLS.

Andreas Hackethal

Fabian Nemeczek

Jan Radermacher

Introduction

Financial Account Aggregators (FAA) enable their users to link all financial accounts and to see an exhaustive overview of the entire financial behavior. This opens great opportunities for research since spending behavior can be holistically observed. We make use of such data with our analysis and, additionally, conduct a survey with users of the FAA. This provides us with complete spending behavior in combination with answers to specific questions about personality and consumption patterns. We used these for our studies on saving and consumption propensities, i.e., investigating how people save and spend money.

Hypotheses and Research Question

We are interested in consumption responses after the receipt of lottery windfalls. Lottery windfalls are useful to analyze as they are characterized as exogeneous transitory income shocks (Olafsson and Pagel, 2020).

Understanding how people react to such unexpected one-time income shocks helps policy makers in designing appropriate monetary policy, e.g., when assessing the effects of inflation or "helicopter money". Additionally, understanding how different types of personalities drive spending behavior also helps companies and banks in targeting certain people of interest. Therefore, we examine the question whether people with different personality types react differently to the receipt of lottery windfalls.

Big Five Personality Traits

The "Big Five" personality traits are a psychological model describing personality by five dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN). The model is based on the lexical hypothesis postulating that personality differences are encoded in language. Specifically, psychologists have identified personality-describing adjectives and several studies have independently from each other identified the above five stated factors (Borghans et al., 2008).

In Table 1, we display facets of the Big Five traits that describe personality.

Data on personality traits are collected in the form of a personality test that includes several questions per trait, where respondents should answer statements on a Likert scale, such as: "Do you believe in the good of people?", which elicits the degree of agreeableness. The personality inventory "Revised NEO Personality Inventory (NEO-PI-R)" is the most commonly used questionnaire and was invented by Costa and McCrae in 1978 (Costa and McCrae, 2008). With 240 questionnaire items, it is characterized as a highly precise research instrument. However, as this questionnaire is time-consuming, more recent studies suggest shorter versions of questionnaires, such as the 10-item short version of Rammstedt and John (2007), that can be completed in less than a minute without considerable lack in precision. According to psychological literature, the personality of people is persistent and robust over their lives and, thus, the Big Five only need to be collected once.

In recent decades, the Big Five model has been more frequently incorporated into economic models. However, as Borghans et al. (2008) collate, economists face several limitations, such as the problem with reverse causality: interpreting correlations between personality measures and economic outcomes might be misleading as one cannot per se trace the originated driver from personalities. Economists try to circumvent these causality issues, e.g., by

Openness: Imagination, Emotionality, Adventurousness, Intellect, Liberalism

Conscientiousness: Efficacy, Dutifulness, Achievement-Striving, Self-Discipline, Cautiousness

Extraversion: Friendliness, Activity Level, Excitement-Seeking, Cheerfulness

Agreeableness: Trust, Morality, Altruism, Cooperation, Modesty, Sympathy

Neuroticism: Anxiety, Anger, Depression, Self-Consciousness, Vulnerability

Table 1: Facets of Big Five Personality Traits

further estimating latent factors and disentangling spurious effects – for more details, refer to Borghans et al. (2008).

Financial Account Aggregators

The digitization of different areas of life also reached the private financial budget planning. There are several companies that provide services that help private households and individuals (i) to optimize financial behavior, (ii) to reduce debt, and (iii) with the management of subscriptions. Such a service is called "financial account aggregator".

FAAs process and aggregate all in- and outgoing cash flows from different bank accounts. Doing so, they reveal aggregated income and spending among different categories to provide a unified overview of the user's financial situation. Such FAAs make use of the EU Payment Services Directive (PSD2) to receive customer data entrusted with other financial service providers.

Spending Behavior and Personality Traits

In recent years, several studies have used FAA data and started to analyze spending behavior of different personality types. For example, Landis and Gladstone (2017) investigate peoples' spending behavior and reveal that especially extraverts consume more status-related goods. Tovanich et al. (2021) go further and infer Big Five traits from the digital footprints that FAA users left with their transaction data. Specifically, they make use of the rich set of transaction data and apply machine learning

methods to predict the Big Five traits. Doing so, they can identify which spending categories are driving certain personality types.

Survey and Transaction Data

We use data from a German financial account aggregator app that provides a personal money management mobile application where users can connect different bank accounts to reveal aggregated income and spending among different categories in a unified overview.

We surveyed about 2,200 customers, and after filtering uncompleted surveys, we end up with about 1,700 observations. We incentivized respondents by raffling 50 Amazon vouchers. We surveyed the Big Five using the Big Five Inventory (BFI)-10 questionnaire of Rammstedt and John (2007).

In our sample, about 25% of the customers received any type of lottery windfall. Such lottery windfalls emerge, for instance, from sports bets (about 11%, e.g., Tipico, Tipp24.de), from charity lotteries (about 6%, e.g., Aktion Mensch), from classical lotteries (60%, e.g., Toto Lotto), and others (23%).

In Figure 1, we show the averages of some personality traits for lottery players and those that do not. We see that the personality traits are rather pronounced for lottery players. This gives us certainty that personality traits are indeed translated into behavior, saying that individuals with pronounced openness and extraversion are
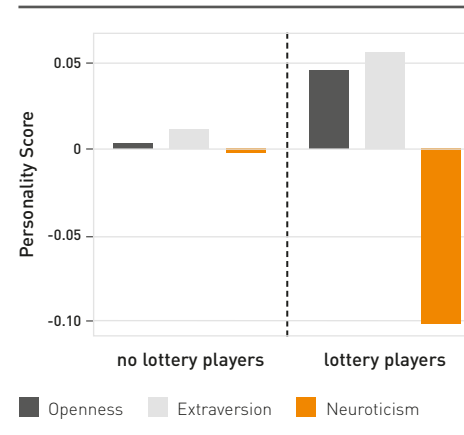

Figure 1: Standardized Personality Traits by Gender and Lottery Windfall

rather lottery players. In addition, they are characterized by a very low degree of neuroticism.

Before we turn to the empirical analysis, we investigate visually whether individuals increase their consumption after the receipt of lottery windfalls. For this, we display in Figure 2 the average monthly total consumption of the customers in a four-month time window around the lottery windfall. We define total consumption as the monthly sum of all accounts' outflows in the categories: cinema, sports, streaming, tickets, newspaper, virtual goods, pets, toys, etc. We see that before the arrival of the lottery windfall, the average total consumption lies around EUR 2,750 and, then, jumps up to over EUR 3,000 in the month of the windfall and peaks in the month after the arrival. Based on this, we indeed see that individuals react to lottery windfalls.
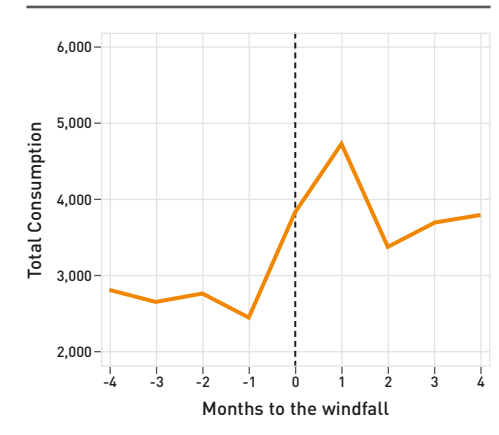

Figure 2: Total Consumption before and after the Receipt of Lottery Windfall

Empirical Investigation

To identify the consumption response of individuals depending on their personality traits, we conduct the following pooled OLS regression:

$$y_{i,t} = \beta_0 + \beta_1 Windfall_{i,t} + \beta_{2,j} BigFive_{i,j}$$

$$+ \sum_{s=-L}^{L} \beta_{3,t+s} D_{i,t+s} + \beta_4 X_{i,t} + \epsilon_{i,t}$$

In this specification, $y_{i,t}$ stands for total consumption of individual i in time t. In addition, β_1 measures the impact of the windfall in EUR on total consumption and $\beta_{2,j}$ includes the coefficients for the j=5 Big Five traits. $D_{i,t+s}$ are dummies that control for the L=3 month window around the lottery windfall. $X_{i,t}$ is a vector of control variables such as gender, age, and income. Lastly, $\epsilon_{i,t}$ is the error term and standard errors are clustered on individuals. With this specification, we expect to
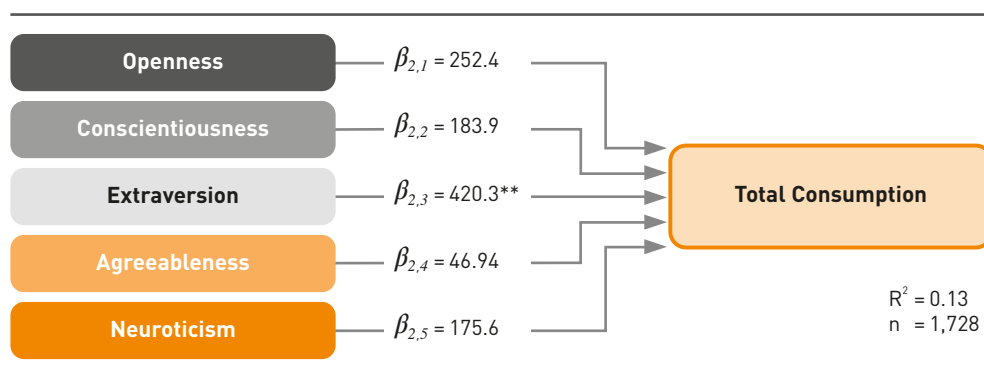
Figure 3: Coefficients of Big Five Personality Traits

see significant effects in the coefficients of the Big Five traits and that the dummy variables $D_{i,t+s}$ indicate significances in the month of or the month after the arrival of the windfall.

Results

The results of the regression are displayed in Figure 3. For the sake of brevity, we only show the coefficients of the Big Five traits, in which we are interested.

The coefficients are interpreted as follows: In the case of extraversion, a one standard deviation increase leads to an increased consumption by about EUR 420. The coefficient of extraversion is the only significant one and the remaining coefficients are all insignificant. We conducted several robustness checks to find further support for this finding.

If we look closer how extraverts in our data set spend money, we see that in addition they spend more for food and clothes shopping.

This finding is in line with Landis and Gladstone (2017) who also identified extraverts as the group that overall spends more, especially on status. In their study, they define spending on high status by elicited preferences for the categories "foreign air travel", "golf", "electronics", and "art institutions".

It is important to mention that, with the underlying sample, we cannot fully generalize our findings to the German population. We compared our dataset with representative samples (e.g., the German Socio-Economic Panel) and found that customers of the FAA only represent younger and wealthier cohorts and were predominantly male.

Methodologically, we could not perform the preferred fixed effects regression because Big Five traits are time invariant and would be omitted. Therefore, we conducted several robustness checks, for instance, we set the traits themselves as fixed effects. By this, we end up with

similar results. Lastly, it is worth mentioning that, for the scope of this analysis, we abstained from more profound endogeneity tests, so that we are limited in providing a full picture on causalities. Nevertheless, our analysis demonstrates that personality traits are indeed relevant determinants that might explain further heterogeneity in consumption behavior.

Conclusion

The co-operation with the German FAA enabled us to study consumption behavior (using transaction data) and personality traits (relying on survey results) in parallel. It allowed us to investigate links between personality and consumption behavior from an economic perspective. Apart from the rich and unique dataset, the setting and research question also form a novel contribution to the literature.

Our finding that extraverted individuals tend to overspend on lottery windfalls confirms our initial hypothesis and can be well embedded in the existing literature. In large groups (e.g., all customers of a bank, all individuals in a country) percentage shares of extraverts are well known thanks to the psychological literature. Combining these insights with our findings could help policy makers to design appropriate policy solutions to help extraverts tackle problematic overspending issues (e.g., by raising awareness through campaigns).

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