



Contents lists available at ScienceDirect

## Journal of Banking and Finance

journal homepage: [www.elsevier.com/locate/jbf](http://www.elsevier.com/locate/jbf)

## Control thyself: Self-control failure and household wealth

Nina Biljanovska<sup>a,\*</sup>, Spyros Palligkinis<sup>b</sup><sup>a</sup> Institute for Capacity Development, International Monetary Fund, 700 19th Street, NW, Washington, DC 20431, USA<sup>b</sup> European Central Bank, Sonnemannstrasse 22, Frankfurt am Main 60314, Germany

## ARTICLE INFO

## Article history:

Received 30 July 2015

Accepted 31 October 2016

Available online xxx

## JEL Classification:

D01

D12

D14

## Keywords:

Self-control

Household wealth

Household finance

## ABSTRACT

We examine the relationship between self-control and household wealth. Building on literature in psychology, we take a more comprehensive approach to the concept of self-control and posit that it consists of three ingredients: planning, monitoring, and commitment to pre-set goals. We build a measure which combines those three components and can be computed using a standard representative survey. We find that self-control failure is strongly associated with different household net wealth measures and with self-assessed financial distress.

© 2016 Elsevier B.V. All rights reserved.

## 1. Introduction

How does self-control relate to households' financial behavior? In this paper we revisit the concept of self-control as a force behind economic decision making. Our departing point is its current definition as the ability to "resist temptation" and therefore avoid conspicuous consumption (Gul and Pesendorfer, 2001, 2004). This approach, together with the related one of treating households as a dual agent that consists of a long-horizon planner and a short-horizon doer (Thaler and Sherfin, 1981; Bertaut et al., 2009) have provided the basis for explanations of inconsistent usage of credit cards in the US. Further empirical work that employs the same definitions finds a negative relationship between self-control and households over-indebtedness (Gathergood, 2012) and a positive relationship with wealth (Ameriks et al., 2003, 2007).

This paper introduces a definition of self-control which is grounded in psychology theory, first introduced by Baumeister and Heatherton (1996) and then applied to consumer behavior in Baumeister (2002). The authors propose that the strength of self-control depends crucially on three, more primitive, behavioral characteristics, referred to as self-control ingredients: the ability for goal-setting, monitoring, and commitment to earlier set goals. This theory suggests that people who exhibit strong self-control set long-term goals (e.g., lose 10 kg of body weight), keep track of the

relevant behavior (e.g., regularly measure their weight or calorie intake), and have the ability to commit to earlier set goals (e.g., resist a more delicious meal that would jeopardize the effort). Therefore, self-control is the ability to set goals, monitor the behavior that is relevant for achieving them and commit to them when a temptation arises.

Measuring self-control in this way, we empirically examine how it relates to various measures of households' wealth, as well as to the probability of households facing financially distressful situations. Further, we shed light on the extent to which each individual ingredient contributes quantitatively to the results. The analysis is conducted using the publicly available Health and Retirement Study (HRS), which surveys US households and has the distinct advantage of a fully-fledged psycho-social questionnaire that provides us with the necessary variables to compile our self-control measure. The survey further includes detailed information on household socio-economic status and demographics, which serve as valuable controls.

The key contributions of the paper are twofold. First, this approach to self-control, which includes the standard "resistance to temptation" view as its third ingredient, can give more flexibility to financial initiatives that help households avoid the adverse outcomes of self-control failure. It provides such initiatives with a measure of self-control failure that maps the new definition and presents results on the relationship of this measure to household wealth measures and measures of financial distress. Second, the self-control measure introduced does not rely on arbitrary proxies such as individuals' smoking or drinking behavior (see for e.g.,

\* Corresponding author.

E-mail addresses: [nbiljanovska@imf.org](mailto:nbiljanovska@imf.org), [nbiljanovska@gmail.com](mailto:nbiljanovska@gmail.com) (N. Biljanovska), [spalligkinis@gmail.com](mailto:spalligkinis@gmail.com) (S. Palligkinis).

Bertaut et al., 2009). Measures of this kind can indeed be highly correlated to consumption-related self-control, but they still introduce measurement error, making the symptom (smoking/drinking) a noisy proxy. Moreover, they measure behavior that is not related to financial decision making such that even if it were to be influenced (e.g., by helping people to give up smoking), this would not have an effect on households' wealth.

We find that our self-control failure measure is related negatively to various wealth measures and positively to self-assessed financial distress. The results are statistically and economically significant across many alternative specifications. Furthermore, our measure produces much stronger results than a generic measure of impulsiveness that is constructed from the same psycho-social questionnaire. Also, from a conceptual perspective, our measure produces a distinct effect from individual's smoking habits, often used as a proxy for self-control.

A paper closely related to ours is Gathergood (2012), who studies UK-based households and finds that impulsive spenders are more likely to fall behind in consumer loan repayments, as well as to self-report over-indebtedness. Also, McCarthy (2011) reports that impulsive behavior has a positive relationship to a number of financial distress indicators, whereas planning has a relation of the opposite sign. The difference between these papers and ours, apart from the somewhat different focus, is that they measure self-control merely as impulsive behavior and/or inability to make plans ahead. The definition we employ is more comprehensive, including theirs as some of its ingredients. Furthermore, we aggregate those ingredients to a single measure in a non-linear way that is consistent with psychology theory.

Another strand of the literature, related to our work, measures the effects of self-control for various life outcomes in the laboratory. Probably the most famous experiment measuring self-control in this kind of setup is the one of Mischel et al. (1972).<sup>1</sup> Other cases where economists have designed field and lab experiments to measure self-control include DellaVigna and Malmendier (2006); Houser et al. (2008), and Burger et al. (2009). Compared to existing studies employing experimental data, we focus on population-wide data, of which the advantage is that they allow controlling for a large set of demographic, financial and behavioral characteristics of households and estimating the relationship that exists between self-control failure and households' wealth accumulation over and above standard wealth determinants. Ameriks et al. (2007) measure self-control in a quasi-experimental setting and find that self-control correlates positively with household wealth measures. A key difference between their work and ours is that they develop a survey instrument to measure self-control problems (based on hypothetical choice scenario) and apply it to a sample of highly educated individuals. To our knowledge, our study is the first one to apply this definition of self-control to the economics literature, using a population-wide representative survey to conduct empirical analysis.

## 2. Self-control failure

Baumeister et al. (1994) and Baumeister (2002) suggest that self-control essentially depends on three main behavioral characteristics, i.e., *ingredients of self-control*, including: ability for *goal-setting*, ability for *monitoring*, and ability for *commitment to pre-set goals*. In what follows we provide a brief explanation of each of

these ingredients and an example of households' financial behavior that corresponds to the ingredient in question.

**Goal-setting.** The goal-setting ability refers to peoples' ability to plan the future ahead. In this respect people can exhibit either farsighted or myopic behavior. An example of household's goal setting behavior may be the objective of buying a house and thus saving for a down-payment. As Baumeister (2002) argues, individuals who know exactly what they want to achieve, i.e., who have an established goal/plan in mind, would be less likely to indulge in impulsive buying or overspending. Thus these people have the ability to better manage their wealth, are more likely to save, have higher net wealth positions, and are therefore also less likely to find themselves in a financially distressful situation.

**Monitoring.** Monitoring refers to the ability to keep track of the relevant behavior. In terms of financial behavior and decision making, monitoring would imply systematically following how the household's financial resources are allocated. If people do not pay attention to "where their money goes," they would be more likely to spend on unnecessary purchases (even though their budget is tight) and thus they would be less likely to save. This would hinder the achievement of their pre-set goal (e.g., buying the house/saving for the down-payment).

**Commitment to pre-set goals.** This ingredient of self-control refers to one's ability to maintain attention and focus on pre-set goals in face of temptation. Considering our previous example of a person who has embarked on buying a house (set a goal) and has also monitored her spending behavior, the crucial question is whether she would be capable of resisting whatever unnecessary purchasing temptations might arise (stick to the pre-set goal) until she has saved enough for the down-payment.

Importantly, as Baumeister and co-authors argue, all three ingredients of self-control have to be enforced at the same time such that self-control is preserved. Namely, if either one of the three components fails, the others are not valuable without it.<sup>2</sup>

## 3. Measuring self-control failure

### 3.1. The data

Personality traits are commonly measured with questionnaires and self-reported assessments.<sup>3</sup> In a similar fashion, household wealth and demographics are studied extensively with survey data (e.g., see Guiso et al., 2002). However, publicly available surveys that cover both psychological traits and household financial information are relatively rare. One exception is the Health and Retirement Survey (HRS), a publicly available dataset that covers US households. Its core questionnaire provides valuable information on a wide range of socioeconomic variables, including household composition, income, real and financial wealth, education, occupational status, health and cognition measures. Moreover, it includes a "Lifestyle Questionnaire," which records respondents' self-reported satisfaction with their life and relationships, as well as their assessment of their inherent personality traits and behavior along a number of dimensions.<sup>4</sup> HRS is by construction a representative sample of US households who have at least one member aged above 50. This mature part of the population controls a large fraction of the overall household wealth of the US economy, which

<sup>1</sup> Walter Mischel designed the famous "Stanford marshmallow experiment," in which children were offered a choice between one small reward vs. two small rewards if they were able to delay gratification. In follow up studies, researchers have found that those children who were more patient had better life-outcomes, such as higher SAT-scores, better educational attainment, etc.

<sup>2</sup> In a sense, the theory put forward by Baumeister and co-authors is reminiscent of the "O-ring" theory in development economics, originally proposed by Kremer (1993), suggesting that production tasks must be completed proficiently together in order any one of them to be of high value.

<sup>3</sup> See Robins et al. (2007) on the prominence of these measures among personality psychologists.

<sup>4</sup> Another survey that covers both psychological and financial information is the Dutch National Bank Household Survey.

makes considerations regarding their self-control failure highly relevant.

The “Lifestyle Questionnaire” is answered by one third of the respondents, which are randomly chosen and sum to approximately 5,350 households. In the questionnaire of the 2010 wave of HRS we find three statements that correspond to the ingredients of self-control discussed in the previous section, and we use them to build our measure of self-control failure.<sup>5</sup> The statements are as follows:

- Goal setting: “I live one day at a time and don’t really think about the future.”

This statement determines people’s ability to establish future goals. It evaluates one’s tendency to be myopic when making decisions, as opposed to being far-sighted. Therefore this variable is given a negative sign with the following interpretation: the more myopic (in decision making) the person is, the less likely she is to set long-term goals for herself.

- Monitoring: “I keep close track of where my money goes.”

This statement is a straightforward measure of how carefully the household monitors the allocation of its financial resources.

- Commitment: “I am an active person in carrying out the plans I set for myself.”

This statement, as we have argued before, measures individual’s ability to commit to earlier set goals. The ability to carry out pre-defined goals reflects individual’s strength to resist immediate gratification or tempting distractions and thus to focus on long-term goals.

The “Lifestyle Questionnaire” respondents are asked to rate their behavior on a 6-levels scale, which ranges from “strongly disagree” to “strongly agree” with the statement. The upper-left graph in Fig. 1 presents the sample distribution of the *goal-setting ability*, using survey population weights. The median household *somewhat disagrees* with the above statement. Fig. 2, top panel, plots the relation between goal-setting ability and average values of wealth variables, namely net total wealth, net financial wealth, and net real wealth. All three indicators of wealth correlate negatively with the statement, implying that they correlate positively with goal-setting ability. For example, the average wealth of those who *strongly agree* with the lack of goal-setting statement is 57% lower than that of those who *strongly disagree*. The average financial and real wealth are 51% and 62% lower, respectively.

The upper-right graph in Fig. 1 shows the sample distribution of households’ reported *monitoring ability*, which shows that 55.1% of the sample assess themselves as having *strong* monitoring ability. Fig. 2, middle panel, displays the relationship between monitoring ability and averages of the wealth variables. Although the correlation between monitoring and the different measures of wealth is not as strong as the one of goal-setting ability, households who can better monitor their finances have higher net wealth. Particularly, the average wealth of those who *strongly disagree* with the monitoring statement is 23% lower than that of those who *strongly agree*. Average financial and real wealth are 13% and 31% lower, respectively.

Finally, the bottom center graph in Fig. 1 reports the sample distribution of the *commitment ability* variable. We find that the median household *somewhat agrees* with the mentioned statement.

Fig. 2, bottom panel, displays a positive relationship between commitment to goals and averages of the wealth variables. Average total net wealth of households who *strongly disagree* that they are active in carrying out their plans is approximately 59%, lower than that of the households who *strongly agree* with the statement. Average net financial and real wealth are 61% and 58%, lower, respectively.

### 3.2. Self-control failure measure

Since the theory we employ states that self-control is not operative if either one of the three ingredients fails, we construct our measure of self-control failure in the following manner. First, based on the questionnaire answers, we create a dummy variable for each ingredient of self-control, which takes the value of one if the questionnaire respondent answers to the statement with *somewhat disagree* or *strongly disagree* and zero otherwise.<sup>6</sup> These dummy variables flag whether households’ goal-setting, monitoring, and commitment abilities fail (or not). Using these dummy variables for the individual self-control ingredients, we set up the measure of self-control failure again as a dummy variable, which takes the value of one if the household fails to satisfy either one of the self-control ingredients. In this case, we say, the household exhibits self-control failure.<sup>7</sup>

Clearly, the choice of the threshold for the definition of the ingredient dummies above is necessarily somewhat arbitrary. We avoided creating ingredient dummies depicting the extreme outcome only (*strongly disagree*), since there are few respondents giving this answer for the monitoring and commitment question (2.42% and 2.50% of the sample, respectively). In Section 8, we present some robustness checks for the case where we group the three *dis-/agree* answers together.

### 3.3. Stability of the measure

The purpose of the paper is to present relationships between our self-control failure measure and measures of household wealth and financial distress. Our setting makes it very challenging to design an identification strategy that would allow for causal statements and, as a result, we shed away from them. Still, we try to account for a number of relevant sources of endogeneity, so that we can at least alleviate concerns about the economic mechanisms that drive our findings.

One such key source of endogeneity is the potential lack of stability of self-control over time, which raises concerns about reverse causality.<sup>8</sup> To address this concern, we first turn to literature in

<sup>6</sup> Note that, given the negative connotation of the statement determining goal-setting behavior, the dummy variable takes the value of one if the questionnaire respondent answers to the statement with *somewhat agree* or *strongly agree* and zero otherwise.

<sup>7</sup> An alternative approach would be to conduct factor analysis, which is the standard approach in personality psychology (see Almlund et al., 2011, for a survey of the research in the intersection of personality psychology and economics). This approach aims at constructing one factor out of the questions used and it operates under the assumption that the questions are measuring the same underlying personality trait. In our setting, however, the three questions correspond to three different traits, which mirrors to the statistical results of the factor analysis we have conducted: the three questions retain a high level of “uniqueness” (above 80%), which indicates that the factor created is not valid. Principal Component Analysis yields similar results: there exists no component that captures enough variation of all three ingredient variables. Yet, an alternative way to construct a self-control failure measure is following the “O-ring” theory of self-control. In that case the measure would no longer take a binary value, but a continuous one within a certain range. We have also experimented with such a measure and our results remain unchanged.

<sup>8</sup> In this context, self-control stability implies that the variable is not a function of educational, labor or any other financial decision variables under consideration, but rather an intrinsic characteristic, largely influenced by genes, developed at early age

<sup>5</sup> The 2010 wave of HRS also includes a special module on personality, where a subset of the respondents are asked questions related to self-control. Even though combining the lifestyle questionnaire and the personality module would be of great interest, the sample size decreases dramatically (only approx. 400 respondents answer both), which leads to insignificant results.

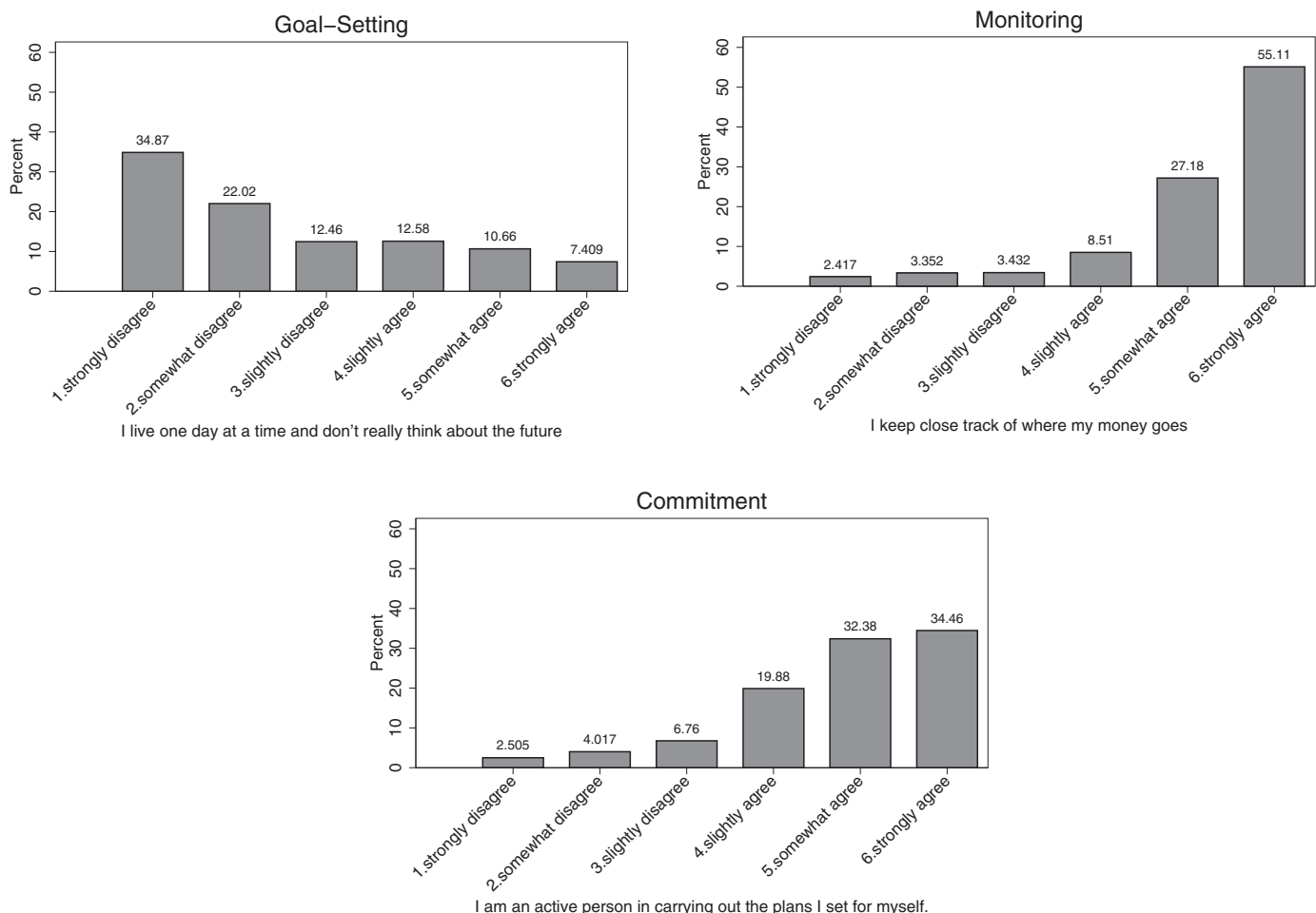


Fig. 1. Sample distributions of self-control ingredients.

psychology and find that it supports the case of self-control stability. In their influential study, Hirschi and Gottfredson (1990) pose the self-control stability hypothesis, arguing that self-control, once established by the ages 8–10, remains relatively stable over the life-course. Further, Coyne and Wight (2014) find substantial stability of self-control from kindergarten through fifth grade, with a strong genetic contribution to self-control (76%) and the remaining contribution attributed to shared environment. Overall, this evidence from the psychology literature is indicative of self-control being identifiable in early life, stable across childhood, and increasingly influenced by genes.

Even though the findings above are comforting, it could still be that our own measure of self-control failure is unstable. This could also occur due to the timing of the survey data that we have, since the 2010 wave records household behavior right after the Great Recession (2007–2009 for the US). To this end, the opportunity that HRS provides us to study self-control failure by introducing the monitoring question in 2010 is bundled with a limitation for our analysis. The respondents of our sample have only been asked the monitoring question once, which prevents us from evaluating the stability of the variable over time. In contrast, the planning and commitment questions have been answered in 2006 by a subset of our sample, containing 3634 households. The remainder of this

section discusses the stability of the planning and commitment ingredients within our dataset.

From the two ingredient variables, as recorded in 2006, we construct the dummies for ingredient failure the same way as for 2010. In the first column of Table 1, we present how the measures have evolved. The measure of planning, shown in panel A, remains the same for 77.7% of the respondents, whereas the one of commitment (panel B) is the same for 89.0% of them. Changes of the variables over time are balanced, with 10.8% of respondents having their planning fail in 2006, but not in 2010 and 11.6% of them reporting the opposite. Similarly, 4.8% of the respondents commitment failed in 2006, but not in 2010, whereas the opposite happened to 6.2% of them.

Following Cobb-Clark and Schurer (2012, 2013), we further examine whether the measures of the two ingredients are stable over the life-cycle. In Fig. 3, we display the results of non-parametric bivariate regression estimates of the change of the ingredient measure by 2010 age.<sup>9</sup> We find that the changes are by and large not significant at the 5% level. Also, our results for the really old are very noisy, due to the limited amount of observations (117 respondents are aged 90 or above).

Finally, although psychologists claim that self-control is largely established at young age, it may be susceptible to life changing

and persistent over the life-time. Moreover, stability of the measure also resolves potential problems with data limitation in the case when, the variable of interest (e.g., various measures of households net wealth) may be available years before or after the measurement of self-control.

<sup>9</sup> We use kernel regressions with a bandwidth equal to 2. See Cobb-Clark and Schurer (2012, 2013) on the stability of the Big Five personality traits and of "locus of control" (the latter refers to an individual's conviction that her life outcome is due to her own efforts).



**Table 1**  
Stability of self-control ingredients.

(A) Planning	Changes between 2006 and 2010					
	Full sample	No event	Spouse/partner died or left	Fired	Cancer	Psychiatric/emotional
No change	77.1	78.5	77.6	76.0	69.0	68.9
Change:						
(i) From no failure to failure	11.6	11.2	11.4	13.4	18.3	14.9
(ii) From failure to no failure	10.8	10.4	11.0	10.6	12.7	16.2
Observations	3634	2922	360	83	178	147
(B) Commitment	Changes between 2006 and 2010					
	Full sample	No event	Spouse/partner died or left	Fired	Cancer	Psychiatric/emotional
No change	89.0	89.2	86.9	87.2	91.2	83.1
Change:						
(i) From no failure to failure	6.2	6.1	6.9	7.6	4.7	8.5
(ii) From failure to no failure	4.8	4.6	6.3	5.2	4.1	8.4
Observations	3634	2922	360	83	178	147

events that happen throughout lifetime. What we have in mind are adverse events, which are arguably exogenous and which may influence self-control failure. We select four events, namely whether: (i) a spouse has died or left, (ii) the respondent got fired, (iii) the respondent got cancer or, (iv) the respondent has developed emotional, nervous or psychiatric problems. We explore the panel dimension of our dataset to track whether any of those events has occurred between the two survey waves, i.e., during the period 2006–2010.

Table 1, columns (2)–(6), display the ingredient changes over time, breaking the sample according to whether such an event has occurred. The events seem to affect the stability of the measures to some extent, and more so for the planning dummy. Still, in the worst case, a 68.9% of the respondents with psychiatric or emotional problems report the same measure for the two waves. Also, in most cases the direction of change of the measure is not clear (with the exception of the cancer variable and the change of planning). For the same emotional problems question, the percentage of respondents, who change from no failure to failure, increase from 11.2 to 14.9%, and the one with the opposite change increase from 10.4 to 16.2%.

Overall, our take of the literature and the analysis of the (two out of three) variables we use suggest that both self-control as a concept and our way of measuring it are quite stable over time, though by no means constant.<sup>10</sup> These findings of potential influences on the stability of our measure also inform the choice of our control variables.

#### 4. Wealth, financial distress and controls

##### 4.1. Wealth and financial distress

We now turn to a multivariate analysis of the relationship between self-control failure and household net worth. An advantage of using HRS is that it provides us with accurate measures of household wealth, net of any liabilities. Furthermore, it allows us to distinguish between net financial and real wealth, thus enabling us to estimate the importance of self-control failure for each of the two wealth components individually. Net real wealth refers to the value of primary residence, various other forms of real estate, privately owned businesses and vehicles, all net of any outstanding loans that use these assets as collateral. Financial wealth includes amounts held in checking, savings or money market accounts and holdings in certificates of deposit, government savings bonds and

T-bills, bonds, stocks, mutual funds and investment trusts, as well as any other savings. We further include the net value of IRA and Keogh accounts and subtract the value of any uncollateralized debt. All these variables are aggregated on the household level and missing values are imputed by RAND corporation. Given that the wealth variables are highly skewed we also normalize them.<sup>11</sup>

We further study whether self-control failure is related to the probability of financial distress. This is not a priori clear, even if self-control failure affects households' net worth negatively. People could ration their consumption behavior when the risk of them facing financial distress is higher, thereby mitigating the effects of self-control failure. The "Lifestyle Questionnaire" of HRS provides us with the financial distress measure we use, through the following question:

- Financial distress: "How difficult is it for you/your family to meet monthly payments on your/your family's bills?"

Respondents answer in a 1–5 scale, which ranges from *not at all difficult* to *completely difficult*. We construct our financial distress measure by creating a dummy variable that takes the value one when respondents answer *very difficult* and *completely difficult*, and zero otherwise. In Fig. 4, we display the distribution of the original measure, using survey population weights. Under our assumptions, 9.84% of the sample is facing financial distress. Gathergood (2012) uses a similar question, which he also calls self-reported financial distress to measure over-indebtedness. McCarthy (2011) uses the same definition with us.

##### 4.2. Controls

In our analysis, we control for a rich set of standard demographic and socioeconomic status characteristics, as well as for cognitive ability and health. All these variables are known to be wealth determinants in the household finance literature. What we would also like to highlight, is that they may be also related to self-control, which makes their inclusion in our specifications relevant. The sample statistics of all controls can be found in Table 2.

##### Cognitive ability

Cognitive ability stands out as an important personal trait, as it is arguable that certain individuals may abstain from planning and monitoring just because they do not have the necessary skill

<sup>10</sup> As Cobb-Clark and Schurer (2013) point out, there is no evidence from the literature in psychology that personality traits remain perfectly invariant over time.

<sup>11</sup> We use the inverse hyperbolic sine (IHS) transformation,  $\log(x + (x^2 + 1)^{1/2})$ . IHS is near-logarithmic and, at the same time, it is defined also for non-positive net wealth values.

**Table 2**  
Sample summary statistics.

	Observations	Mean	SD	Min.	Max.
Self-control failure	5350	0.261	0.439	0	1
Live life one day at a time	5350	2.641	1.642	1	6
Keep close track of money	5350	5.197	1.194	1	6
Active in carrying out own plans	5350	4.791	1.236	1	6
Net worth (000's)	5350	464.4	996.9	−843.5	27,815
Net financial wealth (000's)	5350	198.8	469.3	−1244	9400
Net real wealth (000's)	5350	265.6	761.9	−868.3	27,505
Financial distress	5291	0.098	0.298	0	1
Total income (000's)	5350	69.37	85.28	0	1330.0
Has debt	5350	0.583	0.493	0	1
Has collateralized debt	5350	0.440	0.496	0	1
Has uncollateralized debt	5350	0.373	0.484	0	1
Total debt (000's)	5350	60.31	117.87	0	2000
Collateralized debt (000's)	5350	54.44	110.00	−1.85e-06	1250
Uncollateralized debt (000's)	5350	5.87	34.70	0	2000
Gross financial wealth (000's)	5350	204.68	467.69	−3.97e-07	9400.02
Gross real wealth (000's)	5350	320.03	795.26	−1.98e-07	28,005
Gross worth (000's)	5350	524.70	1029.10	0	28,314
Is a couple	5350	0.559	0.497	0	1
Number of hhd residents	5350	1.977	1.092	1	11
Race: is Hispanic	5346	0.062	0.241	0	1
Race: is black	5347	0.090	0.287	0	1
Education: high-school graduate	5350	0.341	0.474	0	1
Education: some college	5350	0.255	0.436	0	1
Education: college and above	5350	0.289	0.453	0	1
Age in years	5350	65.70	10.56	50	101
Not working for pay	5341	0.551	0.497	0	1
Delayed word recall	5270	4.562	1.830	0	10
Serial 7s	5270	3.828	1.496	0	5
Performs interest compounding	4097	0.157	0.364	0	1
Self-reported health	5347	3.299	1.077	1	5
Is a smoker	5286	0.148	0.355	0	1
Is impulsive	5170	2.276	0.854	1	4

for that. At the same time, lower cognitive ability can have a negative effect on wealth, through poor income generation and mismanagement. We include two controls from the cognition section of HRS.<sup>12</sup> The first one records delayed memory and the second measures numeracy.

#### Health status

Health status may also correlate to our self-control measure. Individuals with very poor health are probably less prone to make long term plans and find it harder to monitor their expenses. The relationship can also work in the opposite direction, since personality traits, including self-control can lead to better health outcomes and longevity.<sup>13</sup> To account for health status, we use a measure of self-reported health, where individuals rate their health from 1 to 5.

#### Household income

We expect household income to interact with self-control through at least two different channels. On the one hand, workers who exercise self-control are expected to have more successful careers and reach higher levels of income, and therefore wealth, as a result.<sup>14</sup> On the other hand, households that face self-control failure and consume excessively as a result, may choose to increase their labor supply or seek better wages in order to avoid reducing their savings or borrow. These effects are distinct from the consumption-related channel that we explore in this paper.

To account for these effects, we include normalized income in our analysis. Furthermore, and in order to capture the non-linear

way that accumulated wealth and current income are linked (see van Rooij et al., 2012), we include its square and cube.

#### Age

Age has a non-linear relationship to income and wealth, as it proxies for work experience, time spent accumulating wealth and occurrence of health expenditures. Ameriks et al. (2007) report that older people display more self-control than the young. This finding also points to the possibility that self-control and financial behavior interact through a learning mechanism. Given our findings on the stability of self-control over the life-cycle, we think that this learning process is probably finished by the time people enter our sample at the age of 50. However, we still include age in our regressions and age squared, to account for the non-linearities.

#### Education

As Almlund et al. (2011) survey, traits related to self-control are related to better educational attainment. The educated exhibit more self-control, as successful studies require a certain level of self-discipline, planning and commitment. In our regressions, we include three dummy variables for high-school graduates, people who have had some college education and, finally, college graduates. Our missing category flags people who have less than a high-school degree.

#### Other controls

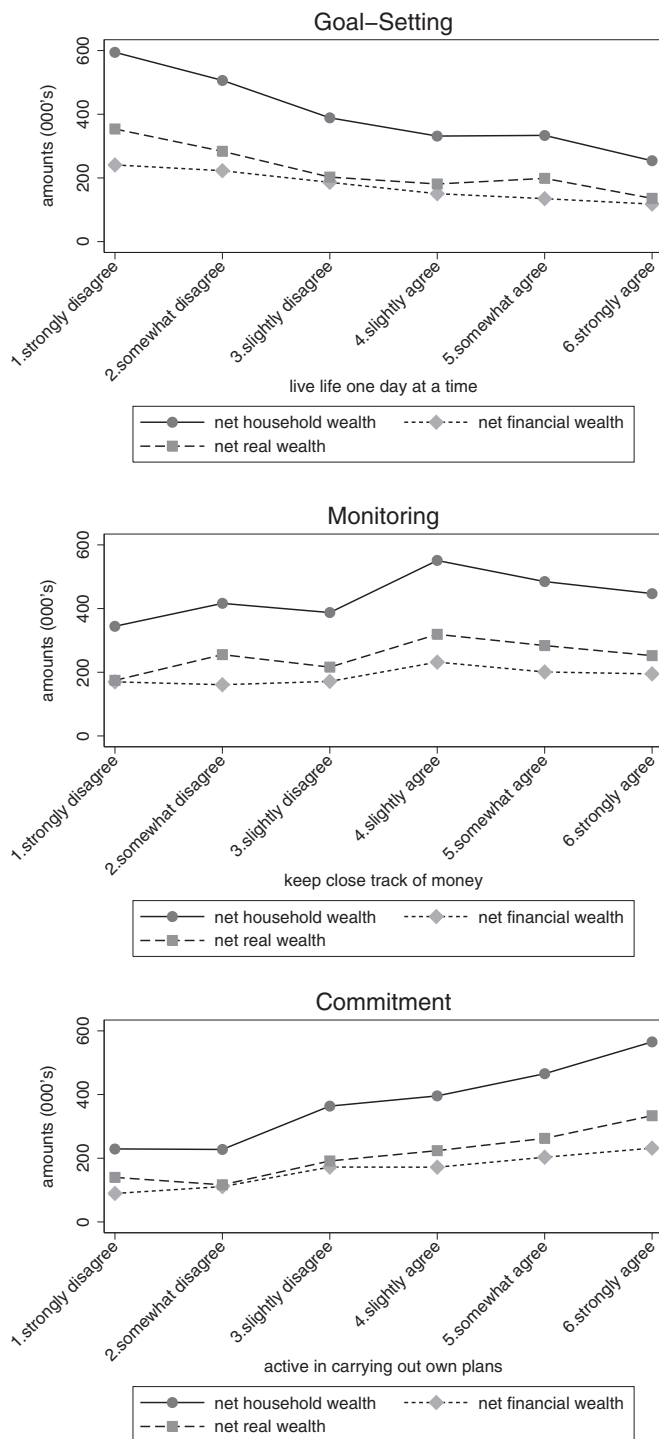
We finally include occupational status as a dummy that takes the value one if the person is not currently working, as well as variables containing race information, household composition and the gender of household respondent. All these have been found to be important factors for household wealth accumulation.

Finally, we note that, and as usual for a survey of its kind, HRS contains some of its variables measured at an individual level (e.g.,

<sup>12</sup> See Christelis et al. (2010) for measures using SHARE data.

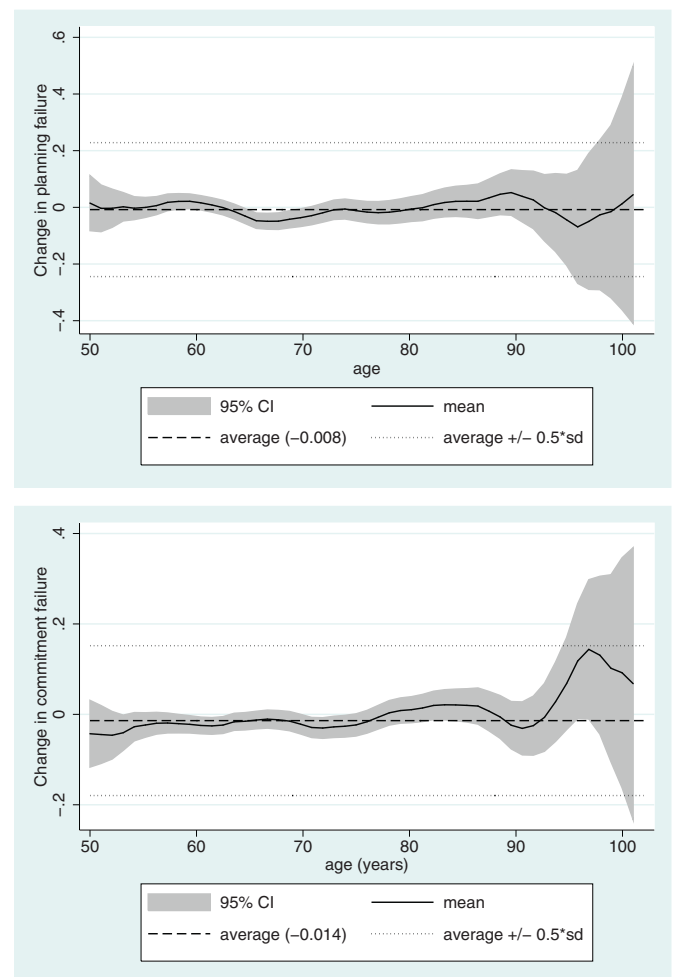
<sup>13</sup> See e.g., Hampson et al. (2007).

<sup>14</sup> See Bowles et al. (2001) for a discussion of how personality traits increase income through an increase in productivity.

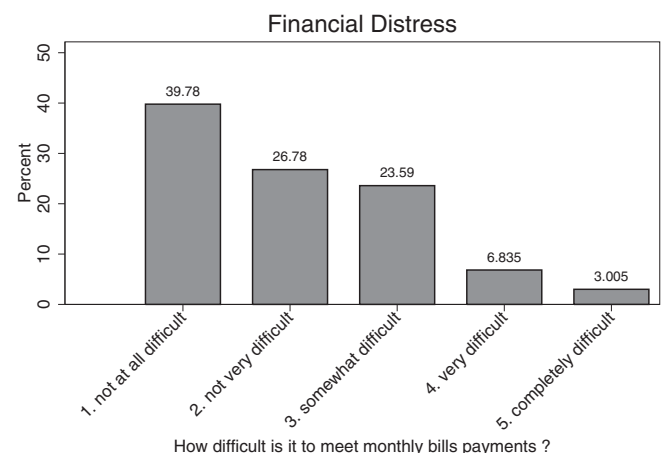


**Fig. 2.** Wealth and self-control ingredients. The figures plot the mean of net worth, net financial and net real wealth across different values of the self-control ingredients.

age and education) and others at a household level (e.g., wealth and income). In our empirical analysis, our approach is to use the financial respondent's individual responses as representative of the household, making the assumption that the person who answers the financial questions is the most relevant one. We believe that the financial respondent's self-control has probably the strongest relationship to household wealth. In Section 8, we present some robustness checks where we re-run our baseline regressions with our self-control measure aggregated on the household level.



**Fig. 3.** Changes of ingredients over the life-cycle. The figures plot the mean of the changes over the period 2006–2010, smoothed using a kernel regression. We further include the average change over the 4-year period, and the confidence bands.



**Fig. 4.** Sample distribution of financial distress measure.

## 5. Results

### 5.1. Self-control failure and net wealth

We model the association between self-control failure and net worth using an OLS regression with robust standard errors. Our

**Table 3**  
Net wealth and self-control failure.

	Net worth (IHS)		Net real wealth (IHS)		Net financial wealth (IHS)	
Self-control failure	−0.397***	(0.0828)	−0.240***	(0.0716)	−0.269***	(0.0836)
Total income (IHS)	0.969***	(0.0502)	0.464***	(0.0479)	0.916***	(0.0563)
Is female	0.00791	(0.0801)	−0.0386	(0.0681)	−0.0292	(0.0820)
Is a couple	0.493***	(0.0974)	0.588***	(0.0829)	0.0585	(0.102)
Number of hhd residents	−0.0650	(0.0462)	0.0263	(0.0407)	−0.270***	(0.0466)
Race: is Hispanic	−0.783***	(0.153)	−0.351***	(0.132)	−0.909***	(0.131)
Race: is black	−1.083***	(0.112)	−0.507***	(0.0979)	−1.109***	(0.108)
Education: high-school graduate	0.461***	(0.118)	0.360***	(0.102)	0.312***	(0.112)
Education: some college	0.595***	(0.129)	0.347***	(0.113)	0.562***	(0.128)
Education: college and above	0.833***	(0.139)	0.303**	(0.122)	1.205***	(0.144)
Age (years)	0.0886***	(0.00519)	0.0398***	(0.00431)	0.0616***	(0.00511)
Not working for pay	0.184**	(0.0918)	−0.0917	(0.0780)	0.753***	(0.0936)
Delayed word recall	0.0210	(0.0217)	0.0152	(0.0200)	0.0244	(0.0222)
Serial 7s	0.0629**	(0.0268)	0.00138	(0.0230)	0.114***	(0.0261)
Self-reported health	0.381***	(0.0386)	0.222***	(0.0333)	0.260***	(0.0373)
Net financial wealth (IHS)			0.220***	(0.0131)		
Net real wealth (IHS)					0.317***	(0.0189)
Observations	5251		5251		5251	
Adj. R <sup>2</sup>	0.348		0.332		0.422	

Note: We run OLS with robust S.E. and the coefficients can be interpreted as the average marginal effects of self control failure. For the real wealth regression we include financial wealth as an explanatory variable, and vice versa. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

specification is:

$$Y_i = b_0 + b_1 \cdot F_i + b'_2 X_i + u, \quad (1)$$

where  $i$  is the index for the households of our sample,  $Y_i$  is normalized net worth,  $F_i$  is our self-control failure measure and vector  $X_i$  includes the set of controls that have been presented in the previous section.

In the first column of Table 3, we report the average marginal effects of our net worth regression.<sup>15</sup> Households that fail to exhibit self-control end up with disproportionately lower levels of net worth. The result is statistically significant at all conventional levels. As we have discussed, our controls include all the standard socioeconomic variables that are considered to be wealth determinants. This implies that our results display a relationship between the two variables that exists over and above all those other factors.

Our controls have signs that are in line with what is standard in the literature. Cognitive abilities, income, education and age are positively associated with wealth, as is the dummy variable indicating that household has a couple (spouses or partners). On the other hand, the number of household residents and the existence of a spouse with Hispanic or black background has a negative relationship to wealth.

The relationship between self-control failure and net real wealth can be affected by two distinct channels. On one hand, individuals aware of their self-control problems may be accumulating more real wealth, utilizing it as a commitment device. On the other hand, individuals not aware of self-control problems may end up without much real wealth due to conspicuous consumption. The two channels operate in opposite directions and which of the two prevails is an empirical question. In the second column of Table 3 we find that self-control failure is associated with a decrease of net real wealth in a significant way, in a regression that includes net financial wealth as an additional control. The result points to the direction of low wealth accumulation as the strongest of the two channels described above. It further draws a different conclusion from the one of Ameriks et al. (2007), who find that

**Table 4**  
Self-control failure quantile regression coefficients.

Quantiles:	10%	25%	50%	75%	90%
Net worth	−0.660*** (0.228)	−0.460*** (0.101)	−0.310*** (0.084)	−0.219*** (0.058)	−0.165*** (0.056)
Net financial wealth	−0.245 (0.247)	−0.286** (0.127)	−0.240*** (0.088)	−0.175** (0.073)	−0.266*** (0.091)
Net real wealth	−0.210 (0.155)	−0.205** (0.086)	−0.124 (0.083)	−0.211*** (0.050)	−0.129** (0.066)

Note: We run quantile regressions with robust S.E. using all the controls included in our baseline specification. The results for controls have been suppressed. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

self-control is not related to illiquid wealth, as proxied by retirement assets.

Finally, net financial wealth may be linked to self-control failure since it is the most liquid part of households' wealth that can be used for impulsive purchases. Moreover, for households aware of their self-control problems, it can be negatively affected by real asset purchases that act as commitment devices. The last column of Table 3 displays the results for net financial wealth, which are significant at the 1% level. The regression includes net real wealth as a control.<sup>16</sup>

## 5.2. Self-control failure across the wealth distribution

One potential concern for the results at the mean that we present above is that maybe the relationship is strong only for a part of the wealth distribution. We therefore extend our analysis by estimating quantile regressions of our wealth measures using the same regressors as in the previous section. In Table 4, we present the coefficients of our self-control failure measure for the regressions of the three wealth variables, estimated at the 10, 25, 50, 75 and 90% level of their distribution. Self-control failure has a negative relationship with household net worth across all of its distribution at 1% significance level. Overall, the link is stronger at the lower end of the wealth distribution, but remains economically

<sup>15</sup> Throughout the paper, we report average marginal effects results for all our estimations, including for OLS regressions. This way, we keep our tables more compact with respect to the non-linear relationships of wealth to age and income (modeled as 2nd and 3rd order polynomials respectively).

<sup>16</sup> As an exercise, we also examined the possibility whether the relationship between self-control failure and wealth is driven by borrowing or by saving behavior only. Taken together, the results were rather weak and inconclusive, requiring a more careful consideration and further research.



**Table 5**

Probability of financial distress and self-control failure.

	Pr(Paying bills = very difficult or completely difficult)	
Self-control failure	0.0349***	(0.00752)
Net financial wealth (IHS)	−0.0162***	(0.00124)
Net real wealth (IHS)	−0.00690***	(0.00145)
Total income (IHS)	−0.0211***	(0.00531)
Is female	0.00560	(0.00763)
Is a couple	−0.00439	(0.00945)
Number of hhd residents	0.00650*	(0.00348)
Race: is Hispanic	−0.0300**	(0.0120)
Race: is black	0.00186	(0.00928)
Education: high-school graduate	0.0106	(0.0103)
Education: some college	0.0311***	(0.0115)
Education: college and above	0.0218	(0.0138)
Age (years)	−0.00346***	(0.000582)
Not working for pay	0.0241**	(0.00941)
Delayed word recall	0.00327	(0.00224)
Serial 7s	−0.00215	(0.00235)
Self-reported health	−0.0119***	(0.00359)
Unconditional probability	0.098	
Observations	5194	
ll	−1318.76	

Note: We run Probit with robust S.E. and report the average marginal effects for the outcome of financial distress. Self-control failure is associated with a increase of the probability of finding it very difficult to pay bills. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

large throughout. Results on net financial wealth range from non-significant at the 10th quantile to significant at the 1% level for the 50th and at 90th quantiles. The relationship is significant at the 5% level for the 25th and for the 75th quantiles. The coefficient sizes remain similar. Finally, as far as net real wealth is concerned, the results appear to be the strongest at the 75th quantile (i.e., significant at 1% level). At the 25th and at the 90th quantiles of the distribution, they appear to be somewhat weaker, i.e., significant at 5% level; and for the 10th and for the 50th quantiles, they appear to be insignificant.

### 5.3. Self-control failure and financial distress

We model financial distress as a latent variable that is related to self-control failure through the following specification:

$$Y_i^* = b_0 + b_1 \cdot F_i + b_2' X_i + u, \quad (2)$$

where, again,  $i$  is the index for the households of our sample,  $Y_i^*$  is financial distress as a latent variable,  $F_i$  is our self-control failure measure and vector  $X_i$  includes the set of controls of the previous section, as well as normalized real and financial wealth. Our financial distress measure is a dummy variable and therefore we estimate the model using a probit regression.

In Table 5, we report the average marginal effects of self-control failure for the outcome of financial distress, adjusted using the survey population weights. For households whose self-control fails, the probability of facing financial distress increases by 3.5%, which represents a 35.9% increase from the unconditional levels of 9.8%. The result is statistically significant at 1% level.

The findings suggest a strong positive relationship between the occurrence of self-control failure and the probability of facing financial distress. This highlights the relevance of self-control for extreme situations that go beyond standard wealth accumulation: whatever households do in reaction to financial distress does not break the link with self-control failure. Furthermore, the relationship exists over and above the effects of all the standard socioeconomic status variables we control for, including wealth itself.

### 5.4. The role of self-control ingredients

Our self-control failure measure is a nonlinear combination of measures that may relate to household wealth. However, it may be that the importance of the ingredients is varying for different wealth measures. Furthermore, we need to exclude the possibility that one or more of the variables we use is actually redundant or, differently put, that our empirical results are driven by the relationship of wealth to only one or two of our ingredients.

To test the relative importance of the three ingredients of self-control, we re-estimate our models, replacing the original measure with the three dummies that flag failure of the three ingredients, as defined in Section 3. In Table 6, we present the results for the wealth variables. The level of significance varies for the different wealth measures and different variables. Failure of the goal-setting ability (standards) has relationships to net worth and net real wealth statistically significant at the 1% level. Monitoring is significant at 1% for net financial wealth and at 5% for net worth. Finally, failure of commitment to preset goals is significantly associated with net worth at the 1% level and with net real wealth at the 5% level. All the significant coefficients are negative, in line with the theory.

For net financial wealth, monitoring is the key ingredient of self-control. The numbers suggest that a failure in monitoring (“keeping track of where money goes”) relates to a significant decrease in net financial wealth. This hints to the idea that liquid financial resources require placing more attention on day-to-day spending behavior and allocation of resources. On the other hand, it appears that the most significant ingredients for net real wealth are the ability for goal-setting and the ability to commit to pre-set goals. This finding supports the presumption that peoples’ investing in real estate requires both planning and commitment (e.g., to mortgage repayment) in order to achieve a goal such as the one of buying a house. Furthermore, and to the extent that our results capture something more than simple correlations, the differences in the results for real and financial wealth may mean that different policies are required for different targets: saving in liquid assets may be fostered by improved monitoring technology, whereas illiquid investments may benefit more by advanced planning and commitment devices.

In Table 7, we present the relationship between financial distress and the three ingredients. Financial distress is significantly associated at the 1% level with monitoring and commitment, and at 5% level with goal-setting. All three relationships are positive.

Finally, a key takeaway from this analysis is that different ingredients of self-control can be more important than others for different settings, but they all contribute to our baseline results. Therefore, our self-control failure measure is not only in line with the theory, but it also consists of ingredients that are associated with household wealth and/or financial distress measures on a stand-alone basis.

## 6. Comparison to other measures of self-control

As discussed earlier, other measures of self-control commonly used in the literature include proxies (e.g., smoking or drinking habits) or single self-reported behavioral personality characteristics based on the presumption that they highly correlate with the strength of self-control. In this section, we examine how the measure of self-control that we built in this paper performs relative to such existing measures. First, we compare the results of our measure to the one measuring self-control through *impulsive behavior*. We use a variable from the “Lifestyle Questionnaire,” where respondents are asked how well the word “impulsive” describes them. The answers are given in four different levels ranging from “a lot” to “not at all” and descriptive statistics can be

**Table 6**  
Net wealth variables and self-control failure ingredients.

	Net worth (IHS)		Net real wealth (IHS)		Net financial wealth (IHS)	
Standards failure	−0.327***	(0.0929)	−0.274***	(0.0808)	−0.0794	(0.0895)
Monitoring failure	−0.404**	(0.168)	−0.00807	(0.135)	−0.671***	(0.178)
Commitment failure	−0.386***	(0.147)	−0.296**	(0.125)	−0.170	(0.151)
Total income (IHS)	0.969***	(0.0501)	0.461***	(0.0479)	0.922***	(0.0562)
Is female	0.00448	(0.0799)	−0.0380	(0.0680)	−0.0362	(0.0819)
Is a couple	0.493***	(0.0976)	0.581***	(0.0830)	0.0689	(0.102)
Number of hhd residents	−0.0672	(0.0462)	0.0271	(0.0407)	−0.275***	(0.0466)
Race: is Hispanic	−0.790***	(0.153)	−0.350***	(0.132)	−0.922***	(0.131)
Race: is black	−1.082***	(0.112)	−0.519***	(0.0980)	−1.086***	(0.108)
Education: high-school graduate	0.462***	(0.118)	0.357***	(0.102)	0.317***	(0.113)
Education: some college	0.600***	(0.129)	0.341***	(0.112)	0.581***	(0.128)
Education: college and above	0.839***	(0.139)	0.294**	(0.122)	1.232***	(0.144)
Age (years)	0.0883***	(0.00520)	0.0396***	(0.00431)	0.0614***	(0.00510)
Not working for pay	0.183**	(0.0920)	−0.0859	(0.0780)	0.742***	(0.0937)
Delayed word recall	0.0198	(0.0217)	0.0133	(0.0200)	0.0256	(0.0222)
Serial 7s	0.0622**	(0.0267)	0.000341	(0.0230)	0.115***	(0.0261)
Self-reported health	0.374***	(0.0385)	0.218***	(0.0333)	0.255***	(0.0374)
Net financial wealth (IHS)			0.221***	(0.0131)		
Net real wealth (IHS)					0.317***	(0.0189)
Observations	5251		5251		5251	
Adj. R <sup>2</sup>	0.349		0.3332		0.423	

Note: We run OLS with robust S.E. and the coefficients can be interpreted as the average marginal effects of self control failure. For the real wealth regression we include financial wealth as an explanatory variable, and vice versa. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

**Table 7**  
Probability of financial distress and self-control failure ingredients.

	Pr(Paying bills = very difficult or completely difficult)	
Standards failure	0.0165**	(0.00841)
Monitoring failure	0.0400***	(0.0135)
Commitment failure	0.0460***	(0.0116)
Net financial wealth (IHS)	−0.0161***	(0.00124)
Net real wealth (IHS)	−0.00689***	(0.00146)
Total income (IHS)	−0.0213***	(0.00533)
Is female	0.00623	(0.00766)
Is a couple	−0.00495	(0.00947)
Number of hhd residents	0.00703**	(0.00347)
Race: is Hispanic	−0.0278**	(0.0120)
Race: is black	0.00114	(0.00932)
Education: high-school graduate	0.00961	(0.0103)
Education: some college	0.0285**	(0.0114)
Education: college and above	0.0182	(0.0138)
Age (years)	−0.00342***	(0.000584)
Not working for pay	0.0244***	(0.00942)
Delayed word recall	0.00329	(0.00224)
Serial 7s	−0.00217	(0.00235)
Self-reported health	−0.0105***	(0.00359)
Unconditional probability	0.098	
Observations	5194	
ll	−1313.17	

Note: We run Probit with robust S.E. and report the average marginal effects for the outcome of financial distress. Self-control failure ingredients are associated with a increase of the probability of finding it very difficult to pay bills. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

found in Table 1. We further use *smoking*, where individual's status as a smoker is taken as a proxy to measure self-control problems. Tables 8–11 display the overall output from these analyses.

We begin by estimating the baseline model using the measure of impulsiveness to reflect households' self-control problems. Subsequently, we augment this estimation scenario by adding our self-control measure to examine if measuring self-control problems the way we do helps in explaining households financial behavior. The estimation output can be found in Tables 8–11 and suggests that the impulsiveness measure is either statistically insignificant, or if significant, its level of significance declines once our measure of

self-control failure is added to the model. These results indicate that while impulsiveness may be a close proxy for lack of commitment, there are might be other relevant attributes that it does not capture such as planning and monitoring abilities, which turn out to associate strongly (both statistically and economically) to households wealth outcomes. Hence, using only impulsiveness to depict households' willpower problems, one may be omitting certain crucial ingredients of self-control, relevant for households' wealth outcomes.

Subsequently, we perform the same analysis as with the impulsiveness measure, but this time using smoking habits to reflect households' self-control problems. The outcome of the estimation, presented in Tables 8–10, column (3), suggests that smoking is associated with all household wealth outcomes at 1% significance level; however, as shown in Table 11, column (3), smoking is not statistically significant for households' probability of facing a financial distress. Similarly, as before, we augment the estimation equation with our measure of self-control. The addition of this variable does not affect the significance of the coefficient on smoking; nonetheless our self-control variable turns out to be significant for all indicators of wealth, including also the probability of facing a financial distress.<sup>17</sup>

The significance of the coefficient on the smoking variable may be explained in several ways. One possible explanation is that smoking is costly on its own and therefore it may affect households' wealth. Another plausible explanation is that it may be capturing other aspects of the environment or life-style that our controls are not capable to fully account for. In essence, it could be justifying certain life choices such as social circles, interactions with other people, sport activities or hobbies, as well as consequences thereof, that appear important for wealth outcomes. At any rate, its inclusion in the regressions does not alter the coefficients of our baseline estimation in a significant way.

## 7. Robustness checks

We further perform a set of robustness checks on our findings. We begin by using an alternative definition for the measure of our

<sup>17</sup> See column (4) in Tables 8–11 respectively.

**Table 8**

Comparison to other measures: net worth (IHS).

	(1)	(2)	(3)	(4)
Impulsive	−0.0581	(0.0433)	−0.0515	(0.0433)
Smoker			−0.460***	(0.113)
Self-control failure		−0.405***	(0.0843)	−0.393***
Total income (IHS)	0.982***	(0.0512)	0.975***	(0.0510)
Is female	−0.00764	(0.0815)	0.0109	(0.0814)
Is a couple	0.481***	(0.0986)	0.465***	(0.0986)
Number of hhd residents	−0.0696	(0.0467)	−0.0654	(0.0469)
Race: is Hispanic	−0.801***	(0.157)	−0.799***	(0.156)
Race: is black	−1.089***	(0.115)	−1.116***	(0.115)
Education: high-school graduate	0.467***	(0.121)	0.442***	(0.121)
Education: some college	0.614***	(0.132)	0.571***	(0.132)
Education: college and above	0.849***	(0.142)	0.803***	(0.142)
Age (years)	0.0884***	(0.00530)	0.0879***	(0.00529)
Not working for pay	0.177*	(0.0930)	0.188**	(0.0927)
Delayed word recall	0.0202	(0.0221)	0.0150	(0.0220)
Serial 7s	0.0816***	(0.0273)	0.0761***	(0.0273)
Self-reported health	0.390***	(0.0394)	0.373***	(0.0394)
Observations	5122	5122	5239	5239
Adj. R <sup>2</sup>	0.343	0.346	0.347	0.350

Note: We run OLS with robust S.E. and the coefficients can be interpreted as the average marginal effects of the alternative measures and our self-control failure measure. Columns (1) and (2) compare our measure to *impulsive behavior*; columns (3) and (4) compare our measure to *smoking*. Standard errors in parenthesis. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

**Table 9**

Comparison to other measures: net real wealth (IHS).

	(1)	(2)	(3)	(4)
Impulsive	−0.00898	(0.0372)	−0.00539	(0.0373)
Smoker			−0.262***	(0.0939)
Self-control failure		−0.233***	(0.0729)	−0.241***
Net financial wealth (IHS)	0.224***	(0.0133)	0.221***	(0.0133)
Net financial wealth (IHS)	0.224***	(0.0133)	0.222***	(0.0132)
Total income (IHS)	0.466***	(0.0488)	0.465***	(0.0487)
Is female	−0.0512	(0.0693)	−0.0407	(0.0693)
Is a couple	0.570***	(0.0841)	0.562***	(0.0840)
Number of hhd residents	0.0251	(0.0411)	0.0269	(0.0412)
Race: is Hispanic	−0.346***	(0.134)	−0.347***	(0.134)
Race: is black	−0.503***	(0.100)	−0.522***	(0.0999)
Education: high-school graduate	0.371***	(0.105)	0.357***	(0.105)
Education: some college	0.364***	(0.115)	0.342***	(0.115)
Education: college and above	0.320**	(0.124)	0.297**	(0.124)
Age (years)	0.0394***	(0.00440)	0.0393***	(0.00439)
Not working for pay	−0.105	(0.0790)	−0.0969	(0.0788)
Delayed word recall	0.0128	(0.0203)	0.00984	(0.0203)
Serial 7s	0.0108	(0.0235)	0.00803	(0.0235)
Self-reported health	0.230***	(0.0338)	0.221***	(0.0340)
Observations	5122	5122	5239	5239
Adj. R <sup>2</sup>	0.328	0.329	0.331	0.333

Note: We run OLS with robust S.E. and the coefficients can be interpreted as the average marginal effects of the alternative measures and our self-control failure measure. Columns (1) and (2) compare our measure to *impulsive behavior*; columns (3) and (4) compare our measure to *smoking*. Standard errors in parenthesis. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

self-control failure ingredients and, therefore, for the self-control failure measure itself. Instead of indexing failure of goal-setting when the original variable takes the values “strongly agree” and “somewhat agree”, we use “slightly agree” as well. Likewise, for monitoring and commitment failure we use “slightly disagree” on top of the “somewhat disagree” and “strongly disagree” outcomes. In Table 12 in the appendix, we see that the results for all wealth variables remain statistically strong. In Table 13 in the appendix, we report the average marginal effects for the case of financial distress. Self-control failure is still positively associated with increased probability of facing financial distress, with the coefficients being significant at the 1% level.

We additionally test to what extent our results are sensitive to the fact that we only use the individual level responses of the financial respondent. We aggregate the responses of the two spouses/partners, where applicable, as follows: we take the age of

the household to be the mean of the two. For cognitive ability measures and education, we take the maximum attainment. We also use the maximum of the scores for the financial distress variable. Our basic financial literacy dummy takes the value 1 if either of the two answers correctly. Also, our race dummies (Black and Hispanic) take the value 1 if either of the two belongs to it and the variable for being out of work is 1 if either of the two does not work. For self-reported health, we use the minimum of the two instead. Regarding the measures of our self-control ingredients, we use the maximum score for the planning variable and the minimum one for monitoring and commitment to change. In Table 14 in the appendix, we report our findings; our estimates are very similar to the ones of the baseline results. Re-estimating the financial distress specification with these data (not reported in the paper) gives exactly the same picture.

**Table 10**  
Comparison to other measures: net financial wealth (IHS).

	(1)	(2)	(3)	(4)
Impulsive	−0.0831**	(0.0424)	−0.0786*	(0.0424)
Smoker			−0.330***	(0.109)
Self-control failure		−0.283***	(0.0850)	−0.262***
Net real wealth (IHS)	0.321***	(0.0191)	0.318***	(0.0191)
Total income (IHS)	0.921***	(0.0572)	0.919***	(0.0571)
Is female	−0.0387	(0.0830)	−0.0259	(0.0830)
Is a couple	0.0635	(0.103)	0.0543	(0.103)
Number of hhd residents	−0.270***	(0.0472)	−0.267***	(0.0472)
Race: is Hispanic	−0.936***	(0.134)	−0.937***	(0.134)
Race: is black	−1.104***	(0.110)	−1.126***	(0.111)
Education: high-school graduate	0.322***	(0.116)	0.306***	(0.116)
Education: some college	0.581***	(0.131)	0.553***	(0.131)
Education: college and above	1.215***	(0.148)	1.185***	(0.148)
Age (years)	0.0624***	(0.00520)	0.0622***	(0.00520)
Not working for pay	0.752***	(0.0945)	0.760***	(0.0944)
Delayed word recall	0.0303	(0.0226)	0.0267	(0.0226)
Serial 7s	0.124***	(0.0266)	0.121***	(0.0266)
Self-reported health	0.264***	(0.0379)	0.253***	(0.0378)
Observations	5122	5122	5239	5239
Adj. R <sup>2</sup>	0.421	0.422	0.427	0.424

Note: We run OLS with robust S.E. and the coefficients can be interpreted as the average marginal effects of the alternative measures and our self-control failure measure. Columns (1) and (2) compare our measure to *impulsive behavior*; columns (3) and (4) compare our measure to *smoking*. Standard errors in parenthesis. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

**Table 11**  
Comparison to other measures: financial distress.

	(1)	(2)	(3)	(4)
Impulsive	0.0108***	(0.00411)	0.0100**	(0.00404)
Smoker			0.0140	(0.00884)
Self-control failure		0.0336***	(0.00758)	0.0344***
Net financial wealth (IHS)	−0.0166***	(0.00125)	−0.0163***	(0.00124)
Net real wealth (IHS)	−0.00717***	(0.00146)	−0.00684***	(0.00145)
Total income (IHS)	−0.0227***	(0.00538)	−0.0223***	(0.00533)
Is female	0.00910	(0.00775)	0.00749	(0.00770)
Is a couple	−0.00196	(0.00957)	−0.00154	(0.00949)
Number of hhd residents	0.00777**	(0.00352)	0.00739**	(0.00351)
Race: is Hispanic	−0.0313**	(0.0123)	−0.0312**	(0.0121)
Race: is black	−0.00300	(0.00949)	−0.000121	(0.00942)
Education: high-school graduate	0.00872	(0.0107)	0.0103	(0.0106)
Education: some college	0.0306***	(0.0117)	0.0334***	(0.0116)
Education: college and above	0.0226	(0.0140)	0.0259*	(0.0139)
Age (years)	−0.00350***	(0.000596)	−0.00339***	(0.000588)
Not working for pay	0.0264***	(0.00948)	0.0242**	(0.00942)
Delayed word recall	0.00242	(0.00229)	0.00281	(0.00227)
Serial 7s	−0.00223	(0.00238)	−0.00179	(0.00238)
Self-reported health	−0.0139***	(0.00366)	−0.0124***	(0.00363)
Observations	5072	5072	5183	5183
Adj.R <sup>2</sup>	−1279.09	−1269.24	−1324.55	−1314.03

Note: We run Probit with robust S.E. and report the average marginal effects of the alternative measures and our self-control failure measure. Columns (1) and (2) compare our measure to *impulsive behavior*; columns (3) and (4) compare our measure to *smoking*. Standard errors in parenthesis. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

Haliassos and Bertaut (1995) discuss that financial knowledge lowers the cost of gathering and processing the information, thereby interfering with self-control. We experiment by including a measure of basic financial literacy in our specification, which measures the ability of households to grasp the rather basic financial concept of interest compounding. We exploit a question that asks respondents to give the amount they would receive if they were to invest 200 US dollars for two years in an account that offered them 20% per annum. We construct a dummy for those respondents that gave the right answer and find that 14.3% of our sample do. van Rooij et al. (2012) use an extended measure that includes our interest compounding measure and a measure of numeracy, similar to the one used in the cognitive abilities section. The problem with this variable is that 19% of our sample do not answer it and this

leads to selection bias of our sample toward the rich. Inclusion of this variable does not change our baseline results much (full tables available upon request).

Last but not least, even though our dataset allows controlling for an important number of variables, it may still be that there exist other, unobservable variables that could correlate with both self-control failure and households wealth. An important example is risk aversion, which may correlate with the propensity to live one day at a time (an ingredient in our self-control measure), but at the same time it is a well-known determinant of wealth outcomes. Unfortunately for our analysis, the 2010 wave of HRS includes no measure of risk aversion. Our specifications do include the gender of the financial respondent, which is a crude proxy of risk aversion, since women are documented to be more risk averse



**Table 12**  
Net wealth and self-control failure (alternative measure).

	Net worth (IHS)		Net real wealth (IHS)		Net financial wealth (IHS)	
Self-control failure	−0.367***	(0.0734)	−0.220***	(0.0635)	−0.274***	(0.0769)
Total income (IHS)	0.970***	(0.0502)	0.465***	(0.0478)	0.917***	(0.0563)
Is female	0.000743	(0.0802)	−0.0430	(0.0681)	−0.0333	(0.0821)
Is a couple	0.486***	(0.0973)	0.584***	(0.0830)	0.0526	(0.102)
Number of hhd residents	−0.0654	(0.0460)	0.0260	(0.0407)	−0.270***	(0.0465)
Race: is Hispanic	−0.812***	(0.153)	−0.368***	(0.132)	−0.930***	(0.131)
Race: is black	−1.099***	(0.112)	−0.517***	(0.0982)	−1.122***	(0.108)
Education: high-school graduate	0.474***	(0.118)	0.368***	(0.102)	0.319***	(0.112)
Education: some college	0.616***	(0.129)	0.360***	(0.113)	0.574***	(0.127)
Education: college and above	0.840***	(0.139)	0.308**	(0.122)	1.208***	(0.144)
Age (years)	0.0882***	(0.00518)	0.0396***	(0.00431)	0.0613***	(0.00510)
Not working for pay	0.186**	(0.0918)	−0.0899	(0.0780)	0.756***	(0.0937)
Delayed word recall	0.0203	(0.0217)	0.0148	(0.0200)	0.0235	(0.0222)
Serial 7s	0.0633**	(0.0268)	0.00165	(0.0230)	0.114***	(0.0261)
Self-reported health	0.373***	(0.0386)	0.217***	(0.0334)	0.254***	(0.0374)
Net financial wealth (IHS)			0.220***	(0.0131)		
Net real wealth (IHS)					0.317***	(0.0189)
Observations	5251		5251		5251	
Adj. R <sup>2</sup>		0.348		0.332		0.422

Note: We run OLS with robust S.E. and the coefficients can be interpreted as the average marginal effects of self control failure. For the real wealth regression we include financial wealth as an explanatory variable, and vice versa. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

**Table 13**  
Robustness checks: financial distress (alternative measure).

	Pr(Paying bills = very difficult) or completely difficult)	
Self-control failure	0.0300***	(0.00737)
Net financial wealth (IHS)	−0.0162***	(0.00124)
Net real wealth (IHS)	−0.00701***	(0.00145)
Total income (IHS)	−0.0215***	(0.00533)
Is female	0.00619	(0.00764)
Is a couple	−0.00378	(0.00946)
Number of hhd residents	0.00667*	(0.00347)
Race: is Hispanic	−0.0272**	(0.0120)
Race: is black	0.00291	(0.00935)
Education: high-school graduate	0.00931	(0.0104)
Education: some college	0.0294**	(0.0115)
Education: college and above	0.0210	(0.0139)
Age (years)	−0.00345***	(0.000582)
Not working for pay	0.0244***	(0.00942)
Delayed word recall	0.00329	(0.00225)
Serial 7s	−0.00227	(0.00236)
Self-reported health	−0.0114***	(0.00360)
Unconditional probability	0.098	
Observations	5194	
ll	−1321.03	

Note: We run Probit with robust S.E. and report the average marginal effects for the outcome of financial distress. Self-control failure is associated with an increase of the probability of finding it very difficult to pay bills. Standard errors in parentheses. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

than men.<sup>18</sup> Still, we acknowledge that this is only a partial solution to the problem.

Further, in an attempt to control for risk aversion, we make use of variables that reflect individuals attitude toward risk and are available in the 2006 wave. This choice could be susceptible to criticism since the stability of risk aversion over time is an open issue in itself. That said, it is the only option that our data provides. More specifically, we use a variable that ranks respondents in a range of 1–6 from the least to the most risk averse, based on

a series of lottery questions on investing an inheritance. The lottery questions are only asked for a random sub-sample of those households who are aged 65 or above at the time of the interview (2006). This reduces the eligible sample down to 1146 households. In Table 15, we compare the results on net worth with and without the risk aversion variable, estimated at the same selected sample. We find that the inclusion of risk aversion does not change our findings. The significance of the results is lower, which is attributed to the decrease in the sample size. Experimenting with other wealth measures and other risk measures (which are available for 2006 households aged 65 and above) provides the same picture: the significance of the point estimate for self-control failure is not altered by the inclusion of the risk aversion parameter.

## 8. Concluding remarks

The positive relationship between self-control and households' wealth has been discussed widely in the literature. In this paper, we have defined a measure of self-control failure by employing a theory from psychology, proposed by Baumeister and Heather-ton and co-authors (1996,2002), which suggests that three factors – goal-setting, monitoring, and commitment – play an important role in determining self-control strength. Based on this definition of self-control, we measure self-control failure in the HRS to examine its link to household wealth outcomes, particularly net wealth (overall, real, and financial) and to the probability of a household facing a financial distress.

In summary, we find that self-control failure is strongly associated with all household wealth indicators we consider as part of this population-wide representative survey. Using quantile regressions, we confirm that the relationship also holds for a wide range of the wealth distribution. Furthermore, our measure delivers stronger results than a standard impulsiveness measure and is unaffected by the inclusion of smoking as a proxy. Finally, a more detailed analysis shows that all the individual components that cause self-control to fail quantitatively contribute to these results.

To the extent that our results capture something more than simple correlations, decomposing self-control to a set of ingredients paves the way to targeted policy remedies. Fernandes et al. (2014) argue that emotionally controlled decisions, like compul-

<sup>18</sup> See e.g., Borghans et al. (2009) and references therein.



**Table 14**

Robustness Checks: net wealth and self-control failure (using data aggregated to the household level).

	Net worth (IHS)		Net real wealth (IHS)		Net financial wealth (IHS)	
Self-control failure	−0.353***	(0.0733)	−0.208***	(0.0630)	−0.274***	(0.0757)
Total income (IHS)	0.970***	(0.0479)	0.464***	(0.0451)	0.903***	(0.0538)
Is a couple	0.647***	(0.0956)	0.722***	(0.0825)	0.0436	(0.101)
Number of hhd residents	−0.0739*	(0.0441)	0.0373	(0.0377)	−0.280***	(0.0442)
Race: is Hispanic	−0.637***	(0.134)	−0.235**	(0.117)	−0.882***	(0.121)
Race: is black	−1.043***	(0.109)	−0.495***	(0.0964)	−1.125***	(0.105)
Education: high-school graduate	0.474***	(0.124)	0.424***	(0.109)	0.246**	(0.114)
Education: some college	0.702***	(0.133)	0.441***	(0.118)	0.608***	(0.126)
Education: college and above	0.923***	(0.142)	0.435***	(0.126)	1.191***	(0.143)
(mean) Age	0.0960**	(0.00531)	0.0485***	(0.00441)	0.0612***	(0.00527)
Not working for pay	0.165*	(0.0977)	−0.113	(0.0840)	0.716***	(0.0988)
Delayed word recall	0.0619***	(0.0217)	0.0367*	(0.0199)	0.0382*	(0.0221)
Serial 7s	0.0556**	(0.0275)	−0.00588	(0.0240)	0.118***	(0.0261)
Self-reported health	0.390***	(0.0369)	0.225***	(0.0315)	0.289***	(0.0369)
Net financial wealth (IHS)			0.218***	(0.0128)		
Net real wealth (IHS)					0.317***	(0.0186)
Observations	5618		5618		5618	
Adj. R <sup>2</sup>	0.344		0.330		0.417	

Note: We run OLS with robust S.E. Compared to the baseline specification, we aggregate the self-control failure measure and the demographic data of the household, instead of using the financial respondent's only. The variables include race, education, age, working status, cognitive abilities and health. For the real wealth regression we include financial wealth as an explanatory variable, and vice versa. Standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 15**

Robustness checks: controlling for risk aversion (OLS with robust S.E.).

Self-control failure	−0.336**	(0.148)	−0.334**	(0.148)
Total income (IHS)	0.973***	(0.0944)	0.977***	(0.0941)
Is female	−0.00271	(0.162)	−0.0152	(0.163)
Is a couple	0.357*	(0.188)	0.353*	(0.188)
Number of hhd residents	−0.0824	(0.105)	−0.0779	(0.105)
Race: is Hispanic	−0.785**	(0.340)	−0.764**	(0.343)
Race: is black	−0.607***	(0.230)	−0.606***	(0.230)
Education: high-school graduate	0.392*	(0.213)	0.393*	(0.213)
Education: some college	0.347	(0.231)	0.351	(0.231)
Education: college and above	0.478**	(0.242)	0.483**	(0.243)
Age (years)	0.0669***	(0.0131)	0.0669***	(0.0131)
Not working for pay	−0.0380	(0.161)	−0.0396	(0.162)
Delayed word recall	0.0524	(0.0375)	0.0524	(0.0375)
Serial 7s	0.137***	(0.0475)	0.139***	(0.0482)
Self-reported health	0.272***	(0.0660)	0.273***	(0.0660)
Risk aversion			0.0360	(0.0453)
Observations	1146		1146	
Adj. R <sup>2</sup>	0.290		0.293	

Note: We run OLS with robust S.E. Compared to the baseline specification, we control for a measure of risk aversion that is available in the 2006 wave of HRS. Standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

sive consumption, can be amended more effectively with initiatives that focus on the problematic behavior itself. These initiatives could include promotion of consumption monitoring through specialized bank statements and more flexible retail financial products that act as tailor-made commitment devices. Furthermore, self-control support can be a convincing argument for households to participate in financial planning programs and to make use of monitoring services and commitment devices. It is a fairly easily understood concept and one that, arguably, people can relate to.

In any case, our decomposition could provide additional justification for existing policies: Initiatives on financial planning are important, not only because learning how to plan is necessary to quantify the goals of the household, but also because a household with a plan may be less likely to act impulsively. Likewise, providing adequate and readable financial information is important, not only for misinformed households to avoid mistakes, but also because an informed household could exhibit more self-control. Finally, devices like automated transfers to savings accounts are not only simplifying the execution of a decision, but also represent a

valuable tool for households to commit to their plans, against their impulses.

### Acknowledgments

We are grateful to Inaki Aldasoro, Enzo Cerletti, Arvid Hoffmann, Olga Goldfine, Yigitcan Karabulut, Jian Li, Eirini Tatsi, Nate Vellekoop and especially our adviser Michael Haliassos for valuable comments. We thank two anonymous referees and the associate editor for extremely useful comments and suggestions, as well as the participants of the CGR Conference on "Institutional and Individual Investors: Saving for Old Age," the 3rd European Retail Investment Conference, the 7th RGS Doctoral Conference in Economics and the Brown Bag Seminar at Goethe University. We gratefully acknowledge research support from the Research Center SAFE, funded by the State of Hessen initiative for research LOEWE. The views expressed are those of the authors and do not necessarily represent the views of the European Central Bank or the International Monetary Fund.

## References

- Almlund, M., Lee Duckworth, A., Heckman, J., Kautz, T., 2011. Personality psychology and economics. In: Hanushek, E., Machin, S., Woessmann, L. (Eds.), *Handbook of the Economics of Education*, Vol.4. Elsevier B.V., Amsterdam: North Holland, pp. 1–158.
- Ameriks, J., Caplin, A., Leahy, J., 2003. Wealth accumulation and the propensity to plan. *Q. J. Econ.* 118 (3), 1007–1047.
- Ameriks, J., Caplin, A., Leahy, J., Tyler, T., 2007. Measuring self-control problems. *Am. Econ. Rev.* 97 (3), 966–972.
- Baumeister, R.F., 2002. Yielding to temptation: self-control failure, impulsive purchasing, and consumer behavior. *J. Consum. Res.* 28 (4), 670–676.
- Baumeister, R.F., Heatherton, T.F., 1996. Self-regulation failure: an overview. *Psychol. Inq.* 7, 1–15.
- Baumeister, R.F., Heatherton, T.F., Tice, D.M., 1994. *Losing Control: How and Why People Fail at Self-regulation*. Academic Press, San Diego, California.
- Bertaut, C., Haliassos, M., Reiter, M., 2009. Credit card debt puzzles and debt revolvers for self-control. *Rev. Financ.* 13 (4), 657–692.
- Borghans, L., Heckman, J.J., Golsteyn, B.H.H., Meijers, H., 2009. Gender differences in risk aversion and ambiguity aversion. *J. Eur. Econ. Assoc.* 7 (2–3), 649–658.
- Bowles, S., Gintis, H., Osborne, M., 2001. The determinants of earnings: a behavioral approach. *J. Econ. Lit.* 39 (4), 1137–1176.
- Burger, N., Charness, G., Lynham, J., 2009. Three Field Experiments on Procrastination and Willpower. Rand Corporation, University of California at Santa Barbara, University of Hawai'i at Manoa. (Unpublished working paper)
- Christelis, D., Jappelli, T., Padula, M., 2010. Cognitive abilities and portfolio choice. *Eur. Econ. Rev.* 54 (1), 18–38.
- Cobb-Clark, D., Schurer, S., 2012. The stability of the big-five personality traits. *Econ. Lett.* 115, 11–15.
- Cobb-Clark, D., Schurer, S., 2013. Two economists musings on the stability of locus of control. *Econ. J.* 123, 358–400.
- Coyne, M.A., Wight, J.P., 2014. The stability of self-control across childhood. *Personal. Individ. Differ.* 69, 144–149.
- DellaVigna, S., Malmendier, U., 2006. Paying not to go to the gym. *Am. Econ. Rev.* 96, 694–719.
- Fernandes, D., Lynch Jr., J.G., Netemeyer, R.G., 2014. Financial literacy, financial education, and downstream financial behaviors. *Manag. Sci.* 60 (8), 1861–1883.
- Gathergood, J., 2012. Self-control, financial literacy and consumer over-indebtedness. *J. Econ. Psychol.* 33 (3), 590–602.
- Guiso, L., Haliassos, M., Jappelli, T., 2002. *Household Portfolios*. MIT Press, Cambridge, MA.
- Gul, F., Pesendorfer, W., 2001. Temptation and self-control. *Econometrica* 69 (6), 1403–1435.
- Gul, F., Pesendorfer, W., 2004. Self-control and the theory of consumption. *Econometrica* 72 (1), 119–158.
- Haliassos, M., Bertaut, C., 1995. Why do so few hold stocks? *Econ. J.* 105, 1110–1129.
- Hampson, S.E., Goldberg, L.R., Vogt, T.M., Dubanoski, J.P., 2007. Mechanisms by which childhood personality traits influence adult health status: educational attainment and healthy behaviors. *Health Psychol.* 26 (1), 121–125.
- Houser, D., Reiley, D.H., Urbancic, M.B., 2008. *Checking Out Temptation: A Natural Experiment with Purchases at the Grocery Register*. University of California, Berkeley, University of Arizona, and George Mason University. (Unpublished working paper).
- Kremer, M., 1993. The O-ring theory of economic development. *Q. J. Econ.* 108 (3), 551–575.
- McCarthy, Y., 2011. *Behavioural Characteristics and Financial Distress*. In: Working Paper Series No. 1303. ECB, Frankfurt.
- Mischel, W., Ebbesen, E.B., Raskoff Zeiss, A., 1972. Cognitive and attentional mechanisms in delay of gratification. *J. Personal. Soc. Psychol.* 21 (2), 204–218.
- Robins, R.W., Tracy, J.L., Sherman, J.W., 2007. What kinds of methods do personality psychologists use? A survey of journal editors and editorial board members. In: Robins, R.W., Fraley, R.C., Krueger, R.F. (Eds.), *Handbook of Research Methods in Personality Psychology*. The Guilford Press, New York, pp. 673–678.
- van Rooij, M., Lusardi, A., Alessie, R., 2012. Financial literacy, retirement planning and household wealth. *Econ. J.* 122, 449–478.
- Thaler, R.H., Sherfin, H.M., 1981. An economic theory of self-control. *J. Polit. Econ.* 89 (2), 392–406.