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SELF-ASSESSED LIFE-CYCLE SAVING BEHAVIOR IN THE U.S. AND SINGAPORE:
PROCRASTINATION VERSUS ECONOMIC SHOCKS

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Working Paper 34835
<http://www.nber.org/papers/w34835>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2026

No conflicts of interest to disclose. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research. The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement and Disability Research Consortium through the Michigan Retirement and Disability Research Center Award RDR18000002 02. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the Federal Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States Government or any agency thereof. Data collection of the SLP was funded by the Singapore Ministry of Education under grant number MOE2013-T3-1-009 to the Singapore Management University. Data collection of the ALP modules used in this study was funded by the National Institute on Aging (P01 AG008291) with additional funding from the Max Planck Society. Jessica Hayes provided excellent programming assistance.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

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Self-assessed Life-Cycle Saving Behavior in the U.S. and Singapore: Procrastination Versus Economic Shocks

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NBER Working Paper No. 34835

February 2026

JEL No. D15, J14, J18

ABSTRACT

It is widely believed that procrastination contributes to under-saving. Using household survey data from the United States and Singapore, we find little evidence to support this view. In both countries, indicators of procrastination have only weak, if any, explanatory power for saving regret. About half of respondents aged 60–74 expressed regret about not having saved more, but this sentiment was primarily associated with exposure to economic shocks rather than procrastination. A larger share of U.S. respondents reported saving regret, reflecting their greater exposure to adverse shocks. In contrast, Singapore’s system of mandatory saving for retirement, housing, and health expenses appears to mitigate the long-term financial impact of such shocks. However, with little opportunity for risk pooling, Singapore households still remain vulnerable to shocks. These findings highlight the importance of institutional design in risk protection over the lifecycle.

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Introduction

A large body of research advocates employing choice architecture or “nudging” to encourage individuals to save more for retirement (Benartzi and Thaler 2013; Chetty et al. 2014; Laibson 1997, 1998; Laibson et al. 1998; Madrian and Shea 2001; Thaler and Sunstein 2009). These interventions are typically justified by the belief that many people under-save because they procrastinate or exhibit present-biased preferences (Akerlof 1991; O’Donoghue and Rabin 1999; Brown and Previtro 2014; Goda et al. 2019; Castaldo et al. 2024). An implication is that, on hindsight, individuals would prefer to have saved more than they actually did. Yet empirical evidence on whether people do regret their past saving decisions—and what drives such regret—remains limited (but see Börsch-Supan et al. 2023; Hurwitz and Mitchell 2025; Castaldo et al. 2024).

This paper examines the behavioral explanation for under-saving by comparing self-assessed life-cycle saving behavior in the United States and Singapore and investigating its relationship to markers of procrastination. Using household survey data from the RAND American Life Panel (ALP) and the Singapore Life Panel (SLP), we ask respondents aged 60–74 whether, if given the chance to do it over again, they would have saved differently earlier in life. We define “saving regret” as wishing to have saved more. Prior work found that saving regret was common but unrelated to survey measures of procrastination (Börsch-Supan et al. 2023). Here, we extend the analysis cross-nationally to examine whether the same pattern holds in a country with markedly different institutional arrangements.

Singapore provides a particularly informative contrast to the U.S. While both countries emphasize individual responsibility for retirement preparation, Singapore has

little social insurance but mandates high levels of saving into funds managed by the Central Provident Fund (CPF), which can be used to finance retirement consumption, health care, and housing. These funds provide a buffer against financial shocks over the lifecycle such as medical expenses that can erode long-term savings. In contrast, the U.S. system relies more heavily on voluntary saving to complement the limited available social insurance programs, possibly leaving households overall more exposed to financial risks.

Our findings challenge the view that procrastination is the primary driver of under-saving. In both countries, individuals who score high on measures of procrastination are no more likely to express saving regret than others. Instead, saving regret is strongly associated with the experience of adverse economic shocks. The higher frequency and severity of shocks in the U.S. largely account for its greater incidence of saving regret relative to Singapore. These results underscore the importance of policy design in mitigating the long-term financial consequences of shocks. By providing institutional mechanisms for forced saving Singapore's CPF system appears to reduce the likelihood that shocks translate into lasting financial regret. Still, although lower than in the United States, saving regret remains substantial in Singapore, with approximately 45 percent of respondents indicating that they wish they had saved more.

Background about Singapore

For many years Singapore has experienced strong economic growth: GDP per capita was \$14,300 in 1979 and \$67,700 in 2019 (both in 2018 USD). And it

experienced similarly strong growth in education. In 2015, for example, only 25% of 65-69 year-olds in Singapore had some post-secondary education, while 45% of 50-54 year-olds did. This implies that in 15 years the proportion of the population attending at least some college increased by 20 percentage points.

The economy of Singapore is strongly market based but with significant policy interventions. The most important intervention for saving behavior is the Central Provident Fund (CPF), which is operated by the Singapore Government. While there is some variation by age and cohort, for most workers 37% of earnings is mandated to be contributed to the CPF, about half paid by the employee and half by the employer. These contributions are on a pre-tax basis (tax advantaged). They are paid into three accounts. First, about half the mandated contribution is deposited into the Ordinary Account. This account may be used for investment and for purchasing housing and servicing a mortgage, even during the working life. Unspent funds from this account may be used to support spending in retirement. Second, about one-fourth of the total contribution is paid into the Special Account, which is savings for retirement. These funds cannot be withdrawn before age 55. Thus about 9% of earnings are dedicated solely to retirement, which is slightly less than what is paid into Social Security for retirement in the U.S. (about 10%). Both the Special Account and the Ordinary Account are defined contribution pension schemes, so that, unlike the U.S. Social Security system, they lack progressivity. Third, the remaining one-fourth of contributions are paid into the MediSave account, which is used for health care insurance and spending on health care during working life and in retirement. The MediSave account can also be used to fund health insurance and health care spending by family members. At age 55,

a fourth account, the Retirement Account, is established using monies from the Special Account and the Ordinary Account. There is a required minimum that must be deposited into the Retirement Account. At age 65 or at least by age 70, a mandated minimum amount of the Retirement Account must be converted to an annuity.

The savings in the Ordinary and Special accounts (about 27% of earnings) would appear to be adequate to finance retirement, but apparently much of the savings in the Ordinary Account have been used to finance the purchase of housing. Housing is quite expensive in Singapore resulting, in a high concentration of wealth in housing: in the SLP sample Singaporeans 50 to 70 years old in 2018 had median housing wealth of about \$377,000 (converted to 2018 US dollars using purchasing power parity)¹ and median total wealth of \$575,000. To put these values into perspective, we note that in 2018 median income of Singapore couples shortly before retirement (age 50-55) was about \$47,000.

All persons can buy subsidized health insurance to cover costs in public hospitals and clinics. Lower income persons can be subsidized further. Higher income persons can buy additional integrated plans which cover private hospitals and better wards. Two-thirds of the population had purchased such plans by the end of 2017 (GenRe, 2018). The insurance purchase can be made from the MediSave account.

Most assets in CPF accounts earn interest above market rates. CPF account holders have some ability to invest in stocks and other limited vehicles, but mostly the

¹ The conversion is to multiply the Singapore dollar by 0.94 based on purchasing power parity. According to the actual exchange rate the Singapore dollar was worth about 0.73 US dollar.

funds are interest bearing. Retirement is financed by CPF account balances and any private savings. Private pensions are rare.

As of the date of the SLP survey, the “Retirement Age” was 62, having been increased from age 60 in 1993. Employers may not dismiss employees on grounds of age before the retirement age of age 62. The retirement age was raised to 63 in 2022. Employees work on contracts, which often have end dates at specific ages, particularly age 62 and 65.

Singapore has a policy to encourage later retirement, the Retirement and Re-employment Act (RRA). The RRA was introduced in 2007 but not enacted until 2012. The employers of workers whose contracts ended between the ages of 62 and 65 were encouraged to extend their contracts either in one shot or in a series of one-year contracts to the Re-employment Age, which was specified in the RRA act to be age 65 (Ministry of Manpower 2025). The new contract may be subject to negotiation, resulting in a change in duties or a reduction in wages within specified limits. The employer has an incentive to “re-employ” the worker because of penalties that could be imposed should an unwillingness to re-employ not be justified. Satisfactory reasons for not re-employing would include workers’ health conditions or poor job performance.

The Re-employment Age was increased to age 67 in 2017 and to age 68 in 2022. Likely as a result of the discussion surrounding the RRA, labor force participation at older ages increased sharply even before the formal enactment in 2012: in 2005 the labor force participation rate of males 60-64 was 52.5% and of females was 21.3%; in 2019, these rates were 76.7% for males and 50.7% for females.

There is no government-provided unemployment insurance in Singapore. The stated aim of the government is to help with re-employment. But some long-term unemployment exists (Hurd and Rohwedder 2018).

Data

The RAND American Life Panel

The ALP is a standing panel of about 6,000 individuals age 18 and older who are invited to take a survey over the Internet from time to time. Individuals are recruited into the panel in a way to enhance population representation. The panel has been active in its current form since 2006, so that data from hundreds of surveys are available and can be linked to individuals, greatly expanding the types of analyses that can be performed on data from any particular wave. See Pollard and Baird (2017) for details on sample recruitment, response rates, retention and weighting.

We designed ALP survey 455, which was fielded in August-December 2016 to respondents age 60 or older. We obtained 1,728 completed interviews (72.3% response rate). The questionnaire began with socio-demographic and economic characteristics, a psychometric battery for personal characteristics including procrastination, and a set of questions about the respondents' assessment of their income and living standards. To elicit an assessment of saving behavior we asked:

...please think back to when you were around 45 years old.
Suppose you could re-do your spending and saving from then to
now, would you...

- 1 Save more over the years?
- 2 Save about the same over the years?

3 Save less over the years?

We call the choice of 1 “saving regret.”

We conducted a design experiment in ALP. For a random 50% of respondents we modified response 1 to:

1 Spend less and save more over the years?

to remind respondents that saving more would require a reduction in spending. We call this the “framed” version. Framing resulted in a reduction of regret of about seven percentage points.

For those who expressed regret we followed up with a list of categories of spending items such as housing, food or clothing and asked which of them could have been reduced in order to have saved more. We included a response of

No way we could have cut spending. We could not have saved more

in which case we re-coded the respondent as not expressing saving regret. The objective of the follow-up questions was to remind, perhaps more forcefully, that saving more would require spending less.

We fielded a second survey from December 2017 to February 2018 in which we asked again about saving regret. We used the framed version only and used the follow-up about categories of spending that could be reduced. In most of the results presented in this paper we pool the responses from the two ALP surveys and account for the effect on the standard errors of a repeated observation on the overlap cases.

We asked a battery of questions in wave 1 about an individual's self-perception of his or her ability to accomplish difficult tasks and about whether in past or ongoing actions the person had or does procrastinate. We call these “psychometric” variables.

The design of this battery was informed by the literature on measurement and research of procrastination (see Ferrari et al., 1995, for an overview of various scales). Several of the widely-used scales were developed to measure procrastination among student populations (Lay, 1986; Tuckman 1991). We selected several items and adapted them to the setting of our research and the age of the respondents in our sample. The battery includes general personal traits (8 items), e.g., “I am a relaxed person” or “I like exciting or risky activities” (strongly agree ... strongly disagree), and questions that directly address procrastination and perseverance (10 items), e.g., “How often do you put off things you should do?” or “Do you give up when things get difficult?” (never, sometimes, most of the time, always).

A first set of five questions used the following format:

Do you agree or disagree with the following statements?

The first question was

People should do what they like today rather than putting it off until tomorrow.

- 1 Strongly disagree
- 2 Disagree
- 3 Neither agree or disagree
- 4 Agree
- 5 Strongly agree

This question was followed with four additional attitudinal questions. See Table 3A for the complete list, and Appendix A for complete wording.

The second set asks the respondent whether he or she behaves in a particular manner such as this question which directly assesses procrastination:

How often do you...
put things off you should do but aren't really interested
in?

- 1 Never
- 2 Some-time
- 3 Most of the time
- 4 Always

We use responses to seven questions of this type in this paper. See Table 3B for a listing, and Appendix A for complete wording. In total we use 12 psychometric variables from the ALP. These same 12 were also asked in the SLP survey. The literature on behavioral explanations for under-saving would suggest that responses to these questions would be strongly related to an expression of saving regret.

An alternative explanation for saving regret is shocks that may have occurred earlier in life, and which had an important impact on the respondent's financial situation. In the ALP survey we asked about negative shocks in the following way:

Sometimes people have negative surprises earlier in life that cause their finances to turn out worse than expected. Did any of the following happen to you? Please check all that apply.

We listed eleven negative shocks such as unemployment or a large health expense. A similar question was posed about positive shocks. We listed eight positive shocks such as "earned more than expected" or "received an inheritance." The list of shocks was the same in ALP Wave 2 and SLP, but it was somewhat different in ALP Wave 1, so that when comparing the frequency of shocks or the saving regret

associated with shocks between the ALP and the SLP we will confine the sample to those who were in ALP wave 2. But for the overlap cases we use their report of saving regret from both waves along with their report of shocks from Wave 2.²

Combining both ALP waves, we have 2,618 respondents in the age range 60-74. Of them 2,111 were in both waves (overlap cases), 328 in wave 1 but not in wave 2, and 179 in wave 2 but not in wave 1.

The Singapore Life Panel

The Singapore Life Panel (SLP) is a monthly, Internet-based survey. It was representative of the Singapore population age 50-70 (and their spouses) when first recruited in 2015. The SLP was modeled in many ways after the ALP Financial Crisis Surveys, a series of monthly interviews that Hurd and Rohwedder launched in the ALP in May 2009 (Hurd and Rohwedder 2015). The SLP has a core of regular monthly questions, some additional regular quarterly content, plus rotating modules. Once a year it obtains a complete assessment of income during the preceding year and a complete balance sheet of assets. The SLP has consistently high response rates, obtaining about 7,500 interviews every month (Vaithianathan et al., 2021).

In May 2018, we fielded a survey in the SLP on saving regret. We aimed to obtain data elicited in exactly the same way as in Wave 2 of the ALP survey. We asked about saving regret in the framed version, as in the second ALP survey. We asked the same psychometrics questions, the same measures of planning horizon, financial

² Because of observation error or reporting error, the wave 2 response contains additional information, but the standard error must be adjusted for a second report from the same respondent.

literacy and probability numeracy, and about the same shocks. We obtained 4,309 responses in the age range 60-74.

Results

Table 1 shows the percent of respondents expressing regret in the ALP and in the SLP, both before and after revision. Both populations reduced regret when asked what types of spending could have been reduced, in the ALP by about 12 percentage points and in the SLP by eight percentage points. Fewer Singaporeans than Americans wished they had saved more (45.4% vs. 54.2%); very few in either country would have saved less.

Table 2 shows the variation in saving regret as a function of demographic, social and economic characteristics. In both countries there is little difference between males and females.

In the U.S. there is a monotonic age gradient: greater age is associated with less regret and the difference between the oldest and the youngest age band is statistically significant. That pattern is not found in Singapore.

The distribution of the population by marital status is quite different in Singapore: Divorce is 11 percentage points lower and “never married” five percentage points higher than in the U.S. Among those in the U.S., higher proportions of those who are separated, divorced, or widowed expressed saving regret. This is in line with the well-known economic status of those groups: in particular divorced or separated women have fewer economic resources. This pattern by marital status is not evident in Singapore.

Because the levels of education in the two countries are quite different, we divided educational attainment into terciles. Given the large number of U.S. respondents who have completed high school but no further education, we used randomization to achieve the equal allocations.³ In the U.S., those in the middle educational tercile expressed regret with the greatest frequency. In Singapore, saving regret was four percentage points higher in the second and third education tercile than in the lowest tercile.

In both countries, those in the highest wealth quartile are the least likely to express saving regret, with the difference between the highest wealth quartile and the others being greater in the ALP than in the SLP.⁴ There is limited variation in saving regret by income in either country and no systematic gradient. In Singapore, those in fair or poor self-assessed health are more likely to express regret. This pattern is also observed in the U.S., but the difference is not statistically significant.

The extensive literature that explains under-saving using behavioral explanations led us to expect systematic and large variation in saving regret as a function of measures of procrastination, self-control and present bias. In Table 3 we show how saving regret varies by such measures of personal traits.

The first five traits measure self-confidence and present focus. The literature suggests that high self-confidence leads to better decision making if it is aligned with competence; otherwise it may signal overconfidence which tends to lead to suboptimal

³ In the ALP the lowest tercile is mostly composed of those who completed high school, whereas in the SLP it is mostly composed of those with a primary education only.

⁴ The large number of missing values in the ALP is due to wealth data being collected in a different wave of the ALP. It is only in the overlap cases that we have a wealth measure.

decision making (Benabou and Tirole, 2002; Moore and Healy, 2008; Pikulina et al., 2017). It is therefore an empirical matter how individuals' rating of self-confidence relates to saving regret. For the other four variables the literature suggests that those with stronger present focus would be less likely to follow through on saving for retirement and thus be more likely to express saving regret (Laibson 1997; O'Donoghue and Rabin 1999; Goda et al. 2019). For example, those who work best under pressure, prefer to do what they like today and believe that life is about having fun would be expected to have a tendency to delay attending to tasks that would have a payoff many years in the future such as saving for retirement, and, thus, they would have a higher propensity to express saving regret.

Because of very few responses at the extremes, we collapsed the five response categories into three: 1. strongly disagree or disagree, 2. neither agree nor disagree, 3. agree or strongly agree. For the first three variables the distribution across response categories shows a similar pattern in the ALP and the SLP. However, for the last two variables, the population distributions differ markedly. For "life is about having fun," the SLP responses are split evenly between the three categories, whereas the ALP responses are strongly shifted toward "disagree." The other notable difference is the response to the statement *"For the sake of my health, I stay away from unhealthy foods or behaviors that I might enjoy."* Some 35% of ALP respondents agreed with that statement compared with 64% of SLP respondents.

When we consider the relationship between the responses to the personal traits and the expression of saving regret, we find little correlation. For each of the five characteristics in Panel A we estimated the mean expression of regret over each of the

three response categories, and we make comparisons between the reference category, the category with the most observations, and the other two categories, for a total of 10 comparisons. In the ALP, there were no statistically significant differences in saving regret at the 5% level. In the SLP, there were six statistically significant differences in two-sided tests, but just two of them had the expected sign, that is an increase in regret for an increase in a measure of a focus on the present. For example, 48% of those agreeing with *“People should do what they like today rather than putting it off until tomorrow”* expressed saving regret compared with 41% of those disagreeing and 40% of those neither agreeing nor disagreeing. That is, people with a greater focus on the present were somewhat more likely to express regret. However, in four of the six significant comparisons the sign of the difference did not align with expectations. Among those who agreed with the statement *“For the sake of my health, I stay away from unhealthy foods or behaviors that I might enjoy,”* 48% expressed saving regret compared with 39% among those who neither agreed nor disagreed with the statement, and 42% among those who agreed.

In Table 3 - Panel B we show the estimates across seven statements about self-reported tendencies of procrastination and perseverance. Rather than asking about general attitudes and perceptions as those presented in Panel A the traits in Panel B are based on asking individuals about the frequency of their own actions. All of them are important ingredients for follow-through for saving for retirement, a multistep process with considerable complexity. In both the ALP and the SLP we conducted comparisons between the reference category and the other three categories for each of the seven behaviors for a total of 21 comparisons in each data set. In the ALP there were four

significant differences, but three were not of the anticipated sign. For example, among those who responded “most of the time” to the question “*How often do you settle for mediocre results when you could do better?*” 35% expressed saving regret compared with 53% among those who responded “sometimes.” In the SLP, there were three statistically significant comparisons, but all had the opposite sign from what the literature would suggest. For example, among those who sometimes “try several tasks but don’t complete many” 43.9% expressed saving regret, compared to 48.4% among those who never “try several tasks but don’t complete many.” Similarly, those who never put off difficult things, and those who never lose motivation during tasks were more likely to report saving regret than the reference group, that is, those who sometimes engaged in those behaviors of delay.

Table 4 shows the fraction expressing regret as a function of individuals’ financial planning horizon and of two supporting skills for better financial decision making (Hung et al. 2009). One of the supporting skills is financial literacy, measured by the number of correct responses to the “Big Three” financial literacy questions that aim to capture individuals’ understanding of basic financial concepts (Lusardi and Mitchell, 2011 & 2014). The other supporting skill is probability numeracy which measures respondents’ ability to think probabilistically, a central component of intertemporal decision making in the context of saving for retirement (Hudomiet et al. 2018).⁵ The most frequent responses to planning horizon were “next few years” or “5-10 years.” In both, the ALP and the SLP, the fraction reporting regret is lowest among those with a long horizon of

⁵ In both the ALP and the SLP large fractions have missing values for these variables because the data had to be retrieved from other ALP and SLP surveys which were not taken by some of our respondents.

10 years or more; there is no clear pattern in regret across the other categories of financial planning horizon. We found no systematic relationship between saving regret and financial literacy, but we did with respect to probability numeracy: Individuals who correctly answered all (ALP and SLP) or all-but-one (SLP) probability questions were least likely to report saving regret, and these differences were statistically significant in both the ALP and the SLP.

Table 5 shows the frequency of shocks that impacted the households' finances either negatively (top panel) or positively (bottom panel), ordered from most frequent to least in the SLP, along with the associated likelihood of expressing saving regret. The fraction reporting at least one negative shock is much higher in the ALP (69%) than in the SLP (46%). Among those who reported a negative shock in the ALP, 61% expressed regret, compared with 42% among those who did not experience a negative shock (Table 7B). In Singapore, negative shocks are not only less common but also appear to have milder consequences, as indicated by the lower fraction expressing saving regret conditional on experiencing a negative shock (52%). Among respondents who did not experience a negative shock, the prevalence of saving regret is nearly identical across the two samples (40% in the SLP vs 42% in the ALP).

Four of the five most frequent shocks are related to the labor market, and their frequencies and their effects on saving regret are greater in the ALP. For example, among those who experienced an unemployment shock (a spell "that caused their finances to turn out worse than expected"), the proportion who stated regret was 0.62 in the ALP, compared to 0.54 in Singapore. The other labor market shocks, "health limited

work,” “retired too early,” and “earnings less than expected,” were also more common in the ALP and associated with higher rates of saving regret than in the SLP.

Several non-labor shocks were likewise more prevalent in the ALP, such as providing financial help to relatives, facing unexpectedly high college costs, experiencing a death in the family, and undergoing a divorce or separation. These events had a pronounced effect on saving regret in the ALP but little or no effect in the SLP. The frequency of health care spending shocks is about the same in both surveys (between 10 and 11%), yet their consequences differ markedly: compared to those without any negative shock, the frequency of saving regret is elevated by 0.244 among those with a health related spending shock in the ALP, while the corresponding differential in the SLP is only 0.096.

The bottom panel of Table 5 shows results related to our queries about positive shocks. Several positive shocks were not associated with reductions saving regret, and investigation showed they were often associated with negative shocks. In the SLP 61% of those working longer than expected also experienced a negative shock compared with 43% among those who did not work longer than expected. Thus, *worked longer* may have been due to financial necessity and the “positive” surprise was the ability to ameliorate the shock to household finances thanks to additional year(s) of work. There is a similar although less pronounced tendency in the ALP: among those who worked more than expected, 80% experienced a negative shock compared with 67% among those who did not work more than expected. (Not shown in table.) While some who “spent less than expected” may have done so because an important item of purchase cost less than expected resulting in an unexpected elevated level of wealth, others may

have spent less because of earnings shortfalls or because other shocks forced them to spend less. Receiving financial help from family, which would be an increase in lifetime resources, was associated in the data with a greater likelihood of experiencing a negative shock, and the increase was greatest for “health limited work,” followed by “large health expense.” Because of these ambiguities, the summary variable “any positive shock” in Table 5 excludes reports from these three variables.

Overall, we found a larger proportion of ALP respondents reported a positive shock, and the shocks had a greater impact on saving regret. In the ALP those who had any positive shock expressed regret 13 percentage points less often than those who did not experience a positive shock, but a positive shock had essentially no effect on regret in the SLP. In both surveys reporting that investments or that business had done well resulted in significant reductions in expressing regret, but relatively few SLP respondents gave such a report.

Table 6 shows the distribution of the number of negative shocks and the associated likelihood of regret. In the ALP 31% of the respondents had no shocks; in the SLP 54% had none. Among those who did not have a shock the likelihood of regret was almost the same in the two countries, 0.421 compared with 0.399. Thus, a first explanation for the difference in the level of regret between the U.S. and Singapore is that many more persons in the U.S. had one or more negative shocks. The difference in shock prevalence is also seen at the upper tail of the distribution: 23% of the ALP respondents reported three or more shocks compared with just 10% in the SLP. Furthermore, the consequences of several shocks for saving regret are greater in the ALP: the likelihood of regret increases with the number of shocks, reaching 0.76 for 5 or

more shocks whereas the likelihood is about or close to 0.50 for any number of shocks in the SLP.

Table 7, Panel A, shows the joint distribution of any positive or negative shock. The likelihood of either type of shock is higher in the ALP. In the ALP there is no correlation between negative or positive shocks. For example, the likelihood of a positive shock given a negative shock is 0.515 versus an unconditional probability of 0.519. But in the SLP, the correlation is positive: the likelihood of a positive shock given a negative shock is 0.277 versus an unconditional probability of 0.228.

Panel B shows the associated likelihood of expressing regret. Reflecting the differences in the consequences of a shock, the variation is much greater in the ALP than in the SLP. The likelihood of regret is 0.39 among those who experienced a positive shock but not a negative shock; this is 30 percentage points less than the likelihood among those who experienced a negative shock but not a positive. In the SLP this difference is just 0.11. The panel exhibits an odd result: in the SLP those who experienced a positive shock expressed saving regret about as often as (or if anything slightly more often than) those who did not experience such a shock. This is the case even though we already excluded from the definition of “any positive shock” those shocks that were likely often preceded by a negative shock (see discussion of Table 5). We conclude that defining unambiguous positive shocks is challenging.

To check which of our main results are robust to controls for correlations among the explanatory variables, we estimated regressions of the probability of regret on the explanatory variables that we have discussed in the preceding tables. The complete results are included in Appendix B. Table 8 has excerpts from those regressions,

focusing on the estimates associated with the psychometric variables and with the indicators of negative and positive shocks.

Psychometrics. We entered the psychometric variables linearly, scaled from 1 to 5 for the first group and from 1 to 4 for the second group. Our priors for the first group are that the coefficient on “*avoid unhealthy food or behaviors*” would be negative and that the coefficients on “*do what you like today, don’t put it off*,” “*works best under pressure*,” and “*life is about having fun*” would be positive (no firm prior on “self-confident”). In the second group our priors were that all would be positive. We estimated regressions that did and did not include wealth quartiles, but the differences are small.

In the ALP in group 1, two coefficients are statistically significant; both estimates have the sign that accords with our priors: someone who endorses “*works best under pressure*” and “*do what you like today*” is more likely to express saving regret. The other coefficients are not significant and have a mix of signs with respect to conforming to priors. In the SLP in group 1, there are also two statistically significant coefficients. One of them (*do what you like today*) is in accordance with the ALP estimate in sign and magnitude and accords with our priors. However, the other has the wrong sign, suggesting that individuals who avoid unhealthy food or behaviors are more likely to express saving regret.

For the second group of variables which has various markers of procrastination and perseverance, none of the estimated coefficients is significant in the ALP. Ignoring significance levels, 4 out of seven have the anticipated sign. In the SLP, only one of them is statistically significant, indicating that individuals who settle for mediocre results are more likely to report saving regret. Ignoring significance levels, three of the seven

estimated coefficients have the anticipated sign. We performed tests of joint statistical significance of the psychometric variables. In the ALP the null hypothesis that all coefficients of the psychometric control variables are simultaneously equal to zero could not be rejected, whereas in the SLP it was rejected.

Overall, the regression results confirm the findings from the earlier tables, suggesting that there is at best a weak relationship between the psychometric variables and saving regret, and among the few statistically significant findings one is at odds with our prior.

The role of shocks. The regression results that do not control for wealth quartiles are shown as *Model 1*; they are similar to the results presented in Table 6 and confirm the importance of shocks in explaining saving regret: in the ALP, the fraction reporting saving regret is 17.9 percentage points higher among those who experienced negative shocks, compared to 11.6 percentage points in the SLP. Adding wealth quartiles to the controls reduces the estimate slightly in the ALP, it is virtually unchanged in the SLP. The effect of any positive shock in the ALP is statistically significant and sizeable: 9.0 percentage points lower saving regret among those reporting a positive shock (7.5 percentage points when controlling for wealth quartile).

Financial planning and literacy skills. The detailed results in Appendix B include models with added controls for financial planning and literacy skills. Having a long financially planning horizon is associated with lower saving regret in both samples (10 ppts in the ALP and 6 ppts in the SLP). Indicators for different levels of financial literacy were not statistically significant in the ALP; in the SLP they were statistically significant but had the opposite sign from what might be expected, implying that lower financial

literacy is associated with lower saving regret. Interestingly, probability numeracy, a skill needed to navigate an uncertain environment, was found to have a strong and statistically significant association with saving regret. Individuals who answered all probability numeracy questions correctly had much lower saving regret compared to those who had difficulties even with the most basic probability concepts (differential of 14 ppts in saving regret in the ALP; in the SLP the differential is 19 ppts).⁶

Discussion

Saving regret is substantially lower in Singapore than in the United States. Several factors likely contribute to this difference. Singapore has experienced sustained economic growth and relatively low unemployment, while the U.S. economy has faced repeated periods of stagnation and volatility since the 1970s. The Great Recession of 2008–09 is particularly relevant, as many U.S. respondents in our sample were in their prime saving years during that downturn. These macroeconomic differences have shaped both realized wealth and expectations about financial security in later life.

Although both economies emphasize individual responsibility, their institutional frameworks for saving and risk protection differ sharply. Singapore's Central Provident Fund (CPF) mandates high contributions that finance retirement, health care, and housing. These funds are individually owned but with restrictions on their use. Some are available during the working life which can offset some types of shocks. In the U.S. the counterparts to the CPF are the Social Security and Medicare systems which also

⁶ The differential may be larger in the SLP due to the fact that probability numeracy was assessed using a five-item battery vs a four-item battery in the ALP, resulting in further stratification by probability numeracy in the SLP.

mandate contributions, but which provide limited access during the working life. In retirement, however, they provide longevity and health insurance. Because of its progressivity the Social Security system is crucial for lower-income households; the CPF does not have a redistribution function beyond paying a guaranteed above-market rate of interest. During the working life the U.S. system relies on employer-provided health insurance, but coverage is not universal both because not all employers provide it and because not everyone works for pay.

Median household wealth among older adults is similar in both countries. In 2018, median wealth among Singapore Life Panel (SLP) respondents aged 60–74 was about US\$575,000 (PPP-adjusted), compared with US\$529,000 among U.S. households in the 2016 Health and Retirement Study (HRS).⁷ However, the composition of wealth differs markedly. In Singapore, housing accounts for a much larger share of total wealth, while CPF balances and financial assets are smaller. This concentration in housing implies that fewer resources are available for non-housing consumption, but the ability to use CPF savings for health care and the relatively low cost of medical services in Singapore offset some of this constraint. In contrast, U.S. retirees face higher out-of-pocket medical expenses—8.7 percent of total spending for those aged 55–64 and 11.9 percent for those aged 65–74—despite near-universal Medicare coverage (Chalise 2020).

Economic shocks play a central role in explaining saving regret. Nearly 70 percent of U.S. respondents reported experiencing a negative financial shock,

⁷ We used HRS 2016 data for comparison for which the HRS provides estimates of Social Security Wealth.

compared with 45 percent in Singapore. The smaller impact of shocks in Singapore is consistent with both lower shock frequency and stronger institutional protection. For example, Singapore's health care system, which combines mandatory MediSave contributions with modest co-payments, shields households from catastrophic medical expenses. In addition, the overall burden of health care spending is much lower in Singapore (4 percent of GDP in 2018 compared with 17 percent of GDP in the U.S. World Bank—World Development Indicators).

Other life-cycle shocks also differ across countries. College expenses have risen sharply in the U.S.—doubling in real terms between 1989 and 2016—while median real wages have stagnated. In Singapore, tuition at the autonomous universities rose by only 14 percent between 2007 and 2016, while median wages increased by 23 percent, making higher education more affordable. Family shocks such as divorce or widowhood are also more frequent in the U.S., and their effects on saving regret are correspondingly larger. Labor market disruptions follow a similar pattern: they are more common and more consequential for regret in the U.S. than in Singapore.

Psychometric measures of procrastination and task avoidance explain little of the variation in saving regret in either country. One interpretation is that our survey measures do not fully capture the psychological dimensions of procrastination that might influence saving. To check, we later fielded an alternative battery to measure procrastination, the widely-used GPS-9 scale (Sirois et al, 2019; Lay 1986), and confirmed the results presented in this paper on the weak explanatory power of behavioral measures for saving regret. This confirmation lends weight to the interpretation that under-saving is not primarily a behavioral problem but rather a

response to uncertainty and the difficulty of making long-term financial decisions in the face of unpredictable shocks. Supporting this view, saving regret was substantially lower among respondents with higher probability numeracy, suggesting that risk comprehension may help individuals better manage uncertainty.

Taken together, these findings point to an environmental rather than purely behavioral explanation for under-saving. They highlight the importance of understanding how individuals perceive and prepare for lifetime shocks, and how institutional design can mitigate their effects. From a policy perspective, mechanisms that promote buffer-stock saving—such as Singapore’s mandatory contributions—increase self-insurance against shocks, an effective measure to protect against small to medium-sized financial setbacks. In the U.S., some employer-sponsored retirement plans allow borrowing in case of hardship, which provides limited liquidity, but roughly half of workers lack access to such plans. Expanding automatic saving programs, encouraging emergency savings accounts, and integrating health and retirement saving could strengthen household resilience. However, self-insurance is inefficient protection against large shocks because of the lack of risk-pooling and it is insufficient protection because many persons cannot save enough to meet all contingencies.

In both countries, there is considerable saving regret that reflects exposure to uninsured financial risks more than failures of self-control. This reframes under-saving as a problem of risk management rather than procrastination. Singapore’s system demonstrates how mandatory saving and integrated health financing can reduce the long-term consequences of shocks. However, even with the high levels of forced savings, 45 percent of older households express saving regret. Recent policy measures

may improve the situation in Singapore in the future through expanded social protection (Silver Support Scheme, a cash benefit for low-income seniors), mandatory long-term care insurance and the increase of the normal retirement age through the Retirement and Re-employment Act.

The U.S. experience, where 54 percent of 60-74 year-olds expressed saving regret, underscores the vulnerability created by reliance on voluntary saving and limited social insurance. Effective retirement policy should therefore consider strengthening social insurance for large risks, such as health expenditure and long-term care risk, and expanding access to retirement and buffer stock saving programs that help households manage risk throughout the life cycle.

References

- Akerlof, G. A. (1991). Procrastination and Obedience. *American Economic Review*, 81(2): 1–19.
- Benabou, R., & Tirole, J. (2002). Self-confidence and personal motivation. *The Quarterly Journal of Economics*, 117(3), 871–915.
<https://doi.org/10.1162/003355302760193913>
- Benartzi, S., & Thaler, R. H. (2013). Behavioral Economics and the Retirement Savings Crisis. *Science*, 339(6124), 1152–1153. <https://doi.org/10.1126/science.1231320>
- Börsch-Supan, A., Bucher-Koenen, T., Hurd, M. D., & Rohwedder, S. (2023). Saving Regret and Procrastination. *Journal of Economic Psychology*, 92, 102577.
<https://doi.org/10.1016/j.joep.2022.102577>
- Brown, J. R., & Previtro, A. (2014). Procrastination, Present-Biased Preferences, and Financial Behaviors. NBER Working Paper RRC NB14-04. National Bureau of Economic Research.
- Castaldo, S., Celidoni, M., Maura, F., Weber, G., & Zambon, N. (2024). Saving Regrets at Retirement. *NETSPAR Academic Series Working Paper* DP 07/2024-013. NETSPAR.
- Chalise, L. (2020). How have healthcare expenditures changed? Evidence from the Consumer Expenditure Surveys. *Beyond the Numbers: Prices & Spending*, 9(15). U.S. Bureau of Labor Statistics, November, 2020),
<https://www.bls.gov/opub/btn/volume-9/how-have-healthcare-expenditures-changed-evidence-from-the-consumer-expenditure-surveys.htm>, accessed Dec 28, 2025.

- Chetty, R., Friedman, J. N., Leth-Petersen, S., Nielsen, T. H., & Olsen, T. (2014). Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence from Denmark." *Quarterly Journal of Economics*, 129 (3): 1141–1219.
<https://doi.org/10.1093/qje/qju013>
- Ferrari, J. R., Johnson, J. L., & McCown, W. G. (1995). *Procrastination and Task Avoidance: Theory, Research, and Treatment*. New York: Plenum Press.
<https://doi.org/10.1007/978-1-4899-0227-6>
- GenRe. (2018). *Formulae for Success? Singapore's Approach to Managing Sustainable Health Insurance*.
<https://www.genre.com/us/knowledge/publications/2018/october/ri18-9-en>.
- Goda, G. S., Levy, M. R., Manchester, C. F., Sojourner, A., & Tasoff, J. (2019). Predicting Retirement Savings Using Survey Measures of Exponential-Growth Bias and Present Bias. *Economic Inquiry*, 57 (3): 1636–1658.
<https://doi.org/10.1111/ecin.12792>.
- Hudomiet, P., Hurd, M. D., & Rohwedder, S. (2018). *Measuring Probability Numeracy*. RAND Corporation Working Paper WR-1270. RAND Corporation.
https://www.rand.org/pubs/working_papers/WR1270.html.
- Hung, A. A., Parker, A. M., & Yoong, J. K. (2009). *Defining and Measuring Financial Literacy*. RAND Working Paper WR-708. RAND Corporation.
https://www.rand.org/pubs/working_papers/WR708.html.
- Hurwitz, A., & Mitchell, O. S. (2025). Financial Regret at Older Ages and Longevity Awareness. *Journal of Risk and Insurance*, 92(3), 719-739.
<https://doi.org/10.1111/jori.70008>.

- Hurd, M. D., & Rohwedder, S. (2015). Measuring Total Household Spending in a Monthly Internet Survey: Evidence from the American Life Panel. In C. Carroll, T. Crossley, and J. Sabelhaus (Eds.), *Improving the Measurement of Consumer Expenditures*, 365–387. Chicago, IL: University of Chicago Press.
- . (2018). The Impact of Unemployment on Income, Spending, and Subjective Well-Being. Presentation at *Japan–Singapore Health & Labour Policy Roundtable*, August 30, 2018. Center for Research on the Economics of Ageing, Singapore Management University.
- Laibson, D. (1997). Golden Eggs and Hyperbolic Discounting. *Quarterly Journal of Economics*, 112 (2): 443–478. <https://doi.org/10.1162/003355397555253>
- . (1998). Life-Cycle Consumption and Hyperbolic Discount Functions. *European Economic Review*, 42 (3–5): 861–871. [https://doi.org/10.1016/S0014-2921\(97\)00132-3](https://doi.org/10.1016/S0014-2921(97)00132-3)
- Laibson, D. I., Repetto, A., Tobacman, J., Hall, R. E., Gale, W. G., & Akerlof, G. A. (1998). Self-Control and Saving for Retirement. *Brookings Papers on Economic Activity*, 1998(1): 91–196. <https://doi.org/10.2307/2534671>
- Lay, C. H. (1986). At Last, My Research Article on Procrastination. *Journal of Research in Personality*, 20(4): 474–495. [https://doi.org/10.1016/0092-6566\(86\)90127-3](https://doi.org/10.1016/0092-6566(86)90127-3).
- Lusardi, A., & Mitchell, O.S. (2011). Financial Literacy and Retirement Planning in the United States. *Journal of Pension Economics and Finance*, 10(4): 509–525. <https://doi.org/10.1017/S147474721100045X>
- . (2014). The Economic Importance of Financial Literacy: Theory and Evidence. *Journal of Economic Literature*, 52(1): 5–44. <https://doi.org/10.1257/jel.52.1.5>

- Madrian, B. C., & Shea, D.F. (2001). The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior, *The Quarterly Journal of Economics*, 116(4), 1149–1187, <https://doi.org/10.1162/003355301753265543>
- Ministry of Manpower, Singapore. (2025). Responsible Re-employment. <https://www.mom.gov.sg/employment-practices/re-employment>. Accessed November 24, 2025.
- Moore, D. A., & Healy, P. J. (2008). The Trouble with Overconfidence. *Psychological Review*, 115(2), 502–517. <https://doi.org/10.1037/0033-295X.115.2.502>
- O'Donoghue, T., & Rabin, M. (1999). Doing It Now or Later. *American Economic Review*, 89(1): 103–124. <https://doi.org/10.1257/aer.89.1.103>
- Pikulina, E., Renneboog, L., & Tobler, P. N. (2017). Overconfidence and investment: An experimental approach. *Journal of Corporate Finance*, 43, 175–192. <https://doi.org/10.1016/j.jcorpfin.2017.01.002>
- Pollard, M. S., & Baird, M. D. (2017). *The RAND American Life Panel: Technical Description*. Research Report RR-1651. Santa Monica, CA: RAND Corporation. https://www.rand.org/pubs/research_reports/RR1651.html.
- Sirois, F. M., Yang, S., & van Eerde, W. (2019). Development and validation of the General Procrastination Scale (GPS-9): A short and reliable measure of trait procrastination. *Personality and Individual Differences*, 146, 126–135. <https://doi.org/10.1016/j.paid.2019.03.039>
- Thaler, R. H. (1994). Psychology and Savings Policies. *American Economic Review*, 84(2): 186–192.

- Thaler, R. H., & Shefrin, H. M. (1981). An Economic Theory of Self-Control. *Journal of Political Economy*, 89(2): 392–406. <https://doi.org/10.1086/260971>
- Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving Decisions About Health, Wealth, and Happiness*. New York: Penguin Books.
- Tuckman, B. W. (1991). The Development and Concurrent Validity of the Procrastination Scale. *Educational and Psychological Measurement*, 51(2): 473–480. <https://doi.org/10.1177/0013164491512022>
- Vaithianathan, R., Hool, B., Hurd, M. D., & Rohwedder, S. (2021). High-Frequency Internet Survey of a Probability Sample of Older Singaporeans: The Singapore Life Panel®. *Singapore Economic Review*, 66(6): 1759–1778. <https://doi.org/10.1142/S0217590818420043>.
- World Bank. (2025). Current health expenditure (% of GDP). *World Development Indicators*. The World Bank Group, <https://databank.worldbank.org/reports.aspx?source=2&series=SH.XPD.CHEX.GD.ZS&country=USA,SGP>, accessed Dec 28, 2025.

Table 1: Prevalence of saving regret, before and after revision

<i>Wish to have</i>	ALP		SLP	
	Total		Total	
	before revision	after revision	before revision	after revision
...saved more	66.0	54.2	53.3	45.4
...about the same	32.5	44.3	42.4	50.3
...saved less	1.5	1.5	4.3	4.3
Total	100.0	100.0	100.0	100.0
N	2,618	2,618	4,309	4,309

Notes: Weighted statistics.

In the SLP and in the second wave of the ALP, respondents were asked whether they would “Spend less and save more over the years?” which we call the framed version of the question. In the first ALP survey a random half of the sample were asked the framed version; the other half were asked whether they would “Save more over the years?” which we call the unframed version. The ALP results combine both random subsamples from the first wave with those from the second wave.

Table 2: Saving regret by sociodemographic characteristics

	ALP					SLP				
	N	In percent	Saving Regret			N	In percent	Saving Regret		
			Mean	Std. Error	T-test			Mean	Std. Error	T-test
Total	2,618	100.0	0.542	0.015		4,309	100.0	0.454	0.008	
Female										
0	1,246	47.6	0.526	0.025	ref	2,124	49.3	0.468	0.011	ref
1	1,372	52.4	0.557	0.019	ns	2,185	50.7	0.441	0.011	ns
Age										
60-64	1,058	40.4	0.581	0.024	ref	2,001	46.4	0.459	0.011	ref
65-69	926	35.4	0.531	0.024	ns	1,504	34.9	0.448	0.013	ns
70-74	634	24.2	0.494	0.032	**	804	18.7	0.453	0.018	ns
Marital status										
Married	1,747	66.7	0.517	0.019	ref	3,301	76.6	0.454	0.009	ref
Separated or divorced	505	19.3	0.625	0.030	***	337	7.8	0.477	0.027	ns
Widowed	242	9.2	0.617	0.048	*	220	5.1	0.466	0.035	ns
Never married	120	4.6	0.426	0.068	ns	446	10.4	0.437	0.024	ns
Missing	4	0.2	0.000	0.000	***	4	0.1	0.250	0.217	ns
Education terciles										
Lowest	874	33.4	0.528	0.034	ref	1,436	33.3	0.427	0.014	ref
2	871	33.3	0.605	0.023	*	1,437	33.4	0.466	0.013	**
Highest	873	33.3	0.494	0.017	ns	1,435	33.3	0.467	0.013	**
Wealth quartiles										
Lowest	328	12.5	0.595	0.048	ref	1,077	25.0	0.458	0.016	ref
2	323	12.3	0.654	0.045	ns	1,072	24.9	0.473	0.016	ns
3	323	12.3	0.559	0.040	ns	1,067	24.8	0.490	0.015	ns
Highest	324	12.4	0.355	0.038	***	1,066	24.7	0.403	0.014	**
Missing	1,320	50.4	0.544	0.021	ns	26	0.6	0.394	0.085	ns
Income quartiles										
Lowest	670	25.6	0.507	0.034	ref	1,025	23.8	0.464	0.016	ref
2	688	26.3	0.595	0.031	*	892	20.7	0.438	0.017	ns
3	585	22.4	0.558	0.028	ns	946	22.0	0.481	0.016	ns
Highest	642	24.5	0.508	0.023	ns	953	22.1	0.444	0.015	ns
Missing	33	1.3	0.535	0.142	ns	493	11.4	0.433	0.022	ns
Fair or poor health										
0	2,029	77.5	0.533	0.017	ref	2,617	60.7	0.429	0.010	ref
1	589	22.5	0.576	0.034	ns	1,692	39.3	0.495	0.012	***

Note: Weighted statistics. *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10. Saving regret after revision.

Table 3-A: Saving regret by personality traits

	ALP					SLP				
	N	In percent	Saving Regret			N	In percent	Saving Regret		
			Mean	Std. Error	T-test			Mean	Std. Error	T-test
Panel A: Self-confidence and present focus										
Self-confident										
(Strongly) disagree	194	7.4	0.561	0.054	ns	265	6.2	0.500	0.031	ns
Neither	420	16.1	0.580	0.041	ns	1,319	30.6	0.419	0.014	***
(Strongly) agree	1,870	71.4	0.521	0.018	ref	2,716	63.0	0.467	0.009	ref
Missing	134	5.1	0.698	0.043	***	9	0.2	0.375	0.171	ns
Works best under pressure										
(Strongly) disagree	708	27.0	0.499	0.031	*	821	19.1	0.496	0.018	ns
Neither	985	37.6	0.524	0.025	ns	1,937	45.0	0.428	0.011	**
(Strongly) agree	791	30.2	0.577	0.028	ref	1,541	35.8	0.467	0.013	ref
Missing	134	5.1	0.698	0.043	**	9	0.2	0.222	0.139	ns
Do what you like today										
(Strongly) disagree	148	5.7	0.478	0.062	ns	247	5.7	0.411	0.032	**
Neither	423	16.2	0.503	0.039	ns	1,116	25.9	0.396	0.015	***
(Strongly) agree	1,913	73.1	0.545	0.018	ref	2,937	68.2	0.480	0.009	ref
Missing	134	5.1	0.698	0.043	***	10	0.2	0.222	0.139	ns
Life about having fun										
(Strongly) disagree	1,365	52.1	0.535	0.021	ns	1,390	32.3	0.483	0.013	ns
Neither	636	24.3	0.498	0.032	*	1,485	34.5	0.428	0.013	ns
(Strongly) agree	483	18.5	0.578	0.037	ref	1,421	33.0	0.452	0.013	ref
Missing	134	5.1	0.698	0.043	**	13	0.3	0.538	0.138	ns
Avoid unhealthy food or behaviors										
(Strongly) disagree	685	26.2	0.514	0.030	ns	311	7.2	0.417	0.028	**
Neither	888	33.9	0.566	0.028	ns	1,227	28.5	0.394	0.014	***
(Strongly) agree	912	34.8	0.518	0.026	ref	2,763	64.1	0.484	0.009	ref
Missing	134	5.1	0.698	0.043	***	7	0.2	0.429	0.187	ns

Note: Weighted statistics. *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10. Saving regret after revision.
N=2,618 for the ALP; N=4,309 for the SLP.

Table 3-B: Saving regret by personality traits

ALP						SLP				
Saving Regret						Saving Regret				
N	In percent	Mean	Std. Error	T-test		N	In percent	Mean	Std. Error	T-test
Panel B: Procrastination and perseverance										
Put off things you should do										
Never	109	4.2	0.441	0.075	ns	410	9.5	0.491	0.025	*
Sometimes	1,916	73.2	0.531	0.018	ref	2,683	62.3	0.448	0.010	ref
Most of the time	411	15.7	0.578	0.039	ns	1,001	23.2	0.462	0.016	ns
Always	48	1.8	0.489	0.119	ns	202	4.7	0.443	0.035	ns
Missing	134	5.1	0.698	0.043	***	13	0.3	0.154	0.100	**
Give up before starting										
Never	1,196	45.7	0.509	0.023	*	1,000	23.2	0.474	0.016	ns
Sometimes	1,166	44.6	0.565	0.023	ref	2,740	63.6	0.448	0.009	ref
Most of the time	109	4.2	0.469	0.090	ns	473	11.0	0.442	0.023	ns
Always	13	0.5	0.531	0.168	ns	74	1.7	0.507	0.059	ns
Missing	134	5.1	0.698	0.043	***	22	0.5	0.409	0.105	ns
Try several tasks, don't complete many										
Never	869	33.2	0.517	0.027	ns	1,279	29.7	0.484	0.014	**
Sometimes	1,322	50.5	0.568	0.020	ref	2,581	59.9	0.439	0.010	ref
Most of the time	235	9.0	0.414	0.052	***	368	8.5	0.447	0.026	ns
Always	58	2.2	0.511	0.152	ns	66	1.5	0.571	0.062	*
Missing	134	5.1	0.698	0.043	***	14	0.3	0.143	0.094	**
Settle for mediocre results										
Never	1,096	41.9	0.558	0.022	ns	999	23.2	0.445	0.015	ns
Sometimes	1,271	48.6	0.528	0.023	ref	2,732	63.4	0.454	0.010	ref
Most of the time	112	4.3	0.345	0.067	***	468	10.9	0.471	0.023	ns
Always	5	0.2	0.910	0.086	***	81	1.9	0.527	0.058	ns
Missing	134	5.1	0.698	0.043	***	29	0.7	0.407	0.095	ns
Put off things not good at										
Never	362	13.8	0.562	0.040	ns	589	13.7	0.453	0.021	ns
Sometimes	1,629	62.2	0.535	0.019	ref	2,756	63.9	0.445	0.009	ref
Most of the time	459	17.5	0.499	0.044	ns	767	17.8	0.481	0.018	*
Always	34	1.3	0.642	0.126	ns	175	4.1	0.500	0.038	ns
Missing	134	5.1	0.698	0.043	***	22	0.5	0.333	0.103	ns
Put off difficult things										
Never	1,086	41.5	0.546	0.025	ns	1,019	23.6	0.485	0.016	**
Sometimes	1,204	46.0	0.527	0.022	ref	2,714	63.0	0.438	0.009	ref
Most of the time	175	6.7	0.490	0.069	ns	467	10.8	0.475	0.023	*
Always	20	0.8	0.667	0.150	ns	90	2.1	0.529	0.054	ns
Missing	134	5.1	0.698	0.043	***	19	0.4	0.278	0.106	ns
Lose motivation during tasks										
Never	846	32.3	0.558	0.027	ns	1,126	26.1	0.477	0.015	**
Sometimes	1,525	58.2	0.534	0.020	ref	2,761	64.1	0.441	0.009	ref
Most of the time	100	3.8	0.323	0.071	***	349	8.1	0.488	0.027	*
Always	14	0.5	0.585	0.160	ns	53	1.2	0.500	0.071	ns
Missing	134	5.1	0.698	0.043	***	20	0.5	0.316	0.107	ns

Notes: Weighted number of observations and statistics. *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Saving regret after revision. N=2,618 for the ALP; N=4,309 for the SLP.

**Table 4. Saving regret by financial planning horizon,
financial literacy and probability numeracy**

ALP						SLP				
	N	In percent	Saving Regret			N	In percent	Saving Regret		
			Mean	Std. Error	T-test			Mean	Std. Error	T-test
Financial Planning Horizon										
I don't plan	94	3.6	0.584	0.102	ns					
Next few months	402	15.4	0.526	0.043	ref	554	12.8	0.482	0.021	ref
Next year	239	9.1	0.638	0.046	*	324	7.5	0.434	0.027	*
Next few years	512	19.6	0.530	0.036	ns	1,285	29.8	0.475	0.014	ns
Next 5-10 years	438	16.7	0.522	0.035	ns	982	22.8	0.466	0.016	ns
Longer than 10 years	326	12.4	0.452	0.043	ns	629	14.6	0.394	0.019	***
Missing	607	23.2	0.582	0.029	ns	536	12.4	0.441	0.022	*
Financial Literacy										
0 correct answers	115	4.4	0.484	0.091	ref	357	8.3	0.425	0.027	ref
1 correct answer	247	9.4	0.595	0.061	ns	578	13.4	0.462	0.021	ns
2 correct answers	506	19.3	0.602	0.033	ns	1,243	28.9	0.469	0.014	ns
3 correct answers	906	34.6	0.514	0.023	ns	1,271	29.5	0.449	0.014	ns
Missing	844	32.2	0.530	0.028	ns	860	20.0	0.447	0.017	ns
Probability Numeracy										
0 or 1 correct answers	258	9.8	0.575	0.054	ref	686	15.9	0.520	0.019	ref
2 correct answers	544	20.8	0.527	0.035	ns	556	12.9	0.507	0.021	ns
3 correct answers	974	37.2	0.589	0.025	ns	649	15.1	0.487	0.019	ns
4 correct answers	281	10.7	0.434	0.032	**	1,125	26.1	0.415	0.015	***
5 correct answers*						406	9.4	0.336	0.023	***
Missing	560	21.4	0.515	0.035	ns	888	20.6	0.454	0.017	***

Notes: Weighted statistics. *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10. Saving regret after revision.

The SLP question battery to assess probability numeracy had one additional item; see Appendix A for details.

N=2,618 for the ALP; N=4,309 for the SLP.

Table 5: Saving regret and negative/positive shocks

	ALP					SLP				
	N	In per- cent	Saving Regret			N	In per- cent	Saving Regret		
			mean	Std. Error	T- test			mean	Std. Error	T- test
Negative Shocks										
Health limited work	452	19.8	0.622	0.037	**	617	14.4	0.522	0.020	***
Earnings less than expected	353	15.5	0.672	0.035	***	531	12.4	0.571	0.022	***
Unemployment	415	18.1	0.621	0.031	**	481	11.2	0.542	0.023	***
Large health expense	233	10.2	0.665	0.043	***	469	10.9	0.496	0.023	*
Retired too early	301	13.2	0.643	0.050	**	353	8.2	0.602	0.026	***
Financial help to relatives	396	17.3	0.661	0.041	***	332	7.7	0.491	0.028	ns
Bad investment	242	10.6	0.673	0.043	***	275	6.4	0.486	0.029	ns
Large (non-health/educ) expense	177	7.8	0.642	0.043	**	208	4.8	0.512	0.035	*
College costs higher than expected	211	9.2	0.673	0.042	***	174	4.0	0.460	0.038	ns
Death in family	279	12.2	0.665	0.043	***	188	4.4	0.442	0.037	ns
Divorce/separation	443	19.4	0.634	0.032	***	64	1.5	0.403	0.062	ns
Other	23	1.0	0.682	0.103	ns	42	1.0	0.325	0.074	*
Any negative shock	1,582	69.1	0.608	0.020	***	1,975	46.0	0.520	0.011	***
No negative shock	708	30.9	0.421	0.031		2,324	54.0	0.400	0.010	
Positive Shocks										
Spent less than expected	335	14.7	0.549	0.049	ns	717	16.7	0.502	0.019	***
Respondent worked longer than expected	400	17.5	0.533	0.038	ns	601	14.0	0.487	0.020	**
Received financial help from family	188	8.2	0.570	0.046	ns	509	11.8	0.508	0.023	**
Respondent salary/earnings more than expected	545	23.8	0.481	0.034	**	445	10.3	0.452	0.023	ns
Good investments/business	539	23.5	0.403	0.031	***	361	8.4	0.384	0.025	***
Spouse worked longer than expected	257	11.2	0.503	0.061	ns	263	6.1	0.502	0.030	**
Spouse salary/earnings more than expected	372	16.3	0.487	0.045	ns	237	5.5	0.500	0.032	*
Received an inheritance	530	23.2	0.467	0.032	***	134	3.1	0.441	0.042	ns
Other	16	0.7	0.659	0.137	ns	54	1.3	0.412	0.069	ns
Any positive shock*	1,188	51.9	0.488	0.022	***	982	22.8	0.461	0.016	ns
No positive shock	1,102	48.1	0.618	0.025		3,327	77.2	0.452	0.009	
All	2,290	100.0	0.550	0.017		4,309	100.0	0.454	0.008	

Notes: Weighted statistics. *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10. Saving regret after revision.

The sample for the ALP is reduced to achieve full comparability with the SLP: the shocks listed in the first ALP saving regret survey (MS455) were slightly different from those listed in the second ALP and the SLP survey. We therefore restricted the ALP sample in this table to those who either responded to both ALP surveys (MS455 & MS487) or just the second one. The saving regret response is taken from either MS455 or MS487; the shocks are obtained from MS487 for all ALP observations.

* The count of "any positive shock" does not include "spent less than expected," "financial help" or "worked longer than expected" as these often appear to be the result of an accompanying negative shock; see discussion of Table 5.

Table 6: Saving regret by number of negative shocks

	ALP					SLP				
	N	In percent	Saving Regret			N	In percent	Saving Regret		
			mean	Std. Error	T-test			mean	Std. Error	T-test
Number of Negative Shocks										
0	708	30.9	0.421	0.031	ref	2,322	53.9	0.399	0.010	ref
1	634	27.7	0.538	0.035	**	1,045	24.2	0.508	0.015	***
2	408	17.8	0.613	0.036	***	485	11.3	0.548	0.023	***
3	267	11.7	0.617	0.040	***	233	5.4	0.548	0.033	***
4	157	6.8	0.738	0.045	***	113	2.6	0.486	0.047	ns
5 plus	111	4.9	0.763	0.051	***	99	2.3	0.479	0.051	ns
Missing	5	0.2	1.000	0.000	***	12	0.3	0.500	0.144	ns
Total	2,290	100.0	0.550	0.017		4,309	100.0	0.454	0.008	

Notes: Weighted statistics. *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10. Saving regret after revision
The sample for the ALP is reduced to achieve full comparability with the SLP: the shocks listed in the first ALP saving regret survey (MS455) were slightly different from those listed in the second ALP and the SLP survey. We therefore restrict the ALP sample in this table to those who either responded to both ALP surveys (MS455 & MS487) or just the second one. The saving regret response is taken from either MS455 or MS487; the shocks are obtained from MS487 for all ALP observations.

Table 7: Saving regret and the experience of at least one negative/positive shock

ALP				SLP			
Panel A: Distribution of Population According to Whether Positive or Negative Shock Was Experienced (Weighted)				Panel A: Distribution of Population According to Whether Positive or Negative Shock Was Experienced (Weighted)			
	Negative				Negative		
Positive	No	Yes	Total	Positive	No	Yes	Total
No	14.59	33.49	48.08	No	43.96	33.22	77.18
Yes	16.34	35.57	51.92	Yes	10.09	12.73	22.82
Total	30.94	69.06	100.00	Total	54.05	45.95	100.00
Panel B: Mean Saving Regret According to Positive or Negative Shock (Weighted)				Panel B: Mean Saving Regret According to Positive or Negative Shock (Weighted)			
	Negative				Negative		
Positive	No	Yes	Total	Positive	No	Yes	Total
No	0.460	0.687	0.618	No	0.395	0.527	0.452
Yes	0.387	0.535	0.488	Yes	0.413	0.498	0.461
Total	0.421	0.608	0.550	Total	0.398	0.519	0.454

Notes: Weighted statistics. Saving regret after revision. ALP: N=2,618. SLP: N=4,309. This table uses the full analytic sample for the ALP, including those observations with information on shocks only available from the first ALP survey where a couple of shocks were not queried. For calculating the "any shocks" variable the differences were immaterial. The count of "any positive shock" does not include "spent less than expected" (conceptually too close to the outcome variable, saving regret), "financial help" or "worked longer than expected" (these may be the result of an accompanying negative shock); see discussion of Table 5.

Table 8: Extracts from regressions — effect on probability of expressing

	saving regret			
	ALP		SLP	
	Model 1	Model 2	Model 1	Model 2
Self-confidence and present focus (Scaled 1-5 from “Strongly Disagree” to “Strongly Agree”)				
Self-confident	-0.0205	-0.0155	-0.00686	-0.00589
Works best under pressure	0.0347***	0.0333***	-0.00477	-0.00447
Do what you like today, don’t put it off	0.0383***	0.0340**	0.0389***	0.0397***
Life is about having fun	-0.00468	-0.00593	-0.0132*	-0.0129
Avoid unhealthy food or behaviors	-0.00255	-0.00284	0.0448***	0.0447***
Procrastination and perseverance (Scaled 1-4 from “Never” to “Always”)				
Put off things you should do	0.0369	0.0350	-0.0231*	-0.0206*
Give up before starting	0.00830	0.00542	0.00651	0.00592
Try several tasks, don’t complete many	0.00834	0.00912	-0.0206	-0.0203
Settle for mediocre results	-0.0108	-0.00805	0.0244**	0.0233**
Put off things not good at	-0.00517	-0.00705	0.0171	0.0190
Give up task when difficult	0.0167	0.0220	-0.0137	-0.0140
Lose motivation during tasks	-0.0287	-0.0276	-0.00405	-0.00569
Negative shock	0.179***	0.161***	0.116***	0.111***
Positive shock	-0.0896***	-0.0746***	-0.00641	0.00729
Wealth included	N	Y	N	Y
Observations	2,618	2,618	4,273	4,273
Adjusted R-squared	0.0710	0.0813	0.0307	0.0351
F-tests				
Joint sig. of psychometric scales	F(12, 1591)=1.75 Prob>F =0.0522	F(12, 1591)=1.51 Prob>F = 0.1132	F(12,4247)=4.54 Prob>F= 0.0000	F(12, 4243) = 4.59 Prob>F = 0.0000
Joint significance, full model	F(28, 1591)=7.76 Prob >F =0.0000	F(32, 1591)=7.83 Prob >F =0.0000	F(25, 4247)=6.42 Prob > = 0.0000	F(29, 4243) = 6.35 Prob >F = 0.0000

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10. No weights applied in regressions, considering the large set of controls that were included. Standard errors adjusted in the ALP models for repeated observations. SLP sample slightly reduced due to some observations missing observations on assets which came from a different SLP survey wave.