Saving regret in the U.S., Singapore and Europe: Failures of individual planning in different welfare systems

Axel Börsch-Supan, Michael Hurd, Susann Rohwedder, Luca Salerno

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Introduction

A number of research papers advocate paternalistic nudging to foster saving, especially to increase economic resources in old age (Thaler 1994;Thaler and Shefrin, 1981; Laibson 1997, 1998; Laibson *et al*., 1998; Thaler and Sunstein 2003, 2009; Lewis 2008; Chetty *et al*., 2014). A justification for these interventions is the belief that many people have under-saved and that the reason for under-saving is that often people procrastinate, particularly about saving. An implication is that on hindsight, the preferred choice of such persons would be to have saved more than they actually did. If persons would have wanted to have saved more, we say as a short hand that they have "saving regret."

Saving regret may have many reasons. In addition to procrastination, it may have been a failure of planning, miscalculations, a failure to have sufficient insurance, or simply the effect of negative shocks, The general aim of this paper is to use comparable data sets in very different countries -- the U.S., Singapore and 19 European countries including Israel -- to compare the extent of saving regret and to shed light on the

mechanisms leading to saving regret and how these may interact with the policy environment.

So far, there is little empirical evidence on the saving behavior that individuals would have chosen on hindsight. To fill this empirical gap, we fielded two surveys in the RAND American Life Panel (ALP). The first wave was from August through December 2016, the second about one and a half years later, partly to the same people and partly to other people. We asked persons aged 60-74 whether, if they were given the chance to do it over again, they would have saved differently earlier in their lives.

In May 2018, we fielded a similar survey to 60-74 year old participants of the Singapore Life Panel (SLP)[1], which is modelled on the ALP Financial Crisis Surveys. Viewed in international context, Singapore is similar to the U.S. in encouraging self-reliance, but it has a smaller safety net and the institutions surrounding economic preparation for retirement are very different. In particular, Singapore mandates a total contribution rate of 37% of earnings (employee and employer combined) for most workers into funds managed by the Central Provident Fund. These funds finance consumption in retirement and health care both pre- and post-retirement. They can also be used for financing the purchase of a home. There are very few defined benefit (DB) pension plans, no Social Security, limited public health insurance, and no unemployment insurance.

Between November 2019 and March 2020, Wave 8 of SHARE, the Survey of Health, Ageing and Retirement in Europe, fielded the same set of saving regret

[1] 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.

questions to 17 EU countries, Switzerland and Israel. The EU countries have a much tighter safety net than both the U.S. and Singapore, in particular large pay-as-you go systems for pensions and universal health insurance. Moreover, some EU countries have mandatory public long-term care insurance. The need to save beyond what is mandatory is thus less pronounced in these countries than in the U.S. and Singapore. One may hypothesize that this leads to lower levels of savings regret.

A similarly salient question is whether the Singapore approach of mandatory saving into the Central Provident Fund is more effective in preventing what is perceived as regrettable saving decisions than the welfare state approach typical for European countries. Moreover, while there are lots of communalities of the European welfare state systems, there is considerable variation in the coverage and generosity of social insurances across the European countries. Do the different welfare state variants within Europe, such as the “Nordic model”, the “Corporate model” in Germany and France, and the more family-oriented model in the Mediterranean countries, generate different saving regret at older ages?

Regarding the mechanisms that may lead to saving regret, one may argue that the high level of mandated saving in Singapore makes procrastination less relevant, bringing the role of financial risks over the lifecycle into focus. This raises questions of what are the roles of uncertainty and the ability of individuals to manage unexpected financial shocks in shaping retirement saving outcomes and how do these differ in Europe, Singapore and the U.S.

Background about Singapore

For many years Singapore has experienced strong economic growth: GDP per capita was $12,400 in 1979 and $58,800 in 2019 (both in 2010 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 20 percentage points.

The economy of Singapore is strongly market based but with significant policy interventions at several key points. 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 (DC) 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 care 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: our SLP sample shows that 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)[2] and median total wealth of $613,000. To put these values into perspective, we note that median income of Singapore couples shortly before retirement (age 50-55) was about $47,000.

All persons can buy subsidized health care insurance that aims to cover costs in public hospitals and clinics, which perhaps are of lower quality. Lower income persons can be subsidized further. Higher income persons can buy additional integrated plans; 68% of the population purchases such plans which cover private hospitals and better wards. The insurance purchase can be made from the MediSave account.

[2] The conversion is to multiply the Singapore dollar by 0.94. According to the actual exchange rate the Singapore dollar is worth about 0.73 US dollar

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

The “Retirement Age” is currently 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 is to be raised in steps to 65 beginning 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. The new contract may be subject to negotiation, resulting in a change in duties or a reduction in wages within 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 health conditions or poor job performance.

The Re-Employment Age was increased to age 67 in 2017 and is scheduled to increase to age 70 in steps beginning 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 public 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).

Welfare reforms in Europe

Europe is proud of their welfare states, a great achievement of civilization in the eyes of most observers. European citizens have gotten used to generous pension, healthcare and unemployment benefits. Many risks to which U.S. and Singaporean citizens are exposed are covered by mandatory social insurance. Together, these entitlement programs represent between 20 and 30% of GDP in most European countries, with considerable variation especially in Eastern Europe, while it is about 18.5% of GDP in the U.S.

Since most European entitlement programs are pay-as-you go financed, population aging forces Europe to align current entitlements with future fiscal capacity. Reform processes are under way in almost all European countries. Some countries reformed early in the 1980s, e.g. Sweden, most countries much later, and some just recently, e.g. Greece. Typically, we have experienced “reforms in installments”. These reforms have combined “parametric” elements (introducing actuarial adjustments, changing the benefits indexation formula, increasing the retirement age) with “fundamental” elements (changing the financial mechanism by moving substantial parts of retirement income from public pensions to private savings). Similar reforms have reduced the generosity of the universal health insurance systems, e.g. by introducing or

increasing co-payments and by reducing the healthcare services that are covered by health insurance.

These reforms have made the future more uncertain than Europeans have been used to. Some countries have formalized the link between demographics and benefit level. Sweden and Italy have introduced notional defined contribution (NDC, see Holzman and Palmer 2005) systems which compute benefits on the basis of the accumulated contributions plus some fictitious interest. This fictitious interest depends on demographic essentials such as life expectancy, dependency ratio and wage growth. Since the labor force growth rate declines as a population ages, a NDC system features a declining replacement rate in the course of population aging. Moreover, longevity decreases the value of the annuity emanating from the accumulated notional wealth. People have to predict these benefit cuts and save accordingly if they want to maintain the level of retirement income that they have been accustomed to.

Similarly, Germany and other countries have created a link between demographics and benefit level within the defined benefit structure which has much political acceptance. The conventional benefit formula which indexes benefits to wages/prices is multiplied by the relative number of contributors to pensioners, the so-called sustainability factor. This augmented indexation formula will lead to decreases in pension benefit levels compared to wages. To offset these benefit cuts, Germany has called for more private saving and introduced voluntary tax-advantaged saving plans. Failures to take up these saving plans will results in lower retirement incomes and potentially to saving regret.

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 individuals' hindsight assessment of their saving behavior we prompted them to look back to when they were around 45 years old and to say whether they wished they had saved more, about the same, or less earlier in life if given the chance to re-do their saving and spending. Specifically, 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. Our objective in the framing was to reduce or even avoid “cheap talk.”

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. 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 reduce “cheap talk” further; that is, 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 (2,111 individuals out of the 2,290 individuals in the second wave). But based on our experience from the first survey we modified several of the questions in the second

wave, so for some of the analyses we only use observations from the second wave and from the overlap cases in the first wave. For these analyses over this modestly reduced data set we have an identical survey design in the ALP and the SLP.

To measure an individual-level lack of will-power to follow through on personal commitments or a tendency to procrastinate, we asked a series 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. They were derived from the General Procrastination Scale (GPS) described and validated by Tuckman (1991). We asked respondents to evaluate themselves along several dimensions, such as a self-assessment on their general and financial planning behavior and motivations. A first set of five questions used the following format:

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Do you agree or disagree with the following statements?
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The first question was

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

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. In total we use 12 psychometric variables from the ALP. These same 12 were also asked in the SLP survey. We anticipated that they would be strongly related to an expression of saving regret.

An alternative explanation to procrastination 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.[3]

Taking both ALP waves together we have 2618 respondents in our age range 60-74. Of them 2111 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 representative of the Singapore population age 50-70 (and their spouses) when first recruited in 2016. 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. In January 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 8,000 interviews every month (Vaithianathan et al., 2018).

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

[3] 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.

about saving regret in the framed version, as in Wave 2. We asked the same psychometrics questions, the same measures of planning horizon, financial literacy and probability numeracy, and about the same shocks. We obtained 4,559 responses in our age range 60-74.

The Survey of Health, Ageing and Retirement in Europe

The Survey of Health, Ageing and Retirement in Europe (SHARE) is a research infrastructure for studying the effects of health, social, economic and environmental policies over the life-course of European citizens and beyond. In eight waves between 2004 and 2020, about 530,000 in-depth interviews with 140,000 people aged 50 or older from 28 European countries and Israel have been conducted. The main hallmark of SHARE is its strict international comparability. All countries use exactly the same questionnaire and much work has been invested in making sure that questions are functionally identical across the almost 40 languages that are covered by the SHARE survey instruments.

In Wave 8, between November 2019 and March 2020, a saving regret module was administered in 19 of the SHARE countries: 17 EU countries, Switzerland and Israel. Combined sample size was 24,576 individuals between age 60 and 79. Per country, the average sample size was 1,293, ranging from 524 in Hungary to 1,866 in Germany.

The module was located in questionnaire after about 90% of the questions had been asked, including information about demographic and socio-economic status, but before questions on personality traits (the “Big Five”) and expectations. The module started with questions about negative and positive shocks with financial consequences,

then the saving regret questions exactly as formulated in the U.S. ALP questionnaire, including a randomized split between the framed and unframed version [confirm] and probing.

SHARE did not administer the extensive battery of psychometric variables contained in the ALP and SLP questionnaires. However, SHARE included a 12-item "Big Five" battery and a set of expectation questions about economic status and life expectancy, as well as items about trust, risk aversion, and planning horizon.

Results

Table 1 shows the percent of respondents expressing regret in the three data sets, both before and after revision. The international differences are striking. In the U.S., on initial questioning, 66 percent wished to have saved more. In Singapore, this percentage is 12.7 percentage points lower at 53.3%. In Europe it is even lower by a very large margin. On average (weighted by country sample size), only 15.1 expressed saving regret. The variation within Europe is also large, ranging from 27.3 percent in Greece to only 8.4 percent in Austria (Figure 1).

Many respondents reduced regret when asked what types of spending could have been reduced, the ALP by about 12 percentage points, the SLP by about eight percentage points, and SHARE by about 3 percentage points. Very few respondents in the U.S. and in Singapore wished they had saved less.

Table 2 shows the variation in saving regret as a function of demographic, social and economic characteristics. In the U.S. and Singapore there is little difference between males and females. This is different in SHARE, where women have slightly less saving regret.

In the U.S. and in Europe, there is a monotonic age gradient: age is associated with less regret and the difference between the oldest and the youngest age band is statistically significant. That pattern, depicted in Figure 2 for the SHARE countries, is not found in Singapore.

The distribution of the population by marital status is quite different in the three regions: Divorce is 11 (three) percentage points lower and widowed four (nine) percentage points higher in Singapore than in the U.S. (Europe). Among those in the U.S., higher proportions of those who are separated, divorced, or widowed express saving regret, and an even stronger relative difference is observed in Europe. This is in line with the well-known, economic status of those groups: particularly 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 for the U.S. and Singapore. The SHARE data reports the International Standard Code of Education (ISCED). 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.[4] In Europe, each of the ISCED code groups 0-2, 3-4, and 5-6 represent roughly a third of the sample. In the U.S. and Europe, those in the middle educational tercile expressed regret with the greatest frequency. In Singapore there is no such education pattern.

[4] 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.

In all 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, even greater in Europe, than in the SLP.[5] There is little variation in saving regret by income in the U.S. and Singapore, but a strong gradient in Europe.

In Singapore and Europe, 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. European respondents with memory problems have more saving regret. There is no such difference in the U.S. and no data available for Signapore.

Based on the extensive literature that explains under-saving using behavioral explanations, we expected to see systematic and large variation in saving regret as a function of self-rated characteristics for procrastination, lack of self-control and present bias. In Table 3 we show how saving regret varies by such measures of personal traits. While ALP and SLP use the same categories for these traits, SHARE uses a 12-component battery for the "Big Five" indicators. Tbd for SHARE, also EX module.

The first five traits are meant to measure self-confidence and a focus on the present. Because of very few responses in some of the categories, we collapsed the five response categories (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) into three categories (strongly disagree and disagree, neither agree nor disagree, agree and strongly agree). Of interest, first, is the distribution of the

[5] The large number of missing values in the ALP are 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.

populations across the response categories. 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. The distribution of responses to the other three categories are similar across the two populations.

When we consider the relationship between the responses to the characteristics and the expressing 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 significant differences in saving regret. In the SLP, there were seven significant differences in two-sided tests at the 5% level, but just three 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 the other four significant comparisons the sign of the difference did not align with expectations. For example, 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," 49% expressed saving regret compared with 40% among those who neither agreed nor disagreed with the statement.

In Panel B we show the estimates across seven statements about self-perceived behavior. These seven may have more validity than the five in Panel A because they ask about what individuals have actually done rather than self-perception. Several would seem to apply directly to an inability to save such as "*How often do you give up a task when it gets difficult?*" 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 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 significant comparisons, but just one had the anticipated sign: the rate of regret among those who always try several tasks but don't complete many was 15 percentage points higher than the reference group ("sometimes"). However, that group comprised just 1.4 percent of the population.

Table 4 shows the fraction expressing regret as a function of several attributes that perhaps could be called skills. Tbd for SHARE. In both the ALP and the SLP large fractions have missing values because the questions about these attributes were not on all the surveys: the data on those attributes had to be retrieved from other ALP and SLP surveys which were not taken by some of our respondents. The most frequent responses to planning horizon were "next few years" or "5-10 years." In the ALP there is

a monotonic reduction in regret as the planning horizon increases, although no horizons are significant relative to the reference group. In the SLP there is little variation in regret except at the long horizon of 10 years or more. In the ALP, regret declines monotonically as financial literacy increases, and the differences are large and significant. By contrast, in the SLP there is no consistent variation in regret as a function of financial literacy. Probability numeracy is a skill that ought to help people make better financial decisions, and it is associated with saving regret: in both the ALP and SLP those who had more correct answers on questions designed to test probability numeracy were less likely to express saving regret.

Table 5a shows the frequency of negative and positive shocks in the ALP and SLP. The twelve items are ordered from most frequent to least in the SLP, and the likelihood of expressing regret. Table 5a shows the corresponding items in SHARE of which nine are identical and three slightly adapted to the European circumstances. The overall level of negative shocks is much higher in the U.S.: 69% reported that they had such a shock that impacted their financial position compared with 46% in the SLP and only 38.5% in Europe. Four shocks are related to the labor market. Their frequencies are higher in the ALP and their effects on saving regret are much larger than in Singapore and even less in Europe.

In the ALP, the frequency of saving regret among those who did not report a negative shock was 42.1% (see Table 7B). Among those who experienced an unemployment shock (a spell “that cause their finances to turn out worse than expected”), the proportion who stated regret was 62.1%, a difference in the frequency of 20 percentage points. In Singapore, among those who did not experience a negative

shock the frequency of expressing regret was 40.1%. Among those who experienced an unemployment shock, the frequency of expressing regret was 54.2%, an increase of 14 percentage points. In Europe, those who suffered from an unemployment shock, 20.2% expressed saving regret, much lower than in the U.S. and in Singapore. Remainder of Table 5 comparisons and Tables 6 & 7 tbd for SHARE. The other labor market shocks, "health limited work," "retired too early," and "earnings less than expected," are stated more frequently in the ALP. Each also causes higher proportions of respondents in the ALP than in the SLP to express saving regret. Other shocks more common in the ALP than in the SLP include giving financial help to relatives, having unexpectedly high college costs, having a death in the family, and having a divorce or separation. The impact of such shocks on saving regret is substantial in the ALP, but negligible in the SLP. The frequency of a health care spending shock is about the same in both surveys, but the consequences for expressing regret are much greater in the ALP: an increase of 0.244 versus 0.097.

A larger proportion of the ALP respondents reported having a positive shock, and the shocks had a greater impact on saving regret. In the ALP those who had any positive shock expressed regret six percentage points less often than the average, but a positive shock had essentially no effect on regret in the SLP. In both surveys having good investments or a good business resulted in significant reductions in expressing regret, but relatively few SLP respondents gave such a report.

Table 6 shows the distribution 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,

0.421 compared with 0.401. Thus, a first explanation for the difference in the level of regret between the U.S. and Singapore is that many more 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: 24% 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 approximately flat at 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 0.29 versus an unconditional probability of 0.24.

Panel B shows the 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 state express saving regret slightly more often than those who do not experience such a shock. Upon investigation of the details we found that what we intended to be positive shocks were often the consequences of a negative shock. For example, among those

who worked more than expected, which *cet. par.* would lead to greater lifetime resources and possibly reduce saving regret, 61% experienced a negative shock compared with 43% among those who did not work more than expected. The most common negative shock was “earnings were less than expected,” suggesting that working more than expected was a response to a shortfall in earnings. Similarly, receiving financial help from family, which would be an increase in lifetime resources, was associated with a greater likelihood of experiencing a negative shock, and the increase was greatest for “health limited work,” followed by “large health expense.” 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.

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 in the Appendix. Table 8 has excerpts from those regressions. 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 coefficients on “*self-confident*,” and “*avoid unhealthy food or behaviors”* would be negative and that the coefficient on “*do what you like today, don’t put it off*,” “*works best under pressure*,” and “*life is about having fun”* would be positive. 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 negligible.

In the ALP in group 1, two coefficients are statistically significant and in accord with our priors. The first, *self-confident*, has a negative coefficient; the second, *works best under pressure*, has a positive coefficient.. The other coefficients are not significant and have a mix of signs with respect to conforming to priors. The coefficients that are significant in the ALP are not significant in the SLP and those significant in the SLP are not significant in the ALP. Of the three that are significant in the SLP, only one, “Do what you like today…” has the anticipated sign.

In the ALP in the second group, one coefficient is significant but it does not have the anticipated sign: those who tend to settle for mediocre results report less regret. Ignoring significance levels, we find that three of the seven estimated coefficients have the anticipated sign. In the SLP the one significant coefficient, “settle for mediocre results,” has the opposite sign from that in the ALP.

As for the effect of any negative shock, our regression results that do not control for wealth quartile are similar to the results evident in the cross-tabs of Table 6. The effect of any positive shock in the ALP is somewhat attenuated but remains significant both statistically and in magnitude.

Discussion

Overall, we find saving regret is substantially lower in Singapore than in the U.S., and even more so in Europe. This may be a result of long-term economic conditions as well as the coverage and generosity of the social insurance systems. The Singapore economy has grown greatly for many years, possibly leading to a current financial position that is better than many had expected. By contrast, since 1973 the U.S. has had periods of a stagnating economy with periods of quite high unemployment, possibly

leading to a current financial position that is worse than many expected. The Great Recession appears to be particularly relevant for this observation: our U.S sample of 60-74 year-olds would have been in prime saving years for retirement at the time of the downturn. Europe has experience little growth as well, but less of the divide between income classes than in the U.S. In many European countries and in the EU as a whole, the Gini-coefficient has essentially remained constant in sharp contrast to the U.S.

Although all economies in our sample are market-driven by now, there are considerable differences in the weight on self-reliance. In Europe, the welfare state is almost omnipresent, and Singapore has an important forced saving mechanism, the CPF. While the U.S. Social Security system may be even more important for retirement saving than the CPF, particularly for low-income individuals because of the progressivity in its benefit schedule, it does not force saving for health care or as a buffer for negative economic shocks. The social security replacement rates in Europe are even higher than in the U.S., and health insurance is universal. A cross-national regression of saving regret in the SHARE countries show that the size of the public pension system (measured by its contribution rate) significantly reduces saving regret (Table 9). Increasing the pension system by 25% reduces the share of respondents who express saving regret (before revision) from 15.1 to 13.2 percent.

Shocks appear to be quite important in all countries. Among SLP respondents, 46% had at least one negative shock that affected their financial position; among ALP respondents, 69%, in Europe 38.5%. The effect of shocks was not symmetric; very few reported they wished that they had saved less. Shocks did have a smaller impact on saving regret among SLP respondents and even less among SHARE respondents,

which is consistent with shocks for SLP and SHARE respondents being less severe. Some institutional reasons may also contribute to shocks having less of an impact in Singapore. In 2017, Singapore spent just 4.4% of GDP on health care while the U.S. spent 17.9%. As a result, the forced contributions to saving in MediSave coupled with possibly some small co-pays could shield many Singaporeans from health care spending shocks.

College expenses may also cause greater shocks in the U.S. than in Singapore and Europe. Between 1989 and 2016, the cost of attending a four-year university in the U.S. doubled in real terms while median real wages barely increased.[6] In Singapore, tuition at the five autonomous universities increased by 14% in real terms between 2007 and 2016, but median wages increased by 23% in real terms. As a result, college education became more affordable in Singapore but less affordable in the U.S. In Europe, most education is free.

Another large difference between the U.S. and the other two regions is the frequency of a death in the family (likely widowing but not specifically asked) and of divorce. Both are more frequent in the U.S., and the effects of each on saving regret is higher in the U.S. Labor market shocks are another difference between the countries: such shocks are more frequent in the U.S., and the effect on saving regret is greater.

We did not find that psychometric variables explain much of saving regret in either the U.S. or Singapore. We conclude that a battery of measures of procrastination, or a tendency not to tackle difficult tasks as measured by 12 indicators, were of little use

[6] https://www.forbes.com/sites/camilomaldonado/2018/07/24/price-of-college-increasing-almost-8-times-faster-than-wages/#30efd6b66c1d

in distinguishing persons who would have liked to have saved more from those who were satisfied with their saving behavior.

Our main conclusion is that to understand economic preparation for retirement we need to understand better the role of shocks in the given economic and social policy environment. Part of that understanding is to learn more about the expectations of individuals about lifetime shocks and their understanding of the consequences of shocks. An approach undertaken by government in Singapore is to force people to engage in buffer stock saving. The European approach is to force people in large public pay-as-you-go pension systems and universal health insurance. However, this is easier to do when an important sector, health care, is so much cheaper than in the U.S.

References

Börsch-Supan, Axel; Brandt, Martina; Hunkler, Christian; Kneip, Thorsten; Korbmacher, Julie; Malter, Frederic; Schaan, Barbara; Stuck, Stephanie; Zuber, Sabrina (2013): "Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE)". In: *International Journal of Epidemiology*, 42, S. 992 - 1001.

Börsch-Supan, Axel, Tabea Bucher-Koenen, Michael D. Hurd and Susann Rohwedder. „Saving Regret.“ NBER Working Paper 25238, November 2018

Chetty, Raj, John N Friedman, Søren Leth-Petersen, Torben Heien Nielsen, and Tore Olsen. "Active Vs. Passive Decisions and Crowd-out in Retirement Savings Accounts: Evidence from Denmark." *The Quarterly Journal of Economics* 129, no. 3 (2014): 1141-219.

Hurd, Michael and Susann Rohwedder,” Measuring Total Household Spending in a Monthly Internet Survey: Evidence from the American Life Panel," in *Improving the Measurement of Consumer Expenditures*, Eds. Christopher Carroll, Thomas Crossley and John Sabelhaus, University of Chicago Press, 2015, pp. 365-387.

Hurd, Michael and Susann Rohwedder, “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, David. "Golden Eggs and Hyperbolic Discounting." *The Quarterly Journal of Economics* 112, no. 2 (1997): 443-78.

Laibson, David. "Life-Cycle Consumption and Hyperbolic Discount Functions." *European Economic Review* 42, no. 3-5 (1998): 861-71.

Laibson, David I, Andrea Repetto, Jeremy Tobacman, Robert E Hall, William G Gale, and George A Akerlof. "Self-Control and Saving for Retirement." *Brookings Papers on Economic Activity* 1998, no. 1 (1998): 91-196.

Lewis, Carol. "Why Barack Obama and David Cameron Are Keen To 'nudge' you." *Times Online, July* 14 2008.

Pollard, Michael S. and Matthew D. Baird, The RAND American Life Panel: Technical Description. Santa Monica, CA: RAND Corporation, 2017. https://www.rand.org/pubs/research_reports/RR1651.html.

Thaler, Richard H. "Psychology and Savings Policies." *The American Economic Review* 84, no. 2 (1994): 186-92.

Thaler, Richard H, and Hersh M Shefrin. "An Economic Theory of Self-Control." *Journal of Political Economy* 89, no. 2 (1981): 392-406.

Thaler, Richard H, and Cass R Sunstein. "Libertarian Paternalism." *American Economic Review* 93, no. 2 (2003): 175-79.

Thaler, Richard H, and Cass R Sunstein. 2009. Nudge: Improving Decisions About Health, Wealth, and Happiness: Penguin.

Tuckman, B. W. (1991). The development and concurrent validity of the Procrastination Scale. *Educational and Psychological Measurement*, 51, 473–480.

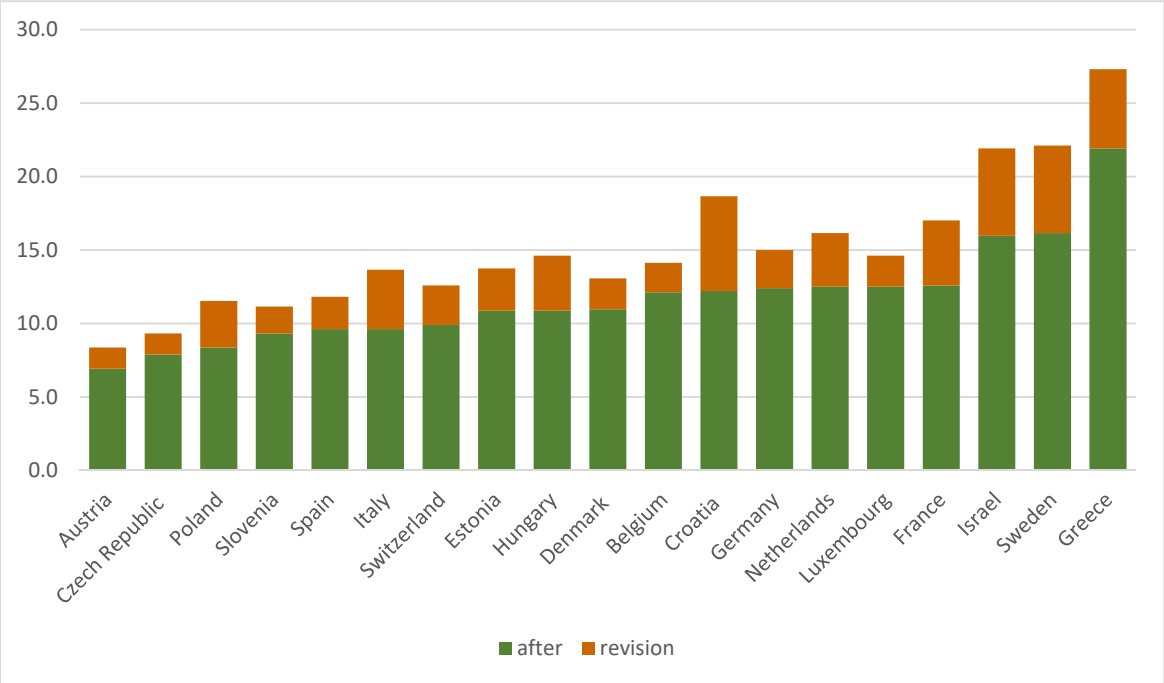
Vaithianathan, Rhema, Bryce Hool, Michael D. Hurd, and Susann Rohwedder. (2018). High-Frequency Internet Survey of a Probability Sample of Older Singaporeans: The Singapore Life Panel®. *The Singapore Economic Review*, Special Edition on Economic Issues of Population Aging in Asia. https://doi.org/10.1142/S0217590818420043.

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

	ALP		SLP		SHARE	
	Total		Total		Total	
Wish to have	before revision	after revision	before revision	after revision	before revision	after revision
…saved more	66.0	54.2	53.3	45.5	15.1	11.9
…about the same	32.5	44.3	42.4	50.1	Tbd	Tbd
…saved less	1.5	1.5	4.4	4.4	Tbd	Tbd
Total	100.0	100.0	100.0	100.0		
N	2,618		4,559		24,576	

Note: In the SLP 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 ALP and SHARE a random half 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 and SHARE results combine both random subsamples.

Figure 1: Extent of saving regret and revisions by SHARE country



Note: Entire bar before revision, green bar after revision, brown bar extent of revision

Table 2a: Saving regret by sociodemographic characteristics (ALP and SLP)

	ALP					SLP				
			Saving Regret (After Revision)					Saving Regret (After Revision)		
	N	In percent	Mean	Std. Error	T-test	N	In percent	Mean	Std. Error	T-test
Total	2,618	100.0	0.542	0.015		4,558	100.0	0.455	0.007	
Female										
0	1,246	47.6	0.526	0.025	ref	2,247	49.3	0.465	0.011	ref
1	1,372	52.4	0.557	0.019	ns	2,311	50.7	0.446	0.010	ns
Age										
60-64	1,058	40.4	0.581	0.024	ref	2,137	46.9	0.467	0.011	ref
65-69	926	35.4	0.531	0.024	ns	1,514	33.2	0.444	0.013	ns
70-74	634	24.2	0.494	0.032	**	907	19.9	0.448	0.017	ns
Marital status										
Married	1,747	66.7	0.517	0.019	ref	3,542	77.7	0.454	0.008	ref
separated or divorced	505	19.3	0.625	0.030	***	364	8.0	0.481	0.026	ns
Widowed	242	9.2	0.617	0.048	*	227	5.0	0.463	0.033	ns
never married	120	4.6	0.426	0.068	ns	421	9.2	0.444	0.024	ns
Missing	4	0.2	0.000	0.000	***	4	0.1	0.250	0.217	
Education terciles										
Lowest	874	33.4	0.528	0.034	ref	1,520	33.3	0.447	0.013	ref
2	871	33.3	0.605	0.023	*	1,519	33.3	0.460	0.013	ns
Highest	873	33.3	0.494	0.017	ns	1,519	33.3	0.460	0.013	ns
Wealth quartiles										
Lowest	328	12.5	0.595	0.048	ref	1,150	25.2	0.463	0.015	ref
2	323	12.3	0.654	0.045	ns	1,129	24.8	0.469	0.015	ns
3	323	12.3	0.559	0.040	ns	1,133	24.9	0.495	0.015	ns
Highest	324	12.4	0.355	0.038	***	1,129	24.8	0.398	0.015	***
Missing	1,320	50.4	0.544	0.021	ns	17	0.4	0.294	0.111	ns
Income quartiles										
Lowest	670	25.6	0.507	0.034	ref	1,022	22.4	0.465	0.016	ref
2	688	26.3	0.595	0.031	*	1,020	22.4	0.441	0.016	ns
3	585	22.4	0.558	0.028	ns	1,038	22.8	0.486	0.016	ns
Highest	642	24.5	0.508	0.023	ns	986	21.6	0.440	0.016	ns
Missing	33	1.3	0.535	0.142	ns	492	10.8	0.433	0.022	ns
Fair or poor health										
0	2,029	77.5	0.533	0.017	ref	2,782	61.0	0.430	0.009	ref
1	589	22.5	0.576	0.034	ns	1,776	39.0	0.495	0.012	***
Fair or poor memory										
0	2,199	84.0	0.537	0.017	ref					
1	285	10.9	0.512	0.048	ns					
Missing	134	5.1	0.698	0.043	***					

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 2b: Saving regret by sociodemographic characteristics in the SHARE countries

	N	In %	Mean SR	Std. Error	T-test
Total	24,540	100	11.56	0.20	
Gender					
Male (ref.)	10,712	43.7	12.01	0.31	
Female	13,828	56.3	11.17	0.27	1.93*
Age					
60 – 64	5,591	22.8	12.96	0.45	
65 – 69	7,067	28.8	12.56	0.39	1.72*
70 – 74	6,586	26.8	10.89	0.38	6.61***
75 – 79	5,296	21.6	8.66	0.39	7.41***
Marital Status					
Married	16,776	70.3	10.30	0.23	
Divorced or Separated	2,580	10.8	16.33	0.73	-7.12***
Widowed	3,330	14.0	11.93	0.56	-0.24
Never Married	1,219	5.1	12.72	0.95	-4.38***
Educational Level					
ISCED 0-2	7,739	31.6	11.48	0.36	
ISCED 3-4	10,381	42.4	12.20	0.32	2.55***
ISCED 5	6,074	24.8	10.75	0.40	3.15***
ISCED 6	217	0.9	8.48	1.90	1.80*
Wealth					
1st Quartile	7,898	32.2	13.49	0.38	
2nd Quartile	4,645	18.9	13.88	0.51	2.59***
3rd Quartile	5,870	23.9	10.27	0.40	5.55***
4th Quartile	6,064	24.7	8.34	0.36	8.70***
Missing	63	0.3	8.79	3.60	0.95
Income					
1st Quartile	5,061	20.6	12.71	0.47	
2nd Quartile	5,228	21.3	13.00	0.47	2.14**
3rd Quartile	4,928	20.1	13.24	0.48	2.37**
4th Quartile	4,657	19.0	9.73	0.43	4.97***
Missing	4,666	19.0	8.90	0.42	5.49***
Self-reported Health					
Excellent, (Very) Good	16,195	66.0	11.16	0.25	
Poor, Fair	8,345	34.0	12.27	0.36	-4.02***
Memory Problems					
No	23,880	97.4	11.51	0.21	
Yes	649	2.6	13.32	1.33	-1.37

Table 1: Summary statistics for saving regret, conditional on individual characteristics. The wealth- and income-quartiles are split by wave and country

Figure 2: Saving regret by age (SHARE countries)

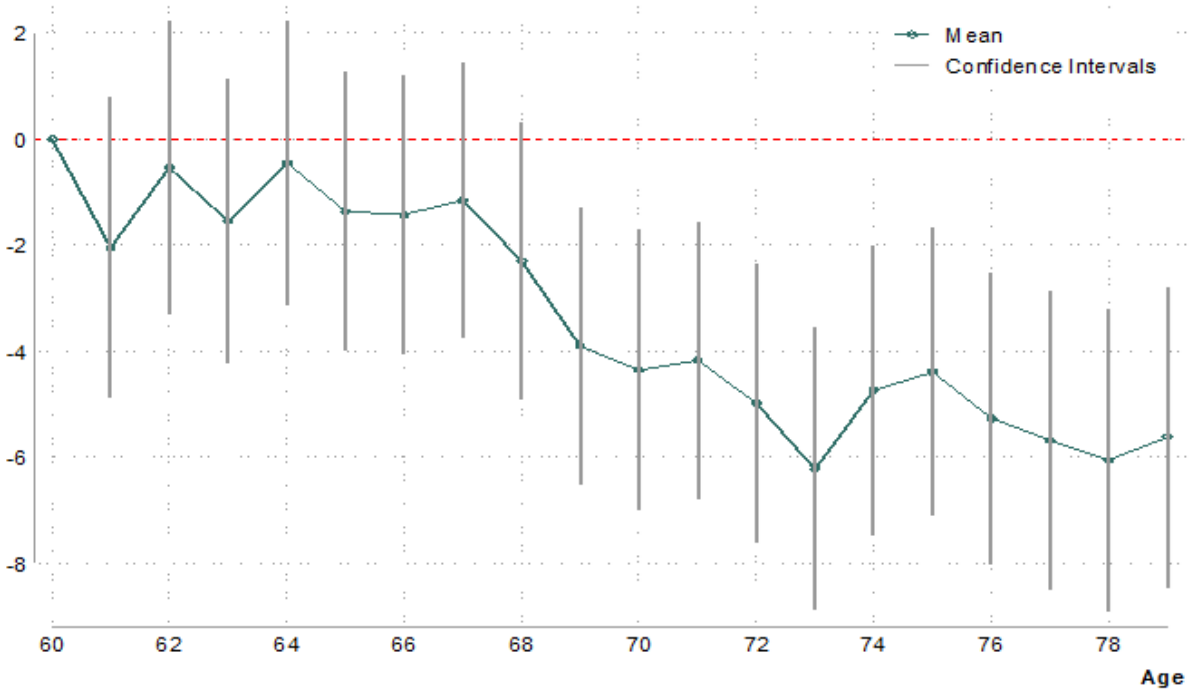


Table 3a: Saving regret by personality traits (ALP and SLP)

	ALP					SLP				
			Saving Regret (After Revision)					Saving Regret (After Revision)		
	N	In percent	Mean	Std. Error	T-test	N	In percent	Mean	Std. Error	T-test
Panel A: Self-confidence and present focus										
Self-confident										
(Strongly)disagree	194	7.4	0.561	0.054	ns	268	5.9	0.500	0.031	ns
Neither	420	16.1	0.580	0.041	ns	1,363	29.9	0.422	0.013	***
(Strongly) agree	1,870	71.4	0.521	0.018	ref	2,918	64.0	0.467	0.009	ref
Missing	134	5.1	0.698	0.043	***	9	0.2	0.333	0.157	ns
Works best under pressure										
(Strongly)disagree	708	27.0	0.499	0.031	*	850	18.6	0.499	0.017	ns
Neither	985	37.6	0.524	0.025	ns	2,035	44.6	0.429	0.011	**
(Strongly) agree	791	30.2	0.577	0.028	ref	1,664	36.5	0.467	0.012	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	252	5.5	0.405	0.031	**
Neither	423	16.2	0.503	0.039	ns	1,150	25.2	0.401	0.014	***
(Strongly) agree	1,913	73.1	0.545	0.018	ref	3,147	69.0	0.480	0.009	ref
Missing	134	5.1	0.698	0.043	***	9	0.2	0.222	0.139	ns
Life about having fun.										
(Strongly)disagree	1,365	52.1	0.535	0.021	ns	1,493	32.8	0.486	0.013	**
Neither	636	24.3	0.498	0.032	*	1,529	33.5	0.431	0.013	ns
(Strongly) agree	483	18.5	0.578	0.037	ref	1,522	33.4	0.449	0.013	ref
Missing	134	5.1	0.698	0.043	**	14	0.3	0.571	0.132	ns
Avoid unhealthy food or behaviors										
(Strongly)disagree	685	26.2	0.514	0.030	ns	318	7.0	0.412	0.028	**
Neither	888	33.9	0.566	0.028	ns	1,296	28.4	0.397	0.014	***
(Strongly) agree	912	34.8	0.518	0.026	ref	2,937	64.4	0.486	0.009	ref
Missing	134	5.1	0.698	0.043	***	7	0.2	0.429	0.187	ns

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 3a: Saving regret by personality traits (ALP and SLP, continued)

	ALP					SLP				
			Saving Regret (After Revision)					Saving Regret (After Revision)		
	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	419	9.2	0.489	0.024	ns
Sometimes	1,916	73.2	0.531	0.018	ref	2,838	62.3	0.451	0.009	ref
Most of the time	411	15.7	0.578	0.039	ns	1,069	23.5	0.459	0.015	ns
Always	48	1.8	0.489	0.119	ns	218	4.8	0.454	0.034	ns
Missing	134	5.1	0.698	0.043	***	14	0.3	0.143	0.094	**
Give up before starting										
Never	1,196	45.7	0.509	0.023	*	1,061	23.3	0.476	0.015	ns
Sometimes	1,166	44.6	0.565	0.023	ref	2,918	64.0	0.450	0.009	ref
Most of the time	109	4.2	0.469	0.090	ns	481	10.6	0.443	0.023	ns
Always	13	0.5	0.531	0.168	ns	75	1.6	0.493	0.058	ns
Missing	134	5.1	0.698	0.043	***	23	0.5	0.391	0.102	ns
Try several tasks, don't complete many										
Never	869	33.2	0.517	0.027	ns	1,362	29.9	0.485	0.014	***
Sometimes	1,322	50.5	0.568	0.020	ref	2,732	59.9	0.441	0.009	ref
Most of the time	235	9.0	0.414	0.052	***	383	8.4	0.444	0.025	ns
Always	58	2.2	0.511	0.152	ns	66	1.4	0.591	0.061	**
Missing	134	5.1	0.698	0.043	***	15	0.3	0.133	0.088	***
Settle for mediocre results										
Never	1,096	41.9	0.558	0.022	ns	1,081	23.7	0.448	0.015	ns
Sometimes	1,271	48.6	0.528	0.023	ref	2,890	63.4	0.454	0.009	ref
Most of the time	112	4.3	0.345	0.067	***	484	10.6	0.473	0.023	ns
Always	5	0.2	0.910	0.086	***	75	1.6	0.533	0.058	ns
Missing	134	5.1	0.698	0.043	***	28	0.6	0.393	0.092	ns

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 3a: Saving regret by personality traits (ALP and SLP, continued)

	ALP					SLP				
			Saving Regret (After Revision)					Saving Regret (After Revision)		
	N	In percent	Mean	Std. Error	T-test	N	In percent	Mean	Std. Error	T-test
Put off things not good at										
Never	362	13.8	0.562	0.040	ns	614	13.5	0.453	0.020	ns
Sometimes	1,629	62.2	0.535	0.019	ref	2,949	64.7	0.447	0.009	ref
Most of the time	459	17.5	0.499	0.044	ns	798	17.5	0.482	0.018	*
Always	34	1.3	0.642	0.126	ns	175	3.8	0.503	0.038	ns
Missing	134	5.1	0.698	0.043	***	22	0.5	0.318	0.099	ns
Put off difficult things										
Never	1,086	41.5	0.546	0.025	ns	1,084	23.8	0.484	0.015	**
Sometimes	1,204	46.0	0.527	0.022	ref	2,890	63.4	0.440	0.009	ref
Most of the time	175	6.7	0.490	0.069	ns	476	10.4	0.479	0.023	ns
Always	20	0.8	0.667	0.150	ns	89	2.0	0.528	0.053	*
Missing	134	5.1	0.698	0.043	***	19	0.4	0.263	0.101	ns
Lose motivation during tasks										
Never	846	32.3	0.558	0.027	ns	1,197	26.3	0.477	0.014	*
Sometimes	1,525	58.2	0.534	0.020	ref	2,930	64.3	0.444	0.009	ref
Most of the time	100	3.8	0.323	0.071	***	358	7.9	0.480	0.026	ns
Always	14	0.5	0.585	0.160	ns	53	1.2	0.509	0.069	ns
Missing	134	5.1	0.698	0.043	***	20	0.4	0.300	0.102	ns

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 3b: Saving regret by personality traits (SHARE countries)

tbc

I see myself as someone who is reserved.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who is generally trusting.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who tends to be lazy.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who is relaxed, handles stress well.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who has few artistic interests.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who is outgoing, sociable.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

Table 3b: Saving regret by personality traits (SHARE countries, continued)

tbc

I see myself as someone who tends to find fault with others.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who does a thorough job.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who gets nervous easily.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who has an active imagination.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

I see myself as someone who is considerate and kind to almost everyone.
1. Disagree strongly
2. Disagree a little
3. Neither agree nor disagree
4. Agree a little
5. Agree strongly

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

	ALP					SLP				
			Saving Regret (After Revision)					Saving Regret (After Revision)		
	N	In percent	Mean	Std. Error	T-test	N	In percent	Mean	Std. Error	T-test
Financial Planning Horizon										
I don't plan	70	4.4	0.68	0.071	ns					
Next few months	234	14.7	0.648	0.034	ns	577	12.7	0.492	0.021	ns
Next year	155	9.7	0.64	0.04	ns	341	7.5	0.443	0.027	ns
Next few years	299	18.8	0.593	0.029	ref	1,352	29.7	0.471	0.014	ref
Next 5-10 years	260	16.3	0.565	0.029	ns	1,061	23.3	0.465	0.015	ns
Longer than 10 years	189	11.9	0.508	0.034	*	689	15.1	0.398	0.019	***
Missing	384	24.1	0.552	0.025	**	538	11.8	0.441	0.021	ns
Financial Literacy										
0 correct answers	69	4.3	0.747	0.068	***	352	7.7	0.426	0.026	ns
1 correct answer	132	8.3	0.737	0.045	***	590	12.9	0.463	0.021	ns
2 correct answers	268	16.9	0.687	0.03	***	1,316	28.9	0.467	0.014	ns
3 correct answers	452	28.4	0.556	0.02	ref	1,431	31.4	0.453	0.013	ref
Missing	669	42.1	0.517	0.02	ns	869	19.1	0.450	0.017	ns
Probability Numeracy										
0 or 1 correct answers	146	9.2	0.505	0.045	ns	728	16.0	0.521	0.019	ns
2 correct answers	272	17.1	0.659	0.03	**	580	12.7	0.495	0.021	ns
3 correct answers	491	30.9	0.581	0.021	ref	702	15.4	0.499	0.019	ref
4 correct answers	147	9.3	0.461	0.033	***	1,204	26.4	0.416	0.014	***
5 correct answers						447	9.8	0.333	0.022	***
Missing	534	33.6	0.607	0.024	ns	897	19.7	0.457	0.017	***

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 5a: Saving regret and negative/positive shocks (ALP and SLP)

	ALP					SLP				
	N	In percent	Saving Regret (After Revision)			N	In percent	Saving Regret (After Revision)		
			mean	Std. Error	T-test			mean	Std. Error	T-test
Negative Shocks										
Health limited work	452	19.8	0.622	0.037	**	641	14.1	0.524	0.020	***
Earnings less than expected	353	15.5	0.672	0.035	***	565	12.4	0.566	0.021	***
Unemployment	415	18.1	0.621	0.031	**	515	11.3	0.542	0.022	***
Large health expense	233	10.2	0.665	0.043	***	478	10.5	0.498	0.023	**
Retired too early	301	13.2	0.643	0.050	**	377	8.3	0.599	0.025	***
Financial help to relatives	396	17.3	0.661	0.041	***	352	7.7	0.497	0.027	ns
Bad investment	242	10.6	0.673	0.043	***	317	7.0	0.492	0.028	ns
Large (non-health/educ) expense	177	7.8	0.642	0.043	**	217	4.8	0.525	0.034	**
College costs higher than expected	211	9.2	0.673	0.042	***	192	4.2	0.469	0.036	ns
Death in family	279	12.2	0.665	0.043	***	193	4.2	0.451	0.036	ns
Divorce/separation	443	19.4	0.634	0.032	***	69	1.5	0.435	0.060	ns
Other	23	1.0	0.682	0.103	ns	40	0.9	0.325	0.074	*
Any negative shock	1,582	69.1	0.608	0.020	***	2,084	45.9	0.520	0.011	***
Positive Shocks										
Spent less than expected	335	14.7	0.549	0.049	ns	762	16.7	0.503	0.018	***
Respondent worked longer than expected	400	17.5	0.533	0.038	ns	646	14.2	0.488	0.020	*
Received financial help from family	188	8.2	0.570	0.046	ns	502	11.0	0.512	0.022	***
Respondent salary/earnings more than expected	545	23.8	0.481	0.034	**	483	10.6	0.460	0.023	ns
Good investments/business	539	23.5	0.403	0.031	***	405	8.9	0.388	0.024	***
Spouse worked longer than expected	257	11.2	0.503	0.061	ns	288	6.3	0.500	0.029	ns
Spouse salary/earnings more than expected	372	16.3	0.487	0.045	ns	259	5.7	0.502	0.031	ns
Received an inheritance	530	23.2	0.467	0.032	***	148	3.3	0.432	0.041	ns
Other	16	0.7	0.659	0.137	ns	54	1.2	0.426	0.067	ns
Any positive shock	1,188	51.9	0.488	0.022	***	1,074	23.6	0.461	0.015	ns
All	2,290	100.0	0.550	0.017		4,558	100.0	0.455	0.007	

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 5b: Saving regret by number of negative/positive shocks in SHARE

	N	In %	Mean	Std. Error	T-test
Negative Shocks					
Health limited work	2,609	10.7	13.79	1.26	1.96**
Large health expense	1,333	5.4	15.86	1.66	2.74***
Unemployment	1,464	6.0	20.17	2.90	3.18***
Retired earlier than expected	1,745	7.1	13.51	1.47	1.40
Earnings less than expected	1,438	5.9	19.42	2.65	3.14***
Investments performed worse than expected	578	2.4	11.14	2.05	-0.22
Financial help to family	907	3.7	14.91	2.04	1.71*
Divorce or separation	1,229	5.0	21.32	2.92	3.55***
Death in family	2,010	8.2	12.22	1.32	0.54
Large expenses other than health	610	2.5	22.84	4.81	2.40***
Pension benefits lower than expected	1,888	7.7	15.62	1.47	2.96***
Other	372	1.5	13.48	2.75	0.71
Any negative shock	9,412	38.5	15.39	0.89	7.04***

	N	In %	Mean	Std. Error	T-test
Positive Shocks					
Own earnings higher than expected	1,655	6.8	12.81	1.50	0.88
Spouse's earnings higher than expected	883	3.6	12.95	1.98	0.72
Respondent retired later than expected	769	3.1	15.39	2.52	1.55
Spouse retired later than expected	308	1.3	12.70	3.01	0.38
Household spending lower than expected	640	2.6	18.52	4.30	1.66*
Investments or business performed better than expected	970	4.0	8.99	1.48	-1.81*
Received financial help from family	586	2.4	17.41	4.44	1.36
Received an inheritance	4,199	17.2	10.07	0.89	-2.04**
Pension benefits higher than expected	777	3.2	10.61	1.86	-0.53
Other	375	1.5	18.04	3.39	1.94*
Any positive shock	7,960	32.5	12.47	0.91	1.47

Table 6: Saving regret by number of negative shocks

ALP	N	In percent	Saving Regret (After Revision)		
			mean	Std. Error	T-test
Number of Negative Shocks					
0	708	30.9	0.421	0.031	ref
1	634	27.7	0.538	0.035	**
2	408	17.8	0.613	0.036	***
3	267	11.7	0.617	0.040	***
4	157	6.8	0.738	0.045	***
5 plus	111	4.9	0.763	0.051	***
Missing	5	0.2	1.000	0.000	***
Total	2,290	100.0	0.550	0.017	

SLP					
Number of Negative Shocks					
0	708	30.9	0.421	0.031	ref
1	634	27.7	0.538	0.035	**
2	408	17.8	0.613	0.036	***
3	267	11.7	0.617	0.040	***
4	157	6.8	0.738	0.045	***
5 plus	111	4.9	0.763	0.051	***
Missing	5	0.2	1.000	0.000	***
Total	2,290	100.0	0.550	0.017	

SHARE					
Number of Negative Shocks	TBD				
0					
1					
2					
3					
4					
5 plus					
Missing					
Total					

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

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

ALP

Panel A: Distribution of Population According to Whether Positive or Negative Shock Was Experienced (Weighted)

		negative	
positive	**No**	**yes**	**total**
No	14.59	33.49	48.08
Yes	16.34	35.57	51.92
total	30.94	69.06	100.00

Panel B: Mean Saving Regret According to Positive or Negative Shock (Weighted)

		negative	
positive	**no**	**yes**	**total**
No	0.460	0.687	0.618
Yes	0.387	0.535	0.488
total	0.421	0.608	0.550

SLP

Panel A: Distribution of Population According to Whether Positive or Negative Shock Was Experienced (Unweighted)

		negative	
positive	**no**	**yes**	**total**
no	43.71	32.68	76.39
yes	10.44	13.17	23.61
total	54.15	45.85	100.00

Panel B: Mean Saving Regret According to Positive or Negative Shock (Unweighted)

		negative	
positive	**no**	**yes**	**total**
no	0.398	0.528	0.453
yes	0.414	0.498	0.461
total	0.401	0.519	0.455

SHARE

Panel A: Distribution of Population According to Whether Positive or Negative Shock Was Experienced (Weighted)

		negative	
positive	**No**	**yes**	**total**
No	TBD		
Yes			
total			

Panel B: Mean Saving Regret According to Positive or Negative Shock (Weighted)

		negative	
positive	**no**	**yes**	**total**
No	TBD		
Yes			
total			

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	-0.0547***	-0.0469**	-0.00600	-0.00517
Works best under pressure	0.0459***	0.0467***	-0.00747	-0.00711
Do what you like today, don't put it off	0.0243	0.0215	0.0394***	0.0406***
Life is about having fun	0.000819	-0.000302	-0.0149*	-0.0150*
Avoid unhealthy food or behaviors	0.0103	0.00862	0.0471***	0.0474***
Procrastination and perseverance (Scaled 1-4 from "Never" to "Always")				
Put off things you should do	0.0333	0.0300	-0.0233*	-0.0203*
Give up before starting	0.0401	0.0443	0.00469	0.00369
Try several tasks, don't complete many	-0.00935	-0.00881	-0.0176	-0.0173
Settle for mediocre results	-0.0507*	-0.0498*	0.0234**	0.0228**
Put off things not good at	0.0174	0.0159	0.0180	0.0209*
Give up task when difficult	-0.0176	-0.0132	-0.0111	-0.0121
Lose motivation during tasks	-0.0374	-0.0390	-0.00654	-0.00902
Negative shock	0.186***	0.173***	0.112***	0.108***
Positive shock	-0.110***	-0.0941***	-0.00336	0.0105
Wealth included	N	Y	N	Y
Observations	2436	2436	4514	4514
R2	0.106	0.119	0.0365	0.0421
F-tests				
joint significance psychometric scales	F(12, 1411) = 2.22 Prob>F = 0.0093	F (12, 1411) = 1.96 Prob>F = 0.0242	F(12, 4487) = 4.99 Prob>F = 0.0000	F(12, 4483) = 5.18 Prob>F = 0.0000
joint significance full model	F(28, 1411) = 7.58 Prob>F = 0.0000	F(32, 1411) = 7.61 Prob>F = 0.000	F(26, 4487) = 6.53 Prob>F = 0.0000	F(30, 4483) = 6.56 Prob>F = 0.000

Note: *** = p-value < 0.01; ** = p-value < 0.05; * = p-value < 0.10

Table 9: Extract from cross-national regressions in SHARE

Real GDP per capita (in $1,000)	-0.14***
	(0.04)
Effective Retirement Age	-0.17
	(0.41)
Medical Expenses (Share OOP)	0.10
	(0.08)
Contribution Rate Pension System	-0.38***
	(0.11)
Unemployment Benefits	0.10
	(0.07)
Taxrate	-0.01
	(0.09)
Gini Coefficient of 65+ (0-100)	0.14
	(0.17)