

# Retirement preparedness in the United states: Quantifying saving adequacy standards based on subjective economic well-being

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## Abstract

Previous research suggests that the median U.S. American retiree has saved adequately for retirement. However, many retirees experience a downgrade in the living standard, which is sometimes unexpected, most times unplanned, but almost always unwanted. This paper sheds further light on the question how saving adequacy can be empirically quantified and what socio-economic aspects matter for saving adequacy. Identification builds on the question how much the retirement income, relative to the working income, has to be to maintain the level of subjective economic well-being from working life. The answer to this question is decomposed across vulnerable groups and the effect of health changes is investigated.

**Keywords:** replacement rates; saving adequacy; health inequality; retirement satisfaction

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# 1 Background and motivation

There is evidence that, on average, U.S. Americans have accumulated enough wealth to maintain consumption levels after retirement. That seems to be true at least for the cohort retiring before the financial crisis (e.g., Scholz et al., 2006; Love et al., 2008; Dudel and Schmied, 2018).

Still, none of these studies neglect, that there are certain socio-economic groups, which are financially unprepared for retirement (e.g., Skinner, 2007; Bernheim et al., 2001). In a series of studies Lusardi and Mitchell (2007, 2011 and 2014) demonstrated that financial illiteracy is a key driver of saving adequacy. Financial illiteracy is in turn widespread among ethnic minorities, older women and the least educated.

Health works in a similar way. Banks et al. (2018) showed that the fact that out-of-pocket health expenditures grow in old age is the major reason why the saving of U.S. American households are often too low. Ill-health is typically more prevalent among blacks, poorly educated and income poor populations (Franks et al., 2003). Consequently, these groups are more at risk to approach retirement with inadequate resources.

Hence, when looking for an answer on whether or not U.S. Americans save enough for retirement, scholars should have a closer look at the vulnerable part of the population. While there seems to be consent about the fact that those groups lack saving, it remains unclear by how much. No benchmarks, which give vulnerable groups an idea of how much more important saving is to them, have been established yet.

To fill this gap, this paper initially defines a retirement goal which is intuitive and highly relevant for the vulnerable population: the perceived difficulty of paying the regular bills (in the following called subjective economic well-being, SEW) should be maintained throughout the retirement step.<sup>1</sup> Second, I show that income is highly relevant for explaining SEW in ages shortly before and after retirement.<sup>2</sup> Third, I calculate the replacement rate, i.e. the retirement income relative to the working income, needed to maintain the SEW of the working life.<sup>3</sup> Finally, this benchmark is calculated for retirees who worsen their health status, for veterans, for poorly educated, for divorced, and for widows. The question is, by how much their replacement rates are below the population average.

## 2 Related work

Existing research has investigated whether or not there is a significant effect of income on financial satisfaction (e.g., Diener et al., 1993; Hansen et al., 2008). Perhaps the most interesting insight from this literature is that relative income matters more for financial satisfaction than absolute income. Relative income can be with respect to other people or with respect to oneself at a different time. Whereas income relative to one's neighbors is certainly an important mechanism how retirees perceive their financial situation it is hard to model based on conventional survey data (see Hsieh, 2003; Palomäki, 2017, for some approaches). Relative retirement income to one's working income can be addressed by

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<sup>1</sup>Of course, there are more ambitious retirement goals such as maintaining the consumption level, but that might be too much to ask for some individuals.

<sup>2</sup>There has been some debate on whether income has an effect on financial satisfaction in older age (see Hansen et al., 2008, for some citations).

<sup>3</sup>Relative income to the own past situation, has shown to be important for financial satisfaction (Diener et al., 1993).

pension replacement rates (Smith, 2003).

Bender (2012) examined the determinants of a slightly more general form of retirement satisfaction than this paper. Respondents are asked whether they find their retirement very satisfying, moderately satisfying, or not at all satisfying. This can be considered as an old-age saving goal as well, but is potentially more prone to other things which influence the happiness of a person such as time and leisure. He finds that relative income and health have a large influence on retirement satisfaction.

A variable which is more framed towards the *financial* part of retiring was used by Dudel et al. (2016) for Germany and Stewart (2009) for the U.K.. Dudel et al. (2016) finds that it needs a replacement rate of 86% to maintain the financial satisfaction. Financial satisfaction is conceptually slightly different to SEW as the question is asked in a different way: e.g., How satisfied are you with your income situation from 1 to 10. Of course, Germany has also a different institutional context. Dudel and Schmied (2018) developed pension adequacy standards for the U.S. and Germany, but they focus on expenditure based retirement goals and they do not investigate heterogeneity within the population. SEW, the way this papers looks at it, was examined by Cracolici et al. (2012) using Italien-SILC data.

Dudel and Schmied (2018) estimate how much income is needed to maintain the living standard, where as a robustness test the living standard is measure by financial satisfaction. The identification comes however from cross sectional data which is not ideal for subjective data Ferrer-i-Carbonell and Frijters (2004). Moreover, they implicitly assume health state independence. However, health might have an influence on the utility of consumption and therefore influence the level of utility drawn from consumption. If heath deteriorates/or improves with retirement the shape of the Engel curves changes. The semiparametric and parametric approach they apply cannot take this into account. While the nonparametric approach does not assume any functional form of the two curves, the results are not point identified. Therefore, a longitudinal approach is needed to model the properly the influence of health on retirement satisfaction.

The life cycle literature and the their optimal saving models can capture some of the heterogeneity (Scholz et al., 2006) as recent models also take into account optimal health (Kuhn et al., 2015) and out-of-pocket medical expenditures (De Nardi et al., 2010). However, calibration models make strong assumptions about individual preferences. In the light of this, Binswanger and Schunk (2012), directly asked respondents what they think how income much they would need in a hypothetical retirement situation. The U.S. American respondents say they that would not want to fall below 45% of their current working income.

Finally, there has been related work on how high the income replacement rate has to be to overcome a monetary poverty threshold (e.g., Love et al., 2008). They find that the median U.S. household has accumulated enough wealth, but 13 % have replacement rates below 50 % and 18% of observations have not saved enough to produce a retirement income which exceeds 150 % of the poverty line.

Arber et al. (2014) examines the UK context and check how subjective financial well-being relates to health. While this is important question on the micro level, the US American context is arguably a more interesting context to study. As Banks et al. (2018) show medical expenditure explain the difference in nondurable expenditure when comparing the US to the UK. Thy observe that nondurable consumption decreases steeper with age in the UK. That implies that health has a larger effect on the financil situation of housheld in the US than in the UK.

Taking this into account Finkelstein et al. (2013) investigates whether the marginal utility

of consumption changes with health in the US. They measured utility by subjective well-being. Kools et al. (2017) does expand the exercise with financial well-being using SHARE Data.

Bonsang and Klein (2012) discusses the effect of retirement on different domains of adjective well-being including income satisfaction. They point out the difference between voluntary and involuntary retirement in Germany using the question whether or not respondents intend to continue working while they are at a retirement status.

There are a number of problems of subjective assessments of economic well-being. For example, Sass et al. (2015) makes the point that financial literate individuals are *ceteris paribus* less satisfied with the financial situation as they are better able to figure out financial deficits. Bertrand and Mullainathan (2001) was able to show that the order of asking the question matters.

### 3 Data

I use the longitudinal Health and Retirement Study which follows individuals aged 50 or older since 1992. It is conducted by the Survey Research Center of the Institute for Social Research of the University of Michigan, and is supported by the National Institute on Aging (NIA) and the Social Security Administration (SSA).

I use observations which have retired by the time of observation in 2014, such that information both before and after retirement are available. I consider cohorts born between 1890 to 1995.

The dependent variable we consider stems from a questionnaire known as the leave-behind-questionnaire, since after the main interview it is left to about 50% of the respondents. The question has been asked since Wave 7, therefore the analysis is mainly based on Wave 7-12, although some retrospective information comes from earlier waves. It is asked in the following way: How difficult is it for (you/your family) to meet monthly payments on (your/your family's) bills? The answers are scaled into five categories ranging from 1, 'not at all difficult' to 5, 'completely difficult'.<sup>4</sup> The benefit of using the HRS is that there is information on this question before and after retirement as well as information on what income is achieved before and after retirement. About 5,240 individuals retired in the relevant time frame and provided information on that question. 1 are the riches 5 are the poors.

As an alternative the question this has been asked since Wave 7 as well: Please think about your life and situation right now. How satisfied are you with your present financial situation? The answers range from 1, completely satisfied to 5, not at all satisfied. 1 are the riches, 5 are the poors.

The HRS also covers a wide range of health variables. For this preliminary version I only use self-reported health. Having a recent diagnosis of an acute event is an alternative assessment which will be covered later on.

As Hansen et al. (2008) showed how important wealth is for financial satisfaction, my income variable covers, besides before-tax income from working or social security, annuities from accumulated asset wealth and housing wealth, assuming a 2.5 % and a 1,25 % nominal growth rate respectively (Crawford and O'Dea, 2012). It also includes most kinds of pension wealth.

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<sup>4</sup>In the SOEP the scale ranges from 1 to 10 where 1 is the lowest scale.

The analysis takes further into account time invariant socio-economic variables such as education, the self-reported age of retirement, the gender, and the voluntariness of retirement (Bender, 2012), as well as time varying aspects as the marital status, age, age squared, the labor force status of the spouse (if applicable), and a geographic variable (the census region), the number of persons in the household.

## 4 Method

The analysis starts by estimating SEW as a function of income. As for most observations, SEW is not provided at every wave, I collapse the data into a panel with one observation before and after retirement. I use a simple specification such as

$$W_{i,d} = \alpha + \beta \log(Y_{i,d}) + \gamma X_{i,d} + \theta_i + u_{i,t} \quad (1)$$

to estimate the effect of income  $\beta$ .  $Y_{i,d}$  represents the average of all observed working incomes in case  $d = 0$  and the average of all observed retirement income for  $d = 1$ .  $W_{i,d}$  denotes the perceived ability to make ends meet, scaling from 1 to 5. The maximum score is taken of each stage when there are multiple observations per labor force status.  $X_{i,d}$  is a vector of covariates as noted in section 3.

Equ. (1) is initially naively estimated by ordinary least square assuming cardinality for the dependent variable. I also test for ordinality applying an ordered logit model. Additionally I apply a fixed effect model on (1), where  $\theta_i$  represents individual time constant effects.

The applied framework for the subsequent step is based on the estimation of equivalence scales (Engel, 1857; Deaton, 1986) and its adaption to retirees (Dudel and Schmied, 2018). Applying this to subjective data was introduced by Dudel et al. (2016); Charlier (2002) and Stewart (2009). Let  $W$  be a function of income  $Y$ , retirement status  $d$ , and some other covariates  $\mathbf{z}$ , i.e.,  $W(Y, d, \mathbf{z})$ . This can be estimated empirically, allowing to use its inverse,  $W^{-1}(w, d, \mathbf{z})$ . Given a welfare level  $w'$ , the adequate replacement rate can then be calculated as  $W^{-1}(w', 1, \mathbf{z})/W^{-1}(w', 0, \mathbf{z})$ .

This idea is implemented as follows

$$W_d = a + \log Y b_Y + d b_d + \mathbf{z}' \mathbf{b}_z + \epsilon, \quad (2)$$

where  $a$ ,  $b_Y$ ,  $b_d$ , and  $\mathbf{b}_z$  are regression coefficients, and  $\epsilon$  is a well behaved error term. Given parameter estimates, which can easily be calculated using least squares, consider equation (2) for a retiree and a non-retiree which are similar with respect to  $\mathbf{z}$ ; assume that these have the same level of SEW; and equate both variants of the equation and solve for  $Y_1/Y_0$ . This yields

$$\mathbb{E} \left( \frac{Y_1}{Y_0} \right) = \exp \left( - \frac{\hat{b}_d}{\hat{b}_Y} \right). \quad (3)$$

The replacement rate differentiated by time varying factors is calculated as (See Dudel et al., 2016).

$$\mathbb{E} \left( \frac{Y_1}{Y_0} \right) = \exp \left( - \frac{\hat{b}_d}{\hat{b}_Y} - (z_{d=1} - z_{d=0}) \frac{b_z}{b_Y} \right). \quad (4)$$

## 5 Preliminary findings

First, I compare the coefficients of (2) as well as the replacement rate defined in (2) by different ways to ask the question, or in other words by using different indicators of welfare (See Table 1).

Table 1: The determinants of subjective economic well-being taking into account the HRS W7-W12 and applying linear fixed effects

	Financial strain (1)	Financial satisfaction (2)	Income satisfaction (3)	Food share (4)
Retired	-0.005 (0.022)	-0.020 (0.037)	-0.033 (0.048)	-1.013*** (0.197)
log(Income)	-0.127*** (0.016)	-0.074*** (0.026)	-0.131*** (0.032)	-3.815*** (0.137)
Age	-0.126*** (0.022)	0.127*** (0.037)	-0.205*** (0.063)	-0.242* (0.143)
Age squared	0.074*** (0.016)	-0.136*** (0.027)	0.133*** (0.044)	0.230** (0.108)
Household size	0.001 (0.012)	0.037* (0.019)	0.059** (0.026)	0.061 (0.102)
Spouse works full-time	0.006 (0.047)	0.017 (0.078)	-0.244** (0.110)	0.381 (0.400)
Spouse works part-time	0.051 (0.061)	-0.062 (0.101)	-0.388*** (0.144)	0.770 (0.513)
Spouse inactive	0.210*** (0.053)	-0.079 (0.088)	0.056 (0.123)	0.507 (0.456)
Spouse is retired	0.058 (0.038)	-0.180*** (0.064)	-0.061 (0.083)	0.407 (0.346)
Bad health	0.041 (0.027)	0.051 (0.045)	-0.013 (0.059)	-0.357 (0.239)
ARR	0.96	0.76	0.78	0.77
ARR (SE)	0.17	0.37	0.28	0.04
Observations	12,558	12,589	6,963	38,571
R <sup>2</sup>	0.039	0.050	0.027	0.025
Adjusted R <sup>2</sup>	-0.839	-0.817	-2.470	-0.195

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Looking at the effect of income on SEW, the coefficients all have the same and expected sign but differ in magnitude. Note however, that the HRS asks for an assessment of income satisfaction only since three waves whereas for financial strain up to 5 waves are available. So it might be not entirely comparable, especially if there is a period effect.

In Table 2, I compare the coefficient using the same waves and notice that now the magnitude of the coefficients are similar. That observation leads to me to the suspicion that there is something wrong with the data before Wave 10, hence I will use only the last 3 Waves (4 Waves as soon as RAND 2016 is available) for the subsequent results.

Table 2: The determinants of subjective economic well-being taking into account the HRS W10-W12 applying linear fixed effects

	Financial strain	Financial satisfaction	Income satisfaction	Food share
	(1)	(2)	(3)	(4)
Retired	-0.038 (0.040)	-0.046 (0.046)	-0.033 (0.048)	-0.728 (0.535)
log(Income)	-0.161*** (0.027)	-0.152*** (0.031)	-0.131*** (0.032)	-5.035*** (0.365)
Age	-0.161*** (0.053)	-0.160*** (0.061)	-0.205*** (0.063)	-1.095 (0.903)
Age squared	0.097*** (0.037)	0.099** (0.043)	0.133*** (0.044)	0.918 (0.648)
Household size	-0.008 (0.022)	0.072*** (0.025)	0.059** (0.026)	0.045 (0.304)
Spouse works full-time	-0.122 (0.092)	-0.163 (0.106)	-0.244** (0.110)	-0.030 (1.330)
Spouse works part-time	-0.031 (0.121)	-0.166 (0.139)	-0.388*** (0.144)	0.987 (1.666)
Spouse inactive	0.094 (0.103)	0.069 (0.118)	0.056 (0.123)	0.118 (1.410)
Spouse is retired	0.032 (0.070)	-0.018 (0.081)	-0.061 (0.083)	-0.135 (1.078)
Bad health	0.073 (0.050)	-0.041 (0.057)	-0.013 (0.059)	-0.338 (0.615)
ARR	0.79	0.74	0.78	0.87
ARR (SE)	0.2	0.22	0.28	0.09
Observations	6,986	6,980	6,963	15,263
R <sup>2</sup>	0.041	0.032	0.027	0.021
Adjusted R <sup>2</sup>	-2.409	-2.451	-2.470	-0.648

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

In Table 3, I proceed with the welfare indicator which is the most relevant one for the mechanism discussed earlier. Now, as there is a lot of debate on how to correctly identify effects with subjective economic well-being, I compare the magnitude of the coefficients by estimation model. The literature suggests, that there is a large difference whether or not cross section variation or within personal variation is used Ferrer-i-Carbonell and Frijters

(2004). That is the case here as well. When the data is treated as cross sectional and the panel is pooled, the effect of income is relatively large with 0.3. The effect diminishes to 0.13 with fixed effects whereas the effect of age increases. The same pattern was found in earlier work by Bonsang and Klein (2012). The random effect model is in between, but the assumptions for random effects, as being uncorrelated to all other covariates, is hard to justify. If the model treats the dependent variable as ordinal, the effect of income is the largest when measured by an ordered logit model. This is about the same magnitude Kools et al. (2017) found with SHARE data. More recent work enables to add fixed effects to an ordered logit model Baetschmann et al. (2015). I notice that the effect of income is larger than in the cardinal fixed effect model but smaller than in the conventional ordered logit model.

Table 3: Coefficients by estimation method using financial strain as welfare indicator

	Pooled	FE	RE	OL	FEOL
Intercept	6.284		6.728		
Retired	-0.204	-0.038	-0.17	-0.407	-0.076
log(Income)	-0.344	-0.161	-0.313	-0.727	-0.182
Age	-0.012	-0.161	-0.032	-0.002	-0.078
Age squared (x 100)	0.001	0.097	0.014	-0.012	0.057
Household size	0.083	-0.008	0.071	0.176	0.049
Spouse works full-time	-0.167	-0.122	-0.173	-0.306	-0.129
Spouse works part-time	0	-0.031	-0.033	0.009	0.897
Spouse inactive	-0.003	0.094	-0.027	-0.004	0.095
Spouse is retired	-0.213	0.032	-0.186	-0.429	-0.279
Bad health	0.364	0.073	0.312	0.673	-0.08
N	6986	6986	6986	6986	6986
ARR	0.55	0.79	0.58	0.57	0.66

The replacement rate which keeps the perception how ends are meet constant throughout the retirement (ARR) is 79% for the average population with the fixed effect estimator. When only the last three waves are used it is about 74 – 79% depending on the welfare indicator. This finding is slightly lower than Dudel et al. (2016) finds for Germany, though again the dependent variable is slightly differently defined.

There is literature that has observed that it equivalence scales depend very much on the the definition of the sample, especially when socio-economic variables are used to shape the sample. As the applied method follow a similar logic, I compare in Table 5 different ways to homogenize the sample.

I start by excluding observation which are below 55 years old. The motivation is that ideally only the incomes of individuals shortly before and after retirement are compared. As expected the effect of income and of age decreases. The replacement rate amounts now to over 200 percent, probably due to the fact that the effect of retirement on SEW is now positive holding income constant, as opposed to the using the full sample. When I take into account only the below median earners, the replacement rate decreases to about 50 percent. If I exclude individuals who retired before the age of 60, the replacement rate is at around 100 percent. Finally when I exclude observations which reported to have retired involuntarily I obtain a rate of 68 percent.



Table 4: The determinants of subjective economic well-being taking by sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Retired	-0.038 (0.040)	0.085 (0.063)	-0.077 (0.073)	-0.090 (0.090)	-0.041 (0.144)	0.005 (0.046)	0.126* (0.065)	0.032 (0.153)	-0.065 (0.047)
log(Income)	-0.161*** (0.027)	-0.106** (0.042)	-0.116** (0.049)	-0.138** (0.057)	-0.147* (0.088)	-0.151*** (0.030)	-0.103** (0.045)	-0.181* (0.095)	-0.168*** (0.032)
Age	-0.161*** (0.053)	-0.030 (0.108)	-0.096 (0.088)	-0.162 (0.126)	-0.103 (0.211)	-0.225*** (0.068)	-0.040 (0.112)	-0.130 (0.222)	-0.093 (0.065)
Age squared	0.097*** (0.037)	0.007 (0.072)	0.047 (0.063)	0.092 (0.087)	0.049 (0.141)	0.140*** (0.047)	0.013 (0.075)	0.065 (0.147)	0.054 (0.046)
Household size	-0.008 (0.022)	-0.008 (0.034)	-0.031 (0.035)	-0.014 (0.043)	-0.041 (0.068)	0.015 (0.025)	0.003 (0.036)	-0.037 (0.075)	-0.016 (0.027)
Spouse works ft	-0.122 (0.092)	-0.090 (0.137)	-0.033 (0.164)	-0.014 (0.203)	-0.192 (0.279)	-0.130 (0.103)	-0.024 (0.147)	-0.033 (0.314)	-0.073 (0.106)
Spouse works pt	-0.031 (0.121)	-0.034 (0.177)	-0.360 (0.265)	-0.402 (0.296)	-0.256 (0.408)	-0.076 (0.133)	-0.022 (0.182)	-0.196 (0.422)	0.010 (0.141)
Spouse inactive	0.094 (0.103)	-0.051 (0.144)	0.353* (0.198)	0.223 (0.225)	-0.435 (0.360)	0.008 (0.112)	-0.066 (0.149)	-0.410 (0.369)	0.031 (0.125)
Spouse is retired	0.032 (0.070)	0.004 (0.090)	0.029 (0.127)	-0.056 (0.145)	-0.211 (0.190)	-0.017 (0.077)	0.008 (0.096)	-0.175 (0.204)	0.068 (0.080)
Bad health	0.073 (0.050)	0.064 (0.064)	0.076 (0.085)	0.060 (0.098)	-0.088 (0.127)	0.069 (0.053)	0.074 (0.065)	-0.048 (0.130)	0.003 (0.060)
ARR	0.79	2.24	0.52	0.52	0.76	1	3.39	1.2	0.68
Observations	6,986	3,434	2,975	2,177	1,292	5,524	3,216	1,204	4,470
R <sup>2</sup>	0.041	0.019	0.045	0.050	0.031	0.037	0.021	0.035	0.034
Adjusted R <sup>2</sup>	-2.409	-2.455	-2.874	-2.813	-2.969	-2.363	-2.485	-3.001	-2.313

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

(1) Full sample

(2) age exceeds 55

(3) below median earner

(4) exlude early retirees and below median earner

(5) age exceeds 55 and below median earner

(6) exclude early retirees

(7) exclude early retirees and age exceeds 55

(8) exclude early retirees and age exceeds 55 and below median earner

(9) only self reported voluntary retirement entries

The main purpose of this paper is to consider the saving adequacy of vulnerable groups.

Table 5: Modelling subjective economic well-being stratified by vulnerable groups

	not more than high school degree (1)	Widows (2)
Retired	−0.016 (0.061)	0.218* (0.119)
log(Income)	−0.137*** (0.043)	−0.207** (0.090)
Age	−0.059 (0.077)	0.010 (0.143)
Age squared	0.027 (0.055)	−0.034 (0.097)
Household size	0.012 (0.030)	
Spouse works full-time	−0.042 (0.143)	
Spouse works part-time	0.002 (0.205)	
Spouse inactive	0.066 (0.157)	
Spouse is retired	0.039 (0.103)	
Bad health	0.056 (0.068)	0.139 (0.168)
ARR	0.89	2.87
Observations	3,463	1,106
R <sup>2</sup>	0.023	0.063
Adjusted R <sup>2</sup>	−2.548	−3.332

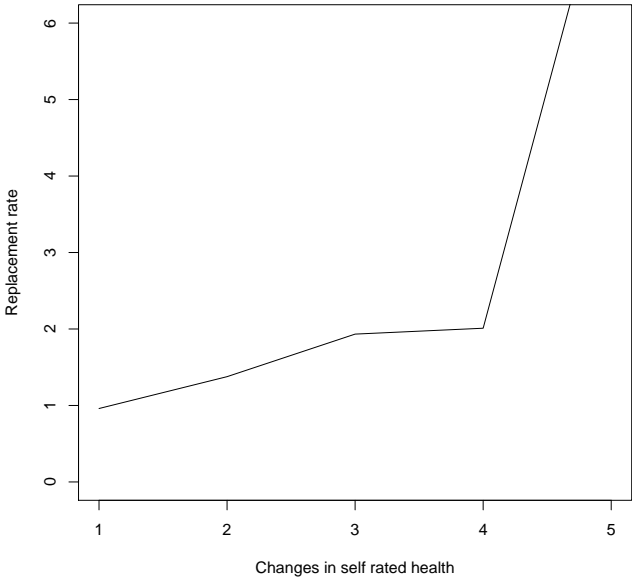
*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

For time invaring socio-demographic characteristics I simply stratify the estimation by variables which are likely to play a role in determining saving adequacy. I start by showing

the results for widows and individuals who did not achieve a higher education than a high school degree. I observe that poorly educated individuals need 8 percent more of their income to maintain SEW than the population average. Widows on the other hand, need over 200 percent. However, due to the small sample size, the estimation for the latter is very imprecise.

Now what about time varying factors such as health?

Figure 1: Changes in self reported health and the SEW maintaining replacement rate estimated with linear fixed effects



It shows that those individuals who worsen their health throughout retirement by 1 scale point need 138 percent of their previous working income to maintain SEW. Those who worsen their health by 4 scale points need 244 percent.

## 6 Implications and outlook

This paper investigates the relative retirement income, with respect to the working income, which is needed to maintain subjective economic well-being. I find that this benchmark is higher for self-reported ill persons.

The replacement rate can be considered as a lower benchmark for saving adequacy for three reasons. First, other studies have shown, that it takes more saving to maintain the consumption level than financial satisfaction (Dudel and Schmied, 2018). Second, subjective economic well-being as an indicator of how financial strains are perceived is a more conservative question than asking for income satisfaction. Third, as the identification strategy builds on a relative income concept, implications on the absolute level of well-being cannot be drawn. When subjective economic well-being is miserable before and after the retirement and retirement income manages to achieve this, the situation of this person is still miserable.

Still, in comparison to other research on this field, the empirical benchmarks delivered here are easily understandable and can be implemented to individual saving plans. From a policy perspective this analysis demonstrated that vulnerable groups have to be financially supported and/or financially educated to achieve the desired retirement goals.

This is only the preliminary version of the full paper I intend to submit. For the final paper, alternative retirement goals such as retirement satisfaction and financial satisfaction are investigated. Also, the saving adequacy of further vulnerable groups such as veterans, widows, income poor or low educated households and ethnic minorities are tested.

## References

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