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# The Great Recession and Life Satisfaction: The Unique Decline for Americans Approaching Retirement Age

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# ABSTRACT

## The Great Recession and Life Satisfaction: The Unique Decline for Americans Approaching Retirement Age

Using data from the U.S. Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System, we examine the impact of the Great Recession on subjective well-being (as measured by life satisfaction) and attempt to identify disparate effects by age. We find that those approaching retirement age (aged 55 to 64) experienced reduced life-satisfaction after the recession, whereas younger working-aged adults did not. The disparate effects by age cannot be explained by income or unemployment trends, but may be explained by wealth effects. For example, we find that the life satisfaction of those approaching retirement age, but not of younger working-age adults, is closely correlated with wealth indices (e.g., the Case-Shiller Housing Price Index and the S&P 500 Index).

**JEL Classification:** G01, D14, D91, D6, I31

**Keywords:** subjective well-being, life satisfaction, Great Recession, wealth effect, retirement, and happiness

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## Introduction

During the 2007-2009 Great Recession, the American economic environment was bleak: unemployment roughly doubled, median household incomes fell 5%, average household net worth declined by a third, and consumer spending dropped markedly. Each month, the Bureau of Labor Statistics reported massive layoffs, disappointing job creation numbers, and a dismal outlook for future job growth. The literature studying the impact of the Great Recession on American households finds that those nearing retirement age were particularly hard-hit. For example, using data from the American Life Panel, Hurd and Rohwedder (2010) find that 25% of respondents aged 50-59 lost at least 35% of their retirement savings, and many took early retirement due to unemployment. Chakrabarti et al. (2015) corroborate these findings using data from credit-report records and various household surveys. Using asset and labor market data from the Health and Retirement Study, Gustman et al. (2012) find that those approaching retirement age during the Great Recession lost retirement wealth, whereas older cohorts gained retirement wealth when they had approached retirement age (prior to the Great Recession).

That the above impacts of the Great Recession would be accompanied by a reduction in subjective well-being (SWB) is suggested by the strong positive relationship between income and SWB both within and across countries (e.g., Diener et al., 1995); the strong positive relationship between wealth and SWB within countries, controlling for income (e.g., Senik, 2014); and the strong negative relationship between unemployment and SWB, controlling for income (e.g., Di Tella et al., 2001). Further, Reeves et al. (2012) report that the number of suicides in the U.S. in 2007-2010 exceeded trend-predictions by 4,750; the authors attribute the increase to the recession. Kerr et al. (2016) report an increase in suicides among 40-64 year-olds

since 2007 and find a positive relationship between suicide and foreclosure rates for this age group during this period; this relationship does not hold for other age groups, nor is a significant relationship identified between suicide and unemployment rates.

Deaton (2012) uses data from the Gallup Healthways Well-being Index (Gallup Daily Poll) to explore the impact of the Great Recession on SWB in the U.S. He examines the relationship between SWB and various economic indicators, e.g., the unemployment rate and S&P 500 Index, between 2008 and 2010. The Gallup Daily Poll surveys a random sample of 1,000 Americans each day and started including SWB items in 2008. Deaton identifies a strong positive relationship between the S&P 500 Index and a range of SWB measures using daily data (controlling for income) and using monthly data (controlling for income and unemployment). In contrast, the relationship between unemployment and SWB, controlling for income and the S&P 500 Index, is only significant (and positive) using a life-satisfaction measure; for other SWB measures (e.g., stress experienced yesterday), the unemployment-coefficient is insignificant.

We explore the effects of the Great Recession on the SWB of adult working-age Americans and conduct various analyses to examine whether those approaching retirement age were more adversely impacted.[1] We use a difference-in-differences (DD) approach, comparing the change in pre- to post-recession SWB of those approaching retirement age to younger working-age adults. For younger working-age adults, we find no difference in their pre-to post-recession SWB. In contrast, we find that the post-recession SWB of those approaching retirement age was significantly lower than pre-recession. We explore channels through which

[1] Concerns about the validity and reliability of SWB metrics have been addressed at length elsewhere, and we refer interested readers to the corresponding literature. SWB metrics have been shown to be psychometrically sound, internally consistent and comparable across individuals, over time, and for different levels of economic development (Diener et al., 1999; Frey & Stutzer, 2002; Helliwell et al., 2010; Krueger & Schkade, 2008).

the Great Recession may have differentially impacted the SWB of those approaching retirement age and find evidence suggestive of wealth effects.

## Data and Descriptive Statistics

We use data from six waves (2005-2010) of the Behavioral Risk Factor Surveillance System (BRFSS), the world's largest telephone survey, conducted by the U.S. Centers for Disease Control and Prevention (CDC). The BRFSS has traditionally collected information on health risk-factors, preventive health practices, and access to healthcare. Between 2005 and 2010, the following life-satisfaction item was included: "Overall, how satisfied are you with your life?" Possible responses are: very satisfied, satisfied, dissatisfied, or very dissatisfied. The survey also collects detailed demographic information, including age, gender, income, marital status, parental status, employment, and education.

Table 1 presents descriptive statistics.[2,3,4] Column 1 includes the entire adult sample (n = 2,005,144), and Columns 2-5 restrict to age-cohorts (age 18-34, 35-54, 55-64, and 65+). Table 2 presents the results of estimating a standard "happiness regression". Specifically, life satisfaction is regressed on a host of SWB-correlates identified in the literature, including state and month-year fixed effects, and standard results are obtained: life satisfaction positively correlates with income, education, and being female, married, and employed. Further, the standard U-shaped relationship between age and life satisfaction, with a nadir in the 40s, holds.

[2] We code life-satisfaction responses as: very satisfied = 4, satisfied = 3, dissatisfied = 2, and very dissatisfied = 1.

[3] The employment status item in the BRFSS asks: "Are you currently…?" Possible responses are: employed for wages, self-employed, out of work for more than 1 year, out of work for less than 1 year, a homemaker, a student, retired, or unable to work. We recode these categories so that employed comprises "employed for wages" and "self-employed," and unemployed comprises "out of work for more than 1 year" and "out of work for less than 1 year."

[4] We use the post-stratification weight (finalwt) provided by BRFSS to account for known deviations between the sample and the U.S. population. For more details, see Centers for Disease Control and Prevention (2010).

## Main Result

Our main analysis attempts to identify if the Great Recession disproportionately negatively impacted the well-being of individuals approaching retirement age. We attempt to identify this effect using a DD approach, comparing the pre- to post-recession change in life satisfaction of those nearing retirement age (aged 55-64) to the rest of the adult working-age population (aged 18-54); we exclude individuals aged 65 and over as they are substantially more likely to be retired (e.g., 21.1% of respondents aged 55-64 are retired, in comparison to 66.7% of respondents aged 65-74).

According to the National Bureau of Economic Research (NBER), the recession lasted from December 2007 through June 2009. As such, our pre-recession period spans January 2005 through November 2007, and the post-recession period spans July 2009 through December 2010; we exclude all observations during the recession. Specifically, we estimate the following equation:

$$(1) \qquad LS_{ist} = \beta_1 Treated_i + \beta_2(Post\text{-}GR_t) + \beta_3(Treated \times Post\text{-}GR)_{it} + \mathbf{X'}_{it}\gamma + \eta_s + \boldsymbol{\lambda}_t + \varepsilon_{ist},$$

where *i* indexes individuals, *s* states, and *t* month-years; *LS* represents life satisfaction; *Treated* is an indicator variable that equals one if the respondent is aged 55-64 and zero otherwise; *Post-GR* is an indicator variable that equals one if the respondent is interviewed after the Great Recession ended (after June 2009) and zero if the respondent was interviewed before the Great Recession began (before December 2007); **X'** represents the observable demographic covariates listed in Table 1;[5] and $\eta_s$ and $\lambda_t$ represent state and month-year fixed effects, respectively. The coefficient of interest

[5] The BRFSS collects information on income using bins ($0 to $10,000, $10,000 to $15,000, $15,000 to $20,000, $20,000 to $25,000, $25,000 to $35,000, $35,000 to $50,000, $50,000 to $75,000, and over $75,000). In order to allow for easier interpretation of the coefficient on income, income is re-coded as the midpoint of the corresponding bin (e.g., observations in the $15,000 to $20,000 bin are assigned an annual income of $17,500). Observations in the

$\beta_3$ is the DD estimator: it represents the differential pre- to post-recession change in LS for those aged 55-64 and those aged 18-54.

Column 1 of Table 3 presents the DD results. The DD estimator is negative and statistically significant (b = -0.0167, t = -3.3), indicating that respondents aged 55-64 became less satisfied with their lives by 0.0167 points after the recession began compared to younger working-age adults. Given that the *Post-GR* coefficient is insignificant, our DD estimation suggests that those aged 18-54 fully recovered from any decline in life satisfaction that they may have experienced during the recession, but that those aged 55-64 did not. While the life satisfaction of those aged 55-64 is statistically indistinguishable from those aged 18-54 in the pre-recession period, a "life-satisfaction deficit" for those approaching retirement age emerges in the post-recessionary period, conditional on observable demographic covariates. The coefficients on these covariates are not reported but are similar to those reported in Table 2.

## Potential Mechanisms

As noted in the literature review, channels by which the Great Recession may have negatively impacted SWB include its effects on income, unemployment, and wealth. Our main result—the negative impact on those approaching retirement age—is then either due to the Great Recession having differentially impacted these factors by age ("factor effects"), or these factors having differentially impacted SWB by age ("SWB effects"). For example, the Great Recession may have reduced wealth more for those approaching retirement age than for younger working-aged adults, or the negative impact of a given reduction in wealth is greater for those approaching

top bin (income over $75,000) are assigned an annual income of $82,500, and an indicator variable is included for incomes in this bin to address top-coding.

retirement age than for younger working-aged adults (e.g., because those approaching retirement age have less time to recover from negative economic shocks before retirement).

To explore these mechanisms, we present various time-series by age-cohort, using seven-month geometric moving averages to smooth the data,[6] and compare those approaching retirement age (aged 55-64) to two younger cohorts (aged 18-34 and 35-54). First, we attempt to rule out differential factor effects for the factors for which we have data. Figures 1 and 2 present time-series for nominal household income and the unemployment rate, respectively.[7] Figure 1 reveals no evidence of a differential factor effect for nominal household income. Figure 2 reveals that any differential factor effect for unemployment would differentially *positively* impact those approaching retirement age, as the pre- to post-recession increase in the unemployment rate was roughly 4 percentage points for those aged 55-64, as compared to 5 (6) percentage points for those aged 35-54 (18-34).

Next, we explore evidence of "wealth effects" being greater for those nearing retirement age than those in younger cohorts. Again, this could be due to either the factor effect (i.e., those nearing retirement age lost a greater sum of wealth than did those in younger cohorts) or the SWB effect (i.e., the SWB of those nearing retirement age was more impacted by a given loss of wealth than for those in younger cohorts). Figure 3 presents the life-satisfaction time-series. For those approaching retirement age, there are two precipitous drops in life satisfaction: one starting in January 2007, and one starting in September 2008. These drops appear to correspond to the start of the housing crisis and the stock-market crash, respectively. To examine whether this is

[6] For a given month, the corresponding value is converted into a weighted average of the observations from three months before through three months after, with the target month bearing 4/16 of the weight, the two contiguous months 3/16 each, the next two contiguous months 2/16 each, and the last two contiguous months 1/16 each.
[7] The nominal household income and unemployment rates are derived from the BRFSS data.

the case, we compare life-satisfaction time-series to the Case-Shiller 20-City Composite Housing Price Index and the S&P 500 Index. As shown in Figure 4, the Case-Shiller Index reached a local maximum in April 2006, declined slowly thereafter, and then fell precipitously after March 2007; as shown in Figure 5, the S&P 500 Index reached a local maximum in October 2007, declined steadily thereafter, and fell precipitously after September 2008.

Further, correlational analyses reveal a strong relationship between life satisfaction and these indices for those approaching retirement age: the correlation between life satisfaction and the Case-Shiller Index is 0.5854 ($p = 0.00$), and the correlation between life satisfaction and the S&P 500 Index is 0.3060 ($p = 0.01$). In contrast, the corresponding correlations for those aged 35-54 are insignificant (Case-Shiller Index rho = -0.0059, $p = 0.96$; and S&P 500 Index rho = -0.0331, $p = 0.78$), as is the correlation between life satisfaction and the Case-Shiller Index for those aged 18-35 (rho = 0.0904, $p = 0.45$). The only exception to this pattern is that there is a statistically significant positive correlation between life satisfaction and the S&P 500 Index for those aged 18-35 (rho = 0.3798, $p = 0.01$); this is comparable in magnitude to the corresponding correlation for those aged 55-64. Our findings corroborate those of Deaton (2012), which identifies a positive relationship between life satisfaction and the S&P 500 Index using Gallup Daily Poll data from 2008 to 2010; as noted above, Gallup did not collect SWB data prior to January 2008. To our knowledge ours is the first evidence of a positive relationship between life satisfaction and the Case-Shiller Index.

We also re-estimate equation (1) replacing the start of the recession period with the start of the housing crisis. The new "pre-recession" period spans January 2005 through February 2007 (rather than November 2007), as the Case-Shiller Index started its precipitous drop in March 2007. We do not change the post-recession period, as both the Case-Shiller Index and

S&P 500 Index bottomed out within two months of the official end of the recession. Column 2 of Table 3 presents the new DD results. As in Column 1, the new DD estimator is negative and significant (b = -0.0227, t = -4.2); further, the magnitude and t-score are each approximately a third greater when marking the end of the "pre-recession" period with the start of the housing crisis rather than the official start of the recession. Lastly, it also warrants mention that, using this specification and controlling for observable demographic covariates, those aged 55-64 have a "pre-recession" "life-satisfaction surplus" of 0.0144 (t = 2.2) compared to those aged 18-54, which is eliminated after the recession.

Finally, we conduct subgroup analyses for those approaching retirement age in "bubble states" versus other states. Chakrabarti et al. (2015) define bubble states as "the five states that experienced the largest housing booms and/or busts;" these are Arizona, California, Florida, Michigan, and Nevada. Figure 6 presents the aged 55-64 life-satisfaction time-series separately for those in bubble states and those in all other states. For those living in bubble states, the peak-to-trough decline in life satisfaction is between 0.08 and 0.10 points (depending on whether the January 2007 or June 2006 peak is utilized); the corresponding decline for those not living in bubble states is approximately 0.04 points. In other words, those approaching retirement age in states experiencing the largest losses in home value experienced greater declines in life satisfaction.

## Conclusion

Using data from the CDC's BRFSS and a DD approach, we identify a decline in the SWB of Americans approaching retirement age when comparing pre- and post-recession years; no such decline is identified for younger working-age Americans. The disproportionately negative effect of the Great Recession on those approaching retirement age cannot be explained by either

income or unemployment time-trends. Rather, our evidence suggests that it is due to wealth effects.[8] We find that the SWB of those approaching retirement age is closely correlated with wealth, as measured by the Case-Shiller Index and the S&P 500 Index; corresponding correlations for younger working-age Americans are weaker. Further, our DD results are magnified when the drop in the Case-Shiller Index is used to mark the start of the recession, rather than being included in the pre-recession period. Lastly, the peak-to-trough declines in life satisfaction are greater for those approaching retirement age in bubble states (the five states with the largest housing booms and/or busts) than for those approaching retirement age in other states.

[8] While our results are suggestive of wealth effects, we acknowledge an alternate interpretation suggested by Daniel McFadden in Deaton (2012): "both SWB and the stock market were likely responding to the same underlying stream of news, assessing its implications for the future." In other words, those approaching retirement age may be more likely than younger working-age adults to follow or orient their expectations vis-a-vis financial news.

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Table 1. Descriptive Statistics

| | All | Age 18-34 | Age 35-54 | Age 55-64 | Age 65+ |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Life Satisfaction | 3.388 | 3.368 | 3.374 | 3.401 | 3.448 |
| | (0.001) | (0.002) | (0.001) | (0.002) | (0.002) |
| Female | 0.504 | 0.491 | 0.500 | 0.501 | 0.543 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Age | 46.11 | 26.82 | 44.49 | 59.21 | 74.17 |
| | (0.027) | (0.019) | (0.013) | (0.008) | (0.017) |
| Income < $10K | 0.051 | 0.063 | 0.041 | 0.046 | 0.061 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.001) |
| $10K < Income < $15K | 0.051 | 0.054 | 0.036 | 0.047 | 0.087 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.001) |
| $15K < Income < $20K | 0.071 | 0.083 | 0.051 | 0.058 | 0.110 |
| | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) |
| $20K < Income < $25K | 0.087 | 0.100 | 0.064 | 0.075 | 0.136 |
| | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) |
| $25K < Income < $35K | 0.114 | 0.126 | 0.088 | 0.105 | 0.167 |
| | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) |
| $35K < Income < $50K | 0.149 | 0.155 | 0.136 | 0.155 | 0.168 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| $50K < Income < $75K | 0.169 | 0.166 | 0.182 | 0.184 | 0.128 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Income > $75K | 0.308 | 0.252 | 0.403 | 0.330 | 0.145 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Did not complete HS | 0.103 | 0.113 | 0.085 | 0.085 | 0.146 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| HS Graduate | 0.276 | 0.283 | 0.254 | 0.265 | 0.333 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Some college | 0.268 | 0.295 | 0.261 | 0.269 | 0.235 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| College graduate | 0.353 | 0.309 | 0.400 | 0.382 | 0.286 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Married | 0.621 | 0.455 | 0.724 | 0.706 | 0.583 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Parent | 0.440 | 0.605 | 0.589 | 0.121 | 0.043 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Employed | 0.624 | 0.681 | 0.782 | 0.578 | 0.143 |

| | | | | | |
|---|---|---|---|---|---|
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Unemployed | 0.0601 | 0.085 | 0.063 | 0.052 | 0.013 |
| | (0.000) | (0.001) | (0.001) | (0.001) | (0.000) |
| Homemaker | 0.076 | 0.087 | 0.077 | 0.053 | 0.073 |
| | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) |
| Student | 0.041 | 0.127 | 0.008 | 0.002 | 0.001 |
| | (0.000) | (0.001) | (0.000) | (0.000) | (0.000) |
| Retired | 0.150 | 0.001 | 0.012 | 0.214 | 0.733 |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) |
| Unable to work | 0.050 | 0.021 | 0.057 | 0.101 | 0.038 |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) |
| Observations | 2,005,144 | 278,235 | 755,635 | 429,516 | 541,758 |

Standard errors in parentheses.

Table 2. Standard "happiness" regression, with dependent variable life-satisfaction

| | (1) |
|---|---|
| Female | 0.0219*** |
| | (0.002) |
| Age | -0.0126*** |
| | (0.000) |
| Age squared | 0.0001*** |
| | (0.000) |
| Log income | 0.0957*** |
| | (0.002) |
| Income top code | 0.0858*** |
| | (0.003) |
| Never completed HS | -0.0135*** |
| | (0.004) |
| Some college | 0.0021 |
| | (0.002) |
| College graduate | 0.0639*** |
| | (0.002) |
| Married | 0.1730*** |
| | (0.002) |
| Parent | -0.0080*** |
| | (0.002) |
| Unemployed | -0.2120*** |
| | (0.005) |
| Homemaker | 0.0229*** |
| | (0.003) |
| Student | 0.0392*** |
| | (0.007) |
| Retired | 0.0399*** |
| | (0.003) |
| Unable to work | -0.3490*** |
| | (0.005) |
| Constant | 2.5270*** |
| | (0.025) |
| Observations | 2,005,144 |
| R-squared | 0.112 |

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 3. DD estimates

| | (1) | (2) |
|---|---|---|
| Post-GR | 0.0051 | 0.0061 |
| | (0.013) | (0.013) |
| Treated | 0.0073 | 0.0144** |
| | (0.006) | (0.007) |
| Post-GR*Treated | -0.0167*** | -0.0227*** |
| | -0.005 | -0.00541 |
| Female | 0.0171*** | 0.0175*** |
| | (0.002) | (0.003) |
| Age | -0.0235*** | -0.0235*** |
| | (0.001) | (0.001) |
| Age squared | 0.0003*** | 0.0003*** |
| | (0.000) | (0.000) |
| Log income | 0.0977*** | 0.0972*** |
| | (0.003) | (0.003) |
| Income top code | 0.0874*** | 0.0887*** |
| | (0.003) | (0.004) |
| Never completed HS | -0.0168*** | -0.0137** |
| | (0.006) | (0.006) |
| Some college | -0.0005 | 0.0001 |
| | (0.003) | (0.004) |
| College graduate | 0.0662*** | 0.0637*** |
| | (0.003) | (0.003) |
| Married | 0.189*** | 0.1900*** |
| | (0.003) | (0.003) |
| Parent | 0.00346 | 0.0053* |
| | (0.003) | (0.003) |
| Unemployed | -0.216*** | -0.2110*** |
| | (0.006) | (0.007) |
| Homemaker | 0.0238*** | 0.0220*** |
| | (0.004) | (0.005) |
| Student | 0.0227*** | 0.0183** |
| | (0.008) | (0.009) |
| Retired | 0.0463*** | 0.0458*** |
| | (0.005) | (0.006) |
| Unable to work | -0.362*** | -0.3590*** |
| | (0.007) | (0.007) |
| Constant | 2.6930*** | 2.6910*** |
| | (0.037) | (0.040) |
| Observations | 1,062,263 | 862,618 |
| R-squared | 0.122 | 0.122 |

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1
Figure 1. Nominal household income time-series, by age cohort

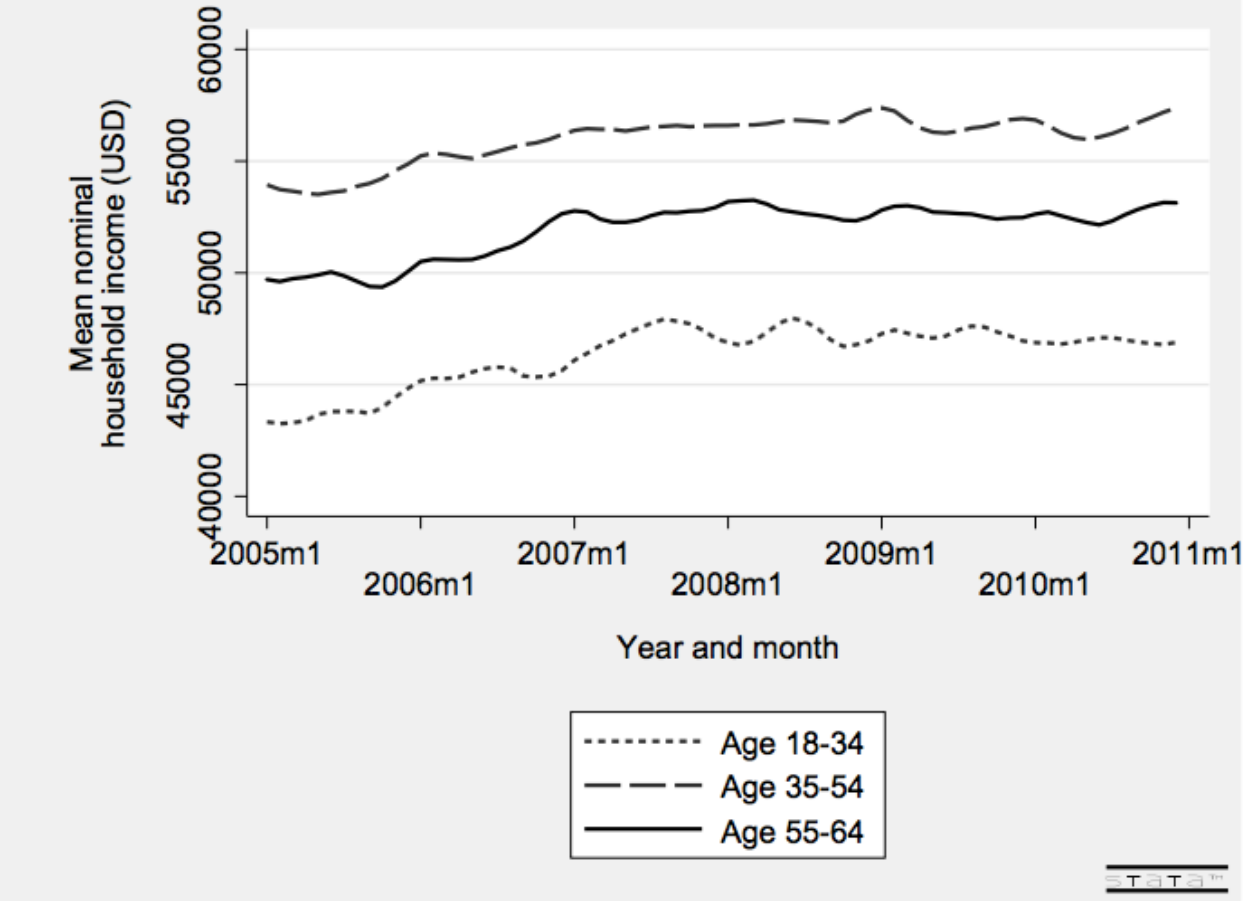

Figure 2. Unemployment-rate time-series, by age cohort

Figure 3. Life-satisfaction time-series, by age cohort

Figure 4. Case-Shiller Housing Price Index and life-satisfaction time-series

Figure 5. S&P 500 Index and life-satisfaction time-series

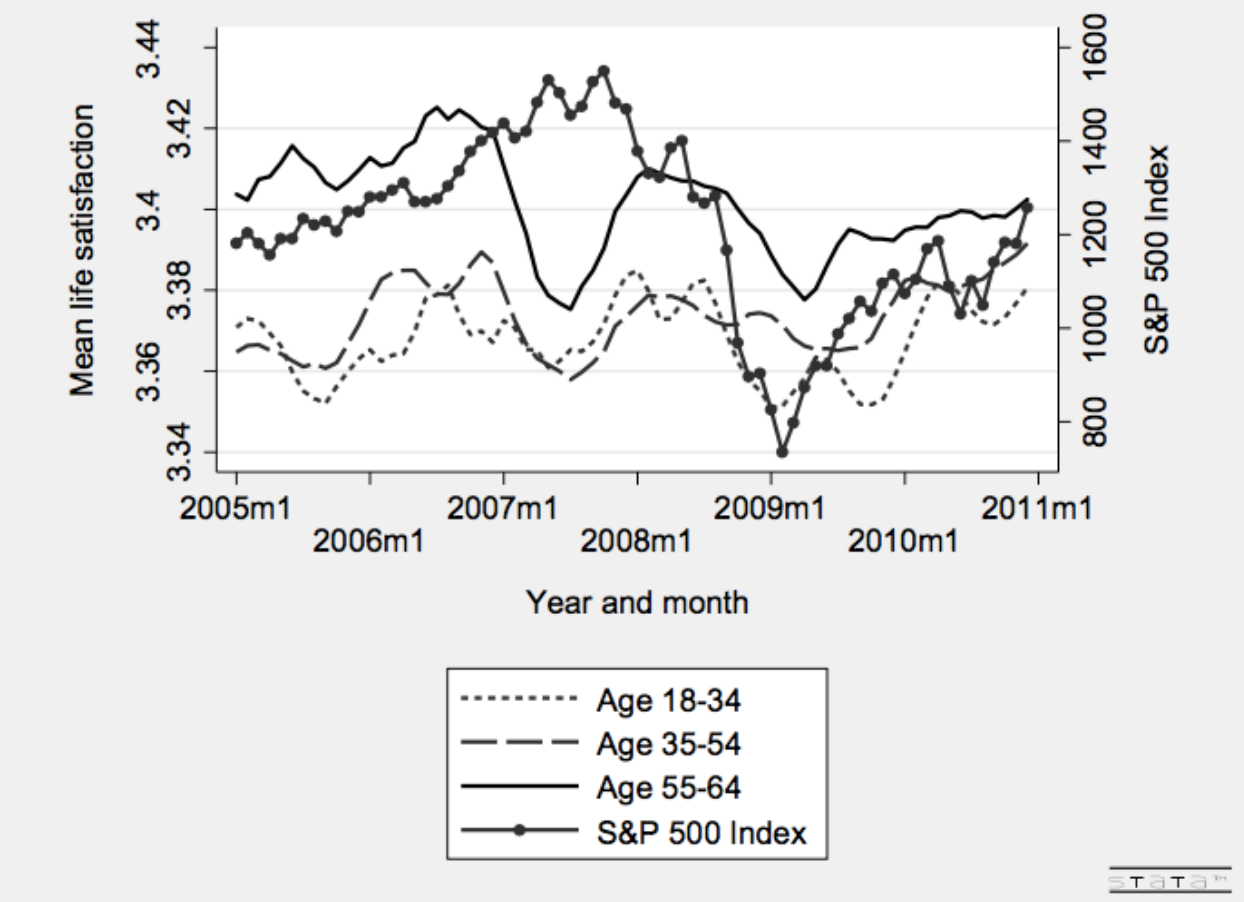

Figure 6. Age 55-64 life-satisfaction time-series for bubble versus non-bubble states