Tomas Bata University in Zlín
Library

Income and life satisfaction: A 'wave formation' framework

Citation

DOI

Permanent link

TBU Publications
Repository of TBU Publications
publikace.k.utb.cz

Income and Life Satisfaction: A 'Wave Formation' Framework

Khatai Aliyev[1,2], Orkhan Nadirov[3], Bruce Dehning[4,5]

Khatai Aliyev: khatai.aliyev@unec.edu.az; xaliyev@beu.edu.az

Orkhan Nadirov: onadirov @ ada.edu. az

Bruce Dehning: bdehning@chapman.edu; dehning@utb.cz

[1]UNEC Empirical Research Center, Azerbaijan State University of Economics (UNEC), Istiqlaliyyat 6, AZ1001 Baku, Azerbaijan

[2]Department of World Economy, Baku Engineering University, Hasan Aliyev 120, AZ0101 Khirdalan, Azerbaijan

[3]School of Public and International Affairs, ADA University, Ahmadbay Agha-Oglu 61, 1008 Baku, Azerbaijan

[4]Argyros School of Business and Economics, Chapman University, One University Dr.,, Orange, CA 92866, USA

[5]Faculty of Management and Economics, Tomas Bata University, Mostni 5139, 76001 Zlin, Czech Republic

Abstract

Previous research on the relation between wealth and life satisfaction has found conflicting results. The current study aims to bring a "wave formation" framework to the subjective well-being literature to understand the features of non-linearity in the income-life satisfaction association. The study compares individuals' life satisfaction at various wealth levels, moving their way up or down through the income stratum. We hypothesize that when someone with increasing income reaches the top of one stratum their satisfaction is high, but when they move from the top of one stratum to the bottom of the next their satisfaction declines, leading to a wave pattern. Using a cross-sectional design for the dataset of 1654 respondents in Azerbaijan, we apply the Ordered Logit method to identify the income borders of ups-and-downs in the "wave." Threshold levels for each wave element are then calculated separately for males and females after controlling for a set of individual-specific factors. Empirical results support the hypothesis, with life satisfaction following a wave formation. The research findings have implications for policymakers and future research.

Keywords: Income, life satisfaction, subjective well-being, wave formation, azerbaijan

1 Introduction

Over the past decades, the relationship between income and life satisfaction has gained considerable attention (**Plouffe and Tremblay 2017**). While they are positively related at the country level (**Diener and Biswas-Diener 2002; Diener et al. 1993, 2010, 2013; Hagerty 2000; Inglehart and Klingemann 2000; Levin et al. 2011; Veenhoven 1991**) and individual level (**del Mar Salinas-Jiménez et al. 2010; Grace et al. 2019; Yuan 2016**), they can also have a nonlinear relationship at the individual level

(**Diener and Biswas-Diener 2002; Diener et al. 1993; Kahneman and Deaton 2010**). **Hou (2014)** underlines the positive spillover effect of locality income on individuals' life satisfaction.

At the individual level, the main argument about this relationship is whether it is absolute (absolute-income hypothesis) (**Diener 1984; Veenhoven 1991**) or relative (reference-income hypothesis) (**Easterlin 1974**). While the absolute argument refers to the notion that access to income helps to meet human needs such as food, housing, and health (**Diener et al. 1993**), the reference argument refers to the idea that the effect of income on life satisfaction can depend on changeable standards such as cultural or societal circumstances (**Diener et al. 2018**). The former hypothesis shows that wealthier people have higher life satisfaction than poorer people within a country (**Diener 1984**). The latter hypothesis stems from the **Easterlin (1974)** paradox, indicating that income and life satisfaction are positively related within a country at a particular time but not in overtime.

The reference-income hypothesis has also been tested as a "comparison income," emphasizing that not only own income, but also the income of a reference group matters for happiness (**Ferrer-i Carbonell 2005**). **Kahneman et al. (2006)** confirm the aforementioned hypothesis that individuals are satisfied when they have an above-average income. However, they are hardly satisfied when they assess the lives of others. Both absolute and reference income hypothesis assume the direct causal relationship between income and life satisfaction. However, it should be noted that the causal relationship between income and life satisfaction has been denied by the study of **Boyce et al. (2010)**, as the causation may stream from higher life satisfaction to higher income (**Diener and Seligman 2004; Johnson and Krueger 2006**). **Hence, Boyce et al. (2010)** add the rank income hypothesis to the literature along with absolute and relative income, showing that individuals compare themselves to others within a reference group. Put differently, as the ranked position of an individual's income increases, their life satisfaction increases compare to the sampled groups from the reference group, which is a contrast to the reference income hypothesis.

1.1 Wave Formation' Framework

By incorporating three hypotheses into one 'wave formation' framework, we hypothesize that the relationship between income and life satisfaction is nonlinear and moves up-down motion. This wave formation idea stems from **Parekh's (2018)** study, which showed that as individuals move through finite preferences, they encounter distinct levels of satisfaction in the wave formation. However, Parekh's theoretical reasoning was based on consumers' decisions in a particular monetary decision-making process. In contrast, we apply the finite preferences idea of the model to the life satisfaction of the individuals, assuming that all 'absolute,' 'reference' and 'rank' income hypotheses are disconnected from each other or cause direct and indirect causality problem due to these finite set of preferences.

According to the "wave formation" framework, individuals' increased income increases their life satisfaction (e.g., there is a direct causal relationship) in general within a country. However, this causality between income and life satisfaction is distorted only within ranked income categories. The main argument behind this distortion is finite preferences, as mentioned above. Consider an individual who needs to reach a minimum subsistence level (which is a first finite preference). After fulfilling this minimum standard of living, an individual wants to reach a reference group (which is a second finite preference) and then is eager to reach a smaller group within that reference group (which is the third finite preference) and so on. We argue that although income positively affects the individual's life satisfaction in general, the repeated up-and-down motion can be observed along with the positive linear relationship between income and life satisfaction.

More precisely, the causality from personal income to individuals' life satisfaction is not always in the same direction. At the lowest level of income, individuals' life satisfaction increases in response to income increasing, which allows them to fulfill basic (absolute) needs, such as food and shelter. However, after a certain level of income, an individual compares himself/herself with a reference group that leads to a change in the concept of needs (in accordance with the needs of the reference group) and makes them relatively unhappy as the income increase further until the second threshold point. Logically a similar tendency brings further ups-and-downs towards much smaller (ranking) reference groups. Therefore, using three prior hypotheses within the 'wave formation' framework may explain how increasing income may raise individuals' life satisfaction.

Life satisfaction is often due to being grateful for what one has (**Gere and Schimmack 2017; Bomhoff and Siah 2019**). Two individuals with vastly different wealth can both be satisfied if they are genuinely grateful for what they have, rather than the less wealthy individual wanting more because they compare what they have to the wealthy individual. However, human nature makes this difficult (**Joshanloo 2018**). One reason for this is because ostentatious wealth is easily observed, whereas the lack of wealth is not. One reason for this is that when something is unobservable, we do not know if it does not exist, or if it is just not present at this moment. The wealth of a rich person driving a luxury automobile is easily observed. Seeing a person walking on the street is not necessarily a signal that they are poor. Perhaps it is just a wealthy person walking after they park their car. Not being grateful for what we have means observing wealth and desiring that wealth, instead of observing poverty and being thankful that we are not in the same circumstance.

In society, segregation across income levels is common. People of similar income levels socialize together, live in the same neighborhoods, and often work together. Within the stratification of society, there are people at the top of each level or stratum, and people at the bottom. Someone at the top of one level might move into a more desirable neighborhood, only to discover that they just went from the top of one income stratum to the bottom of the next. Getting a promotion to a manager makes an employee realize they are now back at the bottom of the managerial pay scale, rather than at the top of the general employee pay scale. Being separated from those with less income and surrounded by those with more income makes the differences more palpable. Now you can afford to send your children to a better private school, only to realize that the car you drive and the vacations you take are not as nice as the other parents. Whereas the dream was to be able to afford a better education for your children, the reality is that your lower-income level is more readily apparent.

In the life satisfaction data from Azerbaijan, this upward movement through society is quantifiable. As shown in **Fig. 1**, when an individual's income increases, life satisfaction rises and falls from the top of one stratum to the bottom of the next. This sawtooth pattern of rising and falling will be slightly different for each individual because the strata are not precisely delineated. Each individual compares themselves to those around them, and changing reference groups occurs at slightly different income levels for each individual. When aggregated across individuals, the sawtooth pattern of rising and falling takes a wave form, as shown in **Fig. 2**.

To better understand this transformation from individuals with a sawtooth-shaped function to the wave formation, imagine thousands of individuals with slightly different peaks and drops. When averaged together, the peaks will smooth out across each stratum, resulting in the wave form discovered in the empirical analysis and shown theoretically in **Fig. 2**.
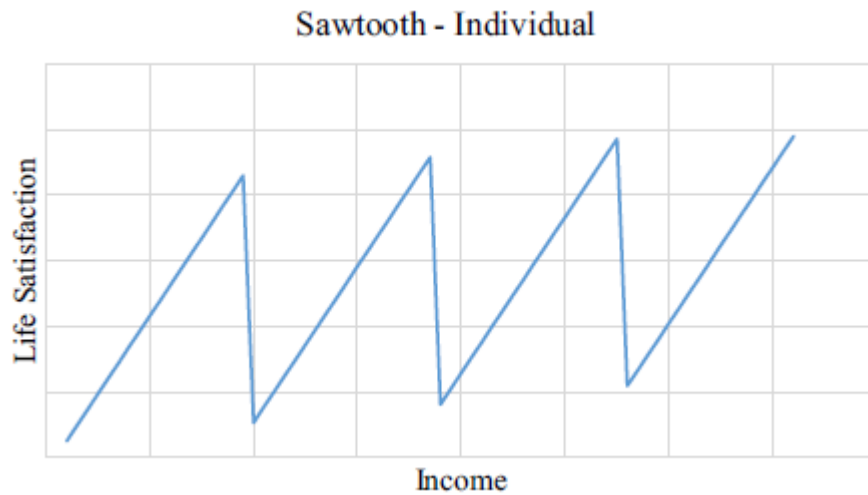
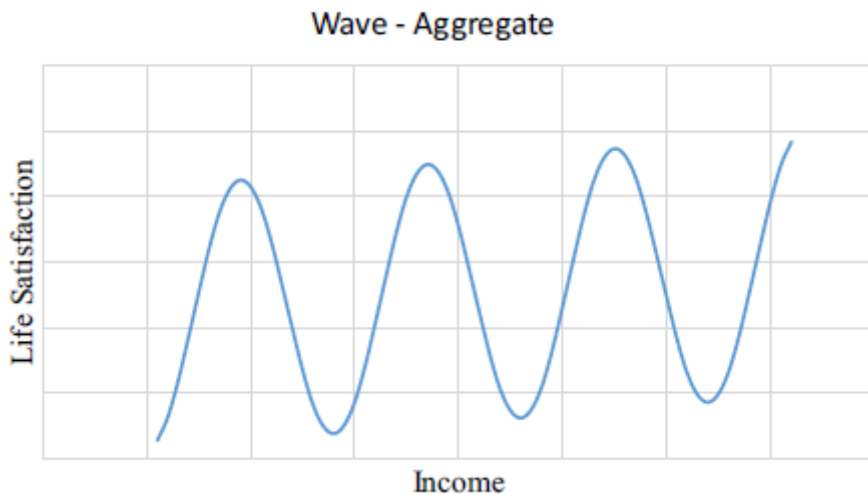**Fig. 1** The pattern of individual life satisfaction as income increases

Fig. 2 The pattern of aggregate life satisfaction as income increases

2 Method

2.1 Participants

The employed dataset was taken from **ASERC (2018)**, representing a random sample of 3308 respondents in Azerbaijan, conducted within March-June 2018 by an independent agency. Data was collected through online surveys. The questionnaire included 27 questions, and the length of time answering these survey items was around 15 min. Students, unemployed individuals, homemakers, retired people, and nearly 180 respondents with missing values are excluded from the sample, leaving 1654 with all required responses. The aforementioned participants were not selected because there is no income data about those respondents. Among 1654 respondents, 39.6% are females and 60.4% are males with age ranging from 17 to 75 (M_{age} = 34.15, SD_{age} = 11.61). In terms of the highest level of education attained, 17.47% have only comprehensive school, 15.05% are college (or vocational school)

graduates, while 44.63% have a bachelor's degree, 17.59% have a master's degree, and 5.26% have a Ph.D. degree (**Table 1**).

Table 1 Descriptive statistics (mean and Std. Error) of variables

Variables	Whole sample	(1)	(2)	(3)	(4)	(5)
SAT	20.644	19.316	20.401	20.711	22.317	23.648
	(7.122)	(7.214)	(7.169)	(7.039)	(6.772)	(6.403)
Income	686.72	308.57	528.23	690.34	1123.9	1826.25
	(613.8)	(93.53)	(151.1)	(179.5)	(227.6)	(788.4)
Female	0.3960	0.5531	0.3604	0.2970	0.2201	0.1641
	(0.489)	(0.497)	(0.480)	(0.457)	(0.415)	(0.371)
Age	34.148	33.621	34.125	34.551	35.257	35.273
	(11.61)	(12.06)	(11.54)	(11.41)	(11.31)	(0.371)
Single	0.3978	0.4521	0.3923	0.3593	0.3059	0.3164
	(0.489)	(0.498)	(0.488)	(0.480)	(0.462)	(0.466)
Married	0.5695	0.5116	0.5736	0.6096	0.6754	0.6563
	(0.495)	(0.500)	(0.494)	(0.488)	(0.469)	(0.476)
Widowed	0.0326	0.0362	0.0341	0.0311	0.0186	0.0273
	(0.178)	(0.187)	(0.181)	(0.174)	(0.135)	(0.163)
No_Child	0.4516	0.5078	0.4395	0.4130	0.3731	0.3672
	(0.498)	(0.500)	(0.497)	(0.493)	(0.484)	(0.483)
School	0.1745	0.2189	0.1868	0.1655	0.1269	0.0937
	(0.379)	(0.414)	(0.389)	(0.372)	(0.333)	(0.292)
College	0.1505	0.1956	0.1439	0.1301	0.1082	0.0508
	(0.358)	(0.397)	(0.351)	(0.337)	(0.311)	(0.219)
Bachelor	0.4462	0.4339	0.4835	0.4724	0.4029	0.4179
	(0.497)	(0.496)	(0.500)	(0.499)	(0.491)	(0.494)
Master	0.1759	0.1321	0.1538	0.1782	0.2649	0.2927
	(0.381)	(0.339)	(0.361)	(0.383)	(0.442)	(0.456)
PhD	0.0526	0.0194	0.0318	0.0537	0.0970	0.1445
	(0.223)	(0.138)	(0.176)	(0.226)	(0.296)	(0.352)
Baku	0.4969	0.4624	0.4473	0.4879	0.5895	0.6289
	(0.500)	(0.498)	(0.497)	(0.500)	(0.492)	(0.484)
Absheron	0.1705	0.1619	0.1857	0.1867	0.1903	0.1718
	(0.376)	(0.368)	(0.389)	(0.389)	(0.393)	(0.378)
Number of Obs	1654	772	910	707	268	256

(1) income < 460; (2)310 ≥ income ≤ 850; (3) 450 ≤ income ≤ 1150; (4) 850 ≤ income ≤ 1600; (5) 1000 ≤ income ≤ 5000. Standard errors are in ()

2.2 Variable Measurement

2.2.1 Dependent Variable

Life satisfaction is measured based on the Satisfaction with Life Scale advanced by **Pavot and Diener (1993, 2009)**, which shows the outcome through the five items they made ("In most ways, my life is close to my ideal," "The conditions of my life are excellent," "I am satisfied with my life," "So far, I have achieved the important things I want in life" and "If I could live my life over, I would change almost

nothing"). The answers to the given questions range from one to seven, with one indicating strongly disagree and with seven strongly agree. The following period of the scale measuring is the calculation of the average score from 5 questions, where the average score provides an index of life satisfaction and contains the subsequent scale ranging: 5-9 (extremely dissatisfied), 10-14 (dissatisfied), 15-19 (slightly dissatisfied), 20 (neutral), 21-25 (slightly satisfied), 26-30 (satisfied) and 31-35 (extremely satisfied).

2.2.2 IndependentVariables

ASERC (2018) had other questions on income, age, education, children, gender, and marriage. Income includes the responses to "What is your average monthly income? (in AZN)." For age, **ASERC (2018)** uses the "Your age?" question, which shows the respondent's actual age. The education variable is measured by asking their highest education level that they have reached, including school, college graduates, bachelor, master, and Ph.D. degree levels, added to the model as dummy variables (bachelor degree holders left as the base group). The number of children status was based on responses to the question, "Do you have children?" ("No_child: yes = 1, no = 0,); Gender (female = 1, male = 0), marital status (being "married" or not and being "widowed" or not; "Unmarried" is left as the reference group) and location area related (living in "Baku" (the capital city with the largest population and national income share) or not, and living in "Absheron" (the region surrounding Baku) or not). Dummies were included as control variables as well.

3 Results

3.1 Descriptive Statistics

The initial descriptive view of the relationship between income and life satisfaction is given in **Fig. 3**. Each point represents the average life satisfaction score for respondents at income levels increasing in 50 AZN increments. Life satisfaction is represented on the y-axis and ranges from 17.39 to 27.86 (M = 21.85, SD = 2.26). Although the overall trend is upwards, the moving average trendline indicates a wave formation.[1]
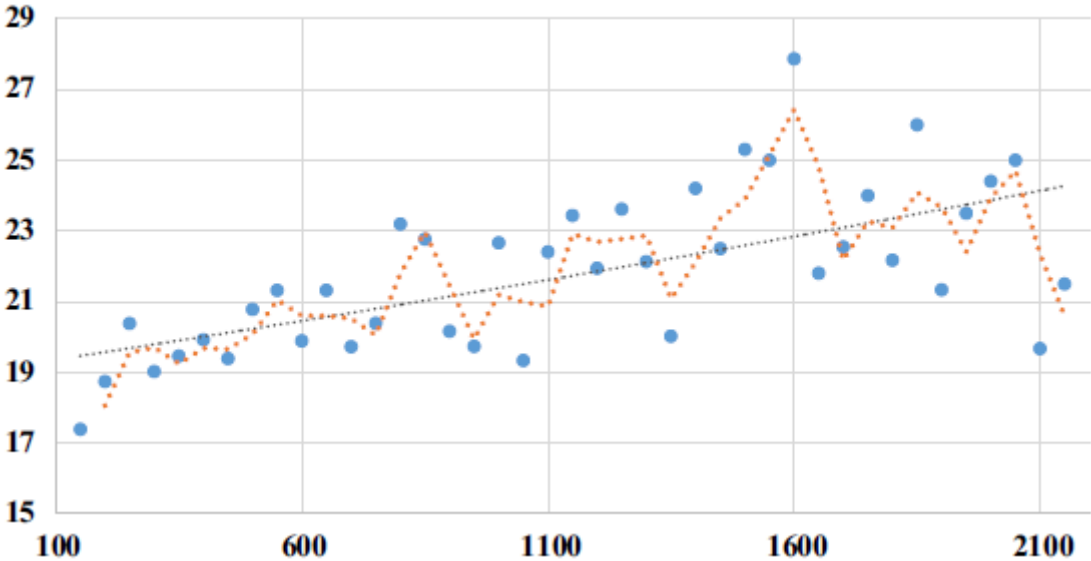

Fig. 3 Average life satisfaction versus income. Source: Authors' own calculations

3.2 Empirical Analysis

3.2.1 Model Building

To examine the level of life satisfaction of individuals (SAT) at different income levels, the baseline models for the empirical analysis are structured as follows:

$$ln(SAT)_i = \alpha_0 + \alpha_1 * ln(income)_i + \alpha_2 * ln(income)_i * female_i + \sum_{t=1}^{n} \gamma_t * X_t + u_i \quad (1)$$

$$ln(SAT)_i = \beta_0^k + \beta_1^k * ln(income)_i + \beta_2^k * \ln(income)_i^2 + \beta_3^k * log(income)_i * female_i$$
$$+ \sum_{t=1}^{n} \delta_t^k * X_t + v_i^k$$

$$(2)$$

where $X_t \in$ *(ln (age)$_i$, ln (age)$_i^2$, Married$_i$, Widowed$_i$, No$_{childi}$, School$_i$, College$_i$, Master$_i$, PhD$_i$)* or all control variables. Note that ln denotes natural logarithm. α and β s display regression coefficients. u_i and v_i^k are the error terms of the corresponding equation. At the first stage, both equations are estimated on the entire sample (n = 1654).

According to the wave formation idea, Eq. (**2**) has been estimated for the sub-samples of defined income intervals. Hence, *k* differentiates the use of the whole sample and the defined sub-samples.

Due to the ordering features of the dependent variable, the Ordered Logit method has been applied. Note that model the dependent variable is $ln\left(\frac{1-p}{p}\right)_i$ Ordered Logit regression where *p* display likelihood of success for each order of life satisfaction ranging from 5 to 35.

3.2.2 Results

As mentioned above, the estimation strategy is built over two main stages. In the first stage, both Eqs. (**1**) and (2) are estimated according to the aggregate sample data (1654 respondents). Results are presented in **Table 2**. Results indicate strong positive causality from income to life satisfaction ($P_{\alpha 1}$ < 0.01). Meanwhile, females' satisfaction is found more responsive to income changes compared to males ($\alpha_2 > 0$, $P_{\alpha 2} < 0.01$). On the contrary, there is no parabolic association between the variables of interest in the case of the whole sample ($P_{\beta 1} > 0.1$, $P_{\beta 2} > 0.1$). Given **Fig. 3** and the accompanying description, this result is quite plausible.

---

[1] *Income levels: [100-150], [151-200], [201-250], [251-300], [301-350], [351-400], [401-450], [451500], [501-550], [551-600], [601-650], [651-700], [701-750], [751-800], [801-850], [851-900], [901950], [951-1000], [1001-1050], [1051-1100], [1101-1150], [1151-1200], [1201-1250], [1251-1300], [1301-1350], [1351-1400], [1401-1450], [1451-1500], [1501-1550], [1551-1600], [1601-1650], [16511700], [1701-1750], [1751-1800], [1801-1850], [1851-1900], [1901-1950], [1951-2000], [2001-2050], [2051-2100], [2101-2150].*

Table 2 Estimation results with aggregate sample

Independent variables	Equation (1)	Equation (2)
$ln(income)_i$	0.6068***	−0.7154
	(0.069)	(0.823)
$ln(income)_i^2$	–	0.1030
		(0.064)
$ln(income)_i * female_i$	0.0609***	0.0595***
	(0.016)	(0.016)
$ln(age)_i$	−12.793***	−12.907***
	(3.354)	(3.355)
$ln(age)_i^2$	1.8415***	1.8576***
	(0.466)	(0.466)
$Married_i$	0.1411	0.1493
	(0.192)	(0.192)
$Widowed_i$	−0.6296**	−0.6142**
	(0.313)	(0.312)
No_child_i	−0.2862	−0.2815
	(0.189)	(0.189)
$School_i$	0.0381	0.0301
	(0.127)	(0.127)
$College_i$	−0.2113	−0.2277*
	(0.131)	(0.131)
$Master_i$	−0.0456	−0.0522
	(0.121)	(0.121)
PhD_i	0.0154	−0.0057
	(0.199)	(0.200)
$Baku_i$	−0.2086**	−0.2134**
	(0.101)	(0.102)
$Absheron_i$	−0.3290**	−0.3261**
	(0.129)	(0.128)
C	$p < 0.05$	$p < 0.01$
Pseudo R-Squared	0.014	0.0114
Number of Obs	1652	1652

Dependent variable is $ln\left(\frac{p}{(1-p)}\right)$ i Standard errors are given in (). ***,

** and * denote statistical significance at 1%, 5% and 10% level of significance, respectively

To examine the wave formation idea, the approximate borders of income level should be found according to the model specification in Eq. (**2**). For this purpose, hundreds of models with different income categories are estimated and tested. Finally, the borders for each downward and upward element of the wave are found as follows: (1) income < 460; (2) 310 ≤ income ≤ 850; (3) 450 ≤ income ≤ 1150; (4) 850 ≤ income ≤ 1600; (5) 1000 < income ≤ 5000. **Table 3** tabulates estimation results for

each income category by the Ordered Logit method. The standard error of parameters and p-values are also reported alongside the regression coefficients.

Estimation results present strong evidence on the existence of an inverse U-shaped (downward) association for the first income category (income < 460, $p < 0.05$).

Table 3 Estimation results with disaggregated samples

Independent variables	(1)	(2)	(3)	(4)	(5)
$ln(income)_i$	13.183**	-16.326*	25.273*	-82.396*	24.382**
	(5.949)	(9.771)	(13.84)	(49.02)	(11.46)
$ln(income)_i^2$	-1.1681**	1.3676*	-1.8626*	5.9741*	-1.5590**
	(0.536)	(0.782)	(1.058)	(3.482)	(0.754)
$ln(income)_i * female_i$	0.0584**	0.0891***	0.0841***	0.0537	0.0402
	(0.024)	(0.021)	(0.024)	(0.038)	(0.041)
$ln(age)_i$	-13.119***	-11.992***	-14.386***	-7.2112	-14.836*
	(4.726)	(4.562)	(5.411)	(8.918)	(8.979)
$ln(age)_i^2$	1.8854***	1.7643***	2.0576***	1.1134	2.1497*
	(0.658)	(0.634)	(0.749)	(1.223)	(1.239)
$Married_i$	0.2309	0.0132	-0.0028	-0.2709	0.0714
	(0.274)	(0.262)	(0.292)	(0.459)	(0.543)
$Widowed_i$	-0.3238	-1.0289**	$--1.0168$**	-2.0038**	-0.6981
	(0.436)	(0.416)	(0.478)	(0.856)	(0.921)
No_child_i	-0.1863	-0.0571	-0.3855	-0.8694**	-0.8715*
	(0.275)	(0.269)	(0.292)	(0.426)	(0.512)
$School_i$	-0.1885	0.0719	0.1986	0.4261	0.2828
	(0.175)	(0.168)	(0.199)	(0.355)	(0.444)
$College_i$	-0.4267***	0.0145	0.1055	-0.7191*	-1.2636**
	(0.177)	(0.176)	(0.212)	(0.397)	(0.564)
$Master_i$	-0.2061	-0.1964	-0.1965	0.0221	0.2923
	(0.198)	(0.168)	(0.182)	(0.275)	(0.271)
PhD_i	-0.7351	-0.1394	0.1553	0.0358	0.0878
	(0.449)	(0.330)	(0.299)	(0.392)	(0.353)
$Baku_i$	-0.1309	-0.2631*	-0.2983*	-0.5704**	-0.3885
	(0.146)	(0.137)	(0.157)	(0.278)	(0.290)
$Absheron_i$	-0.2358	-0.4377***	-0.4696**	-0.5602	-0.6063*
	(0.188)	(0.169)	(0.194)	(0.346)	(0.366)
C	$p > 0.10$	$p < 0.05$	$p > 0.10$	$p < 0.10$	$p > 0.10$
Pseudo R-Squared	0.008	0.009	0.011	0.026	0.023
Number of Obs	770	909	706	268	256

(1) income < 460; (2)$310 \leq income \leq 850$; (3) $450 \leq income \leq 1150$; (4) $850 \leq income \leq 1600$; (5) $1000 < income \leq 5000$. Dependent variable is $ln\left(\frac{p}{1-p}\right)_i$ Standard errors are given in (). ***, ** and * denote statistical significance at 1%, 5% and

10% level of significance, respectively. Number of ordered indicator values: 7. Convergence achieved after 5 iterations. Coefficient covariance computed using observed Hessian

Regarding the second parabola of the wave ($310 \leq$ income ≤ 850), Ordered Logit reveals a weak significant convex shape ($p_{\beta 1} < 0.1$, $p_{\beta 2} < 0.1$) . Therefore, it is concluded that there is a weak U-shaped (upward) association within the income category of 310-850. According to the empirical results, a convex shape is followed by a downward parabola for $450 \leq$ income ≤ 1150 while P values are very close to 0.05 ($p_{\beta 1} = 0.0523$, $p_{\beta 2} = 0.0601$). Regarding the next income category ($850 \leq$ income ≤ 1600), there is a U-shaped weak concaveness. P values are slightly less than a 10% level of significance. Based on available data, the estimated last element of the wave belongs to the $1000 <$ income ≤ 5000 category. In this case, Ordered Logit results reveal a statistically significant inverse U-shaped association ($p < 0.05$). Simultaneously, results altogether display an interaction effect of gender status. Especially at lower levels of income, the association between life satisfaction and income is different for males and females ($p < 0.01$). At higher income levels ($850 \leq$ income ≤ 1600 and $1000 <$ income $<$ 5000) , the interaction effect is not strong enough ($p > 0.1$).

Therefore, the empirical results commonly confirm the existence of a wave formation between income and life satisfaction. In the next step, we calculate the threshold levels of income at each level or element of the wave. **Table 4** presents all threshold levels—for males and females separately, at each income category.

Those with less than 460 AZN monthly income reach the subsistence minimum around 280-290 AZN. Until that point (the first finite preference), life satisfaction increases as the monthly income rises. Here, it is noteworthy to mention that the "living minimum" in Azerbaijan is determined as 180 AZN for the whole country and 191 AZN for the active labor force[2] which supports the reliability of this result. After the first threshold level, the increase in income is followed by life satisfaction fall until 380-390 AZN level because an individual needs to move beyond the subsistence minimum and adjusted according to the behavior of a reference group.

The second finite preference is started to achieve after 380-390 AZN, making the marginal impact of income over life satisfaction positive. The tendency lasts until approximately 880-900 AZN monthly income level, which also denotes entering a new and the third, finite preferences category. Note that the average nominal salary in the country by January-February 2019 has been 557.2 AZN.[3] In this context, those with 400-850 AZN monthly salary can be considered as middle income or the larger reference group.

As the individual enters the third finite preferences category, current income becomes insufficient to fulfill the needs adjusted to a relatively smaller reference group, making people less satisfied despite a rise in income. The negative marginal impact turns to positive after 980-990 AZN monthly income, which lasts until 2500 AZN, followed by a negative marginal return. This is a path from reference income to ranking income hypothesis. The number of employees belonging to the high-income group is relatively small. Only 256 or 15.5% of total respondents have higher than 1000 AZN monthly income while this number is 136 (8.22%) for over 1500 AZN and only 51 (3.08%) for over 2500 AZN monthly salary.

[2] https://president.az/articles/31212 (Accessed December 1, 2020).

[3] https://www.stat.gov.az/news/macroeconomy.php?page=1?lang=en (Accessed December 1, 2020)

Recall **Fig. 3**, descriptive analyses, displays that there is an upward tendency regarding the relationship between life satisfaction and income in Azerbaijan. To make it that much more accurate, the average life satisfaction index is calculated for each income category. It is revealed that the average life satisfaction index of those with less than 460 AZN monthly income (M = 19.316, SD = 7.214) is less than those within 310-850 AZN (M = 20.401, SD = 7.169), 450-1150 AZN (M = 20.711, SD = 7.039), 850-1600 AZN (M = 22.317, SD = 6.772) and 1000-5000 AZN (M = 23.648, SD = 6.403). Note that the wave is upward. The life satisfaction index relatively increases at higher income categories.

Table 4 Threshold levels at each income category. Source: Authors' own calculation21

⊢	(1)		(2)		(3)		(4)		(5)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Threshold value of income	282	289	391	378	884	904	988	983	2489	2521
Direction of shape	Downward		Upward		Downward		Upward		Downward	

(1) income < 460; (2)310 ≤ income ≤ 850; (3) 450 ≤ income ≤ 1150; (4) 850 ≤ income ≤ 1600; (5) 1000 < income ≤ 5000

[a]Note that threshold values imply the value of income at which marginal impact over life satisfaction is equal to zero. The values are calculated by finding the derivative of each estimated equation according to income, which denotes a marginal impact equation. When the marginal impact equation gets a zero value, the threshold level is calculated according to the following formula: For males: Income = $\exp\left(\frac{\beta_1}{2*\beta_2}\right)$ For females: Income = $\exp\left(\frac{\beta_1+\beta_3}{2*\beta_2}\right)$ .Here β_1, β_2, and β_3 represent the coefficient of ln (income) t and ln (income)$_i^2$ and log(income)$_i^*$ female t in Eq. (**2**), respectively

4 Conclusions

4.1 Concluding Remarks

We formed the hypothesis that there would be a "wave formation" of the effect of income on life satisfaction, such that this relationship would be tested incorporating absolute, reference, and ranking income hypotheses into one framework. There is still little consensus on the aforementioned hypotheses to see which one dominates. To conclude, the current study's empirical findings show that the "wave formation" hypothesis certainly matters. Consistent with prior research (**Diener and Biswas-Diener 2002; Diener et al. 1993; Kahneman and Deaton 2010**), our finding showed that the relationship between income and life satisfaction was nonlinear.

The results are representative of the Azerbaijan population. Concern about life satisfaction in Azerbaijan should be extended to an alarm about the people's perception of income levels. The empirical findings support the reference-income hypothesis. As an individual's income increases, they move upward from one reference group to the next. Corresponding to this change in the reference group is a decline in life satisfaction. This is contrary to the absolute-income hypothesis, which predicts that the increase in income brings about more security, greater access to goods and services, and overall improved life satisfaction. However, when increased income shifts individuals from the top of one reference group to the bottom of the next, their satisfaction declines, moving in the opposite direction of the change in income. Only as income increases and they move higher in the new reference group does satisfaction again begin to increase.

4.2 Policy Implications

Oishi and Diener (2014) state that "self-reported happiness can be used to evaluate public policies such as taxation and unemployment benefits." Because enhancing the life satisfaction of citizens is one of the most important priorities for governments, our research findings can be used to (1) increase the effectiveness of transfer payments and other government policies towards the most vulnerable (the least satisfied) groups, (2) have a roadmap to determine a minimum living income according to the first threshold level and (3) adjust progressive taxation strategies.

The policy implications of our work can be useful not only for academic discourse but also for governments, taken together with the studies of **Oishi et al. (2012, 2018)**, as they proposed that a "big government" idea is not crucial, but a fair redistribution of wealth plays a significant role. Put differently, large government spending on superior goods and services does not promise increased levels of life satisfaction. In the current study, the "wave formation" framework demonstrates that the government can increase an individual's life satisfaction through greater access to goods and services if the government can determine the stratum of each income level for them. The optimal level of taxation (e.g., more-progressive taxation (**Oishi et al. 2012, 2018**) and satisfaction with goods and services (e.g., personality-matched spending (**Matz et al. 2016**)) for those income levels may be the solution, which in turn means higher levels of life satisfaction are among the most vulnerable groups.

4.3 Limitations and Future Directions

The strength of the study is using a unique database from Azerbaijan. As with any life satisfaction study, the limitations are not avoidable. The current study uses survey data and closely follows the methodology of **Pavot and Diener (1993, 2009)**, which probably has some shortcomings in measuring the index of life satisfaction. Consequently, future studies should follow the improvements in methodologies to assess the life satisfaction index better. Another limitation is that the current study was conducted in a single country (Azerbaijan) and includes only the employed population of the country due to income data unavailability about other groups. In future research, this study can be replicated for other countries to test the validity of the hypothesis, especially in economies with a similar structure. Meanwhile, it is also noteworthy to mention that the direction of causality can be deduced better if longitudinal designs are employed.

References

ASERC (2018). Social survey-1. Unpublished dataset.

Bomhoff, E. J., & Siah, A. K. L. (2019). The relationship between income, religiosity and health: Their effects on life satisfaction. Personality and Individual Differences, 144, 168-173.

Boyce, C. J., Brown, G. D., & Moore, S. C. (2010). Money and happiness: Rank of income, not income, affects life satisfaction. Psychological Science, 21(4), 471-475.

del Mar Salinas-Jiménez, M., Artés, J., & Salinas-Jiménez, J. (2010). Income, motivation and satisfaction with life: An empirical analysis. Journal of Happiness Studies, 11(6), 779-793.

Diener, E. (1984). Subjective well-being. Psychological Bulletin, 95(3), 542.

Diener, E., & Biswas-Diener, R. (2002). Will money increase subjective well-being? Social Indicators Research, 57(2), 119-169.

Diener, E., Diener, C., Choi, H., & Oishi, S. (2018). Revisiting "most people are happy"—and discovering when they are not. Perspectives on Psychological Science, 13(2), 166-170.

Diener, E., Ng, W., Harter, J., & Arora, R. (2010). Wealth and happiness across the world: Material prosperity predicts life evaluation, whereas psychosocial prosperity predicts positive feeling. Journal of Personality and Social Psychology, 99(1), 52.

Diener, E., Sandvik, E., Seidlitz, L., & Diener, M. (1993). The relationship between income and subjective well-being: Relative or absolute? Social Indicators Research, 28(3), 195-223.

Diener, E., & Seligman, M. E. (2004). Beyond money: Toward an economy of well-being. Psychological Science in the Public Interest, 5(1), 1-31.

Diener, E., Tay, L., & Oishi, S. (2013). Rising income and the subjective well-being of nations. Journal of Personality and Social Psychology, 104(2), 267.

Easterlin, R. A. (1974). Does economic growth improve the human lot? Some empirical evidence. In Nations and households in economic growth (pp. 89-125). Academic Press.

Ferrer-i-Carbonell, A. (2005). Income and well-being: An empirical analysis of the comparison income effect. Journal of Public Economics, 89(5-6), 997-1019.

Gere, J., & Schimmack, U. (2017). Benefits of income: Associations with life satisfaction among earners and homemakers. Personality and Individual Differences, 119, 92-95.

Grace, B. Y., Lee, D. J., Sirgy, M. J., & Bosnjak, M. (2019). Household income, satisfaction with standard of living and subjective well-being. The moderating role of happiness materialism. Journal of Happiness Studies, 1-22.

Hagerty, M. R. (2000). Social comparisons of income in one's community: Evidence from national surveys of income and happiness. Journal of Personality and Social Psychology, 75(4), 764.

Hou, F. (2014). Keep up with the Joneses or keep on as their neighbours: Life satisfaction and income in Canadian urban neighbourhoods. Journal of Happiness Studies, 15(5), 1085-1107.

Inglehart, R., & Klingemann, H. D. (2000). Genes, culture, democracy and happiness. Culture and subjective well-being, 165-183.

Johnson, W., & Krueger, R. F. (2006). How money buys happiness: Genetic and environmental processes linking finances and life satisfaction. Journal of Personality and Social Psychology, 90(4), 680.

Joshanloo, M. (2018). Income satisfaction is less predictive of life satisfaction in individuals who believe their lives have meaning or purpose: A 94-nation study. Personality and Individual Differences, 129, 92-94.

Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. Proceedings of the National Academy of Sciences, 107(38), 16489-16493.

Kahneman, D., Krueger, A. B., Schkade, D., Schwarz, N., & Stone, A. A. (2006). Would you be happier if you were richer? A focusing illusion. Science, 312(5782), 1908-1910.

Levin, K. A., Torsheim, T., Vollebergh, W., Richter, M., Davies, C. A., Schnohr, C. W., et al. (2011). National income and income inequality, family affluence and life satisfaction among 13 year old boys and girls: A multilevel study in 35 countries. Social Indicators Research, 104(2), 179-194.

Matz, S. C., Gladstone, J. J., & Stillwell, D. (2016). Money buys happiness when spending fits our personality. Psychological Science, 27(5), 715-725.

Oishi, S., & Diener, E. (2014). Can and should happiness be a policy goal? Policy Insights from the Behavioral and Brain Sciences, 1(1), 195-203.

Oishi, S., Kushlev, K., & Schimmack, U. (2018). Progressive taxation, income inequality and happiness. American Psychologist, 73(2), 157.

Oishi, S., Schimmack, U., & Diener, E. (2012). Progressive taxation and the subjective well-being of nations. Psychological Science, 23(1), 86-92.

Parekh, M. (2018). Quantifying satisfaction with regard to preferences—A spatial model. Journal of Behavioral Economics for Policy, 2(2), 25-29.

Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. Psychological Assessment, 5, 164-172.

Pavot, W., & Diener, E. (2009). Review of the satisfaction with life scale. In Assessing well-being (pp. 101117). Dordrecht: Springer.

Plouffe, R. A., & Tremblay, P. F. (2017). The relationship between income and life satisfaction: Does religiosity play a role? Personality and Individual Differences, 109, 67-71.

Veenhoven, R. (1991). Is happiness relative? Social Indicators Research, 24(1), 1-34.

Yuan, H. (2016). Structural social capital, household income and life satisfaction: The evidence from Beijing, Shanghai and Guangdong-Province, China. Journal of Happiness Studies, 17(2), 569-586.