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## Top incomes and subjective well-being

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### Abstract

We use data from the World Wealth & Income Database, the European Values Surveys and World Values Surveys to estimate the relationship between top income shares and subjective well-being in a sample of 35 countries observed between 1980s and 2010s (139 surveys and more than 200,000 respondents). Results show that top 1% income shares are positively associated with happiness, but not with life satisfaction. The effect is present in a subsample of Western countries. We discuss possible explanations for the positive association between top income shares and happiness.

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**JEL Classification:** top incomes, subjective well-being, life satisfaction, happiness, income inequality, World Wealth & Income Database.

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## 1. Introduction

Economic and social theories are ambiguous with respect to the effect of income inequality on subjective well-being (SWB). From one point of view, income inequality and SWB can be negatively related if higher income inequality is perceived as unfair inequality or if prospects of vertical mobility in a society are limited (Alesina et al., 2004; Graham and Felton, 2006). Similar effect holds if most people make upward comparisons (comparing themselves to the richer individuals), which generates relative deprivation (Runciman, 1966) or status anxiety leading to stress and decreased SWB (Kelley and Evans, 2017). On the other hand, rising income inequality may be perceived positively in the society if it is considered in the perspective of possible gains to be achieved in the future (the so-called tunnel effect, Hirschman, 1973; or hope factor, Kelley and Evans, 2017). Seen in this light, income inequality could contribute positively to SWB. Recent empirical literature on the effect of inequality on SWB is inconclusive (Verme, 2011; Kelley and Evans, 2017; Schröder, 2018). Clark and D'Ambrosio (2015) list nine empirical studies finding a negative relationship between inequality and SWB, five studies documenting a positive relationship, six papers showing no relationship, and eight studies in which other variables mediate the link.

Most of the existing literature studying the effect of inequality on SWB uses inequality measures estimated from survey data, which often suffer from limited cross-country comparability and under-coverage of top incomes. This can lead to biased measurement and substantial underestimation of the populational inequality level. The availability of top (pre-tax) income shares constructed using income tax records (Atkinson et al., 2011) has brought new opportunities to the literature as this type of data is more suitable for estimation the right tail of the income distribution.<sup>1</sup> Leigh (2007) has found that top income shares based on tax data and Gini coefficients estimated using survey data are strongly correlated. However, a more recent study by Morelli et al. (2015) shows that the relationship between the Gini and top income shares has become weaker in the first decade of the 21st century indicating that inequality measures estimated from household surveys may fail to capture the recent dynamics of top incomes. This suggests that measuring the inequality-SWB link using survey data on inequality may be misleading. Another advantage of using inequality measures calculated using tax data is that they

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<sup>1</sup> However, income data reported for taxation purposes also suffer from various shortcomings (see, e.g., Atkinson et al. 2011, Morelli et al., 2015).

offer higher over-time variability than survey-based measures, which helps to overcome multicollinearity problem plaguing the empirical literature attempting to capture the effect of inequality on SWB (Verme, 2011; Clark and D'Ambrosio, 2015).

In a new study, Powdthavee et al. (2017) have investigated the relationship between income inequality as measured by top income shares and life evaluation and emotional well-being. They found that for European countries top income shares are significantly correlated with lower life evaluation and being well-rested yesterday, and with higher average stress and sadness yesterday. However, the study of Powdthavee et al. (2017) exploits SWB data from the Gallup World Poll (GWP) over the relatively short period from 2005 to 2013. This period does not cover major episodes of income inequality growth in Western countries, which occurred from 1980s to early 2000s. It is also likely that if there are any socio-economic determinants of changes in SWB over short periods of time, they are rather related to business cycles than to income inequality, which is rather a slow changing variable.

In this paper, we reconsider the inequality-SWB link by estimating the relationship between top income shares and two SWB measures (happiness and life satisfaction) using comprehensive SWB database taken from the European Values Surveys (EVS), 1981-2008, and the World Values Surveys (WVS), 1981-2014. The pooled EVS-WVS is perhaps the best single available dataset for international analyses of SWB (Kelley and Evans, 2017). This approach allows to study the inequality-SWB link over much longer period than in previous papers. For several countries, our sample period ranges from early 1980s to 2010s. The EVS-WVS dataset covers much better the period of the main inequality growth in Western countries than the GWP data. Using the EVS-WVS data we can test whether the results of Powdthavee et al. (2017) are driven by a short and recent time frame of their study.

## **2. Data and methodology**

We use historical time-series on top pre-tax income shares held by top 10% and top 1% from the World Wealth & Income Database (WID) (Alverado et al., 2017). The data on SWB come from the pooled EVS-WVS database, which include four waves of the European Values Surveys (1981-2008) and six waves of the World Values Surveys (1981-2014). The EVS-WVS covers more than 100 countries and 500,000 observations. Combining data from WID and EVS-

WVS gives a sample of maximum 35 countries, 139 country-year pairs, and more than 200,000 observations.<sup>2</sup>

We use two measures of SWB available in the EVS-WVS: a 10-point life satisfaction scale (“All things considered, how satisfied are you with your life as a whole these days? 1 Dissatisfied ... 10 Satisfied”), and a 4-category happiness measure (“Taking all things together, would you say you are: very happy, quite happy, not very happy, not at all happy”). In our regressions, we use several individual level control variables: gender, age and age squared, a measure of household incomes (self-positioning on a 1-10 scale of incomes)<sup>3</sup>, self-rated health, labor market status, marital status, educational attainment, religiosity, and respondent’s number of children. All these individual characteristics come from the EVS-WVS dataset. On the country level, we control for the country’s log real GDP per capita (PPP) drawn from the World Development Indicators. Following the standard approach in the literature, we include country and year dummies in all models (Alesina et al., 2004; Verme, 2011). The list of all countries and samples used in the analysis as well as descriptive statistics are available in the Supplementary Appendix.

To investigate the relationship between top income shares and SWB, we run the following regressions:

$$SWB_{ijt} = \alpha + \beta TopIncomeShare_{jt} + \delta X_{ijt} + \varphi C_{jt} + \zeta T_{jt} + \varepsilon_{ijt},$$

where  $i$  denotes individuals,  $j$  denotes countries,  $t$  is the time index,  $SWB_{ijt}$  is individual self-rated life satisfaction or happiness score,  $TopIncomeShare_{jt}$  is country-level top 10% or top 1% income share,  $X_{ijt}$  is a matrix of controls (individual characteristics and log GDP per capita),  $C_{jt}$  are country dummies,  $T_{jt}$  are year dummies, and  $\varepsilon_{ijt}$  is the error term. Regressions are estimated using ordered probit models with standard errors clustered at the within-country regional level. All estimates use the EVS-WVS’s sampling weights.

### 3. Results and discussion

Figure 1 (life satisfaction) and Figure 2 (happiness) show relationships between absolute changes in mean SWB over 1981-2010 (or the nearest years available) and absolute changes in

<sup>2</sup> The sample used by Powdthavee et al. (2017) covers up to 25 countries, 94 country-year pairs, and 145,060 observations.

<sup>3</sup> We have also used this 10-point scale of incomes to construct the cumulative distribution of incomes in each of the EVS-WVS surveys and calculate a measure of relative income based on income decile groups. Our results are not sensitive to the use of this alternative income measure.

top income shares for all countries in our sample (lines are linear regression fits). The figures suggest that increases in top income shares may be associated with increases in mean happiness, but rather not with changes in mean life satisfaction.<sup>4</sup>

[Figures 1-2 around here]

Regression results for the full sample are presented in Table 1. We find little evidence for any association between top 10% income shares and SWB, except for a weak and barely significant positive relationship with happiness when controls are included in regressions. On the other hand, top 1% income shares are positively and significantly associated with happiness in each specification, and with life satisfaction but only when we include control variables. The latter result may be driven by sample selection as including control variables leads to a significant reduction of sample size. For this reason, we conclude that in our sample the relationship between top income shares and life satisfaction is dubious. The estimated association between top 1% income shares and happiness is moderately strong. An increase in top 1% income share by one standard deviation (5.2 percentage points) raises the probability of being very happy by 3 percentage points. The size of this effect is comparable to that of being female or retired (both increase probability of being very happy by 2.4 p.p.) and roughly half of the effect of being unemployed (see full regression results in the Supplementary Appendix).

[Tables 1-2 around here]

Previous studies have hypothesized that the effect of inequality on SWB may be different across different income groups in the population as the groups may have varying preference for inequality. Similar argument leads to the hypothesis that the inequality-SWB relationship may be different in various country groups due to cultural, institutional, and other factors. Table 2 shows our regression results for several country groups and for the sample divided into poor and non-poor individuals.<sup>5</sup> We find that the inequality-SWB relationship is negative in all specifications for non-high-income and non-Western countries. On the other hand, our strongest result for the full sample – the positive link between top 1% income share and happiness – is preserved in the group of Western countries. The positive link between happiness and top income shares holds both for poor and non-poor individuals. These results suggest that the mechanisms behind the association between SWB and inequality as measured by top income shares are different for poorer and richer (especially Western) countries. In poorer countries, relative deprivation or status anxiety may drive the negative link. On the other hand, Hirschman's tunnel

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<sup>4</sup> Our results are robust to the exclusion of the outliers such as Korea and Russia. Details are available on request.

<sup>5</sup> We define poor individuals as those who report that their household income is within the range from 1 to 5 on the 1-10 income scale with 1 denoting the lowest income group and 10 denoting the highest income group.

effect may dominate relative deprivation in richer Western countries leading to the overall positive effect of happiness on inequality. The presence of the tunnel effect in Germany has been found by D'Ambrosio and Frick (2012).

Other explanations for the positive happiness-inequality link are also available. For example, recent developments in Schumpeterian growth paradigm suggest that innovation and creative destruction (approximated by job turnover) are positively correlated in the US with top income inequality and social mobility (Aghion et al., 2018), as well as with SWB (Aghion et al., 2016).<sup>6</sup> Therefore, it may be that innovation is a common cause of both top income inequality and SWB, at least for countries that are close to the world technological frontier. However, empirical verification of this hypothesis in a multi-country framework requires comprehensive cross-country panel data on creative destruction and SWB, which is hardly available.

Our results are rather inconsistent with those of Powdthavee et al. (2017), who found a negative relationship between top 1% share and life evaluation (measured using the Cantril's ladder question), especially for European countries. A likely explanation of this inconsistency is that the sample of Powdthavee et al. (2017) covers a very short period (2005-2013). Instead, our sample spans from 1980s to 2010s and covers periods of the largest increases in top income shares occurring in high-income countries in 1990s and early 2000s. If the sample is restricted to the same period as used in Powdthavee et al. (2017), the inconsistency disappears, and we find a significant negative relationship between both measures of SWB and top 1% income shares<sup>7</sup>.

The results in this paper are also different from those of Verme (2011), who used the WVS data to show a robust negative relationship between survey-based income inequality (the Gini coefficient) and life satisfaction in a sample of 84 countries observed between 1981 and 2004. Our sample covers only up to 35 countries, which is dictated by the availability of data on top income shares. However, when we replace top income shares with the survey-based Gini coefficients for our sample of EVS-WVS surveys, we obtain strongly significant negative links between inequality and both SWB measures used.<sup>8</sup> This suggests two possible interpretations. First, previous results showing a negative inequality-SWB relationship may be driven by the underestimation of income inequality due to underestimation of top incomes in survey data.

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<sup>6</sup> SWB is measured using Cantril's ladder of the worst to best possible life coming from Gallup Healthways Well-Being index and by the life satisfaction measure from the Behavioral Risk Factor and Surveillance System.

<sup>7</sup> These results are available upon request.

<sup>8</sup> The Gini coefficients come from the World Institute for Development Economics Research (UNU-WIDER) World Income Inequality Database (WIID). Full regression results are available upon request.

This possibility should be investigated further using approaches that attempt to reconcile inequality estimates from administrative and survey data (see, e.g., Burkhauser et al., 2012; Jenkins, 2016) or adjust survey-based Gini indices with tax data-based top income shares (Atkinson et al., 2011; Alverado, 2011). Second, it may be that the effect of top income inequality on SWB is positive, while the effect of more comprehensive inequality (or inequality at the bottom or in the middle of income distribution) on SWB is negative.<sup>9</sup> This hypothesis should be studied in future using a database offering a portfolio of high-quality measures capturing inequality at different parts of income distribution.

#### 4. Conclusions

This paper has studied the link between income inequality as measured by top income shares and SWB (life satisfaction and happiness) using sample covering much longer time period (from 1980s to 2010s) than previous analyses (see especially Powdthavee et al., 2017). We have found that top 1% income shares are positively associated with happiness (especially in case of Western countries), while that the relationship with life satisfaction is less clear.

Our results for happiness are consistent with the Hirschman's (1973) tunnel effect or with innovation being a common cause of top income inequality and SWB in the most innovative countries (Aghion et al., 2016; 2018). Future research should verify these hypotheses as well as investigate whether the negative association between survey-based measures of inequality and SWB, often found in previous research, is due to the underestimation of top incomes in survey data.

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<sup>9</sup> See Voitchovsky (2005) and subsequent literature on how economic growth is affected by inequality in different parts of the income distribution.

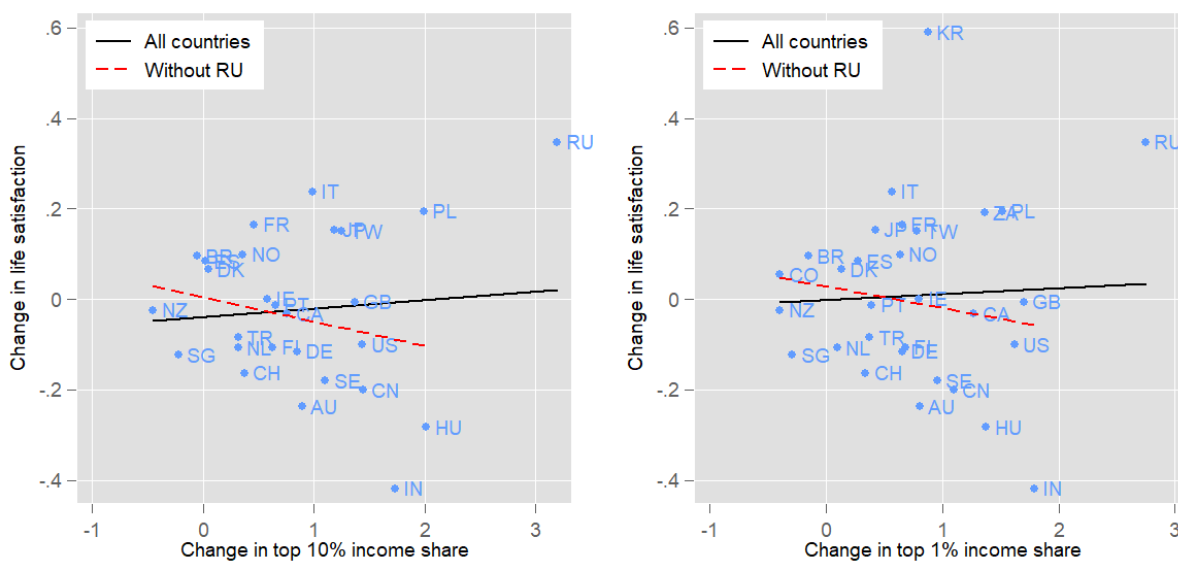


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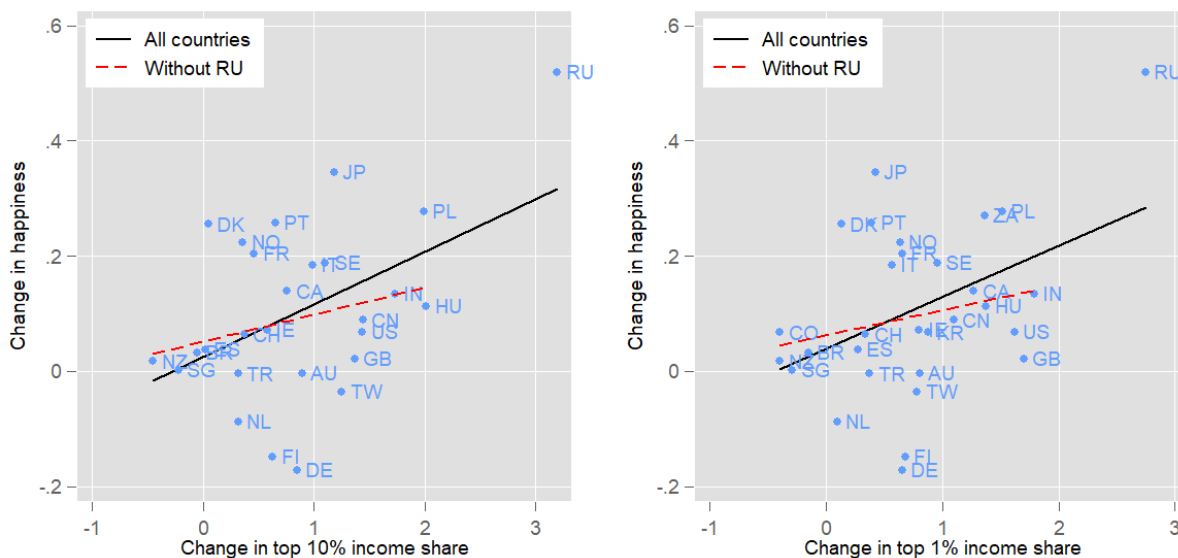
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**Figure 1.** Change in mean life satisfaction by change in top income shares, 1981 to 2010.



*Note:* lines on the graph show linear regression slopes calculated using country-level information.

**Figure 2.** Change in mean happiness by change in top income shares, 1981 to 2010.



*Note:* lines on the graph show linear regression slopes calculated using country-level information.

**Table 1.** Average marginal effects from ordered probit model for the probability of being very satisfied with life (panel A) or being very happy (panel B)

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Life satisfaction</i>						
Top10	0.000 (0.002)	0.001 (0.001)	0.000 (0.001)			
Top1				0.003 (0.003)	0.003** (0.002)	0.003** (0.001)
Observations	180,660	111,536	111,536	204,093	126,011	126,011
Countries	30	29	29	35	34	34
Country-year pairs	127	89	89	139	97	97
<i>Panel B: Happiness</i>						
Top10	0.001 (0.001)	0.002* (0.001)	0.002* (0.001)			
Top1				0.006*** (0.002)	0.006** (0.003)	0.006** (0.003)
Observations	178,628	110,809	110,809	199,437	126,524	126,524
Countries	30	29	29	35	34	34
Country-year pairs	126	89	89	137	98	98
Individual level controls	No	Yes	Yes	No	Yes	Yes
Log of GDP per capita, PPP	No	No	Yes	No	No	Yes

*Note:* All models include country and year dummies. Standard errors clustered by sub-national region appear in parentheses; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Individual-level controls include gender, age and age squared, scale of incomes, self-rated health, labor market status, marital status, educational attainment, religiosity, and number of children. Being very satisfied with life is defined as reporting the highest category (10) on life satisfaction scale (1-10 points), while being very happy as reporting the highest category (4) on happiness scale (1-4).

**Table 2.** Average marginal effects from ordered probit model for the probability of being very satisfied with life (panel A) or being very happy (panel B): a subsample analysis

	High-income countries	Non-high-income countries	Western countries	Non-Western countries	Poor individuals	Non-poor individuals
<i>Panel A: Life satisfaction</i>						
Top10	0.001 (0.001)	-0.017*** (0.004)	0.001 (0.001)	-0.009*** (0.003)	0.000 (0.001)	0.001 (0.001)
Observations	79,248	32,288	68,077	43,459	66,415	45,121
Countries	21	8	17	12	29	29
Country-year pairs	67	22	57	32	89	89
Top1	-0.001 (0.002)	-0.015*** (0.003)	0.003** (0.001)	-0.007*** (0.002)	0.003* (0.001)	0.003 (0.002)
Observations	82,225	43,786	67,537	58,474	75,078	50,933
Countries	22	12	17	17	34	34
Country-year pairs	69	28	56	41	97	97
<i>Panel B: Happiness</i>						
Top10	0.005* (0.003)	-0.018*** (0.002)	0.005 (0.003)	-0.009*** (0.003)	0.003** (0.001)	0.003** (0.001)
Observations	78,705	32,104	67,606	43,203	65,961	44,848
Countries	21	8	17	12	29	29
Country-year pairs	67	22	57	32	89	89
Top1	0.005 (0.006)	-0.020*** (0.005)	0.013** (0.007)	-0.007* (0.004)	0.007** (0.003)	0.004* (0.002)
Observations	82,920	43,604	67,075	59,449	75,210	51,314
Countries	22	12	17	17	34	34
Country-year pairs	70	28	56	42	98	98

*Note:* All models include country and year dummies, as well as control for individual-level characteristics (see notes to Table 1) and log GDP per capita. Standard errors clustered by sub-national region appear in parentheses; \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . High-income countries are defined according to the World Bank classification as countries with GDP per capita higher than US\$12,236 in 2016. Western countries are European countries, the US, Canada, Australia and New Zealand. Poor individuals as those who report that their household income is within the range from 1 to 5 on the 1-10 income scale with 1 denoting the lowest income group and 10 denoting the highest income group.