



Dynamic Analysis of Social and Macro Determinants of Happiness Across Varying Income Countries (2006-2023)

Htwe Ko*, Pathairat Pastpipatkul

Faculty of Economics, Chiang Mai University, Thailand

Received 16 February 2025; Received in revised form 10 October 2025

Accepted 21 October 2025; Available online 26 June 2026

Abstract

Since 2011, a more holistic approach to development has been adopted by the UN which introduced the concept of “happiness”, and subsequent claims have been made to loosen the link between material wealth, particularly money, and “happiness”. This study explores the dynamic effect of the role of money in generating happiness using Gallup World Pool (GWP) survey data. The sample size includes a total of 78 countries consists of 17 higher income economies, 25 upper-middle income economies, 14 lower-middle income economies and 22 lower income economies from 2006 to 2023. First, we determined important covariates influencing happiness in addition to income and GDP growth by using Bayesian additive regression trees and Bayesian variable selection with shrinking and diffusing prior models. Second, we used a Bayesian dynamic nonlinear multivariate panel model to estimate the time-variant and time-varying effects of income and growth on happiness. Our main results show (1) freedom to make life choices, generosity and perception of corruption in higher income countries, generosity and healthy life expectancy at birth in upper middle-income countries, freedom to make life choices and generosity in lower middle-income countries, and healthy life expectancy at birth and freedom to make life choices in lower income countries are found to be important factors on happiness or subjective well-being (SWB), (2) income and real GDP growth have mixed and small effects on SWB across countries with varying income levels, and (3) generosity and freedom to make life choices were found to have the highest positive and significant effects on SWB. These results reveal that happiness is heavily affected by multidimensional factors beyond money. This study adds to the existing empirical literature on the role of money in generating happiness across nations with varying income levels.

Keywords

Money, Happiness, Bayesian Variable Selection, Bayesian Nonlinear Multivariate Panel

1. Introduction

There is no doubt that the pursuit of greater happiness is one of the top priorities for all individuals. From the economic perspective, individuals maximize their utility because it is given that happiness is subjective to everyone. Happiness has been conceptualized by economists and sociologists as subjective well-being (SWB), an individual's perception of his or her quality of life and satisfaction with it. The findings of DiMario et al. (2020) have suggested that higher levels of SWB brings higher productivity and thus promotes economic growth and higher levels of SWB are therefore considered important for the overall economic health of societies and nations. Meanwhile, it might be assumed that higher levels of economic well-being, higher incomes are the principal causal factor in generating higher levels of SWB, and thus the answer to the question of how to generate higher SWB in individuals is to create conditions that increase their incomes. The role of money in happiness has long been debated among psychologists, sociologists and economists as well as in different fields of studies. Since 2011, the use of a happiness index report sponsored by the United Nations (UN) has been considered the most authoritative source of information for this concept. Suggestions have long been made that money cannot buy happiness, although there is no doubt that certain conditions require a certain level of income to keep scarcity, deficiency and insecurity at bay. While the sentiment that money cannot buy you happiness may be found in already developed countries it is unclear to what extent such a sentiment exists in developing countries of varying income brackets. Few empirical studies on the social and macro determinants of income in generating happiness across nations with varying income levels have been made. In general, people accept there are many social factors apart from individual income and national growth that greatly influence subjective well-being (SWB) or happiness within and across countries. Social determinants capture interpersonal, behavioral, and institutional dimensions of well-being, including social support, generosity, freedom to make life choices, perception of corruption, and healthy life expectancy. In contrast, macro determinants reflect aggregate economic conditions and structural performance of the economy, proxied by GDP per capita, economic growth, inflation, unemployment, and external shocks. Thus, studies solely focusing on money or wealth in relation to happiness or SWB may be misleading. Yet, the study of a dynamic relationship among income, growth and happiness is insufficiently examined in the existing literature, especially when considering the mediating role of social and macro factors. In this study, the term "dynamic" refers to the fact that the relationship between income, economic growth, and subjective well-being is not constant over time. Instead, these relationships evolve due to structural changes, external shocks, and behavioral adjustments. To capture this, we employ a Bayesian dynamic panel framework that allows coefficients to vary over time rather than assuming fixed effects.

Easterlin recently argued that the asymmetric response of happiness to income changes is due to the shift in how people evaluate their income. They use social comparison during periods of growth and become acutely aware of their own financial hardship during periods of economic low or stagnant growth or decline (Easterlin, 2023). Social comparison does not necessarily generate happiness, and financial hardship may conversely generate social solidarity. This explains why happiness responds differently to income increases and decreases, and why long-term economic growth does not necessarily lead to greater happiness. For several decades, Easterlin's Happiness Paradox (1974) has been recognized widely as addressing the assumption of a causal relationship between income and happiness. Easterlin's study consisted of a comparative analysis based on evidence gathered from the United States and 11 other economies. His empirical findings revealed that wealthier individuals' self-reported SWB as being higher than their poorer counterparts within countries. But no significant difference was revealed when studying average levels of SWB across rich and poor countries. Easterlin concluded that happiness did not tend to increase in line with national economic growth forever, but that happiness would plateau at a certain income level (Easterlin, 2013; Stevenson and Wolfers, 2008). This study was supported by subsequent similar findings, showing the broad accuracy of his argument (Ambrosio et al., 2020; Behera et al., 2024; Ding et al., 2021; FitzRoy and Nolan, 2022; Lopez-Ruiz et al., 2021; Pastpipatkul & Ko, 2025).

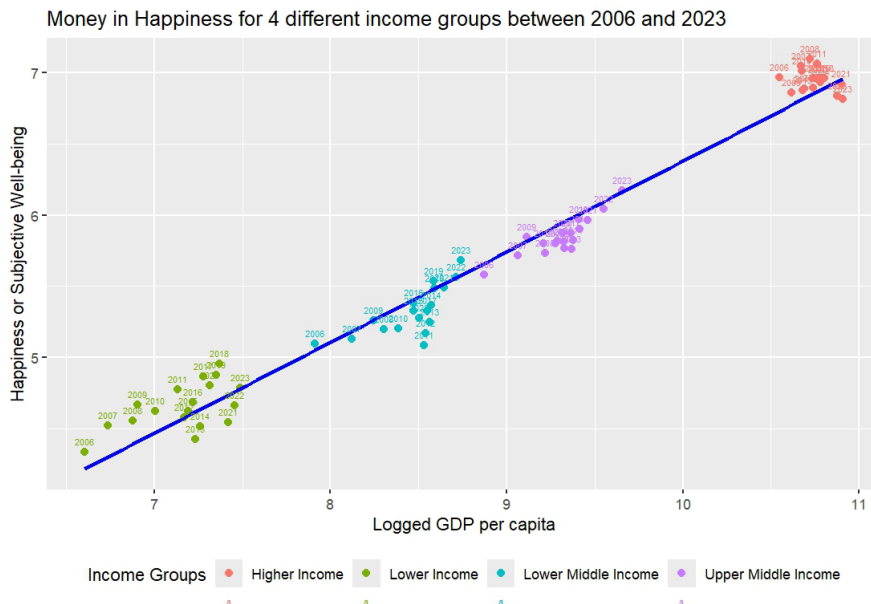


Figure 1 Money in Happiness in Four Different Income Countries (2006-2023)

Source: authors' own estimation

Figure 1 represents how money influences happiness across nations in different years between 2006 and 2023 and it partially supports the “Easterlin Paradox.” While this happiness paradox suggests wealthier individuals within countries are happier, this figure shows that people in lower-middle and upper-income groups do not seem to be happier than those in lower and higher income economies. Additionally, the figure suggests that life satisfaction or subjective well-being fluctuates from year to year in all four income levels. These fluctuations suggest that self-reported life satisfaction changes in short term periods for unknown reasons. The graph shows that higher income groups report higher average well-being, and the points rise in order from low- to high-income economies. Within each group, the position of the points changes slightly over time. Years such as 2018 and 2023 lie above the fitted line indicating periods when well-being was stronger than income alone would predict. Years like 2009 and 2010 fall below the line that reflect weaker outcomes during global downturns. In sum, this variation suggests that income alone cannot explain happiness from time to time. Moreover, this observation raises concerns over the reliability of existing and future studies on the income-SWB nexus. While Figure 1 suggests a positive association between income and subjective well-being across countries, it does not imply a strong causal or persistent relationship over time. The variation around the fitted line and fluctuations across years indicate that income alone cannot fully explain changes in well-being, supporting the need for a dynamic and multivariate framework.

One explanation for this variation could be because of sampling countries in the dataset. In fact, people are indeed happy when their life expectations are met regardless of their financial situation because higher income and material wealth can contribute to a certain level of life satisfaction. For example, if we were to ask the same questions to individuals who are seriously ill and those living in war zones but who have higher income levels, what answers might we expect? Individuals who are seriously ill often report low levels of SWB, regardless of their financial situation. For them, health and quality of life take precedence over material wealth. Even if they have a higher income, the experience of suffering can overshadow any benefits derived from their financial status. Similarly, people living in war zones may also express low SWB, even when they possess higher income levels. The constant stress and danger of their environment can lessen positive feelings associated with financial wealth. Furthermore, not all wealthy individuals experience high levels of happiness. Many face significant stress related to maintaining their wealth, fear of financial loss, or pressure to succeed, which can negatively impact their overall well-being (see Figure 1).

Empirically, most existing research has studied the association between income and happiness or SWB following the assumption first made by Easterlin (1974). While several studies report findings consistent with Easterlin’s paradox—suggesting that increases in income do not lead to sustained improvements in well-being (e.g., Ambrosio et al., 2020; Behera et al., 2024)—

other studies provide mixed evidence. In particular, some studies (e.g., Kollamparambil, 2020; Lim et al., 2020; Kahneman and Deaton, 2010) find that the relationship between income growth and SWB is weak, nonlinear, or context-dependent, rather than uniformly positive. Furthermore, the importance of social and macro factors as well as the incorporation of broader discussion on cultural and individual perception of happiness in generating this nexus remain limited as highlighted in Muresan et al. (2020), Raibley (2012), Raibley (2021), Veenhoven (2015), and Diener et al. (2002). Even Easterlin himself recently noted that SWB responding to increasing and decreasing income levels is different under different economic conditions due to an asymmetry in psychological roots of income evaluation (Easterlin, 2023). These show that the correlation between self-reported life satisfaction or happiness and income is weak as human emotions are always complex and differ from one to another.

There are many recent studies exploring the relationship between income growth and subjective well-being using various samples. For example, one study reported that the correlation between income and SWB in Latin America had declined since 1997 with the authors arguing that the potential cause of this decline in correlation had been the reduction in income inequality. But a positive trend has been recorded in the U.S. and several European countries over the last 50 years (Oishi et al., 2022). In addition, an increase in per capita income increased SWB until a threshold of around 35,000 US dollars in European nations between 2008 and 2016 before plateauing (Muresan et al., (2020). The authors additionally emphasized the influence of culture in these relationships. In supporting this, more wealth was found to have a positive impact on SWB but not much in another study by Jantsch and Veenhoven (2019). One study conducted by Frey and Stutzer (2001) also showed the same findings in which it suggests a positive association between income growth and SWB but not by very much. Another study reported a positive relationship between household income and SWB in China based on rural survey data from 2016 (Zhu et al., 2021). Similarly, Ding et al. (2021) found that both absolute and relative income positively affected SWB in China. Killingsworth et al. (2023) challenge the findings of Kahneman and Deaton (2010). They argue that the relationship between income and subjective well-being is not uniform across individuals. Their results show that subjective well-being increases with logged GDP per capita. However, the relationship is nonlinear. This result in Killingsworth et al. (2023) was also partially supported by our data analysis shown in Figure 1. In Switzerland, SWB was found to be relatively small among those individuals vulnerable to poverty (Simona-Moussa, 2019). Rojas (2019) studied the link between absolute and relative income levels and SWB and showed consistent findings with Easterlin (1974). FitzRoy and Nolan (2022) used a panel data from the UK from 1996 to 2017 and found a significant impact of relative income on SWB.

Beyond income, non-economic factors also play an important role. For example, Florida et al. (2011) found human capital measured by education and skills has a larger effect than income level on subjective well-being. Similarly, Lopez-Ruiz et al. (2021) show that individuals with higher quality of life report higher well-being in Spain. While quality of life is partly related to income, it also reflects broader factors such as health, social conditions, and living environment. The study also highlights the role of gender, showing that well-being differs across demographic groups. In addition, the negative impact of the COVID-19 pandemic on SWB further underscores the importance of environmental and contextual factors. Additionally, the negative impact of the Covid-19 pandemic on SWB of Spanish populations was also noted in the study, suggesting the importance of environmental factors. Lim et al. (2020) reported that Thailand and the Philippines have the lowest SWB shown to be influenced by income levels while South Korea and Taiwan have the highest SWB. The authors therefore concluded that income has a significant effect on subjective well-being. They also suggest that this effect may depend on societal values, such as cultural norms and attitudes, which influence how individuals perceive income and its importance for well-being. Additionally, Frey (2021) suggested that future researchers focus on goals in life other than income increases to build a more holistic picture of the components that make up happiness.

Taken together, the existing literature is generally consistent with “Easterlin’s Happiness Paradox” but some findings in a few studies have not been consistent and overall results have therefore been inconclusive. Therefore, in pursuit of greater clarity, this study firstly explores the important input explanatory variables on subjective well-being or happiness during select periods, and secondly, examines the effect of income and economic growth on happiness across nations with varying levels of national income by using an advanced sequence of modeling approach to interpret data where in this case the order of its elements is critical to understanding the importance of each of their contributions. The sample of this study consisted of 78 countries comprising of 17 higher income economies, 25 upper-middle income economies, 14 lower-middle income economies, and 22 lower income economies between 2006 and 2023 by using a sequence of models.

The rest of this paper is structured as follows: Section 2 offers a brief description of data and variables, and provides the methods of study used; Section 3 provides the discussions of the findings from the results; and Section 4 offers an interpretive conclusion and suggestions for further research on this topic.

2. Data and Methods

Data

This article used the data obtained from two publicly available sources for research purposes. The first source for data collection was from the World Happiness Report (WHR) and World Development Indicators (WDI). The period of study was ranged between 2006 and 2023 with a sample size of 78 countries. For the panel data analysis, we separated four different income groups to empirically explore the relationship between income, economic growth and subjective well-being. In this study, a “life ladder” interpretation of subjective well-being was taken as dependent variable while logged per capita GDP and real GDP growth rate were taken as main independent variables. The intermediating variables included social support, healthy life expectancy at birth, freedom to make life choices, generosity, perception of corruption, consumer price inflation rates, unemployment rates as a percentage of the total labor force, and a dummy variable for external shocks such as global financial crisis and the Covid-19 pandemic. These variables were chosen based on their prevalence in the existing literature. Additionally, this study has chosen intermediating variables that have higher posterior probabilities influencing SWB during the period under study based on a mixed-order selection approach by incorporating both Bidirectional and Auto-Regressive Transformers (BART) and Bayesian Variable Selection with Shrinking and Diffusing priors (BASAD) models. Thus, exploring the association between income, real GDP growth and SWB with final mediating variables selected improved the reliability of findings of the results. We have provided the symbols and units of measurement of variables in Appendix A1 and the descriptive summary of data in Appendix A2.

Methods

In this study, we used a robust panel analysis to determine dynamic social and macro impact on happiness or subjective well-being (SWB) across nations with varying income level groups for the period between 2006 and 2023. As the existing literature and our panel unit root tests show that the correlation between migration, income and subjective well-being is nonlinear at all levels. Hence, we employed Bayesian Dynamic Nonlinear Multivariate and Cross-Sectional Distributed Lags (CS-ARDL) models to account for this in our study. This way, we can offer more robust findings on the income-happiness correlation while including mediating social and macro factors in it. Before generating the Bayesian DNM (Dynamic Nonlinear Multivariate) and CS-ARDL-based estimations, we first identified the most important variables affecting happiness. We selected variables whose posterior values were above the 50th percentile. These variables were then used together with income and economic growth in the analysis. For this selection, we used a mixed-

order variable selection approach between Bayesian Additive Regression Trees (BART) following Chipman et al., (2010), and Kapelner and Bleich (2016), and a Bayesian Variable Selection with Adaptive Sampling (BASAD) following Narisetty and He's (2014) and Xiang and Narisetty's (2022) models. Both BART and BASAD methods can be used to evaluate the posterior probabilities of input predictors, however, they are still weak at distinguishing between relevant and irrelevant factors accordingly with theoretical assumptions. For example, the BART model is less effective as it mixes relevant and irrelevant input predictors (Filho and Artes, 2018). In BASAD, the model space is sensitive to the choice priors in combining adaptive sampling with a Bayesian framework. Therefore, we used a mixed-order variable selection method between BART and BASAD in order to improve the consistency of these two models.

Bayesian Dynamic Nonlinear Multivariate Panel Model

This study primarily used a Bayesian DNM (Dynamic Nonlinear Multivariate) model developed by Helske and Tikka (2024) which was later implemented in an R package “dynamite” by Tikka and Helske (2024). This model supports both time-varying and fixed effects (time invariance) using different distributions such as Binomial, Categorical, Gaussian and Poisson via MCMC (Markov Chain Monte Carlo) simulation. It also estimates full posterior distributions of model parameters examining average causal effects. Additionally, this model quantifies uncertainty associated with point estimates produced from Maximum Likelihood Methods while integrating the Bayesian approach. It is a causal inference based on structural causal models (Pearl, 2009) defined through interventions, external changes to the data generating process. In this paper, we assumed response variables as continuous ($T, i=1, \dots, N$) and time-varying effects through Bayesian panelised splines and random walk priors. However, we found that this model is weak for the absence of explicit error terms in the linear predictor. For this reason, we applied the CS-ARDL model to supplement the findings of the results from the Bayesian DNM. Following Helske and Tikka (2024), the empirical model can be written as:

$$\eta_{c,t,i} = \alpha_{c,t} + \beta_c u_{c,t,i}^T + \delta_{c,t} w_{c,t,i}^T + \vartheta_{c,i} z_{c,t,i}^T + \psi_{c,t} \lambda_{c,t,i}^T \quad (1)$$

Where $\alpha_{c,t}$ = a time-varying intercept, β_c = time-invariant or fixed effect coefficients, $\delta_{c,t}$ = time-varying coefficients, $\vartheta_{c,i}$ = random effects within mean 0 and variance σ^2 , and $\psi_{c,t}$ = latent dynamic factor for unobserved influences.

The Bayesian penalized splines in this model can be expressed as:

$$\tau_{c,t,k} = b_t^\top w_{c,k} \rightarrow w_{c,k,d} \sim N(w_{c,k,d-1}, \tau_{c,k}^2) \quad (2)$$

Where $\beta_t \beta_t =$ Bayesian panelised splines with degree of freedom, and $w_{c,k} w_{c,k} =$ Spline coefficients with random walks priors. The coefficients $(\alpha_{c,t}, \beta_c, \delta_{c,t}, \vartheta_{c,i}, \psi_{c,t}, \alpha_{c,t}, \beta_c, \delta_{c,t}, \vartheta_{c,i}, \psi_{c,t})$ are estimated using 5000 MCMC iterations with 2500 warm-ups and a thinning rate of 1. A smaller degree of freedom for posterior distributions allows the model to handle heavy tails and extreme values in dynamic and nonlinearity in the panel datasets.

3. Findings

This study exposed; (1) freedom to make life choices, generosity, and healthy life expectancy at birth generally influenced overall self-reported life satisfaction or happiness or subjective well-being over time, (2) macroeconomic factors did not appear to be important to happiness measurement across different income levels during studied periods, (3) income and GDP growth had minimal and mixed effects on SWB while generosity and freedom to make life choices were found to have the largest positive impact, and (4) income growth positively correlated with SWB across countries in four different income levels despite it only showing a positive relationship between economic growth and happiness in lower middle and lower income countries.

Variable selection results from using BART, BASAD and Mixed-Order Methods

In this study, we primarily aimed at determining most potential covariates or independent variables influencing happiness or subjective well-being for empirical examination on social and macroeconomic determinants of happiness. For this objective, we used BART and BASAD methods for important variables selection before final model estimation.

In addition to our two main independent variables (logged per capita GDP and real GDP growth rates), we considered some macroeconomic and social indicators as well as a dummy for external shocks in this work. Regarding macro factors, we included consumer price inflation and unemployment rates. Regarding social factors, we included social support, healthy life expectancy at birth, freedom to make life choices, generosity, and perception of corruption. A dummy variable was used to account for external shocks such as the global financial crisis and the Covid-19 pandemic.

The important variable selection results for four different income groups or countries are provided in Table 1. In these tables, selected variables are presented with their posterior probabilities and ranked top to bottom accordingly. For the robustness of variable selection, we use a mixed-order approach in this study. The variable selection for higher income countries

showed freedom of life choices, generosity and perception of corruption. For upper middle-income countries, it showed generosity and healthy life expectancy at birth. In lower middle-income countries, freedom of life choices and generosity were found to have a larger effect on SWB during studied years. In lower income countries, we found that healthy life at birth and freedom of life choices most affected SWB. Surprisingly, we found that none of the macroeconomic factors were important to happiness of populations across these countries studied during the select periods. Perhaps, future research should focus on these factors by adding more macroeconomic- and policy-related variables.

Table 1 Important Variables Selection Results by Using BART, BASAD and Mixed-Order Methods

From using BART* Model		From using BASAD** Model		From using Mixed-Order
Variable	Post. Prob.	Variable	Post. Prob.	Variable
<i>Higher Income Countries</i>				
Healthy Life at Birth	0.2069	Freedom of Life Choices	1.0000	Freedom of Life Choices
Perception of Corruption	0.1880	Generosity	0.9991	Generosity
Generosity	0.1525	Perception of Corruption	0.7630	Perception of Corruption
Freedom of Life Choices	0.1305	External Shocks	0.7133	
Social Support	0.1278	Consumer Price Inflation	0.1151	
Unemployment	0.0821	Unemployment	0.0099	
External Shocks	0.0644	Healthy Life at Birth	0.0913	
Consumer Price Inflation	0.0474			
<i>Upper Middle-Income Countries</i>				
Healthy Life at Birth	0.20061	Freedom of Life Choices	1.0000	Generosity
Perception of Corruption	0.15066	Generosity	0.5803	Healthy Life at Birth
Social Support	0.13902	Healthy Life at Birth	0.4588	
Generosity	0.13581	Perception of Corruption	0.4310	
Freedom of Life Choices	0.13213	External Shocks	0.2902	
Unemployment	0.11021	Unemployment	0.1961	
Consumer Price Inflation	0.07635	Consumer Price Inflation	0.0765	
External Shocks	0.05517			

Table 1 Important Variables Selection Results by Using BART, BASAD and Mixed-Order Methods
(continued)

From using BART* Model		From using BASAD** Model		From using Mixed-Order
Variable	Post. Prob.	Variable	Post. Prob.	Variable
Lower Middle-Income Countries				
Unemployment	0.17754	Freedom of Life Choices	1.0000	Freedom of Life Choices
Generosity	0.15838	Generosity	0.5653	Generosity
Freedom of Life Choices	0.14133	Perception of Corruption	0.4885	
Healthy Life at Birth	0.13649	Healthy Life at Birth	0.1434	
Social Support	0.11760	External Shocks	0.1360	
Perception of Corruption	0.10870	Consumer Price	0.0659	
		Inflation		
Consumer Price	0.09527	Unemployment	0.0657	
Inflation				
External Shocks	0.06465			
Lower Income Countries				
Social Support	0.21132	Healthy Life at Birth	0.4491	Healthy Life at Birth
Healthy Life at Birth	0.16354	Generosity	0.4475	Freedom of Life Choices
Freedom of Life Choices	0.15281	Freedom of Life Choices	0.2673	
Unemployment	0.12574	Perception of Corruption	0.2324	
Consumer Price	0.12049	External Shocks	0.1059	
Inflation				
Perception of Corruption	0.08631	Unemployment	0.0532	
Generosity	0.08316	Consumer Price	0.0478	
		Inflation		
External Shocks	0.05664			

Notes: * and ** 50th quantile was used to estimate the posterior probabilities by running BART model 20 times, and ** based on a Students' t-distribution with a Bayesian information criterion (BIC) of 20 and a 1000 burn for 10000 iterations.

Source: Authors

Estimated Results from using Bayesian Dynamic Nonlinear Multivariate Model

We investigated the social and macro determinants of subjective well-being (SWB) across countries of varying income levels using a Bayesian dynamic nonlinear multivariate panel model for 2006–2023. Table 2 presents the estimated posterior means, standard deviations, at 5 percent and 95 percent credible intervals, R-hat values, and effective sample sizes for each model parameter. Figures 2 to 5 show the time-varying effects of income and GDP growth on SWB for each income group.

Both the time-invariant and time-varying effects of logged per capita GDP and real GDP growth show small, positive, but statistically insignificant influences on happiness in the selected 17 higher-income countries. However, the income effect displays a gradually increasing positive trend over time. Freedom to Make Life Choices (FMLC) and Generosity (G) exhibit strong positive time-invariant effects while Perception of Corruption (P) having a negative effect. Among these, only FMLC demonstrates statistical significance, which indicates that “individuals’ freedom to make life choices” contributes more to well-being than economic variables. Thus, for higher-income countries, freedom and generosity play a greater role in shaping happiness than income or growth.

For upper middle-income countries, both income and economic growth show small and mixed effects. Income has positive and insignificant time-invariant and time-varying effects on happiness in these 25 countries while economic growth has negative and insignificant effects. Generosity shows a significant and positive time-invariant effect, while healthy life expectancy at birth has a positive and insignificant time-invariant effect on happiness. Overall, these results suggest that well-being in upper middle-income economies is driven more by social and health-related factors than by macroeconomic performance.

For lower middle-income countries, we found that income and economic growth have positive and insignificant time-invariant and time-varying effects although the growth effect is very small. Generosity has a small positive and insignificant time-invariant effect on happiness. Freedom to make life choices in the selected 14 countries have a moderate positive and significant time-invariant effect. These findings indicate that personal autonomy and perceived agency are key contributors to well-being in lower middle-income economies even when economic performance is modest.

For lower-income countries, the effects of income and GDP growth are small and insignificant, which is similar to lower middle-income countries. Healthy life expectancy at birth in these selected 22 countries appear to have a small effect, while freedom to make life choices has a larger positive and significant effect on happiness. This implies that in low-income economies, freedom to make one’s own decisions is central to one’s sense of better well-being even amid economic constraints.

In summary, the mixed and minimal effects of income and economic growth on SWB are consistent with the broader empirical literature. The positive influence of generosity particularly in upper middle-income countries aligns with the notion that helping others fosters a sense of purpose and satisfaction. The positive and growing effect of generosity on SWB is credible from a qualitative perspective as humans are known to generally feel pleased or honored to be able to share things with others. Likewise, the significant and consistent effect of freedom to make life choices across most income groups underscores the importance of autonomy and democratic values in shaping happiness. The ability to exercise freedom to make choices reflect what a complex post-industrial contemporary society most wants: individual expression in both private and public spheres and its political expression in a responsive democracy. Thus, the finding in this study that greater freedom to make life choices correlates with the existence of happier citizens of functioning democratic societies. These results are consistent with findings in Pastpipatkul and Ko (2025).

Table 2 Estimated means, standard deviations, intervals, R hats, and effective sample sizes by using a Bayesian DNM panel model

Parameter	Mean	Q5 %	Q95 %	R-hat	Bulk-ESS	Tail-ESS
Higher Income Countries						
$\beta_1 \beta_1$ LOGPCGDP	0.218 (1.37)	-2.00	2.42	1.02	103	192
$\beta_2 \beta_2$ GDPR	0.107 (0.413)	-0.522	0.837	1.00	118	264
$\beta_3 \beta_3$ FMLC	1.23 (0.299)	0.760	1.72	1.00	490	737
$\beta_4 \beta_4$ G	0.221 (0.155)	-0.0281	0.475	1.01	250	484
$\beta_5 \beta_5$ P	-0.441 (0.119)	-0.634	-0.246	1.00	197	514
Residual σ	0.182 (0.008)	0.170	0.195	1.00	444	417
Upper Middle-Income Countries						
$\beta_1 \beta_1$ LOGPCGDP	0.274 (1.42)	-2.20	2.48	1.01	194	321
$\beta_2 \beta_2$ GDPR	-0.0054 (0.3)	-0.474	0.503	1.00	258	310
$\beta_3 \beta_3$ G	0.448 (0.188)	0.142	0.770	1.01	513	811
$\beta_4 \beta_4$ LOGHLEB	0.219 (1.36)	-1.99	2.36	1.01	292	326
Residual σ	0.313 (0.012)	0.294	0.333	1.00	890	1181

Table 2 Estimated means, standard deviations, intervals, R hats, and effective sample sizes by using a Bayesian DNM panel model (continued)

Parameter	Mean	Q5 %	Q95 %	R-hat	Bulk-ESS	Tail-ESS
Lower Middle-Income Countries						
$\beta_1 \beta_1$ LOGPCGDP	0.135 (1.40)	-1.99	2.55	1.00	481	774
$\beta_2 \beta_2$ GDPR	0.002 (0.359)	-0.593	0.591	1.00	541	751
$\beta_3 \beta_3$ G	0.026 (0.25)	-0.392	0.428	1.00	945	1020
$\beta_4 \beta_4$ FMLC	0.732 (0.296)	0.247	1.21	1.00	1286	1355
Residual σ	0.359 (0.017)	0.332	0.389	1.00	1270	1242
Lower Income Countries						
$\beta_1 \beta_1$ LOGPCGDP	0.195 (1.39)	-2.03	2.50	1.00	454	733
$\beta_2 \beta_2$ GDPR	0.019 (0.378)	-0.586	0.652	1.00	360	575
$\beta_3 \beta_3$ LOGHLEB	0.0875 (1.41)	-2.28	2.30	1.00	368	590
$\beta_4 \beta_4$ FMLC	0.507 (0.279)	0.0524	0.973	1.00	1038	1301
Residual σ	0.421 (0.016)	0.394	0.449	1.00	930	1155

Notes: Standard deviations are in parentheses. Time-invariant parameters ($\beta\beta$) were estimated based on 2000 iterations, 1000 warm ups, 1 chain, thinning rate of 1, 4 degrees of freedom and random walk prior for the spline coefficients of the time-varying parameters ($\delta\delta$). The time-varying effects of income and GDP growth are presented in Figures 2, 3, 4 and 5.

Source: Authors

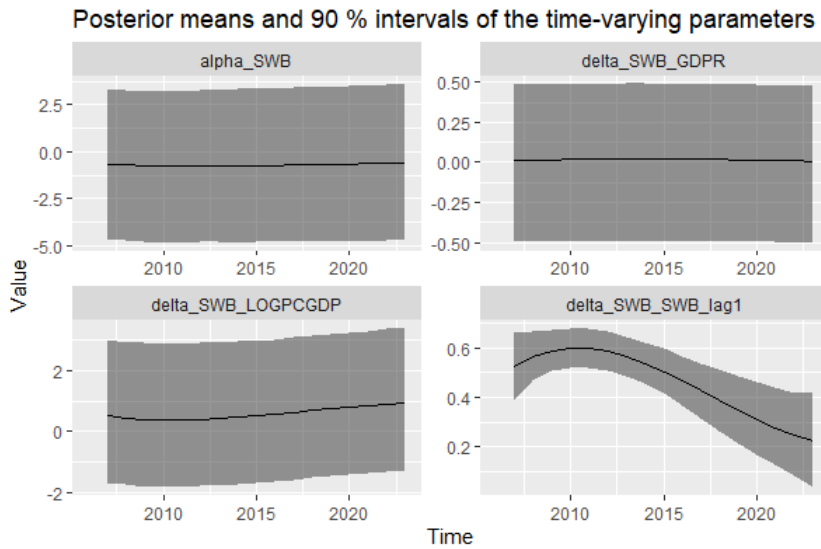


Figure 2 The time-varying effects of income and GDP growth on subjective well-being (SWB) in high-income countries (2006-2023)

Notes: The figure presents a time-varying intercept (top left), time-varying effects of GDP growth (top right), logged income per capita GDP (bottom left) and a lag term of SWB on its own. Black lines in the gray shaded areas indicate posterior means within 90 percent credible intervals.

Source: Authors

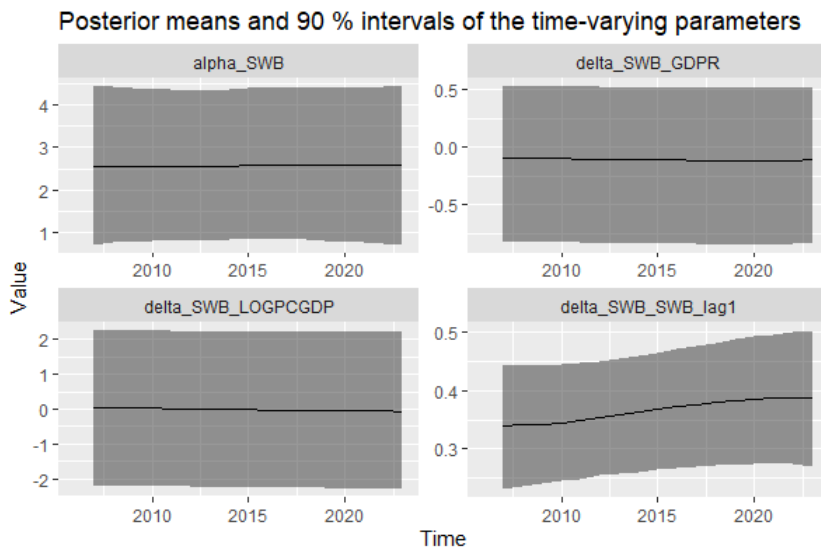


Figure 3 The time-varying effects of income and GDP growth on subjective well-being (SWB) in upper middle-income countries (2006-2023)

Notes: The figure presents a time-varying intercept (top left), time-varying effects of GDP growth (top right), logged income per capita GDP (bottom left) and a lag term of SWB on its own. Black lines in the gray shaded areas indicate posterior means within 90 percent credible intervals.

Source: Authors

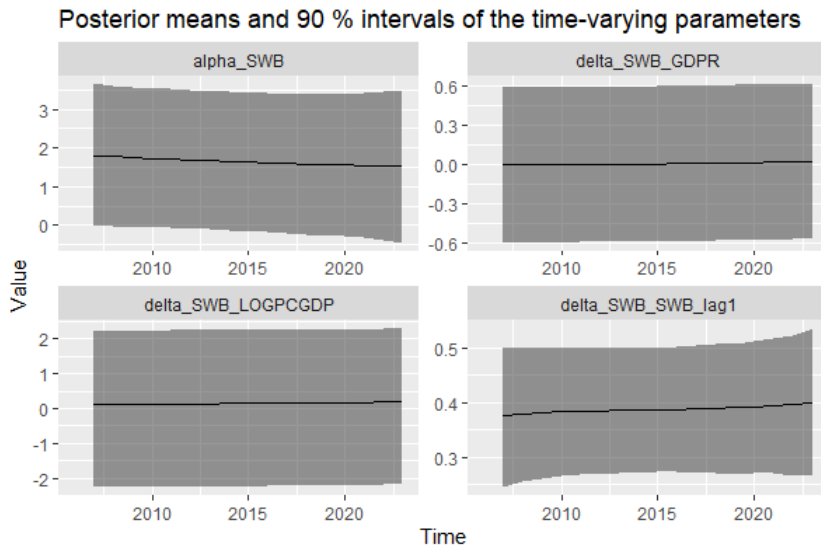


Figure 4 The time-varying effects of income and GDP growth on subjective well-being (SWB) in lower middle-income countries (2006-2023)

Notes: The figure presents a time-varying intercept (top left), time-varying effects of GDP growth (top right), logged income per capita GDP (bottom left) and a lag term of SWB on its own. Black lines in the gray shaded areas indicate posterior means within 90 percent credible intervals.

Source: Authors

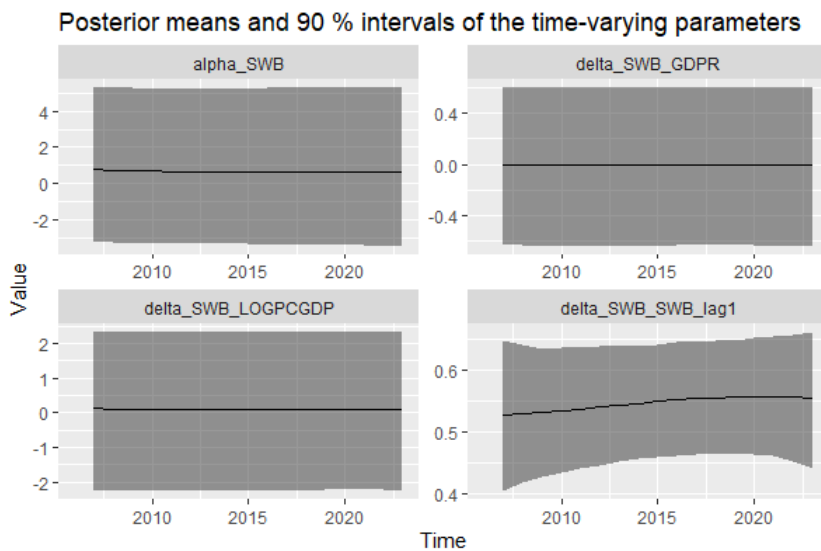


Figure 5 The time-varying effects of income and GDP growth on subjective well-being (SWB) in low-income countries (2006-2023)

Notes: The figure presents a time-varying intercept (top left), time-varying effects of GDP growth (top right), logged income per capita GDP (bottom left) and a lag term of SWB on its own. Black lines in the gray shaded areas indicate posterior means within 90 percent credible intervals.

Source: Authors

4. Conclusions and Implications

This study provides new empirical evidence of the social and macroeconomic determinants of happiness across varying income countries. The results reveal that income and economic growth exert small and statistically insignificant effects on subjective well-being (SWB) across all income groups with only modest positive trends over time. In contrast, social variables play a more decisive role. Freedom to make life choices consistently shows a strong and significant positive association with SWB across most country groups while generosity significantly enhances well-being in upper middle-income countries. Healthy life expectancy exerts weak and mixed effects, and perception of corruption negatively correlates with happiness in high-income economies. Overall, the findings underscore that personal autonomy and social connectedness are more influential determinants of happiness than macroeconomic performance.

The findings suggest that while economic outcomes contribute to well-being, they are not the sole determinant of happiness. Non-material factors particularly social connectedness and personal autonomy play a key role in sustaining long-term happiness. Governments and policymakers should therefore foster social systems that encourage generosity, ethical conduct, and freedom of choice. In this way, it can promote the sustainable form of overall well-being. This is especially relevant in higher-income economies where basic material needs are already met and the focus can shift toward enhancing life satisfaction through social and institutional development. In core, this study contributed to both the understanding of the dynamic nexus of happiness or subjective well-being and non-materialistic factors in achieving sustained happiness. These results have the potential to serve as the basis for targeted policies to improve subjective well-being of populations in these respective varying-income countries. Firstly, governments and policymakers in lower income countries should prioritize improving healthcare access and enhancing freedom of life choices to improve subjective well-being. This in turn will promote the overall productivity of the nation. Secondly, higher income countries should adopt programs that motivate societal generosity in order to boost self-reported life satisfaction of their citizens. Thirdly, governments should closely monitor whether social well-being and economic development progress harmoniously and sustainably.

While each country might consist of different demographics and diverse cultural and societal norms, these factors may appear slight in this study as the study was focused upon the countries' varying income levels.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the authorship and publication of this article.

Author Contributions

Conceptualization, formal analysis, methodology, software, investigation, validation, H.K. and P.P.; data curation, visualization and draft writing, H. K.; review and editing, H.K., P.P.; supervision and funding acquisition, P.P.

Funding

This research received no external funding.

Informed Consent Statement

All authors have reviewed and approved the final version of the manuscript for publication.

Data Availability Statement

The study used the secondary data obtained from the World Bank publicly available at <https://data.worldbank.org> and the World Happiness Report publicly available at <https://worldhappiness.report/data>.

Acknowledgements

The first author gratefully acknowledges the Faculty of Economics, Chiang Mai University, and the full support from the Royal Thai Government Scholarship during the Master's International Program in Economics (2023/24).

^a **ORCID:** <https://orcid.org/0009-0005-6596-9263>

Appendix A

Appendix A1 Symbols, units and sources of data and variables used in this study

Symbol	Variable	Unit	Source
SWB	Subjective well-being (life ladder)	Point	WHR, https://worldhappiness.report/data
LOGPCGDP	GDP per capita	Log (US dollar)	WDI, https://data.worldbank.org
GDPR	Real GDP growth	%	WDI, https://data.worldbank.org
SS	Social support	Point	WHR, https://worldhappiness.report/data
LOGHLEB	Healthy life expectancy at birth	Log (Years)	WHR, https://worldhappiness.report/data
FMLC	Freedom to make life choices	Point	WHR, https://worldhappiness.report/data
G	Generosity	Point	WHR, https://worldhappiness.report/data
P	Perception of corruption	Point	WHR, https://worldhappiness.report/data
CPI	Consumer price inflation	%	WDI, https://data.worldbank.org
UNEMP	Unemployment % of total labor force	%	WDI, https://data.worldbank.org
EXTS	A dummy variable for external shocks*	0 and 1	0 = absence; and 1 = presence

Notes: *2008-2009 Global Financial Crisis and 2020-2021 COVID-19 Pandemic. Subjective Well-Being (SWB) is individuals' self-reported evaluation of their life and emotions, proxied here by national average life evaluation scores from the World Happiness Report (Cantril ladder, 0-10). Freedom to Make Life Choices measures perceived autonomy in life decisions. Social Support captures perceived availability of help from family, friends, or community. Healthy Life Expectancy at Birth reflects the expected years of healthy life for newborns. Generosity measures the tendency to help others or donate. Perception of Corruption reflects individuals' assessment of corruption in public institutions. These data were obtained from Helliwell et al. (2024).

Source: Authors

Appendix A2 Descriptive summary of data and variables used in this study

Variable	Higher Income Countries					Upper Middle-Income Countries				
	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
SWB	306	6.9444	0.5382	5.332	7.971	450	5.8483	0.7502	3.675	7.615
LOGPCGDP	306	10.7461	0.2681	9.8597	11.5519	450	9.3117	0.5728	7.5989	10.474
GDPR	306	1.9691	3.3173	-11.167	24.4752	450	3.0330	4.6019	-17.668	15.835
SS	306	1.1804	4.5495	0.738	80.5	450	0.8525	0.0799	0.503	0.964
HLEB	306	70.7908	4.5047	0.9	83	450	67.779	2.7227	63.1	79.7
FMLC	306	0.8605	0.0808	0.524	0.97	450	0.751	0.1273	0.369	0.965
G	306	0.1130	0.1848	-0.37	1.66	450	-0.087	0.127	-0.34	0.27
P	306	0.4797	0.2175	0.035	0.916	450	0.8041	0.2202	0.29	3.5
CPI	306	2.1066	1.9714	-4.447	10.0012	450	5.5231	9.8481	-2.0969	133.49
UNEMP	306	6.5993	3.6418	2.351	26.094	450	8.3924	4.2723	2.015	27.686
EXTS	306	0.2222	0.4164	0	1	450	0.2222	4.2723	0	1
Variable	Lower Middle-Income Countries					Lower Income Countries				
	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
SWB	252	5.3244	0.6631	3.602	6.985	396	4.6569	0.7384	2.694	6.476
LOGPCGDP	252	8.4687	0.4283	7.2606	9.8211	396	7.1673	0.5676	5.8024	8.8024
GDPR	252	3.4665	4.3576	-12.036	34.5	396	4.6347	3.7560	-17.668	21.452
SS	252	0.8043	0.0776	0.45	0.959	396	0.7255	0.1178	0.366	0.951
HLEB	252	63.8460	4.1888	46	75.4	396	57.112	5.0391	40.4	72.6
FMLC	252	0.7383	0.1433	0.258	0.952	396	0.7212	0.1293	0.295	0.965
G	252	0.0545	0.1920	-0.239	0.59	396	0.0243	0.0988	-0.19	0.413
P	252	0.8115	0.1332	0.03	0.976	396	0.8177	0.0919	0.17	1
CPI	252	6.1447	8.2423	-10.067	53.2309	396	9.3756	34.5421	-72.73	557.20
UNEMP	252	9.4659	8.5691	0.249	36.392	396	4.1576	2.7941	0.12	13.232
EXTS	252	0.222	0.4165	0	1	396	0.2222	2.7941	0.12	13.232

Notes: There are 17 countries in high-income group, 25 countries in upper middle-income group, 14 countries in lower middle-income group and 22 countries in low-income group.

Source: Authors

Appendix A3 Panel unit root testing results by using CIPS (Pesaran, 2007) and CADF (Lm et al., 2003) tests

Variable	CIPS Unit Root Test		CADF Unit Root	
	I(0)	I(1)	I(0)	I(1)
Higher Income Countries				
Subjective Well-Being	-3.065***	-5.350***	-2.014	-2.684***
Logged GDP Per Capita	-1.234	-3.204***	-1.646	-1.858
GDP Growth	-3.014***	-5.172***	-1.679	-2.204**
Freedom of Life Choices	-2.802***	-5.224***	-1.168	-1.485
Generosity	-3.952***	-5.631***	-1.875	-2.778***
Perception of Corruption	-3.554***	-5.165***	-1.737	-2.313***
Upper Middle-Income Countries				
Subjective Well-Being	-2.233***	-4.83***	-1.705	-1.642
Logged GDP Per Capita	-1.401	-2.885***	-1.352	-1.512
GDP Growth	-2.443***	-4.477***	-1.440	-2.071*
Generosity	-3.16***	-5.268***	-1.958	-2.295**
Healthy Life at Birth	-3.448***	-3.873***	-1.973	-2.785***
Lower Middle-Income Countries				
Subjective Well-Being	-2.66***	-4.523***	-1.996	-1.862
Logged GDP Per Capita	-1.207	-3.251***	-1.368	-1.847
GDP Growth	-3.093***	-5.045***	-2.229**	-2.415***
Freedom of Life Choices	-3.411***	-4.989***	-2.366**	-3.028***
Generosity	-2.045**	-4.634***	-1.084	-2.471***
Lower Income Countries				
Subjective Well-Being	-3.007***	-4.582***	-2.075*	-3.927***
Logged GDP Per Capita	-1.989	-3.741***	-1.737	-2.154**
GDP Growth	-3.056***	-4.410***	-1.921	-2.399***
Healthy Life at Birth	-1.86	-3.179***	-0.924	-1.823
Freedom of Life Choices	-3.602***	-3.179***	-2.04*	0.286**

Notes: Significance codes: *** p < at 1%, ** p < at 5%, and * p < 10%. These results were computed with a maximum of 2 lags.

Source: Authors

References

- Ambrosio, C. D., Jantti, M. & Lepinteur, A. (2020). Money and happiness: Income, wealth and subjective well-being. *Social Indicators Research*, 148, pp. 47-66. <https://doi.org/10.1007/s11205-019-02186-w>
- Beherea, D. K., Rahut, D. B., Padmaja, M. & Dash, A. K. (2024). Socioeconomic determinants of happiness: Empirical evidence from developed and developing countries. *Journal of Behavioral and Experimental Economics*, 109, 102187. <https://doi.org/10.1016/j.socec.2024.102187>
- Chipman, H. A., George, E. I. & McCulloch, R. E. (2010). BART: Bayesian additive regression trees. *Annals of Applied Statistics*, 4(1), pp. 266-298.
- Chudik, A. & Pesaran, M. H. (2015). Common correlated effects estimation of heterogeneous dynamic panel data models with weakly exogenous regressors. *Journal of Econometrics*, 188(2), pp. 393-420. <https://doi.org/10.1016/j.jeconom.2015.03.007>
- Diener, E., Lucas, R. E. & Oishi, S. (2002). Subjective well-being: The science of happiness and life satisfaction, in Shane J. Lopez, and C. R. Snyder (eds), *The Oxford Handbook of Positive Psychology* (2nd edn), pp. 187-194. Oxford Academic. <https://doi.org/10.1093/oxfordhb/9780195187243.013.0017>
- Ding, J., Salinas-Jimenez, J. & Salinas-Jimenez, M. d. M. (2021). The impact of income inequality on subjective well-being: The case of China. *Journal of Happiness Studies*, 22, pp. 845-866. <https://doi.org/10.1007/s10902-020-00254-4>
- DiMario, C. H., Peroni, C. & Sarracino, F. (2020). Happiness matters: Productivity gains from subjective well-being. *Journal of Happiness Studies*, 21, pp. 139-160. <https://doi.org/10.1007/s10902-019-00074-1>
- Easterlin, R. A. (2023). Why does happiness respond differently to an increase vs. decrease in income? *Journal of Economic Behavior and Organization*, 209, pp. 200-204. <https://doi.org/10.1016/j.jebo.2023.03.005>
- Easterlin, R. A. (2013). Happiness and economic growth: The evidence. *Discussion Paper No. 7187, Global Handbook of Well-Being and Quality of Life*. Wolfgang Glatzer, ed., Springer.
- Easterlin, R. A. (1974). Nations and households in economic growth? Some Empirical Evidence. *Essays in Honor of Moses Abramovitz*, pp. 89-125. <https://doi.org/10.1016/B978-0-12-205050-3.50008-7>
- Frey, B. S. & Stutzer, A. (2001). Happiness, economy and institutions. *The Economic Journal*, 110(466), pp. 918-938. <https://doi.org/10.1111/1468-0297.00570>

- Frey, B. S. (2021). What future happiness research? In Bruni, L., Smerilli, A. and Rosa, D. D. (eds) *A Modern Guide to the Economics of Happiness*, pp. 17-27. Elgaronline. <https://doi.org/10.4337/9781788978767>
- Florida, R., Mellander, C. & J. Rentfrow, P. (2011). The happiness of cities. *Regional Studies*, 47(4), pp. 613-627. <https://doi.org/10.1080/00343404.2011.589830>
- FitzRoy, F. R. and Nolan, M. A. (2022). Income status and life satisfaction. *Journal of Happiness Studies*, 23, pp. 233-256. <https://doi.org/10.1007/s10902-021-00397-y>
- Filho, D. A. D. B. & Artes, R. (2018). Application of bayesian additive regression trees in the development of credit scoring models in Brazil. *Production*, 28, e20170110. Doi: 10.1590/0103-6513.20170110
- Helliwell, J. F., Layard, R., Sachs, J. D., De Neve, J.-E., Aknin, L. B., & Wang, S. (Eds.). (2024). *World Happiness Report 2024*. University of Oxford: Wellbeing Research Centre.
- Helske, J. & Tikka, S. (2024). Estimating causal effects from panel data with dynamic multivariate panel models. *Advances in Life Course Research*, 60, 100617. <https://doi.org/10.1016/j.alcr.2024.100617>
- Im, K. S., Pesaran, M. H. & Shin, Y. (2003). Testing for Unit Roots in Heterogeneous Panels. *Journal of Econometrics*, 115, pp. 53-74. [https://doi.org/10.1016/S0304-4076\(03\)00092-7](https://doi.org/10.1016/S0304-4076(03)00092-7)
- Jantsch, A. and Veenhoven, R. (2019). Private wealth and happiness: A research synthesis using an online findings-archive. In Gael Brule & Christian Suter (eds) *Wealth(s) and Subjective Well-Being. Part of the Social Indicators Research Series*, 76, pp. 17-50. Springer. <https://rd.springer.com/book/10.1007%2F978-3-030-05535-6#toc>
- Kahneman, D. & Deaton, A. (2010). *High income improves evaluation of life but not emotional well-being*. Center for Health and Well-being: Princeton University. Doi: 10.1073/pnas.1011492107
- Killingsworth, M. A., Kahneman, D. & Mellers, B. (2023). Income and emotional well-being: A conflict resolved. *Psychological and Cognitive Sciences*, 120(10): e2208661120. <https://doi.org/10.1073/pnas.2208661120>
- Kollamparambil, U. (2020). Happiness, happiness inequality and income dynamics in South Africa. *Journal of Happiness Studies*, 21, pp. 201-222. <https://doi.org/10.1007/s10902-019-00075-0>
- Kakamura, H. (2001). *Gotama Buddha: A Biography Based on the Most Reliable Texts*, Vol. 1. Kosei Publishing.
- Kapelner, A. & Bleich, J. (2016). bartMachine: Machine learning with Bayesian additive regression trees. *Journal of Statistical Software*, 70(4), pp.1-40. Doi: 10.18637/jss.v070.i04

- Muresan, G. M., Ciumas, C. & Achim, M. V. (2020). Can money buy happiness? Evidence for European countries. *Applied Research in Quality of Life*, 15, pp. 953-970. <https://doi.org/10.1007/s11482-019-09714-3>
- Narisetty, N. N. & He, X. (2014). Bayesian variable selection with shrinking and diffusing priors. *Annals of Statistics*, 42(2), pp. 789-817. Doi: 10.1214/14-AOS1207
- Lopez-Ruiz, V-R, Huete-Alcocer, N., Alfaro-Navarro, J-L. & Nevado-Pena, D. (2021). The relationship between happiness and quality of life: A model for Spanish society. *PLoS ONE*, 16(11): e0259528. <https://doi.org/10.1371/journal.pone.0259528>
- Lim, H. E., Shaw, D., Liao, P.S., & Duan, H. (2020). The Effects of income on happiness in East and South Asia: Societal values matter? *Journal of Happiness Studies*, 21, pp.391-415. <https://doi.org/10.1007/s10902-019-00088-9>
- Oishi, S., Cha, Y., Komiya, A. & Ono, H. (2022). Money and happiness: the income-happiness correlation is higher when income inequality is higher. *PNAS Nexus*, 1, pp. 1-12. <https://doi.org/10.1093/pnasnexus/pgac224>
- Pastpipatkul, P. & Ko, H. (2025). Buddhist thought on happiness and income growth relations across varying income countries. *J Happiness Stud*, 26, 91. <https://doi.org/10.1007/s10902-025-00921-4>
- Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, 22(2), pp. 265-312. <https://doi.org/10.1002/jae.951>
- Pearl, J. (2009). *Causality: Models, reasoning and inference*. 2nd Edition. Cambridge University Press, Cambridge.
- Rojas, M. (2019). Relative income and happiness in Latin America: Implications for inequality debates: In: Rojas, M. (eds) *The Economics of Happiness*. Springer. https://doi.org/10.1007/978--3-030-15835-4_5
- Raibley, J. R. (2012). Happiness is not well-being. *Journal of Happiness Studies*, 13, pp. 1105-1129. <https://doi.org/10.1007/s10902-011-9309-z>
- Stevenson, B. & Wolfers, J. (2008). Economic growth and subjective well-being: reassessing the Easterlin paradox. *CESIFO Working Paper No. 2394*. <https://hdl.handle.net/10419/26439>
- Simona-Moussa, J. (2020). The subjective well-being of those vulnerable to poverty in Switzerland. *Journal of Happiness Studies*, 21, pp. 1561-1580. <https://doi.org/10.1007/s10902-019-00143-5>
- Tikka, S. & Helske, J. (2024). dynamite: An R package for dynamic multivariate panel models. arXiv preprint. Doi: 10.48550/arXiv.2302.01607

- Veenhoven, R. (2015). Informed pursuit of happiness, what we should know, do we know and can we get to know? *Journal of happiness Studies*, 4, pp. 1035-1071. Doi: 10.1007/s10902-014-9560-1
- Xiang, Q. & Narisetty, N. (2022). Package 'basad'. CRAN, Available at <https://cran.r-project.org/web/packages/basad/basad.pdf>
- Zhu, Z., Ma, W., Leng, C. & Nie, P. (2021). The Relationship between happiness and consumption expenditure: Evidence from rural China. *The International Society for Quality-of-Life Studies*, 16, pp. 1587-1611. <https://doi.org/10.1007/s11482-020-09836-z>