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A Macroeconomic Analysis of the Relationship Between Happiness and GDP per Capita in Asia: Controlling for the COVID-19 Shock

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Abstract

During the twenty-first century, Asia has emerged as a region characterized by strong economic performance and sustained increases in GDP per capita. This study examines the relationship between happiness and GDP per capita from a macroeconomic perspective, controlling for the COVID-19 shock. Drawing on neoclassical theory and panel data for 37 Asian countries over the 2013–2023 period, fixed-effects and random-effects models are estimated after assessing the potential endogeneity of happiness. The results indicate that happiness is positively and statistically significantly associated with GDP per capita across Asian countries. In addition, Dumitrescu–Hurlin panel Granger causality tests indicate a unidirectional predictive relationship between GDP per capita and happiness, suggesting that higher levels of per capita income precede higher levels of reported happiness.

Keywords: GDP per capita; happiness; causality; Asia

1. Introduction

Between 2013 and 2024, Asia experienced strong macroeconomic performance, recording the highest annual GDP growth rate among the world's continents, at 5.8% (World Bank, 2026). This economic dynamism has coexisted with substantial differences in reported happiness across Asian countries, making the region a relevant context for examining the relationship between subjective well-being and material living standards.

Asia provides a particularly relevant setting for examining the relationship between happiness and GDP per capita because of its strong economic dynamism, substantial differences in development levels, and diverse GDP per capita trajectories across countries (M. M. Rahman et al., 2019; Tam, 2018; Yeung, 2000). These characteristics make Asia an especially informative context for comparative analysis, allowing patterns that may be obscured in a heterogeneous global sample to be examined more clearly.

Differences in happiness are particularly evident across the region. According to the World Happiness Report 2026, published by Oxford University (2026), Israel obtained the highest happiness score among Asian countries, at 7.187, whereas Afghanistan recorded the lowest score, at 1.446, placing it at the bottom of the global ranking. These differences in subjective well-being occur alongside substantial disparities in economic conditions.

Afghanistan provides an illustrative example. It has one of the lowest GDP per capita levels in Asia and simultaneously occupies the lowest position in the global happiness ranking. Although this comparison is purely descriptive and cannot establish causality, it

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illustrates the possibility of a systematic association between material living standards and subjective well-being among Asian economies.

From the perspective of macroeconomic theory, differences in aggregate income are related to the availability and accumulation of productive factors, technological capabilities, and the efficiency with which economic resources are employed. Consequently, empirical studies have traditionally emphasized physical capital, human capital, government expenditure, and trade openness as important determinants of macroeconomic performance (Valdiglesias & Quintana, 2026; Nguyen, 2023; Oyebowale & Algarhi, 2020). Nevertheless, macroeconomic outcomes may also reflect factors that extend beyond conventional economic variables.

In this regard, Valdiglesias (2025, 2026) argues that non-economic factors can contribute to explaining differences in aggregate economic outcomes over time. Happiness represents one potentially relevant factor because subjective well-being may be associated with economically important outcomes, particularly through its relationship with productivity and labor-market conditions (Piekałkiewicz, 2017). Thus, happiness can be considered not only as an outcome associated with income but also as a factor potentially related to differences in GDP per capita.

The existing macroeconomic literature has largely concentrated on the relationship between income and happiness. In particular, a substantial body of research has examined whether higher GDP or national income is associated with greater subjective well-being. A central issue in this body of literature is the Easterlin paradox, according to which income and happiness tend to be positively associated in cross-sectional comparisons, whereas the relationship may become weaker over longer periods. This distinction between cross-sectional and longitudinal relationships remains an important issue in the empirical literature (Pal, 2026; Easterlin & O'Connor, 2022). Consistent with this perspective, Beka and Lubishtani (2025) find that GDP is positively related to happiness but that the marginal effect declines as income increases.

Other studies provide evidence of a persistent positive association between income and subjective well-being. Behera et al. (2024), for example, report that increases in GDP per capita are associated with sustained improvements in happiness in samples of both developed and developing countries. Veenhoven and Vergunst (2014) similarly identify a positive relationship in a sample of 67 countries. Oishi et al. (2022) further show that the association between income and happiness tends to be stronger in countries with higher GDP levels than in countries with lower GDP levels.

Related evidence is provided by Fors et al. (2026), Naghdi et al. (2021), and De Neve et al. (2018), whose studies contribute to the literature examining the relationship between economic conditions and subjective well-being, while also addressing qualifications of the Easterlin paradox.

The reverse relationship—whether happiness is associated with higher GDP per capita—has received considerably less attention. Among the relatively limited studies addressing this question, Rasiah et al. (2019), using data for 50 countries, report a positive influence of happiness on macroeconomic performance. B. Li and Lu (2009), based on 66 countries, and Wijaya et al. (2021), examining Romania, provide related evidence of a positive relationship between happiness and economic outcomes.

The relationship may also exhibit nonlinear characteristics. Stevenson (2021), using a sample of 82 countries, finds a positive but diminishing association, indicating that the relationship between happiness and macroeconomic outcomes may weaken at higher levels of subjective well-being. Such evidence suggests that the association between happiness and GDP per capita may not necessarily be adequately represented by a simple linear relationship in every context.

The direction of the relationship between happiness and GDP per capita is also relevant. Previous research has reported evidence in which the two variables predict one another over time. Y. Y. Lee and Goh (2023), using Granger causality tests for 104 countries, found that the happiness index contains predictive information for subsequent changes in GDP per capita and that GDP per capita also contains predictive information for subsequent changes in happiness. They further report that the estimated relationship between happiness and GDP per capita is substantially stronger in developed than in developing countries. Importantly, however, predictive precedence identified through Granger-type tests should not automatically be interpreted as evidence of structural economic causality.

Despite the growing body of literature, evidence specifically covering Asia as a whole remains limited. Asian economies differ substantially in terms of income, institutional characteristics, economic structures, and socioeconomic conditions. These differences make a region-wide analysis particularly useful for determining whether the association between happiness and GDP per capita is systematic across countries with different levels of development.

2. Methodology

This study adopts a quantitative and analytical approach. Using panel data, econometric estimations are conducted to assess the extent to which happiness influences GDP per capita across Asian countries. In addition, to provide a theoretical foundation for the econometric specification, a macroeconomic model is developed to formalize the mechanisms through which happiness may affect GDP per capita.

2.1. The Model

Within the framework of neoclassical macroeconomic theory, economic growth can also be conceptualized as a process of physical capital accumulation over time, because higher levels and growth rates of physical capital imply higher levels and growth rates of aggregate output (Sala-i-Martin, 2000).

Although the model follows the neoclassical growth framework, it also considers the insights of endogenous growth theory. Romer (1986, 1990) emphasizes that technological change can be linked to economic decisions, knowledge accumulation, and innovation, rather than being treated entirely as an exogenous process. Accordingly, the model retains the neoclassical structure while allowing happiness to influence technological progress, providing an additional channel through which it may affect long-run economic growth.

For simplicity, assuming a zero depreciation rate, the change in—or rate of accumulation of—physical capital over time ($\dot{K}$) is equal to gross investment (I):

$$\dot{K} = I \tag{1}$$

Because physical capital is not a consumption good, investment expenditure on this productive factor is financed by income not spent on consumption, that is, by saving. In equilibrium, saving (S) is therefore equal to investment.

$$S = I \tag{2}$$

Saving depends on gross domestic product (GDP), or national income (Y), weighted by the marginal propensity to save (s):

$$S = sY \tag{3}$$

GDP is generated as a function of the level of technology (A), the stock of physical capital (K), and the amount of labor (L) employed:

$$Y = AK^{\beta}(FL)^{1-\beta} \tag{4}$$

where β denotes the share of physical capital in output, and F denotes the personal happiness index.

Because happiness has a positive effect on labor productivity (Fang et al., 2026; Díaz, 2022; Bellet et al., 2024), FL represents effective labor, that is, labor augmented by the productivity associated with personal happiness.

The evolution of technology over time—that is, technological change or innovation—is also influenced, among other factors, by the degree of personal happiness of those involved in such activities (Heo et al., 2026; Ying & Xiao, 2025; Brulé & Munier, 2021; Usai et al., 2020). Formally,

$$A = A(F, V) \tag{5}$$

The technological innovation process depends not only on happiness but also on a set of other variables, which are captured by V.

To derive Equation (6), let $k = K/L$ denote physical capital per worker and $y = Y/L$ GDP per capita. Dividing Equation (4) by L gives $y = Ak^{\beta}F^{1-\beta}$. From Equations (1)–(3), capital accumulation per worker is $\dot{k} = sy - nk$, where n is the population growth rate. In the steady state, $\dot{k} = 0$, so $k = sy/n$. Substituting this condition into the per-worker production function yields the steady-state relationship in Equation (6). Happiness affects GDP per capita through two distinct channels, directly through effective labor (FL) and indirectly through technological progress $A(F,\ V)$, avoiding double counting.

In the long-run steady state $\left(\dot{k} = 0\right)$, the solution to the model establishes the direction of the relationship between happiness (F) and GDP per capita (y).

$$y = \left[\frac{s(A(F,V))^{\frac{1}{\beta}}F}{n}\right]^{\frac{\beta}{1-\beta}} \tag{6}$$

where n denotes the population growth rate.

The reduced-form model implies that, in the long run, GDP per capita—or economic growth—depends positively on happiness. This effect operates mainly through two mechanisms. The first is labor productivity: A higher level of happiness raises labor productivity and, consequently, output. Higher output or income, in turn, increases saving and investment in capital goods and subsequently accelerates physical capital accumulation. The second mechanism operates through technological innovation. Greater happiness promotes technological progress, which subsequently expands productive capacity and output.

The model therefore yields the hypothesis that happiness has a positive effect on GDP per capita. Accordingly, countries with higher GDP per capita are expected to be those that attain higher levels of happiness.

2.2. Variables

Within the theoretical framework developed above, the hypothesis is evaluated empirically through an econometric model that includes the variables presented in Table 1.

Following Ozyilmaz (2022), the dependent variable, GDP per capita, is proxied by the natural logarithm of GDP per capita. Consistent with neoclassical economic theory and the relevant empirical evidence, physical capital, government expenditure, trade openness, and inflation are included as control variables in addition to happiness (Zain et al., 2026; Baglan & Nguyen, 2026).

Table 1. Operationalization of variables.

Variables		Operational Definition
Dependent variable	GDP per capita	GDP per capita at constant 2015 US$ (natural logarithm)
Independent variable of interest	Happiness	Global Happiness Index (1–10)
Control variables	Physical capital	Gross capital formation (% of GDP)
	Government expenditure	Government consumption expenditure (% of GDP)
	Trade openness	Exports and imports of goods (% of GDP)
	Inflation	Implicit GDP deflator
	COVID-19	Dummy: 2020 = 1 and zero in other years
External instruments	Peace	Global Peace Index (1–5)
	Economic freedom	Index of Economic Freedom (1–100)
	Education	Total expenditure on education (% of GDP)

Given the bidirectional relationship between happiness and GDP documented in previous studies (Nademi & Kalmarzi, 2026), happiness is also treated as a potentially endogenous variable, and its endogeneity status is assessed using the corresponding test.

For the endogeneity test, and drawing on research on the institutional and macroeconomic determinants of happiness, sociopolitical peace (Ozerdem, 2019), economic freedom (Graafland, 2024; Spruk & Kešeljević, 2016), and education (Dong et al., 2025; Araki, 2022) are considered external instruments.

The three variables are used as external instruments because they are theoretically associated with happiness but are excluded from the structural GDP equation. Peace, economic freedom, and education provide relevant variation for explaining happiness (Ozerdem, 2019; Graafland, 2024; Spruk & Kešeljević, 2016; Dong et al., 2025; Araki, 2022). Thus, they enter the first-stage equation but not the GDP equation.

A limitation of this instrumental-variable strategy is that peace, economic freedom, and education may also affect GDP per capita directly, rather than only through happiness. Therefore, the exclusion restriction cannot be fully guaranteed in a cross-country macro-panel setting. Strictly exogenous external instruments are difficult to identify in macroeconomic data, and this limitation should be considered when interpreting the endogeneity results. Future research could address this issue using dynamic-panel approaches or micro-level data with stronger identification strategies.

According to Oxford University (2026), the Global Happiness Index measures respondents' self-assessment of their current quality of life. Scores range from 0 to 10, where 0 represents the worst possible life and 10 the best possible life.

2.3. Sample and Data Sources

Because the analysis uses panel data, the annual dataset covers the 2013–2023 period and includes 37 Asian countries with relatively complete records. The 2013–2023 period was selected because the happiness data required for the analysis are available for this period, while comparable data are not available for earlier years. The 37 countries were selected because they have sufficiently complete happiness data and comparable information for the other variables included in the study. Countries without sufficient comparable data were excluded. The complete list of the 37 countries is reported in Table A1 in Appendix A.

As these countries encompass the Asian economies for which sufficiently complete records are available, the accompanying significance levels are interpreted as measures of estimation precision rather than as a basis for inference to a broader population. Data for

the Global Happiness Index were obtained from the World Happiness Report, published by Oxford University in collaboration with Gallup and the United Nations Sustainable Development Solutions Network (Oxford University, 2026). GDP per capita, the control variables, and education data were obtained from the World Bank (2026). The Global Peace Index and the Index of Economic Freedom were collected from the Institute for Economics and Peace (2026) and the Heritage Foundation (2026), respectively.

2.4. Econometric Methods

Following an approach similar to Ogbe et al. (2024), the econometric estimations were performed using fixed-effects and random-effects models. The following equation was specified:

$$GDPPC = a_0 + a_1HAP + a_2CAP + a_3GOV + a_4OPEN + a_5INF + a_6COVID\text{-}19 + e + u \quad (7)$$

where GDPPC denotes the natural logarithm of annual GDP per capita for each Asian country over 2013–2023; HAP denotes happiness; CAP, physical capital; GOV, government expenditure; OPEN, trade openness; and INF, inflation. The term e is the error term, whereas *u* captures country-specific characteristics that remain constant over time.

The magnitude and sign of the estimated happiness coefficient were used to assess the extent and direction of the effect of happiness on GDP per capita.

Because happiness could be endogenous, an endogeneity test was conducted before the main econometric estimations. Given that the Dumitrescu–Hurlin causality test indicated a unidirectional predictive relationship from GDP per capita to happiness, the endogeneity test applied to this simultaneous relationship indicated that happiness was, in fact, exogenous.

The endogeneity test used peace, economic freedom, and education as external instruments for happiness. These variables were selected because they are theoretically associated with happiness but are excluded from the structural GDP equation. Thus, they are used to explain variation in happiness rather than as direct determinants of GDP per capita. The identification strategy relies on the exclusion restriction, namely the assumption that the instruments affect GDP per capita indirectly through happiness rather than directly (Stock & Watson, 2020).

Given the presence of heteroskedasticity and contemporaneous cross-country correlation, and because the number of cross-sectional units (37 countries) exceeded the relatively small number of time periods (11 years), the final estimations were obtained using the cross-section SUR (PCSE) standard error covariance (d.f. corrected) option in EViews, in line with Beck (2001). This procedure produced more robust and consistent standard errors.

Variance inflation factors (VIFs) were also calculated to assess the degree of independence among the explanatory variables included in the study. The resulting values were close to 1, indicating no multicollinearity problems.

Finally, to assess whether the estimated relationship was spurious, a unit-root test was applied to the residuals from the final regression. The test indicated that the residuals did not contain a unit root, suggesting that the estimated regression was not spurious.

All estimations were performed using EViews version 13.

3. Results

Before estimating the econometric models, the stationarity properties of the series were examined using five panel unit-root tests. Based on the overall evidence from these tests, GDP per capita, happiness, physical capital, trade openness, inflation, and the COVID-19 indicator are classified as integrated of order zero, I(0), as they are stationary in levels.

Government expenditure is non-stationary in levels but becomes stationary after first differencing and is therefore classified as integrated of order one, I(1).

Accordingly, government expenditure is included in first differences in the regression models, while the remaining variables are retained in levels. These transformations help mitigate concerns related to non-stationarity and spurious regression, as reported in Table 2. Because the panel may exhibit contemporaneous cross-sectional dependence across countries, the results of conventional panel unit-root tests should be interpreted with some caution, as cross-sectional dependence may affect their size and power.

Table 2. Panel unit-root tests with intercept and trend.

Variable	Levin, Lin & Chu *t*	Breitung *t*-Stat.	Im, Pesaran and Shin W-Stat.	ADF-Fisher Chi-Square	PP-Fisher Chi-Square
GDP per capita	0.0000	0.9912	0.2115	0.0439	0.0210
Happiness	0.0000	0.9984	0.0037	0.0000	0.0000
Physical capital	0.0000	0.7484	0.0128	0.0000	0.0269
Government expenditure (first difference)	0.0000	0.7427	0.1996	0.0047	0.0000
Trade openness	0.0000	0.7440	0.0658	0.0017	0.0323
Inflation	0.0000	0.8877	0.0006	0.0000	0.0000
COVID-19	0.0000	0.0000	0.6980	0.9765	0.0000

As discussed above, several studies have reported simultaneous influences between happiness and GDP in both directions. To examine the potential presence of endogeneity arising from simultaneity, and following a procedure similar to Y. Y. Lee and Goh (2023), a Dumitrescu–Hurlin panel causality test was applied. This approach is particularly appropriate for panel datasets because it allows the causal relationship to differ across countries, rather than imposing a common causal coefficient for all cross-sectional units.

The null hypothesis of the Dumitrescu–Hurlin test is that there is no homogeneous Granger causality from one variable to the other across the panel. Rejection of the null hypothesis indicates that the variable contains predictive information for the other variable for at least a proportion of the cross-sectional units, while failure to reject the null hypothesis indicates insufficient evidence of such predictive causality. The interpretation therefore concerns Granger-type predictive causality rather than structural economic causality. Given the relatively short time dimension of the panel, one lag was selected for the Dumitrescu–Hurlin test to preserve degrees of freedom and avoid over-parameterization.

Table 3 reports the results of the Dumitrescu–Hurlin panel causality tests. For the hypothesis that happiness does not homogeneously cause GDP per capita, the W-statistic is 1.64037 and the Zbar-statistic is 0.52919, with a probability value of 0.5967. Since this probability is greater than 0.05, the null hypothesis cannot be rejected. Thus, the results do not provide sufficient evidence that happiness has predictive content for GDP per capita across the panel.

Table 3. Dumitrescu–Hurlin panel causality tests.

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
Happiness does not homogeneously cause GDP per capita	1.64037	0.52919	0.5967
GDP per capita does not homogeneously cause happiness	3.32936	4.24764	2×10^{-5}

In contrast, for the hypothesis that GDP per capita does not homogeneously cause happiness, the W-statistic is 3.32936 and the Zbar-statistic is 4.24764, with a probability value of 2×10^{-5}. Since this probability is well below 0.05, the null hypothesis is rejected. The results therefore provide evidence that GDP per capita has predictive content for happiness across the panel.

The Dumitrescu–Hurlin results indicate a unidirectional predictive relationship running from GDP per capita to happiness in the sample of Asian economies. Unlike the conventional Granger causality results, the evidence from the heterogeneous panel causality test does not support a statistically significant predictive effect running from happiness to GDP per capita. Accordingly, the findings should not be interpreted as evidence of a bidirectional structural causal relationship or a "virtuous feedback loop"; rather, they indicate that changes in GDP per capita contain predictive information about subsequent changes in happiness.

Based on the results reported in Table 3, the endogeneity of happiness was assessed using the Durbin–Wu–Hausman procedure and a control-function approach (Stock & Watson, 2020).

Although the Dumitrescu–Hurlin test provides evidence that GDP per capita contains predictive information for happiness, it does not establish structural simultaneity or, by itself, imply that happiness is endogenous in the GDP per capita equation. Therefore, an endogeneity test was conducted to determine whether happiness should be treated as an endogenous explanatory variable in the GDP per capita model.

To determine the appropriate panel specification for the endogeneity test, preliminary fixed-effects and random-effects estimations were conducted. The results favored the fixed-effects model, as the Hausman test yielded a chi-square statistic of 62.284421 with a probability of 0.000.

In the first stage, using the fixed-effects specification, happiness—the variable potentially subject to endogeneity—was regressed on the control variables (physical capital, government expenditure, trade openness, and inflation) and the selected instruments (peace, economic freedom, and education). The regression produced an F-statistic of 40.59113. This result indicates that the excluded instruments have substantial explanatory power for happiness in the first-stage regression.

In the second stage, the econometric model was re-estimated after including the residuals from the first-stage regression as an additional explanatory variable. The procedure was specified with the null hypothesis that happiness is endogenous. If the estimated coefficient on the residuals is statistically significant, the null hypothesis is rejected and happiness is considered endogenous; otherwise, the null hypothesis is not rejected, supporting the treatment of happiness as exogenous in the structural GDP per capita equation.

The endogeneity of happiness was further assessed using a control-function approach following the Durbin–Wu–Hausman procedure described by Stock and Watson (2020). In the first stage, happiness was regressed on the control variables—physical capital, government expenditure, trade openness, and inflation—together with the external instruments for happiness, namely peace, economic freedom, and education. The first-stage regression yielded an F-statistic of 40.59113, indicating that the instruments have substantial explanatory power for happiness.

The residuals obtained from the first-stage regression were subsequently included in the structural GDP per capita equation as an additional explanatory variable. Under the control-function approach, statistical significance of the residual term would indicate that happiness is endogenous. The estimated coefficient of the residual was -0.169286, with a standard error of 0.104538 and a probability value of 0.1062. Since this probability exceeds the 5% significance level, the null hypothesis of exogeneity was not rejected. Thus,

the results provide no statistical evidence that happiness is endogenous in the GDP per capita equation.

This finding has an important implication for the subsequent empirical analysis. Since happiness was not found to be endogenous, an instrumental-variable two-stage estimation was not required for the main specification. Accordingly, the analysis proceeded using standard panel-data estimators, treating happiness as an exogenous explanatory variable. Fixed-effects and random-effects specifications were therefore estimated to account for the panel structure and unobserved country-specific heterogeneity. The resulting coefficients can consequently be interpreted within the corresponding panel-data framework without introducing an additional correction for endogeneity.

The results presented in Table 4 show that the coefficient associated with happiness is positive and statistically significant in both panel-data specifications. Under the fixed-effects model, the estimated coefficient is 0.037277 (p = 0.0448), while the random-effects model yields a coefficient of 0.047155 (p = 0.0383). These estimates indicate a positive association between happiness and GDP per capita across the Asian countries in the sample. Given that the dependent variable is expressed in logarithmic form while happiness is measured in levels, the coefficient should be interpreted as a semi-elasticity rather than an elasticity. Accordingly, a one-point increase in the happiness index is associated with an approximately 3.73% increase in GDP per capita under the fixed-effects specification and an approximately 4.72% increase under the random-effects specification, ceteris paribus.

Table 4. Effect of happiness on GDP per capita.

Variables	Fixed Effects		Random Effects	
	Coefficient	**Prob.**	**Coefficient**	**Prob.**
Happiness	0.037277	0.0448	0.047155	0.0383
Physical capital	0.008210	0.0000	0.007839	0.0002
Government expenditure	−0.002151	0.1351	−0.002106	0.2383
Trade openness	0.000213	0.7654	0.000525	0.4413
Inflation	−0.000329	0.6825	−0.000382	0.6338
COVID-19	−0.000308	0.9960	-4.38×10^{-5}	0.9994
Constant	8.264477	0.0000	8.194716	0.0000
R-squared		0.993289		0.101194
Prob(F-statistic)		0.0000		0.0000

Regarding the control variables, the estimated coefficient for physical capital was positive and statistically significant in both models, indicating that greater investment in physical capital, measured as a share of GDP, is positively associated with GDP per capita in the Asian countries. In contrast, government expenditure was not statistically significant in either specification, with coefficients of −0.002151 (p = 0.1351) under fixed effects and −0.002106 (p = 0.2383) under random effects. Trade openness, inflation, and the COVID-19 indicator were also statistically insignificant in both models.

The choice between fixed and random effects depends on how unobserved country-specific characteristics are related to the explanatory variables. The fixed-effects specification permits such unobserved heterogeneity to be correlated with the regressors, whereas the random-effects specification relies on the assumption that these country-specific effects are uncorrelated with the explanatory variables. Since the estimated coefficient on happiness remains positive and statistically significant under both approaches, the main finding is not sensitive to the choice of panel estimator.

The Hausman test reported a chi-square statistic of 0.000 with a p-value of 1.000. Although this result is unusually close to zero, the test was verified, and the reported outcome

reflects the estimated covariance difference between the fixed-effects and random-effects specifications. Thus, the result does not provide statistical evidence against the null hypothesis that the random-effects estimator is consistent. Nevertheless, given the potential for unobserved country-specific heterogeneity to be correlated with the explanatory variables, the fixed-effects estimates are retained as an important benchmark, and the similarity of the happiness coefficient across the two specifications provides an additional robustness check.

Accordingly, the fixed-effects model is treated as the primary specification, given its ability to account for unobserved country-specific heterogeneity that may be correlated with the explanatory variables. The random-effects model is retained as a complementary robustness check. The positive and statistically significant coefficient of happiness in both specifications (0.0373 and 0.0472, respectively) indicates that the main finding is robust to the choice of panel estimator.

For the empirical estimations, the models were estimated using cross-section SUR (PCSE) standard errors with degree-of-freedom correction (d.f. corrected) in EViews. This approach provides robust inference when the panel may exhibit cross-sectional dependence and heteroskedasticity across countries. The high within-model explanatory power of the fixed-effects specification (R^2 = 0.993289) and the statistically significant F-statistic ($p < 0.001$) indicate strong overall explanatory power. The random-effects model also yields a statistically significant overall F-statistic ($p < 0.001$), although its R^2 is substantially lower (0.101194).

Potential multicollinearity was assessed using the variance inflation factor (VIF) based on the auxiliary R^2 obtained from regressing each explanatory variable on the remaining explanatory variables. As reported in Table 5, all VIF values are close to 1 and well below the conventional threshold of 5, indicating that multicollinearity does not represent a concern in the estimated specification. The VIF values range from 1.0145 for the COVID-19 control variable to 1.2443 for happiness, confirming that the explanatory variables are not strongly linearly correlated with one another.

Table 5. Multicollinearity test.

Independent Variables	Auxiliary R^2	VIF
Happiness	0.1963	1.2443
Physical capital	0.0733	1.0791
Government expenditure	0.0953	1.1054
Trade openness	0.1093	1.1228
Inflation	0.0865	1.0974
COVID-19	0.0143	1.0145

In particular, the COVID-19 variable exhibits an extremely low auxiliary R^2 (0.0143) and a VIF of 1.0145, indicating that its inclusion as a control for the exceptional macroeconomic shock associated with the COVID-19 pandemic does not introduce multicollinearity into the model. Thus, the estimated coefficients can be interpreted without evidence that excessive linear dependence among the explanatory variables distorts the regression results.

Because panel data combine cross-sectional and time-series dimensions, the estimated relationship may potentially be affected by spurious regression. To assess this possibility, a residual-based panel unit-root test was applied to the residuals obtained from the final random-effects specification. The null hypothesis is that the residuals contain a unit root and are therefore non-stationary. Rejection of this null hypothesis indicates that the residuals are stationary, providing evidence against the possibility that the estimated relationship is purely spurious.

Table 6 reports the results of three residual-based panel unit-root tests. The Levin, Lin and Chu test rejects the null hypothesis of a common unit root ($p = 0.0035$). The ADF-Fisher and PP-Fisher tests also reject the null hypothesis of individual unit roots, with p-values of 0.0010 and 0.0000, respectively. The consistent rejection of the unit-root null across all three procedures indicates that the residuals are stationary.

Table 6. Unit-root test of the residuals.

Method	Statistic	Prob.
Null: Unit root (assumes common unit root process):		
Levin, Lin & Chu t	−2.70147	0.0035
Null: Unit root (assumes individual unit root process):		
ADF—Fisher chi-square	120.046	0.0010
PP—Fisher chi-square	185.636	0.0000

These results provide evidence against a spurious regression and support the stability of the estimated empirical relationship between happiness and GDP per capita. Importantly, the purpose of this residual-based analysis is to assess whether the estimated relationship may be spurious, rather than to characterize it as a formal long-run cointegrating relationship. Accordingly, the results are interpreted cautiously as evidence that the estimated association is not driven solely by common non-stationary trends.

4. Discussion

This study finds that the Global Happiness Index is positively and statistically significantly associated with GDP per capita across Asian countries. Because the dependent variable is measured as the natural logarithm of GDP per capita, the estimated coefficient represents a semi-elastic association between happiness and the level of per capita income. Thus, higher levels of happiness are associated with higher GDP per capita, conditional on the other variables included in the empirical specification. Because no directly comparable study covers Asia as a whole, the result cannot be contrasted with an equivalent continental analysis. However, it differs partially from the study by Saida et al. (2021), who estimate a statistically non-significant association between happiness and GDP per capita in member countries of the Association of Southeast Asian Nations. At the same time, the present findings are consistent with country-level evidence reported by Abdillah and Maulana (2023) for Indonesia, Abdalaa et al. (2022) for Iraq, Mohamad et al. (2021) for Malaysia, and Esmail and Shili (2018) for the Jazan region of Saudi Arabia.

An additional feature of the empirical specification is the inclusion of a COVID-19 dummy as a structural control for the exceptional macroeconomic shock associated with the pandemic period. The indicator captures the common disruption experienced by the countries in the sample during 2020 and helps separate the association between happiness and GDP per capita from the extraordinary economic and social conditions generated by the pandemic. This control is particularly important because COVID-19 simultaneously affected economic activity, employment, productivity, investment, and subjective well-being. By explicitly controlling for the pandemic shock, the estimated happiness coefficient is less likely to reflect temporary changes associated specifically with the exceptional conditions of 2020. The COVID-19 coefficient itself is statistically insignificant in the estimated fixed-effects and random-effects specifications, suggesting that, after accounting for country-specific effects and the other covariates, the pandemic dummy does not independently explain a statistically significant difference in the level of GDP per capita in the estimated models.

The positive association between happiness and GDP per capita is also broadly consistent with the 2025 rankings of Asian countries on both variables. Singapore, which has the highest GDP per capita in Asia, ranked second in the happiness index, whereas Afghanistan, which ranked last in happiness, recorded the second-lowest GDP per capita in Asia (International Monetary Fund, 2026; Heritage Foundation, 2026). This descriptive comparison is consistent with the positive association identified in the panel estimates, although it should not be interpreted as evidence of structural causality.

The theoretical model developed in this study provides two possible channels through which happiness may be associated with GDP per capita: labor productivity and technological progress. These mechanisms provide a theoretical interpretation of the positive empirical association, rather than direct evidence that happiness structurally causes changes in GDP per capita.

Labor productivity is one of the main determinants of differences in aggregate economic performance and per capita income (Lacey, 2022; Kalkavan et al., 2021). Mahmud and Rashid (2006), for example, document a strong unidirectional relationship running from productivity to economic performance. Higher labor productivity allows a greater quantity of goods and services to be produced with a given amount of labor and productive resources. At the aggregate level, this greater productive efficiency can therefore contribute to higher output and GDP per capita.

A broad body of empirical evidence indicates that happiness is positively and statistically significantly associated with labor productivity. Higher happiness may improve concentration, effort, and work commitment while reducing fatigue, absenteeism, and burnout. These mechanisms can contribute to greater worker productivity (Fang et al., 2026; Mendoza et al., 2024; Pratiwi & Setiyowati, 2024; Mahnaz & Sgroi, 2023). Consequently, the positive association between happiness and GDP per capita identified in this study may partly reflect differences in labor productivity across countries.

The relationship may also involve investment in physical capital. Happiness has been associated with greater investor tolerance for risk, which can encourage the financing of larger-scale projects. Higher investment can subsequently increase the stock of physical capital and raise productive capacity and labor productivity (W. Liu et al., 2025; Mimura, 2023). In this sense, the positive association between happiness and GDP per capita may also be consistent with a broader interaction between subjective well-being, investment decisions, capital accumulation, and productive efficiency. As argued by Burhan et al. (2023), happiness can be related to macroeconomic outcomes through its association with labor productivity.

A second theoretical channel concerns innovation and technological progress. Innovation and technological development are fundamental determinants of differences in economic performance and per capita income (OECD, 2026). Happiness may be related to technological development (Ying & Xiao, 2025; Popescu & Reis Mourão, 2024) and research and development activities (Chuluun & Graham, 2016). These relationships provide a possible explanation for why countries with higher levels of happiness may also exhibit higher levels of GDP per capita.

Creativity represents one potential mechanism linking happiness to innovation. Positive emotions and optimism can increase cognitive flexibility and intrinsic motivation, thereby supporting worker creativity (C. S. Tan et al., 2025; C. Y. Tan et al., 2021). Greater creativity can facilitate the development of new products and processes, the generation of new ideas, and the implementation of organizational changes that support technological innovation (Acar et al., 2024; Lu et al., 2024; S. Rahman et al., 2024). Accordingly, differences in happiness may be associated with differences in innovative capacity and, ultimately, in GDP per capita.

Happiness may also be related to technological progress through social capital. Higher levels of subjective well-being can strengthen interpersonal trust, cooperation, relational capital, reciprocity, and support networks (Akaeda, 2025). A greater stock of social capital can, in turn, facilitate technological progress (Goletsis et al., 2025), suggesting a potential connection among happiness, social capital, innovation, and per capita income (Bartolini & Sarracino, 2014).

Human capital constitutes another potential channel. Human capital facilitates the adoption of advanced technologies, knowledge creation, patent production, technology diffusion, the productivity of research and development activities, and innovation efficiency (W. Li et al., 2024; T. Liu et al., 2023). At the same time, happiness may contribute to human-capital accumulation by increasing enthusiasm, commitment, and discipline during learning processes (Dong et al., 2025; Wong et al., 2024). Consequently, the relationship between happiness and GDP per capita may partly reflect differences in human capital and technological capabilities across Asian economies.

Together, these mechanisms provide a coherent theoretical explanation for the positive association identified in the panel estimates. Nevertheless, because the empirical specification does not establish a structural causal effect of happiness on GDP per capita, these mechanisms should be interpreted as theoretically plausible channels rather than as mechanisms directly identified by the econometric estimates.

The temporal relationship between the two variables provides an additional perspective. The Dumitrescu–Hurlin panel causality test indicates a unidirectional predictive relationship running from GDP per capita to happiness. Specifically, the null hypothesis that GDP per capita does not homogeneously precede happiness is rejected, whereas the null hypothesis that happiness does not homogeneously precede GDP per capita cannot be rejected. Therefore, the results indicate that past values of GDP per capita contain predictive information about subsequent happiness, while the reverse predictive relationship is not supported by the test.

Because no previous study has examined this relationship for Asian countries as a whole, the findings cannot be directly compared with continent-wide evidence. Nevertheless, Y. Y. Lee and Goh (2023), using a sample of 104 countries that included several Asian economies, report evidence of bidirectional Granger causality between happiness and GDP per capita. The difference between their result and the present finding may reflect differences in country coverage, sample period, model specification, lag structure, or the degree of heterogeneity across countries.

At the individual-country level, C. G. Lee et al. (2013), in an analysis of Japan, find that GDP affects happiness, whereas happiness does not exert a statistically significant effect on economic performance. This evidence is particularly relevant to the present results because the direction identified for the Asian panel is also from GDP per capita to happiness. The present findings therefore provide regional evidence consistent with the possibility that higher material living standards precede changes in reported subjective well-being.

The predictive relationship from GDP per capita to happiness is also consistent with findings reported by Dang et al. (2024) for Southeast Asia, Cai et al. (2022) for mainland China, Titisari and Santoso (2025) for Indonesia, and Anitasari and Ariska (2025) for the island of Sumatra. These studies provide supporting evidence for a relationship in which economic conditions are associated with subsequent changes in subjective well-being. However, the present results do not support a bidirectional predictive relationship within the 37-country Asian panel. Therefore, the evidence does not justify describing the relationship as a virtuous feedback loop.

The findings indicate a positive and statistically significant association between happiness and GDP per capita, while the temporal evidence points from GDP per capita to

happiness in the Dumitrescu–Hurlin predictive framework. The inclusion of the COVID-19 dummy as a structural control further helps to distinguish the estimated relationship from the exceptional macroeconomic conditions associated with the pandemic period.

The results therefore suggest that the relationship between subjective well-being and material living standards in Asia is complex and involves both contemporaneous association and temporal predictive precedence. The theoretical mechanisms involving productivity, investment, innovation, social capital, and human capital provide plausible explanations for the positive association between happiness and GDP per capita, but they should not be interpreted as directly identified structural causal channels. The empirical evidence is more appropriately characterized as a positive panel association combined with unidirectional predictive precedence from GDP per capita to happiness.

5. Conclusions

Asia is the world's largest and most populous continent and exhibits pronounced cross-country differences in both GDP per capita and happiness. Using panel data for 37 Asian countries over the 2013–2023 period, this study finds that happiness is positively and statistically significantly associated with GDP per capita. Because the dependent variable is measured as the natural logarithm of GDP per capita, this coefficient represents a semi-elasticity association rather than an elasticity.

Within the theoretical model developed in the study, the positive relationship between happiness and GDP per capita may operate through labor productivity, innovation, and technological progress. These mechanisms provide plausible theoretical channels for the observed association but should not be interpreted as directly identified structural causal effects.

The empirical results further show that the COVID-19 dummy variable, included as a structural control for the exceptional pandemic shock, is not statistically significant in the estimated models. The Dumitrescu–Hurlin panel causality test indicates a unidirectional predictive relationship from GDP per capita to happiness. Thus, higher GDP per capita precedes higher reported happiness, whereas the reverse predictive relationship is not supported. Consequently, the results do not provide evidence of a bidirectional predictive relationship or a virtuous feedback loop.

These findings suggest that policies aimed at improving material living standards, productivity, human capital, innovation, and working conditions may also contribute to higher levels of subjective well-being. However, the results do not establish whether policies aimed at increasing happiness would necessarily increase GDP per capita.

The main contribution of this study is to provide macroeconomic evidence on the relationship between happiness and GDP per capita across Asian countries as a whole, an area in which previous research has focused mainly on individual countries or specific regions. Future research could extend this analysis by incorporating a microeconomic perspective, considering additional non-economic determinants, allowing for greater cross-country heterogeneity, and extending the period of analysis as more comparable data become available.

An important limitation of this study concerns the generalizability of the findings. Because the analysis focuses exclusively on Asian countries, the estimated relationship between happiness and GDP per capita should not be automatically generalized to other regions of the world. Future research could extend the analysis to other regions to determine whether the observed relationship also holds beyond Asia.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Countries and Study Period.

No	Country	Period
1	Afghanistan	2013–2023
2	Armenia	2013–2023
3	Azerbaijan	2013–2023
4	Bahrain	2013–2023
5	Bangladesh	2013–2023
6	Bhutan	2013–2023
7	Cambodia	2013–2023
8	China	2013–2023
9	Cyprus	2013–2023
10	Georgia	2013–2023
11	India	2013–2023
12	Indonesia	2013–2023
13	Iran	2013–2023
14	Israel	2013–2023
15	Japan	2013–2023
16	Jordan	2013–2023
17	Kazakhstan	2013–2023
18	Kuwait	2013–2023
19	Kyrgyzstan	2013–2023
20	Lebanon	2013–2023
21	Malaysia	2013–2023
22	Mongolia	2013–2023
23	Nepal	2013–2023
24	Oman	2013–2023
25	Pakistan	2013–2023
26	Philippines	2013–2023
27	Russia	2013–2023
28	Saudi Arabia	2013–2023
29	Singapore	2013–2023
30	South Korea	2013–2023
31	Sri Lanka	2013–2023
32	Tajikistan	2013–2023
33	Thailand	2013–2023
34	Türkiye	2013–2023
35	United Arab Emirates	2013–2023
36	Uzbekistan	2013–2023
37	Vietnam	2013–2023

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