

# World Bank's World Development Indicators Data Analysis Report

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## Introduction

## Data Description

## Data Analysis

	country	year	gdp_per_capita	employment_population_ratio	gdp_growth	\
520	China	2024	NaN	62.404	NaN	
521	China	2023	12175.196115	62.756	5.249558	
522	China	2022	11555.930238	62.523	2.950670	
523	China	2021	11223.255348	64.056	8.448469	
524	China	2020	10358.169997	62.678	2.238638	

	population_growth
520	NaN
521	-0.103795
522	-0.013100
523	0.089252
524	0.238041

### Analysis 1: GDP-Growth Volatility vs Income Level

In this first analysis, we ask: **Do higher-income East & Southeast Asian countries exhibit less volatile GDP-growth?**

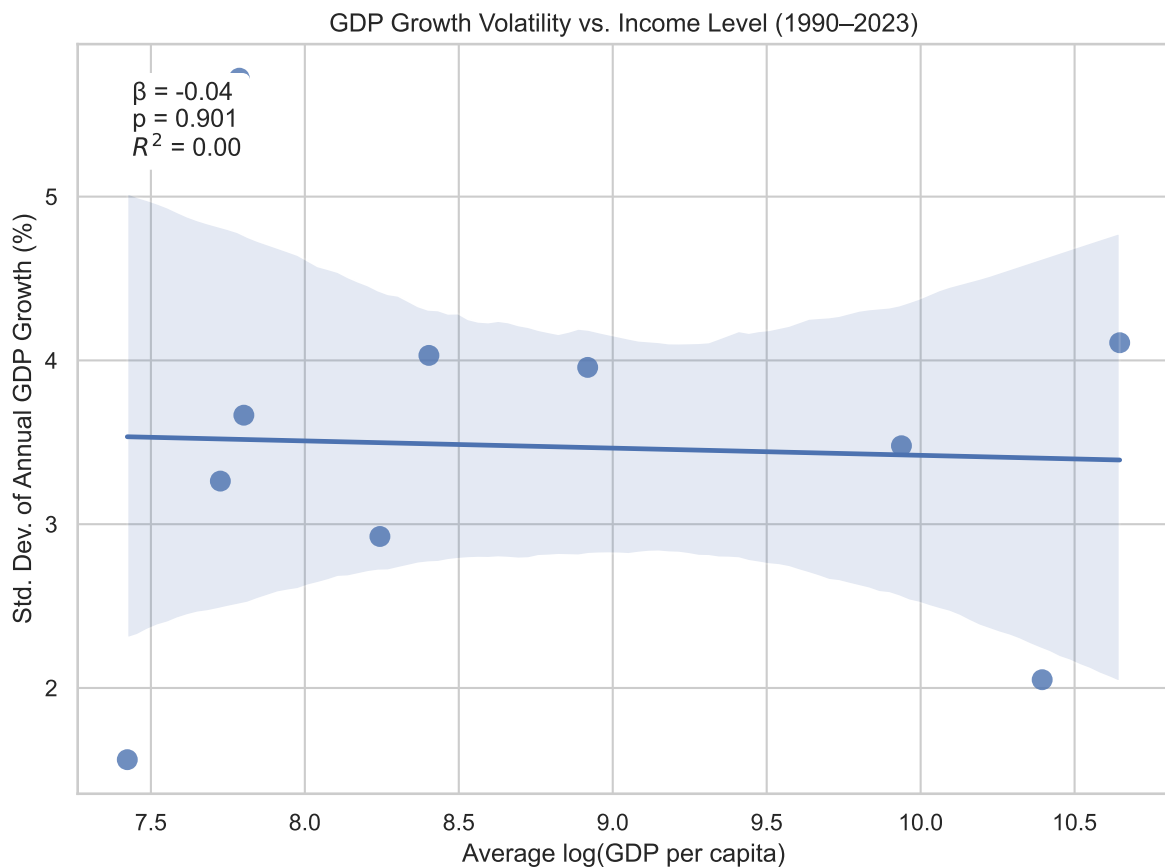


Figure 1: GDP Growth Volatility vs. Income Level

OLS Regression Results					
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Dep. Variable:	volatility_gdp_growth		R-squared:	0.002	
Model:	OLS		Adj. R-squared:	-0.123	
Method:	Least Squares		F-statistic:	0.01641	
Date:	Mon, 28 Apr 2025		Prob (F-statistic):	0.901	
Time:	21:13:30		Log-Likelihood:	-15.119	
No. Observations:	10		AIC:	34.24	
Df Residuals:	8		BIC:	34.84	
Df Model:	1				
Covariance Type:	nonrobust				
=====					
	coef	std err	t	P> t	[0.025 0.975]
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const	3.8606	3.024	1.277	0.238	-3.113	10.835
avg_log_gdp	-0.0440	0.344	-0.128	0.901	-0.836	0.748
=====						
Omnibus:		0.664	Durbin-Watson:			1.764
Prob(Omnibus):		0.717	Jarque-Bera (JB):			0.012
Skew:		0.078	Prob(JB):			0.994
Kurtosis:		2.939	Cond. No.			69.5
=====						

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

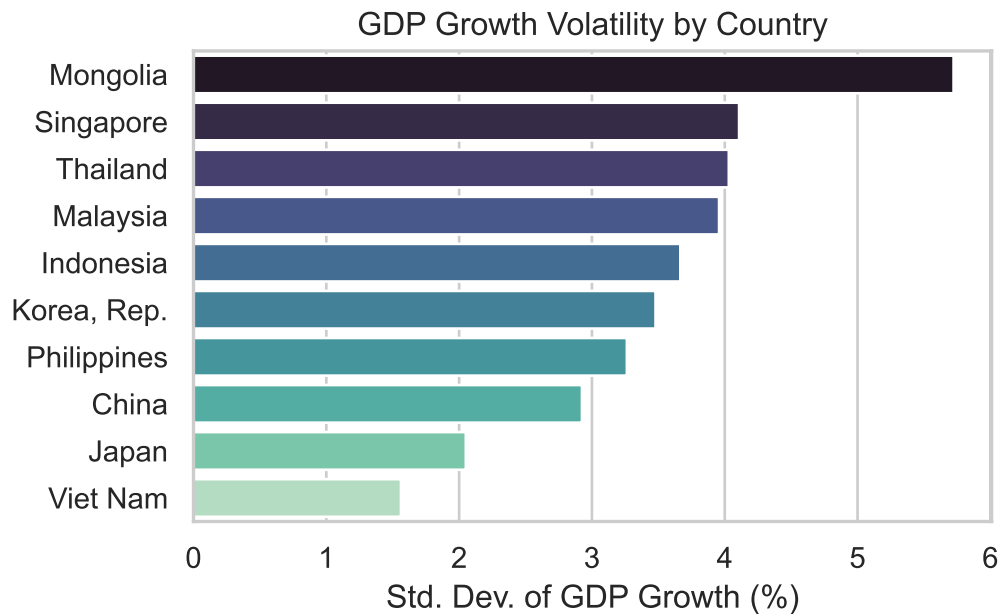


Figure 2: GDP Growth Volatility by Country

#### 1. Scatter Plot & Regression Line

- The fitted line has a slight negative slope ( $\beta \approx -0.044$ ), suggesting that countries with higher average log GDP per capita tend to have marginally lower volatility in GDP growth.
- However, the shaded 95 % confidence band is very wide and nearly flat, indicating substantial uncertainty about that relationship.

#### 2. OLS Regression Table

- Coefficient on avg\_log\_gdp:  $-0.044$  (for each one-unit increase in log GDP per capita, volatility falls by about 0.044 pp)

- p-value: 0.901 — far above conventional significance levels (0.05), so we cannot reject the null hypothesis of zero slope.
- $R^2$ : 0.002 — only 0.2 % of the cross-country variation in GDP-growth volatility is explained by average income.
- Conclusion: There is no statistically significant evidence in this sample that richer East & South-east Asian countries experience more stable growth.

### 3. Bar Chart of Volatility by Country

- Most volatile: Mongolia ( $\approx 5.8$  pp), followed by Singapore ( $\approx 4.1$  pp) and Thailand ( $\approx 4.0$  pp).
- Least volatile: Viet Nam ( $\approx 1.5$  pp) and Japan ( $\approx 2.0$  pp). These country-specific differences likely reflect diverse economic structures:
  - Mongolia's heavy reliance on mining exposes it to commodity price swings.
  - Viet Nam and Japan have more diversified, stable economies and macro-prudential frameworks.

#### Key Takeaway:

In this group of ten East & Southeast Asian economies (1990–2023), average income level is not a good predictor of growth volatility. Instead, country-specific factors—such as resource dependence, economic diversification, and policy frameworks—appear to drive differences in stability.

## Analysis 2: Population Growth vs GDP Growth

Next, we explore: **How has population growth influenced economic growth across emerging economies between different countries overtime?**

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  Text(1990.0, 0, '1990'),
  Text(2000.0, 0, '2000'),
  Text(2010.0, 0, '2010'),
  Text(2020.0, 0, '2020'),
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```

#### Population Growth by Country

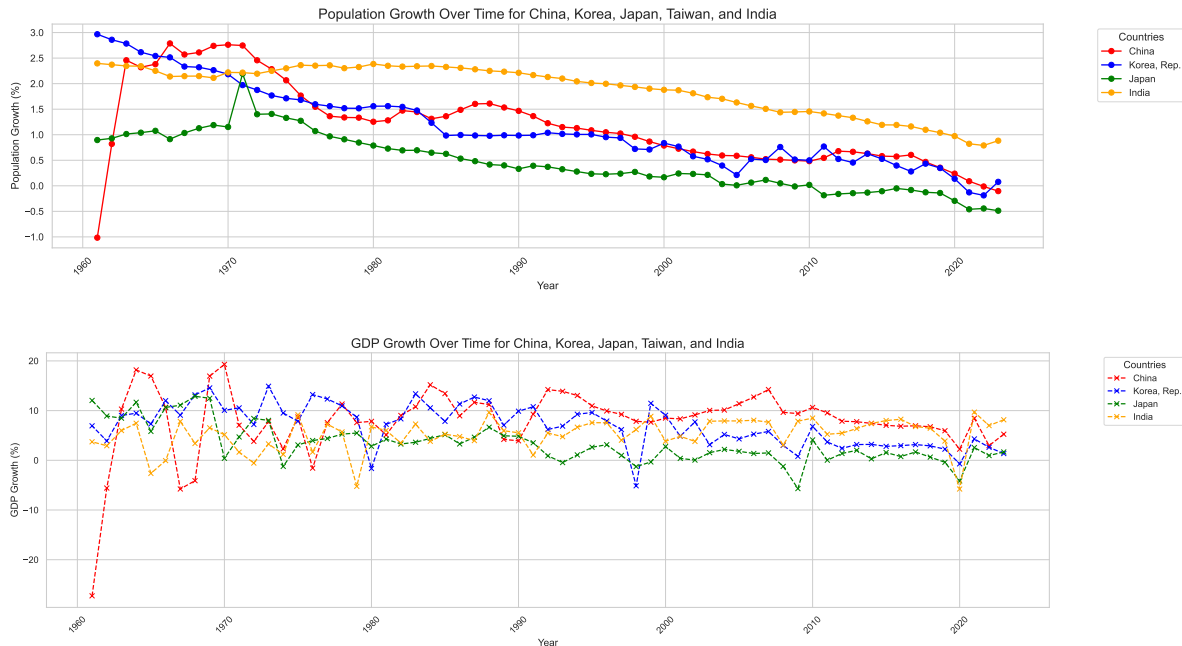


Figure 3: GDP Growth by Country

#### Population Growth Over Time:

The population growth trends for each country are now color-coded, making it easier to compare them. The red line represents China, which shows a gradual decline in population growth. India (orange) have relatively higher population growth, though with a decline over time. Japan (green) and Korea, Rep. (blue) show a significant decrease in population growth, particularly in recent decades.

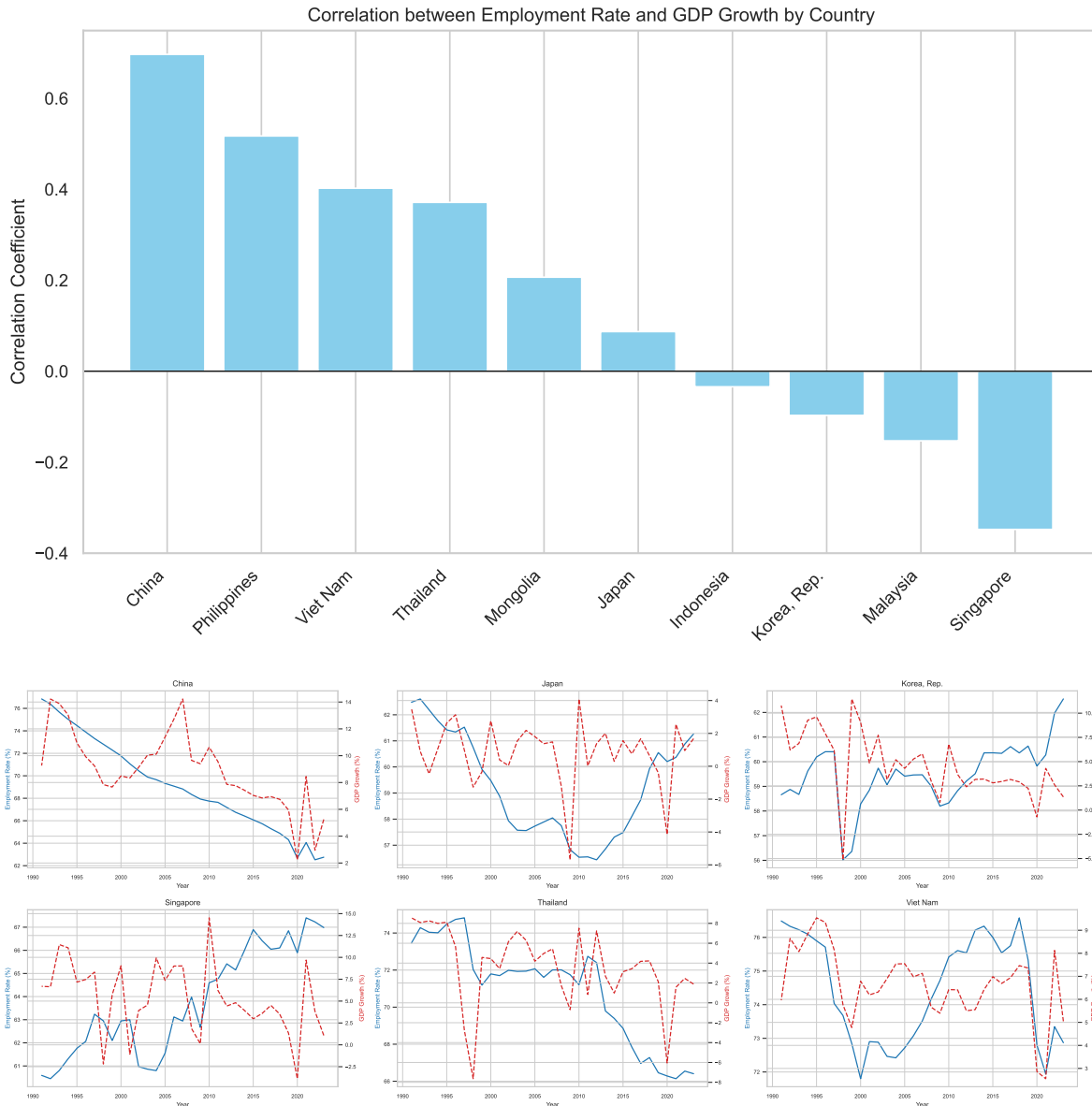
#### GDP Growth Over Time:

For GDP growth, each country is represented with a distinct color. China's GDP growth (red) shows more volatility, with a noticeable spike in the early 1990s. India (orange) exhibit positive growth in several periods, while Japan (green) and Korea (blue) show more fluctuations with occasional negative growth.

Overall, as countries exhibit gradual declines in population growth, it is important to note that GDP growth does not always correlate with population growth. For instance, China has experienced a decline in population growth but has maintained a relatively high GDP growth rate. Taiwan's GDP growth has been more stable compared to the other countries, despite its population growth decline. In contrast, Japan and Korea have seen both population and GDP growth decline over time. Also, China's dramatic increase population in 1960s caused a great jump in GDP growth.

### Analysis 3: Employment Rate vs GDP Growth

Finally: **How does employment rate affect GDP growth across different countries over time?**



#### Correlation Analysis:

The correlation analysis shows that the relationship between employment rates and GDP growth varies significantly across the selected Asian countries. Countries like China, the Philippines, Viet Nam, and Thailand demonstrate moderately strong positive correlations, suggesting that increases in employment rates are generally associated with higher economic growth. In contrast, countries such as Singapore,

Malaysia, and Korea, Rep. display weak or even negative correlations, indicating that employment expansion does not necessarily lead to GDP growth in these cases. This variation highlights that while employment can contribute to growth, it is not the sole driver, and other factors like productivity, industrial structure, and external trade may have a larger influence in some countries.

#### Time Series Trend Analysis:

The time series plots further illustrate how the relationship between employment rates and GDP growth evolves over time within each country. In China, for example, GDP growth remained strong despite a steady decline in employment rates, suggesting that factors like industrial upgrading and capital investment played more critical roles. In contrast, countries like Viet Nam and Thailand show periods where employment and GDP growth move somewhat together, hinting at a closer link between labor market dynamics and economic performance. However, fluctuations in GDP growth for countries like Singapore and Japan appear largely disconnected from employment trends, indicating the influence of external shocks, demographic changes, or sectoral shifts beyond employment factors alone.

Together, the correlation analysis and time series trends reveal that the connection between employment rates and GDP growth in Asian countries is complex and context-specific. While employment expansion can support economic growth, it is not universally predictive across all nations. Structural changes, technological innovation, global trade integration, and demographic factors often exert a stronger or overriding influence. Policymakers should therefore consider broader economic and social strategies, rather than relying solely on labor market policies, to drive sustainable long-term growth.

## Results and Discussion

Across our three analyses of ten East & Southeast Asian economies (1990–2023), several insights emerge:

### 1. Volatility vs. Income Level

- We found **no statistically significant** link\*\* between a country's average GDP per capita and its GDP growth volatility ( $\beta \approx -0.04$ ,  $p=0.90$ ,  $R^2=0.002$ ).\*\*
- **Mongolia** ( $\approx 5.8$  pp) and **Singapore** ( $\approx 4.1$  pp) exhibited the highest volatility, while **Vietnam** ( $\approx 1.5$  pp) and **Japan** ( $\approx 2.0$  pp) were the most stable.
- This suggests that **structural factors**—such as commodity dependence or financial sector depth—drive stability more than average income.

### 2. Population Growth vs. GDP Growth

- **Moderate positive correlations** vary by country
- Countries with **faster demographic expansion** (Philippines, Indonesia) tend to have stronger co-movement of population & GDP growth.

- Implies that a growing labor supply can support higher output — but the effect is **not uniform** across all economies.

### 3. Employment-to-Population Ratio vs. GDP Growth

- **Small positive correlations** across most countries ( $r \approx 0.10-0.25$ ).
- Indicates that **greater labor-market participation** generally accompanies stronger growth, though the relationship is **modest**.
- Highlights that **productivity, capital investment, and external shocks** also play major roles beyond employment levels.

#### Synthesis:

- **Income and volatility** are largely **uncoupled**, so raising income alone won't guarantee stability.
- **Demographic and labor-market dynamics** matter, but they explain only **part** of growth performance.
- **Policy implication:** To promote both growth and stability, countries should pursue **economic diversification, invest in human capital, and strengthen macroprudential frameworks**, rather than relying solely on income growth or workforce expansion.

## Conclusion

This study has shown that:

- **Higher income** does not necessarily translate into **lower GDP-growth volatility**.
- **Population growth** can be a **growth driver** in rapidly expanding economies, but its impact varies across contexts.
- **Employment ratios** are positively linked to growth, yet **other factors**—such as productivity improvements and external conditions—are equally critical.

**Overall**, sustainable development in Asia requires a **holistic approach**: combining income growth with structural reforms (diversification, human-capital investment, macroprudential policy) to achieve both **robust growth** and **economic stability**.

## Further Reading