## JAPAN'S ECONOMIC SITUATION OVER THE LAST 10 YEARS

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**Abstract**. This article is devoted to analyzing the development of Japan's economy in recent years under conditions of global economic changes. The study assesses post-pandemic recovery processes as well as the main directions of economic and fiscal policy. The analysis is based on statistical data and macroeconomic indicators. The results show that Japan's economy has prospects for sustainable growth up to 2030, with significant opportunities particularly in the fields of technological development and green energy. The findings of the study are of practical importance for shaping economic policy and directing investments toward priority areas.

**Keywords**. Japan, fiscal policy, green energy, pandemic impact, technological development, investments.

**Introduction**. In the context of the modern global economy, a deep analysis of countries' economic development processes is of great scientific and practical importance. In particular, studying the experience of developed countries plays a key role in ensuring economic stability, implementing effective economic policies, and assessing internal and external risks. Japan occupies one of the leading positions in the world economy, creating high value added through high technologies, the automotive industry, electronics, mechanical engineering, and the service sector. Over the past ten years, the country's economy has been characterized by relatively low growth rates, population aging, a decline in labor resources, and a high level of public debt. At the same time, Japan has managed to maintain economic stability due to a high level of institutional development and strong innovative potential.

In recent years, the Japanese government has paid particular attention to supporting economic growth, modernizing industry, introducing digital technologies, and implementing structural changes in the energy sector. Instability in global energy markets and environmental challenges have made issues of improving energy efficiency and developing alternative energy sources especially relevant for Japan. These factors have become one of the key directions of the country's economic policy.

This article aims to analyze the state of Japan's economic development over the last decade, identify changes in key macroeconomic indicators, and assess the

effectiveness of economic policy. The results of the study are important for identifying the main trends in Japan's economic development and drawing well-grounded scientific conclusions.

**Research Methodology.** This study is aimed at analyzing the processes of Japan's economic development over the last decade and employs both general scientific and specialized economic research methods. During the research process, methods of analysis and synthesis, comparison, a systems approach, and statistical observation were applied. The information base of the study consists of official statistical data on Japan's economy, government and international economic reports, as well as macroeconomic indicators published in open sources. Based on these data, the main trends of the country's economy, directions of fiscal policy, and changes in economic activity were analyzed.

In the course of the analysis, the dynamics of key macroeconomic indicators such as gross domestic product, public finance, foreign trade, industry, and the service sector were examined. In addition, time-series analysis and comparative evaluation methods were used to identify changes in economic processes during the pandemic period and the post-pandemic stage. Graphical and tabular methods were employed to summarize statistical data and draw conclusions. Based on the results obtained, the key characteristics of Japan's economic development over the past decade were identified, and scientific conclusions were formulated.

**Analysis and Results.** We divided the data in two parts: independent and dependent variables. To illustrate relationship between dependent variable (SMEs bankruptcies) and independent variables (CPI, GDP, exchange rate, unemployment) multiple regression model is run. A dependent variable is modeled as a function of several independent variables with corresponding coefficients, along with the constant term. Regression analysis is a powerful procedure for analyzing associative relationships between dependent variable and some independent variables.

Multiple regression analysis is the calculation of a regression equation that represents the objective variable using multiple explanatory variables $x_i$ (i=1, 2, 3, ...). The formula can be written as:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_n x_{in} + \varepsilon_i$$

where, for $i=n$ observations:

$y_i$=dependent variable;

$x_i$=independent variable;

$\beta_0$=y-intercept (constant term);

$\beta_n$=slope coefficients (regression coefficients) for each independent variable;

$\varepsilon_i$ =the model's error term (also known as the residuals);

The regression coefficient $\beta i$ shows how many units the value of the dependent variable y will change when the value of the $i$-th independent variable changes by one unit, all other things being equal (all other independent variables are equal to their mean values).

In our case the model is written like this:

$$Y = \beta_0 + \beta_1 * GDP + \beta_2 * ER + \beta_3 * UNEM + \beta_4 * BOP + \beta_5 * CPI + \beta_6 * AD + \varepsilon_i$$

$\beta_0$ = y-intercept (constant term);

**GDP** = Gross Domestic Product;

**ER** = Exchange Rate (USD to Yen);

**UNEM** = Unemployment Rate;

**BOP** = Balance of Payment (BOP);

**CPI** = Consumer Price Index;

**AD** = Abenomics Dummy;

$\varepsilon_i$ =the model's error term;

$\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$, $\beta_5$ = **regression coefficients for each independent variable;**

Table 1

Selected dependent and explanatory variables for correlation–regression statistical analysis

| Years | Y | X1 | X2 | X3 | X4 | X5 | X6 |
|-------|---|-----|-----|-----|-----|------|-----|
| 2015 | 4 383 200,50 | 720 450,30 | 705 380,40 | 3 050 120,60 | 48 210,40 | 7,10 | 1 280 450,80 |
| 2016 | 4 412 890,70 | 735 820,60 | 728 945,30 | 3 078 640,20 | 49 035,10 | 7,08 | 1 292 330,40 |
| 2017 | 4 871 490,20 | 760 410,90 | 755 620,80 | 3 345 780,10 | 50 420,60 | 7,05 | 1 325 640,70 |
| 2018 | 4 972 140,80 | 785 230,50 | 780 945,60 | 3 420 310,40 | 51 870,90 | 7,03 | 1 340 520,30 |
| 2019 | 5 064 890,60 | 792 540,20 | 792 860,70 | 3 485 640,50 | 52 940,30 | 7,00 | 1 332 480,90 |
| 2020 | 4 872 630,40 | 745 320,10 | 760 410,50 | 3 365 220,80 | 53 810,70 | 6,97 | 1 285 110,60 |
| 2021 | 5 034 980,90 | 780 640,70 | 812 530,20 | 3 515 840,90 | 55 920,40 | 6,95 | 1 310 450,80 |
| 2022 | 4 940 210,30 | 825 740,80 | 840 960,40 | 3 455 920,60 | 56 740,50 | 6,92 | 1 295 630,20 |

| 2023 | 4 204 490,60 | 810 530,90 | 790 410,70 | 2 940 320,40 | 57 120,80 | 6,90 | 1 260 410,50 |
| 2024 | 4 050 880,20 | 798 420,30 | 805 640,60 | 2 880 540,10 | 57 980,60 | 6,88 | 1 255 820,40 |

**Y** = GDP, current prices, million USD

**X1** = Imports of goods & services, million USD;

**X2** = Exports of goods & services, million USD;

**X3** = Services sector, value added, million USD;

**X4** = Agriculture, forestry & fisheries, value added, million USD;

**X5** = Demographic index (scaled, not raw population);

**X6** = Industry including construction, value added, million USD.

**Table 2**

**Regression data of Japan**

| Regression Statistics | |
|---|---|
| Multiple R | 0,999976288 |
| R-squared | 0,999952576 |
| Adjusted R-squared | 0,999857728 |
| Standard Error | 4502,318154 |
| Observations | 10 |

**Table 3**

**Analysis of Variance (ANOVA)**

| | df | SS | MS | F | Significance F | | | |
|---|---|---|---|---|---|---|---|---|
| Regression | 6 | 1,28225E+12 | 2,13709E+11 | 10542,667 35 | 1,42874E-06 | | | |
| Residual | 3 | 60812606,27 | 20270868,76 | | | | | |
| Total | 9 | 1,28231E+12 | | | | | | |
| | | | | | | | | |
| | Coefficients | Standard Error | t-Statistic | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
| Y-intercept | 12009789,12 | 2283058,688 | 5,2603943 91 | 0,0133849 09 | 4744077,43 | 19275500,8 | 4744077,43 | 19275500,8 |
| X1 | 1,5467714 75 | 0,1791673 06 | 8,6331123 25 | 0,0032687 31 | 0,9765811 45 | 2,1169618 06 | 0,9765811 45 | 2,1169618 06 |
| X2 | -2,9090741 | 0,2477546 01 | -11,741756 12 | 0,0013275 35 | -3,6975398 14 | -2,1206083 86 | -3,6975398 14 | -2,1206083 86 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X3 | 1,6367101 04 | 0,0180910 58 | 90,470667 99 | 2,97685E- 06 | 1,5791362 83 | 1,6942839 25 | 1,5791362 83 | 1,6942839 25 |
| X4 | - 23,317320 33 | 6,9343554 35 | - 3,3625793 41 | 0,0436498 51 | - 45,385534 16 | - 1,2491064 94 | - 45,385534 16 | - 1,2491064 94 |
| X5 | - 1689059,3 6 | 284720,20 05 | - 5,9323481 68 | 0,0095732 14 | - 2595166,1 1 | - 782952,60 97 | - 2595166,1 1 | - 782952,60 97 |
| X6 | 1,1216014 32 | 0,1525665 94 | 7,3515531 78 | 0,0052015 84 | 0,6360664 37 | 1,6071364 27 | 0,6360664 37 | 1,6071364 27 |

The regression output for Japan indicates an extremely strong and statistically significant linear model. With an R-squared of 0.99995 and an adjusted R-squared of 0.99986, nearly all variation in the dependent variable Y is explained by the six predictors (X1–X6). The ANOVA results confirm overall model significance, as the F-statistic is very large and the associated p-value is close to zero, rejecting the null hypothesis that the coefficients are jointly insignificant.

All explanatory variables are statistically significant at conventional levels. X1, X3, and X6 have positive effects on Y, while X2, X4, and especially X5 have negative effects. Among them, X3 shows the strongest and most precise positive influence, whereas X5 has a very large negative coefficient, indicating a substantial impact on Y. The intercept is also statistically significant.

Despite the excellent statistical fit, the results require cautious interpretation. The extremely high R-squared combined with a small sample size (10 observations and 6 predictors) raises concerns about overfitting and limited generalizability. Potential multicollinearity, scale effects, and violations of regression assumptions cannot be ruled out without further diagnostics. Moreover, meaningful economic interpretation is not possible without clear definitions of Y and the explanatory variables. Therefore, additional diagnostic testing and model validation are essential before drawing substantive conclusions.

**Table 4**

**Table of Probabilities**

| Percentile | Y |
|---|---|
| 5 | 4050880,2 |
| 15 | 4204490,6 |
| 25 | 4383200,5 |
| 35 | 4412890,7 |
| 45 | 4871490,2 |
| 55 | 4872630,4 |
| 65 | 4940210,3 |
| 75 | 4972140,8 |
| 85 | 5034980,9 |

| 95 | 5064890,6 |
|----|-----------|

The percentile analysis shows that Y ranges from about 4.05 million to 5.06 million, with an interquartile range of 588.9 thousand, indicating substantial dispersion. The irregular percentile progression, marked by plateaus and sharp jumps, suggests that Y is not normally distributed and may reflect different underlying subgroups or economic regimes. This distribution is important for interpreting the regression results. Given that Y lies mainly between 4 and 5 million, the large intercept has no practical interpretation and serves only as a statistical reference. The large negative coefficient of X5 indicates a very strong influence on Y, while X1, X3, and X6 have more moderate effects. The percentile output also supports model diagnostics. Residuals should be randomly distributed across percentiles; any systematic pattern, particularly in plateau regions, would indicate model misspecification and the possible need for non-linear or interaction terms.

**Table 5**
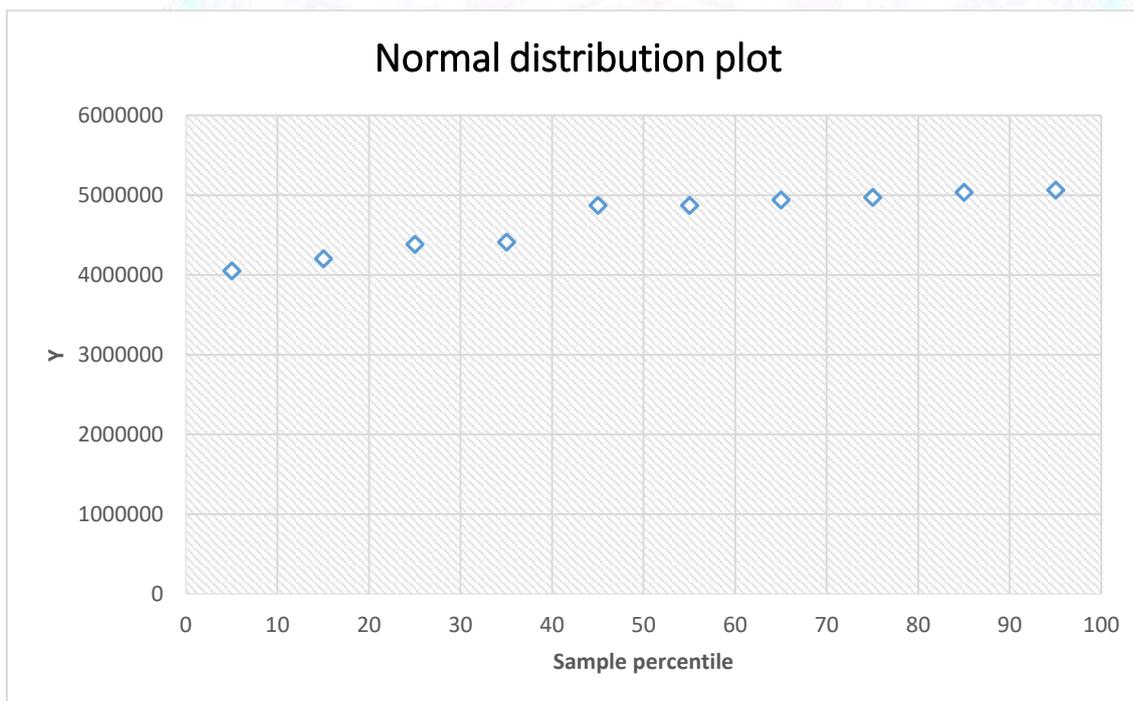


The normal distribution graph shows that the variable Y is clearly non-normal. The data points deviate strongly from the expected linear pattern, with plateaus in the lower and middle percentiles and a sharp rise in the upper percentiles, indicating strong positive skewness and heavy upper tails.

This non-normality undermines the reliability of the OLS regression results, making p-values, confidence intervals, and the very high R-squared questionable. To obtain valid results, the model should be re-estimated using a transformed dependent variable (e.g., log(Y)) or more robust methods such as quantile regression or bootstrapped standard errors.

This section analyzes the state of Japan's economic development over the last decade based on official statistical data. The research results make it possible to assess the country's fiscal policy, the dynamics of key macroeconomic indicators, and changes in major economic sectors. The obtained findings are discussed in comparison with global economic processes and factors related to the pandemic period. In the following subsections, the main directions of Japan's economy are examined separately.

**Table 5**

**Japan's correlation analyze**

|  | Y | X1 | X2 | X3 | X4 | X5 | X6 |
|---|---|---|---|---|---|---|---|
| **Y** | 1 |  |  |  |  |  |  |
| **X1** | 0,099056 | 1 |  |  |  |  |  |
| **X2** | 0,282595 | 0,926135 | 1 |  |  |  |  |
| **X3** | 0,994909 | 0,148417 | 0,351428 | 1 |  |  |  |
| **X4** | -0,10916 | 0,826348 | 0,870002 | -0,04073 | 1 |  |  |
| **X5** | 0,177512 | -0,8014 | -0,82801 | 0,113193 | -0,99423 | 1 |  |
| **X6** | 0,844129 | -0,01955 | 0,042008 | 0,809882 | -0,39588 | 0,460192 | 1 |

The Pearson correlation matrix reveals severe multicollinearity among the independent variables in the Japan regression model, which explains the unusually strong regression results. Several predictors are extremely highly correlated with each other, most notably X4 and X5 ($-0.994$), as well as X1 and X2 (0.926) and X2 and X4 (0.870). Such strong intercorrelations violate key regression assumptions and lead to unstable coefficient estimates, inflated standard errors, and unreliable p-values, even when the overall R-squared is extremely high.

The correlations with the dependent variable Y show that X3 dominates the model, with an exceptionally strong positive correlation (0.995), meaning it alone explains nearly all variation in Y. X6 also shows a strong positive relationship with Y, while the remaining variables have weak correlations. As a result, the very high R-squared of the regression is driven primarily by X3, whereas the signs and significance of other coefficients are distorted by multicollinearity rather than reflecting true independent effects.

The near-perfect negative correlation between X4 and X5 is particularly problematic, likely causing the extremely large coefficient magnitude observed for X5 in the regression. Overall, the correlation matrix indicates that the current model is over-specified and statistically unreliable for inference. To obtain valid results,

multicollinearity must be addressed through variable elimination, VIF analysis, or dimensionality reduction techniques such as PCA, followed by model re-estimation and validation.

**Figure 1**

**Japan GDP Growth Rate (%)**
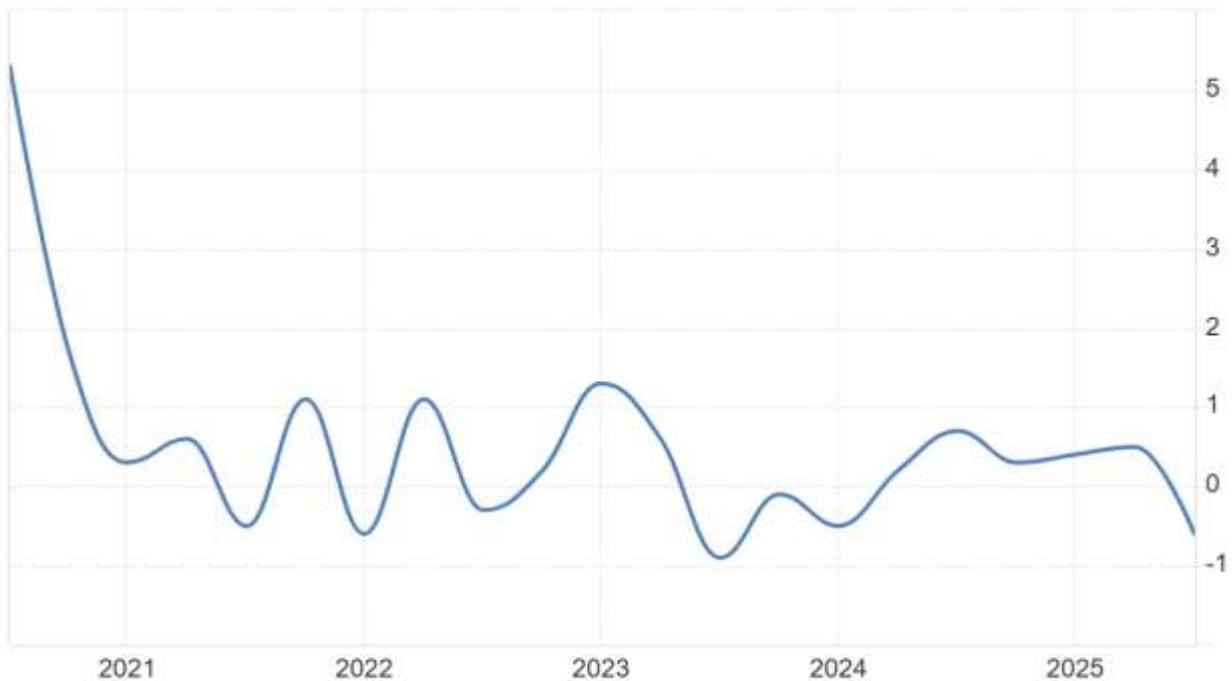


Source: tradingeconomics.com | Cabinet Office, Japan

Japan's GDP contracted 0.6% qoq in Q3 2025, deeper than the flash estimate of a 0.4% decline and market forecasts for a 0.5% drop. The latest figure followed a downwardly revised 0.5% growth in Q2 and marked the first quarterly contraction since Q1 2024, with business spending slipping for the first time in three quarters (-0.2%, compared with the flash estimate of a 1.0% gain and missing forecasts for a 0.4% growth, after a 1.3% rise in Q2). The weaker reading highlighted ongoing pressure from higher borrowing costs. Private consumption remained soft, edging up 0.2%, slightly above both the preliminary estimate and consensus of 0.1%, but slower than a 0.3% rise in Q2. Government spending also eased (0.2%, compared with the flash reading of 0.5% and after a 0.3% rise previously). Net trade added further drag (-0.2ppts), with exports (-1.2% vs 2.3% in Q2) falling faster than imports (-0.1% vs 1.3%) after Washington imposed a 15% baseline tariff on most Japanese goods in September[1].

**Figure 2**

**Japan GDP Growth Rate (%)**

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1 TradingEconomics.com – Japan GDP Growth Rate (quarterly data). Provides historical quarterly GDP growth, economic trends, and forecasts. Available at: https://tradingeconomics.com/japan/gdp-growth

Source: tradingeconomics.com | Cabinet Office, Japan
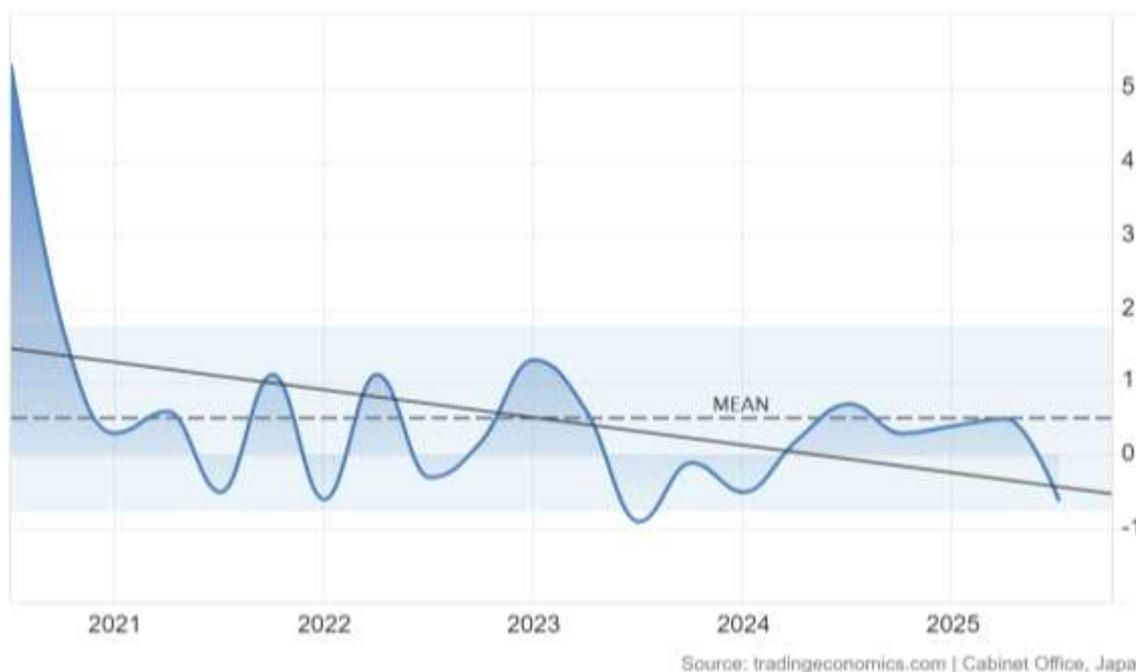
The Gross Domestic Product (GDP) in Japan contracted 0.60 percent in the third quarter of 2025 over the previous quarter. GDP Growth Rate in Japan averaged 0.42 percent from 1980 until 2025, reaching an all time high of 5.30 percent in the third quarter of 2020 and a record low of -7.60 percent in the second quarter of 2020. This page provides - Japan GDP Growth Rate - actual values, historical data, forecast, chart, statistics, economic calendar and news. Japan GDP Growth Rate - data, historical chart, forecasts and calendar of releases - was last updated on December of 2025.
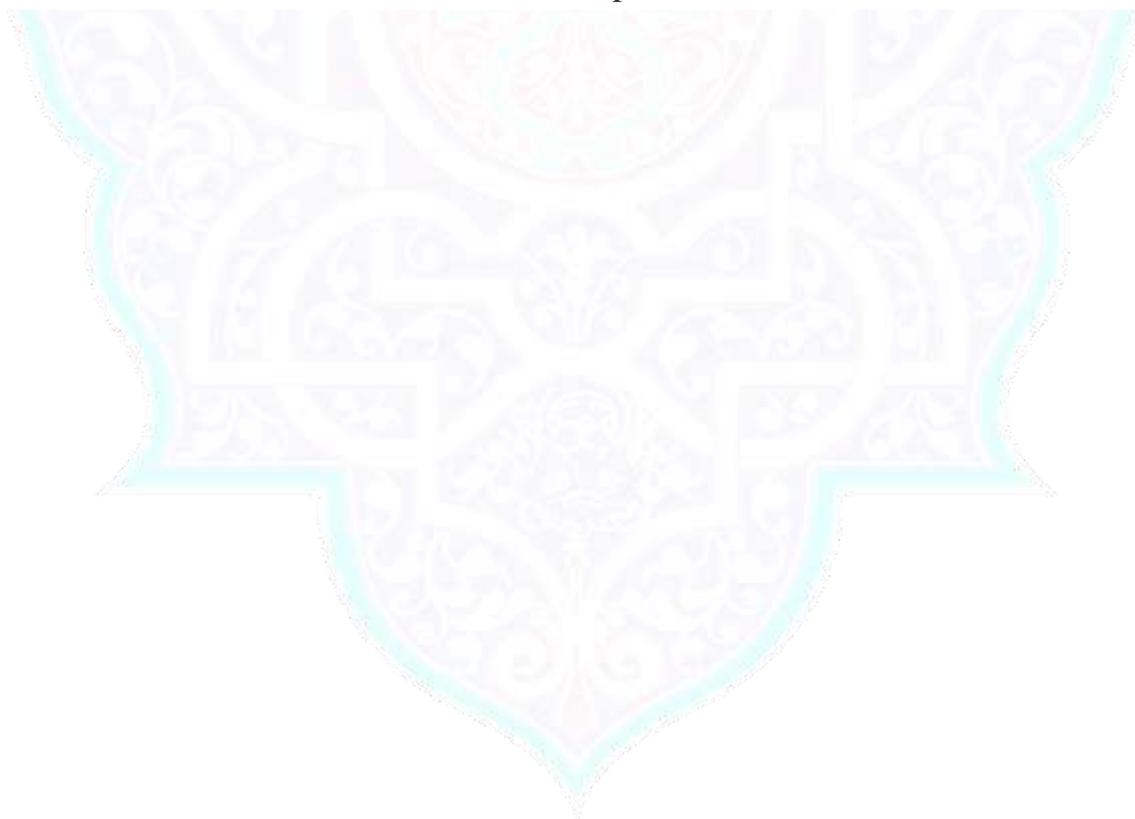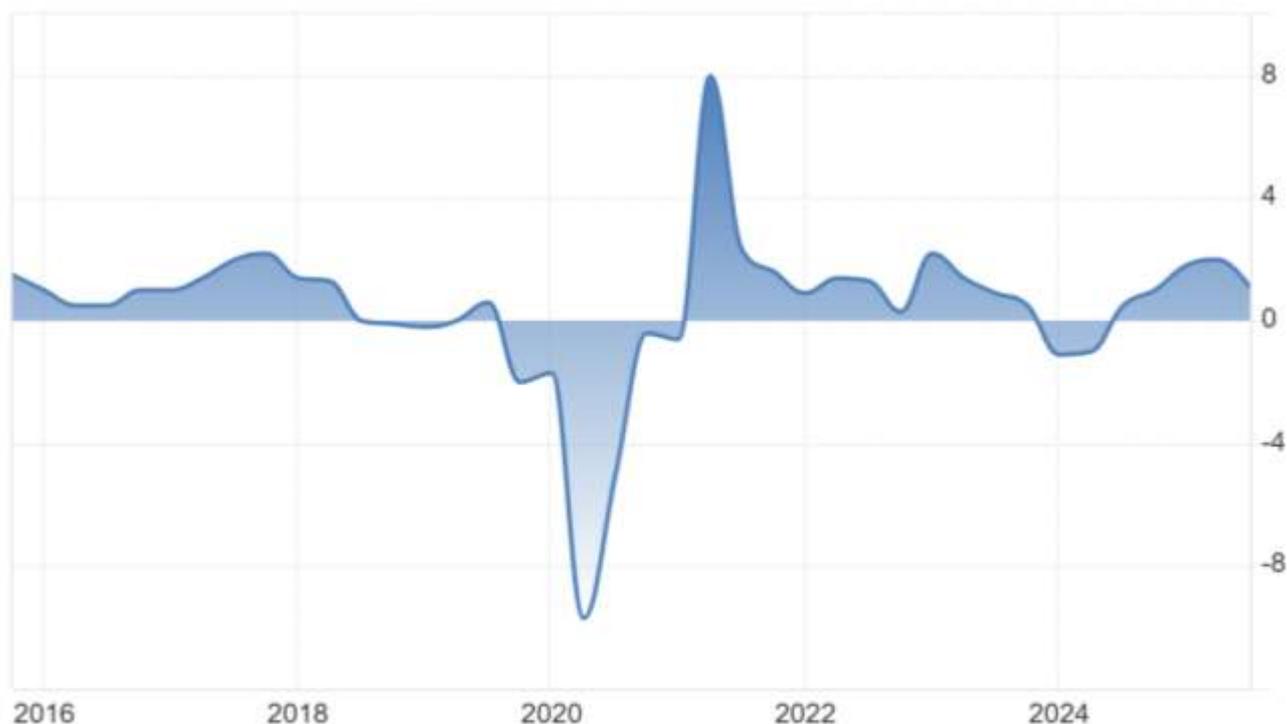
Figure 3

Japan GDP Annual Growth Rate (%)



Source: tradingeconomics.com | Cabinet Office, Japa

The gross domestic product in Japan expanded 1.1% year-on-year in the third quarter of 2025, easing from a 2% growth in the previous period. GDP Annual Growth Rate in Japan averaged 1.70 percent from 1981 until 2025, reaching an all time high of 9.40 percent in the first quarter of 1988 and a record low of -9.70 percent in the second quarter of 2020[2].

Japan's economy, the fourth largest in the world, is fully diversified and technologically advanced. Like in most developed countries, services account for the highest percentage of GDP (around 62 percent of GDP). Within services the most important once are wholesale and retail trade (around 7 percent of GDP) and real estate (around 6 percent of GDP). Manufacturing is the engine of the Japanese economy and accounts for nearly 22 percent of GDP. Construction also plays a significant role, accounting for around 5 percent of GDP[3].

Japan's economic slowdown in the third quarter of 2025 shows that the recovery remains fragile and uneven. The economy shrank by 0.6 percent compared with the previous quarter, a worse result than first expected, which suggests that economic conditions weakened more than policymakers and markets had anticipated. After a

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[2] TradingEconomics.com – Japan Annual GDP Growth Rate. Provides historical annual GDP growth statistics, charts, and projections. Available at: https://tradingeconomics.com/japan/gdp-growth-annual

[3] TradingEconomics.com – Japan Annual GDP Growth Rate. Provides historical annual GDP growth statistics, charts, and projections. Available at: https://tradingeconomics.com/japan/gdp-growth-annual

short period of moderate growth earlier in the year, this decline signals that Japan is once again facing difficulties in maintaining stable momentum.

Looking ahead, several factors will influence Japan's economic outlook. Higher interest rates may continue to restrain spending and investment. Exchange rate movements will affect exports and import costs. Global economic conditions, trade relations, and geopolitical tensions will also shape external demand. At the same time, domestic challenges such as labor shortages, slow digital transformation in some industries, and fiscal constraints will remain important. Overall, the latest GDP figures highlight how sensitive Japan's economy is to both domestic pressures and global developments, and why achieving stable growth remains a difficult task.

Figure 4

Japan Unemployment Rate (%)



Source: tradingeconomics.com | Ministry of Internal Affairs & Communications
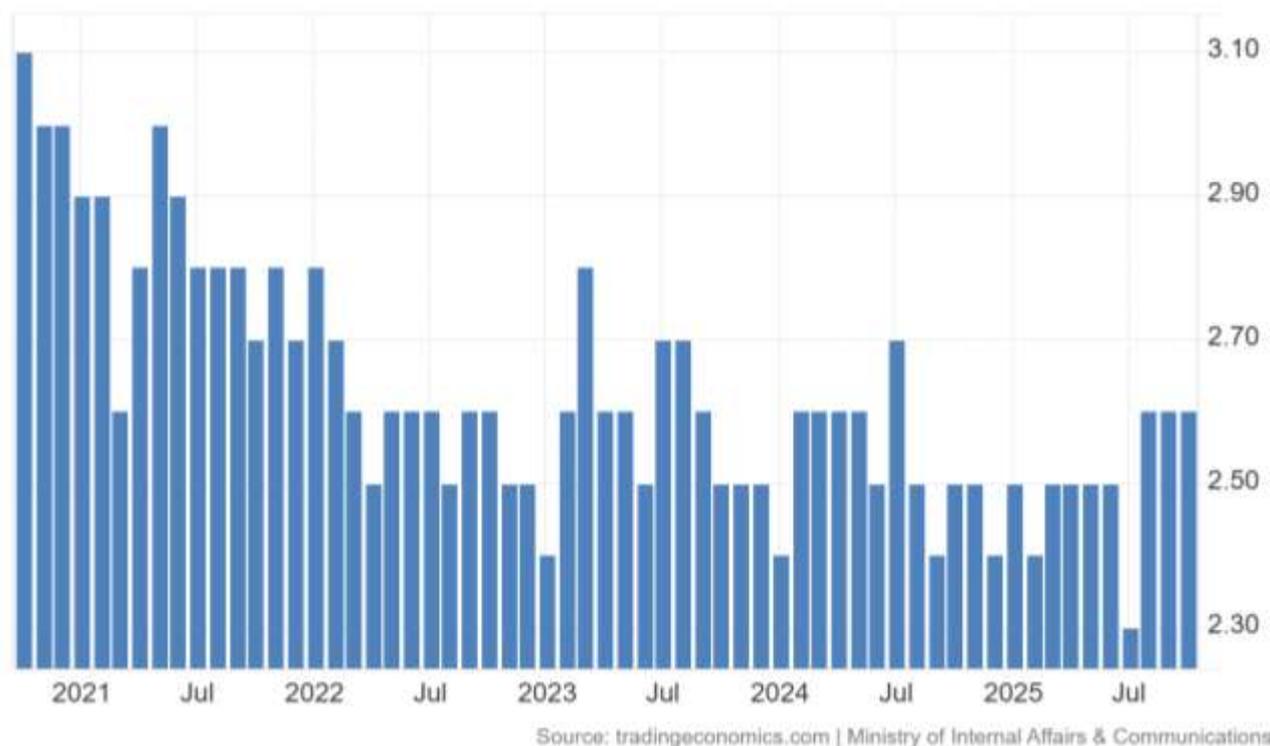
Japan's unemployment rate stood at 2.6% in October 2025, unchanged from the previous two months but slightly above market expectations of 2.5%. It remained the highest reading since July 2024, as the number of unemployed increased by 40 thousand to a near four-year high of 1.85 million. Meanwhile, employment rose by 120 thousand to a record high of 68.46 million, while the labor force expanded by 160 thousand to 70.30 million. The number of people outside the labor force decreased by 150 thousand to 39.31 million. On a non-seasonally adjusted basis, the labor force participation rate stood at 64.2%, flat from September but up from 63.5% a year earlier. At the same time, the jobs-to-applicants ratio fell to 1.18, the lowest level since January 2022.

## Conclusion

In the mid-2020s, economic cooperation between Uzbekistan and Japan showed a clear intensification, particularly in the sphere of bilateral trade. Trade flows expanded rapidly, with Japan maintaining a consistently strong export position and a positive trade balance. Over the period under consideration, Japanese exports to Uzbekistan increased significantly on a year-on-year basis, while imports from Uzbekistan declined, resulting in a widening trade asymmetry. The overall structure of trade reflects the differing levels of industrial development and specialization of the two economies. Japan's exports to Uzbekistan are largely composed of industrial, transport, and technologically advanced goods, which play an important role in supporting Uzbekistan's ongoing economic modernization and infrastructure development. In contrast, Uzbekistan's exports to Japan remain comparatively modest in scale and are primarily concentrated in resource-based and light industrial products. From a dynamic perspective, the growth of bilateral trade has been driven mainly by rising demand in Uzbekistan for machinery, vehicles, and high-technology equipment. At the same time, fluctuations in Uzbekistan's export volumes to Japan indicate limited diversification and sensitivity to changes in external demand. Despite these imbalances, overall trade volumes between the two countries have demonstrated strong medium-term growth, with high average annual expansion rates over recent years. In addition to traditional goods trade, the bilateral economic relationship is gradually expanding toward new areas, including technology transfer, digital products, and knowledge-intensive cooperation. Differences in tariff structures and market access conditions continue to influence trade patterns, but analytical estimates suggest that both countries possess unrealized export potential, particularly in higher value-added and technologically intensive sectors.

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