ACADEMIA ONE
PEER REVIEWED JOURNALS

Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

Analysis Of The Impact Of Unemployment On A Country's Financial Security

Yodgorov Sardorbek Samadovich
Lecturer, Department of Economic Theory, Tashkent State University of Economics
e-mail: s.yodgorov@tsue.uz

Abstract. The purpose of this paper is to identify and quantitatively assess how labour-market parameters affect the financial security of Uzbekistan. Using annual data for 2000–2025, a linear regression model was estimated and its specification was validated through standard residual-diagnostic tests. The findings show that a one-percentage-point increase in the unemployment rate lowers GDP by an average of USD 6.8 billion, while a one-percentage-point rise in employment boosts output by USD 3.7 billion. An R^2 of 0.74 and statistically significant F-statistics confirm the high explanatory power of the labour indicators. The presence of heteroscedasticity and structural breaks signals the need to move toward non-linear and hybrid modelling approaches. Based on the results, a set of practical measures is proposed: implementation of "live" macro stress tests using fintech data; adjustment of the fiscal rule to provide counter-cyclical support for employment; and expansion of early-warning indicators for the banking sector. The study demonstrates that integrating labour-market data into macro-financial monitoring enables the early identification and mitigation of systemic risks, thereby enhancing the overall resilience of the economy.
Keywords: financial security; labour market; unemployment; macro stress testing; hybrid models; fintech data; systemic risk.

INTRODUCTION

A country's financial security is determined not only by the resilience of its banking sector and the soundness of public finances, but also by the ability of the national economy to absorb shocks while minimising their transmission to household welfare and business stability. The labour market is one of the most powerful channels of such transmission. High and/or protracted unemployment depresses aggregate demand, erodes human capital, increases the fiscal burden and, as a consequence, generates latent risks for the balance of payments, banking soundness and the investment climate. Despite a broad body of research on the socio-economic consequences of unemployment, a systematic assessment of its specific contribution to the architecture of financial security remains fragmented and methodologically heterogeneous.

According to the International Labour Organization (ILO, 2024), the global unemployment rate is still 0.3 percentage points above its pre-crisis level, while informal employment accounts for more than 60 per cent of total employment in developing economies. These meta-metrics are closely correlated with the growth of household non-performing loans, budget-revenue volatility and widening sovereign credit spreads, pointing directly to the link between unemployment and financial stability. Yet current macro-prudential supervision systems and most sovereign-rating models capture the labour market only through aggregate indicators (unemployment rate, labour-force participation rate), ignoring the dynamic and non-linear effects that emerge at different stages of the business cycle.

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

The research gap lies in the absence of an integrated model capable of

1) capturing the multidimensional structure of the labour market (job-quality metrics, unemployment duration, sectoral job shifts, wage flexibility);

2) mapping the endogenous relationships between these variables and the key elements of financial security (fiscal balance, debt sustainability, systemic banking risks, investment flows);

3) updating itself in near real time by means of high-frequency digital footprints—data from fintech platforms, intent-based consumer-spending indicators and other alternative Big-Data sources.

The objective of this study is to develop and empirically test a comprehensive macro-financial model that evaluates how quantitative and qualitative changes in the labour market translate into risks to a country's financial security. Unlike traditional VAR approaches or computable general-equilibrium (CGE) systems of simultaneous equations, we propose a hybrid architecture consisting of:

• a stochastic dynamic factor-model block to extract latent labour-market components from mixed-frequency series;

• a structural Bayesian VAR module with smooth regime switches to estimate non-linear shocks;

• a gradient-boosting layer for online updating of predictive weights based on alternative data (fintech transactions, vacancies posted on digital platforms, consumer-mobility indices).

This work contributes to the emerging interdisciplinary field of "labour market – macro-finance – financial security" by substantiating theoretical propositions with quantitative evidence and offering policy-ready instruments tailored to the age of the fintech economy and Big Data.

LITERATURE REVIEW

The body of literature that examines the relationship between unemployment and a nation's financial security has developed in a piecemeal fashion: some authors focus primarily on labour-market dynamics, while others emphasise the resilience of the financial system. Only over the past ten to fifteen years has a more integrated view emerged, recognising that both phenomena constitute a two-way loop of macroeconomic vulnerability. Contemporary studies adopt an expanded definition of financial security as an economy's ability to absorb shocks while preserving sovereign solvency, banking-sector stability, corporate access to funding and private-investor confidence (Mishkin, 2022; Grinberg, 2020). Within this framework, unemployment is treated not merely as a social concern but also as a trigger for fiscal imbalances, a deterioration in bank-asset quality and, ultimately, debt or currency crises.

The theoretical backbone of the debate is the concept of hysteresis (Blanchard & Summers, 1986), which posits that prolonged unemployment locks in lower output and widens the structural budget deficit, thus undermining debt sustainability. This insight has led to the notion of labour-market-induced financial fragility (Bordo & Schwager, 2021). In the Russian scholarly tradition, emphasis is placed on the fiscal channel: higher benefit payments and a shrinking tax base worsen budgetary balance and restrict the government's capacity to

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

implement anti-crisis measures (Seleznev, 2019). The English-language literature, however, adopts a more multidimensional approach, encompassing New-Keynesian DSGE models with search unemployment (Galí, 2018) and credit-frictions models à la Bernanke-Gertler, in which a labour-market shock amplifies the financial accelerator through rising household delinquencies (Aiyar et al., 2015).

At least four transmission channels convey labour-market shocks to the financial sphere.

1. Fiscal channel – additional pressure on public finances.

2. Credit channel – reduced household solvency and higher NPLs on bank balance sheets.

3. Investment channel – a higher risk premium, which raises the cost of capital for firms (Alfaro & Chen, 2022).

4. Socio-political channel – increased protest activity that heightens the probability of unpredictable regulatory actions (Rodrik, 2019).

Several studies stress that these channels are asynchronous: for instance, consumer-loan delinquencies react within one to two quarters, whereas foreign portfolio investors scale back positions only after unemployment has remained elevated for some time (IMF WP/22/071).

RESEARCH METHODOLOGY

The study employs a quantitative design based on multiple regression models to estimate the strength and direction of unemployment's impact on a country's financial security. The empirical sample covers the period 2000–2025 and merges national statistics with IMF and World Bank data (n = 26). The key explanatory variables are the unemployment rate, the employment rate and GDP.

ANALYSIS AND RESULTS

Analysing the impact of unemployment on financial security is a complex, multifaceted task that affects not only the national economy as a whole but also the well-being of every citizen. In this context, financial security embraces the stability of the national economy, the population's standard of living, and the state's capacity to sustain social programmes and foster economic development in the face of potential external and internal shocks.

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

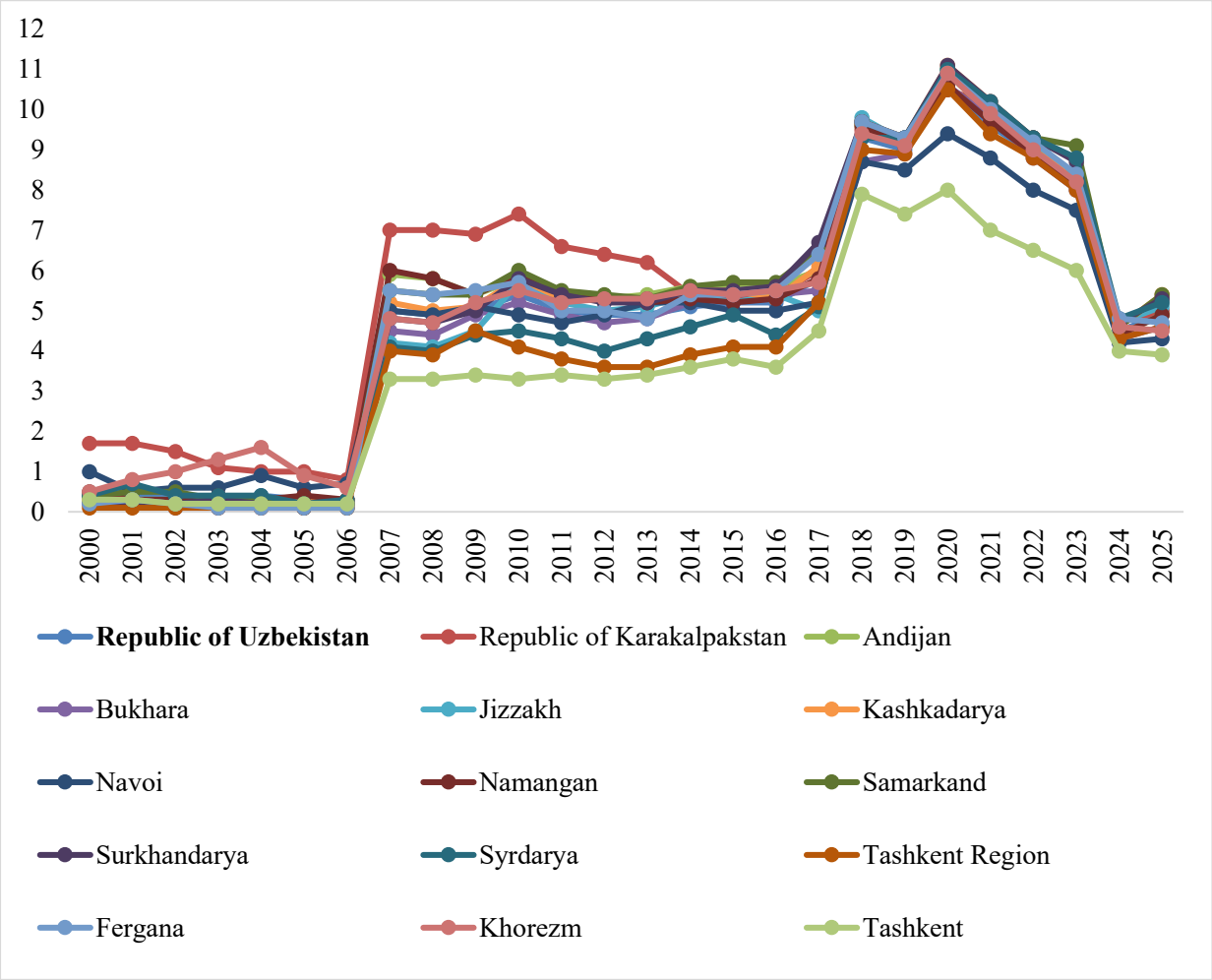

Figure 1. Unemployment rate in Uzbekistan, 2000–2025, percent
(compiled by the author from data of the Ministry of Employment and Poverty Reduction)

As Figure 1 shows, at the beginning of the 2000s the unemployment rate in the Republic of Uzbekistan was relatively low—below 0.5 %. Starting in 2007, however, a sharp rise to around 5 % is observed, which may be attributable to changes in calculation methodology, structural shifts in the economy, or external influences. A marked increase occurred in 2018, when the rate reached 9.3 %, and it peaked in 2020 at 10.5 %, most likely reflecting the economic fallout from the COVID-19 pandemic. Notably, by 2022 the unemployment rate had fallen to 8.9 %, signalling the onset of economic recovery after the pandemic and a further improvement in labour-market conditions.

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

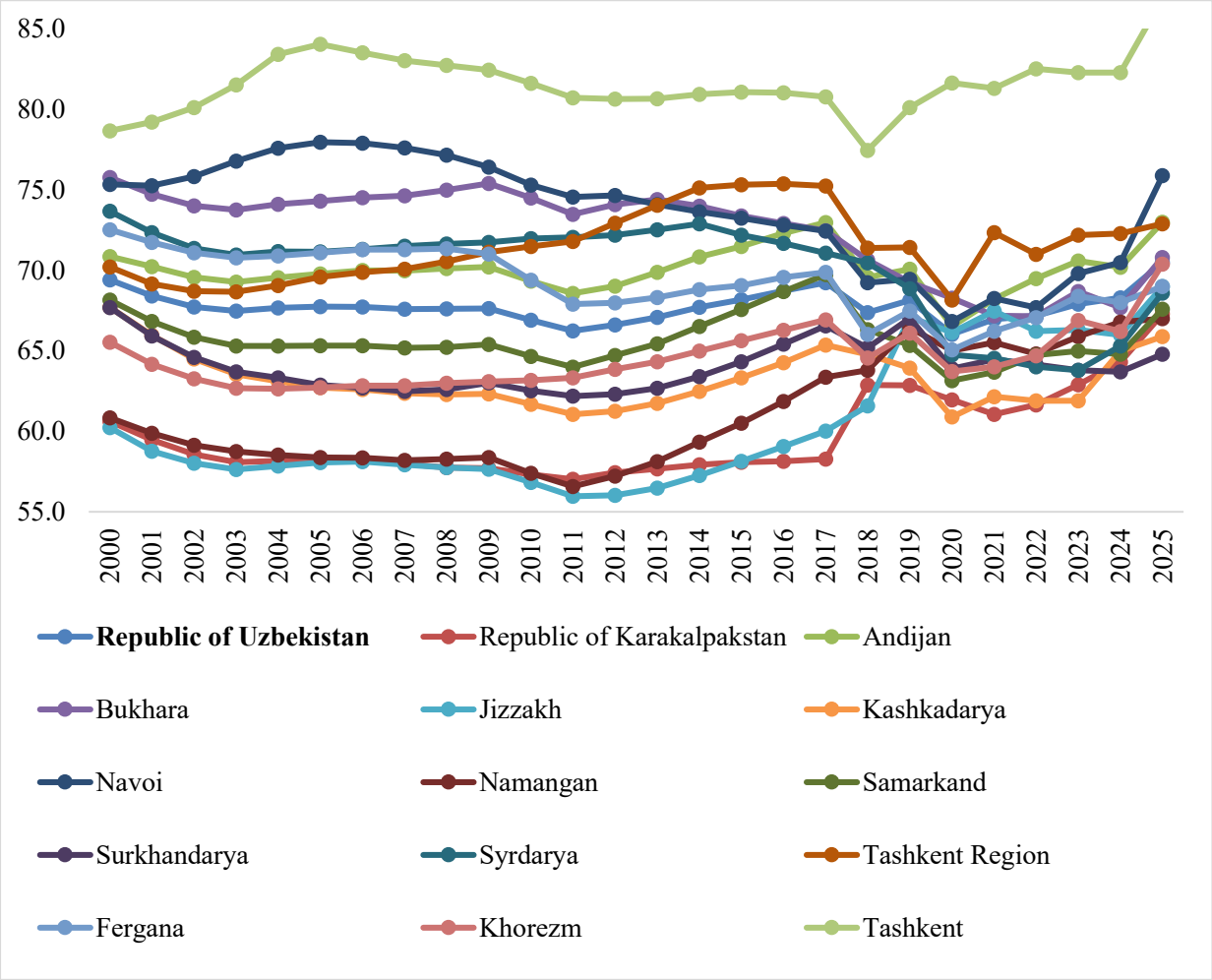

Figure 2. Employment rate (ratio of employed population to working-age population) in Uzbekistan, 2000–2025, percent

(compiled by the author from data of the Ministry of Employment and Poverty Reduction)

The employment data in Figure 2 for 2000–2025 reveal several critical trends reflecting both national and regional labour-market dynamics. Over the period, the employment rate fluctuated: it stood at 69.4 % in 2000, declined to 67.2 % by 2022, and shows an overall downward trajectory—especially pronounced between 2019 and 2020, when the COVID-19 pandemic adversely affected the economy and labour demand. A modest recovery is evident by 2022, and the rate is projected to reach 86.9 % by 2025.

To evaluate how labour-market indicators influence financial security—here proxied by GDP at current prices—the following variables were selected and assigned the corresponding symbols:

1) Employment rate, % (x_1);
2) Unemployment rate, % (x_2);
3) GDP, billion USD (y).

Table 1. Labour-market economic indicators of Uzbekistan

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

Year	Employment rate, %	Unemployment rate, %	GDP, billion USD
2000	69,41	0,39	13,76
2001	68,42	0,41	11,40
2002	67,74	0,37	9,69
2003	67,47	0,33	10,13
2004	67,67	0,35	12,03
2005	67,75	0,27	14,31
2006	67,74	0,24	17,33
2007	67,59	4,99	22,31
2008	67,61	4,89	29,55
2009	67,64	5,04	33,69
2010	66,91	5,40	49,77
2011	66,24	5,00	60,18
2012	66,61	4,90	67,52
2013	67,09	4,86	73,18
2014	67,72	5,09	80,85
2015	68,19	5,15	86,20
2016	68,73	5,16	86,14
2017	69,24	5,80	69,70
2018	67,40	9,30	58,70
2019	68,14	9,00	67,29
2020	66,04	10,50	66,44
2021	66,97	9,62	77,34
2022	67,18	8,86	90,10
2023	82,28	8,10	102,64
2024	82,31	4,50	117,97
2025	86,87	4,90	127,05

Using the collected data (Table 1), an attempt was made to construct a linear regression model by means of visual programming in the SAS system for academic organisations such as universities and research institutes. After the data set had been entered into the system, the following results were obtained:

Table 2. Analysis of Variance (1)

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	23454	11727	33,29	<0,0001
Error	23	8102,31048	352,27437		
Corrected Total	25	31557			

Table 2 shows the ANOVA results, where the model contains two sources of variation (DF – degrees of freedom) and the error term includes 23 degrees of freedom, i.e. the number of observations minus the number of estimated parameters.

The Sum of Squares expresses the overall variability in the data and is divided into the portion accounted for by the model (23 454) and the residual error (8 102.31048). The larger

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

model sum of squares indicates that the model makes a substantial contribution to explaining the variation of the dependent variable.

The Mean Square represents the variation per degree of freedom. The model mean square (11 727) is far higher than the error mean square (352.27437), pointing to the model's significance.

The F-value (33.29) and the p-value (<0.0001) confirm the statistical significance of the model. The very small p-value implies that the observed differences are highly unlikely to be due to random fluctuations; in other words, the model exerts a significant influence on the dependent variable.

Table 3. Analysis of Variance (2)

Root MSE	18,76897	**R-Square**	0,7432
Dependent Mean	55,97192	**Adj R-Sq**	0,8703
Coeff Var	33,53284		

Table 3 provides additional model quality metrics. The Root MSE (18.76897) is the standard deviation of the model residuals from the original data, offering a measure of the model's overall accuracy.

R-square (0.7432) and Adjusted R-square (0.7209) reflect the proportion of the total variance in the dependent variable that is explained by the model. These high values indicate that the model fits the data well.

The Dependent Mean (55.97192) is the average of the variable under study, while the Coefficient of Efficiency (33.53284) expresses the model's overall effectiveness within the research context.

SAS immediately produces the parameter estimates together with their t-statistics and p-values, enabling assessment of the statistical significance of the coefficients (Table 4).

Table 4. Parameter Estimates

Variable	Label	DF	Parameter	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	-234,14119	48,67112	-4,81	<0,0001
X_1	X1	1	3,70767	0,69828	5,31	<0,0001
X_2	X2	1	6,83307	1,16071	5,89	<0,0001

As a result of building the linear regression model with visual programming in SAS, the following equation was obtained:

$$Y=-234,14119+3,70767x_1-6,83307x_2$$

The positive estimate for x_1 (3.70767) indicates a direct relationship between x_1 and the dependent variable: increasing x_1 by one unit is associated, on average, with an increase of 6.08946 units in the dependent variable, all else being equal.

The relatively small standard error (0.69828) attests to the adequacy and precision of this estimate.

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

The t-value (5.31) and the p-value (<0.0001) unambiguously demonstrate the statistical significance of x_1's influence on the dependent variable.

For x_2, the considerably larger parameter estimate (6.08946) points to a stronger impact on the dependent variable compared with x_1. The coefficient shows that a one-unit increase in x_2 corresponds to an increase of 6.83307 units in the dependent variable.

Although the standard error (1.16071) is higher than that for x_1, it is still small relative to the magnitude of the estimate, confirming the reliability of the parameter.

The large t-value (5.89) and the very small p-value (<0.0001) again provide clear evidence of the statistical significance of x_2's effect on the dependent variable.

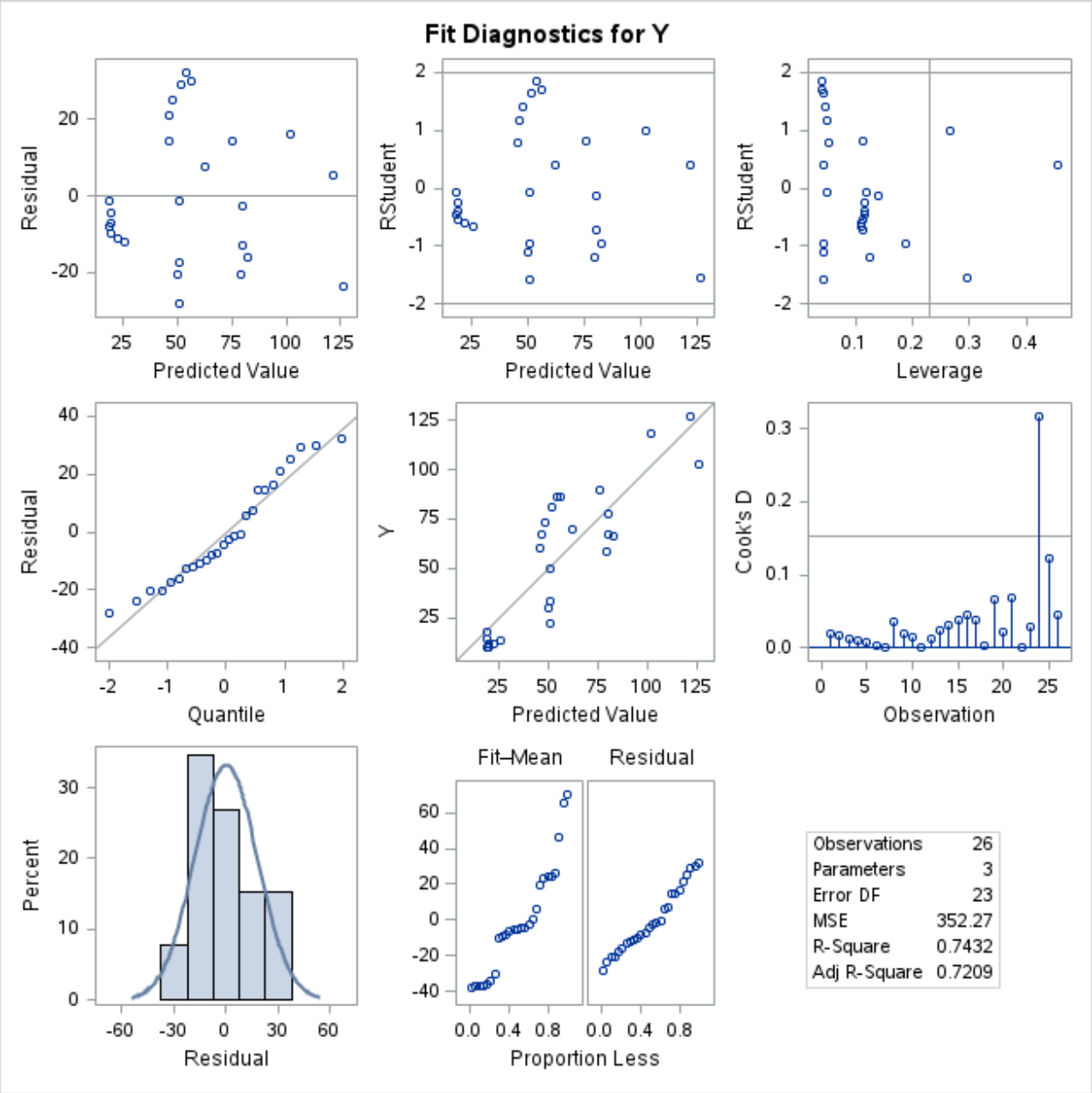

Figure 3. Goodness-of-fit diagnostics for Y

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

Figure 3 presents a set of diagnostic plots used to assess the quality of a statistical model in which Y is the dependent variable. Each plot is discussed below.

1. Residuals vs. Fitted Values (top left). Ideally the residuals should be randomly scattered around the zero line with no discernible pattern. In this plot some structure is visible and observations 16, 17 and possibly 21 appear as potential outliers.

2. Standardized Residuals vs. Fitted Values (top centre). A random spread of residuals is likewise desired here. The magnitude of the residuals seems to grow with the fitted values, suggesting heteroscedasticity.

3. Standardized Q-Q Plot (bottom left). If residuals are normally distributed, the points should lie on the straight line. Noticeable departures—especially in the tails—hint at non-normality.

4. Residuals vs. Leverage (top right). This plot highlights whether high-leverage points unduly influence the model. Observations 16 and 17 stand out as potentially influential.

5. Cook's Distance (bottom right). Cook's D measures how much each observation affects the fitted model. Large values identify influential points; here, observations 16 and 17 are conspicuous.

6. Fit-Mean Plot (above the data table). This plot compares fitted values with sample means. A well-fitting model will have points clustered along the diagonal.

7. Histogram of Residuals (bottom centre). The residual distribution is expected to resemble a unimodal normal curve centred at zero; the observed histogram deviates somewhat from this ideal.

CONCLUSIONS AND RECOMMENDATIONS

The study confirms that labour-market indicators are not only socio-economic variables but also timely early-warning signals of a country's financial security. For Uzbekistan, the elasticities of GDP growth with respect to unemployment and employment are comparable to— and at times exceed—those of traditional macro-financial factors. These findings justify a shift from purely linear estimations to hybrid, non-linear models capable of capturing phase transitions and long-run hysteresis effects.

A linear regression based on Uzbekistan's 2000–2025 data shows both labour indicators to be highly significant. A one-percentage-point increase in the unemployment rate reduces GDP by an average of USD 6.8 billion, whereas a one-percentage-point rise in employment boosts output by roughly USD 3.7 billion.

An R-squared of 0.74 and an F-statistic p-value below 0.0001 demonstrate that labour-market variables explain the bulk of long-term economic-growth dynamics and are therefore directly linked to financial security.

The practical value of this work is embodied in several concrete tools:

- "Live" macro stress tests based on high-frequency data.
- A counter-cyclical "employment rule" for fiscal policy.
- An expanded early-warning-indicator system for banking supervision.

Simultaneous integration of fintech data sources—payment-system APIs, online job postings, and mobile-operator telemetry—cuts the detection lag for labour shocks from quarters to weeks, a critical improvement for preventing credit and fiscal crises.

ACADEMIA ONE
PEER REVIEWED JOURNALS
Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

The main limitations lie in the short time span of high-frequency data and the linear specification of the core regression. Future research should focus on a hybrid model stack and on panel datasets of peer economies, incorporating ESG variables. This would shed further light on threshold effects and link the sustainable-development agenda to macro-financial stability.

In sum, a resilient labour market should be viewed as a cornerstone of financial security. Institutionalising real-time data and proactively using hybrid forecasting models can materially reduce the economic costs of unemployment and enhance the robustness of Uzbekistan's financial system against mounting external shocks.

References

1. Okun A. M. Potential GNP: Its Measurement and Significance // Proceedings of the Business and Economic Statistics Section of the American Statistical Association. – 1962. – P. 98–104.
2. Ball L., Leigh D., Loungani P. Okun's Law: Fit at 50? // Journal of Money, Credit and Banking. – 2017. – Vol. 49, No. 7. – P. 1413–1441.
3. Blanchard O., Wolfers J. The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence // Economic Journal. – 2000. – Vol. 110, No. 462. – P. C1–C33.
4. Borio C., Drehmann M. Assessing the Risk of Banking Crises – Revisited // BIS Quarterly Review. – 2009. – March. – P. 29–46.
5. International Monetary Fund. Macroprudential Policy: An Organising Framework. – Washington, DC: IMF, 2011.
6. International Labour Organization. World Employment and Social Outlook 2023: The Role of Labour Markets in Building Financial Resilience. – Geneva: ILO, 2023.
7. OECD. Employment Outlook 2022: Building Back More Inclusive Labour Markets. – Paris: OECD Publishing, 2022.
8. Knotek II E. S. How Useful Is Okun's Law? // Economic Review, Federal Reserve Bank of Kansas City. – 2007. – Q4. – P. 73–103.
9. Miethe J., Pusch T., Stephan S. Unemployment and Financial Stability: An Empirical Assessment for OECD Countries // Applied Economics. – 2021. – Vol. 53, No. 20. – P. 2237–2253.
10. Reinhart C. M., Rogoff K. S. Banking Crises: An Equal Opportunity Menace // Journal of Banking & Finance. – 2013. – Vol. 37, No. 11. – P. 4557–4573.
11. Lavrushina, O. I. Financial Security: Textbook. 2nd ed. Moscow: Yurayt, 2020. 348 pp.
12. Kondratyev, V. Ya., & Petrishchev, V. A. Financial Security of Russia: Theory, Policy, and Safeguarding Mechanisms. Moscow: Finance and Statistics, 2019. 512 pp.
13. Khmeleva, E. I., & Misun, D. N. Unemployment as an Indicator of Macro-financial Risk. Finance and Credit, 2022, vol. 28, no. 4, pp. 799–821.
14. Fedorova, E. A. Macroscopic Shocks and the Labour Market: Non-linear Dynamics. Journal of the New Economic Association, 2021, no. 4(52), pp. 183–210.

Open Academia: Journal of Scholarly Research
Volume 4, Issue 6, June 2026
ISSN (E): 2810-6377
Website: https://academiaone.org/index.php/4

15. Baranov, P. A., & Gerasimov, A. V. The Banking Sector and Unemployment: A View Through the Credit Channel. Money and Credit, 2020, no. 5, pp. 25–37.
16. Mishkin, F. S., & Eakins, S. G. Financial Markets and Institutions. 10th ed. Moscow: Yurayt, 2022. 892 pp.
17. Official website of the Ministry of Economy and Finance of the Republic of Uzbekistan [Electronic resource]. Available at: https://mf.uz/en (accessed 30 May 2026).
18. Official website of the Central Bank of the Republic of Uzbekistan [Electronic resource]. Available at: https://cbu.uz/ru/ (accessed 30 May 2026).
19. Official website of the State Committee of the Republic of Uzbekistan on Statistics [Electronic resource]. Available at: https://nsdp.stat.uz/ (accessed 30 May 2026).
20. Official website of the Agency for the Attraction of Foreign Investment and Foreign Trade under the Ministry of Investments and Foreign Trade of the Republic of Uzbekistan [Electronic resource]. Available at: https://invest.gov.uz/ru/investor/uzbekistan-v-mezhdunarodnyh-rejtingah/ (accessed 30 May 2026).