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ECONOMIC SHOCKS: THEIR NATURE AND THE IMPORTANCE OF INCORPORATING THEM INTO ECONOMIC GROWTH ANALYSIS

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Abstract. This article examines the nature and essence of economic shocks, their underlying causes, and the mechanisms through which they influence economic growth. The effects of economic shocks on economic growth are comprehensively analysed in relation to key macroeconomic indicators, economic activity, investment, consumption, foreign trade, and financial stability. Furthermore, the study provides an empirical assessment of the effects of monetary shocks on the economy of the Republic of Uzbekistan in recent years.

Keywords: economic shocks, monetary shocks, economic growth, impulse response function (IRF), macroeconomic stability, external shocks, internal shocks, financial crisis, inflation, exchange rate, investment, gross domestic product (GDP), economic cycle, foreign trade, economic stability, economic policy, economic resilience.

Аннотация. В статье рассматриваются природа и сущность экономических шоков, причины их возникновения, а также механизмы их воздействия на процесс экономического роста. Влияние экономических шоков на экономический рост комплексно анализируется во взаимосвязи с ключевыми макроэкономическими показателями, экономической активностью, инвестициями, потреблением, внешней торговлей и финансовой стабильностью. Кроме того, в исследовании представлена эмпирическая оценка воздействия монетарных шоков на экономику Республики Узбекистан в последние годы.

Ключевые слова: экономические шоки, монетарные шоки, экономический рост, функция импульсного отклика (IRF), макроэкономическая стабильность, внешние шоки, внутренние шоки, финансовый кризис, инфляция, валютный курс, инвестиции, валовой внутренний продукт (ВВП), экономический цикл, внешняя торговля, экономическая стабильность, экономическая политика, экономическая устойчивость.

INTRODUCTION

In the current environment of intensifying global economic competition and growing interconnectedness, virtually every country may encounter unexpected risks and economic shocks in the course of pursuing sustainable economic growth. Economic shocks can be defined as unexpected and significant changes in economic conditions occurring over a relatively short period as a result of internal or external factors. Such shocks may manifest themselves through financial crises, substantial changes in inflation, exchange-rate fluctuations, volatility in commodity and energy prices, changes in external demand, natural disasters, pandemics, and geopolitical developments.

This study substantiates the theoretical and practical importance of incorporating economic shocks into the analysis of economic growth. In particular, it demonstrates that changes in gross domestic product (GDP) growth cannot always be fully explained solely by traditional determinants such as capital, labour, investment,

and technological progress. A more comprehensive assessment therefore requires the incorporation and modelling of unexpected external and internal disturbances that may influence overall economic activity. International empirical studies indicate that, under certain circumstances, the effects of economic shocks may extend beyond short-term fluctuations in economic activity and influence the long-term potential level of output. Accordingly, incorporating economic shocks into economic growth analysis can contribute to a more comprehensive understanding of growth dynamics and support the formulation of effective and adaptive economic policy measures.

LITERATURE REVIEW

The recognition of the importance of macroeconomic shocks can be traced back to the early twentieth century. In 1927, Russian statistician Eugen Slutsky published his seminal paper, *"The Summation of Random Causes as the Source of Cyclic Processes,"* in which he examined the role of randomly occurring factors in generating and explaining fluctuations in economic activity over time. Slutsky's study provided an important theoretical foundation for understanding how the cumulative effects of independent random shocks could produce cyclical patterns resembling systematic economic fluctuations. Following this pioneering contribution, research on economic fluctuations and macroeconomic shocks gained increasing prominence throughout the twentieth century and subsequently developed into a major area of modern macroeconomic analysis.

Economic shocks and their effects on economic growth constitute an important area of contemporary macroeconomic research. Studies in this field emphasise that economic growth is closely associated not only with domestic production factors but also with unexpected shocks originating from external sources or arising within the domestic economic system. In particular, the study by Mauro and Becker examines the relationship between substantial changes in output and various types of shocks and identifies external financial shocks and terms-of-trade shocks as significant factors influencing economic performance in developing countries. The authors demonstrate that the effects of shocks can be assessed in terms of their frequency of occurrence, the probability of changes in output, and the magnitude of such changes.

The effects of external shocks on developing and low-income countries have also received considerable attention in the literature. Studies conducted by the International Monetary Fund indicate that the economic performance of these countries can be particularly sensitive to substantial changes in the terms of trade, variations in export demand, natural disasters, and fluctuations in international capital flows. In particular, the condition of fiscal and external balances, the level of public debt, the adequacy of foreign-exchange reserves, the degree of economic diversification, and institutional capacity can significantly influence the transmission and magnitude of such shocks. From this perspective, the consequences of an economic shock depend not only on its nature and magnitude but also on a country's capacity to withstand, absorb, adapt to, and respond effectively to changing economic conditions.

The effects of financial shocks on economic growth have also been extensively examined in the literature. Based on long-term historical data, Reinhart and Reinhart demonstrate that financial crises, changes in banking-sector conditions, currency crises, episodes of elevated inflation, and sovereign debt restructuring can be associated with changes in medium-term economic growth. Since economic activity may follow different adjustment trajectories after a crisis, incorporating such shocks into economic growth models can contribute to a more accurate and comprehensive assessment of the actual dynamics of economic development.

Shocks originating in energy and commodity markets are likewise regarded as important determinants of economic growth. Hamilton's research on oil shocks demonstrates the existence of a nonlinear relationship between changes in oil prices and aggregate output. In particular, increases and decreases in oil prices may have asymmetric effects on economic activity, with price increases potentially exerting a stronger influence on output than corresponding price declines. Subsequent studies have found that the interrelationship between oil prices and economic activity became particularly pronounced during periods such as the global financial crisis and the COVID-19 pandemic.

Health-related shocks, including pandemics, represent a distinct category of economic shocks. The COVID-19 pandemic emerged as a complex shock that simultaneously influenced production, consumption, labour markets, international trade, and financial markets. Empirical studies indicate that the pandemic generated substantial changes in both financial markets and the real economy and prompted the implementation of large-scale fiscal and monetary policy measures aimed at supporting economic activity and facilitating economic adjustment. Consequently, the experience of the COVID-19 pandemic demonstrated that health-related shocks can rapidly propagate across different sectors of the economy and generate significant macroeconomic effects, highlighting the importance of economic resilience and adaptive policy mechanisms.

RESEARCH METHODOLOGY

The research methodology is based on a theoretical and empirical assessment of the effects of economic shocks on economic growth. The study employs a systematic approach, comparative and statistical analysis, correlation and regression analysis, as well as time-series analysis. The real gross domestic product (GDP) growth rate is used as the principal indicator of economic growth. To capture economic shocks, indicators such as the inflation rate, exchange-rate fluctuations, international commodity and energy prices, changes in export volumes, capital flows, interest rates, unemployment, and external demand are considered. This methodological framework makes it possible to identify significant turning points in economic growth dynamics and assess their relationship with specific economic shocks.

ANALYSIS AND RESULTS

From a methodological perspective, it is important to distinguish between internal and external economic shocks. Internal shocks may include changes in banking and financial system conditions, substantial increases in inflation, changes in fiscal balances, fluctuations in investment and domestic demand, as well as political and institutional uncertainty. External shocks, by contrast, may include global financial crises, changes in demand in export markets, substantial fluctuations in international prices, changes in capital inflows, geopolitical developments, and global pandemics. Studies conducted by the International Monetary Fund identify external factors such as terms-of-trade shocks, changes in export demand, and fluctuations in financial flows as important determinants influencing economic growth dynamics in developing economies.

To assess the effects of economic shocks on economic growth, the following conceptual regression model can be employed:

$$GDPG_t = \alpha + \beta_1 SHOCK_t + \beta_2 INV_t + \beta_3 INF_t + \beta_4 EXP_t + \beta_5 FDI_t + \varepsilon_t \quad (1)$$

where $GDPG_t$ represents the real GDP growth rate; $SHOCK_t$ denotes the indicator capturing the economic shock; INV_t represents investment; INF_t denotes inflation; EXP_t represents exports; FDI_t refers to foreign direct investment; ε_t represents the random error term capturing factors not included in the model; α is the intercept; and β_1 – β_5 are the estimated regression coefficients.

If the coefficient β_1 is negative and statistically significant, this indicates a statistically significant inverse relationship between the respective economic shock indicator and economic growth, holding other factors constant. Furthermore, since the effects of an economic shock may persist beyond a single period, the inclusion of lagged values of the relevant variables may also be appropriate. This approach makes it possible to capture both the immediate and delayed effects of economic shocks on economic growth.

When analysing the effects of economic shocks, annual average indicators alone may not fully capture short-term economic dynamics. Economic shocks can generate substantial changes over relatively short periods, while their effects may diminish over time or become more pronounced depending on prevailing economic conditions. Therefore, identifying structural breaks in time-series data, comparing pre-shock and post-shock periods, and employing impulse response functions (IRFs) can enhance the comprehensiveness and analytical quality of the assessment. Studies conducted by the International Monetary Fund have employed impulse response functions to assess the medium- and long-term effects of financial, political, and health-related shocks on GDP.

Impulse response function (IRF) analysis is a widely used econometric tool for assessing the dynamic effects of shocks within multivariate time-series models. It enables researchers to examine how an unexpected shock to one endogenous variable affects other endogenous variables over a specified time horizon. The results of IRF analysis can be presented graphically or in tabular form, thereby providing a clear representation of the magnitude, direction, and persistence of the response to a particular shock.

An IRF graph typically consists of two axes: the x-axis, which represents the time horizon over which the effects of the shock are observed, and the y-axis, which indicates the magnitude and direction of the response of the respective endogenous variable to the shock. The statistical significance of the estimated impulse response is generally assessed using confidence intervals. If the confidence interval does not include zero over a particular period, the estimated response can be considered statistically significant at the corresponding confidence level. Conversely, if the confidence interval includes zero, there is insufficient statistical evidence to conclude that the response differs from zero during that period (Figure 1).

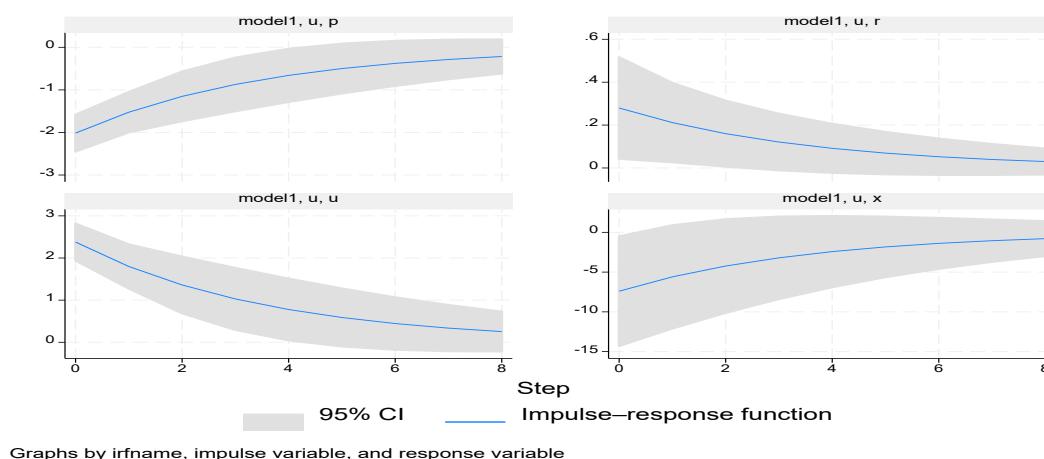


Figure 1. The Impact of a Monetary Shock on Inflation, the Policy Rate, and the Magnitude of the GDP Gap¹

IRF analysis also makes it possible to determine whether the effects of an economic shock are predominantly short-term or persist over a longer period. The response observed in period 0 is generally interpreted as the contemporaneous or immediate response to the shock, while subsequent periods illustrate how this response evolves over time, including whether it gradually diminishes, persists, or becomes more pronounced. Thus, IRF analysis provides an important analytical framework for identifying the dynamic transmission mechanisms of economic shocks and assessing their implications for key macroeconomic variables such as GDP, inflation, investment, and exchange rates.

The figure illustrates the responses of inflation, the policy rate, and the output gap to a monetary shock. The results indicate a decline in all three variables following the shock. In particular, the initial response of inflation shows a decrease of approximately 2%, followed by a gradual recovery in subsequent periods. The output gap also exhibits a noticeable decline. Overall, the observed dynamics illustrate the adjustment of key macroeconomic variables following a monetary shock and provide insight into the transmission of monetary impulses across the economy.

Furthermore, based on the results obtained from the New Classical test, impulse response analysis is conducted to assess the extent to which a productivity shock in the Republic of Uzbekistan influences the other variables included in the eight-variable system (Figure 2).

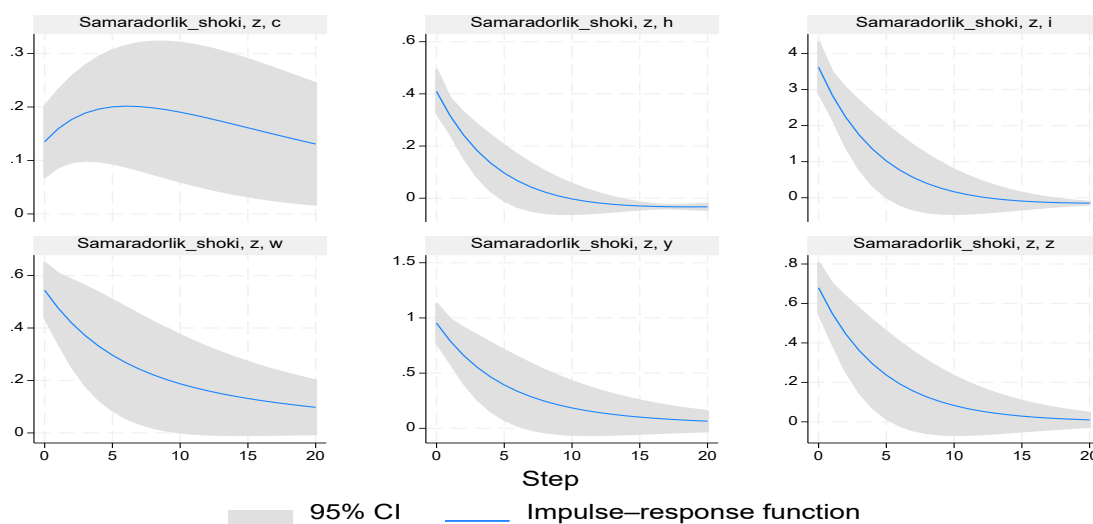


Figure 2. Impulse-response graph assessing the impact of a productivity shock on the model's endogenous variables²

¹ Author's calculations based on Stata 18.

² Author's calculations based on Stata 18.

Analyzing the results of the New Classical test conducted using the impulse response function, we assessed the effects of an external productivity shock on the specified variables in the Republic of Uzbekistan over the subsequent 20 quarters, corresponding to a five-year period. The results indicate that all variables included in the model increase in response to the productivity shock. Among these variables, consumption exhibits a relatively prolonged response before returning to its steady-state level, while the remaining variables return to their respective steady-state levels within the five-year period.

It is also important to recognise that the effects of economic shocks may vary depending on the economic structure and specific characteristics of individual countries. For example, countries whose exports are highly concentrated in one or a few primary commodities may be more sensitive to changes in international prices. In contrast, countries with diversified economies, adequate international reserves, well-developed financial systems, and effective fiscal institutions generally possess greater capacity to absorb and adapt to the effects of economic shocks. OECD studies also indicate that the flexibility of the production structure under changing economic conditions is one of the key factors contributing to a country's economic resilience.

The results of the analysis indicate that economic shocks are among the key factors shaping the dynamics of economic growth. First, economic shocks can influence output through both aggregate demand and aggregate supply mechanisms. For example, financial shocks may affect credit availability and investment activity, while external demand shocks can influence output and employment through changes in exports. A substantial increase in energy prices, in turn, may raise production costs, contribute to inflationary pressures, and influence real incomes. Therefore, assessing economic growth solely through changes in capital accumulation or labour resources may not provide a sufficiently comprehensive picture under conditions characterised by economic shocks.

Second, the effects of economic shocks may operate through both short-term and long-term channels. In the short term, a shock may lead to changes in output, consumption, investment, and exports. Over the longer term, changes in investment may affect the accumulation of capital stock; prolonged changes in employment conditions may influence human capital development; changes in firms' economic activity may affect productive capacity; and innovation processes may adjust accordingly. IMF studies also indicate that substantial external shocks can, in some countries, influence not only cyclical fluctuations but also the underlying trajectory of economic growth.

Third, the effects of economic shocks may be asymmetric. In other words, the magnitude of the economy's response to a negative shock may differ from its response to a positive shock of a comparable magnitude. For example, a substantial increase in oil prices can significantly raise production costs in oil-importing countries; however, a subsequent decline in oil prices of the same magnitude may not necessarily generate an equivalent economic effect in the opposite direction. Empirical evidence on the nonlinear relationship between oil prices and GDP supports this argument.

Fourth, the simultaneous occurrence of multiple shocks can generate a stronger combined effect on economic activity. During the COVID-19 period, the simultaneous occurrence of the pandemic, changes in supply-chain conditions, developments in energy markets, and heightened financial uncertainty contributed to more pronounced fluctuations in economic activity. Studies indicate that the relationship between oil prices and economic activity became particularly pronounced during the pandemic.

Furthermore, the effectiveness of macroeconomic policy plays an important role in facilitating the economy's adaptation to economic shocks and mitigating their potential effects. Adequate fiscal buffers, sustainable public debt, flexible monetary policy, sufficient international foreign-exchange reserves, a diversified export structure, and a sound financial system can strengthen an economy's resilience to changing external and internal conditions. Therefore, when analysing economic growth, it is appropriate to assess not only the rate of growth itself but also the economy's capacity to withstand, absorb, and adapt effectively to economic shocks.

CONCLUSION AND RECOMMENDATIONS

Overall, economic shocks constitute an integral component of the economic growth process, and their incorporation into economic analysis contributes to a more comprehensive assessment of macroeconomic dynamics. Substantial changes in economic growth indicators may be associated not only with changes in investment, labour resources, and technological progress but also with unexpected external or domestic shocks affecting the economy. Therefore, a comprehensive analysis of economic growth requires the simultaneous examination of the origins, duration, intensity, and transmission channels of economic shocks, as well as the economy's capacity to absorb and adapt to their effects.

The research findings indicate that financial crises, external trade shocks, changes in energy and commodity prices, inflationary shocks, substantial exchange-rate fluctuations, and pandemics can influence economic growth through various transmission channels. While some shocks may primarily generate short-term fluctuations in economic activity, more substantial and persistent shocks may also influence an economy's productive capacity over a longer period. International studies have documented that major economic shocks and crisis periods can be associated with changes in medium-term economic growth trajectories.

Therefore, incorporating economic shocks into the analysis of economic growth not only enhances the comprehensiveness and statistical accuracy of the assessment but also facilitates a more effective evaluation of economic policy, the identification and forecasting of potential risks, and the strengthening of a country's economic resilience. In particular, as the interdependence of national economies continues to increase in the context of globalisation, examining the mechanisms through which external shocks are transmitted to the domestic economy represents an important prerequisite for supporting sustainable economic growth and developing effective adaptive policy measures.

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