

WHAT HAS A GREATER IMPACT ON ECONOMIC GROWTH IN THE SHORT-TERM IN THE V4 COUNTRIES? INFLATION OR UNEMPLOYMENT?

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Abstract

Economic growth is among the most monitored macroeconomic indicators, as it is related to the development of the economic level in individual economies and reflects the population's standard of living. However, the inflation rate is related to economic growth; the inflation rate can be a stimulant to sustainable economic growth but also a problem detrimental to economic growth. At the same time, economic growth should be linked to increasing employment and the country's production potential. For these reasons, certain there should be theoretical connections between economic growth, inflation, and unemployment. These connections are crucial for policymakers and the public as they provide a picture of the country's economic development, as Sadiku et al. (2015). Therefore, the object of the paper is an investigation of the short-term relationship between economic growth, inflation, and unemployment in the Visegrad group. Time series obtained from the OECD statistical database for 1999 – 2021 on quarterly frequency are used for the analysis. Using the Vector Error-Correction Model (VECM), it was detected that in short-term economic growth is not influenced by the unemployment rate but by the inflation rate.

Key words: unemployment, inflation, economic growth, Visegrad group, cointegration

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Introduction

In the era of globalization and internationalization, increasing pressures on the economic growth of individual economies are manifested. However, economies may be more susceptible to external factors that may disturb the macroeconomic stability of countries. Governments and central banks may face various problems that disrupt stable economic growth in the long term. Theoretically, in connection with economic growth, there should be a decrease in the unemployment rate due to the revival of economic activity (Davari et al., 2022; Dritsakis and Stamatiou, 2018). On the other hand, the inflation rate can be a stimulant

to sustainable economic growth and a problem detrimental to economic growth (for example, Ahmad et al., 2022; Baharumshah et al., 2016). Therefore, this contribution focuses on the effects of inflation and unemployment rates on economic growth. Specifically, the object of the paper is an investigation of the short-term relationship between economic growth, inflation, and unemployment in the Visegrad group from 1999-2021.

1 Review of the Literature

Investigating the relationship between the unemployment rate, the inflation rate, and economic growth are the subject of empirical research. The conclusions of some of these studies are the content of this section. Specifically, subsection 1.1 focuses on the relationship between the inflation rate and economic growth. And subsection 1.2 is focused on the relationship between the unemployment rate and economic growth.

1.1 Inflation rate and economic growth

The positive relationship between economic growth and inflation is shown by Ahmad et al. (2022). Ahmad et al. (2022) considered a stable price level essential to stimulating sustainable economic growth. Ahmad et al. (2022) also emphasize that a higher-than-desirable inflation rate harms economic growth. The positive impact of inflation and economic growth is detected by Qin and Wang (2018). Qin and Wang (2018) emphasize that some inflation rate is natural for the economic system, but it is necessary to prevent disproportionate inflation growth. It means controlling the money supply in the economy is needed, and the government should take clearly defined steps in case of disproportionate inflation growth.

However, Kilic and Arica (2014) detected a negative impact of the inflation rate on economic growth. This fact may be related to the analysis of countries facing high inflation rates (for example, Venezuela and Uruguay). Therefore, a decline in the inflation rate may reduce the detrimental effect on economic growth in selected countries. Similar findings are detected by Baharumshah et al. (2016). Their results show that a high level of inflation rate harms economic growth. A low inflation rate is perceived positively. While inflationary uncertainty rather supports economic growth (inflation band 5.6–15.9%).

1.2 Unemployment rate and economic growth

Furthermore, Ahmad et al. (2022) show the short-run dynamics between economic growth and the unemployment rate. The authors point out that a stable political framework is

necessary to maintain a low unemployment rate and, thus, steady economic growth. The effect of unemployment on economic growth is also detected by Davari et al. (2022). Davari et al. (2022) found a negative relationship between economic growth and unemployment. The authors state that if any shock affects the unemployment rate, the increase in the unemployment rate will start to influence economic growth negatively. This impact is rated as a significant problem as the unemployment rate deepens, and this impact can last for up to 10 consecutive periods.

Different results from Davari et al. (2022) detected Sadiku et al. (2015). Sadiku et al. (2015) showed no relationship between economic growth and the unemployment rate in Macedonia. For these conclusions, he cites the downward direction of economic policy on the development of employment (the primary source of work is the public sector) and the occurrence of informal employment and structural unemployment in the economy. In contrast with Sadiku et al. (2015) are the results of Dritsakis and Stamatiou (2018). Dritsakis and Stamatiou (2018) found the existence of unidirectional cross-sectional causality from economic growth to the unemployment rate. In this regard, he argues that policymakers should focus on the development, education, and training of human capital that will support economic growth.

2 Data and Methods

Data in the period 4Q1999-4Q2021 quarterly are used to process the analysis. This period is included due to considering as long a time series as possible due to data available for individual countries of the Visegrad Group (V4). Forty-six observations for 1Q-3Q1999 were dropped due to missing data for Poland in the case of unemployment rate data. To maintain the same long time series for all V4 countries for all macroeconomic indicators, the starting period is 4Q1999. The data was drawn from the OECD database, namely 1,424 observations.

Macroeconomic indicators include economic growth, defined as the growth of the protentional product in the economy. Theoretically, it is assumed that the potential product should grow over time and, with it, the population's welfare. Economic growth is calculated as a logarithmic change in the gross national product in time t versus $t-1$. The choice of macroeconomic indicator of gross national product and the method of calculation is in accordance with Mohseni and Jouzaryan (2016):

$$\Delta GNP = \ln\left(\frac{GNP_t}{GNP_{t-1}}\right) * 100 \quad (1)$$

The inflation rate is then used as an explanatory variable. The inflation rate represents a change in the price level in the economy (Ahmad et al., 2022). The inflation rate is calculated as a logarithmic change in the consumer price index at time t compared to $t-1$. The use of the macroeconomic quantity of the inflation rate and its relationship to economic growth is supported, for example, by Qin and Wang (2018) and Baharumshah et al. (2016). The rate of inflation can be expressed as (Mohseni and Jouzaryan, 2016):

$$\Delta\pi = \ln\left(\frac{CPI_t}{CPI_{t-1}}\right) * 100 \quad (2)$$

Like the inflation rate, unemployment is also an explanatory variable. The unemployment rate represents a part of the economically active population that is not employed (either as an employee or self-employed) (Sadiku et al. (2015). The unemployment rate was calculated as the logarithmic change in the unemployment rate at time t compared to period $t-1$. The examination of the relationship between economic growth and the unemployment rate is supported, for example, by Ahmad et al. (2022) and Sadiku et al. (2015). The unemployment rate can be calculated as (Mohseni and Jouzaryan, 2016):

$$\Delta u = \ln\left(\frac{u_t}{u_{t-1}}\right) * 100 \quad (3)$$

The Augmented Dickey-Fuller unit root test will verify stationarity for the calculated time series. Subsequently, it is necessary to determine the optimal time delay to apply the Vector Error-Correction Model (VECM). Optimal time delays can be determined using the Hannan–Quinn information criterion, Schwarz criterion, and the Akaike information criterion.

The VECM focuses on identifying factors causing short-term deviations from long-term equilibrium. It means that the existence of a wide range of variables is possible, which can cause short-term dynamics of relationships between analyzed factors (Barbić and Čondić-Jurkić, 2011; Pesaran et al., 2000). The use of VECM is consistent with Ahmad et al. (2022) and Sadiku et al. (2015). The VECM can be expressed as follows (Barbić and Čondić-Jurkić, 2011):

$$\Delta y = \Pi y_{t-k} + \Gamma_1 \Delta y_{t-1} + \Gamma_2 \Delta y_{t-2} + \dots + \Gamma_{k-1} \Delta y_{t-(k-1)} + u_t \quad (4)$$

where:

- k the lag order
- Δ a difference operator
- Π and Γ .. 2x2 coefficient matrices
- u_t residual component
- Y_t vector of nonstationary variable (economic growth)
- t time period

3 Results and Discussion

First, the Augmented Dickey-Fuller unit root test verified the observed series for their stationarity. As Tab. 1 shows, all-time series were stationary at the level corresponding to stationarity at the first difference since these are logarithmic changes of individual macroeconomic variables. In the case of the unemployment rate in Hungary and the inflation rate in Slovakia, the results were statistically significant at the 5% level. The statistical significance was at the 1% level for all other macroeconomic variables. Before applying the Vector Error-Correction Model (VECM), it was necessary to determine the optimal lag length. For the model for Poland and Slovakia, a delay of 1 quarter was determined according to the Hannan–Quinn information criterion and Schwarz criterion. For the Hungary model, this is a delay of 1 quarter according to the Hannan–Quinn information criterion. Furthermore, in the case of Czechia, a delay of 1 quarter according to the Akaike information criterion is also considered.

Tab. 1: Results of the Augmented Dickey-Fuller unit root test

Variables	Czechia	Poland	Hungary	Slovakia
Economic growth	-9.8680* I(0)	-13.0339* I(0)	-11.0449* I(0)	-10.3134* I(0)
Inflation	-3.6247* I(0)	-3.7552* I(0)	-3.7126* I(0)	-2.9105** I(0)
Unemployment	-4.7186* I(0)	-5.2263* I(0)	-3.0475** I(0)	-4.0475* I(0)

Source: Authors' calculation. Note: *, **, and *** denote significance at the 1 %, 5 %, and 10 % levels. There is the Augmented Dickey-Fuller test statistic in the table. I(0) means stationary at the level, and I(1) means stationary at the first difference.

Subsequently, the short-term dynamics of the relationships between economic growth, inflation, and unemployment rates were tested. According to the results of the VECM estimations in Tab. 2, the coefficients of the error correction parameter $CointEq1$ are statistically significant for all four models. In the case of individual models, the error correction coefficient is unambiguously negative. It means that a positive development (that is, their growth) of macroeconomic variables should negatively affect economic growth. Although there are short-term deviations from the long-term equilibrium, the negative sign indicates the ability to return to the equilibrium state. The largest short-term deviation from the long-term equilibrium is clarified in the case of Czechia based on the constructed model. The VECM results in Tab. 2 suggest that, in the short term, the most important factor of

imbalances is the inflation rate in all Visegrad Group countries. This result is statistically significant at 1% for Poland and Slovakia. For Czechia, it is statistically significant at 5%, and in the case of Hungary, the result is statistically significant at 10%. In comparison, the unemployment rate is insignificant for short-term deviations from the long-term equilibrium in all countries of the Visegrad Group.

Tab. 2: Results of VECM estimations

	Czechia	Poland	Hungary	Slovakia
CointEq1	-1.8227* (0.1986) [-9.1743]	-1.0894* (0.2123) [-5.1307]	-0.9136* (0.1950) [-4.6836]	-1.0828* (0.1796) [-6.0274]
Economic growth (-1)	0.2711** (0.1149) [2.3590]	-0.1142 (0.1288) [-0.8866]	-0.1021 (0.1367) [-0.7472]	-0.0158 (0.1172) [-0.1348]
Inflation (-1)	-0.6300** (0.2805) [-2.2455]	-0.8922* (0.2558) [-3.4880]	-0.6059*** (0.3332) [-1.8182]	-0.7750* (0.2258) [-3.4323]
Unemployment (-1)	0.0482 (0.0472) [1.0211]	0.0488 (0.0395) [1.2349]	0.0875 (0.0616) [1.4211]	-0.0267 (0.0844) [-0.3171]
R2	0.7311	0.6234	0.4770	0.5191
Adj. R2	0.7179	0.6049	0.4512	0.4953
F-statistics	55.0831	33.5342	18.4719	21.8613

Source: Authors' calculation. Note: Standard errors are in round brackets, and t-statistics are in square brackets. All variables used in the VECM are first differenced. *, **, and *** denote significance at the 1 %, 5 %, and 10 % levels.

The absence of a relationship between the unemployment rate and economic growth contrasts, for example, with Ahmad et al. (2022), but is consistent with the conclusions of Sadiku et al. (2015). Regarding the achieved results, it is assumed that the insignificance of the unemployment rate could be a consequence of the measures applied in individual economies to prevent inadequate unemployment growth. Individual states apply measures in the active and passive employment policy, which should dampen the significant growth of the unemployment rate and support the employment of the economically active population. At the same time, some of the measures act as built-in stabilizers that should dampen cyclical fluctuations in individual economies. Labor law legislation in individual states, which

regulates the conditions between employees and employers, also plays an important role. At the same time, as Sadiku et al. (2015) reported, structural unemployment could play a particular role.

On the other hand, frictional unemployment is considered relatively stable. Some factors are expected to impact the unemployment rate in the long run due to certain time lags. These reasons could lead to the unemployment rate not affecting economic growth in the short term.

Unlike the unemployment rate, the inflation rate significantly impacts economic growth in the short term. The effect of the inflation rate on economic growth can also be found in Ahmad et al. (2022) and Qin and Wang (2018). The results could be justified because the rise in the inflation rate has a widespread impact, and the price of goods change can be relatively fast. At the same time, the issue of unemployment may manifest itself locally and, as a result of the above, with a certain delay. Specifics in individual countries, the form and effectiveness of the central bank's measures in the event of an undesirable development in the inflation rate could affect the effect.

The greatest influence is evident in Poland, where the development of the inflation rate causes 89% of the deviation from the long-term equilibrium. The slowdown in the growth of the inflation rate in the years 1999-2006 could be reflected in Poland. The reason was higher credibility of monetary policy, better anchoring of inflation expectations, higher productivity, and competitiveness on international markets (Allard, 2007). In 2015 and 2016, Poland struggled with deflationary effects due to falling world energy commodity prices, which were reflected in other commodity prices, and policy interest rate cuts were implemented. In 2021, a significant increase in food, transport, and energy prices became problematic.

The second country with a significant deviation in the short term caused by the development of the inflation rate is Slovakia. For example, the facts that had a greater influence on the inflation rate in selected years in Slovakia are given. In the case of Slovakia, the higher rate of inflation in 2000 was reflected in the impact of stabilization measures, increased energy prices, the continued rise in oil prices, a lower scope of regulated price adjustments, changes in indirect taxes, and the development of exchange rate the SKK/USD (National Bank of Slovakia, 2000). Inflation was affected by the effect of completed price deregulation of selected commodities such as gas and electricity and the introduction of a single VAT in 2004. Then, inflation was affected by free rail transport for students and

pensioners and a reduced VAT rate on some foodstuffs in 2016 (National Bank of Slovakia, 2000).

Conclusion

The paper aimed to investigate the short-term relationship between economic growth, inflation, and unemployment in the Visegrad group from 1999-2021. The VECM results showed that the inflation rate impacts economic growth in all V4 countries in the short term. In contrast, the unemployment rate does not cause fluctuations in economic growth in the short term. The non-existent relationship between the unemployment rate and economic growth is consistent with Sadiku et al. (2015). The result is a certain delay of some factors and their manifestation over a longer period. It can be, for example, the influence of labor law legislation and the scope of effect of the state's economic policy on the issue of unemployment. Some factors may be acceptable for economic growth, such as frictional unemployment.

Unlike the unemployment rate, the inflation rate significantly impacts economic growth in the short term. These findings were consistent with, for example, Ahmad et al. (2022) and Qin and Wang (2018). The impact of the inflation rate on economic growth in the short term can be explained by the fact that the rise in the inflation rate has a widespread impact, and the change in prices can be relatively fast. Specifics in individual countries, the form and effectiveness of the central bank's measures in the event of an undesirable development in the inflation rate may affect the effect.

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