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Macroeconomic Determinants of Youth Unemployment: A Comparative Analysis of Poland and Türkiye

Makroekonomiczne determinanty bezrobocia młodzieży: Analiza porównawcza Polski i Turcji

Abstract

The paper analyzes the impact of economic growth, inflation, and temporary employment on youth unemployment in Poland and Türkiye in 2000–2023. The main aim is to determine the short- and long-term impact of the GDP growth rate, the inflation rate, and the proportion of temporary employment on the youth unemployment rate. An econometric analysis was conducted on 2007–2020 data using the ARDL Bounds Test method. It found that while economic growth reduces youth unemployment in both countries, a rise in inflation appears to increase it. It further found that an increase in temporary employment increases youth unemployment in Poland, but that this is not significant in Türkiye.

Keywords: Youth Unemployment, Economic Growth, Inflation, Temporary Employment, ARDL Model, Comparative Analysis: Poland and Türkiye.

JEL: E24, F43, E31, O57

Streszczenie

Artykuł koncentruje się na wpływie trzech podstawowych zmiennych makroekonomicznych na bezrobocie młodzieży w Polsce i Turcji w latach 2000–2023, tj. wzrostu gospodarczego, inflacji i zatrudnienia tymczasowego. Głównym celem artykułu jest ustalenie krótko- i długo-okresowego oddziaływania stopy wzrostu PKB, wskaźnika inflacji i udziału zatrudnienia tymczasowego w zatrudnieniu ogółem na stopę bezrobocia młodzieży. W artykule przeprowadzono analizę ekonometryczną, wykorzystując dane z lat 2007–2020 i model autoregresji z rozłożonymi opóźnieniami ARDL. Zgodnie z wynikami analizy, o ile wzrost gospodarczy przyczynia się do zmniejszenia bezrobocia młodzieży w obu krajach, to wzrost inflacji raczej powiększa bezrobocie młodzieży. Z drugiej strony, powiększenie zatrudnienia tymczasowego jest czynnikiem, który zwiększa bezrobocie młodzieży w Polsce, natomiast w przypadku Turcji wpływ zatrudnienia tymczasowego jest nie istotny.

Słowa kluczowe: bezrobocie młodzieży, wzrost gospodarczy, inflacja, zatrudnienie tymczasowe, model ARDL, analiza porównawcza: Polska i Turcja.

JEL: E24, F43, E31, O57

1. Introduction

European labor markets have experienced a number of changes in the 21st century. Although there has been an observable downward trend in unemployment rates in Poland and Türkiye (much more pronounced in Poland) this century, it should be emphasized that this indicator remains high in some groups of the labor force. In both countries, unemployment rates among youth aged 15–24 were much higher than overall unemployment rates. For example, in 2007, the youth unemployment rate in Poland was 21.5%, compared with an overall unemployment rate of 9.6% (i.e. 2.23 times higher), while in Türkiye, the respective figures were 16.0% and 8.9% (i.e. 1.79 times higher). The respective ratios were 3.06 and 1.66 in 2020, and 4.07 and 1.86 in 2023.

The extent of unemployment, including youth unemployment, depends on a number of economic, social, demographic, and institutional factors. The literature on this subject is very extensive. Special attention is given to those determinants of unemployment related to macroeconomic variables, with changes in GDP, inflation and temporary employment being assigned a special role.

The importance of changes in GDP for the development of unemployment, including youth unemployment, is well established in Keynesian theory. Keynes emphasizes that an increase in aggregate demand increases the volume of production and employment in the economy, while a decrease in aggregate demand decreases them (Keynes, 1985, p. 51). This idea was taken up by A. Okun, who estimated the statistical relationship between a change in the unemployment rate and the production growth rate in the US economy, claiming that each additional percentage point of the unemployment rate above 4% is associated with a 3% reduction of real GNP (Okun, 1962). This relationship is known in the economic literature as Okun's law.

Economic theory also emphasizes the relationship between unemployment and inflation. Although Keynesian theory acknowledges that investment activity subsides during periods of high inflation, which implies a positive relationship between inflation and unemployment (Keynes, 1985, p. 143), traditional Phillips curve theories emphasize that an increase in unemployment eases wage pressure, thereby alleviating inflation (Lipsey, 1960). As highlighted in the theory of NAIRU, this relationship may, however, be distorted by a high level of equilibrium unemployment.

The theories of the natural rate of unemployment and NAIRU emphasize the dependence of equilibrium unemployment on labor market efficiency. Friedman associated natural unemployment with labor market imperfections, i.e., with deviations from the model of perfect competition (Friedman, 1975). The NAIRU theory puts forward the idea of the influence of structural mismatches in the labor market and labor market institutions (legal protection of employment, unemployment benefits, degree of unionization) on equilibrium unemployment (Layard et al., 1991). Both theories posit a strong connection between unemployment and the degree of labor market flexibility. The proportion of employment that is temporary can be considered a proxy for labor market flexibility.

This paper examines changes in youth unemployment in Poland and Türkiye in 2007–2023 in order to determine the short- and long-term impact of the GDP

growth rate, the inflation rate, and the proportion of temporary employment on youth unemployment. To the best of the authors' knowledge, this paper's econometric analysis of the long- and short-run effects of these macroeconomic determinants on youth unemployment in Poland and Türkiye has no precedent. This paper therefore contributes to the literature on the topic.

Poland and Türkiye were selected for analysis on account of those similarities and differences that are material to the development of youth unemployment. Both countries have a market economy, a similar level of economic development (GDP per capita was approx. 20% higher in Poland than in Türkiye in 2023), and face a major challenge with youth unemployment. However, their labor markets operate in slightly different institutional conditions. This largely has to do with Poland being an EU member state (since 2004). There are a number of arguments that indicate that Poland has a more flexible labor market than Türkiye.[1] It is therefore instructive to examine the impact of the macroeconomic determinants (enumerated above) on youth unemployment in light of the different institutional conditions of the two countries.

The time period adopted for analysis requires explanation, as changes were made to the definitions and scopes of the basic labor market categories, viz. employed, unemployed, and economically inactive, in the Polish LFS in the first quarter of 2021. It therefore needs to be borne in mind that the 2021-2023 data are not fully comparable with those from previous years. However, as stated in the Polish Central Statistical Office (GUS) report, data on unemployment rates from 2010–2020 converted according to the 2021 definition only exhibit minor changes (up to a maximum of 0.4 percentage points) compared to the original data (GUS, 2022). Nevertheless, to avoid potential problems with data comparability, 2007–2020 is used as the basic analysis period for the econometric analyses.

This paper is structured as follows. Section 2 reviews the literature on youth unemployment in Poland and Türkiye. Section 3 presents the data and explains the research methodology. Section 4 discusses the development of youth unemployment, as well as GDP, inflation, and temporary employment trends in Poland and Türkiye in 2007–2023. Section 5 presents the results of the econometric analyses and demonstrates the importance of GDP growth, inflation, and temporary employment for youth unemployment in both countries in 2007–2020. Section 6 contains the conclusions.

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[1] Firstly, employment protection regulations are less restrictive in Poland than in Türkiye. EPL indexes for regular employment contracts in 2007–2019 were 2.33 in Poland and 3.06 and 2.98 in Türkiye, while the corresponding temporary employment indices were 2.21 in Poland and 4.96 and 4.50 in Türkiye (OECD Database, data downloaded on April 16, 2024). These differences are even more pronounced than these figures would indicate, as Poland has a significantly higher proportion of temporary employment. Secondly, the degree of regulation of the labor market is quantified by the tax wedge indicator. In 2013, this indicator, which incorporates family benefits, amounted to 35.6% of gross wages in Poland and 38.6% in Türkiye, and 34% in Poland and 37% in Türkiye in 2022 (Krajewska, 2016; Ministerstwo Finansów, 2023).

2. Literature Review

This section reviews those studies on the macroeconomic determinants of youth unemployment that examine Poland and Türkiye. Those studies that address the relationship between youth unemployment and economic growth are presented before those that focus on the relationship between youth unemployment and inflation. Those studies that deal with the relationship between youth unemployment and inflation and economic growth are also cited and briefly discussed. The last part looks at a few studies that examine youth unemployment and temporary employment.

2.1. The studies on the relationships between youth unemployment and economic growth

Many of the studies on Poland and Türkiye discuss the relationship between unemployment and economic growth within the framework of Okun's Law. While most of them focus on economic growth and total unemployment, some only deal with youth unemployment.

Hutengs and Stadtmann (2013) discuss youth unemployment developments in some CEE countries, including Poland, and compared them with the EU15. The Okun coefficient was calculated using unemployment types in different age groups. The study finds that the effect of economic growth on youth unemployment in the 15–24 age group is more evident and negative than in the elderly population. The study also finds that Poland has the highest average unemployment of all these countries.

One of the most important studies for Poland regarding the relationship between economic growth and unemployment was conducted by Kliber (2014). The author, who examined the Okun coefficient for each Polish region, stated that Okun's law is valid for the regions, but that the coefficient varies by region. The study stresses that a 1p.p. rise in a regional growth rate reduces its unemployment rate by 0.05 to 0.046 percentage points. The study finds that increasing production on its own will not reduce unemployment, and emphasizes that each region requires a tailored employment policy.

Sophie Dunsch (2016) examined tendencies in youth unemployment in Poland and Germany in 1992–2014. Using Okun's law, she tested whether young people were more vulnerable to the business cycle than adults. She estimated Okun coefficients for five different age cohorts. The results showed that young people in Poland and Germany were more sensitive to business cycle fluctuations than adults, but that the differences between the age cohorts in Germany were smaller. Moreover, the Okun coefficient for young people differed between the two countries: the sensitivity of unemployment rates in Poland to changes in GDP was much larger than in Germany. In order to explain these differences, she investigated employment protection legislation, the minimum wage, the duality of the labor market, and the education system in the two countries.

Soylu, Çakmak and Okur (2018), who conducted research on Eastern European countries by examining the relationship between economic growth and unemployment

within the scope of Okun's law and using 1992–2014 panel data, stated that unemployment is negatively affected by economic growth. Their study finds that a 1% increase in GDP reduces unemployment by approximately 0.08%.

Butkus and Seputiene (2019), who conducted a panel analysis within the scope of Okun's law for 28 EU member states (including Poland) for 2000-2018, focused on the effects of economic growth on both total unemployment and youth unemployment and found that the latter is more sensitive to changes in economic growth. The study also emphasized that youth unemployment is more sensitive to negative output shocks than to positive output shocks.

There are also studies which focus on the relationship between economic growth and (youth) unemployment in Türkiye. For example, Sayin (2012) states that youth unemployment is a major problem for developed and developing countries, and analyzes the impact of economic growth on youth unemployment. Education was also discussed. The VAR model was used and the econometric analysis was performed on 1988–2010 data. The results indicate that economic growth significantly affects youth unemployment in the short- and long-run, and that economic growth reduces youth unemployment in Türkiye.

For their part, Şenol and Onaran (2022) investigated the relationship between economic growth and unemployment by using a time series analysis for 1990–2020, and found a negative relationship between unemployment and economic growth.

There are also studies that address the issue from the perspective of both countries. For example, Zanin (2014), who discussed the relationship between economic growth and youth unemployment in the OECD (which includes Poland and Türkiye), within the framework of Okun's law, found that the Okun coefficient varies according to age and gender. His study found that economic growth reduces youth unemployment in both Poland and Türkiye, and that the Okun coefficient is higher for Poland.

This list is not exhaustive. Other studies consider the impact of economic growth and inflation on youth unemployment simultaneously. These are discussed in the next section.

2.2. The studies on the relationships between youth unemployment and inflation

The literature is replete with studies that discuss the relationship between unemployment and inflation within the scope of the Phillips curve. While most of the studies conducted for Poland directly address the relationship between inflation and youth unemployment, most of those conducted for Türkiye focus on the combined impact of economic growth and inflation on youth unemployment. This section summarizes these studies and their findings.

One important youth unemployment publication is the article by Liotti (2022) which addresses the relationship between inflation and youth unemployment. Econometric analysis was conducted for the EU28 (which includes Poland) using 2000–2018 data. The study found that inflation increases youth unemployment. The author contended that this was because high inflation reduces aggregate demand.

For their part, Ćwiąkała-Małys & Mościbrodzka (2023) focused on investigating the validity of the Phillips curve in Poland during the pandemic and the war in Ukraine. This study, whose econometric analysis was performed on monthly data from 2013–2022, found a negative relationship between inflation and unemployment during the period of pandemic and the war in Ukraine. However, there was no negative relationship between inflation and unemployment in the long term.

Finally, Koterwa, Kycia, & Czapkiewicz (2023) performed an econometric analysis for Poland using 2001–2021 data, and focused on the correlation between inflation and unemployment. This correlation was found to be negative in the short term and positive in the long term.

As mentioned above, the majority of studies conducted for Türkiye have discussed the effects of economic growth and inflation on youth unemployment in the same model and evaluated the effects of these variables on youth unemployment. Kabaklarlı & Gür (2011) examined the macroeconomic variables that affect youth unemployment for Türkiye by using the Johansen Cointegration Test method on monthly data. They found that a 1% point higher inflation rate increases the youth unemployment rate by 0.37% points and that a 1% point higher GDP decreases it by 3.07% points. Their paper also emphasizes that there is a long-run relationship between the variables.

Çondur & Bölükbaş (2014), who examine the labor market and youth unemployment-economic growth relationship in Türkiye by taking the effects of globalization into account, also draw attention to the effects of both economic growth and inflation on youth unemployment. A Granger Causality Test was performed using 2000 Q1–2010 Q4 data. The paper finds a causal relationship from youth unemployment to economic growth, and a causal relationship from inflation to youth unemployment. On the basis of these findings, the authors suggest that changes in economic growth and inflation may have a decisive impact on youth unemployment in Türkiye.

Another study examining the main macroeconomic determinants of youth unemployment for Türkiye using 1988–2013 data was conducted by Günaydın & Çetin (2015). An ARDL Bounds Test and a Granger Causality Test were performed on various macroeconomic variables that affect youth unemployment. The study found that real per capita income and inflation have a statistically significant negative impact on youth unemployment, and that there is a long-run causal relationship between the variables.

Bayrak and Tatlı (2016) examined the short- and long-run effects of some macroeconomic factors, including inflation and economic growth, on youth unemployment. A Cointegration Test and an ARDL Bounds Test were performed on 1988–2014 data. The study found that inflation has a significant and negative effect on youth unemployment, while economic growth has a positive but insignificant effect on youth unemployment in the long run.

Some studies examine the impact of economic growth and inflation on youth unemployment for both Poland and Türkiye. For example, Bayrak and Tatlı (2018) examine the determinants of youth unemployment by performing a panel data analysis of the OECD (which includes Poland and Türkiye) on 2000–2015 data.

Their study investigates the effects of several macroeconomic variables, e.g., economic growth, the consumer price index, gross national savings, and labor productivity, on youth unemployment. It found that economic growth and inflation decrease youth unemployment, and that these variables therefore determine youth unemployment.

Bölükbaş (2018) analyzed the effects of inflation and economic growth on youth unemployment for 20 emerging economies, including Poland and Türkiye, using 1991–2016 data. The relationship between the series was tested with the use of second-generation panel cointegration (developed by Westerlund, 2008) and a panel causality test (developed by Dumitrescu and Hurlin, 2012). The study reveals statistically significant bidirectional causality between the series. It additionally demonstrates that both inflation and economic growth have a negative effect on youth unemployment in those countries. This result indicates that lower inflation and higher economic growth may lead to a decline in youth unemployment rates.

2.3. Studies on the relationships between youth unemployment and temporary employment

The present study differs from those cited above in that it additionally considers whether temporary employment affects youth unemployment. Therefore, it is useful to look at those studies on youth unemployment in which this variable is considered. However, such studies are rare.

J. O'Reilly et al. (2015) examined many of the processes and factors that influence the extent of youth unemployment in contemporary Europe. The authors drew attention to the education system, increases in youth migration, generational inheritance, and the importance of national youth policies. They emphasized that labor market flexibility brought about by increased temporary employment (especially in Poland) and part-time employment prevented young people from obtaining stable employment.

M. Pilc (2017) analyzed the scope and consequences of temporary employment for the economic prospects of the Polish labor market using 2009–2013 data from the Polish Social Diagnosis panel study. The data revealed that temporary employment was predominantly offered to young people in Poland. Although people aged 15–24 accounted for only 16.8% of the temporary employed, more than 70% of them were on temporary employment contracts. The results of the binomial logistic regression models presented in the paper indicated that the temporarily employed were 65% more likely than the permanently employed to become unemployed in 2013.

Kwiatkowski (2016) discussed the economic effects of fixed-term employment in the OECD. Many statistical data, e.g. fixed-term employment by age group and level of education, were used. The analysis shows that an increase in the proportion of fixed-term employment affects employment elasticity in a U-shaped manner.

While there are no studies that directly address temporary employment in Türkiye, there are a few studies[2] that do so for other countries.

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[2] See further: Goux et al., 2001; Blanchard & Landier, 2002; Benito & Hernando, 2008; Van Lancker, 2012; Pfeiffer, 2009; Bentolila et al., 2012; Aguirregabiria & Allonso-Borrego, 2014.

Most studies on Poland and Türkiye deal with the structural problems of youth unemployment and focus on the effects of its macroeconomic determinants. Studies on Poland invariably conclude that economic growth has a negative effect on unemployment. However, they further emphasize that the effect of inflation on unemployment is negative in the short term and positive in the long term. Studies on Türkiye generally arrive at the same conclusions. Most studies emphasize that economic growth and inflation both reduce youth unemployment. Some studies (Kabaklarlı & Gül, 2011 and Sertkaya & Okur, 2016) have found that inflation mitigates youth unemployment in Türkiye but not Poland, which may be due to the specifics of the two countries during the period under consideration. It can therefore be an established fact that developments in economic growth and changes in inflation have determining effects on youth unemployment. This is corroborated by the foregoing literature review. It should prove instructive to additionally examine the effect of temporary employment on youth unemployment. It is this addition of temporary employment as a macroeconomic variable that differentiates the present study.

3. Data and Research Methodology

This section is structured as follows. The first subsection describes the data set, and the second explains the econometric model.

3.1. Data

The period 2007–2023 is discussed in the non-parametric part of the study.[3] However, the econometric analysis is confined to the period 2007–2020 in order to ensure full data integrity. Whether there is a long-run and/or short-run relationship between youth unemployment (total) (YUT), economic growth (GDP), inflation (INF), and temporary employment (TEM), the issue was examined for Poland and Türkiye by using the quarterly data for the period 2007: Q1–2020: Q4. As they are quarterly, they were seasonally adjusted to eliminate transitory variation.

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[3] This decision was made, despite the fact that unemployment and employment data from 2021–2023 are not fully comparable with previous data. The differences between the original and corrected data are small, as emphasized in the GUS report.

Table 1.

Data Description

Variable	Description	Time Period	Data Type	Source of Data
PLYUT TRYUT	Youth unemployment (15–24): Total, %	2007:Q1–2020:Q4	Time Series	Eurostat (2024) OECD (2024)
PLGDP TRGDP	GDP Constant, Growth on the same period of the previous year, %	2007:Q1–2020:Q4	Time Series	Eurostat (2024) OECD (2024)
PLINF TRINF	CPI, Total, Growth on the same period of the previous year, %	2007:Q1–2020:Q4	Time Series	Eurostat (2024) OECD (2024)
PLTEM TRTEM	Proportion of temporary employees (%)	2007:Q1–2020:Q4	Time Series	Eurostat (2024)

Note: PL indicates Poland, TR indicates Türkiye.
Source: Own calculations.

As can be seen from Table 1, there are four different variables used in this study: youth unemployment rate (15–24) – total, % (PLYUT, TRYUT); GDP – constant, growth on the same period of the previous year (%) (PLGDP, TRGDP); CPI – total, growth on the same period of the previous year (%) (PLINF, TRINF); and the proportion of temporary employees (%) (PLTEM, TRTEM). The data were collected from Eurostat (2024) and the OECD (2024). Youth unemployment is the dependent variable, and economic growth, inflation, and temporary employment are independent (explanatory) variables. The GDP growth rate is the main explanatory variable. This study is based on Okun's Law. However, determining whether the effects of inflation and temporary employment on youth unemployment are as significant as the GDP growth rate obviously required that these two explanatory variables be included. This also explains the extensiveness of the literature review.

3.2. Research Methodology

The Autoregressive Distributed Lag (ARDL) Bound Test method, developed by Pesaran et al. (2001), was used to investigate the effect of the macroeconomic variables on youth unemployment. This test is more useful than the cointegration methods developed by Engle & Granger (1987) and Johansen (1988). This is because the method can test the existence of a cointegration relationship when the degree of stationarity of the series is different. Several preliminary tests and operations were conducted on the series. Firstly, the levels of stationarity of the variables were determined by using the Augmented Dickey Fuller (ADF) and Philips Perron unit root tests. The null hypothesis of these tests indicates that there is a unit root, i.e., that the series is not stationary, and the alternative hypothesis shows that there is no unit root, i.e., that it is stationary.

The models used in this study are presented below.

$$PLYUTt = \beta0 + \beta1PLGDPt + \beta\ 2PLINFt + \beta3PLTEMt + ut \qquad (1)$$

$$TRYUTt = \beta0 + \beta1TRGDPt + \beta2TRINFt + \beta3TRTEMt + ut \qquad (2)$$

The location of the variables in the model clearly indicate that the effects of economic growth, inflation and temporary employment on youth unemployment are investigated. While economic growth is expected to reduce youth unemployment, a reverse relationship is expected between inflation and temporary employment and youth unemployment.

In the first step of the ARDL Bounds Test method, an unrestricted error correction model is established to determine whether there is a cointegration relationship between the series. The error correction model of this study was established as follows:

$$\Delta PLYUT_t = \alpha_0 + \sum_{i=1}^{m}\alpha_{1i}\,\Delta PLYUT_{t-i} + \sum_{i=0}^{m}\alpha_{2i}\,\Delta PLGDP_{t-i} + \sum_{i=0}^{m}\alpha_{3i}\,\Delta PLINF_{t-i} + \quad (3)$$

$$+ \sum_{i=0}^{m}\alpha_{4i}\,\Delta PLTEM_{t-i} + \beta_{1i}PLYUT_{t-1} + \beta_{2i}PLGDP_{t-1} + \beta_{3i}PLINF_{t-1} +$$

$$+ \beta_{4i}PLTEM_{t-1} + u_t$$

$$TRYUT_t = \alpha_0 + \sum_{i=1}^{m}\alpha_{1i}\,\Delta TRYUT_{t-i} + \sum_{i=0}^{m}\alpha_{2i}\,\Delta TRGDP_{t-i} + \sum_{i=0}^{m}\alpha_{3i}\,\Delta TRINF_{t-i} + \quad (4)$$

$$+ \sum_{i=0}^{m}\alpha_{4i}\,\Delta TRTEM_{t-i} + \beta_{1i}TRYUT_{t-1} + \beta_{2i}TRGDP_{t-1} + \beta_{3i}TRINF_{t-1} +$$

$$+ \beta_{4i}TRTEM_{t-1} + u_t$$

In these equations, α_0 is the constant variable, α_1, α_2, α_3 *and* α_4 show the error correction dynamics, α_5, α_6, α_7 and α_8 are long run relationship between variables, Δ denotes the difference operator, and ε_t is the error term in the model.

To test these hypotheses, the F-statistic, calculated with a Wald test was used (Pesaran et al., 2001). It is compared with the significance levels derived in their study. If the F statistic is greater than the upper limit value of the table, the hypothesis is rejected and it is stated that there is a cointegration relationship between the variables.

According to the ARDL Bounds Test method, after deciding that there was a cointegration relationship between the series, the phase of investigating long

run and short run relationships should be started. The determination of the long run relationship was carried out within the framework of the model given below.

$$PLYU_t = \varphi_0 + \sum_{i=1}^{m} \varphi_{1i} PLYU_{t-i} + \sum_{i=0}^{n} \varphi_{2i} PLGDP_{t-i} + \sum_{i=0}^{p} \varphi_{3i} PLINF_{t-i} + \tag{5}$$

$$+ \sum_{i=0}^{p} \varphi_{4i} PLTEM_{t-i} \varepsilon_t$$

$$TRYU_t = \varphi_0 + \sum_{i=1}^{m} \varphi_{1i} TRYU_{t-i} + \sum_{i=0}^{n} \varphi_{2i} TRGDP_{t-i} + \sum_{i=0}^{p} \varphi_{3i} TRINF_{t-i} + \tag{6}$$

$$+ \sum_{i=0}^{p} \varphi_{4i} TRTEM_{t-i} + \varepsilon_t$$

Once a long run relationship between the variables is found, Error Correction methods need to be estimated in order to analyze short run relationships. The error correction model is expressed as follows.

$$\Delta PLYU_t = \theta_0 + \sum_{i=1}^{m} \theta_{1i} \Delta PLYU_{t-i} + \sum_{i=0}^{n} \theta_{2i} \Delta PLGDP_{t-i} + \sum_{i=0}^{p} \theta_{3i} \Delta PLINF_{t-i} + \tag{7}$$

$$+ \sum_{i=0}^{0} \theta_{4i} \Delta PLTEM_{t-i} + \theta_5 EC_{t-i} + \varepsilon_t$$

$$\Delta TRYU_t = \theta_0 + \sum_{i=1}^{m} \theta_{1i} \Delta TRYU_{t-i} + \sum_{i=0}^{n} \theta_{2i} \Delta TRGDP_{t-i} + \sum_{i=0}^{p} \theta_{3i} \Delta TRINF_{t-i} + \tag{8}$$

$$+ \sum_{i=0}^{O} \theta_{4i} \Delta TRTEM_{t-i} + \theta_5 EC_{t-i} + \varepsilon_t$$

Here, m, n, p, and o denote the lag lengths (these factor in AIC and autocorrelation results), and Δ is the difference operator. The error correction terms, denoted by in Equations 7 and 8, are the lagged values of the residuals of the long-run relationship model. The coefficient of this term indicates how long it takes for a short run shock to disappear and for the term to approach its long run equilibrium value. Note that this coefficient must be negative and statistically significant.

4. The Development Trends of Youth Unemployment and Its Macroeconomic Determinants

Labor market trends in Poland and Türkiye, including youth unemployment, have been developing in a specific macroeconomic environment. Three indicators play a special role in this environment, viz. GDP growth, inflation, and temporary employment. It is therefore worth examining these indicators during the analyzed period (2007–2023). The relevant data are quarterly real GDP figures (2015 prices), quarterly CPI indices, quarterly youth unemployment rates, and temporary employment rates.

Figure 1 presents trends in changes in the youth unemployment rate in Poland in 2007–2023, along with its main determinants. The figure shows that there were various trends in changes in youth unemployment rates during this period. There are four distinct trends: (1) a downward trend in 2007–2008; (2) a slight increase in 2009–2013; (3) a strong downward trend in 2014–2019; and (4) a tendency to stabilize in 2020–2023.

The downward trend in 2007–2008 (from approximately 21% to 17%), accompanied by a decrease in the overall unemployment rate (from approximately 9% to 7%), was related to high GDP growth rates (7% in 2007 and 4.1% in 2008), and small increases in inflation (3.7% and 3.8% during these years). The proportion of temporary employment was large during this period (approximately 26–28%).
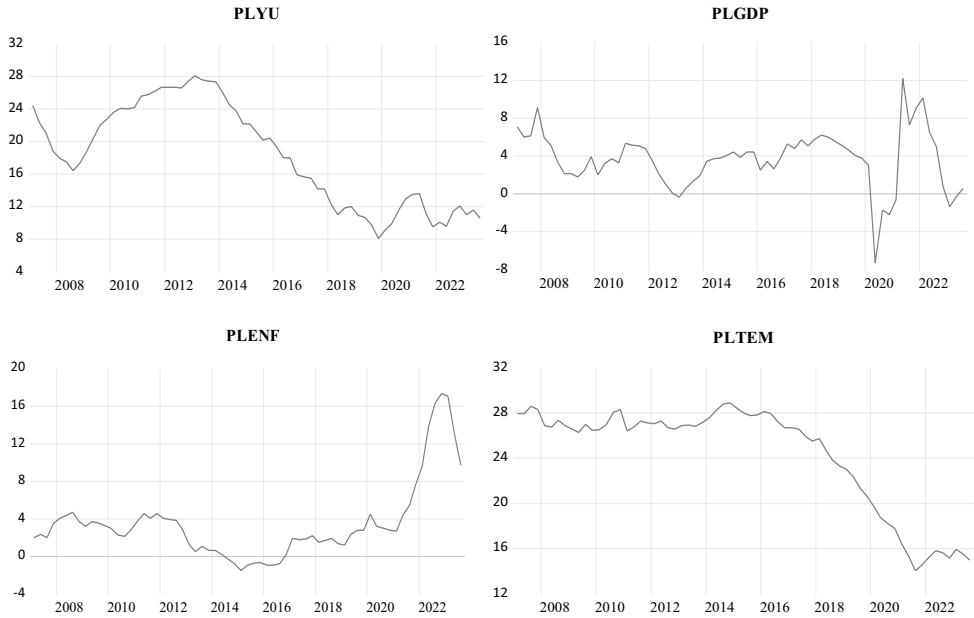
There was an upward trend in youth unemployment (from approximately 20 to 27%), accompanied by an increase in the overall unemployment rate (from approximately 8 to 10%) in 2009–2013. This was, in part, caused by the global financial crisis. The GDP growth rate in Poland decelerated, especially in 2012–2013, but remained positive. These trends were accompanied by increasingly slower price growth (by 0.2% in 2013) and temporary employment rates remaining high (26–28%).

During the third subperiod of 2014–2019, the youth unemployment rate decreased (from approximately 23% to 10%), as did the total unemployment rate (from approx. 9% to 3%). These trends were associated with relatively high GDP growth rates (approximately 4–5% p.a.) and very low inflation rates. There were even deflationary tendencies in 2015–2016. The shares of temporary employment remained high and only began to come down at the end of this subperiod (to approx. 20% in 2019).

Both unemployment and youth unemployment were unstable (approx. 10–11%) during the Covid-19 pandemic and the war in Ukraine (2020–2023). This was associated with the instability of GDP growth. GDP fell by approx. 2% in 2020, but grew at an accelerated rate in the following years. These trends were accompanied by increasingly higher inflation (especially in 2022 and 2023) and decreasing temporary employment rates (up to approx. 15% in 2023).

Figure 1.

Youth Unemployment and Macroeconomic Determinants of Youth Unemployment in Poland (%)

Note: The data in the graphs are quarterly; Unemployment and employment data for 2021–2023 are not fully comparable with those of prior years.

Source: Eurostat (2024) and OECD (2024).

Figure 2 shows the same trends as Figure 1, but for Türkiye. The youth unemployment rate can be analyzed over four sub-periods in 2007–2023: (1) an increase in 2007–2009; (2) a decline in 2010–2011; (3) an increase in 2012–2020; and (4) a decline in 2021–2023.
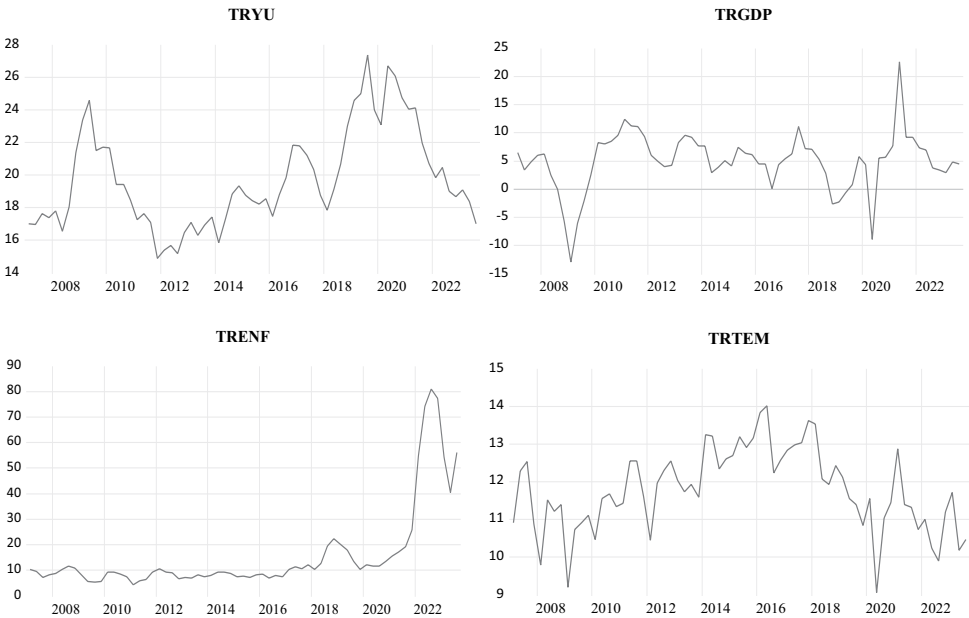
There was an increase in the youth unemployment rate (from approx. 16% to 22%) and the overall unemployment rate (from approx. 8% to 12%) in Türkiye in 2007–2009. This was associated with a decreasing GDP growth rate (from 5% p.a. to approx. −4.8% p.a.), relatively high inflation (approx. 5–12% p.a.), and moderate temporary employment (approx. 10–11% of total employment).

Türkiye experienced downward trends in the youth unemployment rate (from 19% to 15%) and the overall unemployment rate (from approx. 10% to 8%) in 2010–2011. This occurred in tandem with high GDP growth rates (8–11% per year), relatively high inflation (7–8%), and a slightly higher proportion of temporary employment.

There were increases in the youth unemployment rate (from 15% to 24%) and the overall unemployment rate (from 8% to 13%) in 2012–2020. This was associated with a precipitous fall in previously high GDP growth rates (to 0.8% in 2019 and 1.8% in 2020), and higher inflation (14% in 2020). The proportion of temporary employment changed little over this time.

There were downward trends in the youth unemployment rate (from 22% to 18%) and the overall unemployment rate in 2021–2023. This was associated with very high GDP increases (11% in 2021 and 5.5% in 2022), very high inflation (28% in 2021 and 96% in 2022), and a stable proportion of temporary employment (approximately 12–13%).

Figure 2.
Youth Unemployment and Macroeconomic Determinants of Youth Unemployment in Türkiye (%)

Note: The data in the graphs are quarterly.
Source: Eurostat (2024) and OECD (2024).

Several observations can be made from the trends in youth unemployment rates and their macroeconomic determinants presented above. First, unemployment rates were generally higher than the overall unemployment rates in both countries and during every subperiod examined. Second, the relationship between youth unemployment rates and GDP growth rates was uniform in both countries: downward trends in unemployment rates were accompanied by high or increasing GDP growth rates, and upward trends in unemployment were accompanied by low or decreasing GDP growth rates. Third, there is no clear connection between the youth unemployment rate and inflation. In Türkiye, high inflation was accompanied by declines in youth unemployment in some sub-periods and increases in others. In Poland, declines in youth unemployment rates were accompanied by both low and rising inflation, and increases were accompanied by falling inflation. Fourth, changes in youth unemployment are also weakly correlated to the importance of temporary employment. In Poland, a large proportion of temporary employment was

accompanied by an increase in the youth unemployment rate in some sub-periods, and a decrease in others. Similarly, in Türkiye, the proportion of temporary employment increased in sub-periods when the youth unemployment rate increased and decreased.

5. Results of the Econometric Analysis

This section presents the results of the econometric analysis that the authors conducted to determine the impacts of economic growth, inflation, and temporary employment on youth unemployment in Poland and Türkiye.

Table 2.
Unit Root Test Results (Poland & Türkiye)

		ADF		PP		
	Variable	Level	First Difference	Level	First Difference	Stationarity Results
Poland	PLYUT	-0.50(4) [0.49]	-2.96(3) [0.00]	-0.93 [0.77]	-4.34 [0.00]	I(1)
	PLGDP	-2.03(0) [0.04]		-1.91 [0.05]		I(0)
	PLINF	-0.78(0) [0.37]	6.35(0) [0.00]	-0.93 [0.30]	-6.34 [0.00]	I(1)
	PLTEM	-0.77(4) [0.37]	6.96(0) [0.00]	-1.99 [0.99]	-6.97 [0.00]	I(1)
Türkiye	TRYUT	-1.40(0) [0.57]	-6.46(0) [0.00]	-1.52 [0.51]	-6.46 [0.00]	I(1)
	TRGDP	-3.16(0) [0.02]		-3.26 [0.02]		I(0)
	TRINF	-2.69(1) [0.08]	-6.48(3) [0.00]	-2.27 [0.19]	-5.25 [0.00]	I(1)
	TRTEM	-1.41(4) [0.56]	4.30(3) [0.00]	-0.15 [0.72]	-21.80 [0.00]	I(1)

Note: In the ADF test, the optimum lag length was determined according to the Schwarz information criterion. In the PP test, the Bartlett-Kernel method and the bandwidth Newey West Bandwidth method were used. The values in square brackets [...] show p-probability values.
Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

The ADF and PP unit root test results of the series used in the econometric analysis are presented in Table 2. As the probability values in parentheses are less than the 5% significance level, the null hypothesis that there was a unit root in the series was rejected for the economic growth variables (PLGDP, TRGDP), and therefore, they were found to be stationary at the level I(0). Both tests show that youth unemployment (PLYUT, TRYUT), inflation (PLINF, TRINF) and temporary employment (PLTEM, TRTEM) are stationary at the first difference level, I(1), i.e., the same results were obtained in both unit root tests of the stationarity of the variables.

As the variables are not equally stationary at a constant level, the ARDL Bounds Test method can be used to analyze the long-run relationship.

Table 3.
ARDL Cointegration Test Results (Poland & Türkiye)

			Critical Values 5%	
	k	F-Statistic	Lower limit I(0)	Upper limit I(1)
Poland	3	5.56	3.23	4.35
Türkiye	3	9.44	3.69	4.89

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

Table 3 presents the ARDL cointegration test results for Poland and Türkiye. It can be seen that the calculated F statistic is greater than the upper limit for both countries. The H0 is rejected and we can decide that there is the cointegration relationship between the youth unemployment, economic growth, and inflation variables to be determined. The findings of the search for long- and short-run relationships are presented in Tables 4 and 5.

Table 4.
ARDL (4, 1, 0, 2) Long-Run Form and Bounds Test (Poland)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.27	1.84	-2.31	0.02
PLYUT(-1)	1.01	0.13	7.53	0.00
PLYUT(-2)	-0.00	0.21	-0.01	0.98
PLYUT(-3)	0.28	0.19	1.40	0.16
PLYUT(-4)	-0.37	0.12	-3.02	0.00
PLGDP	-0.11	0.06	-1.65	0.10
PLGDP(-1)	-0.16	0.06	-2.38	0.02
PLINF	0.25	0.06	3.61	0.00
PLTEM(-1)	0.17	0.20	0.83	0.41
PLTEM(-2)	0.26	0.17	1.51	0.13
Long-Run Coefficients				
PLGDP	-3.26	1.26	-2.58	0.01
PLINF	2.97	1.44	2.05	0.04
PLTEM	2.86	0.71	3.98	0.00

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

The ARDL (4, 1, 0, 2) long-run form and bound test results presented in Table 4 show that increasing economic growth reduces long-run youth unemployment

in Poland. The coefficients indicate that a 1% point higher economic growth reduces long-run youth unemployment rate by 3.26% points. Moreover, it can be seen that a 1% point higher inflation increases long-run youth unemployment rate by 2.97% points and that a 1% point higher temporary employment increases it by 2.86% points. These findings are statistically significant and theoretically expected. Finally, economic growth is found to have a greater impact on youth unemployment than inflation and temporary employment.

Table 5.

ARDL (3, 1, 1, 0) Long-Run Form and Bounds Test (Türkiye)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.82	1.73	2.20	0.03
TRYUT(-1)	-0.23	0.06	-3.60	0.00
TRYUT(-2)	-0.16	0.12	-1.30	0.19
TRYUT(-3)	-0.21	0.11	-1.94	0.05
TRGDP(-1)	-0.24	0.04	-5.60	0.00
TRINF	0.12	0.04	2.54	0.01
TRTEM	0.06	0.09	0.71	0.47
Long Run Coefficients				
TRGDP	-1.04	0.28	-3.69	0.00
TRINF	0.52	0.19	2.64	0.01
TRTEM	0.28	0.41	0.68	0.49

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

The ARDL (3, 1, 1, 0) long-run form and bound test results presented in Table 5 show that increasing economic growth reduces long-run youth unemployment in Türkiye. The coefficients indicate that a 1% point higher economic growth reduces long-run youth unemployment rate by 1.04% points. Moreover, it can be seen that a 1% point higher inflation increases it by 0.52% points. Finally, nothing can be said about the effect of temporary employment on long-run youth unemployment, because the finding is statistically insignificant.

As stated above, Error Correction methods need to be estimated in order to analyze the short-run relationships between youth unemployment, economic growth, inflation, and temporary employment for Poland and Türkiye. An Error Correction model was therefore established in order to investigate the short-run dynamics of these variables acting together on the two countries in the long run.

Table 6.

Short-Run Form and Error Correction Model (4, 1, 0, 2) (Poland)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.27	0.87	-4.91	0.00
ΔPLYUT(-1)	0.09	0.12	0.80	0.42
ΔPLYUT(-2)	0.09	0.12	0.74	0.46
ΔPLYUT(-3)	0.37	0.11	0.74	0.46
ΔPLGDP	-0.11	0.05	-1.93	0.06
ΔPLTEM	-0.19	0.14	-.1.35	0.18
ΔPLTEM(-1)	-0.26	0.14	-1.81	0.07
ECT(-1)	-0.08	0.01	-4.88	0.00

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

The short-run form and error correction model results presented in Table 6 show that economic growth and temporary employment negatively impact short-run youth unemployment in Poland. This warrants the conclusion that economic growth has a similar effect on long- and short-run youth unemployment. These findings additionally support the long-run relationship between the variables. The error correction mechanism requires that the coefficient of the error correction term (ECT) must be negative and significant, and this is the case. If the error correction term is negative, the short-run deviations will be eliminated and the series will converge to the shortrun equilibrium value again among the series moving together in the long run. The error correction term result here is quite good.

Table 7.

Short-Run Form and Error Correction Model (3, 1, 1, 0) (Türkiye)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.82	0.60	6.36	0.00
ΔTRYUT(-1)	-0.16	0.11	-1.41	0.16
ΔTRYUT(-2)	-0.21	0.10	-2.14	0.03
ΔTRGDP	-0.14	0.03	-4.14	0.00
ECT(-1)	-0.23	0.03	-6.34	0.00

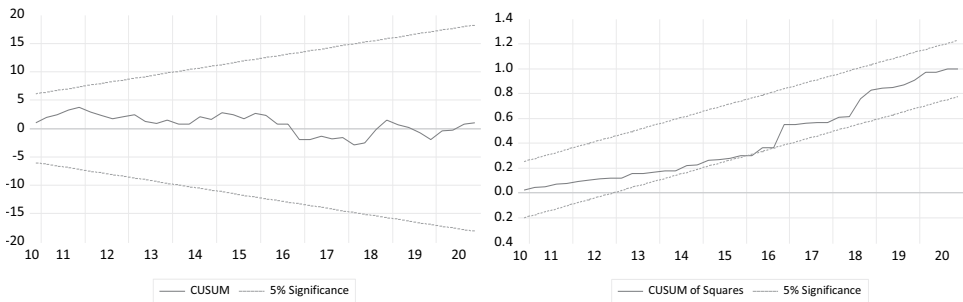*Source*: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

The short-run form and error correction model results presented in Table 7 show similar results for Türkiye. The coefficient of the error correction term ECT(-1) is statistically significant and negative. Economic growth has a negative effect on youth unemployment in both the long run and the short run.

In summary, increasing economic growth reduces youth unemployment, while inflation increases it, in both Poland and Türkiye. However, the impact of these

two factors is more pronounced in Poland. Unemployment is more sensitive to GDP growth in Poland because of that country's more flexible labor market (in the period analyzed, the EPL indices were 2.33 in Poland and 2.98 in Türkiye for regular employment contracts, and 2.21 and 4.50, respectively, for temporary contracts (OECD, 2024). However, whereas temporary employment has a positive and significant effect on youth unemployment in Poland, this is not the case in Türkiye.
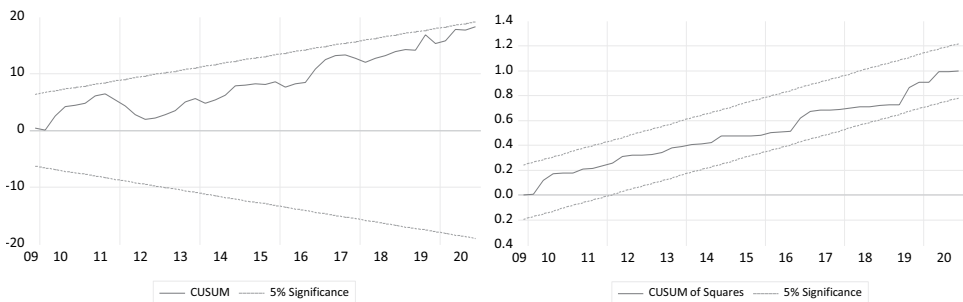
Many diagnostic tests of the models were carried out to verify the validity of these findings. These tests confirmed the accuracy of the predictions of the models. The statistics obtained from autocorrelation, heteroskedasticity, normality, and model building error tests are all acceptable. Moreover, the CUSUM and CUSUMQ graphs depicted in Figures 3 and 4 show that the regression coefficients are quite stable.

Figure 3.
CUSUM and CUSUMQ for Poland

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

Figure 4.
CUSUM and CUSUMQ for Türkiye

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

The CUSUM and CUSUMSQ tests developed by Brown, Durbin & Evans (1975) are usually used to test the stability of the coefficients of the models. If the coefficients are stable, the curves obtained from the CUSUM and CUSUMSQ tests must

remain within the 5% significance level, which is also present in the same tests. As can be seen on the figures, the curves obtained from the CUSUM and CUSUMQ tests remain within the 5% significance level. The regression coefficients are therefore stable for Poland and Türkiye in the period under consideration.

In order to further expand the scope of this study, the effects of GDP, INF and TEM variables on youth unemployment rates were also examined by gender. Both female and male youth unemployment data were taken from Eurostat (2024) and were analyzed separately. The findings are presented in the appendices. This expansion produced some interesting results. The factors affecting total youth unemployment, female youth unemployment and male youth unemployment for Poland and Türkiye are presented as comparative results in the tables below. (For detailed tables, please see the appendices)

Table 8.

Comparative Results for Poland

Long Run Coefficients					
Dependent Variable	Independent Variables	Coefficient	Std. Error	t-Statistic	Prob.
	PLGDP	-3.26	1.26	-2.58	0.01
PLYUT	PLINF	2.97	1.44	2.05	0.04
	PLTEM	2.86	0.71	3.98	0.00
	PLGDP	-5.76	3.41	-1.68	0.09
PLYUF	PLINF	0.21	1.07	0.19	0.84
	PLTEM	-0.00	0.01	-0.42	0.67
	PLGDP	-3.77	2.27	-1.66	0.10
PLYUM	PLINF	2.75	1.74	1.57	0.12
	PLTEM	0.00	0.00	0.34	0.73

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

As stated above, in Poland, economic growth reduces total youth unemployment, while inflation and temporary employment increase it. Table 8 shows that these results are statistically significant. However, while economic growth can be seen to have a negative effect on both male and female youth unemployment, this finding is not statistically significant, as the probability values are not less than 0.05. Similarly, Table 8 shows that both inflation and temporary employment have positive and statistically significant effects on total youth unemployment, but the same cannot be said of male and female youth unemployment (again, the probability values are not less than 0.05).

In summary, the macroeconomic variables under consideration have a negative effect on total, male, and female youth unemployment in Poland, albeit at different significance levels. Table 9 below presents the comparative results for Türkiye.

Table 9.

Comparative Results for Türkiye

Dependent Variable	Independent Variables	Long Run Coefficients			
		Coefficient	Std. Error	t-Statistic	Prob.
TRYUT	TRGDP	-1.04	0.28	-3.69	0.00
	TRINF	0.52	0.19	2.64	0.01
	TRTEM	0.28	0.41	0.68	0.49
TRYUF	TRGDP	-0.51	0.13	-3.95	0.00
	TRINF	0.17	0.04	-4.24	0.00
	TRTEM	-0.00	0.00	-1.77	0.08
TRYUM	TRGDP	-1.13	0.3	-3.54	0.00
	TRINF	-0.10	0.05	-2.17	0.03
	TRTEM	0.00	0.00	1.11	0.26

Source: Own calculations based on Eurostat Database (2024) and OECD Database (2024).

As stated above, increasing economic growth reduces long-run total youth unemployment in Türkiye. Table 9 shows that economic growth has a negative and significant effect on both male and female youth unemployment.

However, the comparative results are not parallel in terms of inflation: an increase in inflation in Türkiye increases total and female youth unemployment, but it decreases male youth unemployment. These statistically significant and interesting results are important in that they imply that an increase in the general price level will significantly affect those parts of the labor market where young people are concentrated.

Increasing temporary employment has a positive effect on total and male youth unemployment, but a negative effect on female youth unemployment. However, it is quite difficult to say whether these coefficients are significant.

6. Conclusion

This examines the impact of economic growth, inflation, and temporary employment on youth unemployment in Poland and Türkiye. As both countries are market economies, comparing the effects of these variables on youth unemployment is an original contribution to the literature. The literature review on the subject reveals that there are few papers that examine the effects of all these variables on youth unemployment and that the results of those few are somewhat disparate. However, there are many studies that show that both economic growth and inflation reduce youth unemployment. The most important contribution of the present study is that it demonstrates that temporary employment is also a determining factor on youth unemployment. Moreover, the effect of temporary employment on unemployment can differ from country to country. A country's labor market flexibility is therefore a significant factor as well. This paper's econometric analysis of the long- and short-

run effects of macroeconomic determinants on youth unemployment in Poland and Türkiye is another addendum to the literature. The scope of the study is further expanded by evaluating the effects of macroeconomic determinants on the male and female components of youth unemployment. This produced interesting results.

Economic growth reduces long-run youth unemployment in Poland and Türkiye. A 1% point higher increase in economic growth reduces long-run youth unemployment rate by 3.26% points in Poland and 1.04% points in Türkiye. The greater reduction in Poland may be associated with that country's relatively high labor market flexibility. The findings of the empirical analysis conform to theoretical expectation and confirm those of Bayrak & Tatlı (2018), as well as those of Bölükbaş (2018), who examined the subject by taking groups of countries, including Poland and Türkiye, into consideration.

Inflation is also shown to affect youth unemployment in both countries: a 1% point increase in inflation increases long-run youth unemployment by 2.97% points in Poland and 0.52% points in Türkiye. This statistically significant result underscores the importance of inflation to the labor market. Temporary employment affects youth unemployment differently in the two countries: while it increases it in Poland, it does not have a significant effect on it in Türkiye.

To summarize the major findings, economic growth and inflation reduce youth unemployment in both countries, although the effect of economic growth is greater. The 2024 World Bank Report predicts that Poland and Türkiye will both grow by approx.[4] 3% in 2024 and 2025. This can be expected to reduce youth unemployment over the coming years.

The finding that inflation increases long-run youth unemployment in Poland and Türkiye is consistent with the Keynesian theory of investment decisions. For this reason, inflation prevention policies should be reviewed. However, there is a significant difference between the impact of inflation on youth unemployment in Poland and Türkiye. This can be attributed to the variable effect of longstanding high inflation on the labor market in Türkiye. This in turn may be the result of over extensive stimulative demand policies.

Another important result is that temporary employment also determines youth unemployment in Poland. This may have to do with the relatively low protection of temporary employment in Poland.

The scope of the study was expanded by analyzing male and female youth unemployment data separately. This yielded the following results:

- The effects of macroeconomic variables on total youth unemployment in Poland are in the same direction as they are on male and female youth unemployment, but with different significance levels;
- While the effects of economic growth on total, male and female youth unemployment in Türkiye are similar, inflation has a positive effect on total and female youth unemployment, but a negative effect on male youth employment.

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[4] According to the World Bank (2024) report, the economic growth estimates are 3% (2024) and 3.4% (2025) for Poland, and 3% (2024) and 3.6% (2025) for Türkiye.

Similarly, temporary employment increases total youth unemployment but decreases female youth unemployment.

Finally, the effects of macroeconomic variables on youth unemployment may differ according to the economic structures of particular countries. It is, however, definitely the case that when youth unemployment is evaluated according to gender, the results differ somewhat. Therefore, this study makes new and modest contributions to the literature.

Data availability

The data and materials used in this study are publicly available in OECD (2024) Quarterly Main Indicators https://ec.europa.eu/eurostat/data/database and Eurostat (2024) Eurostat Database. https://stats.oecd.org/index.aspx?r=367564#

References

Aguirregabiria, V., & Allonso-Borrego, C. (2014). Labor Contracts and Flexibility: Evidence from a Labor Market Reform in Spain. *Economic Inquiry*, *52*(2), 930–957. https://doi.org/10.1111/ecin.12077

Bayrak, R., & Tatlı, H. (2016). Short and Long Term Analysis of Some Factors Effecting Youth Unemployment in Turkey. *Theoretical and Applied Economics, Asociatia Generala a Economistilor din Romania*, *3*(608), 229–242.

Bayrak, R., & Tatlı, H. (2018). The Determinants of Youth Unemployment: A Panel Data Analysis of OECD Countries. *The European Journal of Comparative Economics*, *15*(2), 231–248.

Benito, A., & Hernando, I. (2008). Labour Demand. Flexible Contracts and Financial Factors: Firm-level Evidence from Spain. *Oxford Bulletin of Economics and Statistics*, *70*(3), 283–301. https://doi.org/10.1111/j.1468-0084.2007.00494.x

Bentolila, P., Cachuc, P., Dolado, J. J., & Le Barbanchon, T. (2012). Two-tier Labour Markets in the Great Recession: France Versus Spain. *Economic Journal*, *122*, F155–F187.

Blanchard, O. J., & Landier, A. (2002). The Perverse Effects of Partial Labor Market Reform: Fixed Duration Contracts in France. *Economic Journal*, *112*(480), F214–F244. https://www.jstor.org/stable/798373

Bölükbaş, M. (2018). Do Inflation and Economic Growth Substantially Affect Youth Unemployment? Evidence from 20 Emerging Economies. *International Journal of Economics and Administrative Studies*, *18*, 55–66. https://doi.org/10.18092/ulikidince.354678

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for Testing the Constancy of Regression Relationships Over Time. *Journal of the Royal Statistical Society*, *37*(2), 149–192. https://www.jstor.org/stable/2984889

Butkus, M., & Seputiene, J. (2019). The Output Gap and Youth Unemployment: An Analysis Based on Okun's Law. *Economies*, *7*(10), 1–17, https://doi.org/10.3390/economies7040108

Ćwiąkała-Małys, A., & Mościbrodzka, M. (2023). Relationship between Unemployment and Inflation in Poland in the Context of the Phillips Curve – A Time of Pandemic and War in Ukraine. *Wrocławsko-Lwowskie Zeszyty Prawnicze*, *14*, 185–205. https://doi.org/10.19195/2082-4939.14.12

Çondur, F., & Bölükbaş, M. (2014). A Study on Labor Market and the Relationship between Youth Unemployment and Economic Growth in Turkey. *Amme İdaresi Dergisi*, *47*(2), 77–93.

Dunsch, S. (2016). Okun's Law and Youth Unemployment in Germany and Poland. *International Journal of Management and Economics*, *49*, 34–57. http://www.sgh.waw.pl/ijme, https://doi.org/10.1515/ijme-2016-0003

Engle, R. F., & Granger, C. W. J. (1987). Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, *55*(2), 251–276. https://doi.org/10.2307/1913236

Eurostat (2024). *Eurostat Database*. https://ec.europa.eu/eurostat/data/database

Friedman, M. (1975). Rola polityki pieniężnej. In A. Szeworski (ed.), *Teoria i polityka stabilizacji koniunktury. Wybór tekstów*. PWE.

Goux, D., Maurin, E., & Pauchet, M. (2001). Fixed-term Contracts and the Dynamics of Labour Demand. *European Economic Review*, *45*(3), 533–552. https://doi.org/10.1016/S0014-2921(00)00061-1

Günaydın, D., & Çetin, M. (2015). The Main Macroeconomic Determinants of Youth Unemployment: An Empirical Analysis. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *22*, 17–34.

Hutengs, O., & Stadtmann, G. (2013). *Don't Trust Anybody Over 30: Youth Unemployment and Okun's Law in CEE Countries*. European University Viadrina Frankfurt (Oder), Department of Business Administration and Economics Discussion Paper, 333.

GUS (2022). *Informacja głównego urzędu statystycznego na temat przeliczonych dla lat 2010–2020 wyników*. Badania Aktywności Ekonomicznej Ludności (BAEL). GUS.

Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamic and Control*, *12*(2–3), 231–254. https://doi.org/10.1016/0165-1889(88)90041-3

Kabaklarlı, E., & Gür, M. (2011). *Türkiye'de genç işsizlik sorunu ve ekonomik belirleyicilerinin uzun dönem eş-bütünleşme analizi.* Presented at the 14. Uluslararası İktisat Öğrencileri Kongresi.

Keynes, J. M. (1985). *Ogólna teoria zatrudnienia, procentu i pieniądza*, wyd. 2. PWN.

Kliber, P. (2014). *The Diversity of Okun's Coefficient in the Regions of Poland*. https://ssrn.com/abstract=2461427 or http://dx.doi.org/10.2139/ssrn.2461427

Koterwa, J., Kycia, H., & Czapkiewicz, A. (2023). The Relationship between the Inflation Rate and the Unemployment Rate in Poland and Their Long-term Associations with Selected Macroeconomic Variables. *Managerial Economics*, *24*(2), 165–185. https://doi.org/10.7494/manage.2023.24.2.165

Krajewska, A. (2016). Opodatkowanie pracy w OECD. Analiza porównawcza i wnioski dla Polski. *Annales Universitatis Mariae Curie--Skłodowska Lublin-Polonia, L*(1).

Kwiatkowski, E. (2016). Controversies on the Economic Effects of Fixed-term Employment-evidence from the OECD Countries. *Olsztyn Economic Journal*, *11*(3), 195–210.

Layard, R., Nickell, S., & Jackman, R. (1991). *Unemployment: Macroeconomic Performance and the Labour Market*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199279166.001.0001

Liotti, G. (2022). Labour Market Regulation and Youth Unemployment in the EU-28. *Italian Economic Journal*, *8*(1), 77–103. https://doi.org/10.1007/s40797-021-00154-3

Lipsey, R. G. (1960). The Relationship Between Unemployment and the Rate of Change of Money Wage Rates in the U.K. 1862–1957: A Further Analysis. *Economica*, *105*.

Ministerstwo Finansów (2023). *Klin podatkowo-składkowo-transferowy wg OECD*.

O'Reilly, J., Eichorst, W., Gabos, A., Hadjivassiliou, K., Lain, D., Leschke, J., McGuinness, S., Kurekova, L. M., Nazio, T., Ortlieb, R., Russell, H., & Villa P. (2015). Five Characteristics of Youth Unemployment in Europe: Flexibility, Education, Migration, Family Legacies, and EU Policy. *SAGE Open*, *5*(1), 1–19. https://doi.org/10.1177/2158244015574962

OECD (2024). *Quarterly Main Indicators*. https://stats.oecd.org/index.aspx?r=367564#

OECD Database (2024). *Database Statistics*.

Okun, A. (1962). *Potential GNP: Its Measurement and Significance*. Cowles Foundation, Yale University, Reprinted from the 1962 Proceedings of the Business and Economic Statistics Section of the American Statistical Association.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bound Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, *16*(3), 289–326. https://www.jstor.org/stable/2678547 doi: I: 10.1002/ja

Pfeiffer, C. (2009). Fixed-term Contracts and Employment Adjustment: An Empirical Test of the Core-periphery Hypothesis Using German Establishment Data. *Economic Record*, *85*(268), 92–107. https://doi.org/10.1111/j.1475-4932.2008.00531.x

Sayın, F. (2012). Analysis of the Impact of the Education and the Growth in Turkey from 1988 to 2010 on Youth Unemployment. *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *13*(4), 33–53.

Şenol, N., & Onaran, S. (2022). The Relationship Between Economic Growth and Health. R&D Expenditures and Unemployment in Turkey. *International Journal of Economics, Business and Politics*, *6*(1), 141–155. https://doi.org/10.29216/ueip.1086577

Van Lancker, W. (2012). The European World of Temporary Employment. Gendered and Poor? *European Societies*, *14*(1), 83–111. https://doi.org/10.1080/14616696.2011.638082

World Bank (2024). *World Bank Open Data*. https://databank.worldbank.org/

Zanin, L, (2014). On Okun's Law in OECD Countries: An Analysis by Age Cohorts. *Economics Letters*, *125*(2), 243–248. https://doi.org/10.1016/j.econlet.2014.08.030

Appendix

Additional materials related to this article are available in the online supplementary appendix at the journal's website.