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# Causality Relationship Between Youth Unemployment and NEET Rates by Gender: Baltic Versus Mediterranean

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# Genç İşsizliği ve Neet Oranları Arasında Nedensellik İlişkisi - Baltık ve Akdeniz Ülkeleri Karşılaştırması

**Özet**

Bu çalışma, Baltık ve Akdeniz ülkelerinde genç işsizlik ile NEET oranları arasındaki nedensellik ilişkisini incelemektedir. Baltık ülkelerinde NEET'ten genç işsizliğine doğru bir geçiş gözlemlenirken, cinsiyet açısından bir nedensellik ilişkisi bulunmamaktadır. Akdeniz ülkelerinde ise erkek NEET'lerin genç işsizliğin nedeni olduğu, kadınlarda ise işsizlikten NEET'e geçiş olduğu tespit edilmiştir. Cinsiyetler arasındaki farklılıklar, bu iki kavramın sosyo-ekonomik etkilerini derinleştirmektedir. Ayrıca, Baltık ülkeleri ile Akdeniz ülkeleri arasındaki bulgular, işgücü piyasalarındaki toplumsal cinsiyet ayrımcılığının etkisini göstermektedir. Sonuç olarak, Baltık ülkelerinde cinsiyet eşitliği daha yüksekken, Akdeniz ülkelerinde kadın NEET'lerin en dezavantajlı grup olduğu ortaya çıkmaktadır. Bu durum, gençlerin işgücü piyasasına katılımını artıracak politikaların gerekliliğini vurgulamaktadır.

**Anahtar Kelimeler:** NEET, Genç İşsizliği, Gençlik, Cinsiyet, Nedensellik Analizi

**Abstract**

This study examines the causal relationship between youth unemployment and NEET rates in Baltic and Mediterranean countries. In the Baltic countries, a transition from NEET to youth unemployment is observed, while no causal relationship is found regarding gender. In Mediterranean countries, it has been determined that male NEETs cause youth unemployment, while there is a transition from unemployment to NEET among females. The differences between genders deepen the socio-economic impacts of these two concepts. Additionally, the findings between Baltic and Mediterranean countries demonstrate the effects of gender discrimination in labor markets. As a result, while gender equality is higher in Baltic countries, female NEETs emerge as the most disadvantaged group in Mediterranean countries. This situation emphasizes the need for policies to increase youth participation in the labor market.

**Keywords:** NEET, Youth Unemployment, Youth, Gender, Causality Analysis

**JEL Code:** C33, C51, J21, J71, J71

## Introduction

Youth unemployment has increased in many countries since the beginning of the crisis in 2008. Even more problematic is the dramatic increase in the number of young people not in employment, education or training (NEET), which has led to fears of an impact on social cohesion and a "lost generation" (Dietrich, 2012; Maguire et al., 2013:196-235). Although the concept of NEET (Not in Education, Employment or Training) has only recently entered the global political agenda, reducing unemployment among youth and young adults has become a pressing issue for many countries. The rapid increase in the number of young people not in education, employment or training (NEET) has made the concept of NEET, which was initially used to describe social status, concrete and an important indicator.

Young people are the most important agents of countries' social and economic transformation. If young people are ignored, their social benefits may be jeopardized. The significant increase in the NEET rate in the country's population requires policymakers to conduct an in-depth analysis of the two essential elements of the concept: unemployment and inactivity. In particular, countries with aging populations need to develop policies to ensure that young people are more active in the workforce to ensure the continuity of their social security systems (Özdemir et al., 2023:409).

Although youth unemployment and NEET youth are related to the situation of individuals in the 15-24 age group, they are actually very different concepts. The common feature of the two concepts is that both have negative content for young people in this age range. Policymakers must develop policies to minimize these two disturbing rates in the population. Although youth unemployment and unemployment rates have been a part of unemployment calculations for many years, the concept of NEET and the NEET rate are pretty new in the economic literature. Although both problems essentially represent economic losses, the concept of youth unemployment is a problem that needs to be resolved in the active labor market, while the NEET problem refers to the issues of re-activating inactive people aged 15-24.

However, although these two concepts are different, there is also a transition channel between them. This transition is essentially two-sided. Young unemployed people who search for a job for 6 months and cannot find one, by definition, leave the active labor market and enter NEET status, while on the other hand, people who search for a job again despite being inactive or who participate in training programs such as on-the-job training programs, regain an active status. However, both concepts also appear to be separate socio-economic problems due to their gender differences.

Based on this point, our study is a panel data causality analysis conducted to determine whether there is any causality between youth unemployment rates and NEET rates based on gender in 18 members and candidate European Union countries. Here, a comparison was made for two disturbing ratios by dividing European Countries into two groups: Baltic and Mediterranean Countries on the northern and southern axis. In addition, the transitivity or stickiness of these two structural ratios with each other was also evaluated. In the first part of the study, similar studies conducted in the economic literature on the subject will be mentioned, and the difference of the study from other studies and its contribution to the literature will be revealed. Then, the conceptual framework will be drawn in the second part. Then, the methodology will be explained in the method and data set section, the panel data causality model will be run, and the findings will be presented. The last part will evaluate the results and give policy recommendations.

## 1. Literature

Bruna et al. (2014) aimed to examine the situation after the 2008 Financial Crisis by comparing the youth unemployment rate, total unemployment rate and NEET rates in their study. They tried to determine the differences in the continuity of NEET and YUR rates and the possible changes in the sensitivity of these labor market indicators to GDP dynamics after the crisis by using dynamic panel data GMM and bias-corrected LSDV estimators in the EU region, which are five regions as Continental,

Northern, Anglo-Saxon, Southern and New Countries. In their study, they made findings that favored southern countries in the labor markets between south and northern countries regarding both NEET and youth unemployment (Bruno et al., 2014:592-615).

Examining the spatial and temporal unbalanced expansion of "Neither in Education Nor Employment" (NEET) youth in Italy, Spain, Greece and South Cyprus in the European Union (EU) South between 2008 and 2018, Avagianu et al. (2022) have linked the concept of "youth spaces" to critically analyze the economic, social and political spatialities that determine the dynamic relationship between young people and the labor market. In their study, where they discuss the reasons for the persistently high NEET rates in the EU South, they emphasize that gender, class, education and economic growth are the main socio-spatial factors that determine the geographically unbalanced expansion of NEETs across regions of employment (Avegianu et al., 2022:425-454).

Pennoni and Bal-Domanska (2022) analyze the situation of "Neither in Education Nor Employment" (NEET) and Youth Unemployment (YU) in the European Union member states through data collected over sixteen years. The study uses a hidden Markov model to evaluate the impact of some macroeconomic factors. As a result of the study, the researchers discovered three country clusters. They revealed that Italy was the country with the worst performance in terms of both NEET and YU, the Czech Republic was the country with the best performance in reducing NEETs, and Poland and Slovakia were the countries with the best performance in reducing YU (Pennoni and Bal-Domanska, 2022:739-761).

Bradley et al. (2020) investigated the "determinants" of spatial differences in youth unemployment and NEET rates and the existence of spatial clusters for Italy, Spain and the United Kingdom. They examined the Labour Force Survey data for the period 1993-2018 at the "regional" level. Their study concluded that young people are sensitive to aggregate labour market conditions and the desperate worker effect. While temporary jobs are preferred to part-time jobs in the United Kingdom and Spain, the opposite is found to be true in Italy. They obtained significant results for local and regional labor market policies within the framework of the evidence they found that youth unemployment and NEET rates are spatially clustered. In this context, Bradley et al. emphasize that strategies suitable for local conditions should be developed in regions with high youth unemployment and NEET rates (Bradley et al., 2020:1074-1107).

Balan (2013) examined the size and characteristics of the NEET population in Romania compared with other countries in Southeastern Europe. In his study, he estimated the structure and size of NEET and youth unemployment rates and analyzed the youth unemployment rate. He evaluated the structure, education and gender composition of NEET groups in the pre-crisis period and under the impact of the crisis (Balan, 2013:29-41).

In their study, Gazizova et al. (2022) demonstrate a strong relationship between NEET youth and youth unemployment rates through cross-country econometric analyses. They conclude that high youth unemployment has potentially long-term and destructive consequences, leading to the possibility of increased re-employment for young people, decreased future earnings, and a higher likelihood of exiting the labor market (Gazizova et al., 2022: 48-61).

As seen in the international literature, studies analyze youth unemployment rates and NEET rates. Comparative analyses similar to our research have been conducted between these two disturbing rates across regions or countries. However, the study we have conducted with this article will contribute to the literature by providing clues about the causality between youth unemployment rates and NEET rates across countries and whether there are transitions between these two different statuses. At this stage, in addition to finding the causality between the two, the direction of causality will also be determined, and the separate evaluation of these causality relationships in terms of gender breakdown will bring a different perspective to the situations of these already fragile structures.

## 2. Conceptual Framework

### 2.1. Youth Unemployment

According to the standard definition by the United Nations, "youth encompasses the age group between 15 and 24 years." In practice, the operational definition of youth or young people varies significantly from country to country, depending on cultural, institutional, and political factors. In developed countries, the lower age limit typically corresponds to the legal minimum school leaving age, while the upper limit tends to vary more widely. However, the UN definition will be employed due to the methods and data set used in this article. It is also important to make a further distinction between youth and young adults, as the issues these two groups face are quite different (O'higgins, 1997: 63-93). Nevertheless, this article will focus on youth unemployment and consider the age range of young individuals between 15 and 24 years.

Young individuals entering the labor market are generally considered a vulnerable population. In recent decades, the issue of youth unemployment has gained attention, particularly as many Western countries have faced this problem. On one hand, young people who drop out of school must find jobs, which exposes them to temporary unemployment during their job search. On the other hand, young people have less experience than adults, making them more vulnerable to unemployment (Jacobs, 2008: 147-163). Young people face a higher risk of unemployment than older workers, have a greater likelihood of transitioning between unemployment, education, and work status, and are more likely to enter temporary or insecure forms of employment (Quintini et al., 2007).

One reason for young people's low attachment to the labor market is their low work experience levels. During the transition from school to work, those entering the labor market tend to "shop for jobs" (Topel and Ward, 1992), learning their skills and preferences, which leads to higher turnover rates and more frequent periods of unemployment. At the same time, firms face higher investment costs and lower dismissal costs when employing young workers, making the youth labor market more sensitive to fluctuations on the demand side. This situation was also evident after the 2007/2008 financial crisis (Bell and Blanchflower, 2010; Verick, 2011; Choudhry et al., 2012: 76-95). Between 2008 and 2009, youth unemployment rates increased by about five percentage points, reaching an average of 20%, then rose to 24% in 2013 and 25.9% in 2023. In contrast, the adult unemployment rate increased from 6% to 10% during the same period and then returned to 5.8% during the subsequent recovery period. As seen, these data indicate that the issue of youth unemployment is a much more pressing structural problem compared to adult unemployment rates.

The problem of youth unemployment is a significant issue that stands before both young people and societies, requiring resolution. The difficulties faced by young people, who form the future of the country and are the foundation of its human capital, due to unemployment at an early age will lead not only to individual income and mental health issues but also to social distress (Bayraktar and İncekara, 2013: 15-38). In addition to the economic costs caused by unemployment, the social and psychological effects distinguish youth unemployment from other issues. While income loss due to unemployment can be compensated for over specific periods, the feelings of hopelessness, disappointment, fear, and intense anxiety caused by the problem cannot be remedied, nor can the damage it causes be repaired. Remarkably, exposure to such issues at an early age can lead to behavioral disorders that persist in later stages of life. Youth unemployment can result in social exclusion for young individuals. In addition to these reasons, youth unemployment also poses significant risks in terms of economic development. Young people who cannot participate in the production process during their most productive and active years hinder the progress of national income and economic development (Erdayı, 2009: 133-162).

### 2.2. Not in Employment, Education or Training (NEET)

Approximately thirty years ago, it was observed in Great Britain that young people were unemployed and disengaged from education and training. Today, the number of young people who are neither in education nor employment is increasing daily. The concept of NEET (Not in Education, Employment, or Training) emerged because terms like youth unemployment and youth employment were insufficient to

explain the scale of the problem due to various issues in the labor market (Yates and Payne, 2007: 329-344). Initially, the NEET term referred to individuals aged 16-18 who had completed compulsory education and decided not to continue their education. These individuals were seen to face difficulties in finding jobs due to not participating in vocational qualification courses and were often excluded from the labor market (Bynner and Parsons, 2002: 289-309; Fahmy, 2006; France, 2007; Holte, 2018: 1-16).

Today, this concept has expanded further, with the NEET age range being accepted in different segments as 15-24 and 15-29 by supranational organizations such as ILO, EUROSTAT, UN, and OECD (Cavalca, 2015: 272-287). When the NEET concept, which indicates that young people are neither employed nor engaged in education or training, is examined globally, it is evident that the young people in this group do not come from a homogeneous background. In other words, these individuals come from different social strata. While the reasons for their inclusion in this group vary, the number of young people in the NEET category is increasing yearly (Köken and Koç, 2022).

Facilitating factors for entering the NEET status have been clearly defined: low parental education levels, previous unemployment status of parents, parental divorce, low family income, residing in remote areas, low educational attainment, immigrant background, and any type of disability (Mascherini et al., 2012: 196-426). This group generally includes young people who drop out of school early, are unemployed, hopeless, and have low self-esteem, as well as those who are sick or disabled due to caregiving responsibilities for family members. Among the NEET figures that have reached serious levels in many countries, the segment with the highest share is typically the unemployed and individuals who take on caregiving roles within the family (Çolak and Koç, 2023a: 77-91).

Factors that multifacetedly transform societies, individuals, economies, and working lives complicate the transition of young people from education to work. The emergence of job opportunities at older ages, the disappearance of certain jobs due to technological innovations, the automation of some jobs by robots, the proliferation of artificial intelligence, the changing meanings attributed to work by new generations, and the mismatch between current market conditions and expectations regarding working life and education are among the many reasons for this situation. This leads to a rapid increase in the number of employed young people. Particularly in developing countries, in addition to the aforementioned reasons, problems such as low flexible hierarchical structures, meritocracy issues, corruption, and waste of public resources have been observed to increase the proportion of young people who are neither in education nor employment in such countries that adopt populist economic policies. In other words, one of the greatest economic problems of the modern age is the existence of a large youth population that is not in education or employment on a global scale. The young people in this group come from different social layers, making this group quite heterogeneous. This situation complicates addressing the issue within the framework of usual economic standards and policies and generating solutions (Tolgay and Çakır, 2022: 1680-1707; Çolak and Koç, 2024).

When these challenges and observed problems are combined with changes in the working-age population structure, the presence of Generation Z in labor markets will be a significant turning point. The unique problems that Generation Z brings to the labor market will be a crucial turning point that will affect the structure of youth unemployment and NEET youth. In the coming years, Generation Z's different perspectives and expectations will lead to changes in labor markets and working life. Therefore, a transformation will initially occur in youth unemployment and subsequently in the structure of NEET youth (Çolak and Koç, 2023b: 238-250).

### 2.3. Relationships Between Youth Unemployment and NEET Concepts

According to the ILO's **World Employment and Social Outlook – Trend 2024** report, unemployment has remained slightly elevated since 2019, with young people particularly at risk. The average unemployment rate is estimated at 5.8% in 2023, compared to 5.9% in 2019. This translates to a total of 27 million people. However, the rate is higher for young people: 8.9%, corresponding to approximately 9.4 million individuals. In the context of the increasing working-age population, young

people face the risk of disappointment and disconnection from the labor market due to their inability to find suitable and productive jobs upon entering the labor market. In 2023, it is estimated that around 62 million young people are NEET (Not in Education, Employment, or Training), which constitutes 25.9% of the youth population; this rate was 22.2% in 2013.

A growing body of literature indicates a significant and negative relationship between being NEET at a young age and future labor market outcomes. For instance, Ranzani and Rosati (2013) analyzed the situation of NEET youth in Mexico. They found that the likelihood of being employed one year after experiencing NEET status was lower for these young people. Samoilenko and Carter (2015) showed that young people in New Zealand who experienced NEET for at least five months had a lower likelihood of being employed in the following two years than those with shorter NEET durations. Using data from the Scottish Longitudinal Study (SLS), Ralston et al. (2016) demonstrated that young people who were NEET ten years ago were more likely to be employed in low-status occupations such as cleaning and food services. In another study using the same dataset, Ralston et al. (2022) presented findings that NEET status reduces employment expectations 20 years later. Forrest et al. (2018) showed that being continuously NEET (for at least six months) between the ages of 15-19 was negatively associated with employment and completion of higher education or training by 24 in Australia. Dinku (2024) conducted a study using New Zealand data and found that the negative consequences of being NEET were greater for young people not in the labor market than those in the labor market (or unemployed). This study suggests that being NEET at a specific time (regardless of duration) can negatively affect future labor market expectations.

The high and persistent levels of youth unemployment, along with the increasing number of individuals in NEET status, raise concerns due to the well-documented negative consequences of long-term unemployment in the early stages of a career. On one hand, unemployment is directly related to psychological distress and financial difficulties for affected young people (Goldsmith et al., 1997: 133-158). This situation is a similar structural issue for young people with NEET status. On the other hand, early unemployment can lead to negative effects on later life outcomes, including lower wages (Arulampalam, 2001: 585-606; Gregg and Tominey, 2005: 487-509; Kahn, 2010: 303-316; Skans, 2004), lower labor market attachment (Gregg, 2001: 626-653), lower quality of life (Daly and Delaney, 2013: 19-23), and an increased tendency to engage in criminal activities (Bell et al., 2014; Fougère et al., 2009: 909-938). The immediate costs of youth unemployment include direct costs for unemployment benefits and social assistance, as well as indirect costs such as lost tax payments and social security contributions.

Considering the evolution of youth unemployment into NEET status, calculations by Eurofound (2011) indicate that NEET youth in the EU-26 countries led to public costs of 120 billion euros (1% of GDP) in 2008 and 153 billion euros (1.2% of GDP) in 2011, without accounting for future costs and lost payments due to declining labor market attachment in the long term (Caliendo and Schmidl, 2016: 1-36).

## 3. Methodology and Data Set

### 3.1. Model

To substantiate the relationships between youth unemployment and NEET (Not in Education, Employment, or Training) youth, and to ascertain the existence of a causal relationship between these two, data obtained from the official website of EUROSTAT, the official statistical office of the European Union, has been subjected to panel data causality analysis. For better understanding, this analysis also aims to compare the results between 10 Baltic and 8 Mediterranean countries, taking into account gender breakdown, to determine whether the transition between these two concepts is gender-based. The datasets used are annual data published from 2009, when Eurofound first statistically published NEET data, until 2023. This study is designed as a panel data causality analysis that aims to cover the process and regions

between 2009 and 2023 and to reveal the differences among these data. Panel data analysis allows for the consideration of multiple units simultaneously, facilitating the analysis of relatively weak data due to its cross-sectional and time dimensions (Tarı, Koç, and Abasız, 2019; Gaberli and Akdeniz, 2024:297-316).

Panel data has diversified panel estimation methods due to its homogeneity and heterogeneity characteristics. The reason for this diversification is the desire to obtain bias-free and consistent estimators. For example, when heterogeneous panel data models are estimated by methods developed for homogeneous panels, biased and inconsistent estimates are obtained (Yerdelen Tatoğlu, 2017:3). In this direction, Panel Causality Tests are divided into two as Homogeneous Panel Causality Tests and Heterogeneous Panel Causality Tests.

Following Granger (1969), who developed the methodology for testing the causal relationship in time series, Holtz-Eakin, Newey, and Rosen (1988) developed a test that assumes that the panel is homogeneous under the null and alternative hypotheses. Holtz-Eakin, Newey, and Rosen (1988) based the test on equation (1) (Lau et al., 2019:105).

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_k y_{i,t-k} + \sum_{k=1}^{K} \beta_k x_{i,t-k} + \varepsilon_{i,t} \tag{1}$$

where $y$ and $x$ are stationary series are the fixed autoregressive parameters for all, the fixed regression coefficient for all, and the residual. The null hypothesis stating that there is no Granger causality from $x_{i,t}$ to $y_{i,t}$ is formulated as follows:

$$H_0 : \gamma_1 = \ldots = \gamma_k = 0 \tag{2}$$

This hypothesis is tested by testing the restrictions (Lau et al., 2019:105). For example, when the unrestricted model is expressed as,

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_k y_{i,t-k} + \sum_{k=1}^{K} \beta_k x_{i,t-k} + \varepsilon_{1i,t} \tag{3}$$

and restricted model expressed as

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_k y_{i,t-k} + \varepsilon_{2i,t} \tag{4}$$

From here, the sum of residual squares for both models is calculated as $RSS_1 = \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\varepsilon}_{1i,t}^2$ and $RSS_2 = \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{\varepsilon}_{2i,t}^2$. In this case the $F$ statistic is calculated as follows.

$$F = \frac{\left(RSS_2 - RSS_1\right) / K}{RSS_1 / \left(NT - 2K - 1\right)} \sim F_{(K, NT-2K-1)} \tag{5}$$

where $K$ is the appropriate lag order, $N$ is the number of individuals and $T$ refers to the number of observations for each individual.

Dumitrescu and Hurlin (2012) developed a causality test based on Granger (1969) for use in heterogeneous panels. The model of the test is set up as in Equation (6) for $i = 1, \ldots, N$ and $t = 1, \ldots, T$.

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (6)$$

where $y$ and $x$ variables denote stationary series, $\gamma_k$ denotes autoregressive parameters varying across groups, $\beta_k$ refers to fixed regression coefficient varying across groups and $\varepsilon_{i,t}$ is residual. It is assumed that the lags order $K$ is the same for all cross-sectional units of the panel and the panel is balanced[1].

The hypotheses of the test are as follows:

$$H_0 : \beta_i = 0 \quad \forall_i = 1, \ldots, N \quad (7)$$

$$H_1 : \begin{matrix} \beta_i = 0 & \forall i = 1, \ldots, N_1 \\ \beta_i \neq 0 & \forall i = N_1 + 1, N_1 + 2, \ldots, N \end{matrix} \quad (8)$$

The null hypothesis states that $x$ is not the Granger cause of $y$ for all $i$. The alternative hypothesis states that $x$ is not the Granger cause for the first unit and is the Granger cause for all units. Dumitrescu and Hurlin (2012) used the average of the individual Wald statistics to develop a test of the null hypothesis of Granger no causality for units. This test statistic is calculated as in Equation (9).

$$W_{N,T}^{HNC} = \frac{1}{N} \sum_{i=1}^{N} W_{i,T} \quad (9)$$

where $W_{i,T}$ denotes the individual Wald statistics for the cross-sectional $i$ th unit (Dumitrescu ve Hurlin, 2012: 1453).

This paper uses the annual data of the Baltic and Mediterranean countries for 2009-2023. The Baltic countries used in the study are Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland and Sweden; Mediterranean countries are Croatia, France, Greece, Italy, Slovenia, South Cyprus, Spain and Türkiye. Data are obtained from Eurostat. The corresponding countries' descriptive statistics are presented in Apendix Tables 1 and Apendix Table 2.

The abbreviations used in econometric analyses and in Appendix Table 1 and Appendix Table 2 are as follows: FUR: Female Youth Unemployment Rate, FNEET: Female NEET Rate, MUR: Male Youth Unemployment Rate, MNEET: Male NEET Rate, TUR: Total Youth Unemployment Rate, TNEET: Total NEET Rate.

### 3.2. Econometric Analyses

The aim of this paper is to investigate the existence of a Granger causality relationship between male, female and total youth unemployment and NEET rates in Baltic and Mediterranean countries. In causality tests, variables should be stationary. For this reason, all variables are tested for unit roots using panel unit root tests. In selecting the appropriate panel unit root tests, ADF test regressions with 1 lag order[2] of all variables were constructed and Pesaran, Ullah and Yamagata (2008) and Swamy (1970) tests were applied to the residuals obtained. The related results are presented in Table 1 and Table 2.

[1] If each individual in a panel contains an equal number of observations, that is, if the time dimension of each individual is the same, such panels are called balanced panels (Tarı et al., 2019:491).

[2] The appropriate lag order is selected using the Akaike (1974) information criterion.

**Table 1.** Appropriate Panel Unit Root Test Selection and Panel Unit Root Test Results in Baltic Countries

| Variables | Pesaran, Ullah and Yamagata (2008) | Swamy (1970) | Appropriate Test |
|---|---|---|---|
| FUR | 12.19***[3] | 81.59*** | Pesaran (2003) |
| FNEET | 2.53** | 32.35 | Breitung and Das (2005) |
| MUR | 2.194** | 62.11*** | Pesaran (2003) |
| MNEET | 48.22 | 36.74 | Breitung (2000) |
| TUR | 8.166*** | 67.94*** | Pesaran (2003) |
| TNEET | 1.761* | 33.58 | Breitung (2000) |
| **Variables** | | **Appropriate Test Results** | |
| FUR | | -3.473*** | |
| FNEET | | -0.024 | |
| MUR | | -0.545 | |
| MNEET | | -1.0334 | |
| TUR | | -0.863 | |
| TNEET | | -0.0486 | |

According to the panel unit root test results for the Baltic countries, only the FUR variable is stationary at the level, and the other variables are stationary at their first differences.

**Table 2.** Appropriate Panel Unit Root Test Selection and Panel Unit Root Test Results in Mediterranean Countries

| Variables | Pesaran, Ullah and Yamagata (2008) | Swamy (1970) | Appropriate Test |
|---|---|---|---|
| FUR | 4.508*** | 18.97 | Breitung and Das (2005) |
| FNEET | 1.005 | 21.57 | Hadri (2000) |
| MUR | 8.634*** | 20.66 | Breitung and Das (2005) |
| MNEET | 3.008*** | 40.55*** | Pesaran (2003) |
| TUR | 11.57*** | 17.31 | Breitung and Das (2005) |
| TNEET | 4.8*** | 23.74 | Hadri (2000) |
| **Variables** | | **Appropriate Test Results** | |
| FUR | | -0.9644 | |
| FNEET | | 15.0925***[4] | |
| MUR | | -0.7483 | |
| MNEET | | -1.365* | |
| TUR | | -0.7567 | |
| TNEET | | 6.9931***[5] | |

[3] ***, **, * denote significance level of 1%, 5% and 10%, respectively.

[4] Since Breitung (2000) test gave positive results, Hadri (2000) stationarity test was applied. Due to the hypotheses are inverse in Hadri (2000) test, rejection of the null hypothesis means that the series is stationary. Tests developed under the null hypothesis of unit root are expected to yield negative results. A positive result of the related test is an unreliable result.

[5] Since Breitung and Das (2005) test gave positive results, Hadri (2000) stationarity test was applied.

According to the panel unit root test results for Mediterranean countries, all variables are stationary at level.

At the stage of selecting the appropriate Panel Causality Test, a Panel Vector Autoregression (VAR) Model was established between the variables FUR-FNEET, MUR-MNEET, TUR-TNEET and the residuals obtained from these models were tested for by Swamy (1970) test. The appropriate lag order of the Panel VAR model was determined as 1 with the help of the information criteria stated in Abrigo and Love (2016). The results of the Swamy (1970) test applied to the residuals of the 1-lag Panel VAR model for the Baltic and Mediterranean countries and the appropriate Panel Granger Causality test are presented in Table 3 and Table 4.

**Table 3.** Appropriate Panel Granger Causality Test Selection and Panel Granger Causality Test Results in Baltic Countries

| **Variables** | **Swamy (1970)** | **Appropriate Panel Granger Causality** |
|---|---|---|
| FUR-FNEET | 52.02*** | Dumitrescu and Hurlin (2012) |
| MUR-MNEET | 23.55 | Holtz-Eakin, Newey, and Rosen (1988) |
| TUR-TNEET | 48.51 *** | Dumitrescu and Hurlin (2012) |
| **FUR-FNEET** | | |
| FUR → FNEET | | 0.1743 |
| FNEET → FUR | | -0.3487 |
| **MUR-MNEET** | | |
| MUR → MNEET | | 3.307* |
| MNEET → MUR | | 0.352 |
| **TUR-TNEET** | | |
| TUR → TNEET | | 0.2785 |
| TNEET → TUR | | 2.1899** |

According to the results, there is a Granger causality relationship only from total NEET rate to total youth unemployment rate at 5% significance level. No significant causality relationship was found for other variables.

**Table 4.** Appropriate Panel Granger Causality Test Selection and Panel Granger Causality Test Results in Mediterranean Countries

| **Variables** | **Swamy (1970)** | **Appropriate Panel Granger Causality** |
|---|---|---|
| FUR-FNEET | 12.06 | Holtz-Eakin, Newey, and Rosen (1988) |
| MUR-MNEET | 23.55 | Holtz-Eakin, Newey, and Rosen (1988) |
| TUR-TNEET | 7.46 | Holtz-Eakin, Newey, and Rosen (1988) |
| **FUR-FNEET** | | |
| FUR → FNEET | | 4.375** |
| FNEET → FUR | | 0.130 |
| **MUR-MNEET** | | |
| MUR → MNEET | | 0.795 |
| MNEET → MUR | | 6.419** |
| **TUR-TNEET** | | |
| TUR → TNEET | | 4.993** |
| TNEET → TUR | | 1.196 |

In Mediterranean countries, there is a Granger causality relationship from female youth unemployment rate variable to female NEET rate variable and from total youth unemployment rate variable to total NEET variable at 5% level of significance. In addition, there is a Granger causality relationship from male NEET rate variable to male youth unemployment rate variable at 5% level of significance. As a summary information, the results are shown in Figure 1.

**Figure 1:** Summary Results

| Baltic Countries | | | Mediterranean Countries | | |
|---|---|---|---|---|---|
| FUR | ↛ ↚ | FNEET | FUR | → ↚ | FNEET |
| MUR | ↛ ↚ | MNEET | MUR | ↛ ← | MNEET |
| TUR | ↛ ← | TNEET | TUR | → ↚ | TNEET |

### 4.3. Findings

In the Baltic countries, there is a causality from NEET (Not in Education, Employment, or Training) to youth unemployment. This situation also indicates a transition from NEET to youth unemployment. However, no causality relationship is found when considering males and females separately. The absence of separate causality relationships is due to both groups' borderline nature of the causality criteria. Considering the lag number is 1 and the annual period, it is observed that young people who were NEET in the previous year generally appear in the youth unemployment rate the following year. In the Nordic countries, it is evident that young people are not "stuck" in NEET status and transition into the labor market. The lack of a causality relationship between youth unemployment and NEET can indicate that individuals participating in the labor market, regardless of gender, do not consider exiting the labor market again. It can be suggested that the higher gender equality in the Nordic countries plays a significant role in this context.

When examining the causality results in the Mediterranean countries, it is found that only male NEETs cause youth unemployment, indicating that male NEETs participate in the labor market within one year. After entering the labor market, males do not return to NEET status; they remain permanently in the labor market. However, there has been a transition from unemployment to NEET in the case of women in Mediterranean countries. The significant difference in youth unemployment rates and NEET between men and women also affects the transition process from total youth unemployment to total NEET. In this context, the differentiated causality between youth unemployment and NEET for women is a result of the high rates of female NEETs.

In the Mediterranean countries, there is a causality relationship between male NEETs and male youth unemployment; however, there is no causality relationship between male youth unemployment and male NEETs. This indicates a one-sided causality situation. There is no causality between female NEET rates and female youth unemployment rates. Conversely, there is a causality relationship between female youth unemployment rates and female NEET rates. Although this is also a one-sided causality relationship, for males, this relationship goes from NEET to youth unemployment, while for females, the opposite is true. While there is no causality relationship between total NEET rates and total youth unemployment rates, there is a one-sided causality relationship between total youth unemployment rates and total NEET rates.

The significant differences in findings between the Baltic and Mediterranean countries suggest that the primary reason lies in gender discrimination in labor markets. Plantenga et al. (2009) found that Scandinavian countries such as Finland, Sweden, and Denmark exhibited the highest overall performance, while Mediterranean countries like Greece, South Cyprus, Malta, Spain, and Italy showed very low performance (Plantenga et al., 2009:19-33). Similar results were observed by Bericat (2012), who noted that gender inequality in the Mediterranean countries is felt more deeply in education, work, and power analysis compared to the Baltic countries (Bericat, 2012:1-28). In their 2019 study, Somarriba and Zarzosa highlighted that gender is a key factor in determining welfare levels in southern EU countries (Somarriba and Zarzosa, 2019:179:200). López-Martínez et al. (2021) also found that Scandinavian and Mediterranean countries represent two extremes in terms of gender inequality in their study on EU countries (López-Martínez et al., 2022:605-623).

In light of these evaluations, it is natural that there is such a significant difference between the Baltic and Mediterranean countries in terms of both gender inequality and the dynamics of labor markets. In the Baltic countries, youth female unemployment and female NEET rates are lower than in the Mediterranean countries. Additionally, when examining causality relationships, it can be concluded that gender is not a significant criterion in terms of causality. At this stage, while gender discrimination is an important criterion in the causality of NEET and youth unemployment in Mediterranean countries, it can be said that the most disadvantaged group is female NEETs.

## Conclusion

This study has deeply examined the causal relationship between youth unemployment and NEET (Not in Education, Employment, or Training) rates in the Baltic and Mediterranean countries, revealing significant findings. In the Baltic countries, it was observed that NEET-status youth transitioned to youth unemployment rates in the following year, while no distinct causal relationship was found between genders. This situation indicates that the transition of young people into the labor market in the Baltic countries is more fluid and that the NEET status is not "sticky." The ease of youth participation in the labor market reflects the effectiveness of these countries' education systems and labor policies. Notably, the higher level of gender equality in the Baltic countries positively influences young people's participation in the labor market and strengthens women's position in the workforce.

In contrast, the situation in the Mediterranean countries is quite different. In these countries, it was found that male NEETs cause youth unemployment, while females transition from unemployment to NEET status. This situation highlights the effects of gender inequality and discrimination in the labor market in the Mediterranean countries. The high rates of female NEETs indicate that this group is among the most disadvantaged and that young women face greater challenges in the labor market. Additionally, the presence of social and cultural factors that hinder young women's participation in the labor market in Mediterranean countries complicates the resolution of this issue.

These findings emphasize the need for policymakers to develop strategies to increase youth participation in the labor market, promote gender equality, and reduce NEET rates. Particularly in Mediterranean countries, it is crucial to implement targeted policies to facilitate women's integration into the labor market. In this context, strengthening educational programs, organizing awareness-raising campaigns related to the labor market, and providing incentives to promote women's employment are essential.

In conclusion, this study also highlights the necessity for further research on youth unemployment and NEET issues. Future studies could comprehensively examine the relationship between these two concepts, allowing for similar analyses in different socio-economic and cultural contexts. Moreover, developing innovative policies to enhance youth participation in the labor market is critical for both economic growth and social cohesion. Therefore, a multifaceted and integrated approach must be adopted to strengthen the position of young people in the labor market.

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**Apendix**

**Table 1:Descriptive Statistics of Baltic Countries Data**

| Denmark | | | | | | Estonia | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 11.8 | 1.6 | 9.2 | 14.8 | FUR | 15 | 16.0 | 5.3 | 9.3 | 29 |
| FNEET | 15 | 6.8 | 0.6 | 5.9 | 7.6 | FNEET | 15 | 10.9 | 2.2 | 7.2 | 15 |
| MUR | 15 | 13.8 | 2.7 | 10.4 | 18.2 | MUR | 15 | 19.9 | 6.6 | 11.2 | 36 |
| MNEET | 15 | 7.3 | 0.4 | 6.5 | 8.0 | MNEET | 15 | 11.1 | 2.2 | 7.4 | 15 |
| TUR | 15 | 12.8 | 2.1 | 10.1 | 16.4 | TUR | 15 | 18.1 | 5.8 | 11.6 | 33 |
| TNEET | 15 | 7.1 | 0.4 | 6.4 | 7.7 | TNEET | 15 | 11.0 | 1.7 | 7.9 | 15 |
| **Finland** | | | | | | **Germany** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 17.7 | 1.6 | 14.0 | 19.4 | FUR | 15 | 7.1 | 1.6 | 5.1 | 11 |
| FNEET | 15 | 8.3 | 0.8 | 6.9 | 9.6 | FNEET | 15 | 7.6 | 0.9 | 6.2 | 9.4 |
| MUR | 15 | 21.2 | 3.3 | 14.4 | 26.0 | MUR | 15 | 8.6 | 1.8 | 6.4 | 13 |
| MNEET | 15 | 9.7 | 1.2 | 8.3 | 11.9 | MNEET | 15 | 6.4 | 1.0 | 5.2 | 8.2 |
| TUR | 15 | 19.4 | 2.4 | 14.2 | 22.5 | TUR | 15 | 7.9 | 1.7 | 5.9 | 12 |
| TNEET | 15 | 9.0 | 0.9 | 7.7 | 10.6 | TNEET | 15 | 7.0 | 0.9 | 5.7 | 8.8 |
| **Iceland** | | | | | | **Latvia** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 8.5 | 2.8 | 5.6 | 14.1 | FUR | 15 | 18.9 | 8.6 | 10.0 | 34.8 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FNEET | 15 | 4.6 | 1.4 | 2.6 | 7.2 | FNEET | 15 | 11.0 | 3.7 | 6.3 | 16.9 |
| MUR | 15 | 12.5 | 4.0 | 6.5 | 19.7 | MUR | 15 | 21.5 | 8.1 | 12.5 | 37.3 |
| MNEET | 15 | 6.1 | 1.4 | 3.9 | 9.2 | MNEET | 15 | 11.7 | 3.9 | 7.0 | 18.7 |
| TUR | 15 | 10.5 | 3.2 | 6.1 | 16.2 | TUR | 15 | 20.3 | 8.1 | 12.2 | 36.2 |
| TNEET | 15 | 5.3 | 1.2 | 3.8 | 7.7 | TNEET | 15 | 11.4 | 3.7 | 7.1 | 17.8 |
| **Lithuania** | | | | | | **Norway** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 17.2 | 7.0 | 9.3 | 31.6 | FUR | 15 | 10.6 | 1.1 | 8.8 | 12.7 |
| FNEET | 15 | 9.8 | 1.4 | 7.5 | 12.6 | FNEET | 15 | 5.0 | 0.5 | 4.4 | 6.2 |
| MUR | 15 | 21.3 | 9.0 | 12.0 | 39.0 | MUR | 15 | 12.5 | 1.1 | 10.7 | 14.3 |
| MNEET | 15 | 11.4 | 2.1 | 8.4 | 14.7 | MNEET | 15 | 5.5 | 0.6 | 4.7 | 6.9 |
| TUR | 15 | 19.5 | 8.1 | 11.1 | 35.7 | TUR | 15 | 11.6 | 1.0 | 10.0 | 13.2 |
| TNEET | 15 | 10.6 | 1.6 | 8.0 | 13.5 | TNEET | 15 | 5.3 | 0.5 | 4.6 | 6.4 |
| **Poland** | | | | | | **Sweden** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 18.9 | 7.6 | 9.8 | 30.2 | FUR | 15 | 20.8 | 2.7 | 15.9 | 24.1 |
| FNEET | 15 | 10.6 | 1.6 | 6.7 | 12.3 | FNEET | 15 | 6.5 | 1.3 | 4.6 | 9.5 |
| MUR | 15 | 17.3 | 6.1 | 9.6 | 25.8 | MUR | 15 | 22.1 | 2.7 | 17.6 | 25.4 |
| MNEET | 15 | 9.5 | 1.9 | 6.7 | 12.1 | MNEET | 15 | 6.8 | 1.3 | 5.0 | 9.8 |
| TUR | 15 | 18.0 | 6.7 | 9.7 | 27.6 | TUR | 15 | 21.4 | 2.6 | 16.8 | 24.7 |
| TNEET | 15 | 10.0 | 1.7 | 6.9 | 12.2 | TNEET | 15 | 6.7 | 1.3 | 4.9 | 9.6 |

**Table 2:Descriptive Statistics of Mediterranean Countries Data**

| Croatia | | | | | | France | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 32.1 | 9.7 | 18.8 | 50.2 | FUR | 15 | 24.4 | 4.4 | 16.0 | 30 |
| FNEET | 15 | 14.0 | 2.3 | 9.6 | 18.6 | FNEET | 15 | 11.1 | 1.1 | 9.2 | 13 |
| MUR | 15 | 28.8 | 11.9 | 14.7 | 49.9 | MUR | 15 | 21.8 | 2.3 | 18.2 | 25 |
| MNEET | 15 | 15.6 | 3.9 | 10.1 | 21.9 | MNEET | 15 | 11.9 | 0.7 | 10.9 | 13 |
| TUR | 15 | 30.1 | 10.9 | 16.7 | 50.0 | TUR | 15 | 23.0 | 3.2 | 17.2 | 26 |
| TNEET | 15 | 14.8 | 3.0 | 9.8 | 19.6 | TNEET | 15 | 11.5 | 0.8 | 10.1 | 13 |
| **Greece** | | | | | | **Italy** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 47.2 | 10.4 | 29.4 | 64.6 | FUR | 15 | 34.3 | 6.0 | 25 | 45 |
| FNEET | 15 | 15.5 | 3.4 | 10.7 | 21.3 | FNEET | 15 | 19.0 | 2.4 | 12 | 21 |
| MUR | 15 | 37.2 | 10.3 | 20.1 | 54.9 | MUR | 15 | 30.5 | 6.3 | 21 | 41 |
| MNEET | 15 | 14.5 | 3.4 | 9.5 | 20.9 | MNEET | 15 | 19.3 | 2.6 | 13 | 23 |
| TUR | 15 | 41.8 | 10.3 | 26.1 | 59.2 | TUR | 15 | 32.0 | 6.2 | 23 | 43 |
| TNEET | 15 | 15.0 | 3.2 | 10.7 | 20.4 | TNEET | 15 | 19.2 | 2.5 | 13 | 22 |
| **Slovenia** | | | | | | **South Cyprus** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 14.9 | 4.5 | 8.7 | 23.7 | FUR | 15 | 21.9 | 8.2 | 12.3 | 36.8 |
| FNEET | 15 | 7.7 | 1.2 | 6.0 | 9.2 | FNEET | 15 | 14.0 | 1.8 | 11.1 | 17.0 |
| MUR | 15 | 13.8 | 4.4 | 7.4 | 20.4 | MUR | 15 | 24.7 | 8.1 | 13.6 | 41.1 |
| MNEET | 15 | 7.9 | 1.4 | 6.0 | 9.9 | MNEET | 15 | 14.6 | 3.3 | 8.6 | 20.6 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TUR | 15 | 14.3 | 4.3 | 8.1 | 21.6 | TUR | 15 | 23.3 | 7.9 | 13.8 | 38.9 |
| TNEET | 15 | 7.8 | 1.1 | 6.5 | 9.5 | TNEET | 15 | 14.3 | 2.3 | 9.9 | 18.7 |
| **Spain** | | | | | | **Türkiye** | | | | | |
| **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** | **Variable** | **Observation** | **Mean** | **Standard Deviation** | **Min** | **Max** |
| FUR | 15 | 40.8 | 8.2 | 28.5 | 54.6 | FUR | 15 | 23.6 | 3.9 | 17.8 | 30.3 |
| FNEET | 15 | 14.0 | 3.0 | 9.1 | 17.8 | FNEET | 15 | 36.2 | 4.9 | 29.7 | 47.3 |
| MUR | 15 | 41.4 | 9.2 | 28.7 | 56.2 | MUR | 15 | 17.9 | 2.8 | 14.3 | 22.9 |
| MNEET | 15 | 15.5 | 3.4 | 10.7 | 19.6 | MNEET | 15 | 16.9 | 2.5 | 14.1 | 22.0 |
| TUR | 15 | 41.1 | 8.7 | 28.7 | 55.5 | TUR | 15 | 19.9 | 2.9 | 15.7 | 25.2 |
| TNEET | 15 | 14.8 | 3.2 | 9.9 | 18.6 | TNEET | 15 | 26.5 | 3.5 | 22.4 | 34.9 |