



ORIGINAL ARTICLE


Citation: Aleksandravičienė, A., Butkus, M., & Kadiša, T. (2024). Assessing the effect of trade and FDI on growth-unemployment nexus. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 19(1), 59–91. <https://doi.org/10.24136/eq.3006>

Contact to corresponding author: Tomas Kadiša, tomas.kadisa@vdu.lt

Article history: Received: 1.04.2023; Accepted: 3.03.2024; Published online: 30.03.2024

Akvilė Aleksandravičienė

Vytautas Magnus University, Lithuania

 orcid.org/0000-0003-4882-5602


Mindaugas Butkus

Vytautas Magnus University, Lithuania

 orcid.org/0000-0003-2381-5440

Tomas Kadiša

Vytautas Magnus University, Lithuania

 orcid.org/0009-0003-4647-4252

Assessing the effect of trade and FDI on growth-unemployment nexus

JEL Classification: E22; E24; F14; O11

Keywords: foreign direct investment; unemployment; trade; gross domestic product; Okun's law

Abstract

Research background: Unemployment is a huge topic for policymakers, scholars, and, in general, society. Historically, there have always been a lot of discussions about this phenomenon. It is already acknowledged that unemployment is closely related to economic activity: when the economy is growing, more people are employed, and when economic activity is low, employment decreases, and unemployment rises. This relation is well-researched in the framework of Okun's law. However, it is far less known how this relationship holds if international economic relations are introduced. Thus, the motivation for the research was to examine

Copyright © Instytut Badań Gospodarczych / Institute of Economic Research (Poland)

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

the role of international trade and foreign direct investment (FDI) on the growth-unemployment nexus.

Purpose of the article: To assess how trade and FDI affect growth and gender-, age-, and educational attainment level-specific unemployment relationship and on what scale this effect varies over different business cycle phases.

Methods: Scientific literature review, comparative analysis, and panel regression.

Findings & value added: Given the lack of research examining what effect FDI and trade have on the growth-unemployment nexus, this paper estimates modified Okun's equation on the European Union (EU) countries (EU-28, by the composition of the EU until 31/01/2020) for the period from 2000 to 2019 while incorporating international aspects that can have an impact on this nexus. Also, this study develops a specification that can be useful to monitor the potentially different effects of FDI and trade on the growth-unemployment nexus during different business cycle phases. The estimations of the panel regression for unemployment disaggregated by age, gender and education level has showed that import, export, inward FDI, and outward FDI have a negative effect on the growth-unemployment nexus. It means that with an increase in the intensity of international economic relations, the influence of gross domestic product (GDP) growth on unemployment becomes less significant. Thus, the effectiveness of expansionary fiscal policy to reduce unemployment becomes less effective in more open economies, which in the case of the EU are the smallest member states with relatively small domestic markets.

Introduction

Unemployment was a great concern during the worst economic crisis since the Great Depression and brought new attention in the aftermath of the Covid-19 pandemic. This phenomenon is closely related to economic growth — when the country's economy grows, unemployment decreases and vice versa. The strength of this relationship is estimated by applying Okun's law (International Labor Office, 2010).

However, today's world is not limited to domestic economies. Due to (re)globalization, the world interconnects rapidly, and multicountry economic relations play a significant role. Thus, a country's economic growth may be affected more internationally than domestically. Foreign direct investments and international trade are one of the major global factors that can stimulate growth and, thus, reduce unemployment (Shaari *et al.*, 2012; Sun & Heshmati, 2010; Felbermayr *et al.*, 2011). Foreign direct investments are very important, especially for developing countries. It is a perfect tool for companies or countries to be involved in international relations and benefit from them by creating better economic conditions, entering new markets, and creating jobs.

Literature discloses different effects of outward and inward FDI on unemployment. Inward FDI is seen as an unemployment-reducing factor (Rizvi & Nishat, 2009; Estrin, 2017; Dritsakis & Stamatiou, 2018; Su *et al.*, 2018). Meanwhile, outward FDI can increase (Agarwal, 1996; Chen, 2010; Huijie, 2018) or reduce (Irpan *et al.*, 2016; Yueming, 2014) unemployment.

Other research emphasized the effect of FDI on growth. Gochoero and Boopen (2020) found a positive long-run effect of inward FDI on GDP in host countries. Ali *et al.* (2018) found a positive effect of outward FDI on GDP.

There have been many discussions about the relationship between trade and growth in the last few decades. As Sun and Heshmati (2010) pointed out, globalization and liberalization are the factors that allow countries to be more linked to openness. Awad-Warrad (2018) concluded that openness to trade correlates with growth and reduces unemployment. Bivens (2015) argued that trade deficit increases unemployment. However, Worstall (2015) stated that jobs could not be lost, even if there is a trade deficit. While Mohler *et al.* (2018) found that import increases unemployment, an opposite effect was documented by Jin *et al.* (2019). Ebrahimi's (2017) findings reveal no relationship between growth and import. Kim *et al.* (2007) did not find any effect of export on economic growth. Bakari and Mabrouki (2017) stated no link between import, export, and growth. However, Kaur *et al.* (2017) found a link between export and GDP. Thus, the literature does not provide a clear answer about the effect of import and export on growth and unemployment.

It is noteworthy to mention that economic growth could have a diverse effect on different unemployment disaggregated by age, gender, and level of education. These specific unemployment characteristics are discussed by Butkus *et al.* (2020). Göçer and Erdal (2015) analyzed the relationship between growth and youth unemployment and found that a growth rate above the average can reduce youth unemployment. Brincikova and Dar-mo (2015) studied the impact of growth on gender-specific unemployment and concluded that male unemployment is more sensitive to growth than female unemployment. Another important aspect of the growth-unemployment nexus is associated with education. It is noted that economic progress affects low-skilled and high-skilled unemployment differently: low-skilled unemployment increases while high-skilled unemployment decreases (Moreno-Galbis & Sneessens, 2007).

Hence, trade, FDI, and age-, gender-, and education attainment level-specific unemployment are considered in this research since they are potentially important aspects of the growth-unemployment nexus in the context of Okun's law. Moreover, the growth and decline phases of the business cycle are taken into account since previous research stresses the asymmetric reaction of unemployment to growth during different stages of the business cycle.

Considering all these factors, the problem of this paper focuses on incorporating international economic relations in the growth-unemployment nexus within the asymmetric framework of Okun's law. The research aims to examine if trade and FDI affect the impact of growth on gender-, age-, and educational attainment level-specific unemployment and on what scale this effect varies over different business cycle phases. The research is focused on 28 EU countries between 2000 and 2019. In this paper, we use a scientific literature review and comparative analysis. According to panel diagnostics, we apply the differenced version of pooled ordinary least squares (OLS) to estimate our specifications.

The paper is focused on disclosing the interconnection between trade, FDI, economic growth, and unemployment. Having this information is crucial for understanding how each variable interplays and influences one another. When creating new policies it might help to understand the labor reaction to changes and adapt labor laws according to it. Also, it provides a view of how the global market affects the economy and allows regions to estimate the FDI benefits in their market. It should help to understand how technology shift might affect labor and which sectors have the most potential. Finally, by understanding the effect of each particle in their economy the policymakers would be able to adjust and focus the target area of their global policies to improve their economic performance.

The paper is divided into four main sections. Section 2 presents the recent literature review as a theoretical background of this research. Section 3 specifies the research methodology, including the data set, method, research logic, hypothesis, and research reasoning. The results of the research are presented in Section 4, while the discussion following these results is carried out in Section 5. At the end of the paper, conclusions are provided, including the research limitations, suggestions for future research, implications, and recommendations for practice.

Literature review

Unemployment as an economic term emerged in the 1930s, and the definition of this phenomenon refers to people who don't have a job, but are actively seeking one (Card, 2011). There were many theories regarding this phenomenon, and many researchers analyzed changes in unemployment levels over different periods.

It is not surprising that unemployment was the highest during the worst economic crisis (International Labor Office, 2010). That is related to the fact that unemployment is closely linked to economic activity. The phenomena of economic growth and/or unemployment during the Covid-19 period were analysed by Privara (2022), Kramarova *et al.* (2022), etc. As Louail and Benarous (2021) stated, one of the main factors in understanding an important economic phenomenon — unemployment — is the interaction between growth and unemployment rates. Arthur Okun was the first to empirically estimate the relationship between the unemployment rate and growth in the US in the 1960s. If the GDP or output decreases, it means the labor demand also decreases in the market, resulting in the growth of unemployment. Okun's theory states that when GDP drops by 2 percent, unemployment should rise by one percentage point (Chamberlin, 2011). However, theoretically, the relation between economic growth and unemployment was described in the early 1930s by Keynes, who stated that "changes in employment should result from changes in economic growth due to aggregate demand and low growth leads to an increase in unemployment" (Meyer, 2017).

Among various factors affecting growth and unemployment as a separate phenomena, international trade and foreign direct investment are the most crucial and most widely discussed in the scientific literature. Still, there is almost non-existent literature on how trade and FDI affect the impact that growth has on unemployment, i.e. growth-unemployment nexus.

As Sun and Heshmati (2010) stated, globalization and liberalization are the factors that allow countries to become more linked to openness. A logical assumption is that a trade surplus brings money to the country where the product was produced, stimulating public demand. This effect can decrease unemployment. Contrarily, in times of trade deficit, money leaving the country can cause an increase in unemployment. The research performed by Awad-Warrad (2018) concluded that openness to trade correlates with GDP and reduces unemployment. Bivens (2015) argued that

trade is a crucial factor for unemployment, and a trade deficit influences an increase in unemployment since, in times of trade deficit, a loss for local demand will make a reaction in the market as the need for labor is lower.

In terms of import, Mohler *et al.* (2018) found that import significantly affects the probability of becoming unemployed in the case of the low-skilled labor force. Gonese *et al.* (2023) also found that import positively affects unemployment, but only in the long run. An opposite effect was detected by Jin *et al.* (2019). The scientists proved that import reduces unemployment in developing countries and countries with low service and high industry sectors. The findings of Ebrahimi (2017) reveal that there is no relation between GDP (dependent variable) and import (independent variable). The same result was found in the research of Sarker (2024), who proved an insignificant effect of import on growth in both the short run and long run. However, Kim *et al.* (2007) found a positive effect of import on total factor productivity, which is one of the main factors of economic growth. Altaee *et al.* (2016) concluded that import has a negative effect on real GDP growth in Saudi Arabia.

Kim *et al.* (2007), using the growth of total factor productivity as a measure of economic growth, did not find any effect of export on economic growth. Bakari and Mabrouki (2017) provided a result about both trade factors and stated that there is no link between import, export, and GDP. However, Kaur *et al.* (2017) found a bidirectional causality between GDP and export. Usman *et al.* (2012) and Sarker (2024) proved a positive effect of export on GDP. As regards unemployment, Gonese *et al.* (2023) found that export negatively affects unemployment, but only in the long run. Thus, the scientific literature does not provide a clear answer about the effect of import and export on economic growth and unemployment.

One more important aspect is foreign direct investment. It is one of the most important areas, especially for developing countries. FDI is a perfect tool for companies or countries to be involved in international relations and benefit from it, for example, by creating better conditions and expansion elsewhere, creating workplaces in other regions. As Koluman (2020) stated, FDI is investments from one region, country, or company to another country to build a business in another country where labor costs are cheaper. Logically, a final result could be a loss of the country of origin since money or part of GDP and labor demand goes to another region. In theory, the receiver of foreign direct investment should benefit from this situation since that investments will create new jobs in the country.

There are many discussions in the scientific literature regarding the relationship between FDI and economic growth. Marasco *et al.* (2023), Fazaalloh (2024), and Sarker (2024) found strong evidence that FDI is positively associated with growth in the host country. Also, the findings of Mwakabungu and Kauangal (2023) study reveal a positive and statistically significant unidirectional causality from FDI inflows to economic growth in both long and short run. A conventional approach says that inward FDI increases economic growth and is related to growing employment (Rizvi & Nishat, 2009). This kind of relationship between inward FDI and unemployment is also discussed by Estrin (2017), Dritsakis and Stamatiou (2018), Su *et al.* (2018), and Alfalih (2024). In terms of outward FDI, Agarwal (1996), Chen (2010), and Huijie (2018) have proven a positive effect of outward FDI on unemployment. However, other scientists, for example, Irpan *et al.* (2016) and Yueming (2014), found out that outward FDI negatively affects unemployment. Also, it is worth mentioning Chang (2009) research, where the author proved the existence of weak exogeneity between outward FDI and the unemployment rate. Kim *et al.* (2020) confirmed the importance of FDI on growth. The results of the research reveal a negative link between output and unemployment during a recession, because of the impact of FDI on growth. Thus, in general, the results are ambiguous.

When analyzing Okun's law, it became clear that the literature focuses on the influence of various factors on separate variables of this law, but not on their nexus. This article will fill the gap in the literature.

The empirical examination of Okun's law was based on total unemployment. However, an important aspect in our context is gender-, age-, and educational level-specific unemployment. There are many explanations for gender gaps in unemployment in the scientific literature. Authors single out male-dominated occupations, productivity, personal characteristics, disparities in distribution across sectors, labor market institutions, and other factors that can affect gender differences in unemployment (Passinhas & Proença, 2020). Empirical evidence was provided by Queneau and Sen (2008), who analyzed differences between male and female unemployment in the OECD countries and made a conclusion that there is a minor disparity between gender-specific unemployment only in the US, Canada, and Germany. Albanesi and Şahin (2018) analyzed the effect of economic shocks on gender-specific unemployment and found that the difference between male and female unemployment significantly escalated after economic shocks since male unemployment increased more. Brinciko-

va and Darmo (2015) and Kim and Park (2018) found that changes in GDP affect male unemployment more than female unemployment.

The research carried out by Butkus and Seputiene (2019) proved some differences regarding unemployment and gender from one region to another, and the result of youth unemployment is significant. The scientists described the reasons for the more sensitive reaction of youth unemployment to the business cycle, i.e., low experience, temporary job contracts, etc. Dunsch (2017) analyzed unemployment in terms of age and gender in Central and Eastern European countries and concluded that young people react more sensitively to business cycle fluctuations, regardless of gender. Among many others, Axelrad *et al.* (2018) acknowledge that youth unemployment is relatively higher than for the elderly population. That could be because people start working seasonal jobs at a very young age, which are lost when the season ends. Göçer and Erdal (2015) analyzed the relationship between growth and youth unemployment and found that a growth rate above the average can reduce youth unemployment. Ihensekhien and Aisien (2019) also studied the growth and youth unemployment nexus and found that Okun's law does not work in upper-middle-income countries in Sub-Saharan Africa.

Education is another important aspect of the growth and unemployment nexus. The more educated a person is, the better job that person can get, and the better job an individual has, the fewer chances of being unemployed. It is noted that economic progress affects low-skilled and high-skilled unemployment differently: low-skilled unemployment increases while high-skilled unemployment decreases (Moreno-Galbis & Sneessens, 2007). Askenazy *et al.* (2015) examined the relationship between educational level-specific unemployment and GDP growth and found that higher-educated employees tend to experience a more negligible effect on unemployment from output fluctuations.

A range of scientific papers analyzed the idea of Okun's law. However, as Louail and Benarous (2021) noted, theoretical analysis reveals that Okun's law does not always work. Koettl *et al.* (2013) stated that after the 2008 crisis, unemployment remained very high, despite fast economic growth. It suggests that after an economic shock, the interdependency can change, and Okun's theory is not necessarily a rule of thumb. Omoshoro-Jones (2021) analyzed an asymmetry in Okun's law and confirmed it in the long- and short-run. The asymmetric relationship between output and

unemployment is crucial for policymakers, since it can lead to forecasting errors and misspecification (Harris & Silverstone, 2001).

An *et al.* (2017) suggest that Okun's law works in developed or higher-than-average-income countries, but the results from the lower or middle-income countries are not as expected. It may be due to the heterogeneity of the countries. An assumption can be made here that FDI and international trade can influence the difference in terms of Okun's law, as developed countries are more involved in these activities. Also, there could be many other factors that can strongly affect the growth-unemployment nexus in developing countries. Pizzo (2019) studied Latin American countries and found relatively different Okun's coefficients compared to the one found by Okun for the US. This finding suggests that Okun's law's coefficients might differ in various regions, but, as An *et al.* (2019) stated, Okun's theory is still a good tool for finding coefficients of the unemployment-growth nexus.

In summary, empirical studies on the impact of trade and FDI on growth and unemployment can be found in the literature. With regard to studies on the effects of international trade on unemployment, the literature emphasises the effect of trade on unemployment and growth, with conflicting evidence on the exact nature of this relationship. Empirical approaches that dominate the literature also include the study of the effects of FDI on growth and unemployment. Conventionally, inward FDI increases economic growth and employment, while the effect of outward FDI is not straightforward. The discussion also includes the study of unemployment by gender, age and education. The literature reveals gender differences, the increased sensitivity of youth unemployment to economic fluctuations and the impact of education on reducing the risk of unemployment. Empirical evidence also shows that the relationship between output and unemployment can be asymmetric, especially after economic shocks, challenging the traditional understanding of Okun's law as a universal rule.

Hypotheses development

The research examine how FDI and trade impact the effect of growth on unemployment in the context of Okun's theory. Moreover, considering the recent findings of the asymmetric effect (Koettl *et al.*, 2013; Omoshoro-Jones, 2021) of growth on unemployment over the periods of economic

boom and decline, we develop a specification that allows looking more closely to the potentially different effect of FDI and trade on growth-unemployment nexus during different phases of the business cycle.

The reasoning of the research

A vast amount of literature analyses how FDI and/or trade affect unemployment (Alfalih, 2024; Irpan *et al.*, 2016; Yueming, 2014; Bivens, 2015; Worstall, 2015; etc.) and/or growth (Sarker, 2024; Rizvi & Nishat, 2009; Kim *et al.*, 2007; Bakari & Mabrouki, 2017; Huijie, 2018; etc.). However, there is a lack of research examining what effect FDI and trade have on the growth-unemployment nexus, i.e., whether FDI, trade, and, more importantly, their direction change the impact that growth has on unemployment. FDI flows and trade that transfers new technologies, business practices, etc., could dramatically change the growth effect on unemployment. It is an important question since globalization played and still plays a vital role in the world's economy. Furthermore, it is also relevant to understand how recent trends in deglobalization, which started right after the great financial crisis and accelerated during the COVID-19 pandemic, may change the growth-unemployment nexus.

Moreover, our research considers unemployment disaggregated by age, gender, and educational attainment level since previous research (Askenazy *et al.*, 2015; Butkus *et al.*, 2020) shows that Okun's coefficient (as a measure of the effect of growth on unemployment) varies considerably among age-, gender-, and educational attainment level-specific unemployment. Also, the growth and the decline phases of the business cycle are taken into account since previous research emphasizes that the effect of output change on unemployment is bigger during the decline than during the growth phase. All these aspects combined in one specification should allow for examining the growth-unemployment nexus in today's world, where, due to globalization, economic conditions could be primarily affected by phenomena not caused by domestic factors but contrary brought from abroad.

Formulation and argumentation of the hypothesis

According to the research results presented in the literature review, it is clear that in most countries the output or GDP fluctuations substantially

affect unemployment. If, for instance, GDP rises, the unemployment level plummets, and vice versa, as the classical view of Okun's law suggests. However, another part of the literature review allowed us to see that many other global economic aspects correlate with GDP and unemployment and might affect their relationship. We will focus our research on some variables — inward FDI (iFDI), outward FDI (oFDI), and import and export.

The logic behind FDI is that it indirectly affects GDP. Thus we hypothesize:

H1: FDI lowers the sensitivity of the unemployment level to GDP fluctuations.

If the hypothesis turns out to be confirmed, it could suggest that FDI, in some ways, protects us from the unemployment increase while the economy is facing a downturn. But on the other hand, if unemployment is high, FDI might mitigate the effect of GDP growth and prevent unemployment fall from keeping up with the GDP growth.

Considering trade, we hypothesize:

H2: Trade mitigates the reaction of unemployment to GDP fluctuations due to changes in the demand.

Confirmation of this hypothesis would suggest that the higher the volume of imports, the less influence GDP has on unemployment; and the higher the volume of export, the lower the effect of GDP on unemployment.

The research logic, methods, and data sample

The research focuses on the European Union (EU-28) countries and covers twenty years, i.e. 2000–2019. We deliberately omit data for 2020 due to the atypical distortions caused by the COVID-19 pandemic. Our dataset consists of output, inward and outward FDI, import and export, and gender-, age-, and educational attainment level-specific unemployment collected from Eurostat (2020, n.d.) and Unctad (n.d.). Descriptive statistics of the variables are presented in Table 1 in the Annex.

We can specify a standard first-differenced version of Okun's equation for the panel data as follows:

$$\Delta U_{i,t} = \alpha + \beta \Delta Y_{i,t} + \theta_t + \varepsilon_{i,t}, \quad (1)$$

where ΔU is the unemployment change in percentage points from period $t-1$ to period t , and ΔY is the output growth, i.e. the percentage change of the real GDP. θ_t represents the time-specific effects modeled by including time dummies. Since all variables enter Eq. (1) as their first differences, the time-invariant country-specific effects do not appear in our specifications as they are “differenced away”. $\varepsilon_{i,t}$ is the idiosyncratic error term.

We estimated Eq. (1) using pooled OLS since panel diagnostics revealed that pooled OLS is more adequate than LSDV estimator, which is not surprising since first-differencing removes any observed and unobserved time-fixed effects. Eq. (1) allows us to examine the basic principle of Okun’s law, i.e., that change in GDP is in negative relation to the change in an unemployment level. The estimated negative β coefficient would provide empirical evidence in line with Okun’s law. However, Eq. (1) assumes the relationship is symmetric through different economic cycles. To test whether the growth-unemployment relationship is asymmetric over the growth and decline periods, we specify Eq. (2):

$$\Delta U_{i,t} = \alpha + \beta \Delta Y_{i,t} + \delta_n \Delta Y_{i,t} \times dn_{i,t} + \varphi dn_{i,t} + \theta_t + \varepsilon_{i,t}, \quad (2)$$

where a binary variable dn is equal to 1 for downturn periods and 0 otherwise. Since dn interacted with an output change, now β shows the growth-unemployment nexus over the economic growth period and $\beta + \delta_n$ shows the nexus during economic decline. Considering the previous research, we expect that the unemployment reaction to GDP fluctuations is smaller during the expansion stage compared to the downturn stage. For instance, if there is steady economic growth and unemployment is relatively low, the GDP change may have a smaller effect than during an economic recession, when unemployment is high, and the change of output may have a much more significant impact.

To incorporate FDI or trade as the mediator into Okun’s framework, we can specify the interactive equation with the multiplicative term:

$$\Delta U_{i,t} = \alpha + \beta \Delta Y_{i,t} + \delta_x \Delta Y_{i,t} \times X_{i,t} + \gamma X_{i,t} + \theta_t + \varepsilon_{i,t}, \quad (3)$$

where X represents FDI or trade. This equation allows taking the existing growth-unemployment relationship and testing if FDI or trade changes it

and in what direction. Eq. (3) highlights the possibility that even though Okun's coefficient might be valid, the other factors could alter its size to a certain degree as the coefficient now is composite, i.e. $\beta + \delta_x \times X_{i,t}$. The assumption is that international relations lower the sensitivity of unemployment to GDP fluctuations.

The final specification allows us to separate the effect of FDI and trade on growth-unemployment nexus over different economic phases, namely economic growth and economic downturn. For this purpose, we combine Eqs. (2) and (3):

$$\begin{aligned} \Delta U_{i,t} = & \alpha + \beta \Delta Y_{i,t} + \delta_x \Delta Y_{i,t} \times X_{i,t} + \delta_n \Delta Y_{i,t} \times dn_{i,t} + \\ & + \delta_{x,n} \Delta Y_{i,t} \times X_{i,t} \times dn_{i,t} + \gamma X_{i,t} + \varphi dn_{i,t} + \theta_t + \varepsilon_{i,t}, \end{aligned} \quad (4)$$

where $\beta + \delta_x \times X_{i,t}$ shows the effect of FDI or trade on the growth-unemployment nexus over the economic growth period. To find how FDI or trade affects the growth-unemployment nexus over periods of economic downturn, we need to find a composite slope coefficient $\beta + \delta_x \times X_{i,t} + \delta_n + \delta_{x,n} \times X_{i,t}$.

Since equations are interactive with multiplicative terms, the estimated slopes become conditional, i.e., the growth-unemployment nexus is not constant but depends on the FDI or trade and business cycle simultaneously. The same stands for the significance of this nexus, i.e., it becomes conditional since standard errors associated with slope coefficients vary depending on the size of FDI or trade and $dn_{i,t}$. We calculate standard errors using formulae developed by Brambor *et al.* (2006). Moreover, we used Arellano heteroscedasticity and serial correlation-robust standard errors to minimize the possibility that the significance of the estimated Okun's coefficient may be biased.

Our study analyzing the impact of FDI and trade on the relationship between economic growth and unemployment based on Okun's theory has several strengths and drawbacks in its design. The study recognizes the unequal impact of economic development on unemployment by distinguishing between times of expansion and downturn. This method enables a more thorough comprehension of economic dynamics and the possible fluctuations in the effects of FDI and trade. Utilizing unemployment statistics according to age, gender, and educational attainment levels enhances the study. The model acknowledges the diversity present in the labor market and has the potential to reveal varying effects of economic policies and

international economic linkages on various demographic groups. Using first-differences pooled OLS and accounting for heteroscedasticity and serial correlation-robust standard errors improves the results. Utilizing interactive equations to assess the mediation impact of FDI or trade adds a complex analytical dimension to explore the conditional linkages.

Our technique has several potential flaws. Multiplicative terms in equations provide a detailed investigation of conditional linkages but may complicate understanding. Interaction effects may complicate the separation of the separate influences of FDI and trade from their joint impact with economic cycles. The research primarily examines FDI, trade, and economic cycles, however there might be other important factors like policy changes, technology improvements, or labor market restrictions that influence the relationship between growth and unemployment but are not considered. This constraint may result in an inadequate comprehension of the dynamics in action. Excluding 2020 data because of COVID-19 disruptions may make the conclusions less relevant to economic situations after the epidemic. The unique COVID-19 economic effect may have changed the basic relationships among FDI, trade, and unemployment. Limiting the study to EU-28 nations may restrict the applicability of the results to other locations, particularly emerging countries or economies with varying degrees of globalization exposure. The unique economic, social, and regulatory environments of the EU may impact the relationship between growth and unemployment in a distinct manner compared to other locations.

Results

This part is designated to present empirical findings and their interpretations. Moreover, the research hypothesis will be examined through the prism of the estimation results.

The idea of the research is that GDP growth and unemployment relationship is affected by the FDI and trade. For this reason, the effect of four variables was examined: import, export, inward FDI, and outward FDI. Seven different unemployment variables were considered: total unemployment, youth unemployment, male unemployment, female unemployment, and three different categories of education-level-specific unemployment. Estimates are based on Eq. (4), and the effect of FDI and trade on the growth-unemployment nexus is presented separately over the periods of

economic growth and decline. Combining seven unemployment variables, four moderating variables (iFDI, oFDI, import, and export), and two phases of the business cycle, we have 52 estimations.

Estimations are based on pooled OLS model and 20 years of data for 28 countries. All estimations include time dummies to account for inter-temporal changes in the growth-unemployment nexus common to all 28 countries. Also, the Arellano method was used to robust standard errors.

Import. As mentioned in the literature review and research methodology, the assumption is that the higher the percentage of imports to GDP, the less influence GDP growth has on unemployment. Tables 2 and 3 in the Annex show the conditional growth-unemployment nexus while the import variable is introduced to an equation as the moderator.

The group of tables represents seven unemployment variables under investigation during economic growth and decline phases. The left column shows the import percentage of GDP, and the rest columns to the right show the effect of a one percent change in GDP on unemployment, i.e., Okun's coefficient. The underlined numbers are the statistically significant ones, referring to a 95% confidence interval. In all tables, confidence intervals reach zero at around 120%, which means that if import reaches 120% of GDP, the GDP change does not affect unemployment.

A declining (in absolute terms) negative slope in all tables means that with a higher percentage of import to GDP, the GDP change has a more negligible effect on unemployment. From these results, we can conclude that import is affecting the growth-unemployment nexus. As expected, the higher the import level, the weaker the growth-unemployment nexus.

Export. Here we have a relatively similar situation as with import. The assumption is that the higher export to GDP percentage, the lower the effect of GDP on unemployment. The tables are customized in the same way. The left column shows the export percentage of GDP, and the rest columns to the right show the effect of a one percent change in GDP on unemployment. The higher the slope coefficient (in absolute terms), the higher the effect; the moment the confidence interval of the coefficient reaches zero, the effect becomes insignificant.

The results suggest that similar to an import with a high export level, GDP growth has less effect on the unemployment level. Tables 4 and 5 in the Annex show the conditional GDP growth-unemployment nexus while the export variable is introduced to an equation.

Most steep slopes we see with young and uneducated (EDU0-2) groups of people, similarly as in the import case. These are the two most vulnerable groups, and high export limits their job availability due to the lack of skills needed to produce export goods. To conclude, export also affects the growth-unemployment nexus; the nexus becomes weaker with export growth.

Inward FDI. The assumption was that high capital flows from abroad might directly affect unemployment. Investments create jobs, which, in turn, decrease the unemployment level. However, technical know-how can push the market towards more capital-intensive labor. Tables 6 and 7 in the Annex show the conditional GDP growth-unemployment nexus while the inward FDI variable is introduced to an equation.

Overall, even though for highly educated and for females the effect was relatively small, for unemployment as a whole the effect of iFDI to GDP growth-unemployment nexus is unquestionable. With a sufficiently high iFDI to GDP ratio, iFDI would become a decisive factor in reducing unemployment by inducing GDP growth. Therefore, the significance of expansionary policy would drop.

Outward FDI effect on the GDP to unemployment relationship. The assumption was that oFDI would increase unemployment since it moves money and workplaces elsewhere. However, since the testing subject is the relationship between GDP growth and unemployment level, oFDI might not affect it since both could, in theory, cancel each other. Tables 8 and 9 in the Annex show the conditional GDP growth-unemployment nexus while the outward FDI variable is introduced to an equation.

Looking at the group of tables as a whole, we can see that oFDI has some degree of an effect on the GDP growth-unemployment nexus. Even when the female unemployment and highly skilled (EDU5-8) unemployment group of people feel the opposite effect, the general effect is that oFDI weakens the significance of unemployment reaction to GDP fluctuations.

The findings also suggest that the effect of FDI and trade on the growth-unemployment nexus was the strongest during the economic decline phase compared to the periods of growth.

Interpretations

Each FDI and trade variable affects the GDP growth-unemployment relationship within a different magnitude. The old standing rule was that if

GDP increases, unemployment should decrease. However, as presented in the finding, this could not always be true.

While looking at import, export, iFDI, and oFDI, it is clear that, in theory, all these variables play a considerable role, GDP is affected by them, and in most cases they sufficiently raise the GDP. In theory, this GDP increase should also correspond to a reducing unemployment level effect. However, as it is seen, with higher dependency on global trade and investment, this relationship does not work as it should. The assumptions mostly would be that while participating in international affairs, markets are changing as well, the globalization process plays its part, and with money from abroad, countries also inherit more knowledge and technological know-how or the inhouse markets becomes oversaturated with goods from abroad and that current markets are forced to change. All of that conditions a decrease in unemployment dependency on GDP fluctuations.

Validity and the limitations of the research

The research was dedicated to uncovering what effects international economic relations might have over the deeply investigated and proven Okun's law. It was decided to differentiate unemployment into seven different categories to see the more specific results. Also, from the literature review, it was seen that the growth-unemployment nexus might be different through different phases of the business cycles. Therefore, the business cycle was divided into decline and growth phases to see more differentiated results. Four variables were used to proxy international economic relations open to an investigation, and seven unemployment variables were used to see the effect. The general tendencies were as expected, and the results came that international economic relations weaken the growth-unemployment nexus. If the effect was slightly different for one unemployment variable or another, it was relatively small and conformed to general tendency. Also, while combining the results for different phases of business cycles, the tendencies were relatively similar, again suggesting the reliability of the results.

The limitation of the research is that it was visible that the deviation of a few countries in terms of the level of FDI (for example, Malta and Cyprus) is relatively high, suggesting that it might affect the results for the whole panel. Also, due to that, confidence intervals, in some cases, appeared to be very wide, influencing the efficiency of the estimated Okun's

coefficients. In some cases, the effect seemed to be relatively different for certain unemployment. In such cases, the averaged results become a decisive factor to reach a consensus about the effect of the variable.

Conclusion and investigation of the hypothesis

The research took long-lasting Okun's theory to the test to see how differently unemployment reacts to GDP fluctuation over the influence of another variable. More importantly, Okun's theory was presented before the globalization peaks of this century. Therefore, it is pretty useful information to know how international relations might affect unemployment and GDP correlation.

The effect of FDI and trade on the growth-unemployment nexus was measured using different unemployment variables and different phases of the business cycle. Four different variables (import, export, inward FDI, and outward FDI) proxy international economic relations under investigation. All of them were used to examine how international economic relations affects unemployment reaction to GDP fluctuations. Theory suggests that international economic relations might mitigate the effect of GDP change on unemployment, meaning that if an international economic relation intensifies, the effect of GDP on unemployment weakens.

The results suggest that in the case of an import, the growth-unemployment relationship becomes weaker considering all seven unemployment variables, suggesting that import indeed mitigates the growth-unemployment nexus. The case of export is almost identical, suggesting that GDP is also having a more negligible effect on unemployment if export levels are higher. Inward FDI showed slightly different results, meaning that the effect of iFDI growth-unemployment nexus was relatively minor but still noticeable in all unemployment groups. The only variable that acted a bit differently was outward FDI, since the growth-unemployment nexus was not mitigated for all unemployment groups. Nevertheless, it did not affect only specific groups of unemployed, and thus the general view would still be that oFDI is also mitigating the growth-unemployment correlations. The conclusion would be that the hypothesis is confirmed.

Discussion

Generally, the result provided information that growth-unemployment nexus is affected by all four variables of international economic relations under testing. Taking a closer look at imports, the slopes were steepest for youths and uneducated people (EDU0–2). This means that import has the most drastic effect on these two groups of unemployed. It is relatively understandable, since both groups mainly represent similar people. Suppose the majority of goods come from imports. In that case, these two groups are the ones that suffer, since there is a probability that those low-level jobs that young or uneducated people are targeting would no longer exist with such a level of import. The results are in line with Mohler *et al.* (2018), who found that import has a significant effect on the probability of becoming unemployed in the case of low-skilled workers, as well as the results of Gonese *et al.* (2023), who proved the existence of a positive effect of import on unemployment. It should be noted, however, that these studies did not distinguish unemployment according to specific categories. The results of this study also suggest that if the import to GDP level is higher, the lower effect of growth on unemployment, and if the economy reaches 120% of import-to-GDP, the effect of growth on unemployment becomes insignificant. In this scenario, the country would most likely be fully saturated with imported goods, and unemployment would be high, but it would not be connected to output change. In the scientific literature, the effect of import on growth is defined as positive (e.g. Kim *et al.*, 2007), negative (e.g. Altaee *et al.*, 2016), or no relationship between import and growth (e.g. Ebrahimi, 2017; Sarker, 2024).

Export also weakens the effect of the GDP growth-unemployment nexus. In most cases, confidence intervals of the effects reach zero with a 150% export-to-GDP ratio, meaning the unemployment-to-GDP growth relationship becomes insignificant when export reaches 150% of GDP. Okun's coefficients for the youth and highly educated (EDU5–8) are even more sensitive to the export, meaning their growth-unemployment relationship becomes insignificant when the export reaches 120% of GDP. It could be explained that with a higher and higher export ratio, young people also tend to lose their market cap since they cannot produce exportable goods. However, the situation is different with a highly educated (EDU5–8) group of people. Since unemployment of highly educated people is low, high exports weaken the GDP effect on unemployment not as significant as other

educational attainment level groups. In the scientific literature, the effect of export on growth is not straightforward, as, for example, Bakari and Mabrouki (2017) found no effect of export on growth, Kaur *et al.* (2017) found a bidirectional causality between export and GDP, and Sarker (2024) proved the existence of positive effect. With regard to unemployment, Gonesse *et al.* (2023) proved the existence of a negative effect of export on unemployment in the long run.

Considering the inward FDI, it is visible that the slopes representing Okun's coefficients are directed toward the positive side. This means that, similarly to import and export, if the country receives a high level of iFDI, the GDP growth-unemployment correlation is weakened. Overall, iFDI conditions the relationship between GDP growth and unemployment, which becomes insignificant at approximately 800%, meaning that if iFDI-to-GDP is 800% or more, GDP growth no longer affects the unemployment level. Of course, this high level of FDI is not usual and is common primarily to small countries. However, the pattern that the higher the iFDI, the lower the impact growth has on unemployment is visible. The highest impact was visible in groups of young and uneducated (EDU0–2) people, similarly as with import and export. The lowest impact of iFDI was for female and highly educated unemployment. This outcome was not unexpected, since young and uneducated people often belong to a similar sample and their unemployment levels are volatile. Since iFDI, in most cases, would require employees with higher experience, economic growth would not make such a big difference for young and uneducated people. Since the unemployment of females and highly educated are not fragile, iFDI would make a small change since the demand for this type of labor would hardly be affected. Discussions in the scientific literature mainly refer to a positive effect of iFDI on growth (e.g. Marasco *et al.*, 2023; Fazaaloh, 2024, and Sarker, 2024). The findings of Mwakabungu and Kauangal (2023) research reveal a positive and statistically significant unidirectional causality from FDI inflows to economic growth. Regarding unemployment, the negative effect of iFDI on unemployment is defined by Alfalih (2024), etc.

Lastly, the results show that the outward FDI has a minor effect on the GDP growth-unemployment nexus as a whole. In a hypothetical situation, the growth loses impact on unemployment at approximately 700–1000% of oFDI-to-GDP. However, this situation is highly hypothetical, since the confidence intervals are relatively wide. The interesting findings are with female unemployment and especially with the highly educated people un-

employment. The slope representing Okun's coefficients for the female is going downwards. It is barely visible. However, it means that with every additional oFDI percentage point, at least for female unemployment, the growth effect on unemployment is increasing. The slope also goes downwards for highly educated people and is relatively more visible. The assumption could be that with a high level of oFDI the money and highly skilled specialists are "exported." Therefore, the GDP growth-unemployment relationship becomes more significant. In comparison, the results of the research by Kim *et al.* (2020) proved the existence of a negative relationship between output and unemployment due to the impact of FDI on growth.

Conclusions

The paper aimed to deepen the analysis of Okun's law. GDP and unemployment are negatively correlated, meaning if GDP grows, the unemployment level should decline and vice versa. Nowadays, and especially in the face of challenges that we recently faced, forced countries to move towards globalization even more, and the international economic relations that some time ago could have been considered as an added benefit to the economy now could potentially be one of the factors that could affect growth-unemployment nexus. The analyzed articles allowed us to hypothesize that international economic relations such as import, export, and inward and outward FDI could weaken this.

The result suggests that import mitigates the effect of GDP growth on unemployment, and with a substantial import level, the nexus becomes statistically insignificant. The same is true considering exports, where increasing exports mitigates the growth-unemployment relationship. Inward and outward FDI also weakens the nexus, however, only with a substantially high inward or outward FDI it becomes statistically insignificant.

The results also suggest that socio-demographical factors play an important role as well. In most cases, it was found that the negative effect of international economic relationships stays with either young or inferior educated employees.

The research could be a foundation for sectoral strategic policies to participate in the global market, while at the same time fostering the workforce and promoting growth in their economy. FDI incentive programs could be

adjusted, since it is visible the FDI affects the economy and policies could be tailored in a way to attract FDI in the right areas where the labor is capable of fitting in and using the potential it offers. Trade liberalization topics might be discussed, and policies adjusted knowing trade effect on the nexus and balance should be found, while having a healthy openness to trade ratio versus the domestic market and jobs protection. Lastly, labor policy decisions should be shaped according to global needs. The focus should shift to providing the workforce with the tools and knowledge to be competitive in a global market.

The conducted study has limitations. The results reveal that the deviation of some countries in some specific situations is quite large, which may affect the result for the whole panel. In addition, the confidence intervals in some cases appeared to be wide, which affected the overall efficiency of the estimated composite slope coefficients. In some cases, the effects of certain groups of unemployed appeared quite different, and to reach a consensus about the effects, the averaged results became the deciding factor. Moreover, the paper does not incorporate labor policies, or technological advancements that may affect the nexus, since it is a crucial factor in the ability of the workforce to be able to be positively affected by it. The data analyzed only in EU-28 countries therefore the ability to apply the result might be limited due to lack of data in other regions.

A suggestion for further analysis would be to analyze each country's political and institutional environment to understand the effect of international economic relations on the growth-unemployment nexus more deeply and what policies might mitigate or increase the effect of it. We believe that institutions and policies might shape the effect that trade or FDI has on the domestic markets and thus on the GDP growth-unemployment nexus. Also, similar investigation should be executed throughout the entire world economy as a whole to see and be able to apply the results globally.

References

- Agarwal, J. P. (1996). Does foreign direct investment contribute to unemployment in home countries? An empirical survey. *Kiel Institute for the World Economy Working Papers*, 765.
- Albanesi, S., & Şahin, A. (2018). The gender unemployment gap. *Review of Economic Dynamics*, 30, 47–67. <https://doi.org/10.1016/j.red.2017.12.005>.

- Alfalih, A. A. (2024). The impact of oil prices, foreign direct investment and trade openness on unemployment rates in an oil-exporting country: The case of Saudi Arabia. *Heliyon*, 10, 1–15. <https://doi.org/10.1016/j.heliyon.2024.e25094>.
- Ali, U., Shan, W., Wang, J. J., & Amin, A. (2018). Outward foreign direct investment and economic growth in China: Evidence from asymmetric ARDL approach. *Journal of Business Economics and Management*, 19(5), 706–721. <https://doi.org/10.3846/jbem.2018.6263>.
- Altaee, H. H. A., Al-Jafari, M. K., & Khalid, M. A. (2016). Determinants of economic growth in the Kingdom of Saudi Arabia: An application of autoregressive distributed lag model. *Applied Economics and Finance* 3(1), 83–92. <https://doi.org/10.11114/aef.v3i1.1200>.
- An, Z., Ball, L., Jalles, J., & Loungani, P. (2019). Do IMF forecasts respect Okun's law? Evidence for advanced and developing economies. *International Journal of Forecasting*, 35(3), 1131–1142. <https://doi.org/10.1016/j.ijforecast.2019.03.001>.
- An, Z., Ghazi, T., & Prietto, N. G. (2017). Okun's law: unfit for low and lower middle income countries? Retrieved from https://www.imf.org/external/np/seminars/eng/2016/GlobalLaborMarkets/pdf/Ghazi_Session1_paper.pdf (30.10.2021).
- Askenazy, P., Chevalier, M., & Erhel, C. (2015). Okun's laws differentiated by education. *CEPREMAP Working Papers*, 1514.
- Awad-Warrad, T. (2018). Trade openness, economic growth and unemployment reduction in Arab region. *International Journal of Economics and Financial Issues*, 8(1), 179–183.
- Axelrad, H., Malul, M., & Luski, I. (2018). Unemployment among younger and older individuals: Does conventional data about unemployment tell us the whole story? *Journal for Labour Market Research*, 52(1), 1–12. <https://doi.org/10.1186/s12651-018-0237-9>.
- Bakari, S., & Mabrouki, M. (2017). Impact of exports and imports on economic growth: new evidence from Panama. *Journal of Smart Economic Growth*, 2(1), 67–79.
- Bivens, J. (2015). Yes, trade deficits do indeed matter for jobs. Economic Policy Institute. Retrieved from <https://www.epi.org/blog/yes-trade-deficits-do-indeed-matter-for-jobs/> (10.09.2021).
- Brambor, T., Clark, W., & Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political Analysis*, 14(1), 63–82. <https://doi.org/10.1093/pan/mpi014>.
- Brincikova, Z., & Darmo, L. (2015). The impact of economic growth on gender specific unemployment in the EU. *Scientific Annals of Economics and Business*, 62(3), 383–390. <https://doi.org/10.1515/aicue-2015-0026>.
- Butkus, M., & Seputiene, J. (2019) The output gap and youth unemployment: An analysis based on Okun's law. *Economies*, 7(4), 108. <https://doi.org/10.3390/economies7040108>.

- Butkus, M., Matuzeviciute, K., Rupliene, D., & Seputiene, J. (2020). Does unemployment responsiveness to output change on age, gender, education, and the phase of the business cycle? *Economies*, 8(4), 98. <https://doi.org/10.3390/economies8040098>.
- Card, D. (2011). Origins of the unemployment rate: the lasting legacy of measurement without theory. *American Economic Review*, 101(3), 552–557. <https://doi.org/10.1257/aer.101.3.552>.
- Chamberlin, G. (2011). Okun's law revisited. *Economic & Labour Market Review*, 5, 104–132. <https://doi.org/10.1057/ELMR.2011.21>.
- Chang, S. C. (2009). The interactions among foreign direct investment, economic growth, degree of openness and unemployment in Taiwan. *Applied Economics*, 39(13), 1647–1661. <https://doi.org/10.1080/00036840600675612>.
- Chen, K. (2010). Outward foreign direct investment, wage rigidity and unemployment: a computable general equilibrium analysis. *Journal of International Trade & Economic Development*, 20(4), 569–583. <https://doi.org/10.1080/09638190903137206>.
- Dritsakis, N., & Stamatiou, P. (2018). Causal nexus between FDI, exports, unemployment and economic growth for the old European union members. Evidence from panel data. *International Journal of Economic Sciences*, VII(2), 35–56. <https://doi.org/10.20472/ES.2018.7.2.002>.
- Dunsch, S. (2017). Age- and gender-specific unemployment and Okun's law in CEE countries. *Eastern European Economics*, 55(4), 377–393. <https://doi.org/10.1080/00128775.2017.1338962>.
- Ebrahimi, N. (2017). An analysis of the relationship of imports and economic growth in Iran (comparison of systematic and unsystematic cointegration methods with neural network). *International Journal of economics and Financial Issues*, 7(2), 338–347.
- Estrin, S. (2017). Foreign direct investment and employment in transition economies. *IZA World of labor*, 330, 1–10. <https://doi.org/10.15185/izawol.330>.
- Eurostat (2020). Unemployment statistics. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php/Unemployment_statistics#Youth_unemployment (01.04.2021).
- Eurostat (n.d.). Database. Retrieved from <https://ec.europa.eu/eurostat/data/database> (01.04.2021).
- Fazaaloh, A. M. (2024). FDI and economic growth in Indonesia: A provincial and sectoral analysis. *Journal of Economic Structures*, 13(1), 3. <https://doi.org/10.1186/s40008-023-00323-w>.
- Felbermayr, G., Prat, J., & Schmerer, H. (2011). Trade and unemployment: What do the data say? *European Economic Review*, 55(6), 741–758. <https://doi.org/10.1016/j.eurocorev.2011.02.003>.
- Göçer, İ., & Erdal, L. (2015). The relationship between youth unemployment and economic growth in Central and Eastern European countries: an empirical analysis. *Journal of The Faculty of Economics and Administrative Sciences*, 5(1), 173–188.

- Gochero, P., & Boopen, S. (2020). The effect of mining foreign direct investment inflow on the economic growth of Zimbabwe. *Journal of Economic Structures*, 9(54), 54. <https://doi.org/10.1186/s40008-020-00230-4>.
- Gonese, D., Sibanda, K., & Ngonisa, P. (2023). Trade openness and unemployment in selected Southern African Development Community (SADC) Countries. *Economies*, 11(10), 252. <https://doi.org/10.3390/economies11100252>.
- Harris, R., & Silverstone, B. (2001). Testing for asymmetry in Okun's law: A cross-country comparison. *Economics Bulletin*, 5, 1–13.
- Huijje, G. (2018) Outward foreign direct investment and employment in Japan's manufacturing industry. *Journal of Economic Structures*, 7(27), 27. <https://doi.org/10.1186/s40008-018-0125-z>.
- Ihensekhien, O. A., & Aisien, L. N. (2019). Growth-youth unemployment nexus in upper-middle-income countries in Sub-Saharan Africa. *Turkish Economic Review*, 6(1), 62–76. <https://doi.org/10.1453/ter.v6i1.1852>.
- International Labor Office (2010). Global employment trends. Retrieved from <https://www.imf.org/external/pubs/ft/fandd/basics/unemploy.htm> (24.10.2021).
- Irpan, H., Saad, R., Nor, A., Noor, A., & Ibrahim, N. (2016). Impact of foreign direct investment on the unemployment rate in Malaysia. *Journal of Physics*, 710(1), 012028. <https://doi.org/10.1088/1742-6596/710/1/012028>.
- Jin, C., Lee, S., & Hwang, J. (2019). The impact of import and export on unemployment: A cross-national analysis. *International Journal of Sustainable Economy*, 11(4), 347–363. <https://doi.org/10.1504/IJSE.2019.103475>.
- Kaur, G., Sarin, V., & Dhami, J. K. (2017). Causality between exports and GDP: An empirical evidence from BIMSTEC region. In B. Kamaiah, C. Shylajan, S. Seshaiyah, M. Aruna & S. Mukherjee (Eds.). *Current issues in economics and finance* (pp. 77–94). Singapore: Springer. https://doi.org/10.1007/978-981-10-5810-3_6.
- Kim, J., Yoon, J. C., & Jei, S. Y. (2020). An empirical analysis of Okun's laws in ASEAN using time-varying parameter model. *Physica A: Statistical Mechanics and its Applications*, 540(15), 123068. <https://doi.org/10.1016/j.physa.2019.123068>.
- Kim, M. J., & Park, S. Y. (2018). Do gender and age impact the time-varying Okun's law? Evidence from South Korea. *Pacific Economic Review*, 24, 672–685. <https://doi.org/10.1111/1468-0106.12288>.
- Kim, S., Lim, H., & Park, D. (2007). Could imports be beneficial for economic growth? Some evidence from Republic of Korea. *ADB ERD Working Paper Series*, 103.
- Koettl, J., Mata, E., Saiovici, G., & Santos, I. (2013). Employment recovery stalls in Europe and Central Asia. Europe and Central Asia Knowledge Brief, 65. Retrieved from <https://openknowledge.worldbank.org/handle/10986/16956> (15.08.2021).
- Koluman, E. (2020). Turkey: What is foreign direct investment: Definition, numbers and protection opportunities. Retrieved from <https://www.mondaq.com/turkey/inward-foreign-investment/1001384/what-is-foreign-direct-investment-definition-numbers-and-protection-opportunities> (12.08.2021).

- Kramarova, K., Svabova, L., & Gabrikova, B. (2022). Impacts of the Covid-19 crisis on unemployment in Slovakia: A statistically created counterfactual approach using the time series analysis. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 17(2), 343–389. <https://doi.org/10.24136/eq.2022.012C>.
- Louail, B., & Benarous, D. (2021). Relationship between economic growth and unemployment rates in the Algerian economy: Application of Okun's law during 1991–2019. *Organisations and Markets in Emerging Economies*, 12(1), 71–85. <https://doi.org/10.15388/omee.2021.12.48>.
- Marasco, A., Khalid A. M., & Tariq, F. (2023) Does technology shape the relationship between FDI and growth? A panel data analysis. *Applied Economics*. <https://doi.org/10.1080/00036846.2023.2192033>.
- Meyer, D. F. (2017). An analysis of the short and long-run effects of economic growth on employment in South Africa. *International Journal of Economics and Finance Studies*, 9(1), 177–193.
- Mohler, L., Weder, R., & Wyss, S. (2018). International trade and unemployment: Towards an investigation of the Swiss case. *Swiss Journal of Economics and Statistics*, 154, 10. <https://doi.org/10.1186/s41937-017-0006-7>.
- Moreno-Galbís, E., & Sneessens, H. (2007). Low-skilled unemployment, capital-skill complementarity and embodied technical progress. *Recherches économiques de Louvain*, 73(3), 241–272. <https://doi.org/10.3917/rel.733.0241>.
- Mwakabungu, B. H. P., & Kauangal, J. (2023). An empirical analysis of the relationship between FDI and economic growth in Tanzania. *Cogent Economics & Finance*, 11(1), 2204606. <https://doi.org/10.1080/23322039.2023.2204606>.
- Omoshoro-Jones, O. S. (2021). Asymmetry in Okun's law revisited: New evidence on cyclical unemployment-cyclical output trade-offs in the free state province using NARDL model. *MPRA Paper*, 107126.
- Passinhas, J., & Proença, I. (2020). Measuring the gender disparities in unemployment dynamics during the recession: Evidence from Portugal. *Applied Economics*, 52(6), 623–636. <https://doi.org/10.1080/00036846.2019.1659494>.
- Pizzo, A. (2019). Literature review of empirical studies on Okun's law in Latin America and the Caribbean. *International Labour Organization, Working Paper*, 252.
- Privara, A. (2022). Economic growth and labour market in the European Union: Lessons from COVID-19. *Oeconomia Copernicana*, 13(2), 355–377. <https://doi.org/10.24136/oc.2022.011C>.
- Queneau, H., & Sen, A. (2008). Evidence on the dynamics of unemployment by gender. *Applied Economics*, 40(6), 2099–2108. <https://doi.org/10.1080/00036840600949330>.
- Rizvi, S. Z. A., & Nishat, M. (2009). The impact of foreign direct investment on employment opportunities: Panel data analysis: Empirical evidence from Pakistan, India and China. *Pakistan Development Review*, 48(4), 841–851.

- Sarker, B. (2024). FDI-growth and trade-growth relationships during crises: Evidence from Bangladesh. *Financial Innovation*, 10(55), 10. <https://doi.org/10.1186/s40854-023-00571-6>.
- Shaari, M. S., Hussain, N. E., & Halim, M. S. (2012). The impact of foreign direct investment on the unemployment rate and economic growth in Malaysia. *Journal of Applied Sciences Research*, 8(9), 4900–4906.
- Su, W., Zhang, D., Zhang, C., Abrahám, M., Simionescu, M., Yaroshevich, N., & Guseva, V. (2018). Determinants of foreign direct investment in the Visegrad group countries after the EU enlargement. *Technological and Economic Development of Economy*, 24(5), 1955–1978. <https://doi.org/10.3846/tede.2018.5487>.
- Sun, P., & Heshmati, A. (2010). International trade and its effects on economic growth in China. *IZA Discussion Papers*, 5151.
- Unctad (n.d.). Datacenter. Retrieved from https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en (01.04.2021).
- Usman, M., Ali, M., Kamran, H. W., & Khalid, H. (2012). Impact of exports on economic growth – a case of Luxembourg. *Information Management and Business Review*, 4(1), 1–7. <https://doi.org/10.22610/imbr.v4i1.957>.
- Worstell, T. (2015). The trade deficit doesn't cause unemployment. *Forbes*. Retrieved from <https://www.forbes.com/sites/timworstell/2015/04/30/the-trade-deficit-doesnt-cause-unemployment/?sh=32f832a6378f> (15.08.2021).
- Yueming, Z. (2014). The employment effect of outward FDI on home country. In *2nd international conference on education technology and information system* (pp. 605–610). Hubei: Wuhan University of Science and Technology.



Ministry of Education and Science
Republic of Poland

The journal is co-financed in the years 2022–2024 by the Ministry of Education and Science of the Republic of Poland in the framework of the ministerial programme “Development of Scientific Journals” (RCN) on the basis of contract no. RCN/SN/0129/2021/1 concluded on 29 September 2022 and being in force until 28 September 2024.

Annex

Table 1. Descriptive statistics of the analysed variables

Variables	Mean	Median	St. deviation	Min	Max
Total unemployment, %	5.420	4.800	2.667	1.300	17.300
Male unemployment, %	5.830	5.000	2.976	1.200	18.400
Female unemployment, %	5.036	4.500	2.518	1.400	16.200
Youth unemployment, %	19.760	18.300	9.704	4.400	58.300
Unemployment EDU0-2, %	15.000	12.700	8.541	2.500	53.300
Unemployment EDU3-4, %	8.785	7.600	4.909	1.400	31.200
Unemployment EDU5-8, %	4.854	4.200	2.846	1.000	20.400
GDP growth, %	2.507	2.546	3.423	-14.810	25.160
FDI inward, % to GDP	125.700	44.590	313.600	9.092	1961.000
FDI outward, % to GDP	90.390	26.510	245.900	0.156	2066.000
Import, % to GDP	56.02	49.03	28.61	13.84	197.3
Export, % to GDP	58.28	49.72	34.69	11.91	238.2

Note: Unemployment variables are expressed in a per cent out of that category's total sample; EDU0-2 means uneducated people, EDU3-4 – average educated people and EDU5-8 – highly educated people.

Table 2. Effect of import on growth-unemployment nexus over the phase of economic decline

Import to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
13	<u>-0.373</u>	<u>-1.148</u>	<u>-0.469</u>	<u>-0.285</u>	<u>-0.717</u>	<u>-0.712</u>	<u>-0.353</u>
23	<u>-0.362</u>	<u>-1.112</u>	<u>-0.461</u>	<u>-0.271</u>	<u>-0.750</u>	<u>-0.691</u>	<u>-0.332</u>
33	<u>-0.351</u>	<u>-1.075</u>	<u>-0.454</u>	<u>-0.256</u>	<u>-0.784</u>	<u>-0.670</u>	<u>-0.311</u>
43	<u>-0.340</u>	<u>-1.039</u>	<u>-0.447</u>	<u>-0.242</u>	<u>-0.818</u>	<u>-0.649</u>	<u>-0.289</u>
53	<u>-0.329</u>	<u>-1.002</u>	<u>-0.439</u>	<u>-0.228</u>	<u>-0.851</u>	<u>-0.628</u>	<u>-0.268</u>
63	<u>-0.319</u>	<u>-0.966</u>	<u>-0.432</u>	<u>-0.214</u>	<u>-0.885</u>	<u>-0.607</u>	<u>-0.247</u>
73	<u>-0.308</u>	<u>-0.930</u>	<u>-0.425</u>	<u>-0.199</u>	<u>-0.919</u>	<u>-0.587</u>	<u>-0.225</u>
83	<u>-0.297</u>	<u>-0.893</u>	<u>-0.417</u>	<u>-0.185</u>	<u>-0.952</u>	<u>-0.566</u>	<u>-0.204</u>
93	<u>-0.286</u>	<u>-0.857</u>	<u>-0.410</u>	<u>-0.171</u>	<u>-0.986</u>	<u>-0.545</u>	<u>-0.183</u>
103	<u>-0.275</u>	<u>-0.820</u>	<u>-0.403</u>	<u>-0.157</u>	<u>-1.020</u>	<u>-0.524</u>	-0.161
113	<u>-0.264</u>	<u>-0.784</u>	<u>-0.396</u>	<u>-0.142</u>	<u>-1.054</u>	<u>-0.503</u>	-0.140
123	<u>-0.253</u>	<u>-0.747</u>	<u>-0.388</u>	<u>-0.128</u>	<u>-1.087</u>	<u>-0.482</u>	-0.118
133	<u>-0.243</u>	-0.711	-0.381	-0.114	<u>-1.121</u>	-0.461	-0.097
143	-0.232	-0.674	-0.374	-0.100	<u>-1.155</u>	-0.440	-0.076
153	-0.221	-0.638	-0.366	-0.086	<u>-1.188</u>	-0.419	-0.054
163	-0.210	-0.602	-0.359	-0.071	<u>-1.222</u>	-0.398	-0.033
173	-0.199	-0.565	-0.352	-0.057	<u>-1.256</u>	-0.377	-0.012
183	-0.188	-0.529	-0.344	-0.043	<u>-1.289</u>	-0.356	0.010
193	-0.178	-0.492	-0.337	-0.029	<u>-1.323</u>	-0.335	0.031
203	-0.167	-0.456	-0.330	-0.014	<u>-1.357</u>	-0.315	0.052

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 3. Effect of import on growth-unemployment nexus over the phase of economic growth

Import to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
13	<u>-0.165</u>	<u>-0.457</u>	<u>-0.201</u>	<u>-0.136</u>	<u>-0.306</u>	<u>-0.297</u>	0.049
23	<u>-0.154</u>	<u>-0.424</u>	<u>-0.188</u>	<u>-0.127</u>	<u>-0.289</u>	<u>-0.279</u>	0.045
33	<u>-0.144</u>	<u>-0.392</u>	<u>-0.175</u>	<u>-0.118</u>	<u>-0.271</u>	<u>-0.261</u>	0.040
43	<u>-0.133</u>	<u>-0.360</u>	<u>-0.161</u>	<u>-0.109</u>	<u>-0.254</u>	<u>-0.242</u>	0.036
53	<u>-0.123</u>	<u>-0.328</u>	<u>-0.148</u>	<u>-0.101</u>	<u>-0.236</u>	<u>-0.224</u>	0.032
63	<u>-0.112</u>	<u>-0.295</u>	<u>-0.134</u>	<u>-0.092</u>	<u>-0.219</u>	<u>-0.206</u>	0.027
73	<u>-0.101</u>	<u>-0.263</u>	<u>-0.121</u>	<u>-0.083</u>	<u>-0.201</u>	<u>-0.188</u>	0.023
83	<u>-0.091</u>	<u>-0.231</u>	<u>-0.108</u>	<u>-0.075</u>	<u>-0.183</u>	<u>-0.169</u>	0.019
93	<u>-0.080</u>	<u>-0.199</u>	<u>-0.094</u>	<u>-0.066</u>	<u>-0.166</u>	<u>-0.151</u>	0.015
103	<u>-0.070</u>	-0.166	<u>-0.081</u>	<u>-0.057</u>	<u>-0.148</u>	<u>-0.133</u>	0.010
113	<u>-0.059</u>	-0.134	-0.068	-0.049	<u>-0.131</u>	<u>-0.115</u>	0.006
123	-0.048	-0.102	-0.054	-0.040	-0.113	-0.096	0.002
133	-0.038	-0.070	-0.041	-0.031	-0.096	-0.078	-0.003
143	-0.027	-0.037	-0.028	-0.022	-0.078	-0.060	-0.007
153	-0.017	-0.005	-0.014	-0.014	-0.061	-0.042	-0.011
163	-0.006	0.027	-0.001	-0.005	-0.043	-0.023	-0.016
173	0.005	0.059	0.012	0.004	-0.025	-0.005	-0.020
183	0.015	0.092	0.026	0.012	-0.008	0.013	-0.024
193	0.026	0.124	0.039	0.021	0.010	0.031	-0.028
203	0.036	0.156	0.052	0.030	0.027	0.050	-0.033

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 4. Effect of export on growth-unemployment nexus over the phase of economic decline

Export to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
13	<u>-0.354</u>	<u>-1.112</u>	<u>-0.446</u>	<u>-0.269</u>	<u>-0.727</u>	<u>-0.692</u>	<u>-0.318</u>
23	<u>-0.348</u>	<u>-1.083</u>	<u>-0.444</u>	<u>-0.258</u>	<u>-0.759</u>	<u>-0.676</u>	<u>-0.305</u>
33	<u>-0.341</u>	<u>-1.055</u>	<u>-0.442</u>	<u>-0.247</u>	<u>-0.791</u>	<u>-0.659</u>	<u>-0.292</u>
43	<u>-0.335</u>	<u>-1.026</u>	<u>-0.440</u>	<u>-0.237</u>	<u>-0.822</u>	<u>-0.643</u>	<u>-0.279</u>
53	<u>-0.328</u>	<u>-0.998</u>	<u>-0.438</u>	<u>-0.226</u>	<u>-0.854</u>	<u>-0.626</u>	<u>-0.265</u>
63	<u>-0.322</u>	<u>-0.970</u>	<u>-0.436</u>	<u>-0.216</u>	<u>-0.886</u>	<u>-0.610</u>	<u>-0.252</u>
73	<u>-0.315</u>	<u>-0.941</u>	<u>-0.434</u>	<u>-0.205</u>	<u>-0.917</u>	<u>-0.593</u>	<u>-0.239</u>
83	<u>-0.309</u>	<u>-0.913</u>	<u>-0.432</u>	<u>-0.195</u>	<u>-0.949</u>	<u>-0.577</u>	<u>-0.226</u>
93	<u>-0.302</u>	<u>-0.884</u>	<u>-0.430</u>	<u>-0.184</u>	<u>-0.981</u>	<u>-0.560</u>	<u>-0.213</u>
103	<u>-0.296</u>	<u>-0.856</u>	<u>-0.428</u>	<u>-0.173</u>	<u>-1.013</u>	<u>-0.544</u>	<u>-0.200</u>
113	<u>-0.289</u>	<u>-0.827</u>	<u>-0.426</u>	<u>-0.163</u>	<u>-1.044</u>	<u>-0.527</u>	<u>-0.186</u>
123	<u>-0.283</u>	<u>-0.799</u>	<u>-0.424</u>	<u>-0.152</u>	<u>-1.076</u>	<u>-0.511</u>	<u>-0.173</u>
133	<u>-0.276</u>	<u>-0.771</u>	<u>-0.423</u>	<u>-0.142</u>	<u>-1.108</u>	<u>-0.494</u>	-0.160
143	<u>-0.270</u>	-0.742	<u>-0.421</u>	-0.131	<u>-1.139</u>	-0.478	-0.147
153	-0.263	-0.714	-0.419	-0.120	<u>-1.171</u>	-0.461	-0.134
163	-0.257	-0.685	-0.417	-0.110	<u>-1.203</u>	-0.445	-0.121
173	-0.251	-0.657	-0.415	-0.099	<u>-1.235</u>	-0.428	-0.107
183	-0.244	-0.628	-0.413	-0.089	<u>-1.266</u>	-0.412	-0.094

Table 4. Continued

Export to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
193	-0.238	-0.600	-0.411	-0.078	<u>-1.298</u>	-0.395	-0.081
203	-0.231	-0.572	-0.409	-0.068	<u>-1.330</u>	-0.378	-0.068
213	-0.225	-0.543	-0.407	-0.057	<u>-1.361</u>	-0.362	-0.055
223	-0.218	-0.515	-0.405	-0.046	<u>-1.393</u>	-0.345	-0.042
233	-0.212	-0.486	-0.403	-0.036	<u>-1.425</u>	-0.329	-0.028
243	-0.205	-0.458	-0.401	-0.025	<u>-1.457</u>	-0.312	-0.015

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 5. Effect of export on growth-unemployment nexus over the phase of economic growth

Export to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
13	<u>-0.157</u>	<u>-0.439</u>	<u>-0.192</u>	<u>-0.127</u>	<u>-0.310</u>	<u>-0.281</u>	<u>-0.139</u>
23	<u>-0.148</u>	<u>-0.412</u>	<u>-0.181</u>	<u>-0.120</u>	<u>-0.293</u>	<u>-0.267</u>	<u>-0.130</u>
33	<u>-0.140</u>	<u>-0.385</u>	<u>-0.170</u>	<u>-0.114</u>	<u>-0.277</u>	<u>-0.253</u>	<u>-0.121</u>
43	<u>-0.131</u>	<u>-0.359</u>	<u>-0.159</u>	<u>-0.107</u>	<u>-0.261</u>	<u>-0.238</u>	<u>-0.111</u>
53	<u>-0.123</u>	<u>-0.332</u>	<u>-0.149</u>	<u>-0.100</u>	<u>-0.245</u>	<u>-0.224</u>	-0.102
63	<u>-0.114</u>	<u>-0.305</u>	<u>-0.138</u>	<u>-0.094</u>	<u>-0.228</u>	<u>-0.210</u>	-0.093
73	<u>-0.106</u>	<u>-0.278</u>	<u>-0.127</u>	<u>-0.087</u>	<u>-0.212</u>	<u>-0.196</u>	-0.084
83	<u>-0.098</u>	<u>-0.251</u>	<u>-0.116</u>	<u>-0.080</u>	<u>-0.196</u>	<u>-0.182</u>	-0.075
93	<u>-0.089</u>	<u>-0.225</u>	<u>-0.106</u>	<u>-0.074</u>	<u>-0.179</u>	<u>-0.168</u>	-0.065
103	<u>-0.081</u>	<u>-0.198</u>	<u>-0.095</u>	<u>-0.067</u>	<u>-0.163</u>	<u>-0.154</u>	-0.056
113	<u>-0.072</u>	<u>-0.171</u>	<u>-0.084</u>	<u>-0.060</u>	<u>-0.147</u>	<u>-0.139</u>	-0.047
123	<u>-0.064</u>	-0.144	<u>-0.073</u>	<u>-0.054</u>	<u>-0.130</u>	<u>-0.125</u>	-0.038
133	<u>-0.055</u>	-0.118	<u>-0.062</u>	<u>-0.047</u>	<u>-0.114</u>	<u>-0.111</u>	-0.029
143	-0.047	-0.091	-0.052	<u>-0.040</u>	-0.098	-0.097	-0.020
153	-0.039	-0.064	-0.041	-0.033	-0.081	-0.083	-0.010
163	-0.030	-0.037	-0.030	-0.027	-0.065	-0.069	-0.001
173	-0.022	-0.011	-0.019	-0.020	-0.049	-0.055	0.008
183	-0.013	0.016	-0.008	-0.013	-0.033	-0.041	0.017
193	-0.005	0.043	0.002	-0.007	-0.016	-0.026	0.026
203	0.004	0.070	0.013	0.000	0.000	-0.012	0.035
213	0.012	0.096	0.024	0.007	0.016	0.002	0.045
223	0.020	0.123	0.035	0.013	0.033	0.016	0.054
233	0.029	0.150	0.046	0.020	0.049	0.030	0.063
243	0.037	0.177	0.056	0.027	0.065	0.044	0.072

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 6. Effect of inward FDI on growth-unemployment nexus over the phase of economic decline

iFDI to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
9	<u>-0.314</u>	<u>-0.934</u>	<u>-0.423</u>	<u>-0.213</u>	<u>-0.823</u>	<u>-0.606</u>	<u>-0.249</u>
99	<u>-0.302</u>	<u>-0.884</u>	<u>-0.411</u>	<u>-0.202</u>	<u>-0.798</u>	<u>-0.590</u>	<u>-0.265</u>
189	<u>-0.291</u>	<u>-0.835</u>	<u>-0.399</u>	<u>-0.192</u>	<u>-0.774</u>	<u>-0.574</u>	<u>-0.281</u>
279	<u>-0.280</u>	<u>-0.785</u>	<u>-0.387</u>	<u>-0.181</u>	<u>-0.750</u>	<u>-0.559</u>	<u>-0.297</u>
369	<u>-0.268</u>	<u>-0.735</u>	<u>-0.375</u>	<u>-0.170</u>	<u>-0.725</u>	<u>-0.543</u>	<u>-0.313</u>
459	<u>-0.257</u>	<u>-0.685</u>	<u>-0.363</u>	<u>-0.160</u>	<u>-0.701</u>	<u>-0.527</u>	<u>-0.329</u>
549	<u>-0.246</u>	<u>-0.636</u>	<u>-0.350</u>	<u>-0.149</u>	<u>-0.676</u>	<u>-0.512</u>	<u>-0.345</u>
639	<u>-0.234</u>	<u>-0.586</u>	<u>-0.338</u>	<u>-0.138</u>	<u>-0.652</u>	<u>-0.496</u>	<u>-0.361</u>
729	<u>-0.223</u>	<u>-0.536</u>	<u>-0.326</u>	<u>-0.128</u>	<u>-0.627</u>	<u>-0.481</u>	<u>-0.377</u>
819	<u>-0.211</u>	<u>-0.487</u>	<u>-0.314</u>	<u>-0.117</u>	<u>-0.603</u>	<u>-0.465</u>	<u>-0.393</u>
909	<u>-0.200</u>	<u>-0.437</u>	<u>-0.302</u>	<u>-0.107</u>	<u>-0.579</u>	<u>-0.449</u>	<u>-0.409</u>
999	<u>-0.189</u>	<u>-0.387</u>	<u>-0.290</u>	<u>-0.096</u>	<u>-0.554</u>	<u>-0.434</u>	<u>-0.424</u>
1089	<u>-0.177</u>	<u>-0.337</u>	<u>-0.278</u>	<u>-0.085</u>	<u>-0.530</u>	<u>-0.418</u>	<u>-0.440</u>
1179	<u>-0.166</u>	<u>-0.288</u>	<u>-0.266</u>	<u>-0.075</u>	<u>-0.505</u>	<u>-0.402</u>	<u>-0.456</u>
1269	<u>-0.154</u>	<u>-0.238</u>	<u>-0.253</u>	<u>-0.064</u>	<u>-0.481</u>	<u>-0.387</u>	<u>-0.472</u>
1359	<u>-0.143</u>	<u>-0.188</u>	<u>-0.241</u>	<u>-0.053</u>	<u>-0.456</u>	<u>-0.371</u>	<u>-0.488</u>
1449	<u>-0.132</u>	<u>-0.139</u>	<u>-0.229</u>	<u>-0.043</u>	<u>-0.432</u>	<u>-0.355</u>	<u>-0.504</u>
1539	<u>-0.120</u>	<u>-0.089</u>	<u>-0.217</u>	<u>-0.032</u>	<u>-0.408</u>	<u>-0.340</u>	<u>-0.520</u>
1629	<u>-0.109</u>	<u>-0.039</u>	<u>-0.205</u>	<u>-0.022</u>	<u>-0.383</u>	<u>-0.324</u>	<u>-0.536</u>
1719	<u>-0.098</u>	<u>0.011</u>	<u>-0.193</u>	<u>-0.011</u>	<u>-0.359</u>	<u>-0.308</u>	<u>-0.552</u>
1809	<u>-0.086</u>	<u>0.060</u>	<u>-0.181</u>	<u>0.000</u>	<u>-0.334</u>	<u>-0.293</u>	<u>-0.568</u>
1899	<u>-0.075</u>	<u>0.110</u>	<u>-0.169</u>	<u>0.010</u>	<u>-0.310</u>	<u>-0.277</u>	<u>-0.584</u>
1989	<u>-0.063</u>	<u>0.160</u>	<u>-0.156</u>	<u>0.021</u>	<u>-0.286</u>	<u>-0.261</u>	<u>-0.600</u>

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 7. Effect of inward FDI on growth-unemployment nexus over the phase of economic growth

iFDI to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
9	<u>-0.115</u>	<u>-0.319</u>	<u>-0.138</u>	<u>-0.095</u>	<u>-0.253</u>	<u>-0.211</u>	<u>-0.087</u>
99	<u>-0.107</u>	<u>-0.284</u>	<u>-0.129</u>	<u>-0.088</u>	<u>-0.231</u>	<u>-0.196</u>	<u>-0.093</u>
189	<u>-0.099</u>	<u>-0.249</u>	<u>-0.119</u>	<u>-0.081</u>	<u>-0.210</u>	<u>-0.180</u>	<u>-0.099</u>
279	<u>-0.091</u>	<u>-0.214</u>	<u>-0.109</u>	<u>-0.074</u>	<u>-0.188</u>	<u>-0.165</u>	<u>-0.105</u>
369	<u>-0.083</u>	<u>-0.179</u>	<u>-0.100</u>	<u>-0.068</u>	<u>-0.166</u>	<u>-0.149</u>	<u>-0.111</u>
459	<u>-0.075</u>	<u>-0.144</u>	<u>-0.090</u>	<u>-0.061</u>	<u>-0.145</u>	<u>-0.134</u>	<u>-0.117</u>
549	<u>-0.067</u>	<u>-0.109</u>	<u>-0.080</u>	<u>-0.054</u>	<u>-0.123</u>	<u>-0.119</u>	<u>-0.123</u>
639	<u>-0.059</u>	<u>-0.074</u>	<u>-0.071</u>	<u>-0.047</u>	<u>-0.102</u>	<u>-0.103</u>	<u>-0.129</u>
729	<u>-0.051</u>	<u>-0.039</u>	<u>-0.061</u>	<u>-0.040</u>	<u>-0.080</u>	<u>-0.088</u>	<u>-0.134</u>
819	<u>-0.043</u>	<u>-0.004</u>	<u>-0.051</u>	<u>-0.034</u>	<u>-0.058</u>	<u>-0.072</u>	<u>-0.140</u>
909	<u>-0.035</u>	<u>0.031</u>	<u>-0.042</u>	<u>-0.027</u>	<u>-0.037</u>	<u>-0.057</u>	<u>-0.146</u>
999	<u>-0.027</u>	<u>0.066</u>	<u>-0.032</u>	<u>-0.020</u>	<u>-0.015</u>	<u>-0.042</u>	<u>-0.152</u>
1089	<u>-0.019</u>	<u>0.101</u>	<u>-0.022</u>	<u>-0.013</u>	<u>0.007</u>	<u>-0.026</u>	<u>-0.158</u>
1179	<u>-0.011</u>	<u>0.136</u>	<u>-0.013</u>	<u>-0.006</u>	<u>0.028</u>	<u>-0.011</u>	<u>-0.164</u>
1269	<u>-0.003</u>	<u>0.171</u>	<u>-0.003</u>	<u>0.000</u>	<u>0.050</u>	<u>0.005</u>	<u>-0.170</u>
1359	<u>0.005</u>	<u>0.206</u>	<u>0.007</u>	<u>0.007</u>	<u>0.072</u>	<u>0.020</u>	<u>-0.176</u>
1449	<u>0.013</u>	<u>0.241</u>	<u>0.016</u>	<u>0.014</u>	<u>0.093</u>	<u>0.035</u>	<u>-0.182</u>

Table 7. Continued

iFDI to GDP, %	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
1539	0.021	0.276	0.026	0.021	0.115	0.051	<u>-0.188</u>
1629	0.029	0.311	0.036	0.027	0.136	0.066	<u>-0.194</u>
1719	0.037	0.346	0.045	0.034	0.158	0.081	<u>-0.199</u>
1809	0.045	0.381	0.055	0.041	0.180	0.097	<u>-0.205</u>
1899	0.053	0.416	0.065	0.048	0.201	0.112	<u>-0.211</u>
1989	0.061	0.451	0.074	0.055	0.223	0.128	<u>-0.217</u>

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 8. Effect of outward FDI on growth-unemployment nexus over the phase of economic decline

oFDI to GDP,%	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
1	<u>-0.318</u>	<u>-0.951</u>	<u>-0.429</u>	<u>-0.216</u>	<u>-0.835</u>	<u>-0.616</u>	<u>-0.251</u>
101	<u>-0.331</u>	<u>-0.891</u>	<u>-0.442</u>	<u>-0.229</u>	<u>-0.861</u>	<u>-0.629</u>	<u>-0.270</u>
201	<u>-0.344</u>	<u>-0.831</u>	<u>-0.455</u>	<u>-0.242</u>	<u>-0.887</u>	<u>-0.643</u>	<u>-0.289</u>
301	<u>-0.357</u>	<u>-0.772</u>	<u>-0.468</u>	<u>-0.255</u>	<u>-0.913</u>	<u>-0.657</u>	<u>-0.308</u>
401	<u>-0.371</u>	<u>-0.712</u>	<u>-0.481</u>	<u>-0.268</u>	<u>-0.939</u>	<u>-0.671</u>	<u>-0.327</u>
501	<u>-0.384</u>	<u>-0.652</u>	<u>-0.495</u>	<u>-0.280</u>	<u>-0.965</u>	<u>-0.685</u>	<u>-0.346</u>
601	<u>-0.397</u>	<u>-0.592</u>	<u>-0.508</u>	<u>-0.293</u>	<u>-0.991</u>	<u>-0.699</u>	<u>-0.365</u>
701	<u>-0.410</u>	<u>-0.532</u>	<u>-0.521</u>	<u>-0.306</u>	<u>-1.016</u>	<u>-0.712</u>	<u>-0.384</u>
801	<u>-0.423</u>	<u>-0.472</u>	<u>-0.534</u>	<u>-0.319</u>	<u>-1.042</u>	<u>-0.726</u>	<u>-0.403</u>
901	<u>-0.436</u>	<u>-0.412</u>	<u>-0.547</u>	<u>-0.332</u>	<u>-1.068</u>	<u>-0.740</u>	<u>-0.422</u>
1001	<u>-0.449</u>	-0.352	<u>-0.560</u>	<u>-0.344</u>	<u>-1.094</u>	<u>-0.754</u>	<u>-0.441</u>
1101	<u>-0.462</u>	-0.292	<u>-0.573</u>	<u>-0.357</u>	<u>-1.120</u>	<u>-0.768</u>	<u>-0.460</u>
1201	<u>-0.475</u>	-0.232	<u>-0.587</u>	<u>-0.370</u>	<u>-1.146</u>	<u>-0.782</u>	<u>-0.479</u>
1301	<u>-0.488</u>	-0.172	<u>-0.600</u>	<u>-0.383</u>	<u>-1.172</u>	<u>-0.795</u>	<u>-0.498</u>
1401	<u>-0.501</u>	-0.113	<u>-0.613</u>	<u>-0.396</u>	<u>-1.198</u>	<u>-0.809</u>	<u>-0.517</u>
1501	<u>-0.514</u>	-0.053	<u>-0.626</u>	<u>-0.408</u>	<u>-1.224</u>	<u>-0.823</u>	<u>-0.536</u>
1601	<u>-0.527</u>	0.007	<u>-0.639</u>	<u>-0.421</u>	<u>-1.250</u>	<u>-0.837</u>	<u>-0.555</u>
1701	<u>-0.540</u>	0.067	<u>-0.652</u>	<u>-0.434</u>	<u>-1.276</u>	<u>-0.851</u>	<u>-0.574</u>
1801	<u>-0.553</u>	0.127	<u>-0.666</u>	<u>-0.447</u>	<u>-1.302</u>	<u>-0.865</u>	<u>-0.593</u>
1901	<u>-0.566</u>	0.187	<u>-0.679</u>	<u>-0.460</u>	<u>-1.328</u>	<u>-0.879</u>	<u>-0.612</u>
2001	<u>-0.579</u>	0.247	<u>-0.692</u>	<u>-0.472</u>	<u>-1.354</u>	<u>-0.892</u>	<u>-0.631</u>
2101	<u>-0.592</u>	0.307	<u>-0.705</u>	<u>-0.485</u>	<u>-1.380</u>	<u>-0.906</u>	<u>-0.650</u>

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.

Table 9. Effect of outward FDI on growth-unemployment nexus over the phase of economic growth

oFDI to GDP,%	Okun's coefficient (composite slope)						
	TU	YU	MU	FU	EDU1-2	EDU3-4	EDU5-8
1	<u>-0.1081</u>	<u>-0.3076</u>	<u>-0.1299</u>	<u>-0.0892</u>	<u>-0.2402</u>	<u>-0.1942</u>	<u>-0.0783</u>
101	<u>-0.0996</u>	<u>-0.2607</u>	<u>-0.1203</u>	<u>-0.0969</u>	<u>-0.2135</u>	<u>-0.1806</u>	<u>-0.0733</u>
201	<u>-0.0911</u>	<u>-0.2137</u>	<u>-0.1107</u>	<u>-0.1047</u>	<u>-0.1868</u>	<u>-0.1671</u>	<u>-0.0684</u>
301	<u>-0.0826</u>	-0.1668	<u>-0.1011</u>	<u>-0.1124</u>	<u>-0.1601</u>	<u>-0.1535</u>	<u>-0.0634</u>
401	-0.0741	-0.1199	-0.0915	<u>-0.1202</u>	<u>-0.1334</u>	-0.1399	-0.0584
501	-0.0656	-0.0730	-0.0819	<u>-0.1279</u>	<u>-0.1067</u>	-0.1264	-0.0534
601	-0.0571	-0.0260	-0.0723	<u>-0.1357</u>	-0.0801	-0.1128	-0.0484
701	-0.0486	0.0209	-0.0627	<u>-0.1435</u>	-0.0534	-0.0992	-0.0434
801	-0.0401	0.0678	-0.0531	<u>-0.1512</u>	-0.0267	-0.0857	-0.0385
901	-0.0316	0.1148	-0.0435	<u>-0.1590</u>	0.0000	-0.0721	-0.0335
1001	-0.0231	0.1617	-0.0338	<u>-0.1667</u>	0.0267	-0.0585	-0.0285
1101	-0.0146	0.2086	-0.0242	<u>-0.1745</u>	0.0534	-0.0450	-0.0235
1201	-0.0061	0.2555	-0.0146	-0.1822	0.0801	-0.0314	-0.0185
1301	0.0024	0.3025	-0.0050	-0.1900	0.1068	-0.0178	-0.0135
1401	0.0109	0.3494	0.0046	-0.1977	0.1335	-0.0043	-0.0086
1501	0.0194	0.3963	0.0142	-0.2055	0.1601	0.0093	-0.0036
1601	0.0279	0.4432	0.0238	-0.2132	0.1868	0.0229	0.0014
1701	0.0364	0.4902	0.0334	-0.2210	0.2135	0.0364	0.0064
1801	0.0449	0.5371	0.0430	-0.2287	0.2402	0.0500	0.0114
1901	0.0534	0.5840	0.0526	-0.2365	0.2669	0.0636	0.0164
2001	0.0619	0.6310	0.0622	-0.2442	0.2936	0.0771	0.0213
2101	0.0704	0.6779	0.0718	-0.2520	0.3203	0.0907	0.0263

Note: underlined coefficients indicate at least 5% statistical significance of growth-unemployment nexus.