

Effect of Foreign Direct Investment on Growth-Unemployment Nexus

Tomas Kadiša

Vytauto Didžiojo universitetas, K. Donelaičio g. 58, Kaunas
Vytautas Magnus University, K. Donelaičio str. 58, Kaunas
El. p.: kadisatomas@icloud.com

Mindaugas Butkus

Vytauto Didžiojo universitetas, K. Donelaičio g. 58, Kaunas
Vytautas Magnus University, K. Donelaičio str. 58, Kaunas
El. p.: mindaugas.butkus@vdu.lt

Akvilė Aleksandravičienė

Vytauto Didžiojo universitetas, K. Donelaičio g. 58, Kaunas
Vytautas Magnus University, K. Donelaičio str. 58, Kaunas
El. p.: akvile.aleksandraviciene@vdu.lt

Summary. This paper examines the effect of foreign direct investment (FDI) on the growth-unemployment nexus. A review of previous contributions on Okun's law uncovered which aspects of international relations are more prone to affect growth-unemployment nexus. It was found that inward FDI and outward FDI are most likely to affect this nexus. EU-28 panel data and interactive model with pooled OLS estimator were used to empirically test whether both inward and outward FDI moderates the relationship between growth and unemployment. The estimations showed that, as expected, FDI weakens the effect of growth on unemployment. Moreover, with an increase in FDI, the effect of growth on unemployment becomes less statistically significant.

Keywords: foreign direct investment, gross domestic product, Okun's law, unemployment.

Tiesioginių užsienio investicijų poveikis augimo-nedarbo sąryšiui

Santrauka. Straipsnyje analizuojamas tiesioginių užsienio investicijų (FDI) poveikis bendrojo vidaus produkto (GDP) augimo ir nedarbo sąryšiui. Logiška, kad, augant ekonomikai, didėja darbo jėgos paklausa, o tai reiškia daugiau dirbančių asmenų ir mažesnę nedarbo lygį. Priešingu atveju, jei ekonomika traukiasi, nedarbas didėja, todėl daugiau žmonių lieka be darbo. Teoriniu požiūriu šių reiškinų sąsajas aprašė Arthur Okun, kuris atrado, kad ekonomikos augimas, matuojamas bendrojo vidaus produkto arba gamybos apimčių augimu, turi įtakos nedarbo lygiui. Okun'o dėsnis yra kaip taisyklė – didėjant nedarbui 1 procentiniu punktu, GDP sumažės 2–3 %. Tačiau paminėtina, kad mokslinėje literatūroje analizuojami teoriniai aspektai, atspindintys GDP augimo ir nedarbo santykį, atskleidžia, jog egzistuoja įvairių kitų tarptautinių faktorių, darančių poveikį nedarbui.

Nedarbas yra aktuali tema, kuri labai glaudžiai susijusi su ekonomine veikla. Daugelis mokslininkų ir politikų diskutuoja apie šį reiškinį, kadangi jis susijęs ne tik su ekonomika, bet yra aktualus ir visai visuomenei.

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Tam tikrais atvejais nedarbas gali būti visos ekonomikos ir ekonominės situacijos varomoji jėga skirtingose šalyse. Tačiau paminėtina, kad visais laikais vyravo tendencija, jog vienoje šalyje buvo didesnis nedarbo lygis, o kitose – mažesnis. Nedarbo tema ypatingai aktuali šiandieniniame pasaulyje, kuriame sparčiai vyksta globalizacijos procesas, lemiantis tai, jog šalies sėkmei daugiau įtakos gali turėti padėtis tarptautinėje srityje, o ne vidaus politika. Tiesioginės užsienio investicijos yra vienas iš šaltinių, galinčių paskatinti ekonomikos augimą. Šis augimas yra glaudžiai susijęs su nedarbu, nes augant ekonomikai mažėja nedarbas. Tačiau pažymėtina, kad mokslinėje literatūroje yra nemažai diskusijų šia tema, kadangi yra daugybė kitų veiksnių, kurie gali tiesiogiai ar netiesiogiai paveikti GDP augimą ir nedarbą arba šių reiškinų sąryšį. Dažniausiai atliktų tyrimų rezultatai atskleidžia teigiamą, t. y. nedarbą mažinantį, įeinančių FDI poveikį ekonomikai (Estrin, 2017; Palat, 2011; ir kt.), o išeinančios FDI gali turėti neigiamą, t. y. nedarbą didinantį (Agarvar, 1996; Huijie, 2018; ir kt.), poveikį, arba, šiuo atveju, mokslininkai nenustatė ryšio tarp išeinančių FDI ir nedarbo (Chang, 2009; ir kt.).

Atsižvelgiant į teorinius aspektus ir mokslininkų atliktų tyrimų rezultatus, keliama *tyrimo problema*: koks tiesioginių užsienio investicijų poveikis ekonomikos augimo ir nedarbo sąryšiui? *Tyrimo tikslas* – rasti ryšį tarp FDI ir augimo- nedarbo sąryšio. *Tyrimo objektas* yra tiesioginių užsienio investicijų poveikis ekonomikos augimo ir nedarbo sąryšiui. Šiame straipsnyje naudojami *tyrimo metodai*: mokslinės literatūros apžvalga, palyginamoji analizė ir panelinė regresija.

Tyrimu siekiama detaliau pažvelgti į augimo ir nedarbo sąryšį Okuno dėsnio kontekste, siekiant išsiaiškinti, ar FDI srautai galėtų pakeisti šių reiškinų sąryšį. Daugelyje atliktų mokslinių tyrimų buvo analizuojama, kaip įeinančios ar išeinančios FDI daro poveikį nedarbui. Šiame tyrime analizuojamas FDI poveikis augimo ir nedarbo sąryšiui, tiksliau – tiriama, ar FDI keičia augimo ir nedarbo sąryšio stiprumą. Tai labai aktualus klausimas globalizacijos, kuri vaidina svarbų vaidmenį pasaulio ekonomikoje, kontekste. FDI srautai, perkeltantys naujas technologijas, verslo praktiką ir kt., gali stipriai pakeisti augimo poveikį nedarbui. Taip pat paminėtina, kad šiame tyrime analizuojamas FDI poveikis kelioms nedarbo rūšims, suskirstytoms pagal amžių, lytį ir išsilavinimo lygį. Ankstesni tyrimai atskleidė, kad Okuno koeficientas (kaip augimo poveikio nedarbui matas) skiriasi, atsižvelgiant į skirtingas nedarbo rūšis.

Teorinė mokslinės literatūros apžvalga atskleidžia, kad daugelyje šalių GDP svyravimai turi didelės įtakos nedarbui: jei GDP didėja, nedarbo lygis krenta, ir atvirkščiai. Šie svyravimai atskleidžia klasikinį požiūrį į Okuno teoriją. Tačiau literatūros apžvalga leido suprasti, kad egzistuoja įvairių ekonominių veiksnių, koreliuojančių su GDP ir nedarbu ir galinčių turėti įtakos šių reiškinų sąryšiui. Kai kurie iš šių veiksnių – įeinančios FDI ir išeinančios FDI – įtraukiami į tyrimą. Parametrų įverčių apskaičiavimui tyrime naudojamas jungtinis paprastas mažiausių kvadratų metodas (MKM). Siekiant į bendrąją panelinių duomenų Okuno lygties versiją įtraukti FDI, pradinė lygtis papildoma sąveikos nariu. Tai leidžia, analizuojant esamus augimo ir nedarbo santykius, patikrinti, ar FDI juos keičia, ir, jei taip, kokia kryptimi. Daroma prielaida, kad tarptautiniai santykiai mažina nedarbo jautrumą GDP svyravimams.

Tyrimo rezultatai atskleidžia, kad įeinančios FDI ir išeinančios FDI, tikėtina, turi įtakos GDP ir nedarbo sąryšiui. Tyrime atlikti keli MKM ir analizuota, kaip įeinančios ir išeinančios FDI daro įtaką GDP augimo ir nedarbo santykiui. Modelio įvertinimai parodė, kad, kaip ir buvo tikėtasi, įeinančios FDI ir išeinančios FDI silpnina ekonomikos augimo poveikį nedarbui, o, padidėjus šiems kintamiesiems, GDP augimo įtaka nedarbui tampa ne tokia reikšminga.

Pagrindiniai žodžiai: bendrasis vidaus produktas, nedarbas, Okuno dėsnis, tiesioginės užsienio investicijos.

Introduction

Unemployment is a vast topic whose relevance is highly dependent on economic activity. There has always been a trend that some countries have a higher level of unemployment, and some have a lower level. Many scientists and politicians are discussing this phenomenon since it is closely related to the whole society and economy. The topic is especially relevant in today's world, where globalisation is spreading rapidly, and multicultural relations play a considerable role. Since today's world is pushed from the boundaries of inhouse economies, international relations, in some cases, could even be the driving force of the entire economy, and the success of the country could be more affected by

the position in a global world. Foreign direct investments are one of the sources which can stimulate economic growth. This growth is highly related to unemployment since a growing economy reduces unemployment. However, there are many discussions on this topic in scientific literature as there may be some factors (for example, difference in productivity between women and men, differences among sectors, etc.) that can directly or indirectly affect the growth-unemployment nexus.

Nevertheless, the topic of foreign direct investment effects on growth and unemployment is vastly analysed, there are not so many papers that empirically examine the effect on growth-unemployment nexus. The results of previous research mostly reveal a positive effect of inward FDI on economic growth and thus unemployment reducing effect (Estrin, 2017; Palat, 2011; etc.). On the contrary, outward FDI is found as increasing unemployment (Agarvar, 1996; Huijie, 2018; etc.) or there was found no relationship between outward FDI and unemployment (Chang, 2009; etc.).

The *problem* of the research: what is the effect of foreign direct investment on the impact that economic growth has on unemployment?

The *aim* of the research is to examine the moderating effect of FDI on growth-unemployment nexus.

The *object* of the research is the effect that foreign direct investment might have on growth-unemployment nexus.

The *research methods* used in this article include scientific literature review, comparative analysis, and panel regression.

Theoretical Analysis of the Relationship between GDP, FDI and Unemployment

Relationship between unemployment and economic growth. Unemployment as an economic phenomenon has been known for many decades. There were many theories regarding this subject, and many scientists tested the behaviour of unemployment over different periods of time. It is logical that if the economy is growing, there is a higher demand for labour which means more employed people and a lower unemployment rate. In the opposite case, if the economy is shrinking, the unemployment rises, and therefore more people are left out of jobs. However, it is important to note that there was no scientific evidence regarding this phenomenon until Arthur Okun published his assumptions, which later became a solid theory on unemployment rate dependency on output in 1962, named “Okun’s law”. The author discovered that economic growth, measured by gross domestic product (GDP) or output growth, affects the unemployment level. Knotek (2007) acknowledged that Okun’s law was like a constant rule – with every percentage point increase in unemployment, there would be a 2-3% decrease in GDP. As Fuhrmann (2020) stated, the effect could be positive too – unemployment should fall by one percentage point as GDP increases by 2-3%. A similar opinion was provided by Umair and Ullah (2012). The authors agreed that growing output should not be harmful to unemployment, but they stated that there is an inflation risk, which could potentially have a negative effect on unemployment.

Koettl, Mata, Saioivici, and Santos (2013) found that after the financial crisis in 2008, the unemployment remained very high when GDP was growing fast. This result suggests that after an economic shock, the growth-unemployment nexus changed. It means that Okun's law is not necessarily a rule of thumb and requires an investigation of its own. Also, there is evidence that Okun's law does not necessarily work in some economic regions. An, Ghazi, Prietto (2017) found that Okun's law works in the developed or higher than average-income countries. However, the results in lower- or middle-income countries show that Okun's law does not work. It can be due to the heterogeneous conditions in the countries. In this context, it is noteworthy that Okun's law was discovered in the United States, in a country that is classified as an advanced economy. Hence, the growth-unemployment nexus can differ among countries, regions, etc.

The results of the research carried out by Pizzo (2019) in the Latin American countries reveal that there are different Okun's coefficients (compared to the USA). It does not mean that the effect of growth on unemployment is not visible. Still, there is a relative difference in the magnitude of how growth affects unemployment. This may lead to an assumption that Okun's coefficient can be different for European countries compared to the one provided in the original theory. The assumption could be backed by An, Ball, Jalles, and Loungani (2019), who stated that Okun's law is a great tool for finding coefficients of growth-unemployment relationship and could be used for forecasting. Still, we cannot expect to have a uniform relationship across countries and periods. Thus, our paper assumes that to some extent different reaction of unemployment to output growth could be explained by FDI differences among countries.

Effect of inward and outward FDI on growth-unemployment nexus. Foreign direct investment (FDI) is an excellent tool for countries or companies to engage in international affairs and benefit from better conditions and expansion elsewhere, consequently creating workplaces in other regions. According to Koluman (2020), foreign direct investments are investments from one particular region, country, or company to another country. There could be many purposes for these investments. One of them, for example, could be a desire to establish a business in another country because of cheaper labour, etc. As a result of these actions, the country of origin should lose. It is related to the money or a part of GDP and, therefore, labour demand goes to another region and the receiver of foreign direct investment, in theory, should have a beneficial situation since the investment most likely will create jobs in the country.

In the scientific literature, the most common view is that inward FDI has a positive impact on the economy. Estrin (2017) states that FDI benefits the country that receives it since it reduces unemployment. This is relatively logical since FDI is an investment of money, and it is supposed to increase GDP, which, in turn, should reduce the unemployment level, as referred to Okun's law. A similar opinion was expressed by Palat (2011), who proved a statistically significant relationship between inward FDI and unemployment. Dritsakis and Stamatiou (2018) analysed a similar relationship in 15 European countries and found bidirectional causality of foreign direct investment and unemployment. This could be true since, according to Su, Zhang, Zhang, Abrhám, Simionescu, Yaroshevich

and Guseva (2018), one of the determinants of FDI that companies are looking for before making a decision where to invest is unemployment. Research carried out by Balcerzak and Zurek (2011) found that the FDI effect on unemployment is visible just in the short term and tends to diminish in the long-run.

Hence, it is clear that inward FDI has a negative effect on unemployment, meaning that it reduces it, while outward FDI, from the theoretical point of view, should have a positive effect, meaning that it increases unemployment. Based on Chen's (2010) research, where a computable general equilibrium test was executed, outward FDI positively affects unemployment. However, it is important to note that there was no causality test in that research. Hence, it is unclear if the effect was due to outward FDI, or it was just a coincidence of any kind. Nevertheless, as Agarvar (1996) states, it is very likely that outward FDI can have a very similar effect as import, meaning higher unemployment. This statement seems quite logical since the money is leaving the country of origin, and this might cause a decrease in GDP. The same idea was provided by Huijie (2018), who analysed the situation in Japan and found evidence that outward FDI has a direct effect on unemployment increase. However, it is important to mention that it is unclear if the effect of the region could have played a role in this model since the test was based only on one country.

Contrary to the previous statements, Chang (2009) after running a vector autoregression model, found that the relationship between outward FDI and unemployment rate has relatively weak exogeneity. It means that the results neither confirm nor deny the theory that outward FDI could cause employment to decrease. However, a relationship of some kind should exist. Yueming (2014) used the Hausman test in his research and found that there are more determinants to outward FDI effect on unemployment and potentially that could be also beneficial to country of origin. This statement is valid since international relations are increasing the GDP and, therefore, decreasing unemployment. Other scientists (Irpan, Saad, Nor, Noor, Ibrahim, 2016) stated that inward FDI is important to receive money and create jobs, it means, to reduce unemployment, while outward FDI plays an essential role in reducing unemployment through development of international relations.

Moreover, it is important to note that productivity has an impact on the relation between FDI, GDP and unemployment as well. Moretti (2010) and Dijk (2014) pointed out the differences in tradable and nontradable sectors as well as differences between skilled and unskilled jobs. Dijk (2014) estimated manufacturing sectors as tradable and all other sectors as nontradable and found out that employment in the nontradable sector profits from newly attracted jobs in the tradable sectors. Moretti (2010) found that one extra job in manufacturing sector creates 1.6 jobs in the nontradable sector and this result is more significant for skilled jobs.

Also, a study of the field of location economics which is described by Dunning (2009) should be mentioned. The author analyzed a changing geography of foreign direct investments: developing countries with a low-cost labour pursue to attract FDI and later on, when these countries become developed, they engage in outward FDI.

Summarising the scientific literature review, it can be stated that Okun's theory works – there is a relationship between growth and unemployment, and also, there is almost unanimous belief that inward FDI benefits the economy of the country that is receiving it and that, in turn, increases the GDP which affects unemployment as well. However, there are many opinions and results regarding outward FDI, which seems to be depending on the region where the research was executed. It shows that it is necessary to analyse FDI, growth and unemployment deeper to understand the correlation between them.

Research Methodology

The research aims to take a closer look at the growth-unemployment nexus in the context of Okun's theory, to examine whether FDI flows could alter this relationship.

Reasoning of the research. Many studies analysed how inward or outward FDI is affecting unemployment. However, there are not so many papers examining what effect FDI has on the correlation between growth and unemployment. More specifically, whether FDI changes the strength of the growth-unemployment relationship. It is an important question since globalisation plays a more vital role in the world's economy. FDI flows that transfer new technologies, business practices, etc., could dramatically change the effect of growth on unemployment. Moreover, this research analyses the effect of FDI on numerous unemployment types disaggregated by age, gender, and educational attainment level, since previous research shows that Okun's coefficient (as a measure of the effect of growth on unemployment) varies considering different types of unemployment.

Formulation and argumentation of the hypothesis. According to the theoretical review of scientific literature, it is clear that in most countries, the output or GDP fluctuations have a substantial effect on unemployment. If, for instance, GDP rises, the unemployment level plummets and vice versa. It is the classical view of Okun's theory. However, literature review allowed us to see that many other global economic aspects correlate with GDP and unemployment and might affect their relationship. Our research will focus on some of these variables – inward FDI (iFDI) and outward FDI (oFDI).

The logic behind FDI is that by directly affecting GDP, 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 the unemployment is high, FDI might mitigate the effect of GDP growth and prevent unemployment fall from keeping up with the GDP growth.

The research logic, methods, and data sample. The research is focused on the European Union (EU-28) countries. The timeframe of the data is twenty years, from 2000 to 2019. Data consists of GDP, inward and outward FDI, and different types of unemployment. The program used for an econometric analysis is GRET. Data was gathered from Eurostat (n.d.) and Unctad (n.d.). Descriptive statistics of the variables are presented in Table 1.

Table 1. Descriptive Statistics

Variables		Mean	Median	St. deviation	Min	Max
Dependent variables	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
Independent variables	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

Source: compiled by the authors.

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.

The general first-differenced version of Okun's equation for the panel data takes the following form:

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

In this equation, ΔU represents the unemployment change in percentage points from period $t-1$ to period t , and ΔY represents the economic growth, i.e. percentage change of the real GDP. θ_t represents the time-specific effects. Since the model was based on the panel data of a group of countries, θ_t was included by adding time dummies. $\varepsilon_{i,t}$ is the error term.

To estimate Eq. (1), pooled ordinary least squares (OLS) estimator was used since panel diagnostics showed that pooled OLS is more adequate than least square dummy variable (LSDV), which is not surprising since first-differencing removes any observed and unobserved time-fixed effects. Eq. (1) is dedicated to showing basic principles of Okun's law, i.e. that change in GDP correlates to an opposite change in an unemployment level. If Okun's law is correct, the estimated β coefficient should have a negative sign.

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

$$\Delta U_{i,t} = \alpha + \beta \Delta Y_{i,t} + \delta_{FDI} \Delta Y_{i,t} \times FDI_{i,t} + \gamma FDI_{i,t} + \theta_t + \varepsilon_{i,t} \quad (2)$$

The equation allows taking the existing growth-unemployment relationship test if FDI is changing it and in what direction. Eq. (2) highlights the possibility that even though Okun's coefficient might be valid, the other factors could alter its size to a certain degree. The assumption is that international relations lower the sensitivity of unemployment to

GDP fluctuations. For instance, if the GDP is growing, according to Okun's law, unemployment should decrease. However, if there is a significant amount of inward FDI coming to a country, the unemployment level may stay the same since the inward FDI might bring financial incentives like money and technological know-how, and even though GDP is rising, the unemployment may not decrease as labour-intensive jobs become capital-intensive jobs. Of course, this would be hard to prove empirically. Still, if the estimates show that GDP growth and unemployment nexus lose their sensitivity due to international relations, this might be one of the causes that led to this.

Since Eq. (2) is interactive with the multiplicative term, the estimated slopes become conditional, i.e. the growth-unemployment nexus is not constant but depends on the FDI. 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. Standard errors and thus confidence intervals of the estimated relationship are calculated using the formula developed by Friedrich (1982).

Research results and discussions

The general tendency for GDP growth and unemployment nexus, as presented in Eq. (1), is that both variables have an inverserely directed relationship, as stated by Okun's law. However, since the samples of the labour force are relatively different, the effect also differs. General relationships between different types of unemployment and GDP growth are presented in Table 2.

Table 2. General Effect of GDP Growth on Unemployment

Unemployment type	Coefficient	Standard error
Total unemployment (TU)	-0.1558	0.0294***
Youth unemployment (YU)	-0.4586	0.0965***
Male unemployment (MU)	-0.1924	0.0390***
Female unemployment (FU)	-0.1224	0.0222***
Unemployment EDU0-2	-0.3568	0.0778***
Unemployment EDU3-4	-0.2861	0.0533***
Unemployment EDU5-8	-0.1289	0.0276***

Note: *** indicates statistical significance at the 1 percent level.

Source: compiled by the authors.

Since within all types of unemployment the general effect proved to be statistically significant and GDP growth causes unemployment to drop through all levels under the research, the further examination was executed in order to distinguish the effect of the nexus, while inward FDI and outward FDI variables are incorporated into an equation.

Effect of inward foreign direct investments (iFDI) on growth-unemployment nexus. The assumption behind this effect was that high flows of capital from abroad might directly affect unemployment. Investments create jobs and decrease unemployment. However, technical know-how can push the market towards more capital-intensive labour. Detailed results from all the groups under investigation are presented in Table 3.

Table 3. Panel pooled OLS estimates of inward foreign direct investments (iFDI) effect on growth-unemployment nexus

	TU	YU	MU	FU	EDU0-2	EDU3-4	EDU5-8
Intercept	0.0100 (0.0909)	0.1857 (0.4552)	0.0885 (0.1090)	-0.0519 (0.0859)	0.2818 (0.2595)	0.0585 (0.1678)	-0.0493 (0.1038)
GDP growth	-0.1651*** (0.0298)	-0.4910*** (0.0982)	-0.2046*** (0.0394)	-0.1296*** (0.0229)	-0.3854*** (0.0814)	-0.3078*** (0.0529)	-0.1322*** (0.0303)
iFDI * GDP growth	0.0000 (0.0001)	0.0001 (0.0002)	0.0001 (0.0001)	0.0000 (0.0001)	0.0001 (0.0002)	0.0001 (0.0001)	0.0000 (0.0001)
iFDI	0.0001 (0.0002)	0.0002 (0.0007)	0.0001 (0.0002)	0.0002 (0.0001)	0.0001 (0.0004)	0.0001 (0.0003)	0.0002* (0.0001)

Note: All estimations include time dummies. Robust standard errors are provided in parentheses. *, ** and *** shows significance at 1%, 5% and 10% respectively.

Source: Compiled by the authors

From the coefficients in the Table 3, group of graphs were compiled to present and acknowledge the results more easily (see Figure 1).

Figure 1 shows the conditional growth-unemployment nexus when the inward FDI variable is introduced to an equation. It is visible that the slopes are positive. If the country receives a high level of iFDI, the effect of growth on unemployment is weakened. In general, the effect of iFDI conditions the relationship between GDP growth and unemployment to become insignificant. At the level of approximately 800% (iFDI is worth 800% of GDP or more), growth itself no longer affects the unemployment. Such a high iFDI level is primarily visible in small countries. However, the pattern that the higher the iFDI, the lower impact growth has on unemployment is visible.

The highest impact of iFDI on growth-unemployment nexus is for young and uneducated (EDU0-2) people, and the lowest impact of iFDI could be seen for female and highly educated groups. The result is not unexpected, since young and uneducated people often belong to the same group. Since iFDI, in most cases, would require employees with higher experience, economic growth would not make such a big difference for young and uneducated unemployed. Females and high educated unemployment levels were initially not as fragile, and iFDI makes a small change since the demand of this group of people would hardly be affected by it.

Overall, even though for highly educated and for females the effect was relatively small, for the unemployment as a whole, the effect of iFDI to growth-unemployment nexus

is unquestionable, and with sufficiently high iFDI to GDP ratio, iFDI would become a decisive factor of unemployment instead of GDP growth. Therefore, the significance of growth would drop.

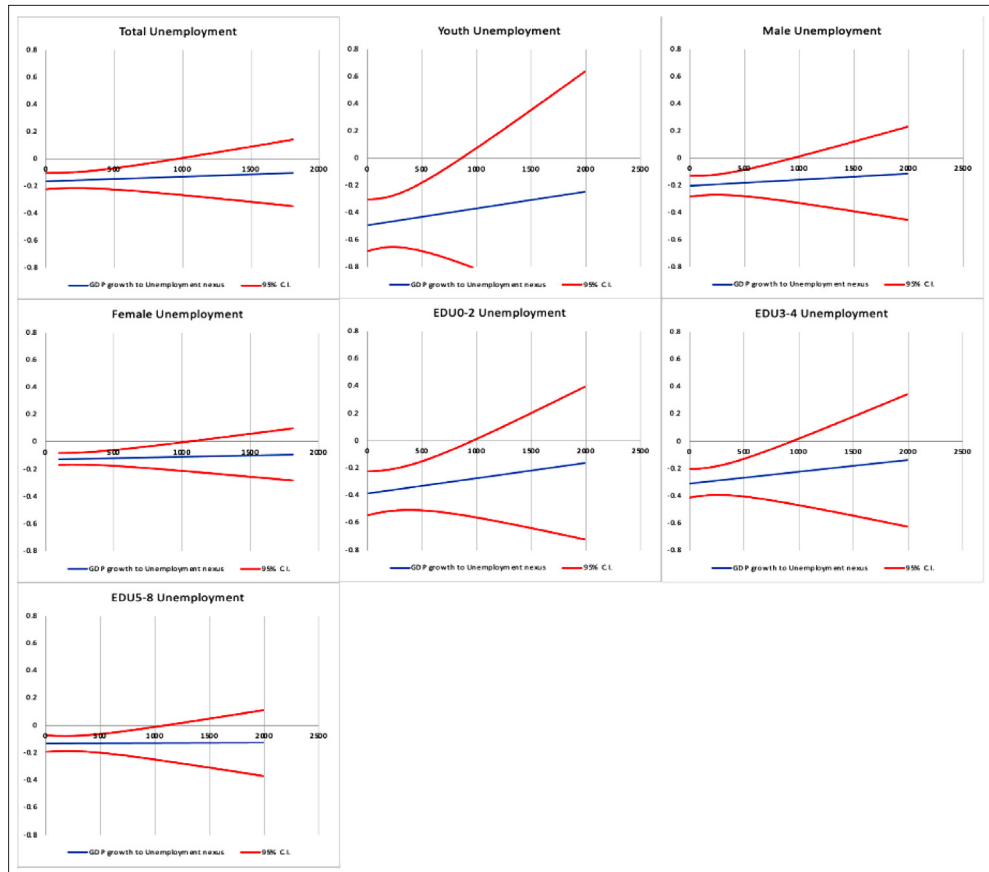


Fig. 1. Inward FDI effect on GDP growth-unemployment nexus

Note: C.I. stands for Confidence intervals.

Source: compiled by the authors

Effect of outward foreign direct investments (oFDI) on growth-unemployment nexus. The assumption behind this effect 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 since both could, in theory, cancel each other. Detailed results from all the groups under investigation are presented in Table 4.

Table 4. Panel pooled OLS estimates of outward foreign direct investments (oFDI) effect on growth-unemployment nexus

	TU	YU	MU	FU	EDU0-2	EDU3-4	EDU5-8
const	0.0052 (0.0885)	0.1682 (0.4492)	0.0837 (0.1068)	-0.0519 (0.0859)	0.2638 (0.2578)	0.0483 (0.1657)	4.8730*** (0.8173)
GDP growth	-0.1571*** (0.0295)	-0.4680*** (0.0948)	-0.1953*** (0.0393)	-0.1296*** (0.0229)	-0.3690*** (0.0797)	-0.2928*** (0.0527)	-0.2490* (0.1341)
oFDI * GDP growth	0.0000 (0.0001)	0.0001 (0.0003)	0.0000 (0.0001)	0.0000 (0.0001)	0.0001 (0.0002)	0.0001 (0.0002)	-0.0001 (0.0001)
oFDI	0.0002 (0.0001)	0.0003 (0.0004)	0.0001 (0.0001)	0.0002 (0.0001)	0.0002 (0.0003)	0.0002 (0.0002)	0.0012 (0.0015)

Note: All estimations include time dummies. Robust standard errors are provided in parentheses. *, ** and *** shows significance at 1%, 5% and 10% respectively.

Source: Compiled by the authors

From the coefficients in the Table 4, group of graphs were compiled to present and acknowledge the results more easily. The figure below shows the conditional growth-unemployment nexus, while the outward FDI variable is introduced to an equation (see Figure 2).

The graphs below show that oFDI has a minor effect on the GDP growth-unemployment nexus as a whole since, as visible in many graphs, the slope is not steep at all. In a hypothetical situation as visible according to confidence intervals, the GDP loses its significance over unemployment if oFDI reaches around 700 to 1000 per cent of GDP. However, since the confidence intervals are relatively wide, it is highly theoretical. The exciting thing is with the unemployed female and especially unemployed people with high education. The female growth-unemployment slope is going downwards. However, it is barely visible, but it means that with every additional oFDI percentage point, at least for female unemployment, growth effect on unemployment is increasing. For highly educated people, the slope is going downwards as well, and it is relatively visible. The assumption could be that with a high level of oFDI, the money and highly skilled specialists are “exported.” Therefore, the GDP growth to unemployment relationship becomes more significant.

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

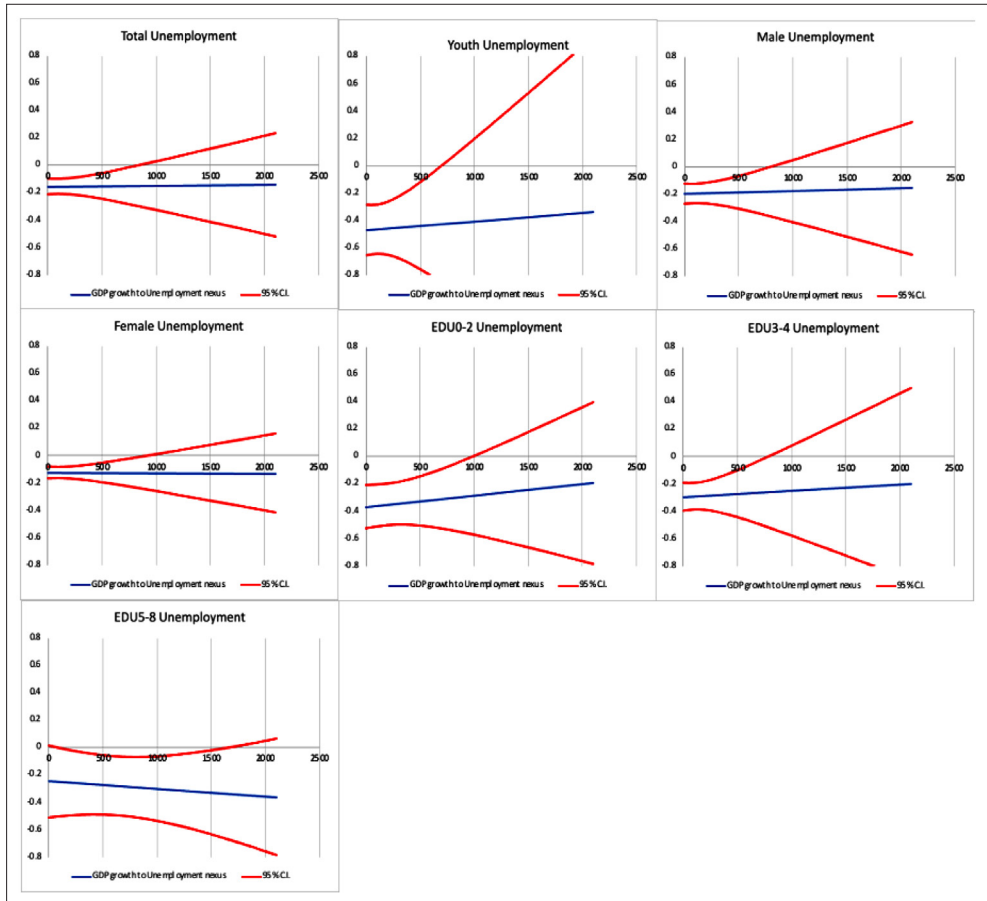


Fig. 2. Outward FDI effect on GDP growth-unemployment nexus

Source: Compiled by the authors

Conclusions

A theoretical review of the scientific literature reveals that in many countries, fluctuations in GDP have a significant impact on unemployment: if GDP increases, the unemployment rate falls, and vice versa. These fluctuations reveal a classical approach to Okun's theory. However, a review of the literature has suggested that there are a variety of economic factors that correlate with GDP and unemployment and that may influence the relationship between these phenomena. Some of these factors – inward FDI and outward FDI – are included in the study.

Pooled ordinary least squares estimator was used to achieve the aim of the research – to find the moderating effect of FDI on growth-unemployment nexus. In order to include FDI in the general version of the Okun equation of the panel data, the initial equation is

supplemented by a multiplicative term. This makes it possible to check whether FDI is changing growth-unemployment nexus and, if so, in which direction by analyzing existing growth and unemployment ratios. International relations are assumed to reduce the sensitivity of unemployment to GDP fluctuations.

The results of the study reveal that inward FDI and outward FDI are likely to affect the relationship between GDP and unemployment. The study conducted several estimates of pooled OLS and analyzed how inward and outward FDI affect the ratio of GDP growth to unemployment. Estimates of the model have shown that, as expected, inward FDI and outward FDI have a negative effect on the relationship and that the impact of GDP growth on unemployment becomes less significant as these variables increase.

Our findings suggest some policy implications. First is related to the fact that expansionary fiscal policy intended to increase aggregate demand, employment and to reduce unemployment might be less efficient in countries that receive high flows of FDI. Moreover, such policy would have the least effect on youth unemployment and unemployment of the least educated. Thus, our findings are in line with the view that FDI brings technologies that substitute the least skilled labour force. Second, policies directed to reduce unemployment should be related to improving the skills of the least educated, increasing their possibilities to find a job in the FDI intense sectors. Third, since just highly educated benefit from outward FDI as high technology manufacturing and service sectors are most likely investing abroad expanding their markets, policies that prohibit companies' plans to reallocate their operations abroad on cost-saving bases due to lower labour cost or tax-reducing incentives, seems to have an empirical ground.

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