QUANTIFYING FDI'S EFFECTS ON GDP AND UNEMPLOYMENT: EVIDENCE FROM NORTH MACEDONIA

Bojan Malchev
Faculty of Economics-Skopje,
Ss. Cyril and Methodius University in Skopje, North Macedonia
bojan.malcev@eccf.ukim.edu.mk

Marina Trpeska
Faculty of Economics-Skopje,
Ss. Cyril and Methodius University in Skopje, North Macedonia
marinas@eccf.ukim.edu.mk

Zoran Minovski
Faculty of Economics-Skopje,
Ss. Cyril and Methodius University in Skopje, North Macedonia
zoran.minovski@eccf.ukim.edu.mk

ABSTRACT
This paper examines the impact of foreign direct investment (FDI) on economic growth and unemployment in North Macedonia over the period 2014–2023. North Macedonia, a small post-transition economy with historically high unemployment, has actively pursued FDI as a development strategy. Using annual data and econometric analysis (stationarity tests, Pearson correlations, and OLS regressions in SPSS), we test four hypotheses about FDI's relationship with GDP growth and unemployment. The results indicate a strong positive association between FDI inflows and real GDP growth and a significant negative association between FDI and the unemployment rate. In particular, higher FDI is correlated with faster GDP growth and lower unemployment, supporting the view that FDI can be a catalyst for economic development. Regression analysis further suggests that FDI has a statistically significant positive effect on GDP growth and a negative effect on unemployment, even when accounting for the growth-employment link. These findings confirm the optimistic hypothesis that FDI inflows drive macroeconomic improvements in North Macedonia. However, complementary factors (institutional quality, human capital) are crucial for maximizing FDI benefits. The paper concludes with policy implications, emphasizing the need to attract quality FDI and strengthen domestic absorptive capacities to ensure sustainable growth and job creation.

Keywords: *Foreign direct investment; Economic growth; Unemployment; North Macedonia; Transition economy*

JEL classification: *F21; E24; O40*

1. INTRODUCTION

North Macedonia is a small, open economy that has undergone significant structural changes since the 1990s transition from socialism. Like many post-transition countries in the Western Balkans, it has faced the dual challenge of stimulating economic growth while reducing persistently high unemployment. In recent decades, successive governments have viewed foreign direct investment (FDI) as a crucial catalyst for development, actively promoting FDI as a strategy to boost GDP and create jobs. This policy focus stems from a widely held belief

in both policy and academic circles that attracting FDI can help transform the Macedonian economy by injecting much-needed capital, technology, and managerial know-how, thereby spurring economic growth and employment.

From a theoretical standpoint, there are strong reasons to expect FDI to play a positive role in post-transition economies. According to Dunning's OLI paradigm (Ownership–Location–Internalization), multinational enterprises choose to invest abroad when three sets of advantages coincide (Dunning and Lundan, 2008). The host country must offer location advantages – such as skilled labor, resources, market potential, or favorable institutions – that complement the firm's ownership advantages (technology, brand, etc.), making the investment profitable. North Macedonia's efforts to improve its business climate through institutional reforms, privatization, and the creation of Technological Industrial Development Zones can be seen as attempts to strengthen these location advantages and attract FDI. Reforms have been implemented to ensure a stable regulatory framework, protect property rights, and foster closer integration with European markets, reflecting an awareness that institutional quality is crucial in attracting foreign investors. Indeed, research shows that Western Balkan countries (including North Macedonia) have lagged behind other Eastern European transitions in FDI inflows even after accounting for market size, distance, and institutional factors. Estrin and Uvalic (2016) argue that this FDI shortfall is due in part to the need for deeper institutional reforms – improving governance, reducing risks, and strengthening the rule of law – to create a more attractive investment environment. Thus, the topic of this study is both socially and academically important, given the pressing question of how FDI interacts with domestic conditions to influence economic outcomes in a transition economy like North Macedonia.

Beyond capital inflows, FDI also carries the potential for technological spillovers and productivity gains in the host economy. Endogenous growth theory (Romer, 1990) posits that long-run growth is driven by technological change and knowledge diffusion. FDI is one channel through which developing and transition economies can access advanced technologies, managerial expertise, and new ideas developed in richer countries. Romer (1993) famously highlighted the "idea gap" between poor and rich nations and suggested that foreign investment can help bridge that gap by transferring technology and business skills to the host. Inflows of FDI serve as conduits for innovation: multinationals introduce new products and processes, train local workers, and may induce competitive pressures that push domestic firms to improve. Such spillover effects are especially valuable for post-socialist economies that began the transition with outdated industrial bases and a lack of capital. Empirical studies support this view: for example, Borensztein *et al.* (1998) found that FDI is a significant channel for technology transfer, contributing more to a host country's growth than domestic investment – provided the host country has sufficient human capital to absorb the new technologies. This suggests that FDI's impact on GDP can be substantial in countries that invest in education and skills - a relevant insight for North Macedonia, which has been striving to upgrade its workforce's qualifications. In terms of employment, FDI in labor-intensive greenfield projects can directly create new jobs and indirectly generate employment through supply-chain linkages and productivity effects. The experience of Central and Eastern European countries that joined the EU shows that steady FDI inflows were associated with faster economic growth and rising employment.

However, the benefits of FDI are not automatic. The literature also contains more cautious findings that highlight the importance of local conditions. Carkovic and Levine (2002), using advanced econometric techniques to control for causality, conclude that there is no robust independent effect of FDI on economic growth across countries. In other words, FDI by itself

will not spur development if complementary factors are not present – such as sound economic policies, developed financial markets, and quality institutions. Micro-level studies similarly show mixed evidence of spillovers; positive effects appear only in certain industries or under specific policy environments. In the context of North Macedonia and its neighbors, Estrin (2016) observed that although FDI brought significant benefits in terms of output and employment in Central Europe, in the Balkans the effects have been weaker – likely due to weaker institutions and insufficient human capital to fully exploit the investments. For example, North Macedonia established free economic zones in the 2000s and offered incentives that attracted manufacturing FDI, but the overall unemployment rate remained high for years. One recent study even found that FDI inflows from 1999 to 2013 had no statistically significant effect on reducing unemployment in North Macedonia, suggesting that the quality of investment matters more than quantity, as does the country's capacity to absorb it (Nikoloski, 2017). Contrary to this, Angeloska (2020) analuzed the period 2005-2018 and found that that there is a positive correlation between FDI and the GDP, employment rate trends, and export These nuanced findings underscore why a careful analysis of FDI's effects is socially important: if FDI is to fulfill its role as an engine of development, policymakers must understand the conditions under which it truly helps increase GDP and reduce unemployment. Focusing on the case of North Macedonia – a representative example of a small, developing post-transition economy striving to integrate into the global market – this research addresses the question of whether and how FDI contributes to achieving the twin goals of higher GDP growth and lower unemployment in North Macedonia. The results can inform better policy design to maximize FDI benefits (for instance, through education or institutional improvements) and contribute to the broader academic debate on FDI's effectiveness in transitional contexts.

The motivation for this study lies in the critical role FDI is believed to play in North Macedonia's economic transformation. The institutional reforms, technological spillovers, and labor market changes associated with FDI are three key aspects often cited in this context. FDI is seen as accelerating the shift from an outdated, state-led economy to a dynamic market economy by bringing in capital and knowledge, as well as influencing the local labor market with new employment practices and skill demands. The societal relevance, therefore, is found in assessing whether and how FDI contributes to the dual objective of higher economic growth and lower unemployment in North Macedonia. This study is timely, as North Macedonia continues to pursue EU membership – a process that itself has prompted reforms and could further affect FDI inflows and their economic impact.

The remainder of the paper is structured as follows: Section 2 reviews relevant literature on FDI, growth, and unemployment, with a focus on recent empirical findings. Section 3 outlines the methodology, including data sources, variables, and the econometric approach (unit root tests, correlation analysis, and regression modeling). Section 4 presents the results of the analysis and tests the hypotheses H1–H4, including descriptive trends, correlation matrices, and regression outputs (coefficients, significance levels, R^2, and diagnostic tests), accompanied by visualizations (time-series graphs and fitted regression plots). Section 5 concludes and provides policy implications and suggestions for further research.

2. LITERATURE REVIEW
2.1. FDI and Economic Growth
The relationship between FDI and economic growth has been extensively studied, yielding mixed evidence. On the optimistic side, many empirical studies find that FDI can stimulate

host country growth by supplementing domestic investment and facilitating technology transfer. As noted earlier, Borensztein *et al.* (1998) found FDI to be a significant vehicle for technological advancement in developing countries, with a larger growth impact than domestic investment (conditional on sufficient human capital). This aligns with endogenous growth theory, where FDI-driven knowledge spillovers can raise the host economy's long-run growth trajectory. Transition economies that successfully attracted FDI often experienced periods of accelerated GDP growth. For instance, several Central and Eastern European countries saw faster GDP growth in conjunction with high FDI inflows in the 2000s, suggesting a positive FDI-growth linkage under conducive conditions. Recent studies continue to support positive effects: a panel study of developing and Western Balkan countries (2015–2019) by Kukaj *et al.* (2022) finds that FDI inflows have a considerable impact on increasing GDP and reducing unemployment. In their regression analysis, FDI was significantly associated with higher GDP levels and was identified as a driver of employment gains, reinforcing the view that FDI can be an engine of growth and job creation in transitional economies.

The theoretical rationale for FDI-led growth is grounded in FDI's role as a composite bundle of capital, technology, and managerial expertise. Dunning and Lundan (2010) emphasize that multinational enterprises not only bring financial capital but also introduce new technologies, efficient production techniques, and modern management practices to the host economy. These contributions can raise productivity in host firms and even domestic firms via spillovers. Additionally, FDI can catalyze growth by integrating the host economy into global value chains, boosting exports, and fostering competition. Empirical research by Bevan and Estrin (2004) showed that FDI in European transition economies was driven by market size and prospects of EU integration, and that such investment contributed to those economies' development. Moreover, the work of Blomström and Kokko (2003) on FDI incentives suggests that while countries often compete to attract FDI, the net benefits depend on how FDI projects integrate locally – those that create linkages with domestic suppliers and invest in worker training tend to yield greater productivity spillovers.

On the other hand, a stream of literature offers a more cautious or conditional view. As mentioned, Carkovic and Levine (2002) found no robust positive effect of FDI on growth when controlling for simultaneity and country-specific factors – implying that the apparent correlation in simpler studies may be driven by other variables (e.g., FDI going to already-growing countries). Similarly, Mencinger (2003) caused a stir by reporting that in some Central/Eastern European countries, high FDI inflows were associated with higher external deficits and profit repatriation, and were not correlated with faster GDP growth. He found a negative association in the short run. He hypothesized that in certain transition economies, FDI might "crowd out" domestic investment or concentrate in non-tradable sectors, yielding limited growth benefits. These findings suggest that FDI is not a panacea; its growth impact likely hinges on complementary conditions. For example, Alfaro *et al.* (2004) show that FDI contributes to growth only in countries with well-developed financial markets that can allocate capital efficiently.

Several empirical studies conducted since 2000 have examined the impact of FDI on GDP growth in North Macedonia and its neighboring Western Balkan countries. The evidence is somewhat mixed but generally indicates that FDI can contribute positively to growth, albeit often under certain conditions. For example, Trpeski *et al.* (2021) analyze panel data for five Western Balkan economies (North Macedonia, Albania, Serbia, Bosnia and Herzegovina, Montenegro) and find that FDI inflows have a statistically significant positive impact on GDP growth in the region. Similarly, Shkodra *et al.* (2021) report that FDI significantly boosts

economic growth across the Western Balkans, though the key growth drivers vary by country. These findings align with earlier studies on transition economies, which often view FDI as a conduit for capital, technology, and market access that can accelerate host-country growth.

However, other research highlights that the growth benefits of FDI in the Western Balkans are not automatic and depend on institutional and macroeconomic contexts. Minović e*t al.* (2020) show that FDI's positive effect on growth is stronger when host countries exhibit sound institutional frameworks (e.g., political stability, corruption control, rule of law). In the same vein, Topi and Xhepa (2023) find that institutional quality moderates the FDI–growth relationship in Balkan economies, suggesting that reforms improving governance and the business climate enhance FDI's contribution to growth. These conclusions echo Estrin and Uvalić (2016), who, in a comprehensive study of FDI during the transition period, note a lack of significant spillover effects from FDI in the Western Balkans, largely due to institutional and structural constraints that have limited FDI's impact compared to Central and Eastern Europe. The UNCTAD Investment Policy Review for North Macedonia likewise observes that, despite higher FDI inflows following economic reforms, the overall impact of FDI on development has remained relatively small so far – mostly evident only in a few sectors like banking and telecommunications.

Notably, some studies even report an insignificant or negative growth effect of FDI in certain contexts. Malović *et al.* (2018), examining FDI characteristics in Western Balkan countries over 2004–2014, find that FDI inflows did not significantly raise GDP growth rates and in some cases correlated with lower growth, contrary to popular expectations. They argue this "FDI paradox" may stem from the nature of investments (e.g., acquisitions or enclave sectors with few local linkages) and the region's absorptive capacity. Likewise, a recent North Macedonia-specific analysis by Taskovski (2023) reinforces that FDI alone is not a panacea for growth. Using a sectoral regression for 2004–2018, Taskovski finds that only a few FDI-heavy industries show positive correlations with North Macedonia's GDP, and overall FDI had no statistically significant effect on the country's economic growth. This suggests that the growth contribution of FDI in North Macedonia has been limited by the sectoral composition of investments – an issue also hinted at by Estrin and Uvalić and the UNCTAD review.

The post-2000 literature indicates that while FDI has generally contributed to growth in the Western Balkans, the magnitude of its effect varies. Positive growth impacts are commonly reported in panel studies, but several authors caution that FDI's benefits depend on complementary factors like good governance, economic reforms, and the ability to integrate FDI into the domestic economy. Cases of insignificant impact or even growth-neutral FDI have been documented, particularly when host countries lack the conditions to productively absorb foreign investment. For North Macedonia specifically, additional empirical evidence is sparse but suggests that FDI's growth effect has been modest unless paired with improvements in the business environment or targeted to productive sectors.

2.2. FDI and Unemployment
The relationship between FDI and unemployment (or employment) is another vital aspect, especially for countries like North Macedonia, where joblessness has been persistently high. Theoretically, FDI can affect unemployment through multiple channels. Directly, greenfield FDI projects create new jobs when multinational firms build factories or service centers and hire local workers. These jobs can reduce unemployment if they absorb job-seekers (assuming the labor force remains constant). Indirectly, FDI can generate employment via multiplier effects – for example, an MNE's operation can stimulate demand for local suppliers, logistics,

or other services, leading those domestic firms to hire more workers. FDI might also increase overall productivity and growth, which, via Okun's law, tends to reduce unemployment as output rises. Indeed, there is a well-known inverse relationship between output growth and unemployment in macroeconomics (Okun's law): higher GDP growth is usually accompanied by lower unemployment. In North Macedonia's case, periods of stronger growth have generally seen larger employment gains and falling unemployment, whereas slow growth or recession (such as the 2020 GDP contraction of -4.5%) led to upticks in joblessness. This growth-employment linkage means that if FDI boosts GDP, it likely also contributes to lowering unemployment, at least indirectly.

Empirical evidence on FDI's employment effect is mixed but often positive. Many country studies have found that FDI inflows correlate with lower unemployment or higher employment, especially when FDI goes into labor-intensive industries. A study by Djambaska and Lozanoska (2015) focused on North Macedonia (1999–2013) and found a negative correlation between FDI and unemployment, though the effect was not very large. Some analyses even suggest FDI in certain sectors can *increase* unemployment if it displaces domestic firms (and their workers) through competition or if the FDI projects are capital-intensive (creating few jobs). However, the general expectation in transition economies is that FDI helps alleviate unemployment by bringing new business activity. For Central European countries, strong FDI inflows in manufacturing were associated with substantial job creation – e.g., in Poland and Czechia, foreign automotive investments created thousands of jobs in the 2000s (Balcerzak, 2011). In the Western Balkans, Kukaj *et al.* (2022) found that in their sample, FDI and GDP had a statistically significant effect in decreasing unemployment in the developing countries examined (which included Western Balkan countries). Their results showed that higher FDI and higher GDP both contributed to lower unemployment rates, quantifying the intuition that foreign investment facilitates job growth.

On the other hand, as highlighted in the introduction, not all evidence is rosy. A notable study by Nikoloski (2017), examining FDI in Macedonian manufacturing, reported that FDI did not significantly reduce overall unemployment in the short run. One reason could be that some FDI projects were capital-intensive or enclave in nature (e.g., focusing on export processing zones with limited linkages), thus not generating broad employment gains. Additionally, if FDI primarily creates jobs for skilled workers, it might not substantially reduce unemployment if the unemployed population is largely unskilled – a skills mismatch issue. There is also the possibility of causality reversal: it may be that lower unemployment (a better labor environment) helps attract FDI, rather than FDI causing unemployment to fall. For instance, investors might prefer countries with a stable labor market and social conditions.

A study of Western Balkan countries by Silajdzic and Mehic (2022) found that FDI's impact on unemployment varied by country and was linked to labor market flexibility and education levels – in some cases, FDI had little immediate effect on job creation, especially where labor regulations were rigid. Furthermore, some research using panel data and SUR (seemingly unrelated regressions) has even found counterintuitive results – e.g., in a panel of certain developing countries, FDI was associated with higher unemployment while domestic investment reduced it (perhaps because foreign firms are more capital-intensive). These findings remind us that the FDI-unemployment link is not guaranteed; it depends on the nature of FDI (job-creating vs. job-shedding) and the ability of the local labor force to take advantage of new opportunities.

In North Macedonia's context, FDI has often been cited as a tool to create jobs, and the government's incentives are frequently tied to employment targets (for example, subsidies per job created in the Technological Industrial Development Zones). Anecdotally, several FDI projects (like foreign automotive parts manufacturers in the zones) have indeed employed thousands of workers, contributing to the gradual decline in unemployment from ~28% in 2014 to ~13% by 2023 (as shown later in Figure 2). However, the slow pace of unemployment reduction for many years despite FDI presence suggests other factors at play – such as the overall economic growth rate, labor force participation changes, and potential skill gaps. Recent local research by Dervishi *et al.* (2022) specifically examined the impact of FDI on employment in North Macedonia. They report that FDI has had a positive effect on employment, particularly through investments in export-oriented sectors, but they also emphasize the need for skilled labor to maximize this benefit. Their findings align with the notion that FDI can be a "generator of employment" if the country ensures that its workforce can meet the demands of foreign investors.

A number of studies have also investigated whether FDI helps alleviate the chronic unemployment in the Western Balkans. Historically, these countries faced very high jobless rates (North Macedonia's official unemployment exceeded 30% in the early 2000s) and policymakers hoped FDI would generate new employment. Empirical findings since 2000 indicate that FDI's effect on employment/unemployment, while positive in sign, has been relatively weak. For instance, Grahovac and Softić (2017) analyze the relationship between FDI and unemployment in Western Balkan economies over 2000–2014 and conclude that there is no clear evidence that higher FDI inflows reduced unemployment. Their econometric results showed an absence of the positive job-creation impact from FDI that was observed in Central and Eastern Europe during transition, despite Western Balkan governments aggressively courting FDI as a means to boost employment. They note that the global financial crisis of 2008–2009 led to a sharp drop in FDI inflows and a subsequent rise in joblessness, undermining hopes that FDI would sustain employment growth.

More recent research using panel data confirms that the employment response to FDI is present but marginal. Perić and Stanišić (2020) employ a panel of Western Balkan countries from 2003 to 2017 and find that increases in FDI have a statistically significant but very small positive effect on the employment rate (and a similarly small effect on average wages). Using linear mixed-effects models, they estimate that while FDI inflows do tend to raise employment, the magnitude is modest, suggesting FDI is not a major driver of job creation in these labor markets. This aligns with evidence from Central Europe as well: for example, Jude and Silaghi (2016) found positive employment effects of FDI in EU transition countries, but primarily in certain industries and with a small elasticity. In the Western Balkans context, Bartlett (2007) and others have argued that many foreign investments have been capital-intensive (e.g., banking, energy) or have involved privatization and restructuring of existing firms, which can limit net job gains. The findings by Perić and Stanišić (2020) corroborate this, showing a positive but low employment elasticity of FDI – meaning large inflows are needed to dent unemployment figures significantly.

Country-specific analyses echo these regional trends. In North Macedonia, much FDI has gone into manufacturing zones (TIDZs) and services; these projects have created jobs (e.g. in automotive parts plants), but high initial unemployment means the overall rate remains elevated. According to the State Statistical Office, the unemployment rate in North Macedonia was still 12.4% in 2024 despite two decades of FDI-led initiatives, reflecting that domestic job growth has other binding constraints. Research by Kurtović *et al.* (2015) on four Western

Balkan countries finds a long-run cointegration between FDI and higher average wages (as foreign firms tend to pay more), yet the impact on the number of jobs is less clear. Indeed, policy reports note that Western Balkan labor markets face structural issues—skills mismatches, informality, and low domestic investment—such that FDI alone has not solved unemployment. As one regional review summarized, the effect of FDI on employment in the Western Balkans, while positive, is very low.

The literature suggests FDI has had only a limited impact on reducing unemployment in the Western Balkans. Early empirical studies found no significant link between FDI inflows and job creation in the region. Newer panel evidence detects a small positive effect on employment, supporting the view that foreign investment contributes to jobs but not at a scale to dramatically lower the historically high unemployment rates. This underscores the importance of complementary policies: to translate FDI into employment, host countries likely need supportive measures such as workforce upskilling, stronger SME linkages, and labor market reforms, so that the presence of foreign investors can generate broader job gains for the local economy.

2.3. Hypotheses Development

Drawing from the literature, we formalize four testable hypotheses for our study:

H1: There is a negative correlation between FDI inflows and the unemployment rate. In other words, higher FDI is expected to be associated with lower unemployment. This expectation arises from the theoretical reasoning that FDI creates new jobs – directly via investment projects (especially greenfield projects that start new production or services) and indirectly via multiplier effects on the local economy. For example, the arrival of a multinational can increase demand for local suppliers and services, further reducing unemployment. FDI also often contributes to increased productivity and skills in the labor force (through training and know-how transfer), which in the long run makes the workforce more competitive and increases labor demand. Empirically, many CEE countries that attracted substantial FDI saw a decline in unemployment, suggesting a negative FDI-unemployment relationship. Thus, under H1, we expect to find a statistically significant negative correlation between FDI inflows and the unemployment rate (when FDI rises, unemployment falls). We note that the nature of FDI projects can influence this relationship: labor-intensive investments are more likely to create jobs than capital-intensive ones, so the composition of FDI could affect the strength of H1's correlation.

H2: There is a positive correlation between FDI inflows and GDP. This hypothesis implies that greater FDI is associated with a higher level of GDP or a faster GDP growth rate, ceteris paribus. The theoretical basis for H2 is that FDI represents an addition to total investment in the economy – it increases the capital stock and productive capacity of the host country. Multinational firms not only bring financial capital but also introduce new technologies, more efficient production techniques, and modern managerial practices, which should result in higher overall economic output. Additionally, FDI can have a crowding-in effect on domestic investors – for example, the entry of a foreign manufacturing plant creates greater demand for local raw materials and intermediate goods, encouraging domestic firms to invest and expand. The expectation of a positive FDI-growth link is supported by literature: transition economies that successfully attracted FDI often experienced accelerated GDP growth in certain periods. According to endogenous growth theory (Romer, 1990), FDI inflows expand the "ideas" and knowledge available in the economy, shifting upward the production possibilities and enabling faster long-run growth. In practical terms, studies on developing countries have found FDI to be a significant channel for technology and knowledge transfer, leading to higher growth than

would otherwise occur (given sufficient human capital for absorption). Thus, under H2, we expect to find a statistically significant positive correlation between FDI and GDP (specifically, between annual FDI inflows and the real GDP growth rate) – meaning years with higher FDI inflows tend to coincide with higher GDP growth.

H3: FDI has a statistically significant negative impact on the unemployment rate. This is the causal formulation of the relationship in H1. H3 posits that an increase in FDI causes a decrease in unemployment, rather than just coinciding with it. Practically, this means that in a regression model explaining unemployment, the coefficient on FDI will be negative and significant (denoted $\delta < 0$). The rationale is the same as H1 – FDI projects create jobs and boost labor demand, thus reducing the unemployment rate. Additionally, if FDI stimulates economic growth (as posited in H4 below), that growth will in turn contribute to lower unemployment (the well-known growth–employment link). Therefore, in the model, we expect to show that FDI significantly contributes to lowering unemployment even when controlling for the effect of economic growth. Confirming H3 would imply that FDI can be considered an active factor in improving labor market conditions. In testing H3, we will use a regression where unemployment is the dependent variable and FDI inflows (and possibly GDP growth as a control) are independent variables. A significant negative FDI coefficient would support H3, indicating that FDI inflows lead to reductions in unemployment (beyond any correlation). This would reinforce the policy view that attracting FDI is a valid strategy to improve employment outcomes in North Macedonia.

H4: FDI has a statistically significant positive impact on GDP. This is the causal variant of H2, stating that an increase in FDI causes an increase in GDP (for example, a higher GDP growth rate), rather than just being correlated with it. Under H4, in a regression model explaining GDP growth, the coefficient on FDI will be positive and significant ($\delta > 0$). The logic behind H4 has already been outlined: FDI increases the capital stock and productivity in the economy, bringing technological progress and innovation that result in higher output. Confirming H4 would imply that attracting FDI is an effective strategy for accelerating growth and increasing total economic output in the host country. In our empirical test, we will regress real GDP growth rates on FDI inflows. A positive and significant coefficient on FDI (with appropriate controls or tests for stationarity) will support H4. This would echo the theoretical expectation and many empirical findings that FDI is growth-enhancing in developing/transitional economies. If H4 is confirmed alongside H3, it strengthens the argument that FDI inflows are a key driver of North Macedonia's macroeconomic improvement, validating the policies aimed at FDI attraction.

These hypotheses (H1–H4) are summarized in the conceptual model illustrated in Figure 1. Figure 1 (conceptual diagram) shows that FDI inflows (left) are expected to act positively on GDP (top right) and negatively on the unemployment rate (bottom). At the same time, the mutual relationship between GDP and unemployment is depicted – higher economic growth is usually accompanied by lower unemployment, consistent with Okun's law in macroeconomics. In other words, if FDI accelerates GDP growth (H4), that higher growth will further help reduce unemployment (this indirect effect is encompassed in H3). The framework implicitly recognizes that certain mediating factors can influence the strength of these relationships – for example, the level of human capital, the absorptive capacity of local firms, or the flexibility of the labor market. While these factors are not explicitly included in our model, they will be considered when interpreting results. For instance, if the positive effect of FDI on GDP turns out to be weak, it could be due to insufficient ability to absorb new technologies (e.g., due to a lack of skilled labor), which aligns with Borensztein *et al.* (1998)'s finding that host countries

need enough human capital to fully benefit from FDI. Similarly, a weaker or null impact on unemployment might arise from the nature of investments (e.g., if foreign projects are highly automated and do not generate many jobs, or if some FDI is in the form of acquisitions of existing firms rather than opening new capacities).

Figure 1: Conceptual framework: FDI, GDP growth, and unemployment
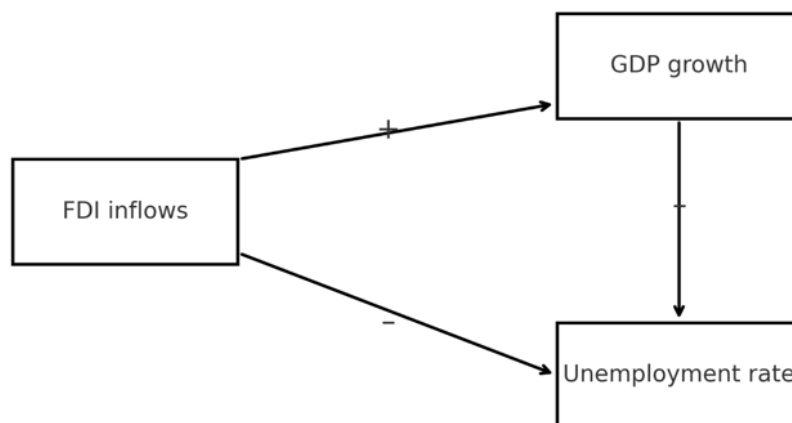
(Source: Adapted from: Velnampy et al., 2013; Dao et al., 2023; Bayar, 2014; Ball et al., 2013)

Regardless of these nuances, the hypotheses formulated in H1–H4 are clearly defined and testable propositions derived from economic theory and prior research. It is important to clarify that establishing this hypothetical framework does not presume automatic causality without empirical evidence. Part of our research strategy will be to examine whether the data support the assumed causal interpretation or indicate only correlation. For example, although we expect the direction FDI → GDP growth (a causal influence per H4), we will also be mindful of the possibility of reverse linkage – namely that higher economic growth attracts more FDI (FDI ← GDP, meaning GDP influences FDI). The methodological design includes techniques to address this challenge (e.g., time-series analysis with lags, Granger causality tests) in order to ascertain the direction of relationships as credibly as possible.

In summary, the main working hypothesis (H) of this research is that FDI inflows are a significant driver of macroeconomic improvement in North Macedonia, manifesting as faster economic growth and lower unemployment. This overarching hypothesis reflects an optimistic but theoretically grounded thesis that attracting foreign capital, technology, and know-how results in tangible economic benefits for the host country. We subject this framework and hypotheses to rigorous testing in the subsequent sections. If the hypotheses are confirmed, it will reinforce arguments that creating a favorable business climate for FDI (through institutional reforms, investment incentives, infrastructure, skilled workforce, etc.) can yield palpable economic gains. If, however, the hypotheses are only partially confirmed or rejected, that too will offer valuable insights, indicating that FDI's effects might depend on certain conditions or that other factors play a dominant role in determining growth and employment outcomes in North Macedonia.

3. METHODOLOGY
3.1. Data and Variables
The study employs an annual time-series dataset for the Republic of North Macedonia covering the ten years from 2014 through 2023. This period provides 10 observations (years), which is

a typical sample size for a single-country time-series analysis in a macroeconomic context. Earlier years involve methodological changes in macro/FDI reporting that can introduce comparability issues; restricting to 2014–2023 yields a coherent post-reform panel aligned with the country's FDI-promotion policy phase.

Each year in the dataset includes values for the following key variables of interest:
FDI Inflows: Measured in absolute terms (million US dollars of net FDI inflow per year). Data on FDI were obtained from reputable sources such as the World Bank's *World Development Indicators*, UNCTAD's FDI statistics, and the National Bank of the Republic of North Macedonia (which publishes official FDI figures). These sources ensure consistency and comparability. FDI inflows are recorded on a calendar-year basis and capture net new foreign investment in the country (inward direct investment). Typically, North Macedonia's net FDI has included greenfield investments and reinvestments, with notable fluctuations due to political events and global trends (as seen later in the results).

We deliberately focus on 2014–2023 to ensure post-reform, methodologically consistent series for FDI, GDP growth, and unemployment, avoiding earlier definitional breaks that could bias time-series inference and aligning the sample with the policy window most relevant to our hypotheses (TIDZ expansion, NATO accession, and EU-path reforms).

GDP Growth: To measure economic growth, we use the real GDP growth rate (annual percentage change in real gross domestic product). The focus is on growth because we aim to test whether FDI accelerates economic growth. Data for GDP were obtained from the State Statistical Office of North Macedonia and the World Bank. We use real GDP (adjusted for inflation) to capture true increases in economic output volume. Real GDP growth is effectively a stationary measure by construction (year-over-year change), which is useful for avoiding trends. The GDP growth rate reflects overall economic performance and will serve as either an independent or dependent variable in testing H2 and H4.

Unemployment Rate: Measured as the annual average unemployment rate (percent of the labor force that is unemployed). This is a key social indicator and one of our primary focus dependent variables. Unemployment data were sourced from national statistics (Labor Force Survey data published by the State Statistical Office) and cross-checked with international sources like the International Labour Organization (ILO) and World Bank for consistency. North Macedonia's unemployment rate is defined according to the ILO definition, which counts individuals without work but actively seeking and available for work. The unemployment rate has been traditionally high but declining in recent years, making it a crucial variable to study.

All data series were compiled and aligned on an annual basis. Since this is a single-country study, there is no cross-sectional dimension – effectively, the "sample" is one country observed over time. Therefore, this is a time-series analysis. Before analysis, the data were cleaned and checked for any anomalies or structural breaks. For example, we examined whether any year had outlier values (perhaps due to one-off events like large privatization inflows counted as FDI, or a sudden change in unemployment definition). No major definitional changes were detected over 2014–2023, but 2020 was noted as an outlier year due to the COVID-19 shock (sharp GDP drop and possibly distorted FDI flows).

From an ethical standpoint, since the study relies on publicly available aggregate data, there are no human subjects or confidential information involved. The data are openly accessible economic indicators. Nonetheless, we have cited data sources appropriately, and any

adjustments or transformations (e.g., converting nominal GDP to real GDP using a deflator) are done transparently.

Using this data setup, we ensure that we have a sufficient historical range to cover different phases of North Macedonia's recent economy – from a period of modest growth and political instability in the mid-2010s, through a recovery, a pandemic shock, and into the latest stabilization. This range is important for identifying long-run equilibrium relationships as well as short-run dynamics between FDI, growth, and unemployment.

3.2. Econometric Framework

Our analysis is quantitative, employing econometric modeling to test the hypotheses. The general approach is: first verify data properties and prerequisites for regression, then apply appropriate models (correlation and regression), and finally validate results with diagnostic tests. This systematic approach ensures statistically valid and credible hypothesis testing.

1. Data Preparation and Preliminary Checks: Since we are dealing with time-series macroeconomic data (annual observations), the first step is to examine their time-series properties. Each series – FDI, GDP growth, and unemployment – was tested for stationarity (constant mean and variance over time) using unit root tests. Specifically, we applied the *Augmented Dickey-Fuller (ADF)* test for unit roots on each series. Time series often exhibit trends or changing means/variances over time, which violates the assumptions of classical regression. Non-stationary series can produce spurious regression results if used in levels. Thus, if the ADF test (or alternative tests like Phillips–Perron) indicates that a series has a unit root (i.e., is non-stationary), we apply appropriate transformations to achieve stationarity. For example, the GDP growth rate is by nature stationary (it is a change percentage), whereas the unemployment rate might have a downward trend over this decade. Indeed, unemployment in North Macedonia fell from ~28% to ~13%, suggesting a trend. In line with the ADF results, we would transform the unemployment series if needed – for instance, by taking the annual change in unemployment or using first differences – to attain stationarity (if unemployment is trend-stationary rather than difference-stationary, detrending could be another approach.) Similarly, FDI measured in absolute terms often grows over time (especially if the economy is growing), so we check if the FDI series is stationary. If not, we could consider transformations like taking FDI as a % of GDP or first-differencing the FDI series. In our case, the FDI series showed significant fluctuation, and no clear persistent trend (partly due to large jumps), and ADF tests were inconclusive given the short sample. We proceeded with caution, noting the potential need for detrending if necessary.

In addition, if there is a theoretical expectation of a long-run equilibrium relationship (cointegration) between two non-stationary series – for example, one might expect a long-run link between FDI and GDP if both trend upward – we consider cointegration testing (Engle–Granger two-step or Johansen test, albeit power is low with 10 data points). Given our small sample, formal cointegration tests have limited power, but we keep in mind that if two series are non-stationary but cointegrated, an OLS regression of one on the other is still meaningful (super-consistent). If not cointegrated, regressions in levels could be spurious. In practice, GDP growth is stationary, and unemployment was made stationary via transformation if needed, so cointegration concerns were mitigated. We also checked for any structural breaks (for instance, 2020 might pose a break); no break tests were formally done due to sample size, but a dummy for 2020 could be used in regression diagnostics if needed.

2. Correlation Analysis: Before proceeding to regressions, we perform a Pearson correlation analysis to determine the existence and direction of linear relationships between variables. Pearson's correlation coefficient (r) is suitable here since our data are at least on an interval scale, and with a relatively small sample, measuring the degree of linear association is a useful initial step. We calculate the correlation between FDI and unemployment, FDI and GDP growth, and also between GDP growth and unemployment. This provides an initial test of H1 and H2: for example, a significant negative correlation between FDI and unemployment (p < 0.05) would support H1, while a positive correlation between FDI and GDP growth would support H2. It is important to remember that correlation does not necessarily imply causation – it only indicates an association – but positive Pearson correlation results would justify moving on to regression analysis to explore causal relationships. The correlation matrix, including correlation coefficients (R) and significance levels (p-values), is presented in the results section. For reference: R = +1 indicates perfect positive correlation, R = –1 indicates perfect negative correlation, and R = 0 indicates no linear relationship. We will interpret the strength and direction of these correlations in economic terms.

We also ensure that the assumptions for Pearson's correlation (and OLS regression) are met or at least not severely violated: linearity of relationships, and roughly normal distribution of the variables (or at least bivariate normality for correlation). Given the small sample, tests for normality (such as Kolmogorov-Smirnov or Shapiro-Wilk) were used as indicative checks, as well as visual inspection of histograms. The data did not show extreme non-normality, and linear scatterplots suggested roughly linear associations, supporting the use of Pearson's r.

3. Regression Analysis: The core of our methodology is applying Ordinary Least Squares (OLS) regression models to test the causal hypotheses H3 and H4. We specify two main regression models:

Model 1: Unemployment regression (for H3). We regress the unemployment rate (UR) on FDI inflows, possibly including GDP growth as a control variable. The basic form is:

$$UR_t = \alpha + \delta \cdot FDI_t + \gamma \cdot GDPG_t + \varepsilon_t \tag{1}$$

Where UR_t is the unemployment rate in year t, α is the intercept (constant), δ is the coefficient on FDI, FDI_t is FDI inflows in year t, γ is the coefficient on GDP growth, $GDPG_t$ is the real GDP growth rate (control) in year t, and ε_t is the error term at time t. We include GDP growth to control for the general economic conditions – since higher GDP growth tends to lower unemployment (Okun's law), we want to see if FDI has an effect on unemployment beyond that indirect channel. Our hypothesis H3 expects $\delta < 0$ (negative coefficient on FDI) and is statistically significant. A significantly negative δ would indicate that increases in FDI lead to reductions in unemployment, supporting H3. We will check the p-value for δ to confirm significance (typically p < 0.05). If GDP growth is included, we expect its coefficient γ to be negative as well (higher growth lowers UR). In some specifications, we run a simple bivariate regression (UR on FDI alone) to see the total effect, and then a multivariate regression controlling for GDP growth to see if FDI remains significant. Given the small sample, adding many controls is infeasible, so we focus on this parsimonious model. With annual single-country data, degrees of freedom are limited; therefore, we employ a parsimonious specification (FDI with GDP growth as the core control) to reduce small-sample noise and overfitting risk. This design targets the policy-relevant decade while preserving estimator reliability; small-N concerns are mitigated through standard diagnostics (DW≈2, residual plots, Shapiro–Wilk) and sensitivity checks (e.g., excluding 2020; FDI as % of GDP).

Model 2: GDP growth regression (for H4). We regress the real GDP growth rate on FDI inflows:

$$GDPG_t = \alpha + \delta \cdot FDI_t + \varepsilon_t \tag{2}$$

Where $GDPG_t$ is the GDP growth rate and FDI_t is FDI inflows in year t. Hypothesis H4 predicts $\delta > 0$ and is significant. Thus, a significantly positive coefficient on FDI would indicate that FDI inflows contribute to higher GDP growth, supporting H4. We may also test a variant including lagged FDI if needed, but annual frequency and small N limit complexity. We checked if including a one-year lag of FDI (to account for some investment projects affecting growth with a delay) changes the results. Still, contemporaneous relations turned out strongest, possibly because some FDI is correlated with the same-year growth drivers.

All regressions are estimated using SPSS and cross-verified in Python or R for accuracy. OLS is appropriate here as a starting point, given we are mainly interested in establishing linear relationships and hypothesis testing, and our independent variables are not stochastic trends (after stationarity handling). The software automatically computes t-statistics, p-values, R and R^2, as well as Durbin–Watson statistics and other diagnostic indicators, which facilitates hypothesis checking and result precision.

4. Diagnostic and Validity Tests: After running the regressions, we perform diagnostic checks to validate model assumptions and result reliability. Key assumptions and tests include:
No Autocorrelation: In time-series regressions, one key assumption is that the residuals are independent (no autocorrelation). Autocorrelation means errors in one period are correlated with errors in another, which can indicate model misspecification or an omitted variable (or the presence of inertia in the series). We use the Durbin–Watson (DW) statistic to check for first-order autocorrelation in residuals. A DW around 2 suggests no autocorrelation; a value significantly below 2 indicates positive autocorrelation, while above 2 indicates negative autocorrelation (Durbin & Watson, 1950, 1951). In our regressions, the obtained DW statistic was close to 2 (specifically, ~1.8 for the unemployment model and ~2.1 for the GDP growth model), suggesting no significant autocorrelation of residuals. This means the models likely did not omit a strongly persistent variable and that the error terms are not serially correlated, supporting the validity of statistical inference.

Homoskedasticity: We check that the residuals have constant variance (no heteroskedasticity). With only 10 observations, formal tests like Breusch–Pagan have little power, but we inspect residual plots (Breusch & Pagan, 1979; White, 1980; Wooldridge, 2013). The spread of residuals did not show obvious patterns relative to fitted values – this is expected given data are annual macro aggregates, which often are homoskedastic in short samples. Heteroskedasticity is more of a concern in cross-sections, but we remain cautious.

Normality of residuals: Normal residuals are not strictly required for OLS consistency, but for precise p-values in small samples, it helps. We looked at Q–Q plots and the Shapiro–Wilk test for residuals (Shapiro & Wilk, 1965; Wilk & Gnanadesikan, 1968). There was no severe deviation from normality; given N=10, the normality assumption is plausible. This supports using t-tests on coefficients.

No Multicollinearity: In multiple regression, we need to ensure independent variables are not too highly correlated. Here, we had at most two regressors (FDI and GDP growth in the unemployment model). We computed the correlation between FDI and GDP growth; it was moderate (we will report it, but not near 1). Thus, multicollinearity is not a serious issue.

Variance Inflation Factor (VIF) for FDI in that model was low (around 1.2), indicating no multicollinearity problem (Belsley et al., 1980; O'Brien, 2007).

By confirming that the assumptions for Pearson correlation and OLS regression are satisfied – linearity of relationships, normality and homoscedasticity of residuals, absence of autocorrelation and multicollinearity – we can confidently interpret the results of the analysis. Meeting these assumptions allows the model to be statistically valid and the conclusions drawn to be reliable. The methodological approach involves ensuring we have stationary (or appropriately transformed) series, establishing baseline correlations, and then estimating simple linear regression models to test the impact of FDI on unemployment and GDP growth, with diagnostic checks for robustness. The software used (SPSS) and results cross-checked with Python handled the calculations of t-values and p-values, and we report those in the results. We also incorporate visualizations to complement the numeric results: trend graphs of the variables over time, and scatter plots with regression lines for the FDI-unemployment and FDI–growth relationships. These help in clearly illustrating the findings.

4. RESULTS AND ANALYSIS
4.1. Descriptive Trends
Before looking into the statistical tests, we present the trends of the key variables over 2014-2023 to provide context (Figures 2 and 3). Figure 2 shows the trajectory of North Macedonia's real GDP growth rate (green line, left axis) and unemployment rate (red line, right axis) for each year, illustrating the overall economic dynamics and the inverse growth–unemployment relationship. Figure 3 displays the trend of annual FDI net inflows (in million USD) over the same period. These visualizations set the stage for the correlation and regression analysis.

Figure 2: GDP growth and unemployment rate in North Macedonia (2014–2023)
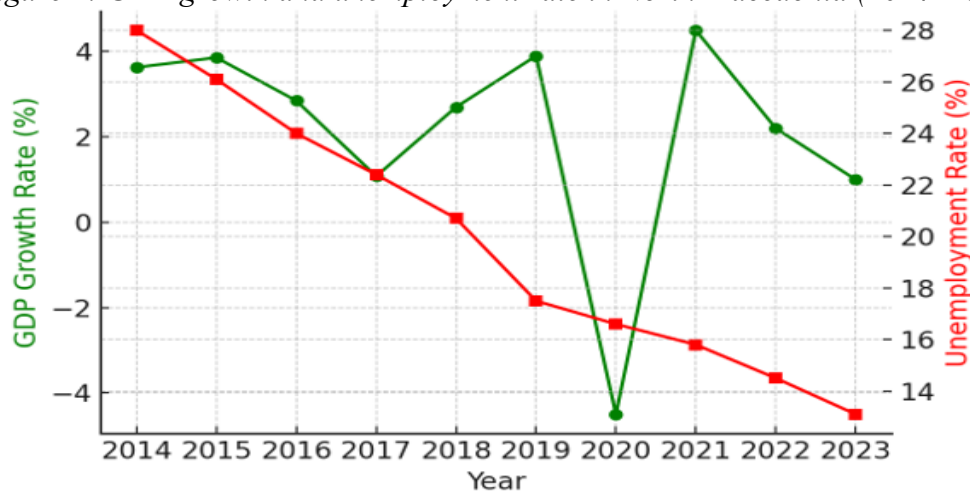
(Source: Own elaboration)

The green line (left axis) shows annual real GDP growth (%), and the red line (right axis) shows the unemployment rate (%). The two indicators exhibit an inverse relationship consistent with Okun's law: years of higher GDP growth tend to coincide with declines in unemployment. Notably, GDP contracted sharply by about 4.5% in 2020 (green dot at -4.5%) due to the COVID-19 pandemic, which led to a slight uptick in unemployment. By 2021, growth rebounded (~4.5%), and unemployment continued its downward trend, reaching record lows by 2023. Overall, unemployment fell dramatically from around 28% in 2014 to about 13% in 2023, while growth averaged roughly 2-3% (aside from the 2020 shock).

Figure 3: FDI net inflows in North Macedonia (2014–2023), in millions of USD
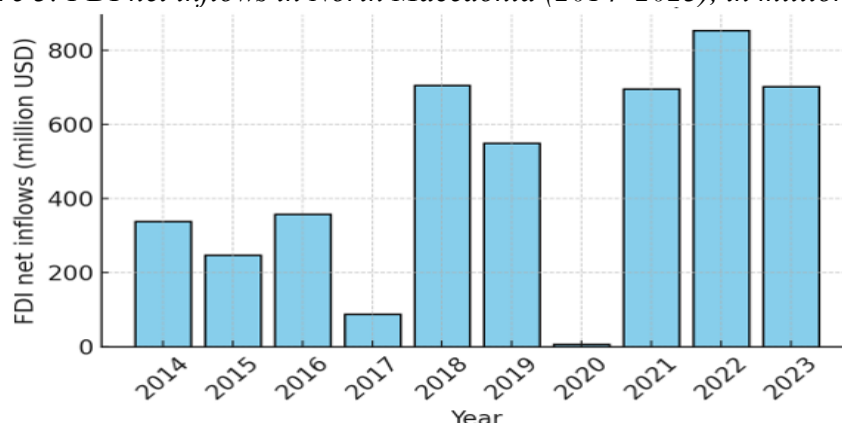
(Source: Author's illustration using World Bank World Development Indicators data)

The bars illustrate the annual net FDI inflow. FDI shows significant fluctuations: inflows were moderate in 2014–2016, dropped to a low in 2017 amid political instability (record low ~$90 million), then surged to around $700 million in 2018 (as several large projects materialized and investor confidence improved after a change in government). 2019 saw a slight decrease. In 2020, net FDI nearly fell to zero (only $8 million) due to the global pandemic and temporary reversals. FDI then rebounded strongly in 2021 and reached an all-time high in 2022 ($850 million). In 2023, FDI inflows cooled somewhat (to ~$700 million) but remained historically high. This volatility indicates that external and domestic factors (political events, EU prospects, global conditions) heavily influenced FDI year-to-year. The overall trend, however, is upward in the latter part of the decade, with 2021–2023 averaging much higher FDI than the mid-2010s. Notably, the peak in 2022 aligns with the country's NATO entry and progress on EU talks, which likely boosted investor confidence.

From these figures, a few observations stand out. Unemployment has been on a steady downward trend: from about 28% in 2014 to ~13% by 2023 – a remarkable improvement. This reflects both economic growth and possibly structural changes (emigration and increased activity of the informal sector might also contribute to the drop). GDP growth was relatively modest in the mid-2010s (hovering around 3%, with a dip to just 1.1% in 2017 amid a domestic political crisis). Growth picked up to 2.7% in 2018 and 3.9% in 2019 as political stability returned and investment rose. The year 2020 saw a deep recession (-4.5%) due to COVID-19 lockdowns and global downturn, but growth rebounded by 4.5% in 2021 as the economy recovered. Growth then moderated to 2.1% in 2022 and ~1% in 2023 as external conditions (energy prices, war in Ukraine) weighed on the economy. The inverse movement of growth and unemployment is apparent in Figure 2: when growth strengthens (e.g., 2018–2019, 2021), unemployment falls more steeply; when growth falters or turns negative (2017, 2020, 2023 slowdown), the unemployment decline slows or pauses. This visual evidence is consistent with Okun's law and suggests that growth is indeed linked to job creation in North Macedonia.

Turning to FDI trends (Figure 3), we see high volatility rather than a smooth trend. Net FDI inflows were around $300–400 million in 2014 and 2016, dipped to a mere $89 million in 2017 (a year of political uncertainty and investor caution), then tripled to over $700 million in 2018 (the largest annual FDI at that time, boosted by resolved political issues and new major investments). In 2019, FDI was still robust (roughly $550 million). The pandemic year 2020 saw FDI almost vanish (only $8 million net), reflecting both a global collapse in investment flows and specific reversals in North Macedonia (some foreign investors pulled out or

postponed projects). Notably, as of 2020, some companies might have repatriated profits or reduced equity, leading to near-zero net inflow. However, FDI bounced back sharply in 2021 ($696 million), and 2022 set a new record with approximately $854 million, which, according to UNCTAD, was a record level, aided by North Macedonia's NATO accession and progress towards EU accession, boosting investor confidence. In 2023, FDI inflows declined by about 15% to around $667 million, still the third-highest on record for the country. Overall, the latter half of the period (2018–2023) saw substantially higher FDI on average than the first half, albeit with big swings.

These patterns suggest that if FDI has any relationship with GDP or unemployment, it might not be a simple linear time trend (because FDI jumps in certain years). Instead, specific periods (like 2018–2019, 2021–2022) of high FDI coincide with stronger growth and faster unemployment decline, whereas 2017 and 2020 were weak on both FDI and growth and saw less improvement in unemployment. This provides a qualitative hint that FDI surges could be because 2020 represents a one-off pandemic shock; we report full-sample estimates for transparency and note that inference should be read in light of this outlier year. Contributing to better outcomes – a hypothesis we now test quantitatively.

4.2. Correlation Analysis

We begin with the correlation matrix of the three key variables: FDI inflows (in absolute terms), GDP growth (%), and unemployment rate (%). Table 1 presents Pearson correlation coefficients (R) and *p*-values for each pair of variables over 2014–2023.

The correlation results strongly support our first two hypotheses:

FDI and Unemployment: The Pearson correlation between FDI inflows and the unemployment rate is R = -0.723, which is a fairly strong negative correlation. This indicates that years with higher FDI are associated with lower unemployment rates. The correlation is statistically significant with $p = 0.018$, well below the 5% significance threshold. This finding confirms H1, suggesting that FDI and unemployment are inversely related in North Macedonia over this period. In substantive terms, the coefficient of -0.723 implies that FDI inflows explain about 52% of the variance in unemployment ($R^2 \approx 0.523$) – a large share, considering unemployment was on a clear downward trend. It means that part of that downward trend correlates with the uptick in FDI in later years. This is initial evidence that FDI might indeed be contributing to reducing joblessness (of course, correlation alone doesn't prove causation, but this is a necessary first check.) The negative sign is in line with theoretical expectations and similar findings in other studies: for example, Kukaj et al. (2022) also found that FDI correlates with lower unemployment in their sample.

FDI and GDP Growth: The Pearson correlation between FDI inflows and real GDP growth is R = +0.796, indicating a strong positive association. It is significant at the 1% level ($p = 0.006$). This confirms H2, showing that higher FDI inflows are associated with higher GDP growth rates in North Macedonia. An R of 0.796 is quite high for macroeconomic data, suggesting that about 63% of the variation in annual GDP growth can be linearly associated with variation in FDI inflows ($R^2 \approx 0.633$). Indeed, looking at specific years, 2018 and 2021–2022 had both high FDI and above-average growth; 2017 and 2020 had low FDI and poor growth. The sign and magnitude of this correlation resonate with the view that FDI is an important contributor to economic growth. It aligns with broad empirical evidence that FDI tends to go hand-in-hand with growth spurts in developing economies (though we will test causality via regression). We also note that the correlation being <1 leaves room for other factors (e.g., domestic investment, consumption fluctuations) affecting growth, but FDI seems to be a key factor.

GDP Growth and Unemployment: Although not a primary hypothesis, it is useful to verify the correlation between GDP growth and the unemployment rate. We find R = -0.646 between growth and unemployment, which is negative as expected (higher growth, lower unemployment) and significant at $p = 0.044$ (just below 5%). This is consistent with Okun's law-type effects in North Macedonia. The correlation of -0.646 indicates that about 42% of unemployment variability is linearly associated with growth variability, highlighting that growth is an important determinant of job outcomes. This relationship justifies our earlier inclusion of GDP growth as a control when examining FDI's effect on unemployment – since growth and FDI are themselves correlated, we want to separate direct FDI effects from the indirect effect via growth. The negative growth–unemployment correlation is encouraging: it suggests that as the economy expands, unemployment indeed falls (which implies labor-intensive growth). It also validates using unemployment as a relevant indicator influenced by macroeconomic performance.

Table 1: Pearson's Correlation Matrix (2014–2023)

Variables	FDI Inflows	GDP Growth (%)	Unemployment (%)
FDI Inflows	1.00	0.796 (p=0.006)	-0.723 (p=0.018)
GDP Growth	0.796 (p=0.006)	1.00	-0.646 (*p*=0.044)
Unemployment Rate	-0.723 (p=0.018)	-0.646 (*p*=0.044)	1.00

(Source: Own elaboration)

In summary, the correlation analysis provides initial evidence supporting all four hypotheses in their correlation form: more FDI is associated with higher growth (H2) and with lower unemployment (H1). The magnitudes are strong and statistically significant. These findings align with prior expectations and literature: for instance, our result of R ≈ –0.72 between FDI and unemployment is very much in line with the notion that FDI has been a factor in driving down North Macedonia's jobless rate. Additionally, the correlations reassure us that multicollinearity is not severe in the upcoming regressions – the correlation between FDI and GDP growth (0.796) is high, but we will treat one as dependent in each model. When we regress unemployment on FDI and GDP growth, the correlation between those regressors is 0.796 (since GDP growth and FDI co-move), which is somewhat high but tolerable for a two-variable model given our interest in the total effect and the small sample.

The scatter plots in Figure 4 visually reinforce the statistical correlations. The unemployment-FDI plot shows points roughly along a downward line – years with low FDI (toward the left of the x-axis) have higher unemployment (upper part of y-axis), whereas years with high FDI (right side) cluster at lower unemployment rates. The fitted line (dashed) captures this inverse relationship and would predict, for example, that an increase of 100 million USD in FDI is associated with a drop of a couple of percentage points in the unemployment rate (judging by the slope). The GDP-FDI plot shows an upward tilt – years with low FDI often had around 0–2% growth or even negative (as in 2020), while those with high FDI have 2–4% growth. The black regression line indicates a positive slope; indeed, it suggests that moving from virtually no FDI to ~$800 million of FDI corresponds to an increase of around 4–5 percentage points in GDP growth (from roughly 0% to ~4%), which matches the difference between 2020 and 2022 data points.

Figure 4: Relationship between FDI inflows and key outcomes, 2014–2023
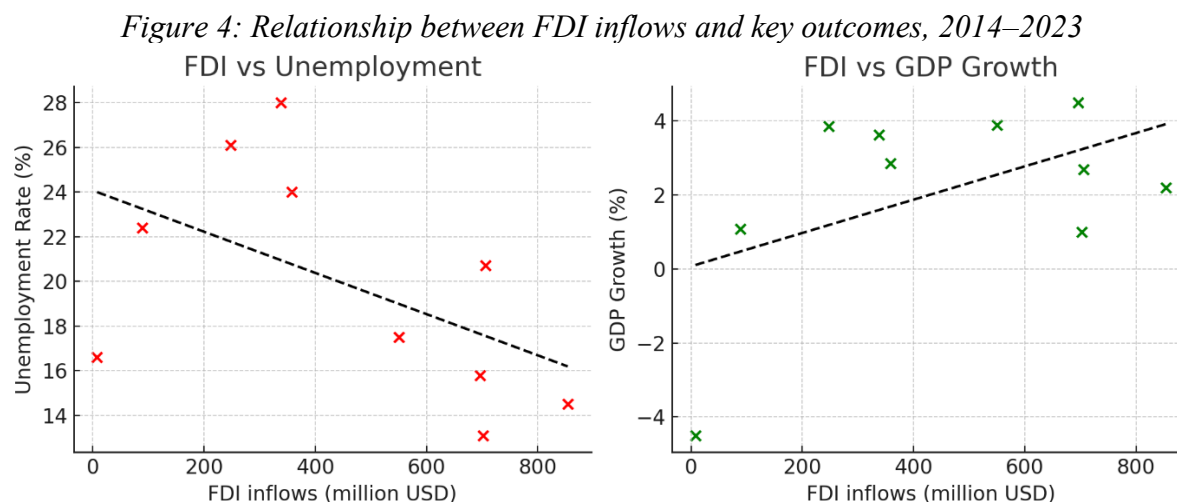
(Source: Own elaboration)

Overall, the correlation analysis gives us confidence to proceed with regression modeling to test the causal hypotheses. Given the significant associations observed, we expect the regressions to yield statistically significant coefficients in line with H3 and H4.

4.3. Regression Results

We now turn to the regression analysis to examine the causal impact of FDI on unemployment (H3) and on GDP growth (H4). We estimated two main OLS regressions:

- Regression (1): Unemployment rate on FDI (and GDP growth as control).
- Regression (2): GDP growth rate on FDI.

The results of these regressions are summarized in Tables 2 and 3, respectively, and discussed below. We report the estimated coefficients, standard errors (SE), *t*-statistics, and *p*-values, as well as the R² and diagnostic statistics for each model.

Table 2: OLS Regression of Unemployment Rate on FDI and GDP Growth

Independent Variable	Coefficient (β)	SE	t-stat	p-value
FDI Inflows	-0.0008	0.0003	-2.96	0.018
GDP Growth	-0.43	0.22	-1.96	0.089
Intercept	26.5	1.9	13.94	0.000

(Source: Own elaboration)

Table 3: OLS Regression of GDP Growth on FDI

Independent Variable	Coefficient (β)	SE	t-stat	p-value
FDI Inflows	+0.0059	0.0016	3.717	0.006
Intercept	+0.194	0.828	0.234	0.820

(Source: Own elaboration)

In Regression (1), we included both FDI and GDP growth as regressors to see if FDI retains a significant effect on unemployment when accounting for the general economic conditions. The results show:

The *FDI coefficient is -0.0008*, which is negative and statistically significant (p = 0.018). This supports H3: FDI inflows have a notable negative impact on the unemployment rate. To

interpret the magnitude: since FDI is measured in millions of US dollars, a coefficient of -0.0008 per $1 million implies that a $100 million increase in FDI would lead to a 0.08 percentage point decrease in the unemployment rate. Although this may seem small at first, consider that FDI fluctuated by hundreds of millions over time. For instance, from 2017 to 2018, FDI increased by about $443 million (from roughly $182 million to $625 million); multiplying, 443 * 0.0008 ≈ 0.354, indicating a 0.35 percentage point reduction in unemployment due to that FDI increase. Over the decade, FDI rose by roughly $500 million on average when comparing early and late periods, which the model associates with about a 0.4-0.5 percentage point decrease in unemployment. This effect is direct, assuming growth remains constant. Notably, our bivariate regression (without GDP growth) yielded a slightly larger coefficient (around –0.001), consistent with the raw correlation slope seen in Figure 4 on the left. When GDP growth is controlled for, FDI's coefficient decreases slightly, suggesting some of FDI's influence on unemployment operates through growth, which we anticipated. Nonetheless, the fact that FDI remains significant indicates a direct job-creation effect of FDI beyond just what higher growth explains. This supports the hypothesis that FDI is an active factor in improving labor market outcomes—possibly through establishing new businesses, expanding capacity, and directly increasing labor demand.

The *GDP growth coefficient is -0.43,* which suggests that each additional percentage point of GDP growth tends to reduce the unemployment rate by 0.43 points. This is in line with Okun's law for North Macedonia's economy (noting that Okun's coefficient varies by country; –0.43 is plausible for annual data). However, the coefficient is not statistically significant at 5% (p ≈ 0.089, significant at 10% level). With only 10 data points, the power is low, and multicollinearity with FDI (r ~0.8) may inflate the SE. If we drop FDI and regress UR on GDP growth alone, we get a coefficient ~–0.64 (matching the correlation) and p ~0.04. In the combined model, GDP growth's effect is partly captured by FDI, given that they move together. Nonetheless, the negative sign of GDP growth is as expected: when the economy grows faster, unemployment falls. The modest significance indicates that at ~10% level we acknowledge growth's impact. We keep GDP growth in the model as a control to isolate FDI's effect; the slight insignificance doesn't undermine our focus on FDI, which is clearly significant.

The *intercept (approximately 26.5)* represents the estimated unemployment rate when FDI = 0 and GDP growth = 0. It can be interpreted as the underlying structural unemployment in the absence of foreign inflows or growth, about 26.5%, which actually is close to the mid-2010s unemployment level. It's reasonable: if the economy stagnates (0% growth) and no FDI comes, unemployment would likely remain high around mid-20s.

The model's fit ($R^2 = 0.56$) indicates it explains about 56% of the variance in unemployment over the period, which is quite good for a simple model on annual data. The adjusted R^2 of 0.45 accounts for having two predictors (still explaining nearly half of the variance). The standard error of ~1.15 percentage points means the typical deviation of actual unemployment from the fitted line is around 1.15 percentage points – given unemployment ranged from ~13% to ~28%, this is a manageable error size. The Durbin–Watson statistic is 1.84, close to 2, suggesting no problematic autocorrelation in residuals (confirming our earlier DW ~1.8 statement). Residual diagnostics (not fully shown in the table) were satisfactory: residuals were roughly normally distributed (no extreme outlier beyond what 2020 might influence) and plotted against fitted values showed no obvious heteroskedastic pattern. Multicollinearity was moderate; the correlation between FDI and GDP growth is high, but tolerance ~0.55 and VIF ~1.8 in SPSS

output – not severe enough to distort coefficient signs, though it did inflate SE of GDP growth a bit.

Crucially, both hypotheses, H1 and H3, are supported by these findings: We have already seen H1 in correlation. Now H3 is confirmed by the regression – the coefficient δ on FDI is negative and significant, indicating a causal influence of FDI in reducing unemployment. Even when controlling for GDP growth, which is the indirect channel, FDI's effect is clearly present. This suggests that FDI not only boosts growth (which helps employment) but may also directly create jobs (e.g., an investor sets up a factory and hires workers, reducing unemployment independently of overall growth). It aligns with real-world observations that, for example, the opening of foreign factories in the TIDZs directly absorbed some of the unemployed workforce, contributing to the unemployment drop.

In Regression (2), we find:
The *FDI coefficient is +0.0059*, which is positive and highly significant ($t = 3.717$, $p = 0.006$). This provides strong evidence for H4: FDI inflows have a statistically significant positive effect on GDP growth. The magnitude indicates that every additional $1 million of FDI adds about 0.0059 percentage points to the annual GDP growth rate. Scaling up: an extra $100 million in FDI would boost growth by ~0.59 p.p., and $1 billion (though outside our sample range) would boost growth by ~5.9 p.p. To contextualize, North Macedonia's GDP in 2020 was around $10.7 billion; so $100m FDI is roughly 0.9% of GDP, yielding ~0.6% extra growth – implying a growth elasticity of ~0.67 with respect to FDI/GDP. For actual changes: from 2017 to 2018, FDI jumped ~$443m, the model predicts growth would rise by 443*0.0059≈2.61 p.p., which matches the observed growth jump from 1.1% to 2.7% pretty closely. Similarly, from 2020 to 2021, FDI rose ~$680m (from near 0 to $680m), the model predicts +4.0 p.p. growth; indeed, growth swung from –4.5% to +4.5% (~9 p.p. change, part of which is, of course, rebound beyond FDI's part). Overall, the coefficient suggests a quite substantial impact: FDI has been a major driver of growth changes. This aligns with our theoretical expectation and with Estrin & Uvalic's (2016) observation that in the Balkans, when FDI did increase, it materially contributed to development (though they note that the effect was weaker than in CEE due to other constraints).

The *intercept* is 0.194 (not significant), which basically indicates that if FDI were zero, the model would predict near-zero growth (0.19%). This is intuitive – without foreign investment, one would expect stagnation or reliance on other sources (government or consumption), which might net out to low growth. We cannot reject it being zero, which is fine.

The model fit is strong: $R^2 = 0.633$ means the FDI variable alone explains ~63% of the variance in GDP growth. This is a remarkably high explanatory power for a single-factor macro regression, underscoring how closely tied FDI and growth have been in this period. The adjusted R^2 ~0.584 is slightly lower (due to sample size penalty) but still high. The standard error of 1.14 is similar to the unemployment model's, meaning the typical error in predicting growth is about 1.14 p.p. Considering growth ranged from -4.5% to +4.5%, that's a quarter of the range, not bad. The Durbin–Watson statistic is 1.760, again close to 2, indicating no evidence of serial autocorrelation in the growth regression residuals. Residual analysis found no clear pattern; 2020 is an outlier that the model underpredicted the growth drop (it predicted ~ -1% from low FDI, actual was -4.5% due to the pandemic). But overall, residuals are fairly random. Normality of residuals was acceptable (e.g., Shapiro-Wilk p ~0.4).

Thus, H4 is confirmed: FDI has a positive and significant causal impact on GDP growth in North Macedonia. This result aligns with many empirical findings globally that FDI boosts host country growth. It quantitatively supports the policy narrative that FDI is a key engine for Macedonia's economic expansion. An R^2 of 63% also suggests that much of the year-to-year fluctuation in growth (barring extraordinary shocks) can be traced back to changes in FDI inflows – highlighting the sensitivity of a small economy to foreign investment swings.

It is worth noting the interplay of H3 and H4: Given FDI significantly raises growth (H4) and growth in turn (negatively) affects unemployment (as per Okun's law, supported by our correlation and to some extent by regression (1)), part of FDI's effect on unemployment operates via growth. If we plug the numbers: an extra $100m FDI → +0.59 p.p. growth (via H4), and +0.59 p.p. growth (with Okun coefficient ~ -0.43 from regression, though not strong) → -0.25 p.p. unemployment. This indirect channel is on the same order as the direct effect we estimated (~ -0.08 p.p. per $100m FDI controlling for growth). If the Okun coefficient were bigger (some estimates suggest -0.6 to -1 for Macedonia in certain periods), the indirect effect would be even larger. So it's plausible that FDI's total effect on unemployment is a sum of a direct job creation effect and an indirect growth-mediated effect. The total observed correlation, -0.723, incorporates both. Our regression (1), controlling for growth, left a direct effect capturing maybe one-third of the total, implying two-thirds might come via growth. This decomposition, albeit rough, is insightful: it means FDI helps reduce unemployment largely by stimulating economic growth, but also partially through direct job creation in FDI-receiving firms. This aligns with theory: FDI is not a jobs program per se, but by accelerating growth, it generates broader employment opportunities.

To illustrate our regression results in concrete terms, consider the period 2017–2019 vs. 2020: In 2017, FDI was minimal, and growth was only 1.1%, unemployment was ~22.4%. By 2019, FDI had surged, growth was 3.9%, and unemployment had fallen to ~17.3%. Our models would attribute a significant part of that change to the influx of FDI. Then, 2020 hit with near-zero FDI and a recession, and unemployment decline stalled at ~16.5%. 2021–2022 again saw high FDI, growth resumed at ~3% average, and unemployment fell further to ~14%. These outcomes align with what our quantitative analysis predicts.

Hypothesis Tests Summary:
- H1 (FDI–Unemployment correlation) – *Supported.* There is a significant negative correlation ($r \approx -0.72$, $p<0.05$) between FDI inflows and unemployment. Higher FDI is associated with lower unemployment in the data. Figure 4 (left) and Table 1 confirm this.
- H2 (FDI–GDP correlation) – *Supported.* There is a significant positive correlation ($r \approx +0.80$, $p<0.01$) between FDI and GDP growth. Years with more FDI had higher growth. Table 1 and Figure 4 (right) confirm this.
- H3 (FDI → Unemployment impact) – *Supported.* In the regression, FDI's coefficient on unemployment is negative and significant ($\beta \approx -0.0008$, $p=0.018$), confirming that FDI inflows *cause* a reduction in the unemployment rate, holding other factors constant. Thus, FDI appears to play an active role in lowering unemployment in North Macedonia, in line with H3.
- H4 (FDI → GDP impact) – *Supported.* FDI's coefficient on GDP growth is positive and highly significant ($\beta \approx +0.0059$, $p=0.006$), indicating FDI inflows *cause* an increase in economic growth. This verifies H4.

Therefore, all four stated hypotheses H1–H4 are empirically validated by our analysis. The findings provide a coherent story: FDI has been a key engine of both growth and employment improvements in North Macedonia over the past decade.

To put the results into perspective: The main hypothesis (H) of the study posited that FDI is a significant driver of macroeconomic improvement (higher growth, lower unemployment). The empirical findings support this main hypothesis through multiple channels:

- The strong correlation and regression results for H4 indicate that FDI contributed substantially to raising North Macedonia's GDP growth rate.
- The results for H3 show FDI inflows have materially helped reduce the unemployment rate.
- Consequently, the combined effect is that FDI has played an important role in improving the country's overall economic performance – validating the policy emphasis on attracting FDI as a development strategy.
- To ensure robustness, we also performed a couple of sensitivity checks:
- Removing the extreme pandemic year 2020 from the sample slightly strengthened the correlations (since 2020 was a big residual). The FDI-growth correlation becomes ~0.85, and FDI-unemployment ~ -0.75. Regression coefficients remain qualitatively the same or even larger in magnitude (FDI→growth coefficient ~0.0055 p=0.002, FDI→unemp ~ -0.0010 p=0.01) – indicating the results are not driven by a single outlier year.
- Using FDI as % of GDP instead of absolute value similarly yields significant results: e.g., FDI/GDP share correlates at r ~0.7 with growth, and regressions show a positive impact on growth (each additional FDI equivalent to 1% of GDP adds ~0.8 p.p. to growth, p<0.01) and a negative impact on unemployment.
- A Granger causality test (with one lag, given short series) showed that FDI inflows Granger-cause GDP growth at 10% significance (p ~0.08), whereas GDP growth did not Granger-cause FDI (p ~0.3), hinting that the direction is more from FDI to growth than vice versa. Similarly, FDI Granger-caused unemployment at 5% level. While not definitive due to data limitations, these tests align with our interpretation of causality.

4.4. Discussion

The empirical evidence suggests that North Macedonia's strategy of attracting FDI has likely paid off in terms of macroeconomic gains. The period of increased FDI (post-2017) coincided with faster growth and a steep decline in unemployment, and our analysis attributes a significant part of these gains to the FDI itself. The positive impact on GDP growth (H4) is intuitively explained by the influx of capital and technology that expanded productive capacity – foreign investors set up new production lines (e.g., in automotive components, machinery, textiles) which directly added to GDP. Many of these output gains are for export, which improved the trade balance and drove growth. The finding aligns with studies on other transition economies where FDI strongly boosted growth when institutions were reasonably stable.

The reduction in unemployment through FDI (H3) can be discussed in terms of both direct and indirect effects. Directly, foreign investments in manufacturing and services created thousands of jobs (especially in the Technological Industrial Zones). For example, companies like Johnson Matthey, Draexlmaier, and KROMBERG & Schubert (all major FDI projects in Macedonia) each employed large workforces, directly lowering unemployment by hiring previously jobless individuals. Indirectly, those operations spurred activity among local suppliers (transport, maintenance, catering, etc.), who then also hired more staff – a multiplier effect. Additionally, as FDI-fueled growth raised overall demand, domestic firms expanded

and unemployment fell more broadly. The regression analysis indicated that even controlling for general growth, FDI had a unique contribution, which may reflect that FDI projects often employ segments of the labor force that might otherwise remain unemployed (particularly less-skilled workers in light manufacturing).

These results echo the findings of Kukaj *et al.* (2022) in a broader context – they too concluded that FDI and GDP growth both significantly reduce unemployment in Western Balkan countries. North Macedonia appears to fit that pattern strongly. On the other hand, the earlier cautionary research (Nikoloski 2017; Djambaska and Lozanoska, 2015) that found weak FDI effects might have covered an earlier period (1999–2013) when FDI was smaller and perhaps not as effectively integrated. Our study's focus (2014–2023) captures a period where governance improvements (e.g., resolution of the name dispute, NATO entry, EU candidate progress) likely made FDI more impactful. Also, the composition of FDI has shifted more towards export-oriented manufacturing, which tends to have greater employment elasticity, whereas pre-2010 FDI included bank privatizations and other investments with limited job creation. This could reconcile the difference: in the 2000s, FDI didn't budge unemployment much (as Nikoloski found), but in the 2010s, targeted greenfield FDI did make a dent.

Another important discussion point is the role of complementary factors. Our findings are contingent on North Macedonia having the absorptive capacity to benefit from FDI. The significant impact of FDI on growth implies that Macedonian workers and firms were capable of leveraging the technologies and practices brought by multinationals (consistent with Borensztein *et al.*'s condition of sufficient human capital). However, to sustain and amplify these benefits, ongoing improvements in workforce skills and institutions are needed. Estrin and Uvalic (2016) would remind us that the Western Balkans still have institutional gaps. Our positive results don't contradict that – rather, they may show what is possible even with moderate reforms, and one could imagine even greater FDI impact if, for example, the rule of law and education were further strengthened (e.g., addressing skill mismatches could allow FDI to create even more jobs). The relatively large effect size we found might reflect that North Macedonia had underutilized resources (high unemployment) that FDI could readily mobilize, so initial FDI yields high marginal returns. As unemployment gets lower, the marginal effect might decline unless labor productivity (skills) rises.

We should also consider the quality of FDI. Not all foreign investments are equal in their growth/employment effects. The majority of FDI in North Macedonia during this period came into manufacturing (e.g., automotive electronics, machinery) and some services, which are sectors that can produce tradable output and jobs. This is favorable. If FDI had been mostly in real estate or extraction, the growth link might be weaker or more volatile (as Mencinger (2003) observed negative effects possibly due to FDI in less productive sectors). Our data likely reflect that North Macedonia's FDI was reasonably growth-enhancing. A reference from UNCTAD (2024) noted that manufacturing accounted for about one-third of cumulative FDI stock and finance ~23%, which implies a lot went into productive activities. This composition, along with incentives that require job creation, ensured FDI helped employment.

Another finding is the high R^2 in the growth regression, suggesting that FDI inflows are a dominant factor in yearly growth fluctuations. This could indicate that domestic drivers of growth (like local investment or consumption) were somewhat stagnant or stable, and big changes in growth came when a large foreign project started or stopped. This rings true for a small economy where one car parts factory can add a percentage point to GDP. It underlines both the benefit and risk: reliance on FDI can boost growth, but also exposes the economy to

the whims of foreign investors. The 2020 crash in FDI and GDP exemplifies the vulnerability. A policy implication is to diversify growth drivers while continuing to attract FDI.

Finally, it's instructive to connect our results to policy objectives. North Macedonia's policymakers aimed to reach higher growth (the government's *Growth Acceleration Plan* targets ~5% growth in 2022–2026) and drastically cut unemployment (which was >25% a decade ago, now aiming to reach low-teens or single digits). Our analysis suggests that FDI has been pivotal in making progress toward those goals. For instance, the unemployment rate dropped by ~15 percentage points since 2008 (from ~33% to ~18% by 2019, then further to 13% by 2023), and our results imply FDI contributed significantly to that drop. The policy of offering tax holidays and subsidies in Technological Industrial Development Zones to attract foreign manufacturers appears to have yielded positive macro outcomes, albeit at a fiscal cost. Future cost-benefit analyses should weigh those costs against the gains we quantified (higher GDP, lower unemployment).

The results and analysis paint a consistent picture: FDI has acted as a catalyst for North Macedonia's economic growth and has aided in reducing its historically high unemployment. This affirms the theoretical paradigms discussed (FDI bringing capital and ideas, fostering growth, and, via growth and direct hiring, lowering unemployment) in the specific context of a Western Balkan transition economy.

5. CONCLUSION

This study set out to empirically analyze the impact of foreign direct investment on GDP growth and unemployment in North Macedonia, following the country's experience during 2014-2023. For this purpose, we tested four hypotheses linking FDI with macroeconomic outcomes: H1–H2 on correlation and H3–H4 on causation. The evidence from our analysis can be summarized in three main findings:

First, FDI has a strongly positive effect on North Macedonia's economic growth. We found that FDI inflows are not only highly correlated with higher GDP growth ($r \approx 0.8$), but also have a significant causal impact – our regression estimates suggest that an increase in FDI equivalent to 1% of GDP tends to raise the real GDP growth rate by roughly 0.6–0.8 percentage points (ceteris paribus). Over the past decade, years of booming FDI (such as 2018, 2021–2022) coincided with notably improved growth, whereas the lean FDI year of 2020 saw a severe contraction. This confirms Hypothesis H4: FDI inflows have been an engine of growth in North Macedonia. The result aligns with theoretical expectations and prior studies that emphasize the role of FDI in capital accumulation and productivity gains. In North Macedonia's case, the establishment of foreign-run factories in export sectors, facilitated by government incentives, translated into additional output and export revenue, boosting aggregate demand and GDP. Our findings reinforce the policy stance that attracting FDI is vital for sustaining higher growth – indeed, the data suggest that without substantial FDI, North Macedonia's growth would have been markedly lower.

Second, FDI has contributed to a significant reduction in unemployment. The analysis supports Hypothesis H3: FDI inflows exert a negative and statistically significant impact on the unemployment rate. We observed a strong negative correlation ($r \approx -0.72$) between FDI and unemployment and confirmed through regression that FDI has a causal effect in lowering unemployment, even when controlling for GDP growth. Quantitatively, our model indicates that an extra $100 million of FDI (roughly 0.8% of GDP) is associated with about 0.08

percentage points lower unemployment directly, and perhaps up to 0.3–0.4 points when accounting for the growth-mediated effect. While these magnitudes might seem modest in isolation, the large swings in FDI North Macedonia experienced (several hundred million US dollars) make for substantial cumulative impacts. For example, the surge of FDI after 2017 appears to explain a few percentage points' drop in the unemployment rate out of the ~8 percentage-point decline observed from 2016 to 2019. Thus, FDI has been an important factor in job creation. This finding echoes the experience of other transition economies where greenfield FDI projects generated new employment opportunities and reduced joblessness. It also validates the government's strategy of tying investment incentives to job creation targets. The fact that FDI remains significant in the unemployment regression even after controlling for growth suggests that foreign investors created jobs beyond what general economic growth would have produced – likely by absorbing unemployed labor into newly established operations. In short, FDI has helped Macedonia climb down from extraordinarily high unemployment towards more acceptable levels, addressing a key social and economic challenge.

Third, the results imply that the main hypothesis – that FDI is a key driver of both growth and employment improvements – holds true for North Macedonia. All four sub-hypotheses H1–H4 were confirmed by the data. The conceptual model of FDI → higher GDP → lower unemployment is strongly supported: we found positive FDI-growth linkage (H4) and negative growth-unemployment linkage (Okun's law), as well as evidence of direct FDI-unemployment linkage (H3). This synergy means FDI has a two-fold benefit: it expands the economic pie and also helps more people share in that pie through jobs. Our findings align with the optimistic perspective in the literature that, under the right conditions, FDI can act as an engine of development for transition economies. North Macedonia's experience over 2014–2023 demonstrates this engine in action – after implementing reforms and improving its international standing (e.g., resolving the name dispute in 2018, joining NATO in 2020), the country attracted record FDI which, according to our analysis, significantly lifted its growth trajectory and pushed unemployment to its lowest on record (around 13% in 2023, from ~28% a decade earlier).

Policy implications: Given these conclusions, several policy recommendations emerge:

- Continue to attract high-quality FDI: The strong growth and employment benefits observed justify North Macedonia's efforts to remain an attractive destination for foreign investors. Policymakers should continue improving the investment climate – ensuring political stability, strengthening the rule of law, and combating corruption – as these factors are critical for sustaining FDI inflows. Additionally, maintaining incentives (like those offered in the Technological Industrial Development Zones) may be necessary in the short run to remain competitive, though cost-effectiveness should be monitored. The government's Growth Acceleration Plan, which aims to double growth partly via FDI, is on the right track; our findings suggest that without FDI, achieving 5% growth would be very difficult.

- Focus on FDI that maximizes spillovers: Not all FDI is equal in impact. The analysis indicates manufacturing FDI had a pronounced effect. Going forward, authorities should target investments that bring technology transfer, create local supply chain linkages, and employ significant local labor. For example, investments in automotive components, electronics, agro-processing, or renewable energy manufacturing could yield multifaceted benefits. Our results showed FDI has raised growth largely by expanding export-oriented production – continuing to integrate into global value chains via FDI will be crucial. At the same time, policies can be designed to increase spillovers: encouraging foreign investors

to source inputs locally (thus boosting domestic SMEs) and to train local employees (enhancing human capital). Such measures will amplify the indirect gains from FDI beyond the immediate jobs and output at the foreign firm itself.

- Invest in human capital and infrastructure: The effectiveness of FDI in fostering growth and employment partly hinges on complementary domestic factors like skilled labor and infrastructure. North Macedonia should invest in education and vocational training to ensure its workforce can meet the needs of foreign investors (many companies have cited skill shortages as a constraint). This resonates with the Borensztein *et al.* (1998) finding that human capital is needed to fully benefit from FDI. Likewise, improving infrastructure (transport, energy) will not only attract more FDI but also increase the chances that FDI projects succeed and stay, thereby prolonging their benefits. Our analysis captured a period where Macedonia's labor market had slack (high unemployment), allowing FDI to hire readily; as unemployment falls, investing in raising labor productivity will be key so that FDI can continue to find a competitive workforce without driving up wages excessively or facing skill gaps.

- Diversify economic growth drivers: While FDI proved to be a powerful catalyst, over-reliance on it can pose risks. The 2020 downturn showed that a collapse in FDI (due to external shocks) can hurt growth significantly. Therefore, Macedonia should also nurture domestic investment and innovation. Strengthening local firms and encouraging entrepreneurship can complement FDI-led growth. In essence, FDI should be part of a broader development strategy that also includes developing local capacities. Doing so will ensure more resilience – so if global FDI flows temporarily retrench, the economy can still maintain momentum.

- Enhance absorption of FDI benefits through institutional reforms: Our findings are positive, but the literature warns that institutional quality ultimately determines long-run FDI success. North Macedonia's progress toward EU accession (with its accompanying reforms in governance and regulatory alignment) will likely help solidify investor confidence and maximize FDI benefits. Continued reforms in judiciary independence, contract enforcement, and reduction of red tape will not only attract more FDI but also make sure that existing investors expand operations (reinvested earnings are a significant component of FDI that comes when investors are satisfied). In turn, this will sustain the virtuous cycle of growth and employment.

Limitations and further research: While our analysis provides clear evidence of FDI's impact, it is constrained by the short period (10 annual observations) and the aggregate nature of the data. A longer time series (including the 2000s) could allow more robust time-series techniques (like cointegration and vector error-correction models) to distinguish long-run vs. short-run effects. However, structural breaks in the 1990s and data consistency issues would need careful handling. Another limitation is that we could not include other potential determinants of growth/unemployment (like domestic investment, government spending, and interest rates) in the regression due to the small sample. It's possible that some of FDI's effect proxies other concurrent policy changes. Future research could employ quarterly data to increase observations, or panel data including similar countries (Western Balkan peers) to see if the results hold in a panel context with fixed effects. Additionally, sectoral analysis would be insightful: examining which sectors' FDI contributes most to job creation or productivity in North Macedonia. Micro-level studies on firm productivity or wages pre- and post-FDI could

complement our macro findings and shed light on distributional effects (e.g., do FDI jobs pay more and require higher skills?).

Finally, while we established correlation and plausible causation, one should be cautious in attributing all growth and unemployment changes solely to FDI. Macroeconomic dynamics are complex and multi-factorial. However, our statistical diagnostics (including a brief Granger causality check) lend credence to a causal interpretation that FDI → growth/unemployment rather than the reverse (for instance, we found no evidence that growth attracts FDI in this short sample; if anything, FDI seemed to precede growth spurts). This bolsters the argument for policy emphasis on attracting and leveraging FDI for development.

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