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Gunter Merdzan

BSF BALKAN STUDIES FOUNDATION

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During his studies, Merdzan received numerous awards, including the Golden Medal for the best graduate in 2016/2017 and the "26 July" award for excellence in social sciences.

From 2021 to 2026, he served as a teaching and research assistant and was also an economics teacher at a gymnasium in Skopje. Since 2026, he has held the title of assistant professor of economics in the Economic Growth and Development course. His research interests include political economy, economic development, economic growth, economic theory, technology and institutional economics.

Merdzan has published multiple scientific papers in reputable journals and participated in international conferences, including those in Naples and Brussels. He has completed study visits in Estonia and Serbia and attended training programs in applied economics. Additionally, he has engaged in national and international projects focused on rural youth and community resilience and is a member of the European Rural Youth Observatory.

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EXECUTIVE SUMMARY

This report examines the impact of foreign direct investment on domestic investment in selected countries of Central, Eastern and Southeastern Europe, with a special focus on the Republic of North Macedonia. The main question addressed in the analysis is whether foreign direct investment stimulates domestic capital formation, or whether it partly substitutes domestic investment. This issue is particularly important for transition and post-transition economies, where domestic savings are often limited, financial markets are less developed, and economic growth has depended significantly on external sources of capital.

The theoretical and empirical background of the report shows that the effect of foreign direct investment on domestic investment is not automatic. FDI can support domestic investment when it creates new production capacities, increases demand for local suppliers, transfers technology and managerial knowledge, improves export potential and strengthens links between foreign and domestic firms. However, FDI can also have limited or even negative effects if foreign companies operate as isolated production units, rely mainly on imported inputs, or compete directly with domestic firms that have weaker financial and technological capacity. Therefore, the key issue is not only the volume of FDI inflows, but also their structure, sectoral distribution and connection with the domestic economy.

The descriptive analysis confirms that CESEE countries have attracted significant amounts of foreign capital over the last decades, although there are important differences across countries. Larger and more developed economies, such as Poland, Czechia and Romania, attract higher absolute amounts of FDI, while smaller economies, including North Macedonia, Serbia and Albania, show a higher relative dependence on FDI as a percentage of GDP. At the same time, gross fixed capital formation remains an important indicator of domestic investment activity across the region, but its relationship with FDI differs from country to country. This suggests that foreign capital alone cannot explain investment dynamics; domestic savings, economic growth, institutional stability, financial development and the capacity of local firms also matter.

The panel results for the CESEE countries show that foreign direct investment has a positive and statistically significant effect on gross fixed capital formation in the baseline fixed effects model. This means that higher FDI inflows are associated with higher domestic capital formation. However, the estimated long-run effect is below one, which means that FDI stimulates investment but does not generate a full crowding-in effect. In other words, foreign investment supports domestic investment, but the increase in total investment is smaller than the inflow of foreign capital itself. The results are stronger for higher-income CESEE countries, suggesting that more developed economies are better able to transform FDI inflows into broader domestic investment effects.

The analysis for North Macedonia shows a similar but more cautious picture. The descriptive statistics indicate that the country has maintained a moderate level of gross fixed capital formation, while FDI has represented an important source of external financing. The relatively large gap between domestic savings and investment confirms that North Macedonia depends on foreign capital to support its investment needs. The regression results show that FDI has a positive dynamic effect on gross fixed capital formation, especially when structural shocks are controlled for. This means that foreign investment contributes to domestic capital formation, but its effect is sensitive to political, economic and external disturbances.

For North Macedonia, the strongest result appears when the model controls for major structural breaks, including the 2001 conflict, the global financial crisis, the post-2018 period, the COVID-19 shock and the post-2022 energy and geopolitical shocks. Once these events are taken into account, the effect of FDI on domestic investment becomes stronger and statistically significant. This suggests that the relationship between FDI and domestic investment exists, but it is partly hidden by the instability and shocks that affected the Macedonian economy during the period analysed. At the same time, the long-run estimates do not provide strong evidence of a stable long-run crowding-in effect.

Overall, the findings suggest that FDI plays a positive role in supporting investment activity in CESEE countries and in North Macedonia, but it should not be treated as a complete substitute for domestic investment capacity. The results point to a moderate complementarity between foreign and domestic investment rather than a strong crowding-in effect. This means that attracting foreign investors is important, but it is not sufficient for long-term development unless foreign investment becomes more deeply connected with the domestic economy.

From a policy perspective, the main implication is that countries should move beyond policies focused only on increasing the volume of FDI inflows. The quality of FDI matters equally, and possibly even more. Governments should encourage investments that create stronger links with domestic suppliers, support technology transfer, increase local value added and contribute to productivity growth. For North Macedonia, this means that investment policy should be connected with industrial policy, SME development, innovation policy, education and skills development, and measures that strengthen the capacity of domestic firms to cooperate with foreign companies.

The report therefore concludes that foreign direct investment can be an important driver of capital formation, but its development effect depends on the domestic economic environment. A stronger policy focus is needed on building local supplier networks, supporting domestic enterprises, improving institutional predictability and attracting FDI into sectors with higher technological content and stronger potential for spillovers. Only under these conditions can FDI become not just a source of external financing, but a real instrument for strengthening domestic investment, productivity and long-term economic growth.

Introduction

The question of whether foreign direct investment represents an additional source of capital that stimulates domestic investment activity, or a mechanism through which foreign companies crowd out domestic firms from the market, is one of the central questions in the literature on international business, development economics and economies in transition. This question is particularly important for the countries of Central, Eastern and Southeastern Europe, since their economic development in the last three decades has been closely linked to the processes of liberalization, privatization, institutional transformation and integration into European and global production chains. In these economies, foreign direct investment has most often been treated as an instrument for overcoming the shortage of domestic capital, modernization of production capacities, transfer of technology and improvement of export competitiveness. However, their impact on domestic investment is not unambiguous, as it depends on the form of entry, sectoral structure, the degree of connection with domestic firms, the development of financial markets, the quality of institutions and the absorptive capacity of the host country.

In theoretical terms, foreign direct investment differs from portfolio investment in that it implies permanent participation, control and managerial influence of the foreign investor in the host economy. Unlike short-term capital inflows, FDI usually involves investment in production facilities, technologies, organizational practices, marketing networks and access to foreign markets. In the classic literature on multinational companies, Hymer (1976) lays the foundation for understanding FDI through the idea that firms invest abroad not only because of differences in capital returns, but because they possess specific firm advantages that enable them to compete in foreign markets. These advantages can be related to technology, brand, managerial knowledge, organizational capabilities or access to financial resources. Buckley and Casson (1976) through the theory of internalization, further explain that multinational companies choose a direct presence abroad when it is more efficient than licensing, exporting or market transactions, especially when there are market imperfections and the risk of losing control over technology and knowledge. Dunning (1980, 1988) through the eclectic OLI paradigm, synthesizes this logic through three conditions for the emergence of FDI: firm ownership advantages, host country locational advantages, and internalization advantages.

These theories are particularly relevant for the countries of Central, Eastern, and Southeastern Europe, since their attractiveness to foreign investors resulted from a combination of locational factors: relatively lower labor costs, geographical proximity to Western European markets, the process of European integration, privatization of state-owned enterprises, and gradual improvement of the institutional framework. In the early stages of the transition, a significant part of FDI was associated with privatization, banking, telecommunications, energy, and

takeovers of existing enterprises. In the later stages, especially after the enlargement of the European Union, foreign investment increasingly focused on manufacturing sectors, the automotive industry, electronics, parts and components, services linked to global value chains, and export-oriented capacities. Therefore, in these countries, FDI should not be analyzed only as a financial inflow, but as part of a broader process of restructuring production and integration into the European economic area.

The theoretical relationship between FDI and domestic investment is most often analyzed through two opposing hypotheses: the crowding-in effect and the crowding-out effect. According to the first hypothesis, FDI can increase domestic investment activity through several channels. First, foreign companies can create demand for domestic suppliers, logistics, construction services, parts, maintenance, and business services, which stimulates investment by local firms. Second, through the transfer of technology, managerial practices, and quality standards, FDI can increase the productivity of domestic enterprises and encourage them to invest in new equipment, human capital, and organizational improvement. Third, foreign companies can increase the export potential of the economy, which creates a larger market for domestic firms and reduces dependence on limited domestic demand. In this sense, FDI is seen as a catalyst for domestic capital accumulation and as a source of long-term structural transformation.

On the other hand, the crowding-out hypothesis suggests that foreign investors can have a negative impact on domestic investment if they crowd out local firms. Multinational companies often have better access to finance, more advanced technology, higher productivity, developed distribution channels and a stronger brand, which can reduce the competitiveness of domestic companies. In conditions of limited financial markets, foreign companies can indirectly increase the pressure on local sources of financing, especially if domestic firms are dependent on bank loans. In addition, foreign companies can attract skilled labor from domestic firms, thereby increasing labor costs and limiting the capacity of local enterprises to expand. Therefore, the positive effect of FDI on domestic investment is not automatic, but depends on whether foreign investments create links with the domestic economy or remain isolated production islands.

The empirical literature shows that the impact of FDI on domestic investment is heterogeneous and depends on the development level and institutional context of the host country. Borensztein, De Gregorio and Lee (1998) show that FDI can be an important channel for technology transfer and contribute to economic growth, but its effect is conditional on the level of human capital in the host country. de Mello (1999) analyses the role of FDI in capital accumulation, output growth and productivity, stressing that the effects differ between developed and less developed economies. Agosin and Mayer (2000) directly ask the question of whether foreign investment stimulates or displaces domestic investment and show that the results depend on the region, the structure of investment and the ability of the domestic economy to absorb the benefits of foreign capital. This literature lays the foundation for an empirical analysis in which FDI is not treated as universally positive or negative, but as a conditional development factor.

In the context of transition countries, Mišun and Tomšík (2002) show that the effects of FDI on domestic investment vary even among relatively similar economies, identifying positive effects in Hungary and the Czech Republic, but negative effects in Poland over the period analyzed. Jude (2019) further develops this debate by arguing that FDI can crowd out domestic investment in the short term, but generate additional effects in the long term through creative destruction,

production linkages, and technological learning. This approach is particularly relevant for CEE, as these economies have gone through different phases: initial transition and privatization, a period of strong capital inflows before the global financial crisis, post-crisis adjustment, and a new phase of nearshoring and regional positioning following disruptions in global supply chains.

The characteristics of the sample countries further justify the need for a separate analysis. The sample includes Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, North Macedonia, Poland, Romania, Serbia, Slovakia and Slovenia. Although all of these countries are part of the broader post-socialist and European development space, they differ in terms of income level, depth of financial markets, degree of integration into the European Union, industrial structure, institutional quality and the ability of domestic firms to connect with multinational companies. More advanced economies from Central Europe, such as the Czech Republic, Slovakia, Slovenia, Poland and Hungary, integrated into European production networks relatively earlier and have deeper domestic financial and industrial capacities. In contrast, economies from the Western Balkans and parts of South-Eastern Europe have long faced weaker institutional capacity, limited domestic savings, a smaller market, higher political uncertainty and weaker connections of domestic small and medium-sized enterprises with foreign investors.

The Republic of North Macedonia is a particularly significant case in this analysis. As a small, open and landlocked economy, the country faced limited domestic capital accumulation, a narrow industrial base and high dependence on external sources of growth. In the early years after independence, economic transformation was hampered by the break-up of the Yugoslav market, regional instability, the Greek blockade and the 2001 conflict. Later, policies to attract FDI, particularly through the "Invest in Macedonia" campaign and the establishment of technological and industrial development zones, contributed to the entry of foreign companies into the automotive and export-oriented industries. These investments played an important role in modernising the industrial structure, increasing exports and introducing new production standards. However, the question remains whether these investments have sufficiently stimulated domestic investment or whether their effect has been limited by weak links with local suppliers, limited technological absorption and structural weaknesses in domestic SMEs.

The theoretical background of this report is therefore based on the view that FDI should not be assessed solely by its volume, but by its ability to create complementarity with domestic investment activity. For the countries of Central, Eastern and South-Eastern Europe, the essential question is not only whether foreign capital enters the economy, but whether it creates production linkages, technological learning, domestic supply networks and long-term growth of private investment. In this sense, the analysis of the relationship between FDI and gross fixed capital formation allows for an assessment of whether foreign capital reinforces domestic capital accumulation or displaces it. The special focus on North Macedonia allows this issue to be considered in a specific institutional and development context, in which FDI has been an important instrument of industrial policy, but its long-term effect depends on the ability of the domestic economy to move from passively attracting foreign investors to actively building domestic investment and production capacity.

The empirical analysis in this report is conducted on the case of selected countries from Central, Eastern and South-Eastern Europe. In the descriptive part of the report, the broader regional

overview includes 15 countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, North Macedonia, Poland, Romania, Serbia, Slovakia and Slovenia. This broader descriptive coverage is retained in order to present the general movement of FDI inflows and gross fixed capital formation across the region. However, after the preliminary data screening, Hungary is excluded from the main econometric analysis because its FDI series contains several extreme and highly volatile observations, including large negative values, which could disproportionately affect the estimated relationship between FDI and domestic investment. Therefore, the regression analysis is based on an unbalanced panel of 14 countries over the period 1997–2024. The countries included in the econometric sample are Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Estonia, Latvia, Lithuania, North Macedonia, Poland, Romania, Serbia, Slovakia and Slovenia. This distinction between the descriptive sample and the econometric sample is maintained consistently throughout the report.

The remainder of the report is structured as follows. Section 2 presents the relevant literature on the relationship between foreign direct investment and domestic investment, with particular attention to the crowding-in and crowding-out effects. Section 3 provides a descriptive overview of FDI inflows and gross fixed capital formation in the selected CESEE countries and in North Macedonia. Section 4 explains the data, variables and empirical methodology used in the analysis. Section 5 presents and discusses the econometric results for the CESEE countries and North Macedonia, while Section 6 summarises the main findings and provides policy recommendations.

Literature Review

The literature on the impact of foreign direct investment on domestic investment and economic growth is extensive and does not yet provide a single conclusion on the nature of this relationship. Basically, the research can be divided into two related groups. The first group of papers analyzes the impact of FDI on economic growth, productivity, employment, exports and technological modernization of the host country. The second group of papers directly examines the question of whether FDI stimulates domestic investment activity, i.e. whether it creates a "crowding-in" effect, or whether it replaces and displaces domestic capital accumulation, which is referred to as a "crowding-out" effect. This division is particularly relevant for the countries of Central, Eastern and Southeastern Europe, since their development model in the last three decades has relied heavily on foreign capital, privatization, institutional reforms and integration into European production chains.

In the theoretical literature, the positive impact of FDI is most often associated with the neoclassical and endogenous growth theory. According to the neoclassical approach, FDI increases capital accumulation and, thereby, contributes to a higher level of production and income in the short and medium term. In endogenous growth models, however, FDI is treated as a more important source of long-term growth, since it brings not only financial capital, but also technology, organizational knowledge, managerial practices, access to foreign markets and integration into international production networks. In this regard, Borensztein, De Gregorio and Lee (1998) show that FDI can be an important channel for technology transfer and that its positive effect on growth depends on the level of human capital in the host country. de Mello (1999) further indicates that the effects of FDI on capital accumulation, productivity and growth are conditioned by the structural characteristics of the economy, the level of development and the ability of domestic firms to absorb the benefits of foreign capital.

The positive effects of FDI on domestic investment are most often explained through several channels. First, foreign companies can create additional demand for domestic suppliers, raw materials, transportation, logistics, construction services, and business services. In doing so, they increase the need for domestic firms to invest in new equipment, standards, technologies, and human capital. Cardoso and Dornbusch, (1989) and Markusen and Venables (1999) emphasize the importance of linkages between foreign companies and domestic suppliers, with stronger vertical linkages being able to increase domestic investment activity. Kim and Seo (2003) and Tang, Selvanathan and Selvanathan (2008) also suggest that FDI and domestic investment can function as complementary factors in the process of economic growth, especially when foreign companies create positive externalities and improve the productivity of domestic firms.

This group of papers also includes research that shows that FDI does not replace domestic investment, but rather complements it. Bosworth and Collins (1999), analyzing developing countries, find that an increase in FDI is associated with an increase in total investment, which suggests that foreign capital does not necessarily crowd out domestic accumulation. Desai, Foley and Hines Jr. (2005), using the example of the US economy, show that foreign investment by multinational companies can be associated with an increase in domestic investment. Similarly, Lalwani (2002), Al-Sadig (2013), Abu and Karim (2016) and Farla, de Crombrugghe and Verspagen (2016) find empirical support for the "crowding-in" hypothesis, with Farla, de Crombrugghe and Verspagen (2016) in particular emphasizing that the results depend on the way domestic investment is measured and the econometric methodology used.

However, a significant body of literature suggests that the positive effect of FDI is not automatic. According to the "crowding-out" hypothesis, foreign companies can reduce domestic investment activity if they enter sectors in which domestic firms are already operating but do not have sufficient productivity, financial capacity or technological readiness to face competition from multinational companies. In such conditions, foreign companies can take over market share, attract skilled labor, increase pressure on factor prices and reduce the ability of domestic firms to invest. Agosin and Mayer (2000) and Agosin and Machado (2005) show that the effect of FDI on domestic investment varies by region and that in some cases foreign investment can replace domestic capital accumulation. Apergis, Katrakilidis and Tabakis (2006), Wang (2010), Eregha (2012), Morrissey and Udomkerdmongkol (2012), Ali *et al.* (2021) and Magbondé, Thiam and Konté (2025) also find evidence of negative or substitution effects of FDI on domestic investment in certain countries and periods.

The differences in results arise from the fact that the effects of FDI depend on the structure of the investment, the sector in which foreign companies enter, the mode of entry, the level of development of the financial system and the absorptive capacity of the domestic economy. If FDI is directed to sectors with strong links to domestic suppliers, it can create additional demand and stimulate domestic investment. If, on the other hand, FDI is concentrated in sectors with weak local links, import dependence and limited technology transfer, its effect on domestic investment may be weak or negative. Aitken and Harrison (1999) show that the presence of foreign firms can have negative effects on domestic companies through market crowding out, while Smarzynska Javorcik (2004) and Javorcik and Spatareanu (2008) suggest that positive effects more often occur through vertical linkages with domestic suppliers, rather than through direct competition in the same sector.

Within the literature on transition countries, papers analyzing Central and Eastern European countries are of particular importance. Mišun and Tomšík (2002) examine the impact of FDI on domestic investment in Poland, Hungary, and the Czech Republic and find mixed results: a positive effect in the Czech Republic and Hungary, but a negative effect in Poland. This result suggests that even relatively similar transition economies can have different relationships between foreign and domestic investment. Mileva (2008), analyzing a larger sample of transition countries, concludes that FDI can generate moderate investment spillovers in countries that are more advanced in the transition process, while in less developed transition economies the effects can be negative. Titarenko (2006), Kosová (2010), Szkorupová (2015) and Zajc Kejžar (2016) further show that in certain Central and Eastern European countries FDI can have crowding-out

effects, especially when foreign capital is associated with privatization and takeover of existing capacities.

Jude (2019) makes a more important contribution to this debate by arguing that the effects of FDI on domestic investment are dynamic. According to this research, FDI in transition countries can crowd out domestic investment in the short term, but create positive effects in the long term through a process of "creative destruction", technological learning and the gradual integration of foreign companies into the domestic economy. The mode of entry of the foreign investor is particularly important. Greenfield investments create new production capacities and can therefore stimulate domestic accumulation in the long term, while mergers and acquisitions most often represent a change in ownership of existing assets and do not necessarily lead to new capital formation. This distinction is particularly important for CESEE countries, where in the early phase of transition a significant part of FDI was associated with privatization, while in the later phases the importance of export-oriented greenfield investments increased.

The broader CESEE literature shows that FDI has played a significant role in the process of productive transformation, but the effects on domestic firms have not been uniform across countries and sectors. Brenton, Di Mauro and Lücke (1999) link regional economic integration to the growth of foreign investment in Central and Eastern European countries. Damijan *et al.* (2003, 2013) and Bijsterbosch and Kolasa (2010) show that FDI contributes to productivity, but that the size of the effect depends on the technological intensity of the sector, the productivity of domestic firms and their absorptive capacity. Hanousek, Kočenda and Maurel (2011), through a review and meta-analysis of papers on emerging European markets, suggest that the effects of FDI are stronger when there are backward and forward linkages between foreign and domestic firms. On the other hand, Pavlínek (2004) warns that in the automotive industry in Central Europe, foreign investment can create regional imbalances and limited local linkages, while Stojčić and Orlić (2020) show that FDI can have negative market effects on direct competitors, but positive spillovers to downstream firms.

In the more recent literature, Hanzl-Weiss and Jovanović (2022) conclude that FDI in CESEE has a positive impact on economic growth and some aspects of the labor market, but they do not find a clear effect on domestic investment. This result can be interpreted as evidence that foreign capital does not crowd out domestic investment, but also that it does not create strong enough domestic linkages to cause a clear "crowding-in" effect. Bucevska and Merdzan (2024) analyzing CESEE countries in the period 1995–2021, find a positive and statistically significant impact of FDI on domestic investment, but the coefficients are less than one. This means that FDI stimulates overall investment activity, but does not create a full crowding-in effect in which the growth of overall investment would be greater than the inflow of FDI. In addition, the breakdown by institutional quality shows that FDI has a positive effect in both countries with higher and lower institutional quality, but institutions do not fundamentally change the nature of this relationship.

In the Western Balkans literature, FDI is most often analyzed as a means to overcome the lack of domestic savings, modernize production, and increase export competitiveness. Sucubasi *et al.* (2021) analyzing six Western Balkan countries in the period 2007–2018, find that inward FDI and real economic growth have a positive and statistically significant impact on domestic investment. This result is important because it shows that in economies with limited domestic accumulation, foreign capital can play a complementary role. However, the effects depend on

whether foreign investment creates linkages with domestic firms, whether domestic firms can meet the technological and quality standards of multinationals, and whether economic policy encourages foreign investors to integrate into the local economy.

For the Republic of North Macedonia, the literature indicates positive but limited effects of FDI. Krstevska and Petrovska (2012) show that FDI contributes to GDP and export growth in the Macedonian economy, but at the same time find weaker effects on employment, which can be explained by the structure of investments and the relatively limited number of labor-intensive greenfield projects in the analyzed period. Apostolov (2016), using a Cobb–Douglas production function for countries in Southeast Europe, analyzes the role of FDI in the development of domestic firms and the economy, while Apostolov (2017) shows that foreign ownership can help in restructuring and increasing the productivity of domestic firms, as well as in the creation of new firms. These results are consistent with the view that FDI can improve productivity and business dynamism, but does not necessarily automatically create a strong investment multiplier.

More recent work on North Macedonia further emphasizes the role of the institutional framework, technological-industrial development zones, and connectivity with European markets. Dauti (2015) analyzes the determinants of FDI in transition economies with a special focus on Macedonia and shows that market size, distance, institutional factors, and traditional determinants of FDI are important for foreign capital inflows. Selamovski (2025), using a gravity model, suggests that economic openness policies, technological zones, and proximity to the European Union market played an important role in attracting FDI to North Macedonia. Hristova and Stevcevska-Srbinoska (2020) on the other hand, through an analysis of domestic companies, show that FDI fosters business linkages, but does not have a strong impact on the investment decisions and innovations of local companies. This result is particularly significant for this research, as it indicates that the main problem is not only attracting FDI, but also its ability to create deeper local production and technological linkages.

Overall, the existing literature shows that the impact of FDI on domestic investment is conditional and heterogeneous. Some papers confirm a positive effect and complementarity between foreign and domestic investment, especially when FDI brings new technology, creates demand for domestic suppliers and increases productivity. Another part of the papers points to crowding-out effects, especially when foreign companies enter sectors in which domestic firms have limited capacity to compete or when FDI is associated with taking over existing capacities without creating a new capital base. The third group of papers finds mixed or insignificant effects, indicating that the relationship between FDI and domestic investment depends on the time horizon, methodology, structure of FDI, institutional context and absorption capacity of the domestic economy.

Hence, this report builds on the existing literature by analyzing the impact of FDI on domestic investment in the countries of Central, Eastern and Southeastern Europe, with a special focus on the Republic of North Macedonia. The contribution of the analysis stems from its focus on a region in which foreign capital has played a key role in the transition and European integration process, but where the effects on domestic capital accumulation remain unclear. In this sense, the key research question is not only whether FDI contributes to the growth of total investment, but also whether it creates a genuine additional effect on domestic investment capacity or, alternatively, partially replaces domestic capital formation.

FDI and Domestic Investment in CESEE countries and North Macedonia

This section provides a comparative overview of the movement of foreign direct investment in selected countries of Central, Eastern and South-Eastern Europe, with a special focus on the Republic of North Macedonia. The analysis is based on data on FDI inflows in different groups of countries, FDI inflows in selected CESEE economies, the relationship between FDI and gross fixed capital formation, as well as the structure of FDI in North Macedonia by country of origin and economic activity. The aim of this section is not only to present the absolute amounts of foreign capital, but also to show whether foreign investment has the potential to be linked to domestic capital formation and the broader development transformation of the analyzed economies.

The data in Table 1 show that global FDI inflows in the period 2005–2024 moved unevenly. In 2005, total global FDI inflows were $954.1 billion, in 2010 they increased to $1,397.5 billion, and in 2015 they reached $2,218.6 billion. In 2024 they decreased to $1,508.8 billion. This indicates that 2015 represents a period of higher global investment activity, while in 2024 global FDI is lower compared to 2015, but still significantly higher than the level in 2005.

Table 1. FDI inflows in different country groups and the world (2005-2024)

Economy / Year	2005		2010		2015		2024	
	FDI inflows (in mil. US$)	% of total world	FDI inflows (in mil. US$)	% of total world	FDI inflows (in mil. US$)	% of total world	FDI inflows (in mil. US$)	% of total world
Developing economies	322840.112	33.838	608758.72	43.560	738602.367	33.291	867161.686	57.473
Eastern Europe	63427.681	6.648	68410.904	4.895	21245.689	0.958	48507.017	3.215
Southern Europe	82324.37	8.629	62821.302	4.495	56256.244	2.536	99023.467	6.563
World	954072.517	100	1397509.86	100	2218639.798	100	1508803.342	100

Source: United Nations Conference on Trade and Development (2026).

Particularly significant is the change in the geographical distribution of FDI. The share of developing economies in total global inflows increased from 33.84% in 2005 to 57.47% in 2024. This shows that developing countries are increasingly becoming central destinations for foreign capital. This trend is associated with the processes of globalization, relocation of production, the search for lower costs, the growth of domestic markets in developing countries and the change of global production chains. In this sense, FDI is no longer concentrated only in developed economies, but is increasingly directed towards economies that offer a combination

of growing markets, lower production costs and opportunities for integration into international trade.

In Eastern Europe, FDI inflows amounted to $63.4 billion in 2005, $68.4 billion in 2010, but then decreased to $21.2 billion in 2015. In 2024, they increased again to $48.5 billion. However, their share in world FDI decreased from 6.65% in 2005 to 3.22% in 2024. This decline shows that, although the region remains an important investment destination, its relative position in global FDI flows has weakened. The reasons can be found in the completion of some privatization processes, the saturation of certain markets, demographic constraints, geopolitical risks and changing global investment priorities.

Southern Europe, on the other hand, shows a different trend. FDI inflows decreased from $82.3 billion in 2005 to $56.3 billion in 2015, but in 2024 they reached $99.0 billion. Their share in world inflows decreased from 8.63% in 2005 to 2.54% in 2015, but then increased to 6.56% in 2024. This points to a revival of investment activity in this part of Europe, likely related to stabilization after the European debt crisis, increased investments in services, energy, infrastructure, and renewed interest in nearshoring in the European space.

Table 2 presents FDI inflows in selected countries from Central, Eastern and South-Eastern Europe. The data show significant differences between countries in the absolute volume of foreign investment attracted. In 2024, the highest FDI inflows are recorded in Poland with $12.74 billion and the Czech Republic with $10.16 billion. These two economies, due to their size, industrial base, membership in the European Union and integration into European production chains, remain among the most important destinations for foreign capital in the region.

They are followed by Romania with $6.20 billion, Hungary with $5.74 billion, Serbia with $5.64 billion and Croatia with $4.38 billion. These data show that larger markets and countries with a more developed industrial structure tend to attract higher absolute volumes of FDI. However, the absolute amount is not sufficient to assess the real importance of FDI for an economy, as smaller countries may have lower inflows in millions of dollars, but a much higher FDI relative to GDP.

The Western Balkan countries saw increased investment activity in 2024. Serbia attracted $5.64 billion, Albania $1.72 billion, Bosnia and Herzegovina $1.11 billion, and North Macedonia $1.36 billion. Compared to 2005, this represents a significant increase, especially for North Macedonia, where inflows increased from $96 million in 2005 to $1.36 billion in 2024. This growth shows that, although North Macedonia remains a small economy in absolute terms, its ability to attract foreign capital has improved significantly over the past two decades.

An interesting case is Hungary, which in 2015 had negative FDI inflows of -$14.7 billion, and in 2024 it again records positive inflows of $5.74 billion. Negative inflows do not necessarily mean a complete withdrawal of foreign capital from the real economy, but can be the result of financial transactions, repayment of inter-company debts, repatriation of profits or restructuring of ownership. Similarly, Estonia has low or negative values in certain years, which indicates that in small and highly open economies annual FDI data can be very volatile.

Overall, the data in Table 2 show that the CESEE region is not a homogeneous group. Central European countries have higher absolute volumes of FDI, while the Western Balkan countries and the smaller Baltic economies often have lower absolute amounts, but higher relative dependence on foreign capital. This is important for further analysis, because the effect of FDI on domestic investment depends not only on the amount of foreign capital, but also on the structure of the economy, domestic savings, institutional quality, and linkages between foreign and domestic firms.

Table 2. FDI inflows in selected CESEE countries (2005-2024)

Economy / Year	2005		2010		2015		2024	
	FDI inflows (in mil. US$)	% of total world	FDI inflows (in mil. US$)	% of total world	FDI inflows (in mil. US$)	% of total world	FDI inflows (in mil. US$)	% of total world
Albania	264.339	0.028	1050.708	0.075	945.723	0.043	1715.572	0.114
Bosnia and Herzegovina	351.186	0.037	406.089	0.029	361.14	0.016	1113.378	0.074
Bulgaria	3919.966	0.411	1549.129	0.111	2217.351	0.100	3089.608	0.205
Croatia	1810.335	0.190	1171.938	0.084	536.032	0.024	4377.34	0.290
Czechia	11653.247	1.221	6140.583	0.439	465.105	0.021	10164.975	0.674
Estonia	2799.175	0.293	1508.542	0.108	88.436	0.004	783.21	0.052
Hungary	7708.959	0.808	2230.49	0.160	-14716.333	-0.663	5737.303	0.380
Latvia	706.362	0.074	419.843	0.030	738.933	0.033	1211.183	0.080
Lithuania	1134.594	0.119	1019.542	0.073	1054.987	0.048	3271.277	0.217
North Macedonia	96.022	0.010	212.528	0.015	240.452	0.011	1358.347	0.090
Poland	8203.218	0.860	13874.44	0.993	15900.942	0.717	12740.081	0.844
Romania	6152.301	0.645	2997.172	0.214	3840.475	0.173	6201.285	0.411
Serbia	2211.651	0.232	1686.104	0.121	2347.56	0.106	5635.485	0.374
Slovakia	3109.638	0.326	1769.761	0.127	106.14	0.005	1843.33	0.122
Slovenia	561.648	0.059	105.37	0.008	1675.077	0.076	1296.042	0.086

Source: United Nations Conference on Trade and Development (2026).

Table 3 allows for a deeper comparison, as it shows FDI and gross fixed capital formation as a percentage of GDP. This approach is particularly important because it allows for comparison between countries of different sizes. Gross fixed capital formation is an indicator of investment activity in the economy, while FDI as a percentage of GDP shows how significant foreign capital is in relation to the size of the economy.

In 2024, the highest values of GFCF are in the Czech Republic with 26.49% of GDP, Romania with 25.29%, Croatia with 25.20%, Bosnia and Herzegovina with 24.47%, Albania with 24.36%, Estonia with 23.90%, Serbia with 23.80% and North Macedonia with 23.49%. These data show that a large part of the countries analyzed maintain a relatively high level of capital formation, which is especially important for economies that still need infrastructural modernization, technological upgrading and industrial transformation.

Table 3. FDI inflows and GFCF in selected CESEE countries as % of GDP (2005-2024)

Economy / Year	2005		2010		2015		2024	
	GFCF (% of GDP)	FDI (% of GDP)	GFCF (% of GDP)	FDI (% of GDP)	GFCF (% of GDP)	FDI (% of GDP)	GFCF (% of GDP)	FDI (% of GDP)
Albania	38.45	3.18	30.17	9.02	26.08	8.63	24.36	6.32
Bulgaria	25.67	13.72	22.18	3.64	20.86	4.38	18.31	3.13
Bosnia and Herzegovina	29.38	5.56	21.19	2.58	21.35	2.34	24.47	3.39
Czechia	28.52	10.00	26.52	4.82	25.68	0.90	26.49	3.76
Estonia	32.86	21.67	21.23	13.28	24.05	-3.07	23.90	-7.97
Croatia	25.18	4.03	20.82	2.62	19.09	0.96	25.20	4.88
Hungary	23.86	24.31	20.11	-15.89	22.29	-4.37	23.06	-27.92
Lithuania	23.40	4.95	17.09	3.01	19.60	2.50	22.50	5.54
Latvia	32.03	4.97	19.52	2.02	22.31	3.09	22.41	3.47
North Macedonia	19.04	2.32	23.06	3.20	23.84	2.95	23.49	6.23
Poland	19.12	3.60	19.61	3.94	20.24	3.30	17.04	2.25
Romania	23.36	6.60	25.67	1.89	24.92	2.43	25.29	1.87
Serbia	19.25	7.81	17.55	3.89	16.80	5.67	23.80	6.20
Slovak Republic	27.10	6.27	21.85	2.32	24.32	1.70	20.42	3.56
Slovenia	26.78	2.70	21.22	0.67	18.92	4.05	20.92	2.56

Source: World Bank Group (2026).

However, the relationship between FDI and GFCF is not simple. For example, Romania in 2024 has a high level of GFCF of 25.29% of GDP, but a relatively low FDI inflow of 1.87% of GDP. This suggests that domestic investment, public investment and domestic sources of financing play an important role in capital formation. On the other hand, Serbia and North Macedonia have similarly high values of FDI as a percentage of GDP, i.e. 6.20% and 6.23%, while at the same time having a relatively high level of GFCF. This relationship may indicate a greater complementarity between foreign capital and total investment activity, although a final conclusion requires econometric analysis.

Albania is a specific case. In 2005, it had a very high level of GFCF of 38.45% of GDP, but by 2024 this had decreased to 24.36%. At the same time, FDI as a percentage of GDP remains relatively high, at 6.32% in 2024. This shows that a relatively high FDI-to-GDP ratio does not necessarily lead to an increase in total capital formation, especially if domestic investment is declining or if foreign investment is directed to sectors with lower physical capital requirements.

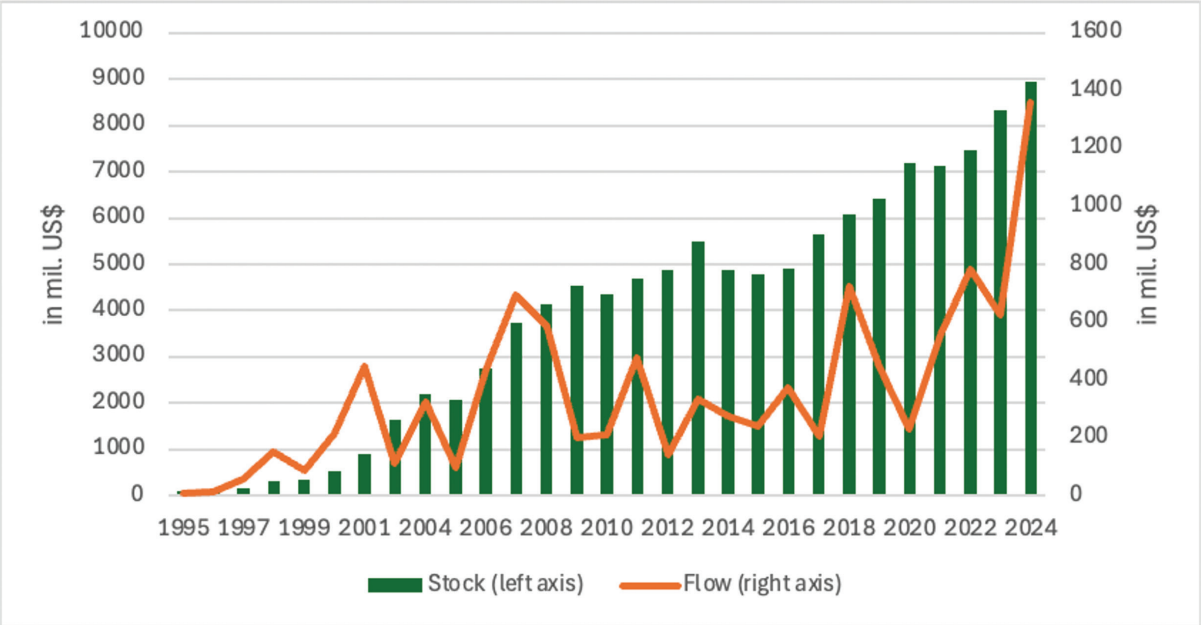
In Poland, the absolute amount of FDI is the highest among the analyzed countries, but FDI as a percentage of GDP in 2024 is only 2.25%, while GFCF is 17.04% of GDP. This shows that in larger economies, absolute inflows can be high, but the relative dependence on FDI is lower. In contrast, North Macedonia, Serbia and Albania, as smaller and less developed economies, have higher FDI as a percentage of GDP, indicating a greater role of foreign capital in their investment model.

The negative FDI values in Hungary and Estonia in 2024 further show that annual FDI inflows are sensitive to financial and corporate transactions. Hungary has FDI of -27.92% of GDP, but GFCF remains at 23.06% of GDP. Estonia has FDI of -7.97% of GDP and GFCF of 23.90% of GDP. This shows that negative FDI does not necessarily mean an immediate decline in domestic capital formation. Domestic investment can remain stable due to public investment, domestic savings, loans or previously accumulated capital.

The Republic of North Macedonia is a small, open economy with a limited domestic market and relatively high dependence on external sources of capital, trade and finance. The country has a population of around 1.8 million and, although GDP per capita has recently exceeded US$10,000, it still remains below most European economies in terms of income. Structurally, the economy faces several long-term challenges, including limited domestic savings, emigration, a shortage of skilled labour, corruption, limited employment opportunities and the need for further institutional modernisation.

The country's investment profile is closely linked to its political and institutional development. In the early years after independence, the economy was affected by the break-up of the Yugoslav market, regional conflicts, blockades and instability. Later, the 2001 conflict further reduced investment certainty. In the period after 2001, the country gradually moved towards stabilisation, attracting foreign investors and improving the investment climate. Important turning points are the Prespa Agreement, the official name change in 2019, NATO membership in 2020, and the formal start of negotiations with the European Union in 2022. These processes have contributed to improving investor perception, although EU integration is still burdened with political and diplomatic challenges.

Figure 1. Inward FDI stock and flows in North Macedonia (1995-2024)



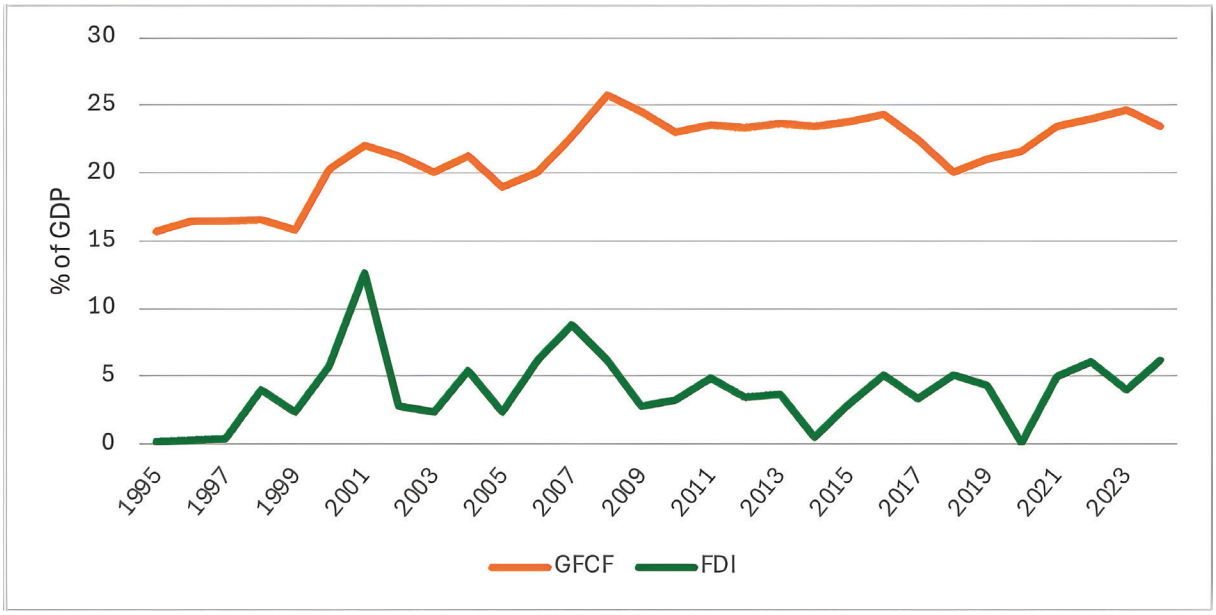
Source: United Nations Conference on Trade and Development (2026).

Figure 1 shows the movement of inward FDI in North Macedonia through annual inflows and accumulated FDI stock in the period 1995–2024. The data show a strong long-term growth of accumulated FDI. The total FDI stock increased from $86.6 million in 1995 to $8.95 billion in 2024. This represents a significant transformation of the economy, as foreign capital from a marginal source in the 1990s became one of the key factors of industrial, export, and investment dynamics.

Annual inflows, however, are much more volatile. In 1995 and 1996 they were almost insignificant, at $9.5 and $11.2 million, respectively. A larger increase was observed in 1998, when inflows reached $150.5 million, and in 2001 they reached $447.1 million. This surge can be attributed to privatization and one-off transactions, which are typical of transition economies. In 2007, inflows reached $692.5 million, and in 2008, $585.8 million, indicating a strong pre-crisis investment cycle.

After the global financial crisis, inflows decreased to $201.4 million in 2009 and $212.5 million in 2010. Then, oscillations are observed, with higher inflows in 2011, 2016, 2018 and 2022. The highest value in the entire period was registered in 2024, when FDI inflows reached $1.36 billion. This is an important signal that North Macedonia has managed to attract a significantly higher volume of foreign capital in recent years, which can be linked to a stabilized macroeconomic framework, connections to European production chains, investments in industrial zones, energy, services and construction.

Figure 2. FDI inflows and GFCF in North Macedonia as % of GDP (1995-2024)



Source: World Bank Group (2026).

Figure 2 shows the movement of FDI and gross fixed capital formation as a percentage of GDP in North Macedonia for the period 1995–2024. The data show that GFCF in the first half of the 1990s hovered around 16% of GDP, indicating relatively low capital formation in the early years of transition. After 2000, the level of GFCF increases and most often stabilizes in

the interval from 20% to 24% of GDP. The highest value was registered in 2008, when GFCF reached 25.76% of GDP.

FDI as a percentage of GDP is much more volatile. In 1995 and 1996, they amounted to only 0.20% and 0.24% of GDP. In 1998, they increased to 4.01%, in 2000 to 5.77%, and in 2001 they reached 12.66% of GDP. This high value is the result of specific transactions and should not be interpreted as a stable annual investment trend. In 2007, FDI amounted to 8.80% of GDP, which is another high value in the pre-crisis period. After 2009, the inflows fluctuated significantly, but in 2022 and 2024 they again reach over 6% of GDP.

The relationship between FDI and GFCF shows that foreign investment can be an important stimulus for total capital formation, but its impact is not mechanical and immediate. In certain years, such as 2007 and 2008, higher FDI is accompanied by high levels of GFCF. But in other years, such as 2014 and 2020, FDI is very low, while GFCF remains relatively stable. In 2020, for example, FDI is only 0.06% of GDP, but GFCF remains 21.59% of GDP. This shows that domestic investment, public capital expenditure, construction, infrastructure and domestic financing have an independent role in maintaining investment.

In 2024, GFCF is 23.49% of GDP, while FDI reaches 6.23% of GDP. This is an important combination, as it shows that strong foreign capital inflows occur in conditions of relatively stable domestic capital formation. This result can be interpreted as a potential sign of complementarity, but not as conclusive evidence of a full-fledged crowding-in effect. Such a conclusion requires an econometric analysis that controls for other factors that affect investments, such as economic growth, interest rates, domestic savings, and macroeconomic stability.

Table 4 shows the structure of FDI inflows in North Macedonia by country of origin in 2005, 2010, 2015 and 2024. The data show that the structure of foreign investors has changed significantly over time.

In 2005, the largest source of FDI was St. Vincent and the Grenadines with $31.92 million, followed by Greece with $21.81 million, Switzerland with $21.36 million, the Netherlands with $15.14 million and Italy with $13.19 million. The presence of countries and jurisdictions such as St. Vincent and the Grenadines, Cyprus and the Netherlands suggests that some of the investments may have been channeled through financial intermediary centres, which is common in small open economies. In such cases, the country of immediate origin of the investment does not always indicate the ultimate ownership of the capital.

Table 4. FDI inflows in North Macedonia by country (2005-2024)

2005		2010		2015		2024	
Country	FDI (in millions US$)	Country	FDI (in millions US$)	Country	FDI (in millions US$)	Country	FDI (in millions US$)
St. Vincent and the Grenadines	31.92	France	116.84	Bermuda	200.7	Germany	241.11
Greece	21.81	St. Vincent and the Grenadines	62.12	Netherlands	104.58	United Kingdom	237.09
Switzerland	21.36	United Kingdom	41.16	Greece	48.59	Turkey	157.18
Netherlands	15.14	Bulgaria	41.01	Germany	43.39	Austria	148.12
Italy	13.19	Slovenia	26.67	Turkey	30.19	Greece	130.43
Slovenia	10.96	Turkey	20.45	Austria	20.5	Slovenia	60.56
Serbia	6.5	Greece	20.11	Russian Federation	20.11	Hungary	47.51
Bulgaria	6.47	Germany	15.6	Belgium	18.44	Bulgaria	43.65
Croatia	6.08	Liechtenstein	8.67	USA	14.84	Estonia	32.07
Cyprus	5.84	Albania	5.22	Kosovo	13.98	Netherlands	30.9
Total FDI	97	Total FDI	211.61	Total FDI	245.86	Total FDI	1294.56

Note: The differences between the FDI values for North Macedonia reported in Table 2 and the totals reported in Table 4 reflect differences between UNCTAD and National Bank of the Republic of North Macedonia data in terms of methodology, coverage, classification and possible revisions; Source: National Bank of the Republic of North Macedonia (2026).

In 2010, the largest investor was France with $116.84 million, followed by St. Vincent and the Grenadines, the United Kingdom, Bulgaria, Slovenia and Turkey. This shows a greater diversification of investors and the presence of both European Union countries and regional partners. In 2015, the largest inflows came from Bermuda and the Netherlands, which again indicates a significant role of financial intermediary jurisdictions. At the same time, Greece, Germany, Turkey, Austria and Russia emerge as significant sources of capital.

In 2024, the structure is different and shows a greater role of economically and industrially relevant partners. The largest investor is Germany with $241.11 million, followed by the United Kingdom with $237.09 million, Turkey with $157.18 million, Austria with $148.12 million and Greece with $130.43 million. This is a significant change, as most of the inflows come from countries with strong industrial, financial or regional links to North Macedonia. Germany and Austria are particularly important in the context of European production chains, while Turkey, Greece, Bulgaria, Slovenia and Hungary demonstrate the importance of regional economic connectivity.

This change in structure could have positive implications if investments from industrialized countries are linked to production, exports, technology transfer and the development of domestic suppliers. At the same time, the presence of financial intermediary countries still requires careful interpretation, as the official country of origin does not always indicate the real economic link behind the investment.

Table 5 shows the structure of FDI in North Macedonia by economic activity for 2010, 2015 and 2024. This analysis is particularly important, as the effects of FDI on domestic investment depend on the sectors in which foreign capital is directed.

Table 5. FDI inflows in North Macedonia by industry (2010-2024)

Industry / year	FDI (in millions US$)		
	2010	2015	2024
Agriculture, forestry and fishing	1.23	3.09	28.02
Mining and quarrying	55.06	-207.21	19.38
Manufacturing	111.93	68.21	380.8
Electricity, gas, steam and air conditioning supply	1.44	-2.94	208.95
Water supply, sewerage, waste management and remediation activities	-0.38	-2.24	2.53
Construction	25.06	41.08	220.11
Total services	17.49	345	436.96
Total FDI	211.61	245.86	1294.56

Note: The differences between the FDI values for North Macedonia reported in Table 2 and the totals reported in Table 5 reflect differences between UNCTAD and National Bank of the Republic of North Macedonia data in terms of methodology, coverage, classification and possible revisions; Source: National Bank of the Republic of North Macedonia (2026).

In 2010, the largest share of FDI was directed to the manufacturing industry, with $111.93 million. This represents more than half of the total FDI in that year. There were also significant inflows in mining and quarrying, with $55.06 million, as well as in construction, with $25.06 million. Services, with $17.49 million, were of relatively lesser importance. This indicates that in 2010 foreign investment was more directed towards the real sector and activities with a greater connection to physical capital formation.

In 2015, the structure is significantly different. Total services reached $345 million and became the dominant category. At the same time, mining recorded a negative value of -$207.21 million, which distorts the overall FDI structure. Manufacturing attracted $68.21 million, and construction $41.08 million. This shows that the annual sectoral structure of FDI can change strongly due to withdrawals, restructuring, or negative flows in certain industries.

In 2024, a much stronger and broader sectoral distribution of FDI is observed. Total services attracted $436.96 million, manufacturing $380.8 million, construction $220.11 million, and electricity, gas, steam and air conditioning supply $208.95 million. This shows that foreign capital in 2024 is not concentrated in just one activity, but is distributed across several sectors that can have different effects on the domestic economy.

The presence of FDI in the manufacturing industry is particularly significant. This sector is important because it has the potential for exports, job creation, technology transfer, and linkages with domestic suppliers. If foreign companies in the manufacturing industry create linkages with domestic small and medium-sized enterprises, then they can stimulate additional domestic investment. On the other hand, if production is based mainly on imported inputs and weak local linkages, then the effect on domestic capital formation may remain limited.

Increased FDI in energy and construction is also significant. Energy investments can contribute to infrastructure modernization, green transition, and reduction of energy dependence. Construction, in turn, directly affects the GFCF, since investments in buildings, infrastructure, and real estate are an integral part of fixed capital formation. However, in construction, it is important to distinguish productive investments, such as industrial facilities and infrastructure, from investments that are mainly concentrated in real estate and may have a smaller long-term effect on productivity.

Services are the largest category in 2024. This can be positive if it concerns services with higher value added, such as finance, ICT, business services, logistics and professional services. However, services usually require less physical capital than industry, so their direct effect on GFCF may be smaller. Therefore, the sectoral structure of FDI in North Macedonia shows that foreign investment can have different channels of impact: industry and construction directly affect capital formation, energy improves the infrastructure base, and services can increase productivity and organizational efficiency.

Empirical Methodology

This section presents the empirical methodology used to analyze the impact of foreign direct investment on domestic investment activity in selected countries from Central, Eastern and Southeastern Europe, as well as in the case of the Republic of North Macedonia. According to the basic research logic, the aim is to assess whether foreign direct investment inflows have a positive effect on gross fixed capital formation, i.e. whether foreign capital stimulates domestic capital formation or partially replaces it. In this sense, the empirical analysis is organized into two related parts: a panel analysis for CESEE countries and a time analysis for the Republic of North Macedonia.

Data and Variables

The empirical analysis for the countries of Central, Eastern and Southeastern Europe is based on annual data for the period 1997–2024. The sample includes 14 countries in the region, namely Albania, Bulgaria, Bosnia and Herzegovina, Croatia, the Czech Republic, Estonia, Latvia, Lithuania, North Macedonia, Poland, Romania, Serbia, Slovakia and Slovenia. Hungary is excluded from the panel sample in order to provide a more consistent and interpretable analysis of the relationship between FDI and domestic capital formation. The panel is strongly balanced and contains 392 observations, i.e. 14 countries over a period of 28 years.

The dependent variable in the analysis is gross fixed capital formation, or GFCF, expressed as a percentage of GDP. This variable is used as an indicator of domestic investment activity and captures the accumulation of fixed assets in the economy. The main independent variable is foreign direct investment, or FDI, inflows, also expressed as a percentage of GDP. The model also includes several control variables that, according to theory and previous empirical literature, affect investment: real GDP growth, the real interest rate, and gross domestic savings (de Mello, 1999; Agosin and Mayer, 2000).

The inclusion of real GDP growth is related to the so-called accelerator effect, according to which higher economic growth creates expectations of higher future demand and profitability, which encourages firms to invest (Jorgenson, 1963; Bilgili, Tülüce and Doğan, 2012). The real interest rate is used as an indicator of the cost of capital, since higher interest rates increase the cost of financing and can reduce investment activity (Jorgenson, 1963). Gross domestic savings are included as an indicator of domestic financial resources available for investment (Feldstein, 1994). In addition, GDP per capita is used to group countries into two subgroups: lower-income countries and higher-income countries within the CESEE sample.

For the Republic of North Macedonia, a separate time series is used for the period 1997–2024. The analysis includes 28 annual observations, and in the dynamic models the number of observations is reduced to 27 due to the use of a lagged dependent variable. As in the panel analysis, the dependent variable is GFCF as a percentage of GDP, the main independent variable is FDI as a percentage of GDP, and the control variables are real GDP growth, the real interest rate, and gross domestic savings. In addition, for North Macedonia, the investment-savings gap, calculated as the difference between GFCF and GDS, is also considered in order to understand the economy's dependence on external sources of financing.

Before estimating the models, the data are checked for the presence of extreme values. Since transition economies are often exposed to one-off shocks, privatization inflows, financial crises, political instability, and sudden changes in capital flows, extreme values can significantly affect the regression results. Therefore, the Tukey-IQR winsorization procedure is applied. For each relevant series, the interquartile range is calculated as the difference between the 75th and 25th percentiles, and the limits are defined as Q1 − 1.5 × IQR and Q3 + 1.5 × IQR (Tukey, 1977). Values outside these limits are limited to the appropriate thresholds. The original series are stored as raw versions, in order to ensure transparency and the possibility of checking the sensitivity of the results.

Empirical Model for CESEE countries

The basic econometric specification for panel analysis is a dynamic investment function. It takes into account the fact that investment is highly persistent, since current capital formation depends on previously initiated investment projects, existing infrastructure, production capacities and expectations of firms (Nickell, 1981; Arellano and Bond, 1991). Therefore, a lagged value of the dependent variable is included in the model.

The general model used for the estimation can be expressed as follows:

$$GFCF_{it} = \alpha + \rho GFCF_{i,t-1} + \beta_1 FDI_{i,t} + \beta_2 GDPG_{i,t-1} + \beta_3 RIR_{i,t} + \beta_4 GDS_{i,t} + \mu_i + \varepsilon_{it} \quad (1)$$

where $GFCF_{it}$ is gross fixed capital formation as a percentage of GDP in country (i) in year (t), $FDI_{i,t}$ is foreign direct investment inflows as a percentage of GDP, $GDPG_{i,t-1}$ is the lagged real economic growth rate, $RIR_{i,t}$ is the real interest rate, $GDS_{i,t}$ is gross domestic savings as a percentage of GDP, μ_i represents unmeasured country specificities, and ε_{it} is the random error.

The coefficient ρ measures the persistence of investments. If this coefficient is positive and statistically significant, it indicates that investments have a dynamic structure and that past values of GFCF affect the current level of capital formation. The coefficient β_1 is of greatest interest for this research, as it measures the short-run effect of FDI on gross fixed capital formation. A positive and statistically significant coefficient indicates that foreign direct investment stimulates domestic investment activity, while a negative coefficient would indicate a possible crowding-out effect.

The first step in the panel analysis is to estimate a fixed-effects model. This model allows to control for all time-invariant characteristics of countries, such as geographical location, institutional heritage, historical structure of the economy, market size and long-term development differences (Wooldridge, 2002; Baltagi, 2021). Standard errors are clustered by country in order to take into account possible heteroscedasticity and serial correlation within each country (Arellano, 1987; Cameron and Miller, 2015).

However, since the model contains a lagged dependent variable, and FDI inflows can be endogenous or predetermined relative to domestic investment, the analysis is extended with a System GMM estimator. This approach is suitable for dynamic panel models in which the dependent variable depends on its own prior values, and some of the explanatory variables can be related to the error (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). In the System GMM specification, lagged GFCF and FDI are treated as endogenous or predetermined variables. To avoid the problem of an excessive number of instruments, the instruments are collapsed, and the depth of the lags is limited (Roodman, 2009).

The validity of the GMM specification is assessed through the Hansen J test for instrument validity, as well as through the Arellano-Bond tests for first- and second-order serial correlation in the differenced residuals (Hansen, 1982; Arellano and Bond, 1991). Special attention is paid to the AR(2) test, since the presence of second-order serial correlation would call into question the validity of the instruments. The GMM results are used as a supplementary check of the basic results of the fixed effects model.

In addition to the main panel model, two subgroup specifications are also estimated. Countries are divided into low-income CESEE and high-income CESEE according to the average GDP per capita in the sample. The group of countries with lower income includes Albania, Bulgaria, Bosnia and Herzegovina, Latvia, North Macedonia, Romania and Serbia, while the group of countries with higher income includes the Czech Republic, Estonia, Croatia, Lithuania, Poland, Slovakia and Slovenia. In this way, it is examined whether the effect of FDI on domestic investment differs according to the development level of the countries, i.e. whether foreign capital has a stronger effect in economies with a greater need for external financing (Borensztein, De Gregorio and Lee, 1998; de Mello, 1999; Alfaro *et al.*, 2004).

Since the model is dynamic, the short-run effect of FDI differs from the long-run effect. The long-run effect of FDI on GFCF is calculated as:

$$LR_{FDI} = \frac{\beta_1}{1 - \rho} \tag{2}$$

where β_1 is the short-run coefficient of FDI and ρ is the lagged GFCF coefficient. This long-run coefficient shows what the total effect of FDI on capital formation is after taking into account the dynamic persistence of investment. In addition, it is tested whether the long-run effect is statistically different from one, which is important for interpreting the crowding-in effect. If the long-run coefficient is greater than one and statistically significant, this would indicate that FDI creates a more than proportional increase in total investment. If the coefficient is positive but less than one, then FDI stimulates capital formation but does not create a full crowding-in effect.

Before evaluating the main models, several pretests are applied. First, descriptive statistics and a correlation matrix are calculated to obtain an initial picture of the movement and interrelationship of the variables. Then, the existence of cross-sectional dependence is tested with the Pesaran CD test (Pesaran, 2004). This is particularly important for CESEE countries, as they are exposed to common external shocks, such as the global financial crisis, the European debt crisis, changes in the monetary policy of the European Central Bank, the COVID-19 pandemic and geopolitical disruptions after 2022.

If cross-sectional dependence exists, classic panel unit-root tests can yield biased conclusions. Therefore, second-generation panel unit-root tests, i.e. CADF and CIPS tests, are used in the analysis (Pesaran, 2007). These tests allow checking the stationarity of the series in conditions where countries are not completely independent of each other. Stationarity of the variables is important because regressions with non-stationary series can lead to spurious regression problems (Granger and Newbold, 1974). Where data do not allow full application of the CIPS test due to unbalanced series, conclusions are based on the available CADF specifications.

Empirical Model for North Macedonia

A separate time-series analysis is used for the Republic of North Macedonia, as the country has a specific institutional, political, and economic development path. The purpose of this analysis is to examine whether FDI has a positive effect on GFCF in the context of a small and open economy, limited domestic savings, significant structural disruptions, and high exposure to external shocks.

The basic dynamic specification for North Macedonia can be written as:

$$GFCF_t = \alpha + \rho GFCF_{t-1} + \beta_1 FDI_{i,t} + \beta_2 GDPG_{i,t-1} + \beta_3 RIR_{i,t} + \beta_4 GDS_{i,t} + u_t \quad (3)$$

where $GFCF_t$ is gross fixed capital formation as a percentage of GDP, $FDI_{i,t}$ is foreign direct investment inflows as a percentage of GDP, $GDPG$ is lagged real GDP growth, $RIR_{i,t}$ is the real interest rate, $GDS_{i,t}$ is gross domestic savings, and u_t is the model error.

Since this is an annual time series with a relatively small number of observations, the standard OLS specification may be sensitive to autocorrelation and heteroscedasticity. Therefore, the basic specification is estimated with Dynamic Newey-West regression, with a maximum lag of 1. Newey-West standard errors are used to obtain more robust statistical conclusions in the presence of possible autocorrelation and heteroscedasticity in the residuals (Newey and West, 1987).

In addition to the dynamic Newey-West specification, an ARDL bounds testing approach is also applied. This approach is useful when the sample is small and when the variables can be integrated in a different order, i.e. I(0) or I(1), but not I(2) (Pesaran and Shin, 1999; Pesaran, Shin and Smith, 2001). The ARDL model allows us to examine whether there is a long-run level relationship between GFCF, FDI and the control variables. In this analysis, an ARDL(1,0,0,0,0)

specification is used, which means that the model includes one lag of the dependent variable and current values of the explanatory variables.

The general error-correction form of the ARDL model can be represented as:

$$\Delta GFCF_t = \alpha + \lambda(\Delta GFCF_{t-1} - \theta_1 FDI_{i,t-1} - \theta_2 GDPG_{i,t-1} - \theta_3 \Delta RIR_{i,t-1} - \theta_4 \Delta GDS_{i,t-1}) + \sum_j \delta_j \Delta X_{jt} + \varepsilon_t \quad (4)$$

where λ is the adjustment coefficient and shows how fast the dependent variable returns to the long-run equilibrium after a short-run shock. If this coefficient is negative and statistically significant, it would indicate that there is an adjustment mechanism towards the long-run equilibrium (Engle and Granger, 1987; Pesaran, Shin and Smith, 2001). The Bounds test according to Pesaran, Shin and Smith is used to check whether there is a long-run relationship between the variables (Pesaran, Shin and Smith, 2001).

As an additional robustness check, a differenced Newey-West model is also evaluated, in which the variables are expressed in first differences. This specification is useful for checking whether the results are sensitive to possible non-stationarity of the series. The model can be written as:

$$\Delta GFCF_t = \alpha + \beta_1 \Delta FDI_t + \beta_2 \Delta GDPG_1 + \beta_3 \Delta RIR_t + \beta_4 \Delta GDS_t + \varepsilon_t \quad (5)$$

This specification assesses the short-run relationship between changes in FDI and changes in capital formation, without directly assuming a stable long-run relationship in levels.

Given the economic history of North Macedonia, a dynamic Newey-West specification with structural dummy variables is additionally used. The model includes dummy variables for 2001, related to the internal conflict; 2008/2009, related to the global financial crisis; the period after 2018, related to institutional and Euro-Atlantic changes; 2020, related to the COVID-19 pandemic; and the period after 2022, related to energy and geopolitical shocks. This model allows us to test whether the effect of FDI on GFCF remains stable when controlling for important structural discontinuities.

The specification with dummy variables can be represented as:

$$GFCF_t = \alpha + \rho GFCF_{t-1} + \beta_1 FDI_{i,t} + \beta_2 GDPG_{i,t-1} + \beta_3 RIR_{i,t} + \beta_4 GDS_{i,t} + \gamma_1 D_{2001} + \gamma_2 D_{2009} + \gamma_3 D_{2018} + \gamma_4 D_{2020} + \gamma_5 D_{post2022} + u_t \quad (6)$$

where the dummy variables represent key structural shocks and institutional turning points in the Macedonian economy.

Before estimating the time models for North Macedonia, ADF and Phillips-Perron unit root tests are applied. These tests are used to check whether the series are stationary or non-stationary (Dickey and Fuller, 1979, 1981; Phillips and Perron, 1988). Since small samples can yield sensitive results depending on the specification, the tests are conducted with both a constant and a trend. This is especially important for GFCF and GDS, as they can show greater persistence compared to FDI and GDP growth.

Additionally, Chow-type tests are applied for known structural breaks (Chow, 1960). These tests are important because the Macedonian economy in the analyzed period was exposed to several significant shocks, such as the 2001 conflict, the global financial crisis, the institutional

changes after 2018, the COVID-19 pandemic, and the shocks after 2022. If these breaks are not taken into account, the estimated relationship between FDI and GFCF may be biased.

After estimating the models, several post-estimation tests are conducted. For serial correlation, the Breusch-Godfrey LM test is used, while for heteroscedasticity, the Breusch-Pagan/Cook-Weisberg test is applied (Breusch, 1978; Godfrey, 1978; Breusch and Pagan, 1979). The Ramsey RESET test is used to check for possible specification weaknesses or omitted nonlinearities, and the skewness-kurtosis test is used to check the normality of the residuals (Ramsey, 1969). In addition, Granger causality analysis is applied to check whether FDI statistically predicts GFCF or vice versa. This test does not completely resolve endogeneity, but provides additional information about the temporal direction of the relationship between foreign and domestic investment (Granger, 1969).

In all specifications, the main parameter of interest is the FDI coefficient. If this coefficient is positive and statistically significant, it indicates that the increase in foreign direct investment inflows is associated with an increase in gross fixed capital formation. However, to evaluate whether there is a real crowding-in effect, it is not enough that the coefficient is only positive. It is important to evaluate whether the effect is strong enough to show that the growth of total capital formation exceeds the FDI inflow itself.

In the dynamic models, the short-term effect of FDI shows the immediate impact on the GFCF, while the long-term effect is calculated through the persistence of investment. If the long-term coefficient is positive, but less than one, it means that FDI increases capital formation, but does not create a full crowding-in effect. If the coefficient is equal to one, then foreign investments are transferred to total investments proportionally. If it is greater than one, it would mean that FDI creates additional domestic investment through linkages with domestic firms, increased demand for local inputs, technological spillovers, and improved investment expectations.

With this methodological setup, the analysis enables a comparative assessment of the effect of FDI on domestic capital formation in the CESEE countries and in the Republic of North Macedonia. The panel approach provides a broader regional insight, while the temporal analysis for North Macedonia enables a more detailed interpretation of a country with specific structural, institutional and historical characteristics.

Results and Discussion

This section presents and discusses the results of the empirical analysis for the countries of Central, Eastern and Southeastern Europe and North Macedonia. The analysis aims to show whether foreign direct investment inflows have a positive impact on gross fixed capital formation, i.e. whether foreign capital stimulates domestic capital formation or partially replaces it. In this sense, the results are examined through several steps: descriptive statistics, correlation analysis, pre-tests, main panel regressions and calculation of the long-run effects of FDI.

The Case of CESEE Countries

Table 6 presents the descriptive statistics for the main variables used in the analysis. The average value of gross fixed capital formation is 23.568% of GDP, which indicates that the sample countries, on average, maintain a relatively significant level of capital formation. This result is expected, considering that these are transition and post-transition economies that in the analyzed period needed to modernize production capacities, invest in infrastructure and gradually converge with developed European economies. However, the standard deviation of 4.728 and the range of 10.475% to 38.453% of GDP show that there are significant differences between countries and over the years. This means that the CESEE region should not be treated as a completely homogeneous group, since individual economies have different dynamics of domestic investment, different roles of the public sector and different degrees of industrial development.

Table 6. Descriptive statistics for CESEE countries

Variable	N	Mean	Std. dev.	Min	Max
GFCF	392	23.568	4.728	10.475	38.453
FDI	381	4.506	2.965	-4.017	19.217
GDP growth	392	3.828	3.739	-10.083	14.347
Real interest rate	392	0.191	5.744	-22.940	18.820
Gross domestic savings	389	18.059	10.264	-25.571	34.532
GDP per capita	392	25768.990	10754.450	4943.004	48648.910

Note: The variables GFCF, FDI, GDP growth, real interest rate and gross domestic savings are shown after winsorization; GDP per capita is used to group countries; Source: Author's calculations.

The average inflow of foreign direct investment is 4.506% of GDP, indicating that FDI is an important source of financing for the countries of the region. CESEE countries have relied significantly on foreign capital as an instrument for privatization, restructuring, technological modernization and integration into European production chains in the last three decades. At the same time, FDI values range from -4.017% to 19.217% of GDP, indicating that FDI inflows are significantly more volatile than domestic investments. Negative values can be the result of capital withdrawals, profit repatriation, inter-company debt repayment or corporate restructuring, and not necessarily a complete withdrawal of foreign companies from the real sector.

The average economic growth in the sample is 3.828%, but with a relatively high standard deviation of 3.739. This reflects the volatility of growth in transition economies, especially in years of crisis, such as the global financial crisis, the European sovereign debt crisis, the COVID-19 pandemic and more recent geopolitical and energy disruptions. The real interest rate has an average value of 0.191%, but with a wide range from -22.940% to 18.820%, which shows that monetary and financial conditions have differed significantly across countries and over time. Gross domestic savings have an average value of 18.059% of GDP, but with high variability and negative minimum values, which indicates that some countries had a pronounced gap between domestic savings and investment needs in certain years. It is in such conditions that foreign direct investment can play an important complementary role, as it provides an external source of financing when domestic accumulation is limited.

Table 7 presents the correlation matrix between the main variables. The most important result for this research is the positive and statistically significant correlation between GFCF and FDI, which is 0.305 and is significant at the 1% level. This result indicates that countries and periods with higher inflows of foreign direct investment are on average associated with higher levels of gross fixed capital formation. Although the correlation does not show a causal relationship, it is an initial indication that FDI and domestic capital formation move in the same direction.

Table 7. Correlation matrix for CESEE countries

Variable	GFCF	FDI	GDP growth	RIR	GDS
GFCF	1.000				
FDI	0.305***	1.000			
GDP growth	0.213***	0.261***	1.000		
RIR	0.256***	-0.061	-0.087*	1.000	
GDS	0.154***	0.008	-0.084*	-0.219***	1.000

Note: Pairwise correlations are shown. * p<0.10, ** p<0.05, *** p<0.01; Source: Author's calculations.

FDI can stimulate domestic investment activity through several channels: increased demand for local suppliers, technology transfer, access to foreign markets, improved management practices, and the creation of new production capacities. However, the magnitude of the correlation is not high enough to conclude that FDI alone explains domestic capital formation. This means that the relationship between foreign and domestic investment is present, but it also depends on other macroeconomic, institutional and structural factors.

The correlation between GFCF and GDP growth is 0.213 and is statistically significant, which is in line with the accelerator logic: higher economic growth creates better expectations for future demand and stimulates investment activity. At the same time, FDI is positively correlated with GDP growth, with a coefficient of 0.261, which indicates that foreign investors are more often directed towards economies with better growth dynamics, but also that FDI can contribute to growth through capital accumulation, technology and export orientation.

The correlation between GFCF and gross domestic savings is positive and statistically significant, but relatively low, 0.154. This shows that domestic savings have some relationship with investment, but are not the only source of capital formation in these economies. For CESEE countries, this is particularly important, as their development model has relied heavily on external financing, including FDI, bank inflows, EU funds and other forms of capital flows. On the other hand, the correlation between FDI and gross domestic savings is almost zero, suggesting that FDI inflows are not directly related to the domestic savings base, but rather depend on the investment climate, labor costs, market size, European integration and positioning in international production chains.

Table 8 shows the pretests for cross-sectional dependence and panel unit-root tests. The Pesaran CD test has a value of 8.859 and a p-value of 0.000, which means that the null hypothesis of independence between countries is rejected. In other words, the countries in the sample do not move completely independently of each other. This result is expected, since CESEE economies are exposed to common European and global shocks, have high trade and financial linkages with the European Union, and often react to similar external influences.

The existence of cross-sectional dependence is important from a methodological point of view, since classical panel unit-root tests can yield biased conclusions if the interdependence between countries is not taken into account. Therefore, the analysis uses second-generation panel unit-root tests, i.e. CADF and CIPS tests, which are more appropriate in conditions when countries are exposed to common shocks (Pesaran, 2007).

Table 8. Cross-sectional dependence and panel unit-root tests for CESEE countries

Test / variable	No trend	With trend	CIPS without trend	CIPS with trend
Pesaran CD test	CD = 8.859; p=0.000			
GFCF	CADF t-bar=-2.556; p=0.001	CADF t-bar=-2.945; p=0.006	-2.377	-2.782
FDI	CADF Z=-4.894; p=0.000	CADF Z=-3.760; p=0.000		
GDP growth	CADF t-bar=-3.193; p=0.000	CADF t-bar=-3.286; p=0.000	-3.856	-3.992
Real interest rate	CADF t-bar=-2.792; p=0.000	CADF t-bar=-3.283; p=0.000	-3.435	-3.911
Gross domestic savings	CADF Z=-4.126; p=0.000	CADF Z=-2.275; p=0.011		

Note: CADF/CIPS are used as second-generation panel unit-root tests due to established cross-sectional dependence. For CIPS, the comparison is with the critical values at 10%, 5% and 1%; Source: Author's calculations.

The results of the CADF/CIPS tests show that the main variables are stationary. GFCF is stationary both without and with a trend. GDP growth and real interest rate also show stationarity according to the available specifications. For FDI and gross domestic savings, the CIPS test is not calculated due to imbalance of the series, but the CADF results show stationarity. This is an important result, as it reduces the risk of spurious regression and justifies the use of level variables in the main panel regressions. Thus, the pretests show that the empirical specification is appropriate for further analysis of the relationship between FDI and GFCF.

Table 9 presents the main fixed-effects panel regressions for the effect of FDI on GFCF. The fixed-effects specification is treated as the baseline empirical model, because it controls for time-invariant country-specific characteristics and provides the most interpretable estimates for the CESEE sample. In addition to the full-sample FE model, the table also reports separate estimates for the low-income and high-income CESEE subgroups. The System GMM specification is not reported as part of the main regression table, but is used only as a supplementary robustness check, due to diagnostic limitations discussed below.

In all fixed-effects specifications, the coefficient on lagged GFCF is positive, high and statistically significant. In the full-sample FE model, the coefficient is 0.717, while in the low-income and high-income CESEE subgroups it is 0.727 and 0.685, respectively. This shows that investment in CESEE countries has strong dynamic persistence. In other words, the current level of capital formation depends to a large extent on the previous level of investment. This result is economically expected, since investment processes are usually realized over several years, and initiated projects create continuity in capital formation.

Table 9. Panel-regression results for CESEE countries

Variable	FE	LINC FE	HINC FE
GFCF, lagged	0.717*** (0.051)	0.727*** (0.072)	0.685*** (0.080)
FDI	0.152** (0.057)	0.102 (0.121)	0.162** (0.046)
GDP growth, lagged	0.199*** (0.037)	0.194** (0.069)	0.208*** (0.051)
Real interest rate	-0.033 (0.047)	-0.065 (0.066)	0.056 (0.046)
Gross domestic savings	0.005 (0.035)	-0.027 (0.026)	0.146*** (0.033)
Observations	367	178	189
Countries	14	7	7
Within R-squared	0.736	0.724	0.766
F-statistic / Wald statistic	427.190	647.750	134.360

Note: Dependent variable is GFCF. FE models used country fixed effects and standard errors clustered by country. * p<0.10, ** p<0.05, *** p<0.01; Source: Author's calculations.

Since the System GMM diagnostic tests do not fully support the validity of the dynamic GMM estimates, the interpretation of the main results is based primarily on the fixed-effects specifications. In the basic fixed-effects model, the coefficient on FDI is 0.152 and is statistically significant at the 5% level. This means that an increase in FDI inflows by 1 percentage point of GDP is associated with an increase in GFCF by about 0.152 percentage points of GDP in the short run, controlling for the previous level of investment, economic growth, real interest rate, domestic savings and country specificities. This result suggests that FDI has a positive effect on capital formation in the CESEE sample.

However, the size of the coefficient shows that the effect is positive but moderate. This means that FDI does not replace domestic capital formation, but it also does not create a very strong short-run multiplier effect. This is an important nuance in the interpretation. The result can be interpreted as evidence of complementarity between foreign and domestic investment, but not as evidence of a full crowding-in effect in the sense that total investment grows more than FDI inflows. This interpretation is consistent with Agosin and Mayer (2000) and Agosin and Machado (2005), who suggest that the effect of FDI on domestic investment can be positive, negative or mixed depending on the structure of investment, sectoral distribution and the absorptive capacity of the host country.

The coefficient of lagged economic growth is positive and statistically significant in all models. In the basic FE model it is 0.199, indicating that higher economic growth in the previous period stimulates current capital formation. This result is consistent with the accelerator theory, according to which the growth of production and demand creates the need for additional investment. In the context of CESEE countries, this means that domestic investment activity does not depend only on foreign capital, but also on general macroeconomic dynamics.

The real interest rate is not statistically significant in any of the specifications. In the basic FE model there is a negative sign, which is in line with the theory, but the effect is not precisely estimated. This result can be explained by the fact that investment in CESEE countries does not only depend on the domestic cost of capital, but also on external sources of financing, bank integration, foreign parent companies, European funds and public investment. Therefore, the real interest rate may not always have a clear and direct effect on GFCF.

Gross domestic savings in the basic FE model has a positive but statistically insignificant coefficient. This indicates that, in the overall CESEE sample, domestic savings are not the main explainer of capital formation when controlling for FDI, growth, real interest rate and country fixed effects. However, in the high-income CESEE subgroup, the coefficient on gross domestic savings is positive and statistically significant, indicating that in more developed CESEE economies domestic financial resources play a more important role in supporting investment. This result is logical, as higher-income countries typically have deeper financial markets, larger domestic savings, and a stronger capacity to finance investments from domestic sources.

As a supplementary robustness check, a System GMM specification was also estimated and reported in Appendix (Table 18). The coefficient on FDI remains positive, but it is small and statistically insignificant. More importantly, the diagnostic tests do not support the use of System GMM as the main basis for inference. The Hansen J test is significant at the 5% level, which raises concerns about instrument validity, while the AR(2) test is also significant at the

5% level, indicating second-order serial correlation in the differenced residuals. This violates one of the key validity conditions of the dynamic GMM framework.

There are several possible reasons for this result. The CESEE panel has a relatively limited cross-sectional dimension, with 14 countries, and covers 28 annual observations. In addition, the instrument matrix was intentionally restricted by collapsing the instruments and limiting the lag depth in order to avoid instrument proliferation. While this reduces the number of instruments, it may also weaken the identifying power of the GMM specification. For this reason, the System GMM estimates are interpreted only as a robustness check and are not used for the main conclusions of the paper. The fixed-effects model with country-clustered standard errors remains the baseline specification and the main basis for interpreting the effect of FDI on GFCF.

The subgroup results show an important difference between low-income and high-income CESEE countries. In the low-income group, the coefficient on FDI is positive, 0.102, but statistically insignificant. In the high-income group, the coefficient is 0.162 and statistically significant at the 5% level. This shows that the positive effect of FDI on GFCF is stronger and more precisely estimated in more developed CESEE countries. Such a result can be explained by higher absorptive capacity, better developed domestic supply networks, higher productivity of domestic firms, deeper financial markets and stronger integration into European production chains.

From an economic perspective, this result is very important. It shows that attracting FDI alone is not enough to create a strong effect on domestic capital formation. For FDI to stimulate domestic investment, domestic firms are needed that can link up with foreign companies, meet technological and quality standards and invest in response to new market opportunities. This is in line with Borensztein, De Gregorio and Lee (1998), Alfaro *et al.* (2004) and Smarzynska Javorcik (2004) who emphasize that the effects of FDI depend on human capital, financial development, vertical linkages and the absorptive capacity of the host country.

Table 10 presents the long-run FDI coefficients calculated from the fixed-effects specifications. These results are particularly important because the short-run FDI coefficient does not capture the full effect of foreign direct investment on GFCF. Due to the high persistence of investment, the effect of FDI may be gradually transmitted over time. Since the System GMM diagnostic tests indicate that the dynamic GMM estimates should not be used as the main basis for inference, the long-run effects reported in the main text are based only on the fixed-effects models.

Table 10. Long-run FDI coefficients for CESEE countries

Model	Long-run FDI effect	Std. err.	95% CI	p-value	H0: LR FDI = 1, p-value
FE	0.538***	0.154	[0.236; 0.839]	0.000	0.0027
LINC FE	0.374	0.374	[-0.359; 1.107]	0.317	0.0942
HINC FE	0.514***	0.153	[0.214; 0.815]	0.001	0.0015

Note: Long-run effect is calculated as beta_FDI/(1-beta_L.GFCF), with Delta-method standard errors. * p<0.10, ** p<0.05, *** p<0.01; Source: Author's calculations.

In the basic FE model, the long-run FDI effect is 0.538 and is statistically significant at the 1% level. The confidence interval ranges from 0.236 to 0.839, which means that the long-run effect is positive and relatively stable. This result shows that FDI has a long-run positive impact on gross fixed capital formation in CESEE countries. In other words, foreign investment is not just a short-term capital inflow, but has a prolonged impact on investment dynamics.

However, the test of the hypothesis that the long-run FDI effect is equal to 1 is rejected with a p-value of 0.0027. Since the estimated coefficient is significantly below 1, the result shows that FDI increases capital formation but does not create a full crowding-in effect. This means that the growth of total investment is lower than the inflow of foreign capital itself. In practice, FDI has a complementary effect, but not strong enough to cause a more than proportional increase in domestic investment.

This result is in line with previous research on CESEE countries, according to which FDI has a positive impact on domestic investment, but the coefficients are less than one, meaning that there is no full crowding-in effect (Bucevska and Merdzan, 2024). At the same time, the results are closer to studies that find complementarity between FDI and domestic investment than to studies that show crowding-out effects. In this sense, they are in line with Sucubasi *et al.* (2021) who find a positive impact of inward FDI on domestic investment for the Western Balkan countries, but differ from some of the literature that suggests crowding out domestic firms in certain transition economies (Mišun and Tomšík, 2002; Szkorupová, 2015; Jude, 2019).

Appendix (Table 19) reports the long-run FDI effect obtained from the System GMM specification. The estimated long-run coefficient is positive, but statistically insignificant, with a wide confidence interval. However, this result is not used as a basis for the main conclusions because the Hansen J and AR(2) diagnostic tests indicate that the System GMM validity conditions are not fully satisfied. In particular, the significant AR(2) test suggests second-order serial correlation in the differenced residuals, which violates a key assumption of the dynamic GMM framework. Therefore, the System GMM long-run estimate is treated only as a supplementary robustness check.

In low-income CESEE countries, the long-run FDI effect is 0.374, but it is not statistically significant. This suggests that in lower-income countries the positive effect of FDI on GFCF is weaker and less certain. This result can be linked to weaker domestic production linkages, more limited access to finance for local firms, lower technological capacity and greater dependence on foreign companies that often function as export enclaves. In this context, FDI can increase exports and employment, but its effect on domestic capital formation may remain limited.

In high-income CESEE countries, the long-run FDI effect is 0.514 and is statistically significant at the 1% level. The confidence interval ranges from 0.214 to 0.815, and the test for equality with 1 is rejected with a p-value of 0.0015. This means that in the more developed CESEE countries there is a clear positive long-run effect of FDI on GFCF, but again there is no evidence of a full crowding-in effect. This result is very important because it shows that the more developed countries are better at converting foreign capital inflows into broader capital formation. However, even for them, the effect remains below one, which means that FDI supports, but does not replace, the need for a strong domestic investment base.

Additional support for these results is provided by the partial correlations between GFCF and FDI. For the entire CESEE sample, the partial correlation is 0.245 after controlling for GDP growth, real interest rate, gross domestic savings and country fixed effects. For low-income countries it is 0.190, while for high-income countries it is higher at 0.273. These results are consistent with the regression findings and again show that the relationship between FDI and GFCF is stronger in the more developed CESEE economies (see Appendix).

Taken together, the fixed-effects results suggest that foreign direct investment is positively associated with gross fixed capital formation in CESEE countries. However, the size of the estimated long-run coefficients indicates that the effect is moderate and remains below the threshold that would imply a full crowding-in effect. Therefore, the results should be interpreted as evidence of partial complementarity between FDI and capital formation, rather than as evidence that FDI generates a more than proportional increase in domestic investment.

In relation to the previous literature, the results are in line with de Mello (1999), who indicates that the effects of FDI on capital accumulation and growth depend on the structural characteristics of the host country. The results are also close to Agosin and Mayer (2000) and Agosin and Machado (2005) as they show that the effect of FDI is not automatically crowding-in, but depends on the regional and institutional context. The positive effect of FDI in the FE model is also in line with Sucubasi *et al.* (2021) who find a positive impact of inward FDI on domestic investment in the Western Balkan countries.

On the other hand, the results partially differ from Hanzl-Weiss and Jovanović (2022), who do not find a clear effect of FDI on domestic investment in CESEE countries. A possible explanation for this difference is the period of analysis, the composition of the sample, the way in which extreme values are treated, and the inclusion of a dynamic specification with lagged GFCF. At the same time, the results do not confirm the crowding-out hypothesis that is present in some of the literature on transition economies, such as in Mišun and Tomšík (2002), Szkorupová (2015) and Jude (2019). Instead, they point to a positive but incomplete complementary effect.

This means that FDI can be an important part of the investment pattern of CESEE countries, but cannot solve the weakness of domestic capital accumulation on its own. To increase their impact on GFCF, policies are needed that strengthen the linkages between foreign investors and domestic firms. This includes developing local suppliers, improving the technological capacity of domestic enterprises, access to finance for small and medium-sized enterprises, investing in human capital, and improving the institutional framework. Without these elements, FDI may remain limited to export-oriented capacities with insufficient spillover effects on the domestic economy.

The Case of North Macedonia

Table 11 presents the basic descriptive statistics for the variables used in the analysis. The average value of gross fixed capital formation in North Macedonia is 21.856% of GDP. This shows that in the analyzed period, investments in fixed assets represent a significant part of economic activity. However, compared to the needs of a small transition economy that needs to

modernize its infrastructure, industrial base and production capacities, this level of investment can be assessed as moderate. The minimum value of GFCF is 15.788% of GDP, and the maximum is 25.759% of GDP, which shows that domestic capital formation has moved in a relatively narrow interval compared to FDI inflows.

The average inflow of foreign direct investment is 4.195% of GDP. This result confirms that FDI is an important source of financing for the Macedonian economy. In conditions of limited domestic accumulation, insufficient domestic savings and a small domestic market, foreign investment plays a significant role in financing capital formation, modernizing production and integrating into international production chains. FDI can complement insufficient domestic accumulation and provide capital, technology and managerial know-how in developing countries and transition economies.

Table 11. Descriptive statistics for North Macedonia

Variable	N	Mean	Std. dev.	Min	Max
GFCF (% of GDP)	28	21.856	2.578	15.788	25.759
FDI (% of GDP)	28	4.195	2.263	0.062	9.805
GDP growth	28	3.223	2.009	-0.977	7.083
RIR	28	0.931	4.491	-8.178	9.545
GDS (% of GDP)	28	8.963	7.342	-3.959	20.500
GDP per capita	28	16818.920	4242.853	10787.580	24203.290
Savings-investment gap: GFCF - GDS	28	12.893	6.398	0.168	22.948

Note: GFCF, FDI, GDP growth, RIR and GDS are analyzed after winsorization according to the Tukey-IQR procedure. Savings-investment gap is calculated as GFCF – GDS; Source: Author's calculations.

However, the standard deviation of FDI is 2.263, and the values range from 0.062% to 9.805% of GDP. This indicates that foreign direct investment inflows are significantly more volatile than GFCF. Such volatility is expected in a small economy, as a few large greenfield investments, privatization transactions, reinvested profits or intercompany financial flows can significantly change the annual value of FDI. Therefore, the effect of FDI on domestic investment should not be assessed only in individual years, but over a longer period of time and through econometric models that take into account the dynamics of investment.

The average economic growth rate is 3.223%, which indicates moderate growth dynamics in the analyzed period. However, the range from -0.977% to 7.083% indicates that growth was exposed to cyclical movements and external shocks. The real interest rate has an average value of 0.931%, but with a relatively high standard deviation of 4.491, which indicates significant changes in financial conditions over time. Gross domestic savings average 8.963% of GDP, which is significantly lower than the average level of GFCF. This is one of the most important descriptive results, as it shows that domestic savings are not sufficient to finance investment needs.

This is also confirmed by the savings-investment gap, calculated as the difference between GFCF and GDS. The average gap is 12.893 percentage points of GDP, which shows that North Macedonia in the analyzed period is facing a structural shortage of domestic financial resources. Such a situation explains the need for external financing, including foreign direct investment,

external borrowing, remittances and other capital inflows. In this sense, FDI is not only an additional source of capital, but part of the broader mechanism through which a small open economy finances its investment process.

Table 12 presents the simple and partial correlations between the main variables. The simple correlation between GFCF and FDI is 0.270, but it is not statistically significant. This result suggests that there is a positive direction of association between foreign direct investment and gross fixed capital formation, but this relationship is not strong enough to be statistically confirmed in a simple bivariate form. In other words, years with higher FDI are on average associated with higher investment, but this relationship is unstable and depends on other factors (see Appendix).

Table 12. Correlations and partial correlations for North Macedonia

Variables	Coeff.	p-value
GFCF – FDI	0.270	0.164
GFCF – GDP growth	-0.012	0.950
GFCF – RIR	0.074	0.708
GFCF – GDS	0.518***	0.005
FDI – GDP growth	0.271	0.164
FDI – RIR	-0.286	0.141
FDI – GDS	0.038	0.847
GFCF – FDI, partial	0.401	
GDP growth – GFCF, partial	-0.117	
GDP growth – FDI, partial	0.315	

Note: *** p<0.01, ** p<0.05, * p<0.10; Source: Author's calculations.

This is an important result for North Macedonia, as it shows that FDI cannot simply be equated with domestic capital formation. In some years, FDI inflows can be high due to individual transactions or financial flows, without these immediately translating into higher levels of GFCF. In other years, domestic investment can remain relatively stable even with lower FDI inflows, due to public investment, construction activity or domestic financing. Therefore, the simple correlation is useful as an initial piece of information, but it is not sufficient to conclude on the effect of FDI on investment.

Interestingly, the partial correlation between GFCF and FDI, after controlling for GDP growth, RIR and GDS, is 0.401. This shows that when the impact of growth, interest rate and domestic savings is eliminated, the relationship between FDI and GFCF becomes stronger. This result suggests that FDI has a potential independent relationship with domestic capital formation, but this relationship is masked by other macroeconomic factors and structural shocks that characterize the Macedonian economy (see Appendix).

The strongest simple correlation is observed between GFCF and GDS, with a coefficient of 0.518, statistically significant at the 1% level. This result shows that domestic savings are an important factor for investment activity in North Macedonia. Although the country has a

pronounced savings-investment gap, years with higher domestic savings are associated with higher capital formation. This suggests that the domestic savings base, although limited, is still important for sustaining investment. In this sense, FDI should be understood as a complement to, and not a substitute for, domestic sources of financing.

The correlation between GFCF and GDP growth is almost zero, while the correlation between GFCF and RIR is also not statistically significant. This suggests that in North Macedonia investment activity does not respond mechanically to current growth or the real interest rate. A possible explanation is that investment in a small economy often depends on public capital expenditures, foreign investment projects, political stability, access to external financing and expectations, and not only on current macroeconomic dynamics (Alfaro et al., 2004; Smarzynska Javorcik, 2004).

Table 13 presents the results of the ADF and Phillips-Perron stationarity tests. These tests are important because the analysis is based on time series, and using non-stationary series can lead to spurious regression results. The results show that FDI is stationary under all specifications, meaning that FDI inflows as a percentage of GDP do not have a unit root and can be used in regression models without first-difference transformation.

Table 13. Stationarity tests: ADF and Phillips-Perron for North Macedonia

Variable	ADF stat.	ADF p	ADF trend stat.	ADF trend p	PP stat.	PP p	PP trend stat.	PP trend p
GFCF	-2.964	0.038	-3.111	0.104	-2.452	0.128	-2.517	0.319
FDI	-4.229	0.001	-4.197	0.005	-4.812	0.000	-4.751	0.001
GDP growth	-3.308	0.015	-3.259	0.073	-4.821	0.000	-4.737	0.001
RIR	-2.917	0.043	-2.964	0.142	-2.982	0.037	-3.005	0.131
GDS	-1.453	0.557	-2.453	0.352	-0.977	0.761	-2.720	0.228

Note: H0 in ADF/PP: the series has a unit root. The tests are conducted with 1 lag; Source: Author's calculations.

GDP growth is a mostly stationary variable. This is expected, since growth rates are usually stationary around some average value, although they can be subject to large shocks. The real interest rate is stationary in the no-trend specifications, but when a trend is included, the null hypothesis of a unit root is not rejected. This shows that the results for this variable depend on the specification of the test.

For GFCF, the results are mixed. The ADF test without trend rejects the null hypothesis of a unit root, but the ADF with trend and Phillips-Perron tests do not provide as clear support for stationarity. This means that the GFCF should be treated with caution, especially considering that it is a relatively short time series. The GDS, on the other hand, shows the weakest results in terms of stationarity, since the null hypothesis of a unit root is not rejected.

These results justify the use of multiple specifications. The dynamic Newey-West model allows for the assessment of the dynamic relationship at levels with robust standard errors. The ARDL bounds approach is useful in conditions where the variables can be a combination of I(0) and I(1), but not I(2) (Pesaran, Shin and Smith, 2001). In addition, the differenced Newey-West

model serves as a check whether the results hold when the variables are expressed in first differences. In other words, mixed results from stationarity tests do not invalidate the analysis, but rather require cautious interpretation and the use of robustness checks.

Table 14 presents the Chow-type tests for known structural breaks. The results show that for all tested years, the stability of the parameters is rejected. This means that the relationship between GFCF, FDI and the control variables is not completely stable over the entire period, but changes around key economic and political events.

First, the year 2001, associated with the internal conflict, shows a statistically significant structural break. This is expected, since the conflict had direct consequences on political stability, investment confidence and economic activity. In such conditions, both domestic and foreign investors tend to postpone investment decisions, and investment risk increases.

Table 14. Structural breaks: Chow-type tests for North Macedonia

Year	Case	F-stat.	p-value
2001	Ethnic conflict	13.33	0.000
2008	Global financial crisis	15.60	0.000
2018	Post-2018 integration/reform period	3.80	0.017
2020	COVID-19 shock	9.81	0.000
2022	Energy and geopolitical shock	12.88	0.000

Source: Author's calculations.

The global financial crisis, represented by 2008, also shows a strong structural break. Although the Macedonian economy was not directly exposed to the financial crisis to the same extent as some developed economies, the crisis affected it through trade, financial flows, investor expectations and external demand. In a small open economy, such external shocks are quickly transmitted to investment.

The period after 2018, associated with institutional, political and Euro-Atlantic changes, also shows a significant structural break. This result suggests that changes in the political and integration context can affect investment dynamics, especially in a country where expectations of EU and NATO integration are important for foreign investors. In addition, the COVID-19 crisis and the shocks after 2022 are statistically significant, confirming the need to control for these periods in the regression analysis.

Hence, the results in Table 14 justify the use of a dynamic Newey-West model with structural dummy variables. Without controlling for these breaks, the effect of FDI on GFCF may be biased, as part of the variation in investment would be attributed to FDI, although it actually stems from political, health, financial or geopolitical shocks.

Table 15 shows the main regression results. The first column shows the Dynamic Newey-West model. The lagged GFCF coefficient is 0.819 and is statistically significant at the 1% level. This is one of the strongest results in the analysis. It shows that the gross formation of fixed capital in North Macedonia has high persistence, that is, current investments largely depend on the

previous level of investments. This is economically logical, because the investment projects are realized in several years, and the started capital formation creates inertia in the next period.

Table 15. Regression results for North Macedonia

Variable	Dynamic Newey-West	ARDL EC / LR	Differenced Newey-West	Dynamic NW + dummies
L.GFCF / ADJ(L. GFCF)	0.819*** (0.107)	-0.127 (0.140)	—	0.806*** (0.233)
FDI / D.FDI / LR FDI	0.236* (0.125)	1.755 (2.072)	0.206 (0.120)	0.404*** (0.136)
L.GDP growth / D.GDP growth / LR GDP growth	0.143 (0.139)	1.134 (1.889)	-0.060 (0.074)	0.139 (0.152)
RIR / D.RIR / LR RIR	-0.103 (0.062)	-1.017 (1.565)	-0.015 (0.093)	-0.090 (0.091)
GDS / D.GDS / LR GDS	0.000 (0.056)	-0.103 (0.470)	0.050 (0.199)	0.039 (0.110)
Dummy: 2001 conflict				-1.771* (0.894)
Dummy: 2009 global crisis				0.123 (1.324)
Dummy: post-2018				-1.899 (1.603)
Dummy: COVID-19				2.914** (1.122)
Dummy: post-2022				0.730 (1.603)
Constant / SR constant	2.839 (2.579)	1.851 (2.871)	0.188 (0.366)	2.280 (4.645)
Observations	27	27	27	27
Model statistic	F=16.99***	R^2=0.482 Adj. R^2=0.359	F=2.52*	F=25.18***

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10. The ARDL column shows the long-run coefficients for the regressors and the adjustment term for L.GFCF; in differenced Newey-West, first differences are used; Source: Author's calculations.

The FDI coefficient in the Dynamic Newey-West model is 0.236 and is statistically significant at the 10% level. This means that an increase in FDI inflows by 1 percentage point of GDP is associated with an increase in GFCF by about 0.236 percentage points of GDP in the short run, controlling for the previous level of investment, economic growth, the real interest rate, and domestic savings. This result indicates a positive but moderate effect of FDI on domestic capital formation.

This finding is important because it shows that FDI in North Macedonia is not just a financial inflow unrelated to real investment activity. On the contrary, the results indicate that they have a positive contribution to the GFCF. However, since the coefficient is only significant at the 10% level, the result should be interpreted as marginal evidence of complementarity rather than strong evidence of a full crowding-in effect. This is consistent with previous literature

according to which the positive effect of FDI on domestic investment is not automatic, but depends on the absorptive capacity, structure of FDI and linkages with domestic firms (Agosin and Mayer, 2000; Smarzynska Javorcik, 2004; Agosin and Machado, 2005).

Control variables in the baseline model are not statistically significant. The lagged GDP growth has a positive sign, which is in line with the accelerator logic, but the effect is not precisely evaluated. The real interest rate has a negative sign, which is consistent with the expectation that a higher cost of capital may reduce investment activity, but this effect is also not statistically significant. GDS has a coefficient close to zero. This shows that in a dynamic specification, when controlling for the previous level of the GFCF, domestic savings do not have a direct and independent effect on investment. This does not mean that domestic savings are unimportant, but rather that their influence is probably already embedded in earlier capital formation or operates through other channels.

The second column shows the ARDL EC / LR results. The adjustment coefficient for L.GFCF is -0.127, but it is not statistically significant. The negative sign is in the expected direction, as it would indicate a return to long-run equilibrium, but the statistical insignificance indicates that there is not strong enough evidence for a stable adjustment mechanism. The long-run coefficient for FDI is 1.755, but it is statistically insignificant and has a large standard error. This means that the ARDL model does not provide reliable evidence for a stable long-run relationship between FDI and GFCF.

This result should be read together with Table 17, where the ARDL bounds test does not reject the null hypothesis of no level relationship. Therefore, the long-run ARDL coefficients should not be used as the main basis for inference. They are useful as an indicative check, but not as strong evidence for a long-run crowding-in effect.

The third column shows the differenced Newey-West model. In this specification, the variables are expressed in first differences, in order to test whether the short-run change in FDI is associated with the short-run change in GFCF. The coefficient of D.FDI is 0.206, which is again positive in sign, but not statistically significant. This result is consistent with the basic model in terms of the direction of the effect, but shows that when the long-run component of the series is removed and only annual changes are analyzed, the effect of FDI becomes less precise. This is expected for an annual series with only 27 observations and with significant structural shocks.

The fourth column shows the Dynamic Newey-West model with structural dummy variables. This model is particularly important for North Macedonia, as it takes into account the volatility of the analyzed period. The coefficient of L.GFCF remains high and statistically significant, 0.806, which again confirms the strong persistence of investments. The coefficient on FDI increases to 0.404 and becomes statistically significant at the 1% level. This suggests that the positive association between FDI and GFCF becomes more visible after controlling for key structural shocks. However, this result should be interpreted with caution and should not be treated as definitive evidence of a stable or causal crowding-in effect.

This result has an important economic interpretation, but it should be read together with the diagnostic tests presented below. In the Macedonian case, structural shocks appear to affect the stability of the relationship between FDI and domestic investment. When these shocks are

not controlled for, the effect of FDI is positive but only marginally significant. When they are included in the model, the estimated coefficient becomes larger and statistically significant. This indicates that FDI may support domestic capital formation, but the relationship remains sensitive to political, health, financial and geopolitical disruptions.

Of the dummy variables, the 2001 conflict has a negative and marginally significant effect, which is expected given the negative impact of security instability on investment activity. The COVID-19 dummy has a positive and statistically significant coefficient. This result should be interpreted with caution. It does not mean that the pandemic itself had a positive impact on investment, but rather that, after controlling for other factors in the dynamic model, the COVID-19 period is associated with a specific change in GFCF. It is possible that this result reflects public capital expenditures, deferred investment, statistical effects, or specific dynamics of capital formation in that year. Therefore, this coefficient should not be overemphasized as an economically positive effect of the pandemic, but rather as evidence that the period was structurally different.

Table 16 shows the long-run FDI effects. In the Dynamic Newey-West model, the long-run FDI effect is 1.300. At first glance, this value is greater than one and could indicate a crowding-in effect. However, the coefficient is not statistically significant, the p-value is 0.262, and the confidence interval is very wide, ranging from -0.971 to 3.571. In addition, the test whether the long-run effect is equal to 1 has a p-value of 0.796, which means that it cannot be concluded that the effect is statistically different from one.

The situation is similar with the ARDL long-run result. The long-run FDI coefficient is 1.755, but it is statistically insignificant, with a p-value of 0.407 and a very wide confidence interval. This confirms the previous observation that ARDL results should be interpreted with caution, especially since the bounds test does not provide support for a stable long-run relationship.

Table 16. Long-run effects of FDI and robustness checks for North Macedonia

Model	LR FDI	SE	p-value	95% CI	p: LR=1
Dynamic Newey-West	1.300	1.159	0.262	[-0.971; 3.571]	0.796
ARDL long-run	1.755	2.072	0.407	[-2.555; 6.065]	—
Dynamic NW + dummies	2.086	2.625	0.427	[-3.058; 7.230]	0.679

Note: The long-run coefficient in dynamic models is calculated as β_FDI/(1-β_L.GFCF). The LR=1 test assesses whether the long-run effect is statistically different from one; Source: Author's calculations.

In the Dynamic Newey-West model with dummy variables, the long-run FDI effect is 2.086, but it is again statistically insignificant. Although the sign is positive and the value is greater than one, the large standard error and wide confidence interval indicate that the estimate is very imprecise. This is expected given the small time dimension of the sample and the presence of several structural breaks.

Table 16 shows that the long-run FDI coefficients are positive in all specifications, but statistically insignificant and accompanied by wide confidence intervals. Therefore, the long-run estimates for North Macedonia should be interpreted as indicative rather than conclusive. The results do

not provide sufficient statistical evidence for a stable long-run crowding-in effect of FDI on domestic investment. A more cautious interpretation is that FDI may be positively associated with capital formation in the short run or within specific dynamic specifications, but its long-run effect remains statistically uncertain.

This conclusion is consistent with the broader literature that suggests that the positive effects of FDI depend on local linkages, sectoral structure and the absorptive capacity of the domestic economy (Alfaro *et al.*, 2004; Smarzynska Javorcik, 2004). For North Macedonia, this means that attracting foreign investors is important but not sufficient. Foreign companies need to create stronger ties with domestic suppliers, encourage technological learning, and increase the capacity of local firms to invest.

Table 17 shows the post-estimation tests and the causality check. The ARDL bounds / PSS test has an F-statistic of 3.907 and a t-statistic of -0.906. According to the decision shown, the null hypothesis of no level relationship at the 10%, 5% and 1% levels is not rejected. This means that the ARDL model does not provide sufficient support for a stable long-run relationship between GFCF, FDI and the control variables. Therefore, the main conclusion should be based more on the dynamic Newey-West specifications, and the long-run ARDL coefficients should be treated as indicative, but not as confirmed.

Diagnostic tests show that the underlying dynamic OLS specification does not have serious problems with serial correlation and heteroscedasticity. The Breusch-Godfrey LM test has a p-value of 0.770, which means that there is no evidence of serial correlation. The Breusch-Pagan/Cook-Weisberg test has a p-value of 0.408, indicating no evidence of heteroskedasticity. The skewness-kurtosis normality test has a p-value of 0.579, indicating that the normality of the residuals is not rejected. These results support the statistical validity of the dynamic specification.

Table 17. Diagnostic check and granger causality for North Macedonia

Test	Statistics
ARDL bounds / PSS	F=3.907; t=-0.906
Breusch-Godfrey LM	p=0.770
Breusch-Pagan/Cook-Weisberg	p=0.408
Ramsey RESET	p=0.047
Skewness-kurtosis normality	p=0.579
VAR lag-order selection	Lag=1
Granger: FDI → GFCF	χ^2=0.252; p=0.616
Granger: GFCF → FDI	χ^2=1.207; p=0.272

Note: The PSS bounds test is from ARDL(1,0,0,0,0), Case 3, with 4 regressors and 27 observations. The diagnostics are from the comparable dynamic OLS specification; Source: Author's calculations.

However, the Ramsey RESET test has a p-value of 0.047, indicating possible specification weakness or omitted nonlinearities at the 5% level. This result does not invalidate the analysis, but it does indicate that the relationship between FDI and GFCF in North Macedonia may not

be completely linear or that there are additional factors not captured in the model. Such factors may include the structure of FDI by industry, the difference between greenfield investments and acquisitions, the quality of institutions, public capital expenditures, political stability, and the linkages between foreign companies and domestic firms.

The VAR lag-order selection shows that one lag is selected according to the LR, FPE, AIC, HQIC and SBIC criteria. This justifies the use of one lag in the Granger causality tests. The results of the Granger tests show that there is no evidence that FDI Granger-predicts GFCF, as the χ^2 is 0.252 and the p-value is 0.616. There is also no evidence of reverse Granger causality from GFCF to FDI, as the χ^2 is 1.207 and the p-value is 0.272.

These diagnostic results require caution in the interpretation of the estimated FDI effect. The significant Ramsey RESET test suggests possible specification weakness or omitted nonlinearities, while the Granger causality tests do not provide evidence of predictive causality either from FDI to GFCF or from GFCF to FDI. The Granger test does not show structural causality, but only whether past values of one variable help predict another variable. In this case, the results do not show a clear predictive relationship in either direction. Therefore, the positive FDI coefficient in the dynamic specifications should be interpreted as evidence of association within the estimated model, rather than as strong evidence of a stable causal relationship. Given the small time dimension and the presence of structural breaks, this cautious interpretation is necessary.

The results for North Macedonia suggest a positive relationship between FDI and gross fixed capital formation, but the evidence is stronger for the short-run and dynamic association than for the long-run effect. In the basic Dynamic Newey-West model, FDI has a positive and marginally significant coefficient. When structural shocks are controlled for, the coefficient becomes larger and statistically significant at the 1% level. However, given the diagnostic limitations, especially the significant Ramsey RESET test and the insignificant Granger causality results, this finding should be interpreted as evidence of a positive conditional association, rather than as definitive evidence of a stable causal effect.

This result is consistent with Sucubasi *et al.* (2021) who find a positive impact of inward FDI on domestic investment for the Western Balkan countries. The results are also in line with the broader theoretical logic that FDI can increase capital formation through additional capital, technology, production linkages, and export orientation (Borensztein, De Gregorio and Lee, 1998; de Mello, 1999). However, the results do not allow a strong conclusion that there is a full crowding-in effect in the long run, as the long-run FDI coefficients are positive but statistically insignificant and with wide confidence intervals.

Compared to the CESEE results, the Macedonian analysis shows a similar direction but less statistical stability. In the CESEE panel, the positive effect of FDI on GFCF is more clearly confirmed in the basic FE model and in the high-income subgroup. For North Macedonia, the effect is positive but sensitive to the specification and to controlling for structural discontinuities. This is expected, since the time analysis for a single country has a significantly smaller number of observations and a greater exposure to specific domestic events.

The results are also important from the perspective of policies to attract FDI. They show that

foreign direct investment can support domestic capital formation, but its effect is not automatic and is not sufficient on its own. To obtain a stronger and more stable crowding-in effect, it is necessary to increase the linkages between foreign companies and domestic firms. This includes developing local suppliers, supporting small and medium-sized enterprises, investing in human capital, technological advancement, improving the quality of institutions, and directing FDI towards sectors with higher domestic value added.

Conclusion

This report analyzes the impact of foreign direct investment on domestic investment in Central, Eastern and Southeastern European countries, with a special focus on the Republic of North Macedonia. The main objective is to determine whether FDI stimulates domestic capital formation or, conversely, displaces domestic investment activity. The results show that foreign direct investment has a positive impact on gross fixed capital formation, but the effect is not strong enough to confirm a full crowding-in effect. In other words, FDI supports investment activity, but does not automatically create more than a proportional increase in domestic investment.

For Central, Eastern and Southeastern European countries, the results show a positive and statistically significant relationship between FDI and domestic investment in the baseline model. However, the long-run effect remains below one, meaning that foreign capital stimulates capital formation but is not sufficient on its own to generate a strong investment multiplier. In addition, the effect is more pronounced in higher-income countries, suggesting that the level of development, institutional stability, financial depth and capacity of domestic firms are important conditions for converting FDI into a broader domestic investment effect.

In the case of the Republic of North Macedonia, the results indicate a positive dynamic relationship between FDI and gross fixed capital formation, especially when structural disruptions in the economy are controlled for. However, this finding should be interpreted cautiously. The evidence is stronger for the short-run and dynamic association than for a stable long-run effect, since the long-run FDI coefficients are not statistically significant and the post-estimation tests point to possible specification limitations. Therefore, the results suggest that foreign investment can support domestic capital formation, but it should not be treated as a sufficient condition for a sustained increase in domestic investment.

From an economic policy perspective, the results do not imply that FDI alone can ensure a sustained increase in domestic investment. Rather, they suggest that FDI may support capital formation when it is accompanied by stronger domestic firms, better supplier linkages, improved institutional predictability and greater absorptive capacity. For the countries of the region, and especially for North Macedonia, the policy focus should therefore not be limited to attracting foreign investors, but should also include measures that help foreign companies become more connected with domestic suppliers, small and medium-sized enterprises, educational institutions and the local labour market.

In this regard, a more active industrial and investment policy is needed that will connect foreign companies with the domestic private sector. Support for domestic companies should be aimed at improving product quality, certification, technological modernization, digitalization and access

to finance. If domestic companies do not have the capacity to become suppliers or partners of foreign companies, the positive effects of FDI will remain limited. Therefore, policies to attract FDI should be complemented by policies for the development of domestic companies.

For North Macedonia, it is particularly important to move from a model based mainly on attracting foreign investors through tax breaks and cost advantages, to a model based on productivity, knowledge, technology transfer and higher domestic value added. This implies better targeting of FDI in sectors that have the potential to create linkages with the domestic economy, such as manufacturing with higher technology content, energy, business services, ICT and industries related to the green transition. At the same time, institutional stability, regulatory predictability and the quality of public services need to be strengthened, as these factors influence both foreign investors and domestic investment decisions.

The results of the paper suggest that FDI can have a positive role in the investment dynamics of CESEE countries and North Macedonia, but its effect is not automatic and should not be overstated. The real development impact of foreign direct investment depends on whether it is linked to the domestic economy, whether it creates new production linkages, and whether it increases the capacity of domestic firms to invest, innovate and grow. Therefore, future policy should not only focus on how much FDI enters the country, but also on what kind of FDI enters, in which sectors it is directed, and how much it contributes to the development of domestic investment potential.

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Appendix

Table 18. Panel-regression results estimated with System GMM for CESEE countries

Variable	System GMM
GFCF, lagged	0.820*** (0.203)
FDI	0.056 (0.217)
GDP growth, lagged	0.178** (0.065)
Real interest rate	0.007 (0.080)
Gross domestic savings	0.016 (0.062)
Observations	367
Countries	14
Within R-squared	
F-statistic / Wald statistic	1500.730
Number of instruments	8
Hansen J p-value	0.025
AR(1) p-value	0.025
AR(2) p-value	0.028

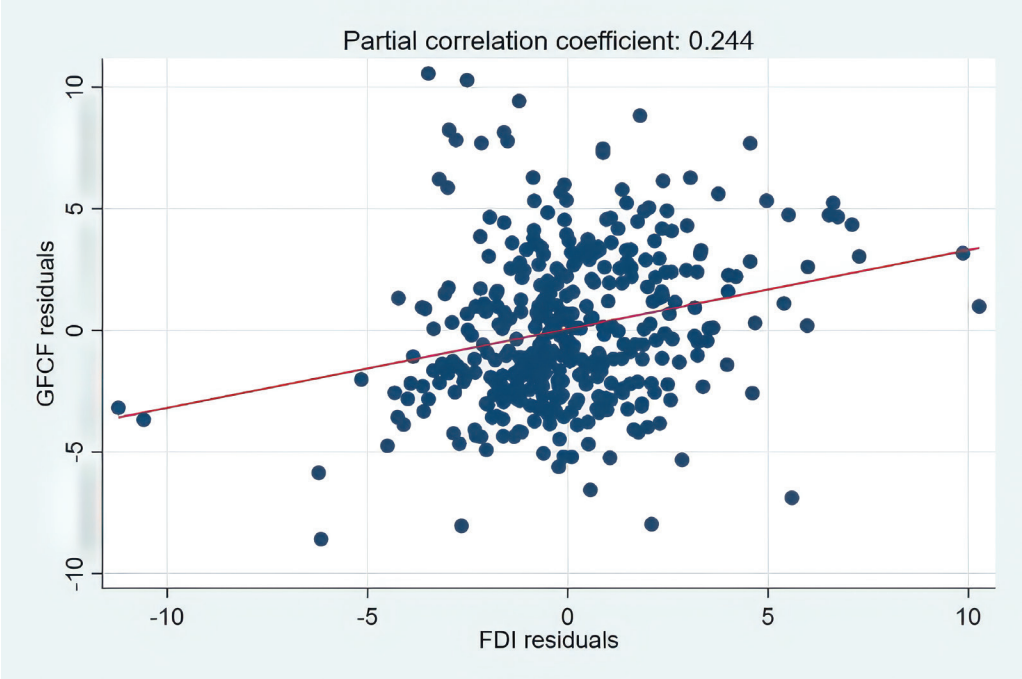
Note: Dependent variable is GFCF. L.GFCF and FDI are treated as endogenous/predetermined. Instruments are collapsed and lag depth is restricted. Standard errors are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. These estimates are reported only as a robustness check. The significant Hansen J and AR(2) tests indicate that the System GMM diagnostic conditions are not fully satisfied; therefore, these results are not used as the main basis for inference. Source: Author's calculations.

Table 19. Long-run FDI coefficients estimated with System GMM for CESEE countries

Model	Long-run FDI effect	Std. err.	95% CI	p-value	H0: LR FDI = 1, p-value
System GMM	0.312	0.936	[-1.522; 2.146]	0.739	0.4622

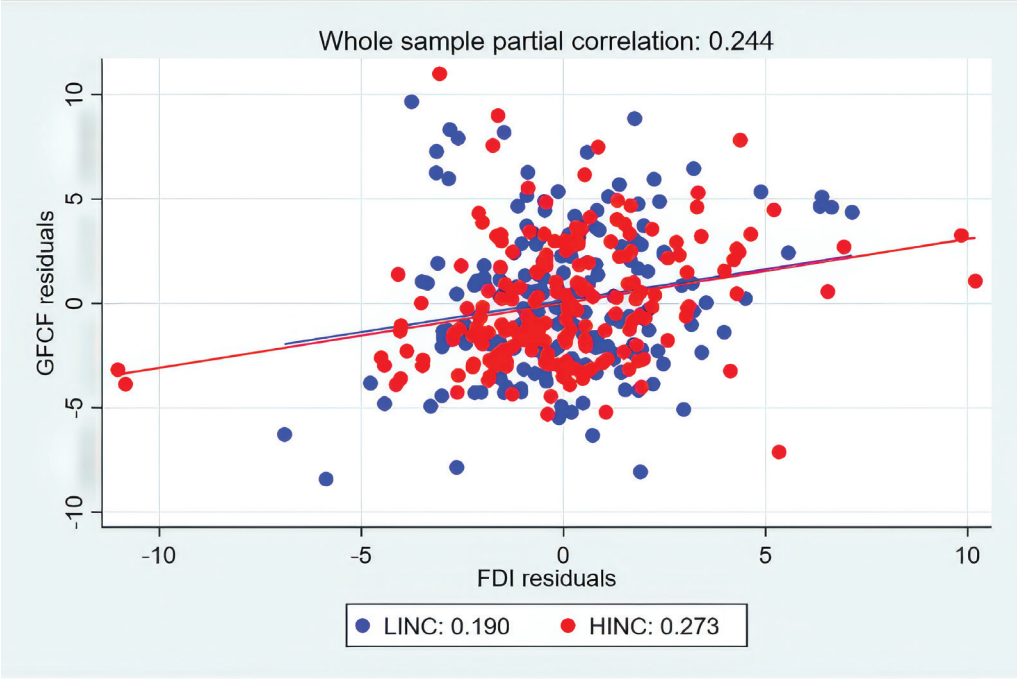
Note: Long-run effect is calculated as beta_FDI/(1-beta_L.GFCF), with Delta-method standard errors. * p<0.10, ** p<0.05, *** p<0.01; Source: Author's calculations.

Figure 3. Partial correlation between FDI and GFCF for CESEE countries



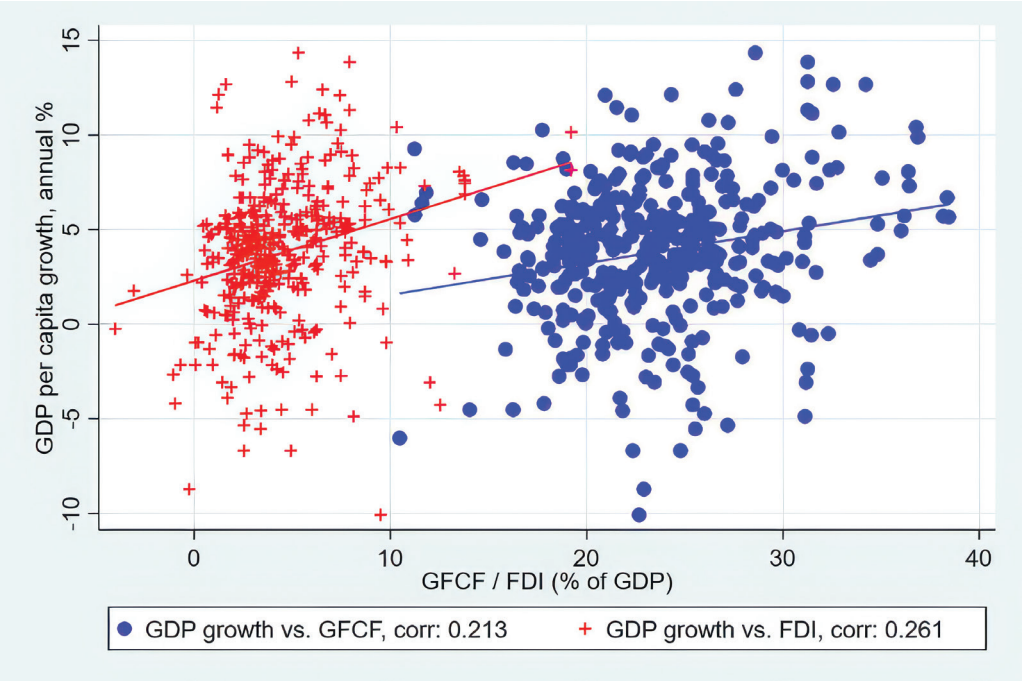
Source: Author's calculations.

Figure 4. Partial correlation between FDI and GFCF by income levels for CESEE countries



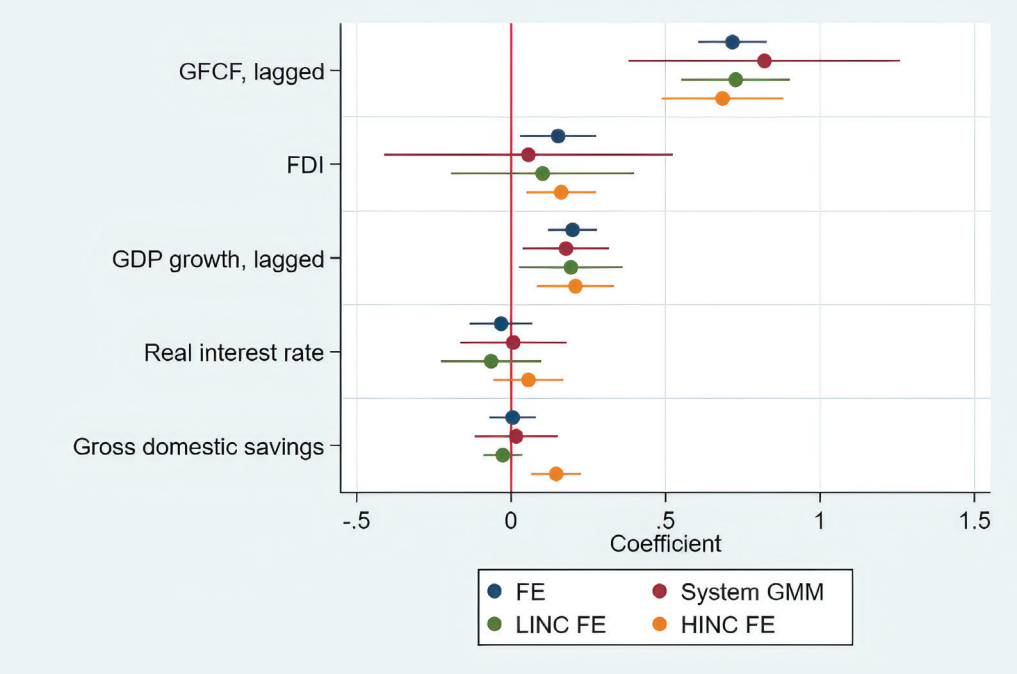
Source: Author's calculations.

Figure 5. Partial correlation between FDI, GFCF and GDP per capita growth for CESEE countries



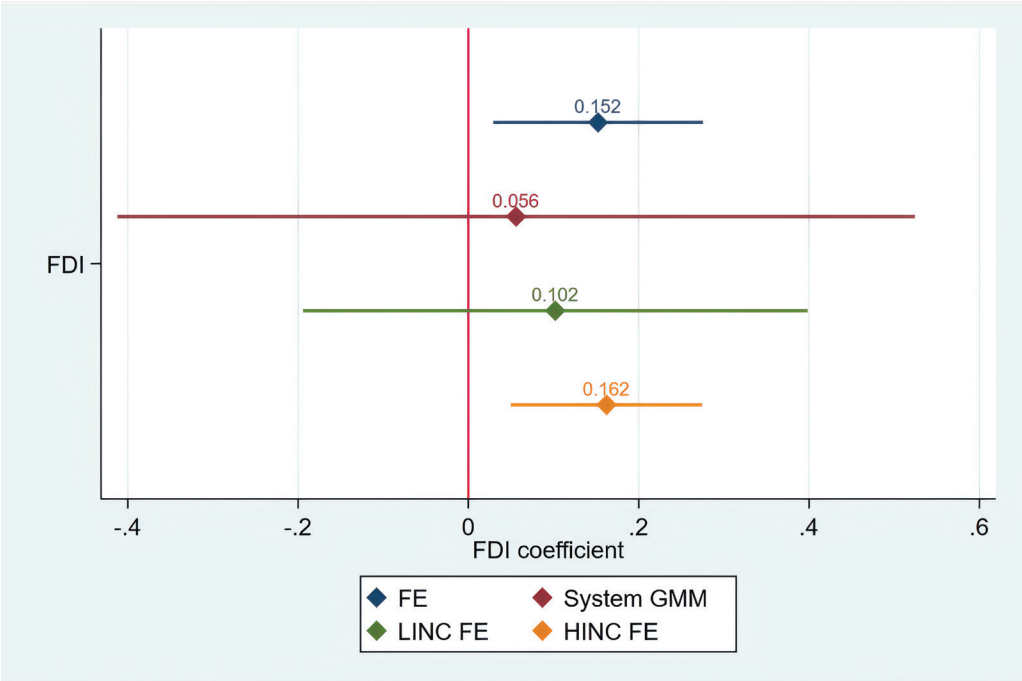
Source: Author's calculations.

Figure 6. Panel-regression results for CESEE countries



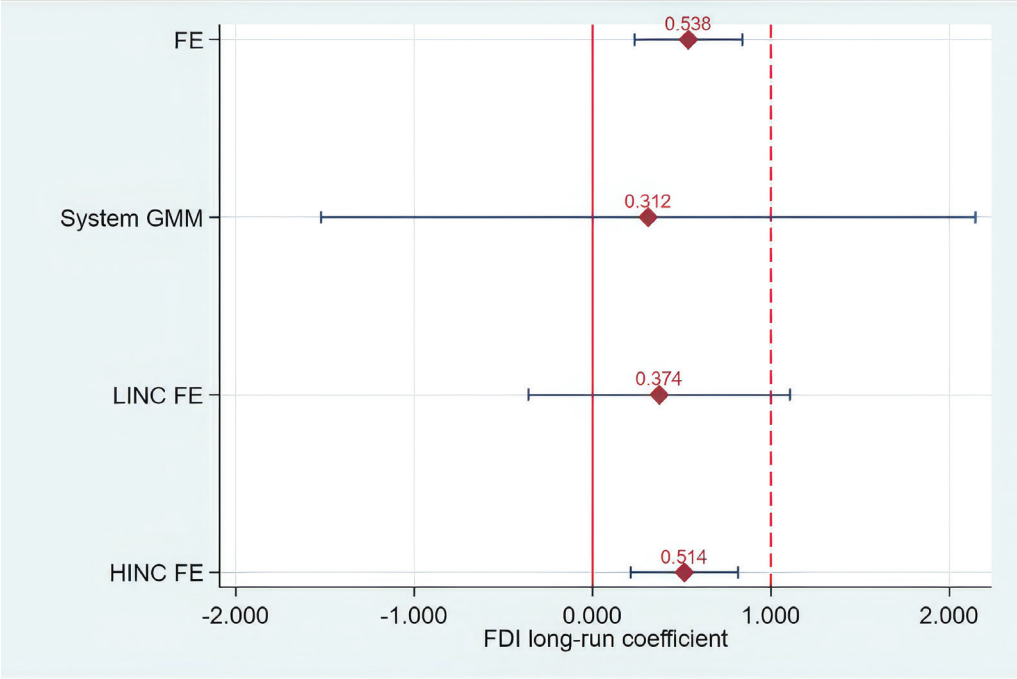
Source: Author's calculations.

Figure 7. Panel-regression results for FDI for CESEE countries



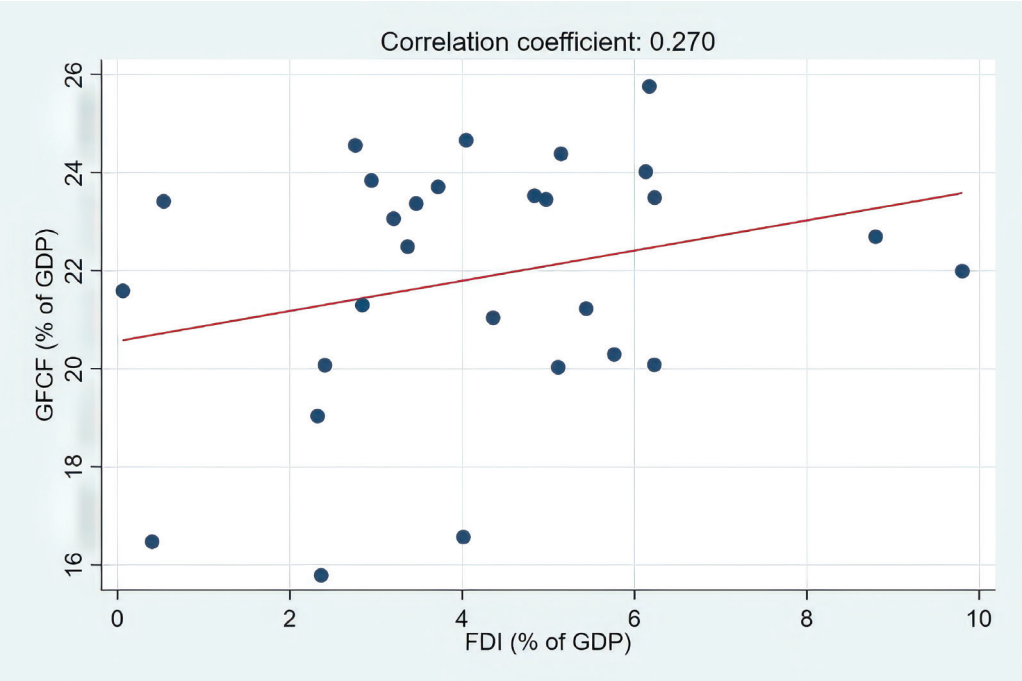
Source: Author's calculations.

Figure 8. Panel-regression results for long-run FDI coefficient for CESEE countries



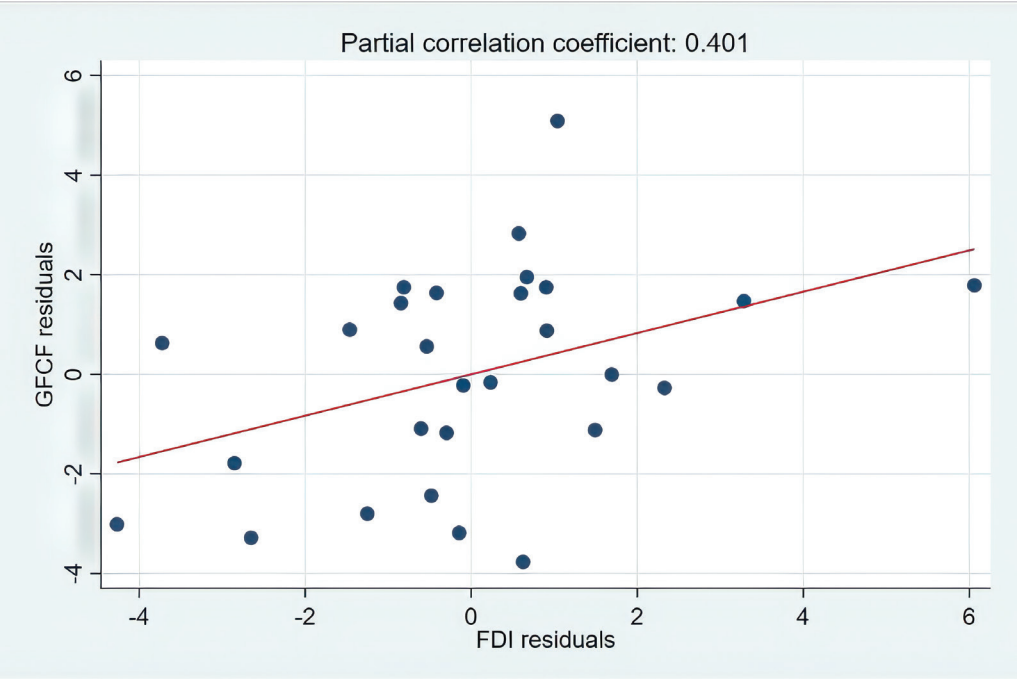
Source: Author's calculations.

Figure 9. Correlation between FDI and GFCF for North Macedonia



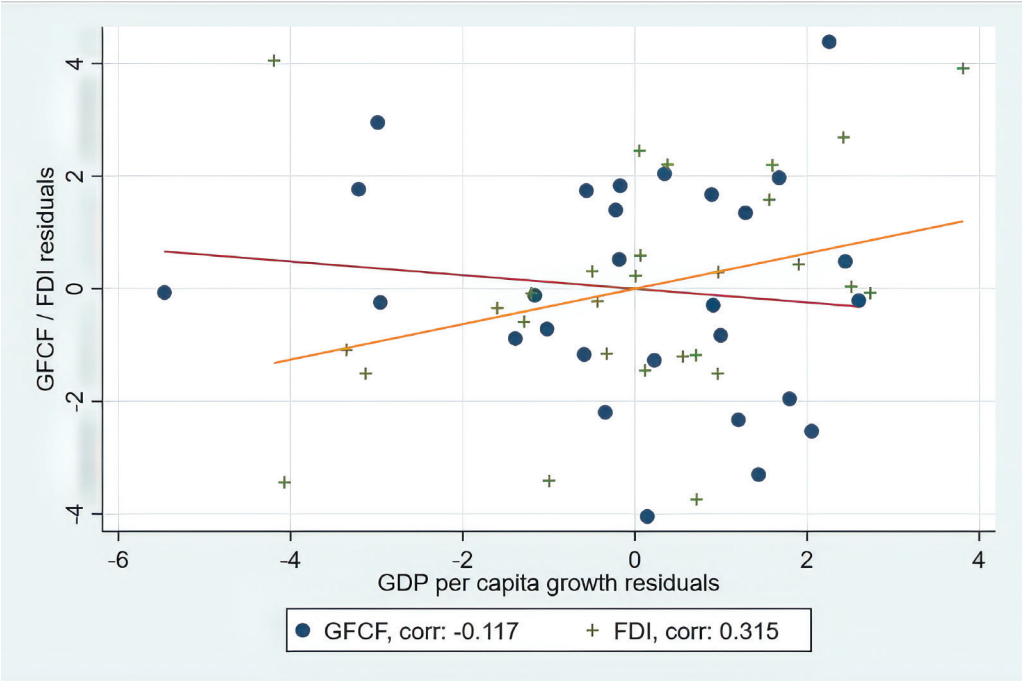
Source: Author's calculations.

Figure 10. Partial correlation between FDI and GFCF for North Macedonia



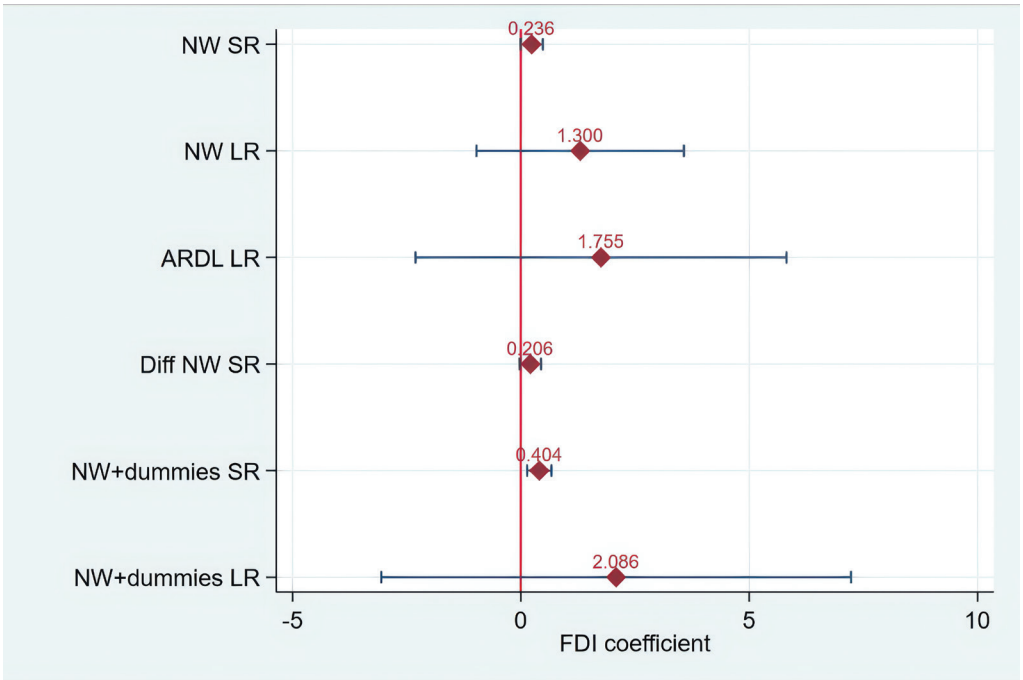
Source: Author's calculations.

Figure 11. Partial correlation between FDI, GFCF and GDP per capita growth for North Macedonia



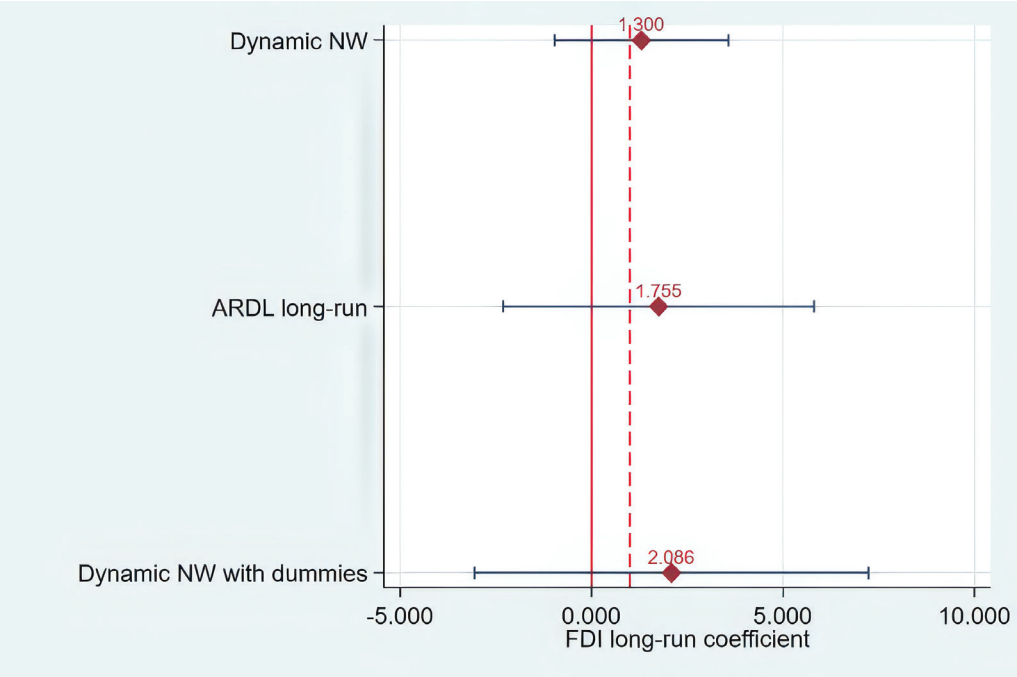
Source: Author's calculations.

Figure 12. Regression results for FDI for North Macedonia



Source: Author's calculations.

Figure 13. Regression results for long-run FDI coefficient for North Macedonia



Source: Author's calculations.

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