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FDI and Economic Growth – Perspective of Southeast European Countries

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Abstract: *Emergence of new economic entities, through either integration or disintegration, always creates system inefficiencies resulting in temporary economic setbacks. At the macroeconomic level, this brings about slowdown in economic growth and delayed catching up with more advanced economies. In Europe, the turn of the century brought along political and economic disintegration, on one hand, and economic integration, on the other. Demise of planned economies across Eastern Europe caused serious economic turmoil due to market fragmentation. Meanwhile, creation of new economic architecture in the European Union (EU) has created additional challenges of economic restructuring. Therefore, achieving sustainable economic growth and high income has become the ultimate economic policy objective. Equity investment in form of foreign direct investment (FDI) has proven to be the right choice, because influx of fresh capital and know-how enabled strong economic growth and restructuring through increasing labor productivity and economic efficiency. Stronger competitive pressure through FDI contributed to dynamic restructuring, resembling in increasing exports and stronger integration into global economy. Yet, growth rates across countries were not always proportional to the volume of inward FDI, which indicates a certain level of underperformance for some countries. The aim of the paper is to closer investigate the FDI-growth nexus by differentiating between two types of FDI – mergers and acquisition (M&A) and greenfield investment. Thus, the analysis will take account of the characteristics of the FDI host economy, and those of the investing company, because we find it reasonable to assume that different forms of FDI incorporate different business dynamics and the time horizon of the investor's expectations. In order to find out the effects of different forms of FDI on economic growth we apply panel data analysis with fixed effects and Prais-Winsten estimator on the sample of European reform countries whereby FDI, M&A and greenfield investment are considered the key variables. Analysis also includes a set of control variables, which combine standard neoclassical growth variables. Results indicate that, with reference to the level of innovativeness, different types of FDI indeed produce different effects on host countries' economic growth.*

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Introduction

Emergence of new economic entities, through either integration or disintegration, always creates system inefficiencies and temporary negative economic effects resulting in slowdown of economic growth and delayed catching up with more advanced economies. At the turn of the century, we witnessed a demise of planned economies in Eastern Europe on one hand, and an advanced process of economic integration, on the other. Both processes have reflected on reform countries, some of which have later become full-fledged members of the EU. First, they had to create a functioning market economy, followed by a need for carrying out sophisticated economic and social reforms aimed at meeting the EU membership criteria. Yet, this process is still far from finished, since there is a number of countries which embarked on the integration process latter than others. This group of countries includes Southeast European countries (SEEC), among which Western Balkans countries (WBC[1]), all of which have candidate status with the EU and are therefore in focus of our paper. These countries still lag behind in terms of economic development and growth, thus being unable to close the development gap towards their more advanced counterparts. Meanwhile, FDI have played a crucial role in helping Central and East European countries (CEEC) to overcome development and technology gap and create economies able to cope with competition on international markets.

When analyzing effects of FDI one must take into account not only characteristics of the host economy, but also types of FDI, known as modes of entry. Location characteristics of the host economy are analyzed within the framework of the eclectic OLI-paradigm, which differentiates between ownership, location and internalization as the main components of successful cross-border equity investment (Dunning, 2015, 1993). Ownership advantage incorporates all resources, which constitute company's competitive position both on domestic and international markets. These resources include intangible assets such as technology, innovation, and other proprietary rights (brand, trademarks, patent rights, etc.). Location advantage refers to desirable characteristics of the recipient country, which make it a favorable investment location. In broad terms, it includes large and dynamic product and production factor markets, accompanied by favorable hard (transport, telecommunication) and soft (business) infrastructure. The latter refers to a reliable legal system (law and contract enforcement), political stability, access to financial markets, agglomeration economies, economies of scale, education, investment in research and development (R&D), and other forms of technological development. Finally, internalization advan-

tage arises as a combination of the previous two components in a way that it enables company to keep control over its ownership advantages on international markets. In other words, it guarantees that gains from FDI will override those coming from some other, non-equity forms of investment[2].

FDI consists of two types of investment, namely M&A and greenfield investment, which are quite different in their nature. While M&A usually target already existing companies with the aim of restructuring them and making them more efficient and resilient on the international market, greenfield investments usually have a longer time horizon as they aim at creating new business entities through building new facilities and starting business operations anew. This includes a series of strategic operations like creating forward and backward linkages, market positioning, and defining company's own product and market niches. Furthermore, efficient realization of M&A requires sophisticated markets, institutions and policies and is therefore typical for countries at higher level of development. Meanwhile, greenfield investments usually act as a means of horizontal or vertical business expansion and are hence more dependent upon quality of a new company, and less on the general business environment. Therefore, it is reasonable to expect different effects of M&A and greenfield investments on the host country's economic growth.

Taking all the above into account, we hypothesize that separate effects of M&A and greenfield investment on economic growth in innovative less advanced countries are weaker than the effects produced by FDI as an aggregate statistical indicator. Furthermore, we hypothesize that in less developed countries greenfield investments produce stronger effects on host country's economic growth. Hence, the aim of the paper is to closer investigate the FDI-growth nexus by differentiating between M&A and greenfield investment. Results of the empirical analysis generally confirm our hypotheses, thus delivering two important conclusions. First, different types of FDI do not contribute to the same extent to local economic growth. Second, contribution of these individual types of FDI is conditional upon technological readiness and innovativeness of the recipient country in a way that in less developed economies greenfield investment adds more to economic growth than M&A. Since such an approach is rarely used in empirical literature, and especially so in case of SEEC and with reference to the host country's innovativeness, we consider these findings to be an important scientific contribution of the paper.

The paper is structured as follows. Following the introductory section, the second part offers an overview of the existing empirical literature on the growth effects of FDI. In doing so, special attention is given to inferences on both SEEC and research methodology and findings on the analyzed problem. The third section puts countries of Western Balkans in the context of the EU integration and its enlargement process, while laying out an overview of the realized inflows of FDI to WBC. The fourth section includes panel data analysis with fixed effects and Prais-Winsten estimator, which corrects for the identified problems in the error term, while the final section concludes.

Previous empirical research on the FDI-growth nexus in SEEC

Empirical studies on the impact of FDI on local economic growth do not arrive at unanimous conclusions. While some studies prove positive effects on economic growth (Krstevska and Petrovska, 2012; Kornecki and Raghavan, 2012; Leitao and Rasekhi, 2013; Hayali, 2014; Kikerkova et al., 2018; Mehic et al., 2013; Vehorn and Vasarevic, 2011; Alexiou and Tsaliki, 2007), others deny these positive effects (Bermejo Carbonell and Werner, 2018; Malikane and Chitabra, 2019; Todorov et al., 2022; Gardašević, 2018; Kersan-Škabić and Zubin, 2009; Bilas, 2020). While considering such contradictory findings this paper concentrates specifically on SEEC whose innovativeness and technological absorptive capacity considerably lag behind those of the more advanced economies, which presumably determines the ultimate effects of equity investment (FDI) on their economic growth.

Convincing results on the positive relation between equity inflows and host country's economic performance can be found in Kikerkova et al. (2018). In their analysis of the relation between FDI and other macroeconomic variables in case of North Macedonia, they apply vector error correction model, and come to a general conclusion of the positive effects of foreign capital on macroeconomic performance of the local economy, and vice versa. In doing so, they take economic growth, labor productivity, trade openness and current account balance as endogenous variables and prove the existence of a long-term relationship between them and FDI. Furthermore, they find the strongest relationship between FDI, on one hand, and economic growth and trade openness, on the other.

Much broader insight into the effects of FDI on local economic development is given in Apostolov (2016) who, by relying on firm-level data, differentiates between manufacturing and services firms in order to find out how the presence of foreign capital in a sector influences overall performance of that sector. In doing so, the author specifically refers to SEEC as small open economies, an approach rarely applied in empirical studies. By contrasting foreign and domestic investment, the author concludes that foreign ownership contributes to efficient company restructuring, thus increasing output and labor productivity. Results of the analysis implicitly point at time lag necessary for the achievement of this positive outcome, since author identifies that an influx of foreign equity capital *per se* does not bring positive effects instantaneously and with no regard to the host country's technological readiness.

SEEC are also in focus of the paper by Mehic et al. (2013) who investigate the relation between FDI and economic growth on the sample of seven countries over a period 1998-2007. Generally, they confirmed positive (exogenous) effects of FDI on economic growth, but weak contribution of domestic capital accumulation. Although they found certain evidence of substitutability between foreign and domestic capital[3], their conclusion on the role of technology gap in achieving economic growth is much more interesting. They conclude that local economy's capacity to apply new tech-

nology strongly determines the ultimate effects of foreign capital inflows in a way that less efficient domestic companies make less use of technology hence achieving weaker contribution to economic growth. However, by analyzing CEEC over a period 1992-2007, Vehorn and Vasarevic (2011) came to altogether different conclusions. Their paper proves that both domestic and foreign capital can have positive effects on local economic growth as long as they are supported by active economic policy measures, especially fiscal policy aimed at supporting aggregate demand. Positive relation between FDI and economic growth has been also demonstrated by Alexiou and Tsaliki (2007), on the case of post-war Greece. They used a long time series (1954-2003) to prove that there is a long-run relationship (cointegration) between the two variables in focus (FDI and economic growth).

Yet, a number of empirical studies proves an absence of the desired positive relation between FDI and economic growth. Todorov et al. (2022) analyzed this effect on the sample of eight new EU member states (who joined EU in 2004). In order to identify short- and long-run causal relations between the variables, but also to account for the presence of time lags and overcome the problem of endogeneity, they used vector autoregression model. In doing so, they found out that real growth rate of gross domestic product (GDP) is not influenced by FDI, either in the short-, or the long-run. Instead, they confirmed that macroeconomic indicators, together with the quality of human capital, are strongly related to local economic growth, even more so than foreign equity inflows. Thus, they implicitly stressed the importance of macroeconomic stability and prudent macroeconomic policy in achieving sustainable economic growth. Similar results, namely finding no significant effects of FDI on local labor productivity of Visegrad countries, can be found in Čuhlová and Kotíková (2022). Still, they pointed at the relevance of the distribution of FDI across economic sectors and thus stressed the relevance of FDI targeted towards technologically more advanced industries in the host countries.

An investigation of the employment effects of FDI is carried out by Gardašević (2018) on the case of Montenegro (2005-2017). The results show positive effects, but with no statistical significance, which can be explained by the nature of inward FDI in Montenegro, which predominantly includes investments in real estate without significant contribution to economic growth. Similar results, of Croatia, can be found in Kersan-Škabić and Zubin (2009) who use relatively long time series (1993-2007), and prove no effects of FDI on either exports or GDP, despite the relatively large *per capita* influx of FDI. They even proved negative effects of FDI on local employment and stressed the problem of uneven sectoral structure of FDI with predominant share of telecommunication and financial sector. They only briefly referred to the structure of FDI assuming that dominant share of brownfield investment, related to large privatization projects, are responsible for these results.

Irrespective of the findings of previous studies – either positive, or negative effects of FDI on local economic growth – we believe that differentiation of FDI into

M&A and greenfield investment can contribute to better understanding this important nexus. Thus, we follow the approach used in some other empirical studies, which explicitly separated M&A and greenfield investment in their analyses (Calderón et al., 2004, Neto et al., 2008, Wang and Wong, 2009, Harms and Meon, 2012).

State of economic growth and inward FDI in WBC

Following the pace and the overreaching character of the integration process in Europe economic developments in Southeast Europe, especially in WBC, should be evaluated against the EU policy framework for accession (Copenhagen criteria). All the countries from Western Balkans have up to now already signed the Stabilization and Association Agreement (SAA) with the EU[4], thus creating a free trade area based on asymmetric trade liberalization to their advantage. Among other membership criteria (political, legal and administrative), economic criteria stand out with the requirements for development of a functioning market economy and the capacity to withstand the competitive pressure from within the EU.

Ability to meet these criteria determines not only readiness of WBC to join the EU, but also their prospects for achieving sustainable economic growth and development in the future. This should further contribute to creation of the lasting peace and security in the region and the high standard of living for the citizens. According to the European Commission (2022a), reform progress in these countries, despite moderate success in certain fields, is still too weak to guarantee sufficient level of readiness both for the aspired full-fledged membership in the EU and for achieving sustainable high rates of economic growth in the long run. Generally, countries of Western Balkans have still to create a general legal and administrative framework to support easy and reliable business activities. This includes thorough reforms in the field of judiciary, followed by anti-corruption efforts and measures for fighting organized crime. Inefficient administration is an omnipresent problem which needs to be eliminated in order to streamline decision making at different levels of public governance.

As far as state of economy is concerned, countries of Western Balkans have so far achieved modest-to-moderate success in reforms aimed at developing a functioning market economy and improvement of their international competitiveness. Despite all the problems caused by the COVID-19 and hard consequences of the war in Ukraine (2022) WBC have to a certain extent, preserved their macroeconomic stability, which is still fragile due to structural weaknesses and the missing economic reforms. The main problems of these countries, which also weaken their competitiveness, include inefficient transport and energy infrastructure (including lagging behind in digitalization and investment in green economy), as well as education and training, which do not meet the needs of the modern labor market. Those weaknesses also include modest

sources for investment in R&D and innovation. With respect to innovation European Commission (2022b) classifies both member and non-member countries into different categories according to four main innovation-related types of activities[5] (Table 1).

Table 1: Classification of EU member and non-member countries by innovativeness, 2022

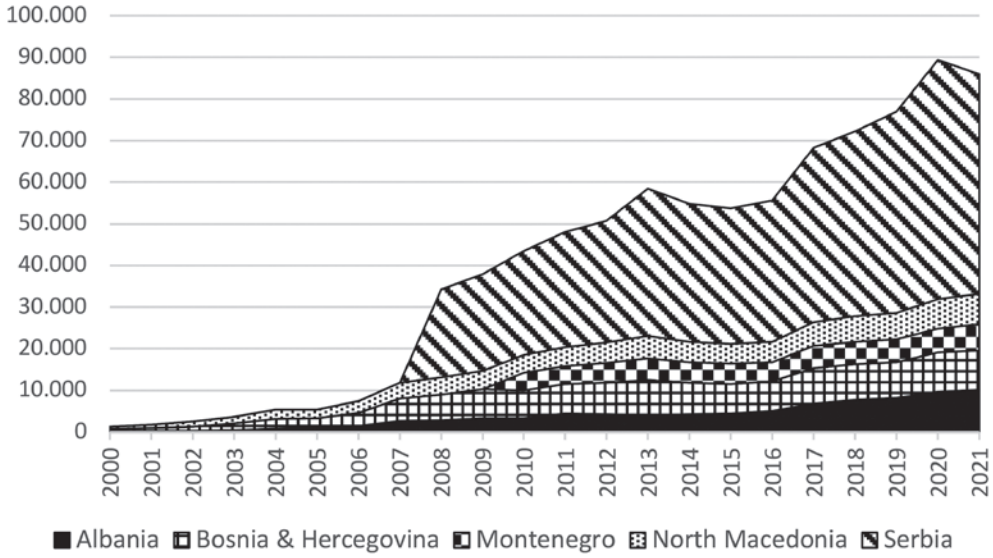
INNOVATION LEADERS > 125% of the EU average	Switzerland, Sweden, Finland, Denmark, Netherlands, Belgium
STRONG INNOVATORS 101-125% of the EU average	Norway, Ireland, Luxemburg, Austria, United Kingdom, Germany, Cyprus, France, Iceland
MODERATE INNOVATORS 71-100% of the EU average	Israel, Slovenia, Czech Republic, Italy, Spain, Portugal, Malta, Lithuania, Greece
EMERGING INNOVATORS ≤ 70% of the EU average	Hungary, Croatia, Slovakia, Russia, Poland, Latvia, Türkiye, Montenegro, North Macedonia, Bulgaria, Albania, Bosnia and Hercegovina, Romania, Ukraine

Source: European Commission, 2022b.

Slow reforms in Western Balkans are evidenced in slow economic growth across the region. Although some countries have realized relatively good economic growth during the period 2000-2021[6], their GDP *per capita* still ranges between 15% and 23% of the EU average (Eurostat 2022). This indicates that they still have to undergo a thorough reform process, in order to achieve higher growth rates, and approach the EU level of development. FDI have helped many CEEC, current members of the EU, to achieve higher level of economic efficiency and labor productivity, and thus bridge the gap towards more developed (EU) economies. Improved labor skills and increased competitiveness of these economics have generally added to their readiness to cope with competitive pressure from the European single market and achieve more benefits from asymmetric market liberalization, followed by benefits from full-fledged membership in the EU, which includes free movement of production factors and the common currency.

From 2000, WBC have realized significant inflows of FDI the greatest share of which was realized by Serbia. Accordingly, in 2021 FDI inward stock in this country is higher than that of all other countries considered together. In the observed period (2000-2021) these countries have had either constant values of FDI inflow stock, or just a slight increase (Figure 1).

Figure 1: FDI annual inward stock (USD mn), 2000-2021



Source: UNCTAD, 2022.

However, in relative terms, the highest inward FDI stock is realized by Montenegro (USD 10,000), followed by Serbia (USD 6,000). Although we can observe stronger FDI dynamics after 2010, when all the countries have achieved higher FDI inflows, the relative positions of the countries have only slightly changed (Table 2). Finally, when measured against national GDP Montenegro again achieves the prominent place with the share of 112% of FDI inward stock. The remaining countries achieve modest values of this indicator, which potentially points to their capacities to accept new foreign investment.

Table 2. Various indicators of FDI annual inward stock

	Albania	**Bosnia and Hercegovina**	**Montenegro**	**North Macedonia**	**Serbia**
FDI annual inward stock *per capita* (USD)					
2000	78.87	120.05	-	265.25	-
2005	330.58	612.85	-	1,025.57	-
2010	1,104.11	1,180.53	6,777.76	2,101.01	2,773.03
2015	1,500.25	2,088.11	7,785.26	2,303.80	3,674.26
2021	3,506.55	2,902.97	10,127.85	3,480.15	6,067.77
FDI inward stock (% GDP)					
2010	27.29	39.06	102.23	46.25	52.33
2015	38.08	44.17	120.43	47.60	70.76
2021	57.58	43.38	112.22	51.59	73.17

Source: UNCTAD, 2022.

Analysis of the impact of M&A and greenfield investment on host country's economic growth

Analytical sample includes 16 East European countries, which combine SEEC and CEEC. Despite their differences in the reform success, as resembled in the realized EU membership for some countries, their common characteristic is similar classification by the level of innovativeness (European Commission, 2022b). Accordingly, they all belong to the same group of emerging innovators and therefore represent a homogeneous and large enough sample for the analysis of the presumed dichotomous effects of M&A and greenfield investment on host country's economic growth[7]. Homogeneity in the level of innovativeness of the countries in the sample is crucial for the analysis of the FDI-growth nexus which in our opinion depends upon local capacity to innovate. We observed selected countries over a 22-year period (2000-2021), but were unable to keep all the observations due to a large number of missing data (either due to data non-availability, or non-compliance with international statistical standards). Consequently, we got an unbalanced set of longitudinal data with N=16 and T<16 (Appendix, Table A1). Analysis is carried out with statistical package Stata.17.

Variables include those typical for the growth equation (Table 3). Dependent variable, depicting economic growth, is approximated by GDP *per capita*, so that change in levels of this variable denotes economic growth. We find use of absolute values of our variables more practical, since it makes their transformation into natural logarithms easier[8]. Furthermore, in this way we avoid the impossible situation of transforming negative values into natural logarithms (in case of negative growth rates), which can easily end up in loosing too many observations. Key variables in our analysis include FDI, M&A and greenfield investment. Control variables include employment and domestic investment (gross fixed capital formation), whereas foreign demand is approximated with two variables – exports of goods and trade (trade volume) in goods, which are interchangeably used in our regression equation.

Table 3: Variables of the panel data regression equation

Symbol	Name	Indicator	Unit of value	Data source
GDPc	Economic growth	Gross domestic product *per capita*	USD	UNCTADstat
EMPLOY	Labor	Employment	Share of employment (15+) in working age population (15-64)	ILOSTAT
GFCF	Domestic investment	Gross fixed capital formation	% GDP	UNCTADstat
FDI	Foreign direct investment	Annual inward stock	% GDP	UNCTADstat
MA	Mergers & acquisition	Accumulated annual inflow	% GDP	UNCTADstat
GREEN	Greenfield investment	Accumulated annual inflow	% GDP	UNCTADstat
EXg	Export of goods	Commodities export	% GDP	UNCTADstat
TRADEg	Trade openness - goods	Export and import of commodities	% GDP	UNCTADstat
EXs	Export of services	Services export	% GDP	UNCTADstat
TRADEs	Trade openness - services	Export and import of services	% GDP	UNCTADstat
TRADE	Trade openness – goods and services	Export and import of commodities and services	% GDP	UNCTADstat

Source: Authors' own analysis.

We estimate the following general panel regression model in the matrix form:

$$i = 1, 2, \ldots, N; t = 1, 2, \ldots, T, \tag{1}$$

or with selected analytical variables in a more specific form:

$$EC.GROWTH_{it} = \alpha_i + \beta_1 FOREIGN.INV_{it} + \gamma_i CONTROL.VAR_{it} + \varepsilon_{it} \tag{2}$$

where i denotes unit of observation (country) and t denotes time dimension (year). Economic growth *(EC.GROWTH)* is dependent variable, while foreign investment variables *(FOREIGN.INV)* include FDI, M&A and greenfield investment, which will be subsequently used in different specifications of the panel regression model. Control variables *(CONTROL.VAR)* include employment, domestic investment and foreign demand.

First, we analyzed multicollinearity among explanatory variables (Appendix, Table A2). Correlation matrix shows very high level of correlation among FDI and greenfield investment which enter regression equations separately. Very high correlation can also be observed among trade variables (export of goods and export of services). Analysis based on the variance inflation factor (VIF) reaffirmed the presence of multicollinearity. However, when we separately include variables of export of goods and export of services in the regression equation, the value of variance inflation factor drops to acceptable level (below 2 which is taken as a rule of thumb), (Appendix, Table A3). Preliminary analysis of the impact of M&A and greenfield

investment on economic growth is presented in scatterplots (Appendix, Figure A1) which indicate relatively strong relation between FDI and economic growth. Yet, when FDI is separated into M&A and greenfield investment we realize that M&A has significantly stronger contribution to economic growth, unlike greenfield investment which achieve just a moderate growth effect. Hence, we continue our analysis by strictly differentiating between the two types of FDI. According to Baltagi (2008) and Wooldridge (2008), unlike long panels with (T>N, or T>>N), short panels (N>T), such as ours, are assumed not to suffer from the problem of non-stationarity. Hence, we continue with transformation of original values of the selected variables into natural logarithms.

Forthcoming regression analysis includes standard procedure, which starts with pooled ordinary least square (POLS) regression equation, for M&A and greenfield investment separately. Comparison of each POLS estimation with robust standard errors (country clustered) to that with default standard errors shows significant deterioration of the results, which means a surge in standard errors, and hence loss of statistical significance of almost all explanatory variables in the model (Appendix, Table A4). This indicates possible problems with the error term of the regression model. Furthermore, only two variables of foreign demand – namely export of goods (EXg) and trade openness (TRADEg) – show satisfactory results, among which export of goods contributes more to the explanatory power of the model (see adjusted R^2). Following the preliminary insight into the results of the regression equation (POLS), we succeed with the random effects model (REM) and fixed effects model (FEM), by estimating separate equations with M&A and greenfield investment. Before going on the FEM we carry out Breusch and Pagan test according to which we reject the null hypothesis and give preference to REM over POLS [9] (Appendix, Tables A5, A6, A9 and A10).

Estimation results for both REM and FEM are quite similar. Overall, this is confirmed by the F-test and similar results of adjusted R^2 (overall, within and between). Based on general characteristics of the models, correlation between unit-specific characteristics and error term in REM is assumed to be zero, while in FEM this condition is (expectedly) not fulfilled. In regression equations with M&A almost all variables are statistically significant, especially in REM (Appendix, Table A5), while in FEM our key variable (M&A) is significant at almost 5% (Appendix, Table A7). Yet, in both specifications M&A contributes negatively to host country's economic growth, as well as the variable of employment. Strongest positive contribution to economic growth comes from export of goods and domestic investment (GFCF). As far as the regression models with greenfield investment are concerned (Appendix, Table A9 and Table A11) we obtain fairly similar results between REM and FEM. Our key variable (greenfield investment) becomes statistically significant in the FEM, but constantly keeps negative sign, thus indicating negative contribution to host country's economic growth. The strongest contribution to economic growth in this specification also comes from foreign demand through export of goods.

In both specifications (M&A, greenfield investment) FEM proves to be better, as corroborated by the F-test (unit-specific fixed effects different from zero) and slightly higher rho-coefficient (almost 99%). Finally, Hausman test confirms consistency of the FEM estimation by rejecting the null hypothesis (Appendix, Tables A8 and A12).

In the two regression equation specifications two variables of foreign demand are used – export of goods (EXg) and trade openness based on commodities trade flows (TRADEg). As described above, equation specifications which include export of goods (Table 4) show fairly good results, while specifications with the variable od trade openness show even better results, especially in terms of statistical significance and the sign of the key variables (M&A and greenfield investment). In all these specifications, variables of M&A and greenfield investment have positive impact on host country's economic growth. In doing so, greenfield investments add more to local economic growth. Regarding the historical circumstances of former transition countries and the current relative weak position of the SEEC in terms of soft business infrastructure and their need for building new economic structure and creating new production and other business capacities, stronger impact of greenfield investment on host country's economic growth appears to be quite reasonable.

Table 4: REM and FEM with M&A and greenfield investment*

	(1) lnGDPc	(2) lnGDPc	(3) lnGDPc	(4) lnGDPc	(5) lnGDPc	(6) lnGDPc	(7) lnGDPc	(8) lnGDPc
lnEMPLOY	-0.394***	-0.398***	-0.248	-0.315	-0.376***	-0.363***	-0.388*	-0.404*
	(0.0764)	(0.0721)	(0.207)	(0.210)	(0.0760)	(0.0723)	(0.162)	(0.161)
lnGFCF	0.402***	0.397***	0.586***	0.588***	0.375***	0.346***	0.809***	0.821***
	(0.0560)	(0.0528)	(0.148)	(0.148)	(0.0580)	(0.0553)	(0.116)	(0.114)
lnMA	-0.0197	-0.0257	0.165***	0.156***				
	(0.0148)	(0.0140)	(0.0371)	(0.0374)				
lnEXg	0.775***	0.791***			0.800***	0.844***		
	(0.0176)	(0.0168)			(0.0275)	(0.0273)		
lnTRADEg			1.283***	1.396***			0.109	-0.00668
			(0.174)	(0.185)			(0.168)	(0.175)
lnGREEN					-0.0235	-0.0464**	0.352***	0.370***
					(0.0165)	(0.0162)	(0.0248)	(0.0252)
_cons	-8.952***	-9.439***	2.038*	1.785	-9.499***	-10.56***	6.304***	6.782***
	(0.505)	(0.458)	(1.037)	(1.050)	(0.673)	(0.642)	(0.888)	(0.884)
N	285	285	285	285	285	285	285	285
adj. R-sq		0.903		0.252		0.905		0.561

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

*REM - regression estimations (1), (3), (5), (7). FEM - regression estimations (2), (4), (6), (8).

Source: Authors' own analysis.

Yet, large differences in the results of alternative regression equation estimations (POLS with robust standard errors vs. POLS with default standard errors), as well as differences in the estimation results of the key regression variables (M&A and green-

field investment), possibly indicate problems in these estimations which demands further investigation into the error term of the regression model. In that respect, we subsequently refer to the problems of serial correlation, groupwise heteroscedasticity and cross-sectional correlation.

The problem of serial correlation is typical for time series in a way that there might exist a correlation in the value of the same variable between two successive periods. In order to test for the presence of serial correlation in panel data we carry out Wooldridge test for serial correlation (Wooldridge, 2002; Drukker, 2003) with the null hypothesis assuming no autocorrelation. According to test results with various specifications of key variables (M&A and greenfield investment) and two different variables for foreign demand (exports of goods and trade volume) we reject the null hypothesis in all four specification of regression equation and prove the presence of serial correlation in this specific dataset (Appendix, Table A13).

The problem of heteroscedasticity occurs when variance is unstable (e.g. increases) over time with negative consequences on the reliability of the estimated parameters. In panel data this problem can easily occur due to differences in the scale of variables between different panels of data[10] (Baum and Lewbel, 2019). According to the null hypothesis of the Modified Wald test for groupwise heteroscedasticity we assume that variance is constant, whereas rejection of the null indicates unstable variance and presence of groupwise heteroscedasticity in the panel dataset. The results of Wald test for all specifications of the FEM suggest rejection of the null hypothesis, thus indicating that this specific data set suffers from the problem of groupwise heteroscedasticity (Appendix, Table A14).

Another problem in macro-level panel data is cross-sectional dependence which is nowadays increasingly present with the growing integration of global trade and capital flows and especially so in case of regional economic integration such as EU. In order to test for the presence of cross-sectional correlation in panel data we follow methodology proposed by Pesaran (2004) and De Hoyos and Serafidis (2006). Test results for all alternative specifications of the regression equation (FEM) require rejection of the null hypothesis (p-value$<\alpha$) which indicates the presence of the problem of cross-sectional correlation in the dataset (Appendix, Table A15).

With the above problems of the estimation and taking into account the dimension of the unbalanced panel dataset (N>T) and the proven consistency of the FEM we opted for Prais-Winsten estimator with panel corrected standard errors. This estimator by default assumes error structure which includes heteroscedasticity, panel autocorrelation and contemporaneous correlation (Lloyd Blackwell, 2006). In order to find out the effects of separate FDI modes of entry we carry out regression estimation for all three forms of foreign investment (FDI, M&A and greenfield investment) with alternative use of the variables of export of goods and trade openness. The results of this estimation (Table 5) show much more intuitive outcomes with a large number of statistically significant variables and the expected direction of their influence

on economic growth. Variables of both M&A and greenfield investment are highly statistically significant thus proving that investment, both domestic and foreign, can add to local economic growth. In that respect, the impact of domestic investment (as approximated by GFCF) has stronger influence, than foreign capital. The difference between various forms of foreign capital is striking. First, the impact of total FDI on economic growth is stronger than the impact of individual types of investment. Second, in case of emerging innovators the impact of greenfield investment appears to be stronger than the impact of M&A. Contribution of foreign demand to local economic growth proves to be consistent throughout the analysis, irrespective of the variable which approximates this effect (exports or trade volume). The only variable without statistically significant impact on local economic growth for this specific group of countries is employment whose impact proves to be inconsistent across different models anyway.

Table 5: Prais-Winsten regression with heteroscedastic panels corrected standard errors

	(1) lnGDPc	(2) lnGDPc	(3) lnGDPc	(4) lnGDPc	(5) lnGDPc	(6) lnGDPc
lnEMPLOY	-0.0330	-0.0161	-0.0692	0.0609	-0.0616	0.00247
	(0.0540)	(0.0886)	(0.0493)	(0.0885)	(0.0442)	(0.0857)
lnGFCF	0.537***	0.567***	0.447***	0.623***	0.500***	0.517***
	(0.0734)	(0.100)	(0.0711)	(0.103)	(0.0691)	(0.102)
lnFDI	0.279***	0.197***				
	(0.0366)	(0.0456)				
lnEXg	0.302***		0.382***		0.350***	
	(0.0115)		(0.0168)		(0.0167)	
lnTRADEg		0.409***		0.249**		0.449***
		(0.0934)		(0.0876)		(0.102)
lnMA			0.0571**	0.0631*		
			(0.0208)	(0.0286)		
lnGREEN					0.0610***	0.106***
					(0.0132)	(0.0208)
_cons	-0.896*	4.508***	-1.490***	5.346***	-0.901*	4.733***
	(0.410)	(0.605)	(0.451)	(0.561)	(0.444)	(0.559)
N	285	285	285	285	285	285
R-sq	0.998	0.991	0.994	0.992	0.995	0.984

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Source: Authors' own analysis.

An alternative specification without constant shows even better results (Table 6). In this specification, all variables are statistically significant, including that of em-

ployment whose sign, however, changes across different estimations. Yet, this specification confirms our previous findings that total FDI, proves to have stronger effect on economic growth, than M&A and greenfield investment separately. This difference is very large and possibly indicates overestimation of the FDI-growth nexus when only FDI is taken as the explanatory variable. Furthermore, in case of countries at the bottom end of innovation activities (emerging innovators), greenfield investments add more to local economic growth than M&A. Finally, specification in which foreign demand is approximated by trade volume, shows even stronger contribution of all types of investment (including FDI) on local economic growth.

Table 6: Prais-Winsten regression with correlated panels corrected standard errors (PCSEs)

	(1) lnGDPc	(2) lnGDPc	(3) lnGDPc	(4) lnGDPc	(5) lnGDPc	(6) lnGDPc
lnEMPLOY	-0.122***	0.204**	-0.115***	0.378***	-0.0873**	0.288***
	(0.0331)	(0.0622)	(0.0292)	(0.0618)	(0.0283)	(0.0673)
lnGFCF	0.388***	0.831***	0.376***	1.041***	0.452***	0.784***
	(0.0717)	(0.102)	(0.0636)	(0.0930)	(0.0593)	(0.101)
lnFDI	0.219***	0.364***				
	(0.0442)	(0.0572)				
lnEXg	0.304***		0.337***		0.322***	
	(0.00961)		(0.00846)		(0.00833)	
lnTRADEg		0.902***		0.899***		1.057***
		(0.0797)		(0.0665)		(0.0833)
lnMA			0.0524***	0.0952**		
			(0.0152)	(0.0294)		
lnGREEN					0.0644***	0.127***
					(0.0135)	(0.0315)
N	285	285	285	285	285	285
R-sq	0.998	0.991	0.997	0.990	0.997	0.983

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Source: Authors' own analysis.

Conclusion

Over the last three decades FDI has proven to be an efficient means of encouraging economic growth through transfer of technology and know-how, while not creating additional debt. Global trade and financial market liberalization, together with global segmentation of production have created an excellent playing field for both global investors and FDI recipient countries. The competition in attracting FDI was

so hard that governments entered a 'race to the bottom' in order to attract new FDI by granting various concessions some of which have put significant burden on the budget. Yet, empirical literature does not offer a unanimous view on the ultimate effects of FDI on host economies. Some contributions speak of positive effects on the main macroeconomic variables such as GDP, employment and exports, while others take on a different view showing that FDI has failed to yield significant outcome on economic growth and development. The motivation for this paper arose from this dichotomy, as we have tried to provide a more thorough insight into the matter by differentiating between M&A and greenfield investment as two distinctive forms of investment, both in terms of investors' expectations and the effects on the host economy. In doing so, less advanced innovators, selected from the pool of SEEC and CEEC, have served as an excellent research sample. We hypothesized that separate effects of M&A and greenfield investment on host country's economic growth are weaker than those of FDI as an aggregate statistical category. We also claimed that greenfield investments produces stronger growth effects in less innovative countries that M&A. Our research includes 16 countries, classified as emerging innovators, over a period 2000-2021. This created an unbalanced panel data set with N>T. Problems we came across in our investigation (serial correlation, groupwise heteroscedasticity and cross sectional correlation) were solved by using Prais-Winsten estimation which proved our initial hypotheses according to which separation of FDI into M&A and greenfield investments indeed reduces their ultimate growth effects, with M&A having weaker contribution to economic growth in less innovative countries. Our model further proves that, along with foreign equity investment, strong contribution to local economic growth also comes from domestic investment and exports, while in this specific case employment fails to render a consistent contribution to economic growth. In terms of economic policy our findings imply that efficiency of domestic investment does matter in achieving economic growth, along with the potentials of export markets and different forms of FDI whose maximum efficiency ultimately depends on the level of innovativeness of the host economy.

Declarations

Funding

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Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests

Availability of data and material

The data that support the findings of this study are openly available in the website of United Nations Conference on Trade and Development (www.unctad.org) and International Labor Organization (www.ilo.org).

Code Availability

The computer program results can be obtained from the corresponding author upon request.

Authors' Contributions

Dražen Derado: Conceptualization. Methodology. Software. Formal Analysis. Data Curation. Writing – Review and Editing. Supervision.
Darko Horvatin: Investigation. Resources. Writing – Original Draft. Visualization. Project Administration.

NOTES

1 WBC include: Albania, Bosnia and Hercegovina, Kosovo, Montenegro, North Macedonia and Serbia. Since 2022 the EU policy framework for enlargement also includes Türkyie and former Soviet republics of Georgia, Moldova and Ukraine.

2 Contract manufacturing, services outsourcing, licensing, franchising, management contracts, concessions, strategic alliances, contractual joint ventures, etc.

3 Similar to Hanafy and Marktanner (2018).

4 At the end of 2022 all of them (except Kosovo) have candidate status with the EU.

5 These include framework conditions for innovation (human resources, research, digitalization), investment in innovation (R&D expenditure, information and communication technology – ICT), innovation activities (cooperation, intellectual assets) and impact of innovation (employment, sales, environment).

6 Average annual growth rates during 2000-2021 were: Bosnia and Hercegovina (8.4%), Albania (8%), North Macedonia (6.5%), Serbia (1.7%) and Montenegro (1,7%), (Eurostat, 2022). Figures for Montenegro and Serbia refer to the period 2008-2021.

7 The only two exceptions in the sample are Slovenia (moderate innovator) and Moldova (not classified by the European Commission). Yet, they are included in the sample as countries which have gone through the process of 'decoupling', similar to other countries and included in the analytical sample. Although European Commission (2022b) did not classify Moldova by the level of innovativeness, based on its level of development and other macroeconomic indicators, we find it reasonable to include Moldova in the sample as an emerging innovator.

8 Transformation into natural logarithms is advantageous when values of the same variable are of a different scale for different countries, which is most often the case with country level data.

9 Test for heteroscedasticity in a linear regression model assumes normal distribution of the error term. In the null hypothesis it assumes that variance of the error term is constant and does not fluctuate with the change of the independent variables. Rejection of the null means that error variances are not equal and hence POLS model has to be rejected in favor of REM (Breusch and Pagan, 1979).

10 E.g. countries of different economic size, level of development, amount of capital inflows, etc.

Appendix

Table A1: Summary statistics for panel data

Variable		Mean	Std. dev.	Min	Max	Observations
country	overall	8.961404	4.566633	1	16	N = 285
	between		4.760952	1	16	n = 16
	within		0	8.961404	8.961404	T-bar = 17.8125
year	overall	2011.232	5.683778	2000	2020	N = 285
	between		1.854892	2010	2015	n = 16
	within		5.437384	2001.232	2021.232	T-bar = 17.8125
lnGDPc	overall	8.820873	.7970771	5.907866	10.22052	N = 285
	between		.687984	7.227795	10.07893	n = 16
	within		.4216089	7.475272	9.586298	T-bar = 17.8125
lnEMPLOY	overall	3.850722	.169381	3.155914	5.062157	N = 285
	between		.1401547	3.498951	4.043257	n = 16
	within		.1103181	3.137329	4.909975	T-bar = 17.8125
lnGFCF	overall	3.099505	.1899521	2.57093	3.639433	N = 285
	between		.1227629	2.909356	3.351171	n = 16
	within		.1475665	2.696099	3.528612	T-bar = 17.8125
lnFDI	overall	3.705249	.5020416	1.925462	4.791046	N = 285
	between		.4408955	2.76704	4.674231	n = 16
	within		.284903	2.607019	4.45513	T-bar = 17.8125
lnMA	overall	1.691033	.834295	-3.19887	3.25823	N = 285
	between		.5686029	.3106358	2.42781	n = 16
	within		.6075397	-2.822258	2.909624	T-bar = 17.8125
lnGREEN	overall	2.916281	1.179348	-2.327328	5.105309	N = 285
	between		.843446	1.13148	4.732235	n = 16
	within		.8938031	-.9274948	4.430065	T-bar = 17.8125
lnEXg	overall	23.50994	1.658746	19.67883	26.33579	N = 285
	between		1.663814	19.91564	25.59722	n = 16
	within		.5171241	22.07012	24.24852	T-bar = 17.8125
lnTRADEg	overall	4.41471	.378001	3.401067	5.172893	N = 285
	between		.3558981	3.72603	5.012203	n = 16
	within		.1323769	3.969822	4.678439	T-bar = 17.8125
lnEXs	overall	22.46743	1.283739	18.91903	24.97508	N = 285
	between		1.195526	20.27826	24.26448	n = 16
	within		.5047274	20.78954	23.64358	T-bar = 17.8125
lnTRADEs	overall	3.007295	.4275884	1.911863	3.875541	N = 285
	between		.4139531	2.141892	3.70135	n = 16
	within		.1603073	2.646694	3.466133	T-bar = 17.8125
lnTRADE	overall	4.652178	.3374578	3.707385	5.28958	N = 285
	between		.3080059	3.915721	5.129536	n = 16
	within		.1232177	4.231973	4.914744	T-bar = 17.8125

Source: Authors' own analysis.

Table A2: Correlation matrix

	lnEMPLOY	lnGFCF	lnFDI	lnMA	lnGREEN	lnEXg	lnTRADEg	lnEXs	lnTRADEs	lnTRADE
lnEMPLOY	1.0000									
lnGFCF	-0.0493	1.0000								
lnFDI	0.0328	-0.2335	1.0000							
lnMA	0.0895	-0.2517	0.4645	1.0000						
lnGREEN	0.1110	-0.1586	0.7766	0.3061	1.0000					
lnEXg	0.3778	-0.1902	-0.1265	0.2856	-0.0939	1.0000				
lnTRADEg	0.2828	-0.3013	0.4676	0.2873	0.2448	0.2083	1.0000			
lnEXs	0.3681	-0.0753	-0.0999	0.2954	-0.0045	0.9082	-0.0543	1.0000		
lnTRADEs	0.1930	0.0266	0.5090	0.0803	0.4318	-0.4691	0.3196	-0.3059	1.0000	
lnTRADE	0.2933	-0.2452	0.5584	0.2801	0.3431	0.0279	0.9574	-0.1482	0.5700	1.0000

Source: Authors' own analysis.

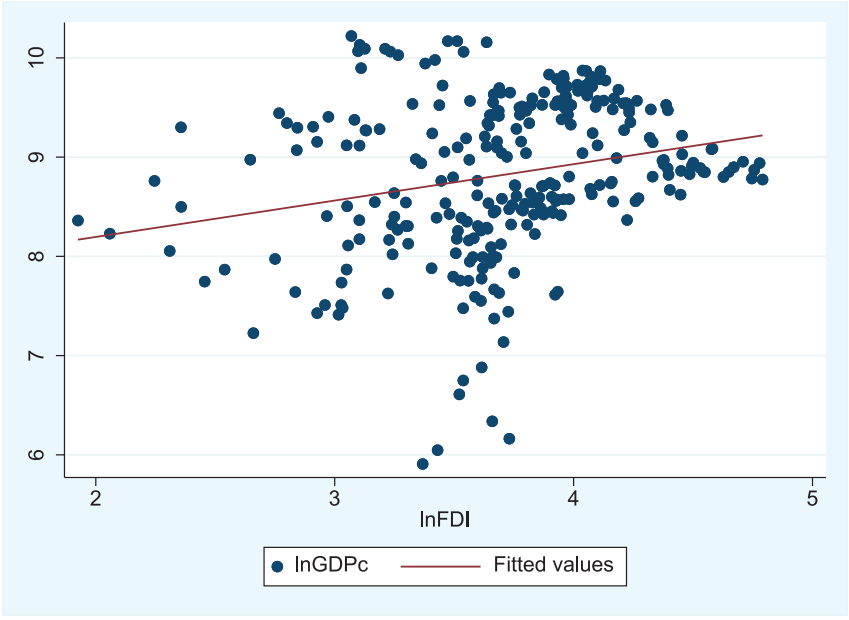
Table A3: Variance inflation factor

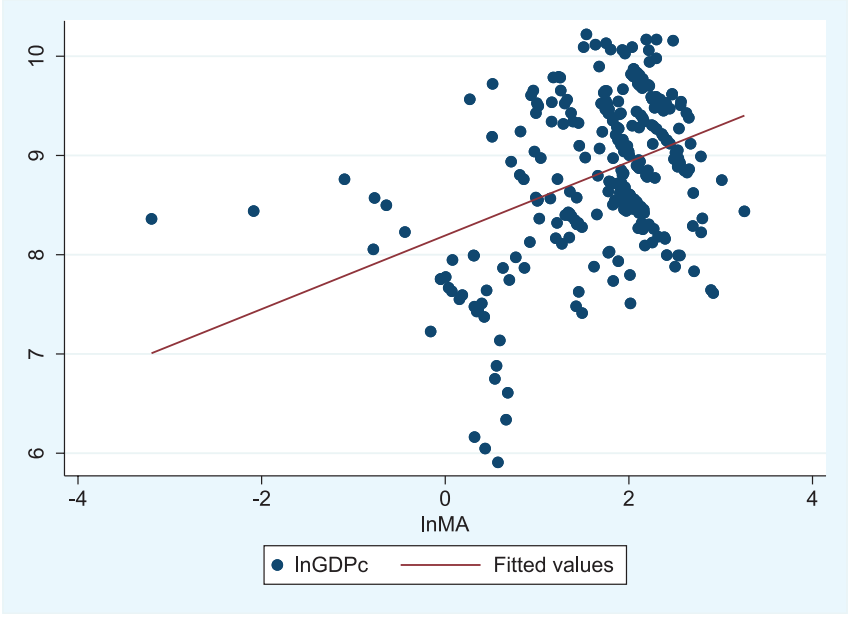
Variable	VIF	1/VIF
lnEXg	1.26	0.793944
lnEMPLOY	1.18	0.848511
lnGFCF	1.12	0.894201
lnFDI	1.10	0.906437
Mean VIF	1.16	

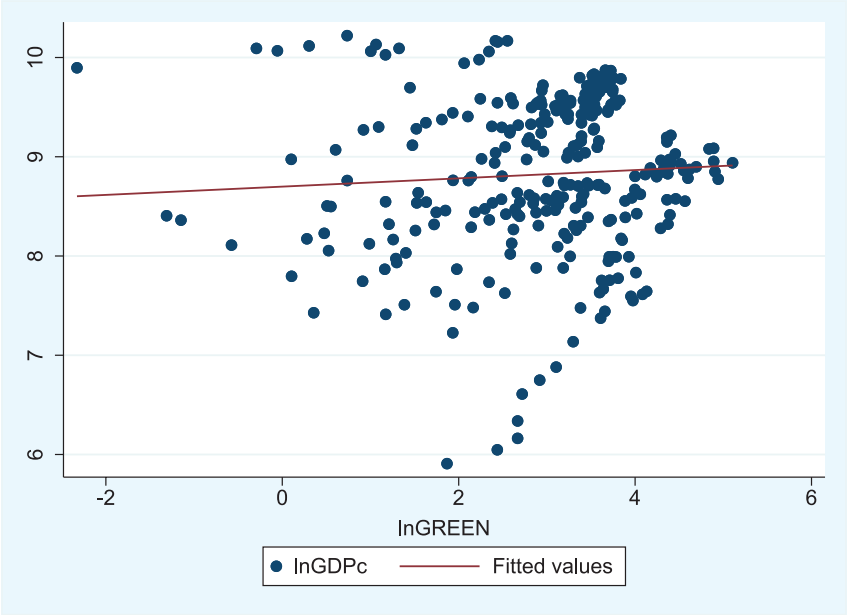
Variable	VIF	1/VIF
lnTRADEg	1.48	0.675076
lnFDI	1.31	0.761983
lnGFCF	1.11	0.897588
lnEMPLOY	1.10	0.906740
Mean VIF	1.25	

Source: Authors' own analysis.

Figure A1: Graphical representation of the dependency between economic growth and key investment variables (FDI, M&A, greenfield investment)







Source: Authors' own analysis.

Table A4: POLS estimations with default and robust standard errors*

	(1) lnGDPc	(2) lnGDPc	(3) lnGDPc	(4) lnGDPc	(5) lnGDPc	(6) lnGDPc	(7) lnGDPc	(8) lnGDPc
lnEMPLOY	0.140	0.140	0.751**	0.751	0.0000184	0.0000184	0.781**	0.781
	(0.231)	(0.696)	(0.255)	(0.713)	(0.245)	(0.738)	(0.274)	(0.647)
lnGFCF	0.752***	0.752	0.710**	0.710	0.623**	0.623	0.433	0.433
	(0.199)	(0.450)	(0.233)	(0.511)	(0.206)	(0.428)	(0.246)	(0.455)
lnMA	0.269***	0.269*	0.339***	0.339				
	(0.0464)	(0.125)	(0.0527)	(0.203)				
lnEXg	0.251***	0.251**			0.299***	0.299**		
	(0.0247)	(0.0823)			(0.0255)	(0.0974)		
lnTRADEg			0.450***	0.450			0.626***	0.626
			(0.123)	(0.403)			(0.131)	(0.359)
lnGREEN					0.0970**	0.0970	-0.00880	-0.00880
					(0.0332)	(0.117)	(0.0390)	(0.0943)
_cons	-0.402	-0.402	1.168	1.168	-0.413	-0.413	1.733	1.733
	(1.098)	(2.505)	(1.279)	(2.543)	(1.154)	(2.513)	(1.367)	(2.203)
N	285	285	285	285	285	285	285	285
adj. R-sq	0.412	0.412	0.233	0.233	0.361	0.361	0.120	0.120

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

*Default standard errors - regression estimations (1), (3), (5), (7). Robust standard errors (clustered by country) - regression estimations (2), (4), (6), (8).

Source: Authors' own analysis.

Table A5: REM with M&A

```
Random-effects GLS regression                   Number of obs     =       285
Group variable: country                         Number of groups  =        16

R-squared:                                      Obs per group:
     Within  = 0.9095                                         min =        11
     Between = 0.2100                                         avg =      17.8
     Overall = 0.3372                                         max =        21

                                                Wald chi2(4)      =   2338.39
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =    0.0000
```

lnGDPc	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
lnEMPLOY	-.3939832	.076351	-5.16	0.000	-.5436283	-.244338
lnGFCF	.4017256	.0559736	7.18	0.000	.2920193	.5114319
lnMA	-.0196853	.0148449	-1.33	0.185	-.0487807	.0094101
lnEXg	.7745147	.0175705	44.08	0.000	.7400771	.8089524
_cons	-8.951842	.5053049	-17.72	0.000	-9.942222	-7.961463
sigma_u	.61330132					
sigma_e	.13126322					
rho	.95619875	(fraction of variance due to u_i)				

Source: Authors' own analysis.

Table A6: Breusch and Pagan test between POLS model and REM with M&A

```
        Breusch and Pagan Lagrangian multiplier test for random effects

                lnGDPc[country,t] = Xb + u[country] + e[country,t]

                Estimated results:
                                 |       Var     SD = sqrt(Var)
                -----------------+------------------------------
                          lnGDPc |    .6353318       .7970771
                               e |      .01723       .1312632
                               u |    .3761385       .6133013

                Test: Var(u) = 0
                                          chibar2(01) =  1193.06
                                        Prob > chibar2 =   0.0000
```

Source: Authors' own analysis.

Table A7: FEM with M&A

```
Fixed-effects (within) regression               Number of obs      =       285
Group variable: country                         Number of groups   =        16

R-squared:                                      Obs per group:
     Within  = 0.9096                                         min =        11
     Between = 0.2092                                         avg =      17.8
     Overall = 0.3360                                         max =        21

                                                F(4,265)           =    666.22
corr(u_i, Xb) = -0.7856                         Prob > F           =    0.0000
```

lnGDPc	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
lnEMPLOY	-.3982872	.0720604	-5.53	0.000	-.540171	-.2564034
lnGFCF	.3968582	.0527913	7.52	0.000	.2929144	.500802
lnMA	-.0256571	.0140291	-1.83	0.069	-.0532798	.0019656
lnEXg	.7914456	.0167876	47.14	0.000	.7583916	.8244996
_cons	-9.438952	.4575009	-20.63	0.000	-10.33975	-8.538152
sigma_u	1.1370289					
sigma_e	.13126322					
rho	.98684795	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(15, 265) = 386.96                     Prob > F = 0.0000
```

Source: Authors' own analysis.

Table A8: Hausman test between REM and FEM with M&A

	Coefficients (b) fe1	(B) re1	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
lnEMPLOY	-.3982872	-.3939832	-.004304	.0042813
lnGFCF	.3968582	.4017256	-.0048674	.0023385
lnMA	-.0256571	-.0196853	-.0059717	.0011296
lnEXg	.7914456	.7745147	.0169308	.0029416

```
                b = Consistent under H0 and Ha; obtained from xtreg.
 B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

    chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =  34.92
Prob > chi2 = 0.0000
```

Source: Authors' own analysis.

Table A9: REM with greenfield investment

```
Random-effects GLS regression                   Number of obs     =         285
Group variable: country                         Number of groups  =          16

R-squared:                                      Obs per group:
     Within  = 0.9105                                         min =          11
     Between = 0.2151                                         avg =        17.8
     Overall = 0.3371                                         max =          21

                                                Wald chi2(4)      =     2423.04
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =      0.0000
```

lnGDPc	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
lnEMPLOY	-.3763663	.0759754	-4.95	0.000	-.5252753	-.2274573
lnGFCF	.375117	.0579505	6.47	0.000	.2615361	.4886979
lnGREEN	-.0234647	.0164864	-1.42	0.155	-.0557774	.0088481
lnEXg	.8000532	.0275237	29.07	0.000	.7461078	.8539987
_cons	-9.498542	.6733045	-14.11	0.000	-10.81819	-8.178889
sigma_u	.68329047					
sigma_e	.13008976					
rho	.96502062	(fraction of variance due to u_i)				

Table A10: Breusch and Pagan test between POLS model and REM with greenfield investment

```
Breusch and Pagan Lagrangian multiplier test for random effects

        lnGDPc[country,t] = Xb + u[country] + e[country,t]

        Estimated results:
                         |       Var     SD = sqrt(Var)
                 --------+------------------------------
                   lnGDPc|    .6353318       .7970771
                       e |    .0169233       .1300898
                       u |    .4668859       .6832905

        Test: Var(u) = 0
                                  chibar2(01) =  1545.64
                              Prob > chibar2 =   0.0000
```

Source: Authors' own analysis.

Table A11: FEM with greenfield investment

```
Fixed-effects (within) regression               Number of obs      =        28
Group variable: country                         Number of groups   =         1

R-squared:                                      Obs per group:
     Within  = 0.9112                                         min =         1
     Between = 0.2170                                         avg =       17.
     Overall = 0.3336                                         max =         2

                                                F(4,265)           =     679.5
corr(u_i, Xb) = -0.8196                         Prob > F           =     0.000
```

lnGDPc	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
lnEMPLOY	-.3634935	.0722756	-5.03	0.000	-.5058009	-.221186
lnGFCF	.3456197	.0553036	6.25	0.000	.2367294	.4545
lnGREEN	-.0464101	.0161996	-2.86	0.005	-.0783063	-.014513
lnEXg	.8439169	.0272741	30.94	0.000	.7902155	.897618
_cons	-10.55576	.6420384	-16.44	0.000	-11.8199	-9.29161
sigma_u	1.2293786					
sigma_e	.13008976					
rho	.98892665	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(15, 265) = 430.08                     Prob > F = 0.000
```

Source: Authors' own analysis.

Table A12: Hausman test between REM and FEM with greenfield investment

	Coefficients (b) fe2	(B) re2	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
lnEMPLOY	-.3634935	-.3763663	.0128728	.0046742
lnGFCF	.3456197	.375117	-.0294973	.0058446
lnGREEN	-.0464101	-.0234647	-.0229454	.0043905
lnEXg	.8439169	.8000532	.0438637	.0082182

```
                b = Consistent under H0 and Ha; obtained from xtreg.
     B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

    chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =  31.17
Prob > chi2 = 0.0000
```

Source: Authors' own analysis.

Table A13: Wolldridge test for serial correlation in panel data (N>T)

```
. xtserial lnGDPc lnEMPLOY lnGFCF lnMA lnEXg
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      15) =     75.755
           Prob > F =      0.0000

. xtserial lnGDPc lnEMPLOY lnGFCF lnMA lnTRADEg
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      15) =    242.674
           Prob > F =      0.0000

. xtserial lnGDPc lnEMPLOY lnGFCF lnGREEN lnEXg
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      15) =     75.898
           Prob > F =      0.0000

. xtserial lnGDPc lnEMPLOY lnGFCF lnGREEN lnTRADEg
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      15) =    170.635
           Prob > F =      0.0000
```

Source: Authors' own analysis.

Table A14: Modified Wald test for groupwise heteroscedasticity for FEM

. xtreg lnGDPc lnEMPLOY lnGFCF lnMA lnEXg, fe

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (16)  =     101.15
Prob>chi2 =      0.0000
```

. xtreg lnGDPc lnEMPLOY lnGFCF lnMA lnTRADEg, fe

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (16)  =    3080.15
Prob>chi2 =      0.0000
```

. xtreg lnGDPc lnEMPLOY lnGFCF lnGREEN lnEXg, fe

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (16)  =     171.68
Prob>chi2 =      0.0000
```

. xtreg lnGDPc lnEMPLOY lnGFCF lnGREEN lnTRADEg, fe

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (16)  =     286.05
Prob>chi2 =      0.0000
```

Source: Authors' own analysis.

Table A15: Pesaran test for cross-sectional independence (N>T)

. xtreg lnGDPc lnEMPLOY lnGFCF lnMA lnEXg, fe

```
Pesaran's test of cross sectional independence =     9.204, Pr = 0.0000
```

. xtreg lnGDPc lnEMPLOY lnGFCF lnMA lnTRADEg, fe

```
Pesaran's test of cross sectional independence =    14.565, Pr = 0.0000
```

. xtreg lnGDPc lnEMPLOY lnGFCF lnGREEN lnEXg, fe

```
Pesaran's test of cross sectional independence =     9.722, Pr = 0.0000
```

. xtreg lnGDPc lnEMPLOY lnGFCF lnGREEN lnTRADEg, fe

```
Pesaran's test of cross sectional independence =    10.726, Pr = 0.0000
```

Source: Authors' own analysis.