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Impact of Greenfield Investment and M&A on the Host Country's Economic Growth: An Assessment of the EU Member Countries

Abstract

Empirical literature regarding the ultimate effects of foreign direct investment (FDI) on host countries' economic growth does not reach a unanimous conclusion. To fill the gap, this paper differentiates greenfield investments from mergers and acquisitions (M&A) and focuses on the host country's innovativeness. A total sample of 25 member countries of the European Union (EU) over the period 1999-2018 has created a balanced panel dataset, which made it possible to analyse the separate effects of greenfield investment and M&A on economic growth. Panel data analysis with fixed effects, corrected for groupwise heteroskedasticity and cross-sectional correlation, confirms that different types of FDI generate different effects on economic growth and concerning the host country's innovation capacity. More specifically, M&A achieve the strongest contribution to economic growth in countries with stronger innovation capacities, while greenfield investments add more to economic growth in countries lagging behind in innovation.

Keywords: FDI, M&A, greenfield investment, innovativeness, EU.

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1. INTRODUCTION

The theoretical background of the analysis arises from the issues concerning extending control over a firm's equity in foreign markets. Contributions in this field led to the internalization theory by Coase in 1937 and further extensions by Williamson in the 1980s. Transaction cost theory (TCT) and property rights theory, both arising from the aforementioned internalization theory, focus on contractual frictions, which ultimately determine the allocation of ownership rights over a firm's assets (Antràs & Yeaple, 2014). TCT deals with the cost of individual contracting of each business transaction and managing related risks abroad, in contrast to internalizing the whole process within one (global) firm, thus reducing transaction costs and business risk. Since internalization involves formal control over resources and business operations abroad, FDI ideally fits into this theoretical framework. By focusing on the ownership rights, Dunning (2015) further extended aspects of internalization by relating them to location advantages of the target country, thus creating a platform for the analysis of FDI (OLI paradigm[1]). Yet, FDI is not homogeneous and can take different forms like M&A and greenfield investment. They are different in terms of both strategic goals and business expectations, thus presumably creating different effects on the host economy.

From the point of view of the internalization theory, M&A create an immediate effect on productivity and economic growth by integrating the already existing assets and resources. It exposes local businesses to competitive pressure aimed at swift restructuring and repositioning on the market (Atalay, Sorensen, Sullivan & Zhu, 2020). This facilitates an efficient transfer of technology and know-how. Yet, the effectiveness of this transfer largely depends upon the innovation capacity of the host economy. By merging resources with local firms, M&A create synergies evident in increasing economies of scale, productivity and business performance (Zhang, Wang, Li, Chen & Wang, 2018). Furthermore, M&A can act as a catalyst for local innovation by participating in all stages of the innovation process – from idea generation and funding research, to commercialization and product development. In terms of location advantages, this requires sophisticated business infrastructure that supports the innovation process (scientific infrastructure, universities, finance, etc.). Due to financial complexity, M&A usually require highly developed financial markets and advanced financial instruments, combined with strong legislation able to cope with complex business operations (Hsu, Huang, Humphrey-Jenner & Powell, 2021).

Meanwhile, greenfield investment involves establishing new facilities and setting up new business operations, thus contributing to local economic growth through mechanisms common for less developed countries (Amendolagine, Crescenzi & Rabellotti, 2024). Therefore, it usually requires higher initial costs, while being strongly influenced by the location-specific advantages of the host economy. These include factor markets, consumers, regulatory bodies, etc. Adjusting to these new conditions usually requires a longer period for a greenfield investment to realize its full potential in terms of local economic growth (Nguyen, Luu & Do, 2021). Greenfield investment creates direct and indirect effects on the local economy, whereby the indirect ones take longer. These include: increasing employment and labor skills, transfer of know-how, development of physical infrastructure, and other positive externalities (e.g. entrepreneurship). Through spillover effects, foreign investment creates a competitive market essential for maintaining sustainable economic growth (Nguyen, 2023). These are important, especially for less developed economies due to their low cost of production (resource abundance), on one hand, and the underdevelopment of the local market and business sector, on the other. These long-term effects go hand

[1] Companies with specific ownership advantage utilize FDI to keep control over their intangible assets on foreign markets. Modern version of this eclectic approach includes not only market failures, but also novel aspects of technical advance – demand for specialized inputs, labor quality, agglomeration economies, etc. While investment is generally seen as a crucial component of economic growth, FDI is considered even more important due to technology and know-how incorporated in the new capital stock.

in hand with the long-term time horizon of a greenfield investor.

Empirical studies dealing with the impact of FDI on local economic growth usually make no distinction between the two types of FDI. Hence, some papers confirm positive effects[2], while some others prove neutral or even negative effects (Claudio-Quiroga, Gil-Alana & Maiza-Larrante, 2021; Bermejo Carbonell & Werner, 2018; Pečarić, Kusanović & Šitum, 2021; Lyroudi, Papanastasiou & Vamvakidis, 2004; Mencinger, 2003).

According to Altzinger (2008) M&A become profitable earlier, while greenfield investments need more time to reach their maximum profitability. Calderón, Loayaza & Serven (2004), by distinguishing between M&A and greenfield investment, found that FDI enters host economies in two stages, with M&A taking the lead at an early stage and greenfield investment dominating later. Neto, Brandao & Cerqueira (2008) performed a more detailed analysis to separately examine growth effects of total FDI, M&A and greenfield investment on a large sample of countries. Their analysis proved a compelling contribution of FDI to the economic growth of both developed and less developed countries. Positive growth effects have been found with greenfield investment. Yet, M&A did not exhibit any significant contribution to the economic growth of developed countries, while it produced a negative effect with less developed ones. Wang & Wong (2009) came to similar conclusions and proved positive growth effects of greenfield investments, and negative effects of M&A. Yet, they showed that negative effects of M&A turn positive when combined with high quality human capital. Harms & Meón (2012) came to similar conclusion as they found out positive growth effects of greenfield investment and no such evidence for M&A. Hayali (2014) proved that in less developed countries both types of FDI have positive growth effects, with a more pronounced impact of greenfield investments. Similar results can be found in Derado and Horvatin (2023) who proved that greenfield investment bears more benefit to less advanced countries, yet without reference to the countries' innovation capacity.

With reference to the seminal paper by De Mello Jr. (1997), and acknowledging fundamental distinction between greenfield investment and M&A, this paper hypothesizes that different types of FDI create different effects on economic growth. Therefore, the aim is to investigate whether different types of FDI produce different growth effects. In doing so, special attention is dedicated to the innovativeness of the FDI host economy as an indicator of technological readiness for economic growth. Panel data analysis includes a sample of EU member countries separated into two groups according to their innovativeness, while differentiation of FDI by type makes it possible to analyze separate effects of M&A and greenfield investment on the host country's economic growth. The usual techniques of testing for serial correlation, heteroskedasticity, and cross-sectional dependence in the balanced panel dataset are applied. Results suggest the existence of a specific pattern of the FDI-growth nexus according to which M&A contribute more to the economic growth of the innovation forerunners, while greenfield investment achieves stronger effects with innovation laggards.

The paper is structured as follows. After the introduction, the second chapter presents analytical methodology and the research sample. The analysis is presented in the third chapter, followed by the discussion of the results in the fourth chapter. The last chapter concludes.

2. ANALYTICAL METHODOLOGY

This analysis includes 25 EU member countries over the period 1999-2018[3]. Such a composi-

[2] Todorov, Tsvetkov, Mirchova & Durova, 2020; Yeboua, 2020; Hayali, 2014; Mehic, Silajzic & Babic-Hodovic, 2013; Leitão & Rasekhi, 2013; Agrawal & Khan, 2011; Kornecki & Raghavan, 2011; Beugelsdijsk, Smeets & Zwinkels, 2008; Har, Teo & Yee, 2008; Hermes & Lensink, 2003; Ramírez, 2000.

[3] Malta and Luxemburg are excluded as outliers, while Belgium is excluded due to the lack of data. Period marked by coronavirus pandemic is omitted from the analysis due to the disruption in the global capital flows (Hayakawa, Lee & Park, 2022).

tion of the dataset is advantageous for several reasons. Countries at different levels of development and with different technological characteristics allow for a deeper insight into the impact of foreign investments on host country's economic growth. Meanwhile, their adherence to the same institutional framework (EU) makes cross-country comparisons easier and more insightful. Further, after initially strong influx of foreign capital into Central and East European countries (CEEC) during the 1990's, FDI flows have subsequently stabilized and started to yield positive effects on economic growth[4]. Previous empirical papers have mostly analysed the effects of FDI on growth by differentiating between developed and less developed countries. Such a differentiation is slightly dubious since it implicitly refers to income, which can be high even in technologically less advanced countries (e.g. oil exporters). Additionally, these papers mainly focus on the quality of labour force, which is not sufficient to embrace all the facets of technological advantage, as a transmission channel for positive FDI effects. Therefore, this analysis uses a more general indicator of innovativeness[5], while creating two country groups[6].

Economic growth, approximated by GDP *per capita*, is the dependent variable. Its absolute value is more informative and practical, than e.g. annual growth rates, in a way that changes in levels denote economic growth[7]. All variables are transformed into natural logarithms (Table 1). As far as independent variables are concerned, this analysis uses standard growth variables like employment and domestic investment. The main variables in focus are M&A and greenfield investment[8]. Variable of research and development (R&D) is included in the model to approximate technological source of economic growth, whereas variable of trade describes contribution of foreign demand to local economic growth.

Dataset with cross-sectional and time series component makes possible estimation of the regression equation of the following form:

$$GROWTH_{it} = \alpha + \beta INVESTMENT_{it} + \gamma CONTROL_{it} + \varepsilon_{it}$$
$$i = 1, ..., N; t = 1, ..., T \quad (1)$$

where *GROWTH* describes economic growth of country *i* in period *t* and *INVESTMENT* is an indicator of foreign capital. *CONTROL* includes control variables like employment, domestic investment, R&D and trade, while ε is the error term. Analysis starts with the panel data fixed effects model (FEM). The main intuition behind that relates to the data sample in which units of observations (countries) are not randomly chosen from a wider population, while the distribution of the dependent variable is presumably strongly determined by country-specific effects. In a matrix notation, this panel data model takes the following form:

$$y_{it} = \alpha + x_{it}^{'}\beta + e_{it} \quad i = 1, ..., N; t = 1, ..., T \quad (2)$$

where $x_{it}^{'}$ is a (1×*k*) vector of explanatory variables, while β is a (*k*×1) vector of partial effects of individual explanatory variables on the dependent variable (y_{it}). Unit specific individual

[4] In the period 1990-1999 some CEECs either did not realize FDI inflows (breaks in time series), while some others had problems in data reliability due to weak reporting methodology. Consequently, creation of a balanced dataset required losing some of the initial years of the period under analysis.

[5] As a composite index it evaluates four aspects of innovation activities: framework conditions (human capital, resources, research system, digitalization), investment (finance, business investment, information technologies), innovation activities (innovators, linkages, intellectual assets), and the innovation impact (employment, sales, environment), (European Commission [EU], 2021).

[6] Innovation forerunners: Sweden, Finland, Denmark, Netherlands, Germany, United Kingdom, Austria, Estonia, France, Ireland. Innovation laggards: Italy, Cyprus, Slovenia, Spain, Czech Republic, Lithuania, Portugal, Greece, Croatia, Hungary, Slovakia, Poland, Latvia, Bulgaria, Romania.

[7] Another reason is the subsequent transformation of the variables in natural logarithms, which would be rather impractical in case of negative growth rates.

[8] Due to non-availability of data for greenfield investment in international statistics, this paper follows the approach of Calderon et al. (2004), Wang & Wong (2009) and Harms & Meón (2012) who calculate greenfield investment as a difference between annual inflows of FDI and M&A, which was subsequently accumulated on annual basis to obtain an approximation the annual stock.

Table 1: Variables of the panel regression model

Symbol	Name	Indicator (all units of value in USD)	Source
GDPc	Economic growth	GDP per capita in current prices (USD)	UNCTADstat
EMPLOY	Employment	employed persons (15+) as a percentage of the working age population (15-64)	ILOSTAT
GFCF	Domestic investment	gross-fixed capital formation (% of GDP)	UNCTADstat
FDI	Foreign direct investment	annual inward stock (% of GDP)	UNCTADstat
MA	Mergers and acquisition	accumulated annual inflows (% of GDP)	UNCTADstat
GREEN	Greenfield investment	accumulated annual inflows (% of GDP)	UNCTADstat
RD	R&D	gross-domestic expenditure (business, universities, government and non-profit sector) on R&D (% of GDP)	UNESCO Institute for Statistics
TRADEg	Trade volume	sum of merchandise exports and imports (% of GDP)	UNCTADstat

Source: Authors.

Table 2: Results of Levin-Lin-Chu test of stationarity

lnGDPc	lnEMPLOY	lnGFCF	lnFDI	lnMA	lnGREEN	lnRD	lnTRADEg
-9.0052 (0.0000) ***	D.lnEMPLOY -5.3429 (0.0000) ***	-4.9569 (0.0000) ***	-4.9650 (0.0000) ***	-2.5409 (0.0055) **	-2.5893 (0.0048) **	-2.2553 (0.0121) *	-3.6028 (0.0002) ***

p-value: *** 0.001 (0.1%), ** 0.01 (1%), * 0.05 (5%).

Source: Authors.

effect (α_i) is a constant term idiosyncratic to each unit of observation. Finally, ε_{it} is the error term which is assumed to be independent and identically distributed over units of observations and time, with zero mean value and constant variance (Verbeek, 2008). All variables are tested for stationarity, since non-stationarity can lead to spurious regression, thus indicating presence of a linear relationship among statistically unrelated variables (Wooldridge, 2009). Although panel datasets are less prone to these problems[9], Levin-Lin-Chu unit root test is carried out (Levin, Lin & Chu, 2002), as best suited for moderate sized panels (10<N<250 and 25<T<250), (Table 2).

All variables proved stationarity in levels with the exception of employment *(lnEMPLOY)* which proved stationarity when first differenced. Therefore, the rest of the analysis includes first difference of the variable of employment *(D.lnEMPLOY)*.

[9] Baltagi (2008) suggests testing for stationarity of panel datasets with T>30, similar to Verbeek (2008) who suggests the same for panel datasets with small N.

3. DATA ANALYSIS

3.1. Innovation forerunners – M&A

In the random effects model (REM) only three variables are statistically significant, among which is M&A. Yet, deterioration of the results when robust standard errors (clustered by countries) are applied indicates potential problems with the error term. Stark difference in the statistical significance of the estimated parameters of the pooled ordinary least square (POLS) regression equation with default and robust standard errors confirms the above. Results of the fixed effects model (FEM) show good overall fit, yet not when robust standard errors are applied (Table A1, Annex). According to Hausman test (Hausman, 1978) FEM is confirmed as appropriate since Chi-square test rejects the null hypothesis about inefficiency of the fixed effects estimation (Table A2, Annex). Large differences in statistical significance between estimated parameters with default and robust standard errors in FEM possibly conceals problems of groupwise heteroskedasticity, cross-sectional correlation, and serial correlation[10]. These can impair variance, standard errors and t-statistics, thus leading to wrong conclusions.

The problem of heteroskedasticity resembled in unstable variance can arise due to large differences in the scale of variables[11] (Baum, 2001, 2006). Wald Chi-square test rejected the null hypothesis about constant variance of the error term, thus confirming the presence of groupwise, or panel-specific heteroskedasticity (Table A3, Annex). EU member countries show increasing economic, spatial and other interdependencies, as well as symmetric reactions to external shocks. Therefore, cross-sectional dependence among different panels can also be expected. Breusch and Pagan test for cross-sectional dependence in residuals of FEM (Serafidis & Wansbeek, 2010; De Hoyos & Serafidis, 2006) proves presence of pairwise cross-sectional dependence among analysed countries (Table A4, Annex). Regarding the results of the previous tests and based on generalized least square (GLS) estimator, parameters of the corrected FEM are assessed and adjusted for panel level heteroskedasticity and cross-sectional correlation in long panels (T>N), (Table 3).

The general significance of the model is good and all the variables (except GFCF) are statistically significant at 0.1% (employment at 5%). In the case of innovation forerunners R&D and M&A achieve the strongest impact on host country economic growth, while trade openness and employment achieve negative effects.

3.2. Innovation forerunners – greenfield investments

Estimations with greenfield investments shows pattern similar to that with M&A. This refers to deterioration of statistical significance of the estimated parameters in REM, and especially so in POLS estimation, when robust standard errors are applied. Compared to REM, FEM achieves better results (Table A5, Annex), as confirmed with Hausman test by rejection of the null hypothesis (Table A6, Annex).

Based on the above results presence of groupwise heteroskedasticity can be assumed. Accordingly, Wald test rejects the null hypothesis about homoscedasticity of the variance (Table A7, Annex). Breusch and Pagan test for cross-sectional dependence in the residuals confirms dependency between pairs of countries since null hypothesis (no cross-sectional correlation across units of panel data) has to be rejected (Table A8, Annex). Final FEM, which accounts for the problems of groupwise heteroskedasticity and cross-sectional correlation is presented in Table 4.

In this specification, all variables are statistically significant at 0.1% with the strongest contribution of R&D and employment to local economic growth. All variables, including greenfield investment, have the expected sign, except for GFCF and trade openness. In case of innovation forerunners, greenfield investments achieve

[10] All models are tested for autocorrelation (Born & Breitung, 2016). Results showed absence of serial correlation.

[11] The use of natural logarithms mitigates this problem. Yet, since countries in the sample are of both different size and the level of development, testing for groupwise heteroscedasticity is done.

Table 3: FEM corrected for groupwise heteroskedasticity and cross-sectional correlation, M&A, innovation forerunners

Cross-sectional time-series FGLS regression						
Coefficients:	generalized least squares					
Panels:	heteroskedastic with cross-sectional correlation					
Correlation:	no autocorrelation					
Estimated covariances =		55		Number of obs =		190
Estimated autocorrelations =		0		Number of groups =		10
Estimated coefficients =		6		Time periods =		19
				Wald chi2(5) =		3625.69
				Prob > chi2 =		0.0000
lnGDPc	Coefficients	Std. err.	z	P>|z|	[95% conf.	interval]
lnEMPLOY D1.	-.4113607	.1980158	-2.08	0.038	-.7994645	-.023257
lnGFCF	.0534529	.0307667	1.74	0.082	-.0068489	.1137542
lnMA	.3066904	.0069535	44.11	0.000	.2930618	.320319
lnRD	.4948045	.0134883	36.68	0.000	.4683679	.5212411
lnTRADEg	-.0586121	.0080764	-7.26	0.000	-.0744415	-.0427826
_cons	9.408949	.0895599	105.06	0.000	9.233415	9.584483

Source: Authors.

positive, yet modest contribution to host country's economic growth.

3.3. Innovation laggards – M&A

In REM half of the predictor variables are not statistically significant, whereas variable of interest (M&A) is statistically significant but with negative sign. Regarding the non-random character of the sample, FEM delivers considerably better results (Table A9, Annex). Overall fit of the model is good, though with variable of M&A not statistically significant. Hausman test rejects the null hypothesis and gives preference to FEM (Table A10, Annex). Due to deterioration of the results of FEM estimation, when robust standard errors are applied, problems in the error terms are expected. Wald test for unit-based heteroskedasticity dismisses the null hypothesis on constant variance, thus confirming that the dataset suffers from groupwise heteroskedasticity (Table A11, Annex). Test for cross-sectional dependence in residuals confirmed cross-sectional dependence between pairs of the units of observation (Table A12, Annex). Regarding that, GLS estimation of FEM is used to cope with the above problems (Table 5).

Table 4: FEM corrected for groupwise heteroskedasticity and cross-sectional correlation, greenfield investment, innovation forerunners

Cross-sectional time-series FGLS regression						
Coefficients:	generalized least squares					
Panels:	heteroskedastic with cross-sectional correlation					
Correlation:	no autocorrelation					
Estimated covariances =		55		Number of obs =		190
Estimated autocorrelations =		0		Number of groups =		10
Estimated coefficients =		6		Time periods =		19
				Wald chi2(5) =		4193.13
				Prob > chi2 =		0.0000
lnGDPc	Coefficients	Std. err.	z	P>|z|	[95% conf.	interval]
lnEMPLOY D1.	1.658613	.3460423	4.79	0.000	.9803821	2.336843
lnGFCF	-.9763821	.0457829	-21.33	0.000	-1.066115	-.8866492
lnGREEN	.0954776	.0058476	16.33	0.000	.0840165	.1069387
lnRD	.4929282	.0171624	28.72	0.000	.4592905	.5265659
lnTRADEg	-.2708902	.0107254	-25.26	0.000	-.2919117	-.2498688
_cons	14.07669	.1329627	105.87	0.000	13.81609	14.33729

Source: Authors.

The fixed effects model corrected for the above problems is statistically significant, with all parameters significant at 0.1%. Variables of gross fixed capital formation and trade have a negative impact on the host country's economic growth, as well as M&A.

3.4. Innovation laggards – greenfield investment

REM, which compensates for the weaknesses of POLS estimation, offers fairly good results. However, statistical significance of the estimated parameters declines when robust standard errors are applied. FEM with default standard errors yields favorable results, with all variables, including greenfield investment, found to be statistically significant (Table A13, Annex). Hausman test requires dismissal of the null hypothesis and gives preference to FEM (Table A14, Annex). Regarding the groupwise heteroscedasticity in the dataset, Wald test rejects the null hypothesis, thus confirming non-stability of the variance in error term across panels (Table A15, Annex). Meanwhile, test of cross-sectional correlation proves presence of interdependencies across panels (Table A16, Annex). Final specification of the FEM corrected for the above problems proves joint statistical significance of the model and estimated coefficients of the explanatory variables, which are all significant at 0.1% (Table 6).

Table 5: FEM corrected for groupwise heteroskedasticity and cross-sectional dependence, M&A, innovation laggards

Cross-sectional time-series FGLS regression						
Coefficients:	generalized least squares					
Panels:	heteroskedastic with cross-sectional correlation					
Correlation:	no autocorrelation					
Estimated covariances =		120		Number of obs =		258
Estimated autocorrelations =		0		Number of groups =		15
Estimated coefficients =		6		Time periods =		19
				Wald chi2(5) =		17651.16
				Prob > chi2 =		0.0000
lnGDPc	Coefficients	Std. err.	z	P>|z|	[95% conf.	interval]
lnEMPLOY D1.	2.984167	.1271458	23.47	0.000	2.734966	3.233368
lnGFCF	-.5416828	.0176497	-30.69	0.000	-.5762757	-.50709
lnMA	-.2121699	.0056454	-37.58	0.000	-.2232348	-.2011051
lnRD	.7815164	.0069355	112.68	0.000	.767923	.7951097
lnTRADEg	-.4816693	.0107289	-44.89	0.000	-.5026976	-.4606411
_cons	13.85457	.0647316	214.03	0.000	13.7277	13.98144

Source: Authors.

As expected, greenfield investments contribute to host countries' economic growth in case of innovation laggards. Yet, much stronger contribution to economic growth is rendered through R&D. As expected, labour force positively contributes to economic growth, whereas gross fixed capital formation and trade in goods have negative effect on growth.

4. DISCUSSION OF THE RESULTS

The results confirm that different types of FDI generate different effects on host countries' economic growth, especially in relation to their innovation capacity. More specifically, M&A achieve a robust contribution to economic growth with more advanced innovators, while greenfield investments add strongly to the economic growth of the innovation laggards. This pattern is further corroborated by significantly weaker growth effects of greenfield investments in the case of innovation forerunners, and an adverse impact of M&A with innovation laggards. Hence, these findings confirm the initial hypothesis.

This outcome sheds a new light on the role of M&A in achieving economic growth, since the majority of earlier papers (Neto et al., 2008; Harms & Meon, 2012) proved negative growth effects of M&A. This analysis proves that the growth impact of both M&A and greenfield investment should be evaluated against the host

Table 6: FEM corrected for groupwise heteroskedasticity and cross-sectional dependence, greenfield investment, innovation laggards

Cross-sectional time-series FGLS regression						
Coefficients:	generalized least squares					
Panels:	heteroskedastic with cross-sectional correlation					
Correlation:	no autocorrelation					
Estimated covariances =		120		Number of obs =		285
Estimated autocorrelations =		0		Number of groups =		15
Estimated coefficients =		6		Time periods =		19
				Wald chi2(5) =		10908.24
				Prob > chi2 =		0.0000
lnGDPc	Coefficients	Std. err.	z	P>|z|	[95% conf.	interval]
lnEMPLOYD1.	2.541611	.1367816	18.58	0.000	2.273524	2.809698
lnGFCF	-.2038255	.017227	--11.83	0.000	-.2375898	-.1700612
lnGREEN	.1222934	.0044112	27.72	0.000	.1136475	.1309392
lnRD	.858521	.0098858	86.84	0.000	.8391452	.8778969
lnTRADEg	-.7247209	.0162247	-44.67	0.000	-.7565207	-.6929211
_cons	13.10893	.0767148	170.88	0.000	12.95858	13.25929

Source: Authors

country's capacity to innovate. Previous studies dealing with the same topic based their analyses primarily on differentiation of countries by the level of development, while this study explicitly refers to technological differences among them. Therefore, the results of this analysis are not fully comparable with those of the previous studies. However, findings of this paper are corroborated by papers which proved positive effects of greenfield investments on economic growth (e.g. Hayali, 2014; Harms & Meón, 2012; Wang & Wong, 2009), while empirical findings on the impact of M&A are less straightforward. The present research comes closest to the one conducted by Neto et al. (2008), who found that M&A have negative growth effects in less developed countries. Results of this study are similar to those of Wang & Wong (2009) who implicitly take into account technological aspect in determining the ultimate effect of M&A on economic growth. In the case of less developed countries, Hayali (2014) confirms a strong positive effect of greenfield investments and a modest positive effect of M&A, which is in line with the findings of this study. As far as control variables are concerned, employment achieves the strongest effect. Only in one regression specification for innovation forerunners does this variable appear with the negative sign, though with rather modest statistical significance (5%). Another strong contribution to local economic growth comes from R&D in all estimations, meaning with both country groups. GFCF, as an approximation of domestic investment, and trade in goods show adverse growth effects. This may be attributed to the fact that gross investments include

asset depreciation, which ultimately weakens their contribution to economic growth. Furthermore, foreign equity investment incorporates more advanced technologies and know-how than domestic ones, resulting in the expected higher efficiency and productivity of foreign investment. However, this does not explain the negative growth effect of domestic investment in countries at a high level of technological development and innovativeness. Variable of trade does not contribute to economic growth, especially with innovation laggards. Although this outcome does not match the expectations, numerous studies reveal a more complex mechanism behind the export-growth nexus. It primarily depends upon the country's ability to transform its productive structure. If such capacities exist, the country will be able to diversify exports along extensive trade margins, hence building resilience to fluctuations in global markets (terms of trade, supply chains, etc.), and keep a stable growth path (Mora & Olabisi, 2023; Ofabemi Young, 2024). These effects are addressed in various studies, whether concerning exchange rate and financial sector development (Öncel, Saidmurodov & Kutlar, 2024) or the quality of human capital. The complexity of the export-growth relation is accentuated through the presence of the global value chains (GVC). These enable less advanced countries to engage in low complexity labor-intensive operations with high import contents. Consequently, they might export high technology products, while performing low complexity tasks within the GVC, and fall into what Mania & Rieber (2019) call 'under-industrialization trap' with weak prospects for economic growth. A significant issue among the new EU member states is increasing income inequality, indicating that the catching-up process in Eastern Europe did not go without adverse effects on long-term growth (Cota, Erjavec & Jakšić, 2024). All these aspects lie outside the scope of the present study but they offer interesting avenues for further research.

5. CONCLUSION

Assuming different characteristics of M&A and greenfield investment, and regarding technological aspects of the FDI recipient countries, the initial hypothesis postulated that M&A and greenfield investments produce different effects on local economic growth. The analysis is based on two country groups – innovation forerunners and innovation laggards. The difference in statistical significance of the estimated parameters and confidence intervals in the initial estimations suggested problems in the error term. For each model specification, the fixed effects estimation proved superior in explaining factors behind economic growth than the random effects estimation. Statistical tests have confirmed the presence of groupwise heteroskedasticity and cross-sectional correlation in the dataset as problems arising from differences in scale among countries (heteroskedasticity), or increasing similarity among them (cross-sectional correlation). Based on these outcomes, and observing the specific nature of the panel size GLS estimator made possible estimation of the FEM corrected for groupwise heteroskedasticity and cross-sectional correlation. Results showed that variable R&D is statistically significant in all specifications, with a positive and strong impact on local economic growth. Greenfield investments achieve a consistent impact on economic growth with both country groups. Yet, this type of investment has proven to be more efficient with innovation laggards. This can be explained by the dominant share of CEEC in the group of innovation laggards, which heavily relied on greenfield investment during the 1990s. Meanwhile, M&A deliver a positive and statistically significant effect on the host country's economic growth only with innovation forerunners. This confirms the initial assumption that M&A are typical for more advanced economies with sophisticated business infrastructure and stronger market potential. Furthermore, in the case of innovation forerunners, two variables with the strongest contribution to economic growth are R&D and M&A, thus confirming the relevance of the technology channel in achieving positive spill-overs on local economy. The main scientific contribution of this paper arises from the research topic and the novel approach to investigating the role of FDI in achieving economic growth. It starts with the enquiry into the structure of FDI flows and differentiates between greenfield investment and M&A as an aspect usually neglected in the empirical literature, which treats FDI as a rather homogeneous form of equity capital. Concerning

technological aspects of FDI, the paper differentiates countries by their level of innovativeness, thus enabling a more thorough investigation of the FDI-growth nexus. Economic policy implications arise thereof.

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ANNEX

Table A1: Results of the estimations of the panel data model with M&A, innovation forerunners

variable	POLS	POL-Srobust	REM	REMrobust	FEM	FEMrobust	FEMcor-rected
lnEMPLOYD1.	-.58489424	-.58489424	.80073521	.80073521	.82147275	.82147275	-.41136071 *
lnGFCF	.02864328	.02864328	.30534254	.30534254	.45099516 *	.45099516	.05345265
lnMA	.32020381 ***	.32020381 *	.15742218 **	.15742218	.14203109 **	.14203109	.30669041 ***
lnRD	.50145141 ***	.50145141	1.0048453 ***	1.0048453 ***	1.1928309 ***	1.1928309 ***	.49480449 ***
lnTRADEg	-.06430497	-.06430497	-.20912164	-.20912164	-.33223673	-.33223673	-.05861207 ***
_cons	9.4450544 ***	9.4450544 **	9.2715884 ***	9.2715884 ***	9.2423146 ***	9.2423146 **	9.4089491 ***
N	190	190	190	190	190	190	190
r2	.46542947	.46542947			.38878187	.38878187	

Legend: *p<0.05; **p<0.01; ***p<0.001

Source: Authors.

Table A2: Hausman test of fixed vs. random effects, M&A, innovation forerunners

	---------- Coefficients ----------			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_V)
	fe	re	Difference	Std. err.
lnEMPLOYD1.	.8214728	.8007352	.0207375	.
lnGFCF	.4509952	.3053425	.1456526	.0485949
lnMA	.1420311	.1574222	-.0153911	.0147593
lnRD	1.192831	1.004845	.1879856	.0490695
lnTRADEg	-.3322367	-.2091216	-.1231151	.1049491

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Differents in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 20.31

Prob > chi2 = 0.0011

(V_b-V_B) is not positive definite)

Source: Authors.

Table A3: Wald test for groupwise heteroskedasticity, M&A, innovation forerunners

Modified Wald test for groupwise heteroskedasticity
In fixed effect regression model
H0: sigma(i)∧2 for all i
chi(2) (10) = 263.58
Prob>chi2 = 0.0000

Source: Authors.

Table A4: Cross-sectional correlation of residuals, M&A, innovation forerunners*

Correlation matrix of residuals:										
	_e1	_e7	_e8	_e9	_e10	_e11	_e14	_e20	_e27	_e28
_e1	1.0000									
_e7	0.9164	1.0000								
_e8	0.0292	0.1973	1.0000							
_e9	0.2907	0.5166	0.7412	1.0000						
_e10	0.8280	0.9152	0.3938	0.7441	1.0000					
_e11	0.7646	0.8841	0.4637	0.8048	0.9854	1.0000				
_e14	0.1206	0.1765	0.6926	0.5001	0.2594	0.2621	1.0000			
_e20	0.8126	0.8868	0.3384	0.6664	0.9750	0.9530	0.1363	1.0000		
_e27	0.5356	0.7330	0.4507	0.8763	0.8923	0.9318	0.2037	0.8616	1.0000	
_e28	0.7733	0.9051	0.2679	0.6420	0.8683	0.8842	0.2212	0.7950	0.7870	1.0000
Breusch-Pagan LM test of independence: chi2(45) = 398.756, Pr = 0.0000										
Based on 18 complete observations over panel units										

*e1-Austria, e7-Denmark, e8-Estonia, e9-Finland, e10-France, e11-Germany, e14-Ireland, e20-Netherlands, e27-Sweden, e28-United Kingdom.

Source: Authors.

Table A5: Results of the estimations of the panel data model with greenfield investment, innovation forerunners

variable	POLS		POLSrobust		REM		REMrobust		FEM		FEMrobust		FEMcorrected	
lnEMPLOY														
D1.	2.2682197		2.2682197										1.6586126	***
--.					3.7332819	***	3.7332819	***	3.8800557	***	3.8800557	***		
lnGFCF	-1.1088059	***	-1.1088059		-.19453925		-.19453925		-.19791949		-.19791949		-.97638213	***
lnGREEN	.11420133	***	.11420113	*	-.03279138		-.03279138		-.05081952		-.05081952		.09547759	***
lnRD	.49895868	***	.49895868		.80804826	***	.80804826	***	.87229864	***	.87229862	***	.49292821	***
lnTRADEg	-.28214828	**	-.28214828		-.30601721	*	-.30601721		-.36819364	**	-.36819364		-.27089025	***
_cons	14.473955	***	14.473955	***	-4.0312263	*	-4.0312263		-4.3848657	**	-4.3848675		14.07669	***
N	190		190		200		200		200		200		190	
r2	.39050101		.39050101						.57347078		.57347078			
r2_a	.37393854		.37393854						.54119289		.56247776			

Legend: *p<0.05; **p<0.01; ***p<0.001

Source: Authors.

Table A6 Hausman test of fixed vs. random effects, greenfield investment, innovation forerunners

	---------- Coefficients ----------			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_V)
	fe	re	Difference	Std. err.
lnEMPLOY				
D1.	1.008907	1.23722	-.2283129	.0899169
lnGFCF	.4140937	.2230063	.1910875	.0550904
lnGREEN	.0321103	.0418938	-.0097836	.0092913
lnRD	1.150779	.9899042	.1608747	.049058
lnTRADEg	-.2799774	-.2575582	-.0224192	.0923373

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Differents in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 9.58

Prob > chi2 = 0.0879

(V_b-V_B) is not positive definite)

Source: Authors.

Table A7: Wald test for groupwise heteroskedasticity, greenfield investment, innovation forerunners

Modified Wald test for groupwise heteroskedasticity
In fixed effect regression model
H0: sigma(i)∧2 for all i
chi(2) (10) = 252.84
Prob>chi2 = 0.0000

Source: Authors.

Table A8: Cross-sectional correlation of residuals, greenfield investment, innovation forerunners

Correlation matrix of residuals:										
	_e1	_e7	_e8	_e9	_e10	_e11	_e14	_e20	_e27	_e28
_e1	1.0000									
_e7	0.8570	1.0000								
_e8	0.0775	0.3196	1.0000							
_e9	0.3965	0.7268	0.6919	1.0000						
_e10	0.8401	0.9726	0.4207	0.8077	1.0000					
_e11	0.8906	0.9622	0.3864	0.7063	0.9682	1.0000				
_e14	0.0517	0.2369	0.7485	0.6198	0.3365	0.2449	1.0000			
_e20	0.8089	0.9328	0.3406	0.7342	0.9624	0.9176	0.1676	1.0000		
_e27	0.6230	0.8861	0.4047	0.8935	0.9162	0.8443	0.2975	0.8991	1.0000	
_e28	0.7557	0.9162	0.3871	0.7920	0.9244	0.9363	0.3203	0.8346	0.8795	1.0000
Breusch-Pagan LM test of independence: chi2(45) = 437.383, Pr = 0.0000										
Based on 18 complete observations over panel units										

*e1-Austria, e7-Denmark, e8-Estonia, e9-Finland, e10-France, e11-Germany, e14-Ireland, e20-Netherlands, e27-Sweden, e28-United Kingdom.

Source: Authors.

Table A9: Results of the estimations of the panel data model with M&A, innovation laggards

variable	POLS		POL-Srobust		REM		REMrobust		FEM		FEMrobust		FEMcor-rected	
lnEMPLOYD1.	3.3575328	**	3.3575328	*	1.0478871		1.0478871		-1.557754		-1.557754		2.9841671	***
lnGFCF	-.53092226	**	-.53092226	*	.13509598		.13509598		.62288409	***	.62288409	*	-.54168283	***
lnMA	-.21383033	***	-.21383033	*	-.1000616	*	-.1000616		-.08841295	*	-.08841295		-.21216992	***
lnRD	.79061083	***	.79061083	***	.98443346	***	.98443346	***	.96237086	***	.96237086	**	.78151638	***
lnTRADEg	-.49092843	***	-.49092843	*	.15243744		.15243744		1.1019818	***	1.1019818	*	-.48166933	***
_cons	13.857577	***	13.857577	***	8.7855864	***	8.7855864	***	3.0932803	**	3.0932803		13.85457	***
N	285		285		285		285		285		285		285	
r2	.43447128		.43447128						.42268841					
r2_a	.42433636		.42433636						.38129626					

Legend: *p<0.05; **p<0.01; ***p<0.001

Source: Authors.

Table A10: Hausman test of fixed vs. random effects, M&A, innovation laggards

	---------- Coefficients ----------			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_V)
	fe	re	Difference	Std. err.
lnEMPLOYD1.	-1.557754	1.047887	-2.605641	.
lnGFCF	.6228841	.135096	.4877881	.0186671
lnMA	-.088413	-.1000616	.0116486	.
lnRD	.9623709	.9844335	-.0220626	.0289561
lnTRADEg	1.101982	.1524374	.9495444	.121952

b = Consistent under H0 and Ha; obtained from xtreg.

B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Differents in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 78.64

Prob > chi2 = 0.0000

(V_b-V_B) is not positive definite)

Source: Authors.

Table A11: Wald test for groupwise heteroskedasticity, M&A, innovation laggards

Modified Wald test for groupwise heteroskedasticity
In fixed effect regression model
H0: sigma(i)∧2 for all i
chi(2) (15) = 135.23
Prob>chi2 = 0.0000

Source: Authors.

Table A12: Cross-section correlation of residuals, M&A, innovation laggards*

Correlation matrix of residuals:															
	_e3	_e4	_e5	_e6	_e8	_e12	_e13	_e15	_e16	_e17	_e21	_e22	_e23	_e24	_e25
_e3	1.0000														
_e4	0.8476	1.0000													
_e5	0.4984	0.6705	1.0000												
_e6	0.6716	0.4663	0.4303	1.0000											
_e8	0.5570	0.4571	-0.1517	0.2025	1.0000										
_e12	0.4233	0.4361	0.6681	0.8145	-0.0585	1.0000									
_e13	0.5308	0.4109	0.4488	0.7903	0.2964	0.7998	1.0000								
_e15	0.6060	0.5380	0.6533	0.7744	0.2503	0.8692	0.9050	1.0000							
_e16	0.7120	0.5125	0.0513	0.3448	0.8218	0.0127	0.2850	0.2578	1.0000						
_e17	0.9038	0.8224	0.2918	0.4347	0.7546	0.1510	0.3626	0.3823	0.8623	1.0000					
_e21	0.2844	0.2456	0.5318	0.8103	-0.1956	0.8381	0.7039	0.6839	-0.0754	-0.0001	1.0000				
_e22	-0.2069	-0.2326	-0.1895	-0.1514	0.2013	0.0450	0.3421	0.2848	-0.1376	-0.1672	-0.1294	1.0000			
_e23	0.8145	0.8763	0.3506	0.2908	0.7657	0.1175	0.2448	0.3684	0.7232	0.9120	-0.0675	-0.0983	1.0000		
_e24	0.8947	0.7872	0.5879	0.8622	0.5017	0.7139	0.7875	0.8353	0.5859	0.7497	0.6012	-0.0739	0.6854	1.0000	
_e25	0.2259	-0.1373	-0.1518	0.5612	0.3555	0.4431	0.6629	0.5706	0.3047	0.1207	0.3517	0.4599	-0.0544	0.4099	1.0000
Breusch-Pagan LM test of independence: chi2(105) = 574.712, Pr = 0.0000															
Based on 18 complete observations over panel units															

*e3-Bulgaria, e4-Croatia, e5-Cyprus, e6-Czech Republic, e8-Estonia, e12-Greece, e13-Hungary, e15-Italy, e16-Latvia, e17-Lithuania, e21-Poland, e22-Portugal, e23-Romania, e24-Slovakia, e25-Slovenia.

Source: Authors.

Table A13: Results of the estimations of the panel data model with greenfield investment, innovation laggards

variable	POLS		POL-Srobust		REM		REMrobust		FEM		FEMrobust		FEMcor-rected	
lnEMPLOY D1.	3.0694556	**	3.0694556	*	.1181698		.1181698		-1.9804517	*	-1.9804517		2.5416111	***
lnGFCF	-.2068764		-.2068764		.4603227	**	.4603227	*	0.83007779	***	.83007779	***	-.20382553	***
lnGREEN	.13264125	***	.13264125		.22996205	***	.22996205		.27343976	***	.27343976		.12229337	***
lnRD	.88478078	***	.88478078	**	.85241014	***	.85241014	***	.733715	***	.733715	**	.85852104	***
lnTRADEg	-.7633729	***	-.7633729	*	.16199611		.16199611		.93601525	***	.93601525		-.72472091	***
_cons	13.208143	***	13.208143	***	6.7843116	***	6.7843116	***	2.0934892	*	2.0934892		13.108933	***
N	285		285		285		285		285		285		285	
r2	.41838977		.41838977						.46445401		.46445401			
r2_a	.40796665		.40796665						.42605637		.45485641			

Legend: *p<0.05; **p<0.01; ***p<0.001

Source: Authors.

Table A14: Hausman test of fixed vs. random effects, greenfield investment, innovation laggards

	---------- Coefficients ----------			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_V)
	fe	re	Difference	Std. err.
lnEMPLOY D1.	-1.980452	.1181698	-2.098621	.
lnGFCF	.8300778	.4603227	.3697551	.
lnGREEN	.2734398	.229962	.0434777	.013277
lnRD	.733715	.8524101	-.1186951	.0302966
lnTRADEg	.9360152	.1619961	.7740191	.0953709

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

Test of H0: Differents in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 65.22
Prob > chi2 = 0.0000

(V_b-V_B) is not positive definite)

Source: Authors.

Table A15: Wald test for groupwise heteroskedasticity, greenfield investment, innovation laggards

Modified Wald test for groupwise heteroskedasticity
In fixed effect regression model
H0: sigma(i)∧2 for all i
chi(2) (15) = 137.12
Prob>chi2 = 0.0000

Source: Authors.

Table A16: Cross-section correlation of residuals, greenfield investment, innovation laggards*

Correlation matrix of residuals:															
	_e3	_e4	_e5	_e6	_e8	_e12	_e13	_e15	_e16	_e17	_e21	_e22	_e23	_e24	_e25
_e3	1.0000														
_e4	0.5720	1.0000													
_e5	-0.1478	0.2010	1.0000												
_e6	0.6055	0.7609	0.3918	1.0000											
_e8	0.5461	0.4221	-0.5573	0.3372	1.0000										
_e12	0.3407	0.7905	0.6400	0.8729	0.0942	1.0000									
_e13	0.4950	0.6398	0.3769	0.8287	0.4124	0.7752	1.0000								
_e15	0.0533	0.3217	0.8932	0.6121	-0.2279	0.7555	0.6699	1.0000							
_e16	0.7048	0.5110	-0.3853	0.5270	0.8616	0.2613	0.4873	-0.1332	1.0000						
_e17	0.7869	0.7588	-0.3525	0.5747	0.7918	0.3758	0.5042	-0.1298	0.8799	1.0000					
_e21	0.1591	0.5282	0.7402	0.7898	-0.1086	0.7985	0.6735	0.8226	0.0700	0.0979	1.0000				
_e22	0.1147	0.2093	0.2213	0.1918	0.2973	0.2922	0.6042	0.4705	0.0870	0.1297	0.2051	1.0000			
_e23	0.6601	0.7296	-0.4179	0.4543	0.8395	0.2872	0.3559	-0.1863	0.7931	0.9253	0.0086	0.1605	1.0000		
_e24	0.7375	0.9048	0.0708	0.8593	0.6496	0.7356	0.7503	0.3137	0.7709	0.8764	0.5001	0.2387	0.8134	1.0000	
_e25	0.3380	0.1175	0.4717	0.5400	0.1344	0.5037	0.6656	0.7354	0.1856	0.0322	0.5013	0.5153	-0.0628	0.3077	1.0000
Breusch-Pagan LM test of independence: chi2(105) = 594.441, Pr = 0.0000															
Based on 18 complete observations over panel units															

*e3-Bulgaria, e4-Croatia, e5-Cyprus, e6-Czech Republic, e8-Estonia, e12-Greece, e13-Hungary, e15-Italy, e16-Latvia, e17-Lithuania, e21-Poland, e22-Portugal, e23-Romania, e24-Slovakia, e25-Slovenia.

Source: Authors.

Utjecaj greenfield ulaganja i pripajanja i stjecanja na gospodarski rast zemlje primateljice ulaganja na primjeru zemalja članica EU

Sažetak

Empirijska literatura o utjecaju izravnih inozemnih ulaganja na gospodarski rast zemlje primateljice ne daje jedinstvene zaključke. U svrhu rješavanja tog nedostatka ovaj rad razlikuje greenfield ulaganja od pripajanja i stjecanja, fokusirajući se pritom na stupanj inovativnosti zemlje primateljice ulaganja. Uzorak od 25 zemalja članica EU analiziranih tijekom razdoblja 1999.-2018. daje balansirani set panel podataka koji omogućuje odvojenu analizu utjecaja greenfield ulaganja i pripajanja i stjecanja. Analiza panel podataka pomoću metode fiksnih efekata, korigirane za učinke skupne heteroskedastičnosti i korelacije po jedinicama promatranja, pokazuje da različiti tipovi izravnih inozemnih ulaganja ostvaruju različite učinke na gospodarski rast i to u ovisnosti o inovacijskim kapacitetima zemlje primateljice. Konkretno, pripajanja i stjecanja ostvaruju najsnažniji doprinos gospodarskom rastu u zemljama sa izrazitom sposobnošću inoviranja, dok greenfield ulaganja više doprinose gospodarskom rastu u inovacijski manje naprednim zemljama.

Ključne riječi: izravna inozemna ulaganja, pripajanja i stjecanja, greenfield ulaganja, inovativnost, EU.