Macroeconomic Drivers, Governance, and Foreign Direct Investment in Central and Eastern European Countries (CEECs)

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ORIGINAL ARTICLE

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Abstract

Background and objective: The transition to market-oriented economies in CEECs entailed significant structural economic and institutional reforms. Over the past years, studies have investigated how these reforms affected foreign direct investment (FDI) inflows. However, the evidence remains debatable and varies across countries. This study provides new insights by considering the impact of macroeconomic factors, governance, and the moderating effect of governance on the macroeconomic drivers–FDI nexus.

Methods: A panel of 12 countries from 1991 to 2020 are analysed within the framework of conventional methods and Seemingly Unrelated Regression (SUR).

Results: Results robustly suggest that gross capital formation, macroeconomic stability, and trade openness are significant determinants of FDI at 1%–5% levels. We also observe cross-country differences in FDI performance. Governance does not moderate the relationship in the full sample, but additional results uncover heterogeneous FDI behaviour.

Conclusion: In order to attract more FDI in CEECs, policymakers should invigorate domestic macroeconomic policies and trade liberalisation.

Contribution: We advance literature by documenting new linkages between macroeconomic drivers, governance, and FDI across CEECs from the lens of SUR, a gap largely ignored by extant studies.

Keywords: Transition economies, FDI, Governance, Seemingly Unrelated Regression

JEL classification: F21, E02, O43

Introduction

We consider the impact of macroeconomic drivers and governance on foreign direct investment (FDI) in Central and Eastern European Countries (CEECs)[1] from 1996 to 2020. This period succeeded the breakup of the former socialist states in 1992, which paved the way for transitions into market-oriented economies. The transitions were lengthy, gradual and necessitated significant reforms. New institutions and economic structures were erected or underwent behavioural changes to acclimatise with the neoliberal system (Kolodko, 1999). The study covers the transition period from its early to late years. In the first phase, CEECs gradually liberalised trade and withdrew the government from many activities to incentivise FDI and accelerate technological and economic development. The second phase was characterised by the development of institutions that underpin market economies, while the last phase consisted of consolidating the systems in place.

The global integration of these economies brought many opportunities and challenges. On the one hand, FDI and its trickle-down effects via knowledge transfer increased substantially over the following decade,

accelerating development outcomes. On the other, CEECs became increasingly vulnerable to external shocks. Prior to the 2008 financial crisis, real GDP growth rates and capital inflows were already volatile in most CEECs (Jimborean & Kelber, 2017). This was followed by the post-2007 economic downturns, the euro debt crisis in 2011, the COVID-19 pandemic, and recently, the Russo-Ukrainian conflict.

Economic disruptions pose macroeconomic challenges that could potentially obstruct the sustainable inflow of FDI into these economies (Beri et al., 2022; Beri & Nubong, 2023). However, countries with more resilient macroeconomic indicators and institutions can sustain FDI. At this stage, important questions that arise are: (i) What is the impact of macroeconomic drivers on FDI inflows? (ii) To what extent does governance influence FDI? (iii) Does governance moderate the macroeconomic drivers–FDI nexus?

Studying this relationship is crucial because FDI provides a vigorous channel for the transfer of technology, creation of jobs, and development of skills and knowledge in workers in host countries. It also bridges the savings–investment gap that percolates into further investment, industrialisation, and economic growth (Beri & Nubong, 2023; Magbondé & Konté, 2022). Since CEECs have different levels of institutional development (Dorożyński et al., 2019, 2020), those with better institutions may attract more investments as institutions are known to moderate the macroeconomic drivers–FDI nexus. This explains why FDI inflow remains at the centre of policymaking and continues to attract rigorous theoretical and empirical scrutiny.

According to the Ownership, Internalisation, and Location (OLI) paradigm, multinational companies (MNCs) carefully consider country-specific characteristics and how they rank relative to other potential host countries before investing (Dunning & Lundan, 2008). A review of the paradigm reveals that market size, infrastructure, trade openness, human and natural resources, appropriate fiscal and monetary policies, and firm-specific factors are critical for FDI location (Beri & Nubong, 2023; Dunning, 2000). Although the influence of macroeconomic drivers in the spatial distribution of FDI remains debatable and may vary across countries, literature shows that they are indispensable for FDI location in CEECs (Brenton et al., 1999; Carstensen & Toubal, 2004; Jimborean & Kelber, 2017; Lane & Milesi-Ferretti, 2007; Marinova & Marinov, 2017). This theory leads us to the first hypothesis of the study:

H0. *Macroeconomic factors and good governance invigorate the inflow of foreign direct investment*

Institutional theory has also gained centre stage in recent analyses of FDI. Institutions encompass the informal societal knowledge, norms, and formal government regulations that jointly influence the investment climate (Contractor et al., 2020). Since MNCs operate in dynamic and intricate environments (Dorożyński et al., 2019), politically stable countries and those with good governance indicators provide favourable environments for FDI (Beri & Nubong, 2023; Nielsen et al., 2017; Rjoub et al., 2017). Acemoglu and Robinson (2010) also attributed differences in economic growth to differences in economic institutions, which in turn depended on political institutions in place. Likewise, countries that are devoid of these features but make commitments through investment treaties, members of the World Trade Organisation, and European Union (EU) member states are also perceived credible for FDI inflow (Alfaro et al., 2008; Beri & Nubong, 2021). Institutional theory leads us to the following hypothesis:

H1. *Good governance stimulates the macroeconomic drivers–foreign direct investment nexus*

Literature on the role of macroeconomic factors and governance in FDI is plentiful. Contractor et al. (2020) found that countries with stronger contract enforcements and efficient trade regulations attracted more investments. Dang and Nguyen (2021) uncovered that economic growth, quality of economic institutions, and inflation played significant roles in attracting FDI. Dorożyński et al. (2019, 2020) documented positive relationships between institutional environment and FDI. Doytch (2021) uncovered that aggregate FDI inflows were countercyclical, increasing during economic downturns and reducing during economic booms. Jimborean and Kelber (2017) documented evidence that history of FDI, market size, openness, and accession to the European Union were significant determinants of FDI in CEECs. Finally, Mason and Vracheva (2017) found that inflation targeting had a positive impact on FDI.

Notwithstanding the plethora of potential FDI determinants and the role of cross-country heterogeneities (Alfaro et al., 2008), the use of mostly aggregative analytical methods for inference in extant research makes it challenging for policymakers to isolate factors that attract FDI in each country relative to its regional peers. Addressing these issues can advance the frontiers of knowledge and improve policy decisions in CEECs.

This paper shows that gross fixed capital formation, trade openness, and macroeconomic stability are the most significant determinants of FDI. Our approach exploits static panel models and the Seemingly

Unrelated Regression (SUR). A challenge with this strategy is that FDI might be dynamic. Nevertheless, our small sample (12 countries) relative to the time (25 years) does not allow for dynamic modelling, although similar studies considered it with a shorter time (Dorożyński et al., 2020; Jimborean & Kelber, 2017).

The study contributes to literature in two ways. First, it complements studies on the impact of macroeconomic drivers of FDI with more extensive data from 1996 to 2020. While most studies on the determinants of FDI in CEECs employ dynamic panel models, we choose SUR in the second part of the analysis because it controls for aggregative bias and addresses small sample problems and the Nickel bias. Second, previous studies either focused on macroeconomic drivers (Carstensen & Toubal, 2004; Doytch, 2021; Jimborean & Kelber, 2017) or the effect of institutions on FDI (Dorożyński et al., 2019, 2020; Marks-Bielska et al., 2022). We build on these studies and add a layer of originality by examining the moderating role of governance in the macroeconomic drivers–FDI nexus. Our study is closely related to those by Carstensen and Toubal (2004) and Jimborean and Kelber (2017). However, we cover a longer time and also emphasise the heterogeneous behaviour of FDI in CEECs.

Section 1 gives a feel of the context by elaborating on the trajectory of FDI and its traditional determinants in CEECs after the collapse of the Soviet Union and Yugoslavia. Section 2 details the variables and analytical procedures. Section 3 presents diagnostics of the data and regression results, while Section 4 concludes the paper.

1 FDI inflows and macroeconomic drivers in CEECs: Stylised facts

Inward FDI plays a crucial role in the economic growth and development endeavours of CEECs. In a historical context, following the collapse of the Union of Soviet Socialist Republics (USSR) in 1991, the former Soviet CEECs (i.e., Estonia, Latvia, and Lithuania) had to undergo significant political and economic transitions (Hare & Turley, 2013). This entailed the introduction of comprehensive macro-economic stabilisation reforms, progression towards a free market economy, and the privatisation of a large part of state-owned enterprises (Carstensen & Toubal, 2004). Similarly, former Yugoslavia, namely Croatia and Slovenia, had to undertake significant political and economic transformations after the end of the Socialist Federal Republic of Yugoslavia in 1992 (Horvat, 2015). Again, all CEECs (except Albania) are members

of the EU, which maintains rigorous political, economic, and administrative requirements during the accession process to the bloc.

During the pre-2008 Global Financial Crisis (GFC) era after 2003 (see Fig. 1), CEECs attracted large inflows of FDI primarily incentised by privatisation initiatives and the likelihoods of accession of some of the CEECs into the EU. Hence, the region was mostly effective in attracting FDI relative to other emerging market economies (Castejón & Wörz, 2007). As noted by Damijan and Rojec (2007), the FDI inflows into the CEECs have been the central driver of economic restructuring and technology diffusion, eliciting productivity convergence within the region (Bijsterbosch & Kolasa, 2009).

After the GFC, regional FDI in CEECs have been epitomised by an indolent recovery comparative to other emerging market regions. Fig. 1 shows that East Asia and the Pacific region recovered swiftly from the aftermath of the 2008 GFC and has been experiencing a fairly growing trend in FDI since then. From 2010 to 2015, FDI inflows were more prominent in the East Asia and Pacific, North America, Latin America, and Northern Europe regions. In contrast, CEECs received significantly meagre FDI inflows.

Prior to the COVID-19 pandemic, regional FDI inflows (except that of the East Asia and Pacific region) largely had declining trajectories. However, while other regions continued to follow a declining path, CEECs began to witness a recovery in 2018, and the trend continued during COVID-19 and beyond. FDI inflows in Western Europe, North America, Southern Europe, and Northern Europe generally moved in the same direction as the global trend both in the pre- and post-GFC period.

The transitions have also been accompanied by an expansion of FDI inflows. CEECs, per se, witnessed more inflows of FDI from 1993 onwards (see Fig. 2), with Hungary and Poland outperforming many emerging market economies in 1999, perhaps due to the Asian crisis in 1997 (Konings, 2001). The surge in FDI inflows in CEEs during this era may be a consequence of a deeper phase of integration of some CEECs into the EU (Brenton & Gros, 1997). Within the CEEC region itself, heterogeneity could be observed with countries exhibiting favourable initial conditions attracting more FDI than riskier and inferior performing neighbouring countries (Carstensen & Toubal, 2004).

An analysis of FDI crescendos in Fig. 2 reveal that Hungary, Poland, the Czech Republic, and Romania receive the largest shares. The same countries are also the largest CEECs, in terms of economic output as measured by GDP, and the trends in their FDI inflows were generally upward before plummeting
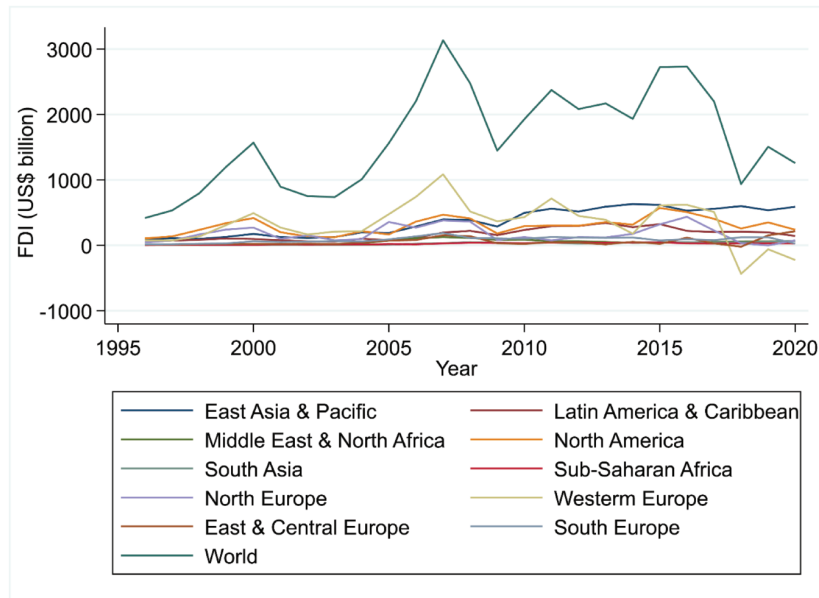
Fig. 1. Regional classification of FDI inflows from 1996 to 2020. Source: World Bank (n.d.-a).
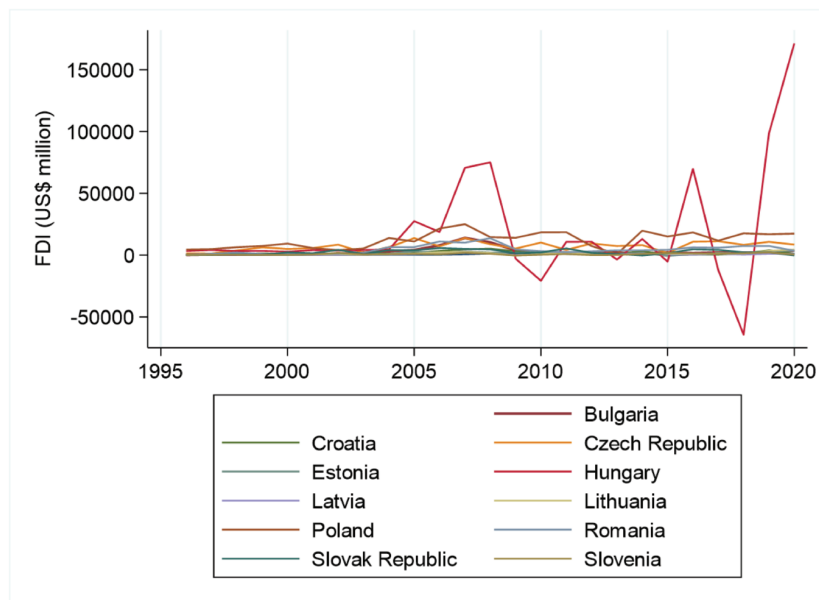

Fig. 2. FDI inflows in CEECs from 1996 to 2020. Source: World Bank (n.d.-a).

during the GFC. Hungary, in particular, experienced a decline from US$75.1 billion in 2008 to −US$347.0 million in 2009 and −US$20.8 billion in 2010. For other CEECs, both pre- and post-GFC inflows of FDI seem mostly subdued. In terms of origin, most of the FDI inflows within the region originate from the Organisation for Economic Co-operation and Development (OECD) members (see Table A2).

Similar to the CEECs and other regional trends, FDI inflows in CEECs were already declining before the onset of the COVID-19 pandemic in 2019. In fact, the period between the post-GFC era and pre-COVID-19 era is characterised by upward and downward swings in FDI inflows in the majority of the CEECs. It is during this period that Hungary, again, saw its FDI inflows decline from US$69.7 billion in 2016 to −US$64.4 billion in 2018 before increasing to US$98.5 billion in 2019 and continuing to recover into the COVID-19 period. While the FDI inflows of Poland showed signs of recovery by the end of 2020, the

Table 1. Overview of the main macroeconomic indicators in selected years.

Country	GDP growth (%)		FDI inflows (% of GDP)		Inflation (%)		FCF growth (%)		Governance index		EDB score	
	2000	2019	2000	2019	2000	2019	2000	2019	2000	2019	2015	2019
Albania	6.95	2.09	4.11	7.80	5.65	1.26	42.63	−3.68	−0.62	−0.08	58.08	67.75
Bulgaria	4.59	4.04	7.56	3.22	7.38	5.24	16.48	4.53	0.13	0.26	72.46	71.97
Croatia	2.90	3.48	4.65	6.27	4.34	1.92	−1.70	9.82	0.17	0.45	71.35	73.62
Czech	4.00	3.03	8.07	4.26	1.84	3.89	7.53	5.95	0.56	0.93	76.11	76.34
Estonia	10.09	4.10	7.32	9.87	3.68	3.19	14.18	6.12	0.90	1.24	80.54	80.62
Hungary	4.48	4.55	5.82	60.24	9.58	4.77	5.99	12.78	0.97	0.47	71.07	73.42
Latvia	5.68	2.48	4.07	3.17	3.62	2.58	22.09	6.93	0.39	0.85	79.13	80.28
Lithuania	3.70	4.57	3.30	6.28	1.30	2.65	−6.86	6.64	0.47	0.95	78.99	81.62
Poland	4.56	4.74	5.42	2.82	6.12	3.19	2.19	6.06	0.69	0.64	76.93	76.38
Romania	2.46	4.19	2.78	2.95	43.18	6.80	5.85	12.91	−0.18	0.27	72.72	73.33
Slovak	1.17	2.61	7.47	2.17	9.49	2.49	−12.23	6.74	0.54	0.64	74.84	75.59
Slovenia	3.67	3.25	0.67	3.97	5.57	2.20	2.38	5.49	0.89	0.99	74.71	76.52

Note: GDP = Gross Domestic Product; FDI = Foreign Direct Investment; FCF = Fixed Capital Formation; EDB = Ease of Doing Business.
Source: World Bank (n.d.-a, n.d.-b).

inflows in the rest of the CEECs portrayed signs of distress, and the trend may continue into the future given the negative spill-over effect of the Russo-Ukrainian conflict.

Table 1 overviews the main macroeconomic indicators in the CEECs in selected years. Economic growth averaged 4.52% in 2000 and declined to 3.59% in 2019. CEECs that experienced declining growth include Estonia, Albania, and Latvia. The higher economic growth in these countries during 2000 might have been a corollary of GDP growth from a lower base. FDI inflows as a percentage of GDP averaged 5.10% in 2000 and grew to an average of 9.42% in 2019. Hungary saw a growth in its FDI from 5.82% in 2000 to 60.24% in 2019, while the Slovak Republic witnessed a decrease from 7.47% to 2.17%.

An observation of the inflation dynamics shows a decline in the inflation average from 8.49% in 2000 to 3.35% in 2019. The most outstanding countries in this regard are Hungary, Romania, and the Slovak Republic, whose inflation rates declined from 43.18%, 9.58%, and 9.49% in 2000 to 6.8%, 4.77%, and 2.49% in 2019, respectively. The growth in FCF in the CEECs declined from an average of 8.21% in 2000 to 6.69% in 2019. However, the governance index in the CEECs improved from an average of 0.41 in 2000 to 0.63 in 2019. Estonia, in particular, displayed an improvement in general governance with the governance index increasing from 0.90 in 2000 to 1.24 in 2019. The EDB score in the region averaged 73.91 in 2015 and improved to 75.62 in 2019. All the CEECs generally possess business-friendly regulations, with Lithuania holding the highest EDB score of 81.62 in 2019, while Albania has the lowest EDB score of 67.75 during the same year.

2 Estimation procedures and data

Our empirical strategy follows a two-stage process. First, we examine the impact of macroeconomic drivers and governance using static panel estimation procedures. In the second stage, we employ a Seemingly Unrelated Regression (SUR) model to account for cross-country differences in FDI inflow. Drawing from past studies by Alfaro et al. (2008), Beri and Nubong (2023), Beri et al. (2022), Doytch (2021), Marks-Bielska et al. (2022), and Peres et al. (2018), we specify the following semi-log panel model:

$$y_{i,t} = \beta X_{i,t} + \mu_i + \eta_t + \varepsilon_{i,t} \qquad (1)$$

where $y_{i,t}$ is the log of FDI, $X_{i,t}$ is a set of explanatory variables, $\mu_i \approx i.i.d(0, \sigma_{\mu i})$, $\varepsilon_{i,t} \approx i.i.d(0, \sigma_\varepsilon)$, $E(\mu_i \varepsilon_{i,t}) = 0$. μ_i is the country-specific effects and η_t captures the time effects. We analyse and present results for pooled OLS, the within fixed effect (FE), the generalised least squares random effect (RE), and the FE and RE models with Driscoll and Kraay robust standard errors. We also analyse the interactive effects of governance and macroeconomic drivers on FDI using equation (2).

$$y_{i,t} = \beta X_{i,t} \times GOV_{i,t} + \mu_i + \eta_t + \varepsilon_{i,t} \qquad (2)$$

where $\beta X_{i,t} \times GOV_{i,t}$ captures the interaction between macroeconomic drivers and the composite index of governance. Additionally, we employ the SUR or the Zellner (1962) approach to account for heteroscedasticity and contemporaneous correlation of residuals in cross-country equations (Dang & Nguyen, 2021; Khan et al., 2014; Kok & Ersoy, 2009). In this case, the model

$(y = X\beta + \varepsilon)$ takes the following matrix form:

$$y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix}; \quad X = \begin{bmatrix} X_1 & 0 & \cdots & 0 \\ 0 & X_2 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & X_n \end{bmatrix}; \quad \beta = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix};$$

$$\text{and } \varepsilon = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{bmatrix} \qquad (3)$$

where $\varepsilon_1 \ldots \varepsilon_n$ is the error vector. Since $E(\varepsilon_i \varepsilon_j') = \sigma_{ij} I$, it implies that $E(\varepsilon\varepsilon') = \sum \otimes I$, where $\sum = \begin{bmatrix} \sigma_{11} & \sigma_{12} & \cdots & \sigma_{1n} \\ \sigma_{21} & \sigma_{22} & \cdots & \sigma_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ \sigma_{n1} & \sigma_{n2} & \cdots & \sigma_{nn} \end{bmatrix}$ and the identity matrix (I) is of order 25×25

Although the OLS method provides consistent parameter estimates, results from SUR are generally more efficient because it accounts for aggregation bias (Zellner, 1962). Nevertheless, OLS produces the same results as SUR when residuals between equations are not correlated, and when the system contains the same explanatory variables (Khan et al., 2014). We recognise that a good history of FDI, GDP, inflation, and trade openness can attract future FDI. To avoid issues of endogeneity in our models, we do not use a dynamic model. The following variables are under scrutiny (see summary statistics in Table A3):

- **Foreign direct investment** (FDI_{it}). FDI inflow as a percentage of GDP is our dependent variable. Although Beugelsdijk et al. (2010) consider FDI stocks as a more representative measure of MNCs' activities, Bonnitcha (2017) argued that its quality is usually poor because the methods used in compiling the data are not uniform across countries. The distribution of FDI in CEECs is skewed to the right because some countries attract more investments than their counterparts (Skewness, 1.95; Kurtosis, 12.43). Despite this drawback, we consider FDI inflows because they are not vulnerable to book value bias. Additionally, changes in FDI are not quite apparent with stocks (Jimborean & Kelber, 2017). Using FDI as a percentage of GDP enables us to examine its sensitivity to changes in the business environment. We have collected FDI data from the United Nations Conference on Trade and Development (UNCTAD).
- **Gross Domestic Product per capita** ($GDP_{i,t}$). This is a measure of market size widely employed in empirical studies (Gao et al., 2021; Naudé &

Krugell, 2007). Most MNCs, especially market-seeking investors, strive to avoid tariff and non-tariff barriers in order to minimise transaction costs. According to the market size hypothesis, foreign investors are likely to benefit from economies of scale when they locate their businesses in countries with large markets. We expect market size to have a positive effect on FDI (Carstensen & Toubal, 2004), and the effect should be stronger in countries with good governance. GDP per capita data has been gleaned from Eurostat.
- **Macroeconomic stability** ($CPI_{i,t}$). Price stability is a crucial macroeconomic policy objective in most economies. A stable macroeconomic environment reduces volatility in returns from FDI. Therefore, countries with a history of low inflation and manageable fiscal deficits are more credible in the eyes of foreign investors relative to those with high and unpredictable inflation rates. One way that governments ensure macroeconomic stability is through inflation targeting (Mason & Vracheva, 2017), which has been shown to be associated with lower real exchange rate volatility. This policy strategy was adopted by Armenia, the Czech Republic, Hungary, and Poland after their transition to market economies. Extant studies measure macroeconomic stability with the GDP deflator, consumer price index (CPI), or exchange rate (Gao et al., 2021; Pečarić et al., 2021). We employ CPI to measure macroeconomic stability and expect a positive association with FDI. We also expect good governance to have a positive modulating effect on the macroeconomic drivers–FDI nexus.
- **Trade openness** (Trade). Trade openness facilitates the accumulation of physical capital, technology transfer, capacity utilisation as well as opens domestic firms to international competition (Pradhan et al., 2017). Classical economic theories like that of absolute and comparative advantages emphasise the importance of efficiency gains from specialisation and free trade (Nath, 2009). In this regard, trade openness enhances the efficient allocation of resources that percolates into additional investment, productivity, and economic growth. Investors are mostly interested in open economies that promote the free movement of capital. There is no perfect measure of trade openness in economic literature. In this study, however, it refers to exports plus imports as a percentage of GDP. We expect open economies to attract more FDI, with an even more robust effect in countries with good governance.

- **Gross fixed capital formation** (*GFK*). FDI is generally expected to move towards countries with more domestic investments. This variable also determines the level of infrastructural development in a country. We expect improvements in infrastructure to be associated with FDI inflow, and the effect should be stronger in countries with better governance. We expect a positive relationship between FDI and gross capital formation.
- **Human capital** (School). It measures the quality and price of labour in each country. This variable represents the tertiary school enrolment rate taken as a percentage of gross enrolment. Jimborean and Kelber (2017) argued that FDI in CEECs concentrated in the transport, storage and communication, financial intermediation, business-related services, and information-intensive services sectors that required a highly trained labour force. Although the effect of a highly skilled labour force on FDI could be ambiguous (Doytch, 2021), we expect a positive association with FDI inflow.
- **Governance** (*GOV*). While human capital, physical capital and technology are core economic variables in production, countries with better institutions use their resources more efficiently (Acemoglu & Robinson, 2010). Governance institutions set the rules of the game in every society (North, 1990), and as such, play a critical role in cross-country differences on FDI. Good governance is associated with less risk, low transaction costs, a low level of information asymmetry, and high returns, which attract foreign investors (Su et al., 2019).

We measure governance with indices from the World Governance Indicators: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption (Kaufmann et al., 2011, p. 221). The advantage of these indicators is that they enhance the comparisons of governance systems across countries and over time. The indices range from -2.5 to 2.5 and reflect weak to strong governance performance. We have employed linear interpolation to generate missing observations for the years 1997, 1999, and 2001.

Although governance indicators appear to be disparate, they are not strictly independent. For instance, countries characterised by voice and accountability are likely to be less corrupt while those that respect the rule of law are more likely to have better regulatory environments. Governance indicators in this study are contemporaneously correlated ($r > .80$). In order to minimise

the loss of information, we have conflated these indicators into a composite index using principal components analysis (PCA). In accordance with the Kaiser rule to retain components with Eigenvalues of >1 (Eigenvalue $= 5.14$ in this study), we have recollected the first component because it explains 85.7% of data variation. The KMO measure of sampling adequacy has been $0.894 > 0.5$, justifying the use of PCA. We expect governance and its interactions with macroeconomic drivers to augment the inflow of FDI. We have also used polity and democracy scores from the Polity5 project to corroborate results in this study.

3 Results and discussion

3.1 Panel diagnostics

In order to choose the most appropriate technique, we have performed several diagnostic tests on the data. Tests for potential multicollinearity indicated high correlations between GDP and human capital (0.6849) as well as GDP and governance (0.6397). However, further analysis using the variance inflation factor revealed no evidence of collinearity (VIF $= 1.64$).

Results from the poolability test show that cross sections do not have a common intercept. We have also investigated whether panel FDI regressions are homogenous or heterogeneous (Bersvendsen & Ditzen, 2021; Pesaran & Yamagata, 2008). To this end, we have fit two FDI models. In the first model without the dynamic parameter, we have rejected the null of slope homogeneity at 1% level (Delta $= -2.575$, *p*-value $= 0.010$). In the second model that includes the first lag of FDI and controls for heteroscedasticity with the HAC robust standard errors, we have again rejected the null of slope homogeneity (Delta $= -2.206$, *p*-value $= 0.027$). Therefore, an estimator that allows for heterogeneous slopes, such as the mean group estimator or Seemingly Unrelated Regression, may be apposite for the analysis.

Results from the Hausman test show that the RE model is the most appropriate [$\chi^2(6) = 1.06$, Prob $> \chi^2 = 0.983$]. Pesaran's test shows evidence of cross-sectional dependence (2.057, *p*-value $= 0.0397$). Based on the modified Wald test for groupwise heteroscedasticity, we have also found evidence that the variances are non-constant [$\chi^2(12) = 2618.15$, Prob $> \chi^2 = 0.0000$]. Finally, the Woodridge test for autocorrelation shows no evidence of first-order autocorrelation [$F(1, 11) = 2.825$, Prob $> F = 0.1210$].

Table 2 shows that gross domestic product, inflation, tertiary education enrolment, and governance are stationary at level. Conversely, FDI, trade

Table 2. Im-Pesaran-Shin (IPS) unit root test.

Variable	Statistic	Decision (H_0)	Level
D.FD	−3.3718***	Reject	I(1)
GDP	−2.0406***	Reject	I(0)
CPI	−3.3466***	Reject	I(0)
D.Trade	−3.2653***	Reject	I(1)
D.GFK	−2.9390***	Reject	I(1)
School	−2.6093***	Reject	I(0)
GOV (PCA)	−5.0355***	Reject	I(0)

Stationary at level, I(0); Stationary at first difference, I(1).
***$p < 0.01$.

Table 3. Cointegration test.

	Statistic	*P*-value
Modified Phillips-Perron *t*	2.3443	0.0095
Phillips-Perron *t*	−6.8934	0.0000
Augmented Dickey-Fuller *t*	−7.2826	0.0000

openness and gross fixed capital formation are stationary at first difference.

Finally, we have performed Pedroni's test for cointegration with heterogeneous panels to ascertain the presence of a long-run relationship between the macroeconomic drivers–FDI nexus (Pedroni, 1999). The assumption is that if two or more variables are cointegrated, their residuals will be stationary or I(0). Based on results in Table 3, we can reject the null hypothesis and conclude that all panels are cointegrated.

The preliminary diagnostics suggest the need to account for heterogeneity, cross-sectional dependence, and heteroscedasticity. Since we have a long panel, the first conceivable strategy is to follow the nonparametric technique by Driscoll and Kraay (1998), whose estimates are based on the asymptotic assumption

of large *T*. The procedure produces standard errors that are robust to heteroscedasticity, autocorrelation, and spatial dependence. We take the first difference of all nonstationary variables before running the regression.

3.2 Regression results

This section presents static regression results, juxtaposed with those from SUR in Table 5. In Table 4, (1) is the Pooled OLS, (2) Fixed Effect (FE), (3) Random Effect (RE), (4) Driscoll and Kraay FE, and (5) Driscoll and Kraay RE. The results are largely similar, irrespective of the type of estimation. In Table 5, (1)–(12) represent SUR estimates for each country in the system. Table 4 shows that market size (GDP) is only significant in equation (2) at 0.05 level. Further scrutiny using the SUR model in Table 5 shows that market size is the most significant determinant of FDI in Hungary, while the effect is negative and significant in Lithuania, Latvia, and Poland.

It is not unusual for studies to uncover a negative and significant relationship between GDP and FDI (Magbondé & Konté, 2022). The overall implication is that market size plays a largely heterogeneous influence on FDI, and policymakers must consider cross-country differences when designing policies. While prior studies showed supportive evidence for the market size hypothesis (Carstensen & Toubal, 2004; Doytch, 2021; Jimborean & Kelber, 2017), this is perhaps the first paper to show cross-country differences in FDI performance.

Our second variable was to examine the impact of macroeconomic stability (inflation) on FDI. Table 4

Table 4. Pooled OLS, Fixed/Random effects, Driscoll and Kraay (D-K) standard errors results.

Variables	(1) Pooled OLS	(2) FE(within)	(3) GLS RE	(4) D-K FE	(5) D-K RE
LGDP	0.014	0.315**	−0.012	0.315	−0.012
	(0.032)	(0.127)	(0.188)	(0.488)	(0.362)
CPI	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
D.Trade	0.076***	0.079***	0.076***	0.079***	0.076***
	(0.024)	(0.023)	(0.024)	(0.024)	(0.024)
D.LGFK	2.285**	2.032*	2.271**	2.032**	2.271**
	(0.886)	(0.986)	(0.911)	(0.857)	(0.899)
School	−0.007	−0.014	−0.006	−0.014	−0.006
	(0.005)	(0.009)	(0.005)	(0.015)	(0.015)
GOV	−0.017	−0.212	−0.015	−0.212	−0.015
	(0.040)	(0.150)	(0.054)	(0.146)	(0.073)
Constant		−2.524**	0.236	−2.524	0.236
		(0.944)	(1.911)	(4.218)	(3.033)
N	288	288	288	288	288
R-squared	0.066	0.069			
Groups	12	12	12	12	12

Robust standard errors in parentheses.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 5. Seemingly unrelated regression results.

Variables	(1) ALB	(2) BGR	(3) CZE	(4) EST	(5) HRV	(6) HUN	(7) LTU	(8) LVA	(9) POL	(10) ROU	(11) SVK	(12) SVN
GDP	−3.743	6.347	−5.020	1.772	5.710	17.200**	−4.324**	−8.107***	−8.249**	−4.221	8.420	4.082
	(2.507)	(5.492)	(4.894)	(5.877)	(5.221)	(8.594)	(1.993)	(1.706)	(3.393)	(2.903)	(10.267)	(3.734)
CPI	0.028	−0.000	0.345*	−0.346**	−0.252	0.778***	0.186***	−0.078*	0.017	−0.017	0.818**	0.139
	(0.032)	(0.003)	(0.206)	(0.169)	(0.172)	(0.221)	(0.071)	(0.043)	(0.068)	(0.016)	(0.328)	(0.145)
Trade	0.021	0.190***	−0.045	0.003	−0.136***	0.043	0.108***	0.079***	0.068	−0.048	0.033	−0.004
	(0.041)	(0.061)	(0.041)	(0.046)	(0.042)	(0.055)	(0.033)	(0.020)	(0.075)	(0.079)	(0.088)	(0.041)
GFK	2.468**	5.408**	8.966***	6.773	9.792***	−5.377	2.086	10.125***	6.649***	3.849	−18.210**	0.812
	(1.861)	(2.737)	(3.422)	(7.948)	(3.509)	(5.717)	(1.438)	(1.556)	(2.074)	(3.310)	(8.857)	(2.039)
School	0.079**	−0.898***	0.033	−0.158*	−0.080	−0.060	−0.027	−0.057*	0.001	0.033	−0.337	−0.060
	(0.038)	(0.191)	(0.112)	(0.095)	(0.181)	(0.084)	(0.046)	(0.023)	(0.039)	(0.063)	(0.237)	(0.041)
GOV	1.559***	−0.864	0.285	−2.957***	−8.272***	4.534***	−0.277	−1.904***	−0.471	0.316	4.721*	−0.391
	(0.429)	(2.271)	(0.432)	(0.874)	(2.899)	(1.513)	(0.729)	(0.571)	(0.365)	(1.321)	(2.693)	(0.748)
Constant	−10.778	−148.22**	−151.7***	−165.817	−220.06***	−49.938	−11.225	−149.644**	−87.416*	−46.669	352.266*	−53.101
	(26.490)	(60.137)	(51.618)	(154.778)	(68.306)	(103.288)	(27.621)	(26.607)	(48.354)	(70.845)	(187.599)	(45.979)
N	25	25	25	25	25	25	25	25	25	25	25	25
R-sq	0.873	0.714	0.607	0.461	0.475	0.377	0.549	0.721	0.539	0.328	0.354	0.015
F-Statistic	24.63***	8.4***	5.45***	4.96***	4.42***	3.7***	5.8***	12.12***	3.66***	2.16**	4.58***	1.05

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: Table 5 presents SUR results. (1) to (12) represent regression output for each CEEC.

shows a positive and consistent effect of macroeconomic stability on FDI in CEECs across the pooled, FE/RE, and Driscoll-Kraay procedures. Table 5 shows that the positive effect of macroeconomic stability is stronger in the Czech Republic, Hungary, Lithuania, and the Slovak Republic. Low inflation is associated with macroeconomic stability and is always viewed favourably by investors because it reduces volatility in returns (Gao et al., 2021; Pečarić et al., 2021). Conversely, it seems that inflation rates deter FDI from Estonia and Latvia. These countries experienced inflation rates of between 1% (min) and 23% (max) over the period considered. Countries with high inflation are often characterised by macroeconomic instability, which makes investors sceptical. Our results further show how CEECs respond differently to inflation. Studies using purchasing power parity as a measure of macroeconomic stability also arrive at similar conclusions, especially for FDI in the service sector (Pečarić et al., 2021). Therefore, policymakers should make sure to keep inflation at low to moderate levels.

The impact of trade openness on FDI is positive and consistent across models (1) to (5) in Table 4. These demonstrate the propelling effect of openness to trade on FDI. Nonetheless, Table 5 shows that the effect is stronger in Bulgaria, Lithuania, and Latvia. Conversely, openness seems to have a reducing effect on FDI in Croatia. These results differ from those by Pečarić et al. (2021), who found a negative relationship in their analysis of the determinants of sectoral FDI in East European EU economies. Theory generally postulates a positive or negative relationship between trade openness and FDI, depending on the type of flow. For instance, FDI and trade openness complement each other for vertical FDI and substitute each other for horizontal FDI. Therefore, the observed coefficients of trade openness in this study give a sense of the type of investments in CEECs. However, additional studies may be conducted at sectoral levels to ascertain the responsiveness of different types of FDI on trade openness.

The effect of human capital is negative and insignificant, which lends credence to Jimborean and Kelber (2017). Human capital is strongly significant in Albania (see Table 5). Conversely, human capital is associated with reductions in FDI in Bulgaria, Estonia, and Latvia. The negative effect of human capital could imply an increase in the cost of labour. A more educated labour force is usually more expensive to hire, and in some instances, could retard the inflow of FDI.

Gross fixed capital formation has the largest positive effect on FDI. In economic literature, capital formation is a proxy for the level of infrastructural development (transport, telecommunication, and social). Higher domestic investments indicate more productivity, which sends signals of opportunities for profitability to foreign enterprises. Table 5 shows that the effect of GFK is stronger in Bulgaria, Czech Republic, Croatia, Latvia, and Poland. Conversely, GFK is negatively associated with FDI inflow in the Slovak Republic. Once again, these results highlight heterogeneity in the performance of macroeconomic drivers, which is consistent with much of the literature (Jimborean & Kelber, 2017; Magbondé & Konté, 2022).

We do not find a significant effect of governance on FDI. However, the evidence from SUR indicates that governance is associated with FDI in Albania, Hungary, and the Slovak Republic. Conversely, governance plays a reducing effect on FDI in Estonia, Croatia, and Latvia. After obtaining these results, we employed the polity scores and democracy scores to check for robustness (not presented). The results were largely consistent with those from the governance index. Fig. 3 presents the fitted regression model of Driscoll and Kraay standard errors. It shows that, on average, FDI has slid towards a downward trajectory in CEECs. Accordingly, only Albania and Estonia have shown signs of recovery.

3.3 The moderating effect of governance on the macroeconomic–FDI nexus

The last part of this study examines the impact of the interaction between macroeconomic factors and governance on FDI using the Driscoll and Kraay (1998) model with robust standard errors. (1) to (5) in Table 6 represent the different models estimated. It is worth noting that governance does not moderate the effect of macroeconomic drivers on FDI in all models. In addition, we recollected data on polity and democracy from the polity5 project to test for robustness. The results (not presented) were generally consistent with preceding findings.

Although many studies find that institutions explain cross-country difference in FDI and economic development (Acemoglu & Robinson, 2010; Alfaro et al., 2008; Peres et al., 2018), Moosa (2017) argued such studies are a product of junk-science to justify the dishonest activities of foreign enterprises. A possible reason for the insignificant coefficients is that governance and measures of institutions scarcely change significantly over time, which makes it difficult to ascertain their effect on volatile macroeconomic variables like FDI. Dorożyński et al. (2020); Jimborean and Kelber (2017), and Marks-Bielska et al. (2022) showed that institutions matter for FDI.
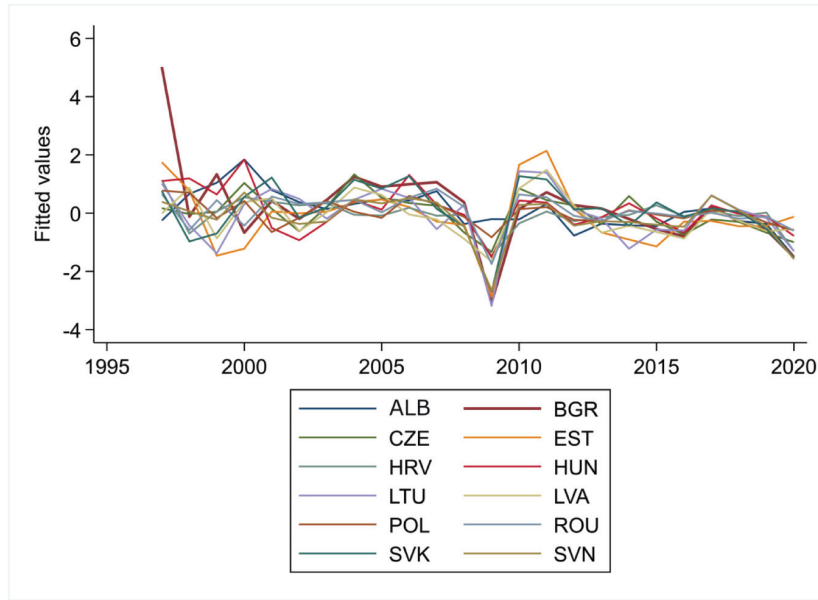
Fig. 3. Fitted FDI in CEECs.

Table 6. Moderating effect of governance on macroeconomic drivers.

Variables	(1) D-K RE	(2) D-K RE	(3) D-K RE	(4) D-K RE	(5) D-K RE
LGDP	−0.007	−0.041	−0.013	−0.012	0.015
	(0.379)	(0.368)	(0.368)	(0.367)	(0.376)
CPI	0.003***	−0.010	0.003***	0.003	0.003***
	(0.001)	(0.045)	(0.001)	(0.002)	(0.001)
D.Trade	0.076***	0.077***	0.083**	0.076***	0.076***
	(0.024)	(0.026)	(0.032)	(0.026)	(0.024)
D.LGFK	2.267**	2.320**	2.164**	2.210**	2.254**
	(0.890)	(0.959)	(0.923)	(0.901)	(0.883)
School	−0.006	−0.007	−0.006	−0.006	−0.007
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
GOV	−0.100	0.011	0.001	−0.008	−0.076
	(0.806)	(0.104)	(0.076)	(0.075)	(0.143)
LGDP#c.GOV	0.009				
	(0.085)				
CPI#GOV		−0.004			
		(0.014)			
D.Trade#GOV			−0.015		
			(0.013)		
D.LGFK#GOV				−0.125	
				(0.546)	
School#GOV					0.001
					(0.002)
Constant	0.175	0.605	0.225	0.241	−0.038
	(3.289)	(3.078)	(3.135)	(3.075)	(3.227)
Observations	288	288	288	288	288
Number of groups	12	12	12	12	12

Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4 Concluding remarks

This paper employs data from 1996 to 2020 to address two important questions: (i) To what extent do macroeconomic drivers and governance influence FDI in CEECs? (ii) Does governance moderate the macroeconomic drivers–FDI nexus? The paper's main contribution is that it identifies and isolates new linkages between macroeconomic factors, governance, and FDI by using SUR. Disentangling the

heterogeneous behaviour of FDI gives policymakers insights on how to incentivise its inflows into these economies.

We find that macroeconomic stability, gross fixed capital formation, and trade openness are the most significant determinants of FDI. The results are concomitant with those obtained by Carstensen and Toubal (2004), Jimborean and Kelber (2017), and Mason and Vracheva (2017). The effect of market size is weak, but there is evidence of substantial heterogeneous responses across countries. We find no evidence that human capital and governance significantly influence FDI in the full sample, which fails to support Dorożyński et al. (2019, 2020). Further scrutiny shows that governance is significant in Albania, Hungary, and the Slovak Republic, while human capital is only significant in Albania. Fig. A1 (appendix) shows a volatile but downward trajectory in FDI that became conspicuous after the 2011 euro debt crisis.

In order to attract more FDI, policymakers should aim to consolidate domestic macroeconomic policies and trade liberalisation. A limitation of the study is that it does not account for structural breaks due to economic crises. The transition into neoliberal economies exposed CEECs to external shocks, which raise several questions. First, what is the effect of interconnected crises on FDI? Do institutions in place shield CEECs from these economic shocks? We recommend that future studies examine how these issues affect FDI in CEECs.

Funding statement

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Appendix

Table A1. Geographical classification of European countries.

Region	Countries
Northern Europe	Denmark; Faroe Islands; Finland; Greenland; Iceland; Ireland; Norway; Sweden; and United Kingdom.
Western Europe	Austria; Belgium; France; Germany; Liechtenstein; Luxembourg; Netherlands; and Switzerland.
Central and Eastern Europe	Albania; Bulgaria; Croatia; Czech Republic; Estonia; Hungary; Latvia; Lithuania; Poland; Romania; Slovak Republic; and Slovenia.
Southern Europe	Andorra; Bosnia and Herzegovina; Cyprus; Gibraltar; Greece; Italy; Kosovo; Malta; Monaco; Montenegro; North Macedonia; Portugal; San Marino; Serbia; and Spain.

Source: One World (2022) and Organisation for Economic Co-operation and Development (2022).

Table A2. Top 10 Inward FDI investors in CEECs in 2019 by partner countries (US$ billions).

Czech Republic		Estonia		Hungary		Latvia		Lithuania		Poland		Slovak Republic		Slovenia	
Partner	US$B	Partner	US$B	Partner	US$B	Partner	US$B	Partner	US$B	Partner	US$B	Partner	US$B	Partner	US$B
Luxembourg	3.80	Sweden	2.67	Netherlands	0.65	Sweden	0.29	Sweden	0.45	Netherlands	6.22	Austria	1.50	Austria	0.40
Netherlands	3.67	Finland	2.21	United States	0.34	Estonia	0.17	Netherlands	0.29	Germany	4.97	Netherlands	0.85	Switzerland	0.19
Germany	3.26	Netherlands	1.66	Canada	0.15	Russia	0.12	Hong Kong	0.26	Luxembourg	3.32	Luxembourg	0.58	Netherlands	0.18
Austria	2.48	United Kingdom	1.63	Germany	0.13	Cyprus	0.12	Estonia	0.25	France	1.91	Germany	0.45	Germany	0.15
Belgium	1.33	Luxembourg	1.38	Austria	0.09	Netherlands	0.11	Germany	0.16	United Kingdom	1.01	South Korea	0.40	Luxembourg	0.11
France	1.24	Cyprus	0.93	Luxembourg	0.07	Luxembourg	0.11	Poland	0.14	Switzerland	0.77	Czech Republic	0.37	Italy	0.10
Switzerland	0.97	Lithuania	0.61	United Kingdom	0.07	Lithuania	0.07	Finland	0.12	Spain	0.69	France	0.19	Croatia	0.08
Cyprus	0.67	Germany	0.46	France	0.06	Denmark	0.05	Cyprus	0.11	Italy	0.66	Belgium	0.18	Hungary	0.07
Italy	0.56	Ukraine	0.44	Jersey	0.06	Germany	0.05	Switzerland	0.09	Cyprus	0.52	Italy	0.18	Sweden	0.06
United Kingdom	0.45	Norway	0.29	Switzerland	0.05	Norway	0.04	Denmark	0.09	Belgium	0.47	United Kingdom	0.11	Serbia	0.06

Source: Organisation for Economic Co-operation and Development (n.d.).

Table A3. Summary statistics.

Variable	Mean	Std. Dev.	Min	Max	Observations
FDI	4.25	3.82	−11.62	27.90	300
GDP	19,055.89	9371.61	2717.64	42,847.00	300
CPI	9.34	62.15	−1.54	1058.37	300
Trade	109.40	34.61	44.90	190.70	300
GFK	1.97E+10	2.13E+10	7.36E+08	1.06E+11	300
School	54.96	18.44	10.94	94.86	289
GOV	−0.08	2.33	−6.89	3.89	300
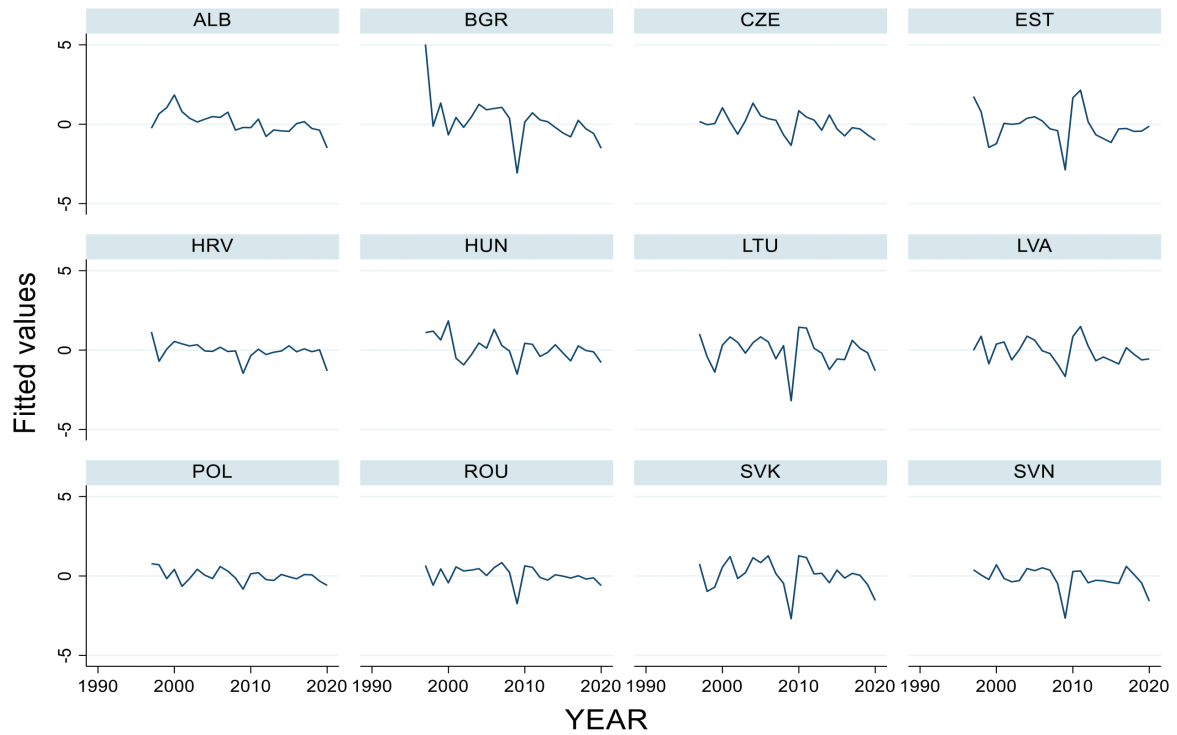
Fig. A1. Predicted patterns of FDI by country.