

Trick or Treat? The Effect of IMF Programmes on Mobilising FDI in CESEE Countries

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Abstract

This paper investigates the effect of IMF programmes on foreign direct investment in the countries of Central, Eastern and South-eastern Europe. We use the original dataset for 17 countries in the region for the period from 1990 to 2013. In order to address selection bias stemming from the fact that countries are not randomly assigned to participation in IMF arrangements in a given year and controlling also for the unobservable factors influencing both IMF participation and foreign investment, we employ the treatment effect model. The robustness of our findings was additionally assessed by the fixed effects instrumental variable panel and Arellano Bond dynamic panel estimation. Irrespective of the method used and model specification, we find that IMF arrangements negatively affect foreign direct investment in the CESEE region.

1. Introduction

Economic crises have attracted much attention from both academic and wider public due to their resilience and negative economic, social and psychological consequences throughout history. The International Monetary Fund (IMF or the Fund) is often involved in addressing such crises, by providing financial arrangements which should ensure necessary liquidity and stimulate economic adjustment with a view towards economic recovery for the crisis-stricken countries. The necessary liquidity is partly provided by the Fund; however, its financial arrangements are envisaged with the aim and the assumption of attracting additional foreign capital into the borrowing countries. The relationship between IMF programmes and foreign capital is underpinned by the concept of the IMF's catalytic effect, according to which a provision of official resources to a country in the framework of a programme might increase the propensity of private investors to hold capital assets in the country concerned (Cottarelli and Giannini, 2006). In this context, the propensity of foreign investors to take advantage of investment opportunities in a country can be operationalized indirectly through foreign capital inflow, including foreign direct investment (FDI).

The IMF has traditionally claimed that its programmes have the catalytic effect on foreign capital (Cottarelli and Giannini, 2006; Mody and Saravia, 2006; Bauer et al., 2012), offering several arguments why IMF programmes could improve the perception of foreign investors. Firstly, IMF programmes are characterised by conditionality – a series of policy measures agreed with the Fund and to be carried out in the programme. Monitoring by the Fund and the activation of negative financial and reputational consequences for noncompliant countries can improve the perception of foreign investors regarding the likelihood of borrower countries to

implement predefined policy measures (Bauer et al., 2012). Furthermore, IMF financial arrangements can increase the predictability of economic policy in the borrower countries. Given that unpredictability is defined as one of the key barriers to foreign investment (Dhonte, 1997), through participation in an IMF programme a country limits its power of creation and implementation of policy measures to the ones previously agreed with the Fund. This argument might be especially pertinent for foreign direct investments as they become relatively inelastic once the investing transaction has been carried out, so this kind of investors might be especially motivated to try and predict the course of future economic policies in a potential beneficiary country. Thirdly, Fund programmes are characterised by the IMF's requirements for user countries to adopt various market reforms, which might signal a more appealing investment climate. As pointed out by Biglaiser and De Rouen (2010), if investors prefer market reforms to state interventionism, participation in IMF programmes might signal the readiness of the user country to initiate and/or maintain market policies and thus catalyse foreign investment under the assumption of *ceteris paribus*.

On the other hand, the positive link between the IMF's programmes and inflows of foreign investment might not always be the case. Borrower countries sometimes fail to implement predefined policy measures, the Fund does not sanction the noncompliant countries (Steinwand and Stone, 2008), or the policy measures taken might not always be conducive to improved recovery or investment prospects (Bird and Rowlands, 2004a; 2004b; 2016). All this could negatively affect the perception of foreign investors.

The lack of consensus regarding the beneficial effect of IMF programmes indicates the necessity to turn towards empirical examination of the relationship between IMF arrangements and foreign capital flows. Yet again, existing empirical findings do not converge on the unified assessment of the catalytic effect and report mixed results on the whole. Furthermore, they are not easily comparable due to different methods as well as variations in dependent variables, sample countries and time-spans. In addition, only relatively recently studies have managed to take on board various methodological tools to adequately isolate the impact of the Fund as opposed to other factors. Being able to employ methodology which allows us to address this issue, we decided to focus our study on the region of Central, Eastern and South-eastern Europe (CESEE), which has so far been unduly disregarded by researchers. The CESEE region is very interesting in terms of assessing the IMF's catalytic effect, while at the same time we take into consideration the region's specificities, since countries from the region participated in IMF arrangements on multiple occasions in the observed period. In the past quarter century, the countries from the region faced many challenges, such as political and economic transition, privatisation, recession and the EU integration. Fidrmuc and Reiner (2011) showed that most of the countries from the CESEE region were good examples of the growth-enhancing effect of capital flows, where most of the external capital into the region has taken the form of FDI and cross-border bank flows. The major share of the capital stock, in particular inward FDI, originated from the EU countries and therefore needs to be analysed in the context of the region's gradual EU integration. Also, the great share of FDI was a result of the large-scale privatisation that followed transition, but also of greenfield investment (IMF, 2014).

The aim of this paper is to explore the effect of IMF programmes on foreign direct investment in CESEE countries, bearing in mind some of the above-mentioned specificities of the region. We use the original dataset for the sample of 17 countries in the region for the period from 1990 to 2013. In order to address selection bias – stemming from the fact that countries are not randomly assigned to participation in IMF arrangements in a given year and controlling also for the unobservable factors influencing both IMF participation and foreign investment – we employ the treatment effect model. Robustness check was also done with fixed effects instrumental variable panel and system GMM estimations. Irrespective of the method used and model specification, we find that IMF arrangements negatively affect foreign direct investment in the CESEE region.

The contribution of our paper to the existing literature is threefold. Firstly, to the best of our knowledge, this is the first publicly available study on the catalytic effect of IMF arrangements with respect to FDI focused exclusively on the CESEE region. So far, the existing research on the topic has been primarily focused on the global level, encompassing econometric analyses and a smaller number of case-studies covering mostly countries from Latin America and Asia. By focusing on CESEE countries, we were able to construct an original dataset, taking into account the specificities of the region by introducing variables not previously used in the existing literature on this topic. Consequently, we introduce variables such as privatisation, economic freedom, trade openness, as well as progress in the EU integration process. We also take into consideration the role of interstate conflicts and societal unrests which have negatively affected this region in the course of the last few decades. Secondly, besides employing treatment effect model to address selection bias connected with non-random participation in IMF programmes, we test robustness of our key observed relationship by computing instrumental variable panel with fixed effect and Arellano-Bond dynamic panel estimation, which is a novel approach in this strand of literature. Finally, by means of variable and methodology selection, as well as accompanying discussion, this paper contributes to the growing awareness that in order to understand the IMF's operations and its effect, economics has to be intertwined with politics.

The rest of the paper is organised as follows. In section 2 we give a brief overview of literature. Data and empirical model are described in section 3, while two last sections, 4 and 5 provide presentation and discussion of results with their wider implications.

2. Literature Review

Extensive literature explored the effects of the catalytic effect of the IMF's financing by analysing the link between IMF programmes and foreign capital flows. The authors of such studies usually employ case-studies or econometric analyses of large-sample studies, or combination of both. In general, the studies reported mixed results at best. Findings on catalytic effect in selected studies are summarized in Table 1. All the below mentioned studies are difficult to compare because they cover different time-frames and countries, and they also use different methodologies or dependent variables. However, while looking at their results, it is possible to note

that there is no strong consensus regarding the relationship between IMF arrangements and foreign capital flows on a global level.

Table 1 Catalytic Effects of IMF Programme Participation on Capital Flows – Key Studies

<i>Study</i>	<i>Time period</i>	<i>Sample (No of countries)</i>	<i>Method</i>	<i>Dependent variable</i>	<i>Selection correction</i>	<i>Catalytic effect</i>
Rodrik (1995)	1970 - 1993	n.a.	OLS	Private capital flows	No	+/- ^(a)
Bird et al. (2000) ¹	1970 - 1990	17 developing	Case studies	Private capital flows	No	-
Rowlands (2001)	1973 - 1989	99 developing	Fixed effect	Capital flows ^(b)	No	+*
Jensen (2004)	1970 - 1998	68	Treatment effect model	FDI	Yes	-*
Barro and Lee (2005)	1975 - 1999	130	IV	FDI	Yes	-
Edwards (2005)	1979 - 1995	106 developing	Two step estimation based on Heckman	Portfolio equity flows	Yes	-/+ ^(c)
Diaz-Cassou et al. (2006)	1970 - 2002	156 developing	Case study + Matching	Private capital flows	Yes	+ ^(d)
Edwards (2006)	1979 - 1995	126	Two step estimation based on Heckman	Portfolio equity flows	Yes	-*
Biglaiser and De Rouen (2010)	1980 - 2003	126 developing	Treatment effect model	FDI	Yes	+ ^(e)
Bauer Racenberg (2012)	1977 - 2008	142	Treatment effect model	FDI and portfolio equity flows	Yes	-*

Notes: (a) IMF programmes have positive catalytic effect on the whole, but negative effect on FDI.

(b) Measured through the change in external debt.

(c) Conditional on success of programme implementation.

(d) Positive catalytic effect on FDI, while strongly negative one on short-term debt inflows.

(e) Positive catalytic effect on FDI was found for the US FDI at the global level.

* represent statistical significance

Source: Authors' compilation.

Apart from examining the relationship between participation in IMF programmes and foreign capital flows, some studies tried to explain factors leading to the variability of catalytic effect in this respect. Bauer et al. (2012) demonstrate that the effect of IMF programmes on FDI inflows depends on the regime type – in democracies where governments can more credibly commit to reforms, the authors observe a positive catalytic effect, while weak negative effect is recorded in

¹ Apart from the study mentioned in the Table 1, authors Bird and Rowlands did a lot of research on the topic of the IMF. Based on their research regarding the catalytic effect of the IMF (1997, 2002, 2008, 2009, 2014, 2016), it is possible to discern mixed results depending on observed periods, samples and examined types of capital flow. Nevertheless, most of their findings point towards the negative catalytic effect of IMF programmes on FDI, although in some cases statistically insignificant one. The authors conclude that on the whole, there is no evidence of strong, reliable, positive and significant catalytic effect of IMF arrangements on capital flows.

autocracies. Van der Veer and de Jong (2013) differentiate between countries restructuring their debt in the same year they sign the IMF arrangement, as opposed to ones that do not. The authors show that IMF arrangements stimulate foreign capital inflows (a sum of bank loans, bonds, FDI and portfolio investment) in the countries that do not restructure their debt. Finally, Woo (2013) argues that IMF financial arrangements with larger number of conditionality and larger number of politically sensitive conditionality attract more foreign direct investment. Brune et al. (2004) examine the relationship between IMF programmes and privatisation, and find that investors are more likely to buy privatised assets and pay higher price in countries under IMF programmes. According to the authors, it is because they perceive that under the auspices of the IMF, economic policies of the government will be more committed to market reforms.

3. Data and Empirical Model

3.1 Data

In order to perform our analysis, we use time-series cross-section data for the sample of 17 countries in the CESEE region, in the period from 1990 to 2013. Namely, the sample includes Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Macedonia, Poland, Romania, Russian Federation, Serbia, Slovak Republic and Ukraine. The dataset takes into account whether a country is under the IMF's arrangement or not. However, it does not differentiate between the types of IMF arrangements. This is a standard approach in the literature following Polak's (1991) observation that fundamental objectives of the arrangements do not differ crucially. We employed annual data for every particular country in the sample regarding each tested variable, following the approach of the literature in this field. Data were collected from the IMF, Eurostat, the World Bank, the EBRD and the Vienna Institute for International Economic Studies respective databases.

Dependent variable in the outcome equation shows FDI, i.e. net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP². Participation in IMF financial arrangements is operationalized through binary variable coded 1 if the observed country participates in an IMF financial arrangement in a given year, otherwise 0.

Potential determinants of FDI include lagged FDI, privatisation, conflict, trade openness, growth, inflation, economic freedom, the EU integration and labour costs.

FDI inflows in the host country are positively associated with FDI inflows at that location in the past. It can be explained with differences in the availability of production factors (Campos and Kinoshita, 2002), herding behaviour of investors

² We use the ratio of FDI to GDP rather than the log of FDI flows for several reasons. In essence, logarithmic specification of FDI assumes that 100% increase in FDI from 1 million dollars to 2 million dollars has the same impact as a 100% increase from 1 billion dollars to 2 billion dollars, which might distort the picture regarding the key relationship of interest. Furthermore, scaling FDI to GDP also reduces the risk of potential non-stationarity, which was later corroborated by unit root tests. Due to all this, the authors dealing with this subject prefer to specify the dependent variable as a ratio, rather than in logs (Bird and Rowlands 1997, 2002, 2006, 2009, 2016; Jensen 2004, 2006; Bauer et al., 2012; Biglaiser and De Rouen, 2010; Van der Veer and de Jong, 2013; Edwards, 2006).

(Knoop, 2008) or positive externalities from spatial FDI concentration (Campos and Kinoshita, 2002).

Privatisation can also be seen as one of the possible institutional determinants of FDI inflows in transition countries. According to Estrin and Uvalic (2013), privatisation process created specific motivation for FDI in search of assets in transition countries. In this respect, the authors describe privatisation as one of possible institutional determinants of FDI inflows in CESEE countries. Consequently, one of the variables used in testing the sensitivity of estimation results is privatisation.

Conflict produced by warfare and social unrest signifies political instability, and consequently it is likely to reduce FDI in the host countries (Biglaiser and De Rouen, 2010). This variable is particularly important in the context of our research, as many countries in the region were affected by interstate conflicts and civil wars.

Trade openness is a sum of a country's exports and imports over its gross domestic product. The effect of trade openness is not clear-cut, as it can depend on the type of FDI (horizontal versus vertical), and the data do not offer this distinction. In general, greater openness to trade could be expected to positively influence the location decisions of FDI investors, as enlarged markets and less costly movement of production inputs across borders should benefit them both (Seric, 2011; Razin and Sadka, 2007; Botrić and Škuflić, 2006).

Higher annual real growth rate of GDP is a proxy for the market potential and the quality of market growth in the host country. That is why it is expected to positively influence FDI inflows (Walch and Worz, 2012).

Academic literature exploring the effect of IMF programmes on FDI (Bird and Rowlands, 2009), as well as the one dealing with determinants of FDI (Arbatli, 2011), identifies inflation as a potentially significant predictor of FDI. In this context, it represents an approximation of macroeconomic instability and uncertainty (Ivanov et al., 2011), so we expect it to have a negative influence on FDI.

The index of overall institutional quality in the host country can also be an important predictor of FDI. We use the Index of the Economic Freedom of the World by the Fraser Institute. We expect a positive sign as locations with better functioning institutions should have lower transaction costs and thus should be more appealing to foreign investors (Tintin, 2013).

EU membership should positively influence FDI inflows as it is an important factor for countries in the observed region. Many of them became fully-fledged members of the EU or have politically confirmed perspective of the entry. (The perspective of) EU membership motivates and instigates countries to undertake institutional reforms and subsequently improve investment attractiveness (Tintin, 2013). In the process of EU integration, countries have to transpose EU *acquis* into their national legislation in a wide range of areas including commercial law, property rights, financial regulation, market competition, management of macroeconomic policies. Such institutional transformation should result in increased market orientation, as well as legal, political and economic stability of the host country (Kalotay, 2006; Backe et al., 2010). Hence, the EU integration process improves the perception of foreign investors regarding the decreased risk of unexpected and adverse developments in economic policy of the host country (Walch and Walz, 2012). Furthermore, it also decreases the risk premium demanded for the investment

in such countries, making potential foreign investors face decreased capital costs (Baldwin et al., 1997). All this should result in increased investment attractiveness of the observed countries.

Compliance with EU accession requirements can act as a “seal of approval” and external validation of economic policy management and institutional development, also giving implicit guarantees about future economic policy direction (Bevan and Estrin, 2004; Estrin and Uvalic, 2013). As pointed out by Bevan and Estrin (2004) and Kalotay (2006), entry of new members into the EU offers opportunity for the “old” and more developed member-states to reallocate production process into the countries with lower production costs. Moreover, entry into the EU eliminates the risk of administrative protection by the existent EU member-states towards third parties. It is important to bear this in mind that most of the capital inflows into CESEE countries come from the EU countries (IMF, 2014). Finally, EU membership enables countries to use structural and cohesion funds aimed at improving their human and physical capital. The perspective of such financial assistance and its effects can also improve the perception of foreign direct investors (Kalotay, 2006).

Labour costs are defined in academic literature as one of the potentially negative determinants of FDI inflows (Bevan and Estrin, 2004; Seric, 2011; Estrin and Uvalic, 2013). Empirically confirmed negative relationship between labour costs and FDI inflows implies that FDI inflows are motivated by increased efficiency through the reallocation of production capacities in a country with lower labour costs.

In the framework of participation in IMF programmes, important variables include political proximity to the USA, past IMF engagements and number of countries currently under the arrangements. Furthermore, conflict and privatisation can also explain probability to participate in such arrangements, so can growth and trade openness.

Political closeness between the USA and a particular country is operationalized through the voting pattern between the observed country and the USA in the United Nations General Assembly (UNGA). The idea is that the USA, as the most powerful IMF member³, uses its influence to reward its political allies with the IMF’s financial resources in exchange for their vote in UNGA. The USA may prefer to compensate its allies in this way, thus minimizing the commitment of its own budgetary resources or concealing political vote-trading (Dreher, 2009). The importance of this variable is empirically confirmed by Broz and Hewes (2000), Barro and Lee (2005) as well as Pop-Eleches (2008).

Expected sign next to past participation in IMF programmes is ambiguous. There are cases where participation in IMF programmes in the past increases the likelihood of participation in IMF arrangements at present time (Berger et al., 2005; Jensen, 2006), as well as cases with the opposite effect. Non-recidivism is in consonance with the aim of the IMF to secure temporary financing for the countries affected by BOP difficulties. Recidivism, on the other hand, can be explained by the persistence of negative economic circumstances (Jensen, 2006), or alternatively, once

³ Votes at the meetings of IMF Executive Board are based on quotas paid by each member-state to IMF. The USA has 16.5% of votes, which means that they effectively have a veto on all the (key) decisions requiring 85% of total votes.

a borrowing country has incurred sovereignty costs of entering into an IMF arrangement (Vreeland, 2003), marginal costs of entering a new one are relatively low.

Regarding the total number of the countries on IMF programmes, sovereignty costs are perceived to be lower when there are more countries participating in the arrangements, thus increasing the probability of additional countries to get involved (Oberdabernig, 2013; Berger et al., 2005).

The expected relationship between conflict and IMF participation is negative (Biglaiser and De Rouen, 2010; Berger et al., 2005). In countries with higher level of interstate and social unrests, political costs of negotiating IMF arrangements are higher. Moreover, the Fund may be less inclined to give a “seal of approval” with an IMF programme as there is no complete political and social support for such a programme in those countries.

Privatisation receipts alleviate (immediate) liquidity concerns and make the governments less likely to subject themselves to (painful) adjustment demands customarily made by the IMF. Consequently, the expected sign next to this variable is negative.

Countries experiencing relatively weak growth are more likely to face financial constraints and demand IMF credit. Moreover, low growth can exacerbate a country’s inability to repay its sovereign debt (Berger et al., 2005).

Regarding trade openness, Moser and Sturm (2011) show that more open economies in this respect tend to be more prone to spill-over effects via trade. Hence, the likelihood that an IMF programme is signed increases.

Table 2 Summary Statistics

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
IMF participation	374	0.52	0.50	0	1
Past IMF participation	374	7.19	4.65	0	21
Conflict	364	0.27	1.05	0	7
Privatisation	368	2.87	0.95	1	4
GDP growth rate	366	1.71	7.08	-32.12	15.6
Trade openness	367	96.42	33.11	26.3	181
EU membership	408	0.21	0.41	0	1
Voting in the UNGA	306	0.43	0.09	0	1
Number of countries under IMF arrangements	408	50.21	7.83	34	62
Inflation	370	89.40	349.58	-0.2	4736
Economic freedom	316	7.32	4.10	3.0	31
Labour costs	347	435.64	342.03	23.42	1536.13

3.2 Empirical Model

One of the key challenges for researchers on the topic of IMF effects on various macroeconomic aggregates refers to the unobservability of the counterfactual outcome - it is impossible to know what would have happened if the country that participated in IMF arrangement at a particular period had not done it or vice versa. The literature on the impact of IMF arrangements on foreign capital flows has used various approaches to come up with and measure counterfactuals.

Before- and- after approach assumes that all the conditions which can affect a country's rate of foreign capital inflows are exactly the same before an arrangement is introduced as they are after. Thus, any change in the rate of capital inflows is attributed to the participation in an IMF programme. Such an approach suffers from a bias as it overlooks changes in the structure of the country or world-shocks between the two periods that are unrelated to the participation in an IMF arrangement.

Another approach measures the effect of a programme as the difference between the average foreign capital inflow in countries under arrangements, and the average foreign capital inflow in the countries not under arrangements. By comparing the two, one controls for the effects of world shocks. However, the results may still be biased because this approach ignores selection bias (a form of endogeneity) stemming from the fact that participation in an IMF arrangement is not a random event - characteristics of the countries participating in an IMF arrangement at a particular time may be systematically different from the countries not participating at the same time. The differences might arise due to observable or unobservable factors.

If it is assumed that only the observed country's characteristics determine IMF programme participation, propensity score matching may be an appropriate approach. It firstly computes the probability of participating in IMF arrangements conditional on observable characteristics of the countries. In the second step, these probabilities or propensity scores are used to form treatment and control groups and the mean differences are calculated across these two groups. However, if the unobserved country's characteristics determine IMF programme participation, conditional independence assumption of PSM will be violated and the results will again be biased.

In this context, one should try to explore approaches that control for the presence of unobserved factors influencing selection into the treatment and the outcome. The presence of such unobservable factors leading to selection bias is especially pertinent, as it has been detected by recent literature (e.g. Vreeland, 2003; Bauer et al., 2012; Oberdabernig, 2013). For example, if a country is characterised by a government with strong "political will" (Bauer et al., 2012), that might make it more likely to participate in IMF arrangements and undergo sovereignty and political costs associated with the arrangement. Furthermore, its strong political will might also make it less likely to nationalise foreign direct investment and thus attract more FDI. In this case, failing to control for political will, which influences both selection and outcome, would lead to selection bias (correlation of binary regressor with error term) resulting in overestimation of positive IMF effect.

In order to address this issue, several authors researching the effects of IMF arrangements on different macroeconomic and institutional aggregates employ the approach which they identify as treatment effect model (see for example Biglaiser and De Rouen, 2010; Bauer et al., 2012; Bird and Rowlands, 2009; Jensen, 2006, 2004; Bauer Racenberg, 2012; Oberdabernig, 2013; Woo, 2013).⁴

⁴ The estimation and analyses for this paper were performed using Stata 12 and Stata 13 versions. In the Stata 12, this model is fitted with *treareg* command and identified as treatment effect model. For example, Biglaiser and De Rouen (2010, 2011) as well as Jensen (2004, 2006) explicitly define the Stata command (*treareg*) they employ to fit the treatment effect model. In Stata 13 (onwards) there was a change in

Key principle behind this kind of model is to estimate two regressions. The first is a probit regression predicting the probability of treatment. The second is linear regression for the outcome of interest as a function of the treatment variables, controlling for observable confounders. (Basically, the model enables us to include endogenous treatment variable as an independent variable in the outcome equation after the first one has been solved (Biglaiser and De Rouen, 2010, p. 84)).

Treatment effect model used in this study to assess the catalytic effects of IMF arrangements consists of outcome equation and selection equation. We are primarily interested in the effect of endogenous binary treatment z_j on the continuous, fully observed variable y_j , conditional on the independent variables x_j and w_j . Consequently, it is necessary to estimate the outcome equation:

$$y_j = \beta x_{jt} + \delta z_{jt} + \varepsilon_j \quad (1)$$

where y_j - continuous dependent variable (FDI inflow), z_j - endogenous dummy variable for participation or non-participation in the treatment (IMF arrangement), δ - coefficient estimating the effect of endogenous binary treatment on the dependent variable which quantifies the catalytic effect of the IMF on FDI inflows. If it is statistically significant and negative, the catalytic effect of the Fund is negative, meaning that the participation in IMF programmes leads to decreased FDI inflows in the observed countries. x_j - vector of explanatory variables, β - the estimated coefficient of x_j , ε_j - error term (random component).

The binary decision to participate in the treatment is modelled as an outcome of an unobserved latent variable z_j^* . It is assumed that z_j^* is a linear function of exogenous covariates w_j and random component u_j .

Consequently, we estimate the following selection equation:

$$z_j^* = \gamma w_{jt} + u_j \quad (2)$$

z_j^* - unobserved latent variable, w_j - vector of covariates, γ - the estimated coefficient of w_j , u_j - error term.

And the observed decision regarding participation or non-participation in the treatment is:

$$z_j = \begin{cases} 1, \wedge \text{if } z_j^* > 0 \\ 0, \wedge \text{otherwise} \end{cases} \quad (3)$$

The equations (1) and (2) are based on the following assumptions: bivariate normal distribution of error terms u_j and ε_j with mean zero, homoskedacity $Var(\varepsilon_j) = \sigma^2$, $Var(u_j) = 1$, $Cov(\varepsilon_j, u_j) = \rho\sigma$.

In using this model, the covariance between the error term of the selection equation and outcome equation (ρ) is presumed not to be equal to zero, implying that

terminology – 2013 edition retains the same model (with the command *treatreg* replaced by its updated form *etregress*). In the accompanying Stata 13 manual, the same model was now identified as endogenous treatment-regression model, also known as endogenous binary-variable model, and together with several other ones classified under the general heading of treatment effect models.

there are unobservable factors influencing both selection into an IMF arrangement and outcome, i.e. FDI inflows. If there is such a correlation, the model identifies it and corrects for it.

The treatment effects models address bias caused by the correlation of the regressor with omitted variables, by adding a term to the outcome regression that represents the non-zero expectation of the error term (Inverse Mills Ratio - transformation of the predicted individual probabilities from the selection equation).

Lambda or the coefficient of the Inverse Mills Ratio ($\lambda = \rho * \sigma$, where ρ is the correlation between two error terms, σ is standard deviation of disturbance term in the outcome regression) will indicate if there is a selection bias. Because σ is >0 by definition, the sign of this coefficient is the same as ρ . If it is statistically significant, then we will know that there is a selection bias and it is appropriate to use treatment effect model.

The model can be estimated either by using two-step estimator (TSE) or maximum likelihood estimator (MLE). ML estimator is more efficient under the assumption of joint normal distribution of error terms in the 2 equations; however, it is less robust because it requires stronger assumptions regarding distribution of error terms u_j and ε_j . Furthermore, sometimes it is difficult to get the model to converge. In order to assess the robustness of our estimations, we used both TSE and MLE.

Accordingly, our basic empirical model consists of:
outcome equation:

$$FDI_{it} = \alpha + \beta_1 FDI_{it-1} + \beta_2 C_{it} + \beta_3 P_{it} + \delta_1 IMFp_{it} + \varepsilon_{it} \quad (4)$$

selection equation:

$$IMF_t = \alpha + \gamma_1 UNvote_{it} + \gamma_2 C_{it} + \gamma_3 P_{it} + \gamma_4 IMFp_{it} + \gamma_5 IMFno_{it} + u_{it} \quad (5)$$

We note that the voting alignment between the observed countries and the USA in the United Nations General Assembly (i.e. *UNvote*) acts as our “exclusion restriction” in the selection equation: a variable that is significant in explaining the country’s participation decision in IMF programmes, but it is not correlated with the dependent variable of the outcome equation, in this case the FDI.

4. Results

Table 3 M1 represents our basic estimation. The results of the Wooldridge test indicated the presence of serial correlation and the necessity to insert the lagged dependent variable in the outcome equation, as recommended by Beck and Katz (2011). At the same time, this is the econometric confirmation of the theoretical principle relating to the agglomeration effect of FDI, i.e. countries that have managed to attract more FDI so far are more likely to do so in the future (Knoop, 2008).

Hausman test was also carried out to examine the necessity for fixed or random effects. Following the approach of Bauer et al. (2012), Biglaiser and De

⁵ With TSE, all we need to assume is that ε_j and u_j are independent of the explanatory variables, with mean 0 and $u_j \sim N(0, 1)$. MLE, on the other hand, implies that ε_j and u_j have bivariate normal distribution with mean 0, and $u_j \sim N(0, 1)$, $\varepsilon_j \sim N(0, \sigma^2)$, as well as $\text{corr}(u_j, \varepsilon_j) = \rho$.

Rouen (2010) and Bauer Racenberg (2012), and based on the test results, we included fixed effects.

In dynamic panel models with fixed effects, the fixed effects can downwardly bias the coefficient of the lagged dependent variable (Nickell bias). It is well known that this bias is of order $1/T$, and almost all of the work on this problem has been in the context of classical (small- T) panels. When T is 2 or 3, the bias is indeed severe (50% or so).

However, it is much less of an issue with the so called time-series-cross-section data (unlike panel data, they are characterised by reasonably sized time-periods (T) and not very large number of cross-section units (N)). Consequently, Beck and Katz (2009, 2011) demonstrate that in this context Nickell bias is negligible when the number of time periods is 15 or more. Based on this argument, political economists in their research regarding the effects of IMF arrangements on foreign capital inflows, under the above conditions, customarily use lagged dependent variable with fixed effects (for discussion and examples see Biglaiser and De Rouen, 2010, p. 85; Bauer et al., 2012, p.42). As an average number of time periods in our research is 20, this should not be an issue. Moreover, our results regarding key relationship of interest do not place focus on direct interpretation of the coefficient on the lagged dependent variable. Nevertheless, in order to further assess the sensitivity of our results, we also present a static version of our estimations in Table 3 M2.

Next, we tested our estimation via maximum likelihood estimator and added controls – the EU integration, growth and trade openness (Table 3 M3). Subsequently, we also present a static version of that estimation (Table 3 M4).

In the context of the research, it is also important to empirically assess the justification for the usage of treatment effect regression aimed to address selection bias. In this respect, after every estimation of treatment effect model with the two-step estimator, Stata generates data on lambda variable (λ), including its statistical significance.

$$\lambda = \rho\sigma \tag{6}$$

where ρ =a measure of correlation between disturbance terms u_j and ε_j in equation (1) and equation (2), σ =standard deviation of disturbance term ε_j in outcome equation.

As is visible from the estimation results in Table 3, the coefficient of λ is statistically significant (estimation via TSE), i.e. there are unobserved variables affecting the likelihood of participation in IMF arrangements and FDI inflows in the countries of the CESEE region, which justifies the use of treatment effect model. Substantially, the same findings in the research pointing out towards the influence of unobservable factors on both participation in IMF arrangements and FDI inflows are present if we use the alternative maximum likelihood estimator (see results of the Wald test $\rho=0$ or atrho) in Table 3.

Following the approach of Biglaiser and De Rouen (2010), we also tested the possibility of unit root in the dependent variable. However, H_0 implying the existence of unit root was rejected based on the results of the augmented Dickey Fuller test (Maddala and Wu, 1999). We also assessed variable correlations and

variance inflation factors for every variable in order to eliminate potential problems with multicollinearity. None of them was problematic (VIF smaller than 2).

To sum up the results of the estimations, apart from the voting alignment with the USA, IMF participation is also determined by recidivism as well as total number of the countries on IMF programme, making it easier for additional countries to undergo sovereignty costs associated with the arrangements. Privatisation receipts alleviate liquidity concerns and make countries less likely to participate. Furthermore, countries with relatively weaker growth are more likely to face financial constraints and difficulties in repaying their debt, which increases the probability of their involvement with the IMF.

Table 3 Treatment Effect Regression - FDI and IMF Involvement in CESEE Countries

	<i>M1</i>	<i>M2</i>	<i>M3</i>	<i>M4</i>
FDI				
FDI (lag)	0.3964*** (0.0594)		0.3874*** (0.0792)	
C	-0.2645 (0.4741)	-0.4537 (0.5335)	-0.0945** (0.0464)	-0.1187 (0.1068)
P	0.8277 (0.6087)	1.5669** (0.6658)		
IMF	-3.6220** (1.5495)	-6.6527*** (1.6881)	-1.2391* (0.7095)	-1.9323*** (0.7422)
0EU#P			0.6836 (0.6741)	1.5698 (0.9892)
1EU#P			0.8525* (0.5134)	2.1099** (0.8219)
GDP			0.0650*** (0.0240)	0.0381 (0.0278)
TRADE			0.0250*** (0.0096)	0.0435*** (0.0169)
_cons	4.0204 (2.7683)	6.5381** (3.0277)	0.2176 (2.0918)	-0.7308 (2.4207)
IMF				
UNvote	4.7870*** (1.3506)	4.9927*** (1.3522)	4.7039** (0.9021)	4.7320*** (0.9660)
C	-0.0879 (0.1073)	-0.0828 (0.1074)	-0.0540 (0.0982)	-0.0535 (0.0980)
P	-1.0852*** (0.1847)	-1.0983*** (0.1826)	-1.1969*** (0.3396)	-1.1985*** (0.3183)
IMFp	0.1123*** (0.0348)	0.1170*** (0.0343)	0.1679** (0.0440)	0.1728*** (0.0413)
IMFno	0.0579*** (0.0129)	0.0584*** (0.0129)	0.0678** (0.0167)	0.0726*** (0.0172)
GDP			-0.0493** (0.0242)	-0.0456** (0.0208)
TRADE			0.0037 (0.0072)	0.0031 (0.0069)

_cons	-1.9719** (0.8335)	-2.0810** (0.8213)	-2.6796*** (1.0243)	-2.9355*** (0.9546)
lambda	2.1957** (0.9919)	4.2580*** (1.0466)		
athrho			0.1789** (0.0593)	0.2992** (0.0894)
Insigma			1.4695** (0.2978)	1.5545*** (0.2738)
Wald test of indep. eqns. (rho=0), p value			0.0025***	0.0008***
N	253	259	247	252

Notes: M1 and M2 estimated with two-step estimator, M3 and M4 with maximum likelihood estimator. All models correct for fixed effects. Standard errors robust to clustering on country level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

lnsigma is the natural logarithm of σ , the standard deviation of the error term from the outcome equation. Athrho is Fisher's z transformed correlation of the error terms of the selection and outcome equation i.e. arc-hyperbolic tangent of ρ . The high statistical significance of athrho indicates the presence of sample selection, which justifies the use of treatment effect regressions.

Source: Authors' calculation.

Regarding the determinants of FDI, it is possible to discern the presence of FDI agglomeration effect, while conflict as an approximation of political instability can be a significant predictor of negative attention from FDI investors. In dynamic models, privatisation in itself is not a significant determinant of FDI; however, when coupled with EU membership it spurs FDI investors to get involved in the host country. Growth and trade openness are expectedly significant positive predictors of foreign investment. Finally and most importantly, it is possible to observe that in all our estimations, participation in IMF arrangements acts as a deterrent for FDI investment, and the static versions of the models exacerbate this effect if compared to their respective dynamic counterparts.

In the next step, in order to test the robustness of our results obtained by treatment effect model, we also employ fixed effects instrumental variable panel (2SLS). We instrumented IMF participation by means of voting alignment with the USA (voting behaviour).

As demonstrated by Presbitero and Zazzaro (2012), countries politically closer to the USA (approximated through the voting pattern between the observed countries and the USA in UNGA) are more likely to participate in the IMF's financial arrangements. This can be explained with fact that the USA can thus indirectly reward their political allies with the IMF's financial resources. In the next step, it is necessary to assess whether the countries voting in line with the USA in UNGA will have statistically significant increase of FDI. Intuitively, it is possible to assume that, ceteris paribus, foreign investors will invest more in the countries they are politically closer to. Observing at the global level, Woo (2013) shows that countries politically closer to the USA (as measured through UNGA voting pattern) are more likely to participate in IMF financial arrangements. As the USA is one of the key investors on a global scale, looking at the global level it is possible to observe that countries politically closer to the USA register a higher level of FDI. However, this relationship holds under the assumption that the USA is a key investor for the observed group of countries. If the USA is not a major investor in the observed

region, it is possible to assume that UNGA voting pattern is not a statistically significant explanatory variable for aggregate FDI inflows in the observed territory. Between 1990 and 2013, FDI inflow from the USA into the CESEE region on average amounted to only 6% of total FDI inflows in the region.⁶ Therefore, it is possible to assume that UNGA voting pattern for the observed countries is not significantly correlated with aggregate FDI inflows in the CESEE region.

In order to assess further voting behaviour as our instrument, we also compute underidentification tests as well as weak identification tests with our estimations, and report the results in Table 4. The test statistics point to the relevance of this instrument. The Kleibergen-Paap LM statistics reject the null hypothesis that the equation is underidentified at the level of 5%. The cluster-robust Kleibergen-Paap F statistics easily surpass conventional levels of weak identification tests such as Staiger and Stock's (1997) threshold of 10, as well as Stock and Yogo's (2005) most conservative critical values.

We start with the basic estimations (Table 4 M5) and then add additional controls (Table 4 M7). Moreover, we also report respective static versions of those estimations (Table 4 M6 and M8).

Table 4 Fixed Effects Instrumental Variable Panel (2SLS) - FDI and IMF Involvement in CESEE Countries

	<i>M5</i>	<i>M6</i>	<i>M7</i>	<i>M8</i>
IMF	-2.2962*** (0.7240)	-4.8701*** (1.3932)	-2.4593' (1.3025)	-5.5888*** (2.1117)
FDI (lag)	0.7057*** (0.1442)		0.7425*** (0.1290)	
C	-0.3959** (0.1670)	-0.9506*** (0.3528)	-0.3418' (0.1747)	-0.9357*** (0.3604)
P	0.8042 (0.6614)	3.1507*** (0.8923)	0.3081 (0.7876)	2.0473 (1.3284)
I			-0.0006** (0.0003)	-0.0011** (0.0005)
logFREE			0.4646' (0.2779)	0.2559 (0.6150)
LC			-0.0000' (0.0000)	-0.0000** (0.0000)
Kleibergen-Paap (KP) underidentification test LM statistic	7.467	7.822	6.137	5.843
KP underidentification test p values	0.0063	0.0052	0.0132	0.0156
KP weak identification test F statistic	49.533	66.486	40.059	39.241
<i>N</i>	238	246	201	204

Notes: IMF participation (IMF) instrumented with voting alignment with the USA (UNvote). All models correct for fixed effects. Standard errors robust to clustering at the country level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Source: Authors' calculation.

⁶ According to the author's calculation and based on the WIIW FDI 2014 data, FDI inflow from the USA to Central Europe, South-Eastern Europe and Eastern Europe amounted to 7.3%, 3.2% and 7.9%, respectively, averaging 6% in the whole region.

Our basic estimation confirms the importance of the FDI agglomeration effect as well as the negative influence of interstate and societal unrests because political instability can deter investors. Privatisation gets to be a significant predictor of FDI engagement only in the static version of the basic model. When we add controls for inflation, labour costs (approximated through gross monthly wages in constant prices⁷), as well as log measure of economic freedom, they act expectedly. Inflation as approximation of macroeconomic instability and uncertainty negatively affects investors as well as higher labour costs. Finally, higher level of economic freedom entails lower transaction costs for investors, which makes them more engaged in the host countries.

It is visible that, irrespective of the IV panel specifications, coefficients next to IMF participation are negative and statistically significant, proving that IMF arrangements negatively affect FDI inflows in the countries of the CESEE region.

As a last check, we also test the system GMM estimation, as suggested by Arellano and Bover (1995). As can be seen (Table 5), our main findings are not qualitatively affected by the usage of different method; the IMF's arrangements still have negative effect on FDI inflows.

Table 5 System GMM - FDI and IMF Involvement in CESEE Countries

	<i>M9</i>
FDI (lag)	0.7862*** (0.0997)
C	-0.3018 (0.3280)
P	1.9739 (1.6598)
IMF	-4.0747** (1.7141)
_cons	10.0831 (5.9896)
Arellano-Bond test for AR(2), p value	0.498
Hansen test, p value	0.897
N	238

Notes: The results are based on the two-step estimator implemented by Roodman (2006) in Stata, including Windmeijer's finite sample correction and the usage of robust option. In order to minimize the number of instruments in the regression, we collapsed the instruments as suggested by Roodman. IMF participation, privatisation and conflict are treated as endogenous, while lagged FDI is treated as predetermined. We also include the results of the Hansen tests on the validity of instruments (amounting to the test for the exogeneity of the covariates) and the Arellano-Bond test of second order autocorrelation which must be absent in order for the estimator to be consistent. Corrected standard errors are in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01

Source: Authors' calculation.

⁷ Striving to capture productivity effect, we tested unit labour costs instead. They did not turn out to be significant and did not affect our key findings.

5. Conclusion

The role of the IMF is a relatively recent subject in academic literature, and this characterisation is even more pronounced when it comes to the research on the relationship between IMF programmes and foreign capital inflows including FDI. The IMF has traditionally contended that its arrangements have positive catalytic effect on foreign capital. Debates why this should (not) be the case have not reached a consensus, and that is why catalytic effect may be considered to be primarily an empirical question. Empirical research on the topic has also divulged mixed results which are difficult to compare as they focus on different dependent variables, time-spans and samples.

As existent studies on the topic have predominantly focused on the global level, consequently we are not aware of any publicly available research relating to the effect of IMF programmes on FDI in CESEE countries. That is why this paper tries to assess whether participation in IMF programmes is a positive catalyst for FDI investors in CESEE area, bearing in mind some specificities of the region.

In order to address selection bias – stemming from the fact that countries are not randomly assigned to participation in IMF arrangements in a given year, and controlling also for the unobservable factors influencing both IMF participation and foreign investment – we employ treatment effect model. Additional robustness check is done with fixed effects instrumental variable panel and system GMM estimations. Irrespective of the method used and model specification, we find that IMF arrangements negatively affect foreign direct investment in the CESEE region.

Although the results of this study provide insights to policymakers in the region and enable them to make more informed decisions regarding involvement in IMF programmes, they should be interpreted with prudence: it is important not to generalise – the results concern a particular group of countries in a given period and focus on FDI as opposed to other types of capital flows. In that vein, aggregate results may mask differences at the level of individual cases. Moreover, the lack of consensus regarding theoretical tenets, as well as the empirical results at the global level, suggests that the catalytic effect might not be regarded as a universal and reliable phenomenon.

Nevertheless, what might be the possible explanation for these findings? Firstly, current literature on the effects of IMF programmes regarding various macroeconomic and institutional aggregates in user countries points to the mixed results at best (e.g. relative to growth, progress in economic reforms and state capacity). If this is the case, it might make foreign investors wary of getting involved. Secondly, political noise surrounding IMF arrangements (e.g. the influence of powerful member-states like the USA) might make it harder for foreign investors to get the clear picture regarding prospective economic or investment climate in the user country. All this links to a long-standing debate whether possible negative macroeconomic or institutional performance in the IMF's user countries has more to do with the lack of commitment on their part, or it is more a matter of IMF arrangement design (their typology or conditionality). In our future research, we plan to contribute to the disentanglement of this issue by studying whether different levels of user country's commitment to reforms and the IMF's influence in this respect can make a difference for FDI investors, or a more nuanced view of IMF conditionality could help to explain their behaviour.

APPENDIX

Table A1 Data Description

Variable	Label	Symbol	Source
Participation in IMF financial arrangements	IMF participation	IMF	Coded by the author based on the IMF annual reports, IMF weekly financial activities reports, IMF financial query
Previous participation in IMF financial arrangements	Past IMF participation	IMFp	Coded by the author based on IMF annual reports, IMF weekly financial activities reports, IMF financial query Note: Following the approach of Oberdabernig (2013), it is operationalized as a cumulative number of years spent in IMF financial arrangements for a particular country and a year
FDI flows as a percentage of GDP	DIIGDP	FDI	World Bank - World Development Indicators
Conflict	Conflict	C	Total summed magnitudes of all (societal and interstate) episodes, given per country-year. 0=no conflict. Scale: 1 (lowest) to 10 (highest) Major Episodes of Political Violence, Center for Systemic Peace
European Union membership	EU	EU	Coded by the author (1= EU membership, 0 otherwise) based on the data of the European Commission
GDP growth rate	GDP growth	GDP	GDP growth (annual %) World Bank-World Development Indicators
Trade openness	Trade openness	TRADE	Trade (% of GDP) World Bank-World Development Indicators
Total number of countries under IMF arrangements	Number of countries under IMF	IMFno	Total number of countries under IMF arrangements in a given year. Author's calculation based on data from IMF annual reports
Voting in the UNGA in line with the USA	Voting behaviour	UNvote	Dreher and Sturm (2012) Note: definition according to Thacker, (1999). Voting in line with the USA coded 1, not in line with USA coded 0, and abstinence coded 0.5. Resulting numbers are divided with the number of votes in every year
Labour costs	Labour costs	LC	Average monthly gross wages in constant dollars. Calculated by the author based on Vienna Institute for International Economic Studies data
Economic freedom	Economic freedom	FREE	Economic Freedom of the World Index Fraser Institute Note: As this index was available on a 5-year basis until 2000 when it started being published annually, we use linear interpolation to account for the sub-period 1990-2000
Inflation	Inflation	I	Inflation, CPI (annual %) World Bank-World Development Indicators
Privatisation	Privatisation	P	European Bank for Reconstruction and Development Transition indicators Progress in large scale privatisation http://www.ebrd.com/cs/

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