Muhammet Daştan[*]
Kerem Karabulut[**]
Ömer Yalçınkaya[***]

JEL classification: C33, D80, F21, F51, G15
Original scientific paper
https://doi.org/10.32910/ep.73.5.3

THE NEXUS BETWEEN UNCERTAINTY AND FOREIGN DIRECT INVESTMENT FLOWS TO G20 MEMBER COUNTRIES

The main objective of this study is to examine the link between global economic, political, and geopolitical uncertainties and FDI flows to G20 member countries over the 1996-2018 period. Unlike most of the previous studies, this study employs reasonable uncertainty indexes, namely, the Economic Policy Uncertainty (EPU) index, the World Uncertainty Index (WUI) for economic/political uncertainty rather than the volatility or election indicators. The study also uses the Geopolitical Risk index as a proxy for geopolitical uncertainty, and thereby it not only focuses on economic/ political uncertainty but also considers the geopolitical uncertainty to provide a more comprehensive picture of uncertainty. Findings obtained from the panel data analysis indicate that heightened uncertainty in the global economic/political and geopolitical environment deters FDI flows to G20 member countries. It is also found that there is a unilateral causality running from uncertainty to FDI inflows. Considering these empirical findings, policymakers in G20 economies should provide a stable economic/political and geopolitical environment to attach FDI inflows, which have a key role in stimulating economic growth and development.

---

[*] M. Daştan, PhD, Research Assistant, Ağrı İbrahim Çeçen University, Department of Economics (e-mail: mdastan@agri.edu.tr).

[**] K. Karabulut, PhD, Professor, Atatürk University, Department of Economics (e-mail: kerem@atauni.edu.tr).

[**] Ö. Yalçınkaya, PhD, Associate Professor, Atatürk University, Department of Economics (e-mail: oyalcinkaya@atauni.edu.tr). The paper was received on 01.10.2020. It was accepted for publication on 23.11.2020.

Keywords: *Foreign Direct Investments, Economic Policy Uncertainty, Geopolitical Uncertainty, Panel Data Analysis, G20 Member Countries*.

1. INTRODUCTION

Economic, political, technological, and socio-cultural developments in the global economic conjuncture have strengthened ties between the national economies since the second half of the twentieth century. Together with the proliferation of liberalization and globalization trends in the world, these developments take nations' attempts to increase their production possibilities beyond borders, and foreign direct investment (FDI) has become a key factor in economic strategies put forward by both developed and emerging economies. The main reason behind this is that FDI flows contribute to economic growth and development by providing a higher level of technology (Lim, 2001; Osano and Koine; 2016), capital formation (Iamsiraroj, 2016), employment opportunities or a higher number of skilled workers (Al-shawaf and Almsafir, 2016). Moreover, FDI allows capital-exporting countries to enter new markets, to export a greater volume of final goods, and thereby to increase international competitive capacities.

However, these positive outcomes of FDI flows do not accrue without risk, and the investment decisions become more complicated when uncertainty is taken into consideration (Hsieh, et al., 2019). A jump in uncertainty because of unpredictable future outcomes of the changes in the economic, political and geopolitical (EPG) environment[1] may induce firms to postpone investment decisions and to be more reluctant to enter new markets. Heightened uncertainty can also be a risk factor for foreign investors, affecting relatively more to FDI than that of domestic investments or other types of capital flows because it has a higher fixed cost (Choi et al., 2019) and more sensitive to the host country's political environment (Aizenman and Spiegel, 2006; Dixit, 2011). In line with the widening uncertain EPG environment, global flows of FDI–which fell by 13 percent (to 1.3 trillion US Dollars-represents the lowest level since the financial crisis) in 2018 compared with the previous year– dropped by 20 percent in the first half of 2019 compared with the second half of 2018 and this latest decline continuous the slowdown in global flows of FDI following the post-crisis peak in 2015 (Organisation for Economic Co-operation and Development [OECD], 2019).

[1] Such as the following: the unpredictable effects of unconventional monetary policies of central banks in developed countries on global capital flows; the increase in the importance of inward-oriented policies in the European Union countries; the unpredictability of the U.S. policies led by Donald Trump and continuing trade conflicts between the U.S. and China; the unresolved tensions originating in the Middle East with a progressively expanding sphere of influence.

In addition, the COVID-19 pandemic presenting several unknown challenges, such as the possibility of second wave and its impact on supply and demand sides of the global economy, has triggered a massive spike in global uncertainty. Indeed, the pandemic has generated a huge uncertainty shock which is larger than the one associated with the 2008-09 financial crisis (Baker, et al., 2020). As high levels of uncertainty related to the pandemic have been recorded in most of the advanced and emerging countries with a significant number of cases, global flows of FDI is expected to be under severe pressure in 2020 (United Nations Conference on Trade and Development [UNCTAD], 2020). In line with this expectation, it is forecast that global flows of FDI will fall by more than 30% in 2020 under the most optimistic scenario for the success of the public health and governments' economic support policy measures to make provision for the pandemic and the resulting recession (OECD, 2020).

In this context, the present study aims to investigate the simultaneous effects of the global economic, political, and geopolitical uncertainty (GEPGU) on FDI flows to G20 members over the 1996-2018 period. The uncertain EPG environment and the growing interest to FDI in G20, which account for approximately two-thirds of global FDI flows with its both developed and developing members, provide an interesting field for such an analysis. Given their positions in the global economic platform, G20's members are most likely to account for heightened GEPGU on the one hand and they tend to be mostly exposed to such an uncertain EPG environment on the other. The study goes beyond the existing literature first by employing reasonable uncertainty indexes, namely, the Economic Policy Uncertainty (EPU) index and the World Uncertainty Index (WUI). Second, the study not only focuses on economic/political uncertainty but also considers the geopolitical uncertainty to provide a more comprehensive picture of uncertainty. The remainder of the paper is organized as follows. Section 2 reviews the literature on the link between uncertainty and FDI flows. Section 3 describes data, transformations of the variables, and measurements of economic policy and geopolitical uncertainty. Section 4 illustrates methodology, empirical model and results, and section 5 focuses on the main conclusions.

2. LITERATURE REVIEW

The argument proposing that there is a relationship between uncertainty and investment goes back to at least Keynes (1937), who suggests that investment decisions depend heavily on the agent's subjective beliefs about uncertain future events. Considering this argument, scholars have tended to explain two main channels through which shocks to uncertainty can affect investment decisions. The first channel is related with the irreversibility of investment. During periods of heightened uncertainty, firms may postpone irreversible investment decisions with "wait and see" effect and become more reluctant to enter new markets (Dixit & Pindyck, 1994; Bloom, 2009) until the uncertainty has been resolved. The second channel is related with risk premium. In a highly uncertain economic/political environment, investors require greater compensation as insurance against future risks. This is likely to discourage investments by making borrowing more expensive (Haddow et al., 2013). Besides, a jump in uncertainty may reduce bank incentives to provide loans for firms. Thus, the tightened credit conditions may lead to restrict investments and funding for new start-up companies (Haddow et al., 2013, Gilchrist et al., 2014). While these channels exhibit the negative relationship between uncertainty and investment decisions through wait and see behaviour and risk premium effects, the link between uncertainty and FDI flows may be stronger because FDI is subject to higher fixed costs than domestic investments and it is more sensitive to the political environment as foreign investors have limited protection from the host country's political environment (Aizenman & Spiegel, 2006; Dixit, 2011; Choi, 2019).

Because of its unobservable nature, it has always been very difficult to measure uncertainty thoroughly and accurately (Hsieh, et al., 2019). Accordingly, a great deal of previous research has focused on the relationship between uncertainty and global FDI flows by mostly employing different proxies for uncertainty. For example, using the stock market return volatility as a proxy of uncertainty (Gourio et al., 2015) found that a jump in economic uncertainty deters the international capital flows for a large set of 26 emerging counties. Jeanneret (2016) examined the effects of exchange rate volatility (used as a proxy for economic uncertainty) on FDI for eighty-four developed and emerging countries over the period 1996-2012. The evidence obtained from this study indicates that the exchange rate volatility has a detractive effect on the FDI outflows. Likewise, Asamoah et al. (2016) examined the relationship between the volatility of the exchange rate, institutional quality and FDI inflows in the Sub-Saharan Africa (SSA) economies and found that while heightened economic uncertainty among these economies harms the FDI flows into most countries in the sub-region, institutional quality moderates the adverse effects of the economic uncertainty on FDI. Noria and Fernandez (2018) examined the effect of uncertainty (based on the entrepreneurs'/forecasters' expectations) on FDI flows into the Mexican manufacturing sector and concluded that uncertainty has a negative effect on FDI flows into the country. Using election timing as a proxy of political uncertainty, (Julio & Yook, 2016) investigated the relationship between political uncertainty and cross-border capital flows U.S. companies to 43 countries over the period of 1994-2010 and found that FDI flows drop during the just before the elections. Likewise, Chen et al. (2019) examined the effects of the timing of national elections (used as a proxy for policy uncertainty) on FDI among

126 countries concluded that a jump in policy uncertainty in the election years reduces the FDI flows.

While volatility in variables and election indicators may be reliable proxies for economic/political uncertainty, respectively, they do not provide a direct and broader measurement of such uncertainties. For example, volatility-based indexes such as VIX (an index of 30-day option-implied volatility in the S&P500 stock index) focus on only uncertainty about the stock market and nominal/real variables. In addition, election indicators do not show how much policy uncertainty raised during the election period, and they do not consider the nonelection periods (Gulen & Ion, 2016). To fill this gap (Baker et al., 2015) constructed the Economic Policy Uncertainty (EPU) index based on the frequency of articles in leading newspapers containing a triple of keywords pertaining to the economy, policy and uncertainty. It is argued that the EPU index is a more comprehensive and reasonable proxy for economic/political uncertainty because it not only reflects equity returns but also covers other policy related economic issues and it captures the time-varying intensity of uncertainty (Hsieh et al., 2019, Choi et al., 2019; Baker et al., 2015). Despite the superiority of the EPU index in providing a more accurate picture of economic/political uncertainty, there is relatively small body of literature that is concerned with the effects of uncertainty on FDI flows by using EPU index. A key study conducted by (Hsieh et al., 2019) using EPU indices for both the U.S. and a panel of twenty host countries indicate a strong causal link between the EPU indices and U.S. outward FDI flow. Similarly, using the EPU index (Choi et al., 2019) investigated the relationship between policy uncertainty and FDI inflows in 16 countries over the period of 1985-2013 and found that heightened uncertainty robustly reduces FDI inflows. Employing the same index (Nguyen et al., 2018) examined the link between policy uncertainty and firm-level FDI in eight East Asian economies and found that firms increase their investments in countries where EPU is lower than that of their home countries.

The studies presented thus far provide evidence that heightened uncertainty has an adverse effect on FDI flows. They mostly tend to focus on economic/political uncertainty by using several proxies for these uncertainties or directly employing the EPU index and not much on geopolitical uncertainty[2] that has become a central issue for investors in the global economy. Indeed, as it is mentioned above, in an uncertain geopolitical environment multinational firms may also be reluctant

[2] An exception is Cheng et al., (2016), who investigate how heightened uncertainty due to geopolitical conflict over the Senkaku Island (between Japan and China) affects the FDI flows from Japan to China. The results from their study indicate that Japan's outward FDI flows to China started to drop significantly after the sudden escalation of island crisis. However, that kind of approach is only focusing on one special conflict between the two states and it does not tell us how much geopolitical uncertainty raised during the conflict period.

to invest abroad. To fill this gap the recent study also takes into account the geopolitical uncertainty and constructs a single index by using principle component analysis (PCA) to examine the simultaneous impact of GEPGU on inward FDI in G20 member economies. Therefore, the methodology and findings of this study are believed to contribute to the development of the existing literature by providing a new perspective for using a broader measurement of uncertainty.

3. DATA DESCRIPTION, VARIABLES AND MEASURES

This study covers G20 member countries for a twenty-three (23) year period[3] spanning from 1996 to 2018. The data are compiled from three different sources. GEPGU index is computed from the Economic Policy Uncertainty website, FDI flows are culled from the World Bank Development Indicators (WDI), and the other macroeconomic variables are collected from the International Monetary Fund-Monetary and Financial Statistics (IMF-MFS). Definition of variables and their sources are reported in Table 1.

Table 1.

DEFINITIONS OF VARIABLES

<table>
<tr><th>Abbreviations</th><th>Variables</th><th>Sources</th></tr>
<tr><td>FDI</td><td>Real Inward Foreign Direct Investments (USD)</td><td rowspan="5">The World Bank-WB (World Development Indicators-WDI-2019)</td></tr>
<tr><td>GDP</td><td>Per capita Real Domestic Product (2010-USD)</td></tr>
<tr><td>NR</td><td>Real Total Natural Resources Rents</td></tr>
<tr><td>OPR</td><td>Openness Ratio (2010-USD)</td></tr>
<tr><td>INFR</td><td>Inflation Rate (Consumer Price Index, 2010=100)</td></tr>
<tr><td>ER</td><td>Nominal Effective Exchange Rate, Special Drawing Right (SDR)</td><td rowspan="2">IMF-MFS (International Monetary Fund-Monetary and Financial Statistics-2019).</td></tr>
<tr><td>IR</td><td>Money Market Interest Rate</td></tr>
<tr><td>GEPGU</td><td>Global Economic, Political, and Geopolitical Uncertainty Index</td><td>www.PolicyUncertainty.com. Authors’ Calculation</td></tr>
</table>

[3] The reason for that the study covers the 1996-2018 period is that the variables can be continuously obtained from the related databases during this period.

In this study, most of the variables are subject to transformation before being used in estimations. For dependant variable, that is FDI, representing inflow foreign direct investments is calculated by converting nominal foreign direct investment net inflows to real form by employing GDP deflator (base year varies by country) series of the G20 member countries. For independent variable, the GEPGU index is measured by employing the Global Economic Policy Uncertainty (GEPU) index, the World Uncertainty Index (WUI), and the Geopolitical Risk (GPR-as a proxy for geopolitical uncertainty) index. The ability to construct the EPU index extended the scope of the literature on constructing new uncertainty indexes. For example, Davis (2016) constructed the GEPU index, which is a GDP-weighted average of national EPU indexes for 21 countries that are assumed to have a power to represent the global economy. Ahir et al. (2018) developed the WUI for 143 countries using frequency counts of uncertainty and its variants in the Economist Intelligence Unit (EIU) country reports discussing main economic and political developments in each country. Caldara and Iacoviello (2018) developed the GPR index with an algorithm that computes the share of articles containing geopolitical events that are of global interest and associated risks in 11 leading international newspapers published in the United States, the United Kingdom, and Canada.

In constructing the GEPGU index, the yearly data on GEPU index, WUI, and GPR index for the 1996-2018 period are computed by taking the arithmetic means of quarterly WUI and monthly GEPU and GPR indexes. Then the data on the GEPGU variable are derived for the sample period by employing PCA after taking the logarithm of the GEPU, GPR, and WUI index values. The PCA allows one to obtain a new variable that is reduced from the linear components of the variables to reflect the structure explained by the number of correlated variables and their observed variances. Therefore, one can measure strongly correlated global economic, political and geopolitical uncertainties by a single variable and can investigate the simultaneous effects of these uncertainties on FDI flows.

In addition, following the empirical literature on the determinants of FDI inflows, the study employs five different control variables as GDP, NR, OPR, INFR, ER, and IR to capture macroeconomic environment of the sample countries. The GDP variable is used as a proxy for market size, which has been most widely acknowledged as a significant determinant of FDI flows. Data on the NR variable are measured by converting the total natural resources rents (sum of oil rents, natural gas rents, coal rets (hard and soft), mineral rents, and forest rents) in Nominal United States dollars (USD) to real form by employing GDP deflator (base year varies by country) series of the related countries. The OPR variable presents trade openness or the level of integration of the G20 member countries with the global economy and their internalization levels of technological developments. It is suggested that economies that are more open can attract the FDI flows since the multinational companies may willing to benefit from easiness of international trade. Data on the OPR variable are measured by total export and import-to-GDP (2010-USD) ratios. Since the data on the export and import variables for Saudi Arabia and China are not available in real terms, the OPR variable for these countries is used by converting nominal export-import values to real form by employing GDP deflator series.

The ER, IR, and INFR variables, respectively, representing exchange rates interest rates, and inflation rates, are used as an indication of macroeconomic stability. Although countries with stable macroeconomic environment are known to provide better options to foreign investors, expectations of this study are inconclusive because the impact of the exchange rate on inward FDI flows depends on the type of FDI. For example, a rise in exchange rate on the one hand can increase the profitability of foreign firms that have a strong export orientation in any specific sector and attract FDI inflows. On the other hand, a real depreciation of the domestic currency can reduce the profits and dividends back to the parent company, thereby reducing the FDI inflows (Ramirez, 2006). Data on the ER variable for Germany, USD, Australia, France, England, Italy, Japan, Canada, South Korea, Brazil, China, South Africa, Mexico, Russia and Saudi Arabia are obtained as the midterm nominal equivalents of the national currencies' weighted values calculated based on the consumer price index (CPI, 2010=100) or unit labour costs against the currencies of the leading countries in foreign trade. The related data for Argentina, India, Indonesia, and Turkey (countries for which the nominal effective exchange rate is not available in the MFS) are obtained as the midterm nominal equivalents of SDR calculated through the weighted average values of the national currency against the nominal exchange rates as USD, Euro, Yuan, Pound-Sterling, and Yen. Data on the IR variable are obtained as Monetary Policy Interest Rate for Turkey and Saudi Arabia, as Deposit Interest Rate for China, India, and Argentina, as Money Market Interest Rates for other 14 countries, respectively, and data on the INFR variable are measured based on the Consumer Price Index (CPI, 100=2010).

This study uses logarithmic values of the FDI, GDP, NR, OPR, and GEPGU variables and level values of the INFR, MIR, and ER variables. Table 2 reports the descriptive statistics of these variables.

Table 2.

DESCRIPTIVE STATISTICS OF VARIABLES

Statistics	Mean	Median	Max.	Min.	Std. D.	Skew.	Kurt.
FDI	22.19	24.00	26.87	-24.27	8.73	-4.73	24.11
GDP	9.62	9.79	10.95	6.57	1.09	-0.76	2.78
NR	23.45	23.89	27.37	18.18	2.07	-0.38	2.22
OPR	3.82	3.88	4.68	2.68	0.41	-0.42	2.82
INFR	5.90	2.81	85.75	-1.40	11.02	4.95	31.01
ER	4.47	4.59	9.91	-2.13	1.65	0.26	7.86
IR	8.05	4.69	183.20	-0.56	13.56	6.69	71.75
GEPGU	-8.70	0.23	2.48	-2.59	1.49	-0.15	1.92
Obs.	437	437	437	437	437	437	437

4. METHODOLOGY AND FINDINGS

The present study investigates the long-term simultaneous effects of the GEPGU on inward foreign direct investments for G20 member countries employing panel data analysis. The basic form of the econometric model, which is subject to estimation in this study, is given in equation 1. As macroeconomic stability (MES) is represented by three different variables (namely, INFR, ER, and IR), three different variations of the model (defined in the following equation) are estimated in this study to prevent the multicollinearity issue and to obtain consistent results.

$$\mathrm{FDI}_{it} = \vartheta_{it} + \partial_1 \mathrm{GDP}_{it} + \partial_2 \mathrm{NR}_{it} + \partial_3 \mathrm{OPR}_{it} + \partial_4 \mathrm{MES}_{it} + \partial_5 \mathrm{GEPGU}_{it} + \varepsilon_{it} \qquad (1)$$

Where the term (ϑ) denotes constant parameter, the term (∂) denotes slope parameter and (ε) is the error term. (t) and (i) indicate the time and the cross-section dimensions of the panel, respectively.

According to whether or not there is a presence of CSD, unit root and other consecutive tests directing the econometric methodology in panel data analyses are groped as first and second generation. It is assumed that all units in panel are equally affected by a shock in one unit in the first-generation tests while each unit are affected at different levels in the second-generation tests. The assumptions above highlight a necessity to detect CSD in models and variables and to determine the unit root and other consecutive tests (Menyah et al., 2014).

CSD in variables and models can be examined by CD-LM tests by considering the time (T) and section (N) dimensions of the panel. In case of T>N, CD-LM1, and in case of T<N, CD-LM2 test is suitable whereas in all alternative cases Pesaran et al. (2008) CD-LM_{adj} test can be used. CD-LM1 and CD-LM2 tests are computed as follows:

$$\mathrm{CD-LM} = \breve{\rho}_{ji} = \frac{\sum_{t=1}^{\mathrm{T}} e_{it}\, e_{jt}}{\left(\sum_{t=1}^{\mathrm{T}} e_{it}^{2}\right)^{1/2}\left(\sum_{t=1}^{\mathrm{T}} e_{jt}^{2}\right)^{1/2}} \tag{2}$$

Where the term ($\breve{\rho}_{ji}$) denotes correlation among the error terms, the term (e_{it}) denotes error terms obtained from the panel units by OLS methodology.

When the unit mean is non zero and the group mean is zero, CD-LM_{adj} test is computed to remove biased results from CD-LM1 and CD-LM2 tests by adding variance (υ_{Tij}) and mean (μ_{Tij}) of units to equation 3.

$$CD-LM_{adj} = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{\mathrm{i=j}}^{\mathrm{n-1}}\sum_{\mathrm{j=i+1}}^{\mathrm{n}}\frac{(\mathrm{T}-\mathrm{K})\breve{\rho}_{ij}^{2}-\mu_{\mathrm{Tij}}}{\upsilon_{\mathrm{Tij}}}\right) \tag{3}$$

The presence of CSD among the panel units is examined with the null hypothesis "there is no cross-sectional dependence in variables/models" in CD-LM tests that are assumed to have standard normal distribution (Pesaran et al., 2008). Results of the CSD analysis obtained from the CD-LM1 and CD-LM_{adj} by taking account the T and N conditions of the variables and models are reported in Table 3.

Table 3.

CROSS-SECTIONAL DEPENDENCE TEST RESULTS

Constant +Trend	Test Statistics			Constant +Trend	Test Statistics		
Variables	**CD-LM1**	**CD-LM$_{adj}$**	**L**	**Models**	**CD-LM1**	**CD-LM$_{adj}$**	**L**
FDI	244.15[a] [0.000]	93.08[a] [0.000]	4	**Model-1**	-0.296 [0.227]	0.590 [0.278]	3
GDP	935.69[a] [0.000]	87.57[a] [0.000]	4	**Model-2**	-0.214 [0.830]	1.485 [0.069]	3
NR	2186.12[a] [0.000]	87.48[a] [0.000]	3	**Model-3**	0.008 [0.993]	-0.495 [0.690]	3
OPR	1076.76[a] [0.000]	139.92[a] [0.000]	3				
INFR	516.76[a] [0.000]	113.16[a] [0.000]	3				
ER	451.34[a] [0.000]	76.25[a] [0.000]	4				
IR	411.65[a] [0.000]	85.45[a] [0.000]	4				
GEPGU	906.17[a] [0.000]	82.74[a] [0.000]	2				

Note: "[a]" and "[b]" denotes the presence of CSD at 1% and 5% significance level. Column "L" shows the optimal lag length determined by Schwartz Information Criterion. Probability values of the test statistics are given in box brackets "[ ]".

As seen in Table 3, probabilities of CD-LM tests statistics computed for variables are lower than 0.05; therefore, the null hypothesis is rejected at 5% significance level and it is concluded that the variables are interdependent. On the other hand, probabilities computed for all models defined in this study are higher than 0.05; therefore, the null hypothesis cannot be rejected at 5% significance level and it is concluded that the co-integration equations are independent of each other. These results require employing the first and second-generation econometric methodologies together, both considering and not considering CSD among the panel units. From this point of view, the study investigates the stationarity of the variables using Cross-Sectional Augmented Dickey Fuller (CADF) test that takes in to account the CSD among the panel units and Multifactor Panel Unit Root Test (MPURT). The CADF and MPURT tests can be used in all alternative cases among the T and N dimensions of the panel and can provide consistent results on the stationary of the variables. Using arithmetic means of the CADF values computed for the panel units, stationarity of the variables for panel-wide is computed by the equation 4 with CIPS statistics.

$$\mathrm{CIPS} = \mathrm{N}^{-1}\sum_{\mathrm{i=1}}^{\mathrm{n}} \mathrm{t}\left(\mathrm{N},\mathrm{T}\right) \tag{4}$$

The MPURT including the effects of the factors (m) arising from technological, economic, etc. changes that can cause to CSD in the variables prevents the autocorrelation stemming from the errors in these factors. Stationary of the variables in the MPURT is computed with CIPSm test statistics as follows:

$$CIPSm^{*}{}_{NT} = N^{-1}\sum_{0-1}^{N} t_i^{*}\left(N,T\right) \tag{5}$$

Where $\mathrm{t}\left(\mathrm{N},\mathrm{T}\right)$ and $t_i^{*}\left(N,T\right)$) indicate sample distribution of panel. CIPS and CIPSm test statistics obtained from the equations 4 and 5 are compared with critical table values derived respectively by Monte Carlo and Stochastic simulations, and hypotheses for stationarity are tested. If CIPS and CIPSm test statistics are higher than the critical table values in absolute value, the null hypothesis “series has unit root” can be rejected. Table 4 reports the results obtained from CADF and MPURT in which the RGDP and GEPGU variables are used as common factors that have an effect on the presence of the CSD.

Table 4.

UNIT ROOT TEST RESULTS

(Constant + Trend)	Test Statistics					
	CIPS			CIPSm		
Variables	**LV**	**FD**	**L**	**LV**	**FD**	**L**
FDI	-2.37	-2.99[a]	4	-2.08	-3.49[a]	2
GDP	-3.69[a]		4	-2.42	-3.74[a]	3
NR	-3.22[a]		3	-3.65[a]		3
OPR	-2.65	-3.04[a]	3	-2.77[b]		2
INFR	-3.25[a]		3	-2.07	-3.49[a]	2
ER	-2.23	-2.93[a]	4	-2.34	-3.69[a]	3
IR	-3.06[a]		4	-3.48[a]	-	3
GEPGU	-3.19[a]		2	-2.86[a]		2
Critical Values (**% 1** / **% 5**)	**-2.92**	**-2.73**		**-2.96**	**-2.72**	1
				-2.80	**-2.56**	2
				-2.78	**-2.52**	3

Note: “[a]” and “[b]” indicate that the variables are stationary at 1% and 5% significance levels, respectively. “LV” and “FD” columns indicate the tests statistics computed in the level and the first differences.

As seen in Table 4, some of the variables are stationary at their levels [I(0)] and the others become stationary at their first differences [I(1)], that is the variables are integrated with different degrees. Additionally, shocks in the variables that are stationary at their levels do not make a lasting impact whereas the effects of the shocks in the variables that are stationary at their first differences can be permanent. This situation can eliminate the effects of temporary shocks occurring in the examination period in the variables that are integrated with different degrees and the possible long-term integrated relations among the variables. For this reason, it is necessary to determine the possible long-term relations among the variables with co-integration analyses (Gujarati & Porter, 2008). This study uses Durbin-Hausman (DH) test developed by Westerlund (2008) to investigate the possible long-term co-integrated relations among the variables. The DH panel co-integration test that allows one to examine the long-term relations when the dependant variable is [I(1)] and independent variables are [I(1)] and [I(0)] can be used when the section units in the panel are interdependent or independent of each other. In the DH test, where the presence of common factors is considered, long-term relations among the variables are computed by assuming that the autoregressive parameter in the panel units is the same and differentiated respectively with the DH group (DHg) and the DH panel (DHp) test statistics.

$$DH_g = \sum_{i=1}^{n} \hat{S}_i \left(\tilde{\varnothing}_i - \tilde{\varnothing}_i\right)^2 \sum_{t=2}^{T} \hat{e}_{it-1}^2 \ and \ DH_p = \hat{S}_n \left(\tilde{\varnothing} - \tilde{\varnothing}\right)^2 \sum_{i=1}^{n} \sum_{t=2}^{T} \hat{e}_{it-1}^2 \qquad (6)$$

Here ($\hat{S}_n = \hat{\omega}_n^2 / \left(\sigma_n^2\right)^2$) and ($\hat{S}_i = \hat{\omega}_i^2 / \hat{\sigma}_i^4$) respectively present the variances of panel and cross section units. ($\hat{\omega}_i^2$) is the consistent estimator of long-term variance of (ω_i^2), and ($\hat{\sigma}_i^2$) presents the simultaneous variance estimations corresponding to ($\hat{\omega}_i^2$) and (ω_i^2). Using the DHp and DHg test statistics, the long-term relations among the variables are tested with null hypothesis "there is no co-integration relationship between the variables". The null hypothesis can be rejected provided the computed DHg and DHp test statistics are higher than the normally distributed critical table value (1.65) at 5% significance level, and it can be concluded that there is a co-integration relationship between the variables.

On the other hand, whether or not the long-term co-integrated relationships among the variables are valid for the panel-wide (the homogeneity of the slope coefficients in the co-integration equation) can be examined by the Slope Homogeneity Test (SHP). In the SHP test, whether or not the slope coefficients in the co-integration equation are differentiated among the cross sections in panel is tested by ($\tilde{\Delta}_{adj}$) test statistics. The null hypothesis "slope coefficients are homogenous" cannot be rejected provided the ($\tilde{\Delta}_{adj}$) test statistics are higher 0.05 at 5% significance level and it can be concluded that co-integration coefficients in the cross sections are homogenous.

Results of the DHp, DHg and $\tilde{\Delta}_{adj}$ test statistics that are investigating the long-term relationships among the variables in Constant and Trend forms are reported in Table 5 and Table 6. The DH co-integration test results in Table 5 and 6 indicate that there is a long-run equilibrium relationship between the variables in all models since the computed DHp and DHg test statistics are higher than the critical table values (shown in the box brackets) and therefore the null hypothesis is rejected at 5% significance level. Additionally, the SHP results in Table 5 indicate that these co-integrated relations are valid for panel-wide because the computed ($\tilde{\Delta}_{adj}$) test statistics are higher than 0.05 and the null hypothesis "slope coefficients are homogenous" cannot be rejected at 5% significance level.

After detecting that the variables are integrated at different levels ([I(0) and [I(1)]), section units in the panel are independent of each other, the variables are co-integrated and the slope coefficients are homogenous; the long-run coefficients of the variables should be estimated by appropriate methods. In this context, the long-run effects of the GEPGU on FDI flows can be investigated by employing Panel Autoregressive Distributed Lag (ARDL) model that takes into account these conditions. The Panel ARDL model developed by Pesaran et al. (1999) as an error correction model relies on the two different group estimators (namely, Mean Group (MG) and Pooled Mean Group (PMG) estimators). When the long-run coefficients of the variables are estimated in the MG estimator, no restrictioimposed on the coefficients in the ARDL specification and the coefficients for the panel-wide are computed from the unweighted average of individual ARDL estimations of the section units in the panel. In the MG estimator, it is assumed that the coefficients of the variables are homogenous among the section units.

On the other hand, in the PMG estimator, certain restrictions are imposed on the coefficients in the ARDL specification and the long-run coefficients are computed from the weighted average of individual ARDL estimations of the section units in the panel. In the PMG estimator, it is assumed that the model coefficients are heterogeneous in the short-run and homogenous in the long-run as the constant term, variances of the error term and the short-term coefficients are allowed to change according to the section units in the panel. The general form of (p, q) lagged MG and PMG models with two variables (Y, X) are computed from the following equation.

$$Y_{it} = \alpha_i + \sum_{j=1}^{p} \beta_{ij} Y_{it-j} + \sum_{j=0}^{q} \delta_{ij} X_{it-j} + \varepsilon_{it}. \tag{7}$$

Where (i) and (t) indicate the section units in the panel and the time dimension, respectively. When the Panel ARDL model in equation 7 is rewritten as an error correction model, the short-term coefficients of the variaes can be estimated as follows:

$$\Delta Y_{it} = \alpha_i + \sum_{j=1}^{p-1} \beta_{ij} \Delta Y_{it-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta X_{it-j} + \sigma_i Y_{it-1} + \varphi_i X_{it} + \varepsilon_{it} \tag{8}$$

Where (Δ) is the difference operator. ($\sigma = -(1 - \sum_{j=1}^{p} \beta_{ij})$) indicates the error correction coefficient. A negative and statistically significant (σ) refers that the effects of a temporary shock in the variables will be removed in the long run. While equation 7, where the level values of the variables are used, indicates the long-term coefficients, equation 8, where the first differences of the variables are used, indicates the short-term coefficients.

Additionally, in the Panel ARDL methodology, to determine the best estimator that can give unbiased and consistent results among the MG and PMG estimators, this study uses Hausman (Chi^2) test. In case of Hausman (Chi^2) test statistics are higher (lower) than 0.05, the null hypothesis "long-term coefficients are homogenous" cannot be rejected (can be rejected) and the PMG (MG) estimator is determined as a best estimator at 5% significance level. According to the Hausman (Chi^2) test, this study estimates the defined models to investigate the short-long term effects of the GEPGU on FDI flows in the selected countries by using PMG estimator. Table 5 reports the estimation results obtained by the PMG Panel ARDL methodology.

Table 5.

ESTIMATION RESULTS

Variables	**Model-1**		**Model-2**		**Model-3**	
Long Run	**CE.**	**SE.**	**CE.**	**SE.**	**CE.**	**SE.**
GDP	0.8583[a]	0.2950[0.004]	1.5293[a]	0.3877[0.000]	2.0832[a]	0.3926[0.000]
NR	0.2069[b]	0.0939[0.028]	0.4315[a]	0.1011[0.000]	0.3605[a]	0.0847[0.000]
OPR	1.4346[a]	0.3703[0.000]	0.7892[b]	0.4023[0.042]	0.6954[a]	0.0416[0.000]
INFR	-0.0557[a]	0.0081[0.000]	––	––	––	––
ER	––	––	0.0032[a]	0.0009[0.000]	––	––
IR	––	––	––	––	-0.0034	0.0022[0.113]
GEPGU	-0.2441[a]	0.0444[0.000]	-0.2531 [a]	0.0467[0.005]	-0.4335[a]	0.0526[0.000]
ECM(σ)	-0.6745[a]	0.1032[0.000]	-0.7296[a]	0.0969[0.000]	-0.6609[a]	0.0973[0.000]
Short Run	**CE.**	**SE.**	**CE.**	**SE.**	**CE.**	**SE.**
ΔGDP	56.0852[b]	23.6618[0.018]	53.5827[a]	18.0569[0.003]	55.4797[a]	23.2834[0.000]
ΔNR	5.5552[b]	2.4931[0.026]	5.9269[b]	3.0107[0.049]	3.9972[b]	2.0012[0.048]
ΔOPR	-4.4892	10.1321[0.658]	0.0256	10.7646[0.998]	-6.1613	8.2791[0.457]
ΔINFR	-0.1405	0.3952[0.722]	––	––	––	––
ΔER	––	––	0.0610	0.0854[0.475]	––	––
ΔIR	––	––	––	––	-1.5366	1.7161[0.371]
ΔGEPGU	0.0862	0.4949[0.861]	-0.0155	0.5199[0.976]	0.2323	0.4492[0.371]
C	1.4355	0.9666[0.138]	-6.8757[a]	2.2732[0.003]	-7.2317[a]	1.4759[0.000]
DH_g	23.18*[0.000]		26.37*[0.000]		25.15*[0.000]	
DH_p	29.38*[0.000]		12.81*[0.000]		9.84*[0.000]	
$\tilde{\Delta}_{adj}$	-0.0475*[0.519]		-0.0081*[0.500]		-0.0812*[0.532]	
Obs.	418		418		418	
Hausman (***Chi***^{2})	3.09[0.686]		1.81[0.875]		4.20[0.521]	
Log-Likelihood	-598.7815		-595.4129		-599.8524	

Note: "CE" indicates the coefficients; "SE" indicates the standard errors; "[a]" and "[b]" respectively indicate that the variables are significant at 1% and 5% significance level; "*" shows that there is a co-integration relationship among the variables at 1% significance level; "*" indicates that the slope coefficients in the co-integration equation are homogenous at 1% significance level. Maximum for the models and optimal lag lengths for the DHg, DHp and $\tilde{\Delta}_{adj}$ test statistics are determined by Schwarz Information Criterion.

As seen in table 5, signs of the per capita GDP and natural resource rents are consistent with theoretical predictions while other control variables and GEPGU are not statistically significant in the short run. For long run, the estimation results obtained from three models indicate that all of the variables except for inflation rate are statistically significant and signs of the control variables including per capita GDP are consistent with the previous empirical studies. For example, GDP, NR, OPR, and ER variables tend to receive higher FDI inflows while increases in the inflation rate reduces FDI inflows, when everything else being equal. Positive sign of the exchange rate implies that the FDI inflows to G20 member countries are mainly export oriented. Moreover, the sign of the GEPGU is negative and statistically significant at 1% significance level. The magnitude of the GEPGU is -0.2441, in that one percentage point increase in GEPGU is associated with a 0.24 percentage point decline in FDI flows to G20 member countries. In addition, signs of the ECMs in all models are negative and their magnitudes rage from -0.6609 to -0.7296. The coefficients are statistically significant at 1% significance level referring that the disequilibrium in the previous period will be removed in the long run.

After determining the long run effects of the GEPGU on FDI inflows, the present study also investigates the causal relation between the variables employing Emirmahmutoğlu and Kose (EK) (2011) panel causality test that takes into account the CSD among the panel units. The EK panel causality test depend on the extension of the Toda-Yamamoto (1995) causality test allows one to examine the causality among the variables independently of stationarity degrees and co-integration levels of the variables. While investigating the causality relationships among (y) and (x) variables in the EK panel causality test, where biased results that may stem from identification errors can be prevented, firstly, optimal lag lengths (k) for the variables are determined by establishing a Panel VAR model. Then, the maximum integration level (d_{max}) is added to the optimal lag lengths and the panel VAR model with ($k + d_{max}$) order is estimated by using level values of the variables as follows:

$$x_{i,t} = \mu_i^x + \sum_{j=1}^{k_i + d\,max_i} A_{11,ij} x_{i,t-j} + \sum_{j=1}^{k_i + d\,max_i} A_{12,ij} y_{i,t-j} + \mu_{i,t}^x \quad (9)$$

$$y_{i,t} = \mu_i^y + \sum_{j=1}^{k_i + d\,max_i} A_{21,ij} x_{i,t-j} + \sum_{j=1}^{k_i + d\,max_i} A_{22,ij} y_{i,t-j} + \mu_{i,t}^y \quad (10)$$

Estimating these equations for all cross-sections in the panel, individual Wald statistics are computed and then Fisher test statistics for panel-wide are obtained by using the Wald statistics. While the probability values of the test statistics calculated by using bootstrap distribution are lower than 0.01, the null hypothesis “there is no causality relationship among the variables in cross-sections in the panel or in the panel-wide" can be rejected at 1% significance level, and it can be concluded that there is a causality relationship among the variables (Emirmahmutoğlu & Kose, 2011). Table 6 below reports the causality test results with Fisher test statistics.

Table 6.

EK PANEL CAUSALITY TEST RESULTS

Null Hypothesis	**Fisher Test Statistic**	**L**
FDI ⇏ GEPGU	56.93[0.088]	2
	56.93[0.076]	3
GEPGU ⇏ FDI	41.86^{b} [0.015]	2
	41.85^{b} [0.017]	3

Note: "b" indicate there is a causality relationship among the variables at % 5 significance level. Column "L" indicates the lag lengths determined by Schwarz Information Criterion. Probability values of the test statistics obtained from the bootstrap distribution are given in box brackets "[ ]". "⇏" shows the sign of the causality relationships among the variables.

As seen in table 6, there is a unilateral causality running from GEPGU to FDI at 5% significance level because the probabilities of the Fisher test statistics are lower than 0.05 at lags 2 and 3. The finding show that changes in the global economic, political, and geopolitical uncertainties cause a decline in FDI flows to G20 member countries during the examination period.

5. CONCLUSION

This study investigates the simultaneous effects of global economic, political, and geopolitical uncertainties on FDI flows to G20 member countries for the period 1996-2018 under the panel data analysis. Unlike most of the previous studies focusing on the link between uncertainty and FDI flows employing volatility in some macroeconomic variables and election indicators as a proxy for economic and political uncertainty, the present study uses novel uncertainty indexes, namely Economic Policy Uncertainty and World Uncertainty indexes that can measure economic/political uncertainty thoroughly and simultaneously. In addition, this study not only considers the economic/political uncertainty but also uses the Geopolitical Risk index as a proxy for geopolitical uncertainty to provide a more comprehensive picture of the link between uncertainty and FDI flows while other studies mainly focus on the economic policy uncertainty.

Results obtained by employing the Pooled Mean Group Panel ARDL model indicate that the GDP per capita, natural resources rents, openness, inflation, and exchange rate have a statistically significant effect on the FDI flows and signs of these variables are mostly consistent with the previous empirical studies, although interest rate is not statistically significant. All else equal, a rise in the market size, openness to trade, abundance of natural resources and exchange rate, and lower inflation rate lead to higher FDI inflows. The results also indicate that global economic, political, and geopolitical uncertainty has a negative and statistically significant impact on FDI inflows to G20 member countries. This finding is consistent with the theoretical literature proposing that heightened uncertainty can deter investments with wait and see behaviour and risk premium effects (Dixit & Pindyck, 1994; Bloom, 2009, Haddow et al., 2013, Gilchrist et al., 2014) as well as with the empirical literature (i.e., Asamoah et al. 2016; Julio & Yook, 2016; Noria & Fernandez 2018; Choi et al., 2019; Chen et al., 2019) investigating the role of uncertainty in explaining FDI inflows. This study also examines the causality relationship among the variables employing Emirmahmutoğlu and Kose (2011) panel causality test and finds a presence of a unilateral causality running from global economic, political, end geopolitical uncertainty to FDI inflows.

Overall, these results show that heightened uncertainty stemming from the changes in economic, political, and geopolitical environment has a detractive effect on FDI flows to G20 member countries in the long-run. In this context, together with forming or maintaining a good relationship with foreign countries, policymakers in G20 member countries should play a conciliating role in reducing global economic and geopolitical tensions. Policymakers should also extend or redesign the traditional fiscal and monetary policies together with the implementation of new structural reforms that may moderate the negative effects of uncertainty on the FDI inflows to provide a confidential policy environment to attract FDI.

REFERENCES

1. Ahir, H., Bloom, N., & Furceri, D. (2018), "The World Uncertainty Index", Available at: http://www.policyuncertainty.com/media/WUI_mimeo_10_29.pdf.
2. Aizenman, J., & Spiegel, M.M. (2006), "Institutional Efficiency, Monitoring Costs and The Investment Share Of FDI", *Review of International Economics*, 14(4): 683-697.

3. Al-Shawaf, A.M.K., & Almsafir, M.K. (2016), "Economic globalization: role of inward and outward FDI with economic growth-evidence from Malaysia", *Journal of Business and Retail Management Research* (JBRMR), 10(2): 64-74.
4. Asamoah, M.E., Adjasi, C.K.D., & Alhassan, A.L. (2016), "Macroeconomic uncertainty, foreign direct investment and institutional quality: Evidence from Sub-Saharan Africa", *Economic Systems*, 40: 612-621.
5. Baker, S.R., Bloom, N., & Davis, S.J. (2015), "Measuring Economic Policy Uncertainty", *NBER Working Paper Series*, No: 21633.
6. Baker, S.R., Bloom, N., Davis, S.J., & Terry S.J. (2020), "COVID-Induced Economic Uncertainty. NBER Working Paper Series, Working Paper No: 26983.
7. Bloom, N. (2009), "The Impact of Uncertainty Shocks", *Econometrica*, 77(3): 623:685.
8. Caldara, D., & Iacoviello, M. (2018), "Measuring Geopolitical Risk", *International Finance Discussion Papers* 1222. https://doi.org/10.17016/IFDP.2018.1222.
9. Chen, K., Nie, H., & Ge, Z. (2019), "Policy uncertainty and FDI: Evidence from national elections", *The Journal of International Trade & Economic Development*, 28(4): 419-428.
10. Cheng, C., Tatsuro, S., Chang, S., & Hongyong, Z. (2016), "Policy Uncertainty and Foreign Direct Investment: Evidence from the China-Japan islands dispute", *RIETI Discussion Paper Series*, 16-E-090.
11. Choi, S., Furceri, D., & Yoon C. (2019), "Policy Uncertainty and FDI Flows: The Role of Institutional Quality and Financial Development", *Economic Research Institute Yonsei University*, RWP-144.
12. Davis, S.J. (2016), "*An Index for Global Economic Policy Uncertainty", NBER Working Paper Series,* No: 22740.
13. Dixit, A. (2011), "International Trade, Foreign Direct Investment, and Security", *Annual Review of Economics*, 3(1): 191-213.
14. Dixit, A. and Pindyck, R. (1994), Investment under Uncertainty. Princeton: Princeton University Press.
15. Emirmahmutoğlu, F., & Kose, N. (2011), "Testing For Granger Causality in Heterogeneous Mixed Panels", *Economic Modelling*, 28: 870-876.
16. Gilchrist, S., Sim, J., & Zakrajsek, E (2014), "Uncertainty, Financial Frictions, And Investment Dynamics", NBER Working Paper No: 20038.
17. Gourio, F., Siemer, M., & Verdelhan A. (2015), "Uncertainty and International Capital Flows", *Working Paper*, MIT.

18. Gujarati, D. N., & Porter, D. C. (2008), *Basic Econometrics*, 5th edition, McGraw Hill.
19. Gulen H., & Ion, M. (2016), "Policy Uncertainty and Corporate Investment", *The Review of Financial Studies*, 29(3): 523-564.
20. Haddow, A., Hare, C., Hooley, J., & Shakir, T. (2013), "Macroeconomic Uncertainty: What is it, how can We Measure It and Why Does it Matter?", *Quarterly Bulletin*, 53(2): 100-109.
21. Hsieh, H.C., Boarelli, S., & Vu, T.H.C. (2019), "*The Effects of Economic Policy Uncertainty on Outward Foreign Direct Investment", International Review of Economics and Finance,* 64: 377-392.
22. Iamsiraroj, S. (2016), "The Foreign Direct Investment–Economic Growth Nexus", *International Review of Economics and Finance*, 42:116–133.
23. Jeanneret, A. (2016). "International Firm Investment under Exchange Rate Uncertainty", *Review of Finance*, 20(5): 2015–2048.
24. Julio, B., & Yook, Y. (2016), "Policy Uncertainty, Irreversibility, and Cross-Border Flows of Capital", *Journal of International Economics*, 103: 13–26.
25. Keynes, J.M., (1937), "The General Theory of Employment", *The Quarterly Journal of Economics*, 51(2): 209-223.
26. Lim, E.G. (2001), "Determinants of, and the Relation Between, Foreign Direct Investment and Growth: A Summary of the Recent Literature", *IMF Working Paper*, WP/01/175.
27. Menyah, K., Nazlioglu, S., & Wolde-Rufael, Y. (2014), "Financial Development, Trade Openness and Economic Growth in African Countries: New Insights from A Panel Causality Approach", *Economic Modelling*, 37: 386-394.
28. Nguyen, Q., Kim, T., & Papanastassiou, M. (2018), "Policy uncertainty, derivatives use, and firm-level FDI", *Journal of International Business Studies,* 49: 96-126.
29. Noria, G.L., & Fernandez, J.J.Z. (2018). "The Effect of Uncertainty on Foreign Direct Investment: The Case of Mexico", *Estudios Económicos*, 33(1):117-149.
30. Organisation for Economic Co-operation and Development [OECD], (2020), Foreign Direct Investment Flows in the Time of COVID-19, Tackling Coronavirus (COVID-19): Contributing to a Global Effort. Oecd.org/coronavirus.
31. Osano, H.M., & Koine, P.W. (2016), "Role of Foreign Direct Investment on Technology Transfer and Economic Growth in Kenya: A Case of The Energy Sector", *Journal of Innovation and Entrepreneurship*, 5(31): 1-25.
32. Pesaran, M. H., Shin, Y., & Smith, R. P. (1999), "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels", *Journal of the American Statistical Association,* 94(446), 621-634.

33. Pesaran, M. H., Ullah, A., & Yamagata, T. (2008), "A Bias-Adjusted LM Test of Error Cross-Section Independence", *The Econometrics Journal*, 11(1): 105-127.

34. Ramirez, M. D. (2006), "Economic and Institutional Determinants of Foreign Direct Investments in Chile: A time-series Analysis, 1960-2001", *Contemporary Economic Policy*, 24(3): 459-471.

35. United Nations Conference on Trade and Development [UNCTAD], (2020), World Investment Report, International Production Beyond the Pandemic. United Nations Publications, New York 10017.

36. Westerlund, J. (2008), "Panel Cointegration Tests of the Fisher Effect", *Journal of Applied Econometrics*, 23(2): 193-233.

POVEZANOST IZMEĐU NEIZVJESNOSTI I TOKOVA IZRAVNIH STRANIH ULAGANJA U ZEMLJAMA ČLANICAMA G20

Summary

Glavni cilj ovog istraživanja je ispitati vezu između globalnih ekonomskih, političkih i geopolitičkih neizvjesnosti i tokova izravnih stranih ulaganja u zemljama članicama G20 u razdoblju od 1996. do 2018. godine. Za razliku od većine prethodnih istraživanja, ovo istraživanje koristi razumne indekse nesigurnosti, to jest, indeks nesigurnosti ekonomske politike (EPU) te indeks svjetske nesigurnosti (WUI) za ekonomsku/političku nesigurnost, umjesto pokazatelja volatilnosti ili izbora. Istraživanje se također koristi indeksom geopolitičkog rizika kao zamjenom za geopolitičku neizvjesnost, i stoga se ne usredotočuje samo na ekonomsku/političku neizvjesnost, već također uzima u obzir geopolitičku neizvjesnost kako bi se pružila sveobuhvatniju sliku neizvjesnosti. Nalazi dobiveni analizom panel podataka pokazuju da povećana neizvjesnost u globalnom ekonomskom/političkom i geopolitičkom okruženju odvraća tokove izravnih stranih ulaganja u zemlje članice G20. Također je utvrđeno da postoji jednostrana uzročnost koja se proteže od neizvjesnosti do priljeva izravnih stranih ulaganja. Uzimajući u obzir ove empirijske nalaze, kreatori politika u gospodarstvima zemalja G20 trebali bi osigurati stabilno ekonomsko/političko i geopolitičko okruženje za privlačenje priljeva izravnih stranih ulaganja, koja imaju ključnu ulogu u poticanju gospodarskog rasta i razvoja.

Ključne riječi: izravna strana ulaganja, nesigurnost ekonomske politike, geopolitička nesigurnost, analiza panel podataka, zemlje članice G20