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World Economic Policy Uncertainty and Foreign Direct Investment

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Abstract

Using a new world economic uncertainty index and applying the Generalised Method of Moments, this paper investigates the effect of world economic policy uncertainty on foreign direct investment on a large panel of 138 countries over the period 1996-2018. With sample differentiated according to IMF classification, the results show that overall, world economic policy uncertainty reduces foreign direct investment and that, the magnitude of the effect is greater in emerging and developing countries than in advanced economies.

1. Introduction

Since the publication of John Kenneth Galbrait's book « The Age of Uncertainty[1] » in 1977, several major events have emerged, causing economic and political uncertainty around the world (Al-Thaqeb and Algharabali, 2019). This globalization of uncertainty is largely linked to the fact that we live in a hyper-connected world, where an event that occurs in one part of the world will certainly have an effect on the other part of the world[2] (Cheng, 2017). Among the recent causes of uncertainty around the world are the Arab Spring in 2012, the financial crisis of 2008, the European sovereign debt crisis, the migration crisis, Brexit, the election of Trump in 2016 and recently the trade war between the US and China (Jiang et al., 2019).

This sequence of events has prompted politicians and researchers to examine the social, economic and political effects of uncertainty. So, it has been shown among others that uncertainty reduce employment (Caggiano et al., 2017), increase stock market illiquidity (Dash et al., 2019), reduce domestic credit (Hu and Gong, 2019), increase exchange rate volatility (Krol, 2014) and reduce economic growth (Kang et al., 2019). Despite the vast and growing literature on the effects of uncertainty, little attention has been paid on the relationship between economic uncertainty and foreign direct investment (FDI). Our goal is to bridge this gap by examining the effect of world economic uncertainty on FDI. Thus theoretically[3], the volatility of investments and the "wait-and-see" behaviour of investors may explain the negative effects of uncertainty on FDI. First, according to Keynes (1937), investment is the most volatile component of demand because the latter depend more on opinions on future events and therefore, any negative opinions on future events will reduce investments. Second, for authors such as Bernanke (1983) and Bloom (2009), the propensity of companies to invest depends on the level of uncertainty. Consequently, in times of high uncertainty, and if investments are irreversible like FDI, companies adopt a "wait and see" behaviour and the consequence is that they delay their investment decisions, which in return may lead to a decrease in investments rate. On this basis, can we explain the decline in FDI observed in recent years by the succession of events mentioned above? Figure 1 shows that FDI globally has increased at a decreasing rate over the past three decades, going from 21% growth rate in the 1990s to 1% in the post-financial crisis years.

Empirical literature on the effect of economic uncertainty on FDI is still at the nascent stage. Of the two empirical studies that have attempted to investigate the relationship between economic uncertainty and FDI, the results are inconclusive. Zhu et al. (2019) investigate the effect of economic uncertainty on FDI in 23 countries over the period 2004-2012 and show that domestic economic uncertainty reduces FDI. Canh et al. (2019) analyses the effect of domestic and world economic uncertainty on FDI in 21 economies over the period 2003-2013 and show that, while domestic uncertainty reduces FDI, world economic uncertainty increases FDI. Other studies were more interested on the effects of political uncertainty rather than economic uncertainty (Julio and Yook, 2016; Gulen and Ion, 2016; Bonaime et al., 2018). This article, while linked to that of Canh et al. (2019) differs from their study and contributes to this new literature in many points. First, this is one of the first paper in the literature that uses the new measure of world economic uncertainty (WUI) from Ahir et al. (2018) to investigate the effect of economic uncertainty on FDI. Second, contrary to Canh et al. (2019) who consider only 21 countries during the period 2003-2013, this paper considers a large worldwide panel of 138 developed and developing countries over a period from 1996 to 2018, which allow us to have observations over 23 years and estimates the effect of WUI in the long term. The contradictory result found by Canh et al. (2019) according to which the global uncertainty increases FDI may also be due to the size of its sample (21 countries) and also to the study period (11 years). Third, assuming that the magnitude of the effects of global economic uncertainty varies from

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[1] Galbraith (1977).

[2] For example, the economic effects of the trade war between the United States and China in Africa.

[3] The theory of irreversible choice under uncertainty, first developed by Bernanke (1983), provides the theoretical framework for understanding cyclical fluctuations in investment and for assessing the effects of uncertainty on investment in general and on FDI in particular.

country to country and from region to region, this paper analyses the effects of world economic uncertainty on FDI by region and by income level. Four, to obtain more robust results, we use the Generalized Method of Moments that account for potential endogeneity issue. To sum up, the results show that world economic uncertainty reduces FDI in the whole sample and that, the magnitude of the effect is greater in emerging and developing countries than in advanced economies.

The rest of the paper is structured as follows. Section 2 describes the data and methodology. Section 3 presents and analyses the results and Section 4 concludes.

Figure 1: FDI inflows and the underlying trend, 1990-2018
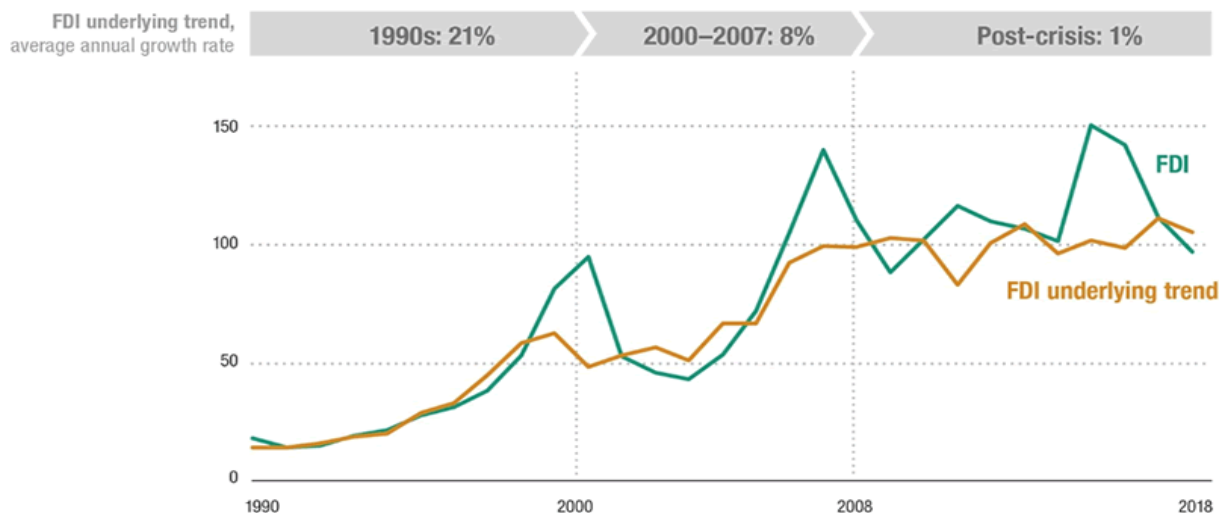
Source: UNCTAD, WIR (2019)

2. Data, model and empirical strategy

Our sample covers 138[4] developed and developing countries over the period 1996-2018. This provides us with a number of observations equal to N*T= 3,174 where N is the number of countries (138) and T is the number of years (23). The full description of the data is as follows: the dependent variable is foreign direct investment inflows (FDI) as a percentage of GDP from World Bank: World Development Indicators (WDI). To measure global economic uncertainty, we use the new World Uncertainty Index (WUI) from Ahir et al. (2018) which includes the uncertainty measures for 143 countries over the period 1996-2018. The economic uncertainty index by Ahir et al. (2018) provides major political and economic issues in each country as well as the analysis and the forecasts on political and economic conditions, which are created by domestic analysts and the editorial board of the Economist. The WUI is constructed on a single source that has specific topic coverage- economic (2007-2008 global financial crisis), political developments (9/11 attack, Arab Spring, the Gulf War II), global environmental crisis (El Nilo crisis) and health crisis (SARS outbreak). These are events that greatly increase uncertainty and which at their turn fundamentally influence the investment decision process and may push transnational firms to postpone their investments decisions or withdrawal them or even increase their investments. Figure 2 suggests a negative correlation between

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[4] Afghanistan; Albania; Algeria; Angola; Argentina; Armenia; Australia; Austria; Azerbaijan; Bangladesh; Belarus; Belgium; Benin; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burundi; Cambodia; Cameroon; Canada; Central African Republic; Chad; Chile; China; Colombia; Congo, Dem, Rep; Congo, Rep; Costa Rica; Cote d'Ivoire; Croatia; Czech Republic; Denmark; Dominican Republic; Ecuador; Egypt, Arab Rep; El Salvador; Eritrea; Ethiopia; Finland; France; Gabon; Gambia, The; Georgia; Germany; Ghana; Greece; Guatemala; Guinea; Guinea-Bissau; Haiti; Honduras; Hong Kong; Hungary; India; Indonesia; Iran, Islamic Rep; Iraq; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kazakhstan; Kenya; Korea, Rep; Kuwait; Kyrgyz Republic; Lao PDR; Latvia; Lebanon; Lesotho; Liberia; Libya; Lithuania; Madagascar; Malawi; Malaysia; Mali; Mauritania; Mexico; Moldova; Mongolia; Morocco; Mozambique; Myanmar; Namibia; Nepal; Netherlands; New Zealand; Nicaragua; Niger; Nigeria; Norway; Oman; Pakistan; Panama; Papua New Guinea; Paraguay; Peru; Philippines; Poland; Portugal; Qatar; Romania; Russian Federation; Rwanda; Saudi Arabia; Senegal; Sierra Leone; Singapore; Slovak Republic; Slovenia; South Africa; Spain; Sri Lanka; Sudan; Sweden; Switzerland; Tajikistan; Tanzania; Thailand; Togo; Tunisia; Turkey; Turkmenistan; Uganda; Ukraine; United Arab Emirates; United Kingdom; United States; Uzbekistan; Venezuela, RB; Vietnam; Yemen, Rep; Zimbabwe.

WUI and FDI. However, as correlation does not mean causality, this relationship will be investigated empirically. To ensure that our results are not bias, this paper includes seven control variables. They comprise: (i) Annual GDP growth rate, (ii) domestic investment, (iii) human capital, (iv) financial development, (v) CO2 emissions, (vi) natural resources, and (vii) trade openness.

To investigate the effect of world economic policy uncertainty on FDI, this paper estimates the following dynamic panel model:

$$FDI_{it} = \alpha + \beta FDI_{it-1} + \lambda WUI_{it} + \gamma X_{it} + \mu_i + \nu_t + \varepsilon_{it} \qquad (1)$$

Where FDI_{it} is the foreing direct investment net inflows as a percentage of GDP for country i in period t, WUI is the world economic policy uncertainty index, X is the vector of control variables, μ_i is an unobserved country-specific effect, ν_t is time specific effect and ε_{it} is the error term. We estimate Equation (1) by using a system Generalised Method of Moments proposed by Arellano and Bover (1995) and Blundell and Bond (1998). GMM is useful for several reasons. First, GMM estimator has been widely used to address the endogeneity problem that appears in panel data estimation (Arellano and Bover, 1995 and Blundell and Bond, 1998). Second, GMM estimator also consider the biases that appear due to country-specific effects. Third, GMM also avoids simultaneity or reverse causality problems. The GMM technique is declined in two versions: "difference GMM" and "system GMM". In the difference GMM estimator, the lagged levels of the endogenous variables are used as instruments (for exogenous variables, their first differences serve as their own instruments). The system GMM estimator employs simultaneously the equation in differences and the equation in levels by using lagged levels of the variables as instruments in the differenced equation and lagged differences of the variables as instruments in the level equation. Given sample –bias concerns associated with the difference GMM estimator, Bond et al. (2001) have recommended that the system GMM estimator can dramatically improve efficiency and avoid the weak instruments problem in the first-difference GMM estimator. The consistency of the GMM estimator depends on two things: the validity of the assumption that the error term does not exhibit serial correlation (AR (2)) and the validity of the instruments (Hansen test).

Table 1: Summary statistics and data description

Variable	Description and Sources	Obs	Mean	S.D
FDI	Foreign direct investment, net inflows (% of GDP) Source : WDI (2019)	3118	4.243	7.145
WUI	World economic uncertainty index Source: Ahir et al. (2018)	3174	0.165	0.145
GDP growth	GDP growth (annual %) Source: WDI (2019)	3145	4.036	5.378
Domestic investment	Gross fixed capital formation (% of GDP) Source: WDI (2019)	2968	22.432	6.850
Human capital	School enrollment, secondary (% gross) Source: WDI (2019)	2165	76.824	31.717
Financial development	Domestic credit to private sector (% of GDP) Source: WDI (2019)	2915	49.092	73.811
CO2 emissions	CO2 emissions (metric tons per capita) Source: WDI (2019)	2623	4.576	6.589
Natutal resource	Total natural resources rents (% of GDP) Source: WDI (2019)	3005	8.852	12.359
Trade openness	Sum of exports and imports of goods and services(%GDP) Source: WDI (2019)	3069	81.338	49.135

3. Empirical results

Table 2 and Table 3 report the estimations results of Equation (1) with the world economic uncertainty index (WUI) by Ahir et al. (2018) as a proxy of economic policy uncertainty. Table 2 presents our baseline estimates, while in Table 3 we present our results using a 3-years average data and countries differentiated according to IMF classification.

Column (1) in Table 2 provides a bivariate regression specification in which WUI is used as the only determinant of FDI, while columns (2-6) represent the robustness of the baseline model in which we include a subset of the contemporaneous controls that were found to be important for foreign direct investment.

Table 2: World Economic policy uncertainty and FDI: Baseline model

|	Dependent variable : Foreign direct investment					
	(1)	(2)	(3)	(4)	(5)	(6)
WUI	-3.929***	-3.375***	-0.574***	-1.041***	-1.292***	-0.588***
	(1.195)	(1.018)	(0.152)	(0.142)	(0.150)	(0.198)
GDP growth		0.0766***	0.0809***	0.126***	0.126***	0.114***
		(0.0120)	(0.00536)	(0.00724)	(0.00710)	(0.00718)
Domestic investment			0.103***	0.0957***	0.0976***	0.0880***
			(0.00660)	(0.00729)	(0.00715)	(0.00622)
Human capital				0.00777***	0.0121***	0.00274
				(0.000955)	(0.00140)	(0.00180)
Financial development				0.00589***	0.00773***	-0.000998
				(0.000837)	(0.000826)	(0.000805)
CO2 emissions					-0.0664***	-0.0103
					(0.0117)	(0.0147)
Natural resource						-0.0190***
						(0.00408)
Trade openness						0.0314***
						(0.00111)
Lag FDI	0.368***	0.360***	0.613***	0.608***	0.607***	0.542***
	(0.0131)	(0.00917)	(0.00230)	(0.00303)	(0.00311)	(0.00372)
Constant	2.840***	2.476***	-0.952***	-1.755***	-1.908***	-2.896***
	(0.265)	(0.245)	(0.120)	(0.130)	(0.131)	(0.166)
Observations	2,975	2,968	1,534	1,534	1,534	1,534
AR(1)	0.000	0.001	0.001	0.005	0.002	0.002
AR(2)	0.125	0.121	0.0341	0.259	0.975	0.969
Number of country	138	138	125	125	125	125
Instruments	30	45	60	74	83	99
Hansen OIR	0.0630	0.114	0.180	0.215	0.205	0.130
Fisher	433.4***	623.2***	22306***	15155***	11474***	11876***

Note: The values in the parentheses are the standard error. ***, $p<0.01$, ** $p<0.05$, * $p<0.1$.

Consistent with Figure 2, column (1) shows a negative effect of the world economic uncertainty on FDI. The coefficient associated with the world economic uncertainty is 3.929, suggesting that a 1 unit increase in economic uncertainty leads to a decrease in FDI by 3.929 units. This result goes against the conclusions of Canh et al. (2019) who show that world economic uncertainty increases FDI. Our results are consistent with the general belief that investors are more sensitive to global uncertainty than to local uncertainty which can easily be managed if we refer to the anchor and adjustment bias (Tversky and Kahneman, 1974). The results presented in Columns (2-6) confirm the previous findings. The coefficients associated with world economic uncertainty

remained negative and statistically significant at the 1% level, suggesting that world economic uncertainty is a major determinant of foreign direct investment and that an increase in WUI is associated with a decrease in the share of foreign direct investment receive by a country.

The results of the diagnostic tests show that all model are well specified. The Hansen test does not reject the validity of instruments, and the absence of second order serial correlation is also not rejected. Too many instruments can severely weaken and bias the Hansen over-identifying restrictions test and therefore, the rule of thumb is that the number of instruments should be less than the number of countries (Roodman, 2009). The System GMM presented in Table 2 generated a maximum of 99 instruments which is less than the number of countries, hence regression results are free from instruments proliferation.

Figure 2: World Economic policy uncertainty and FDI
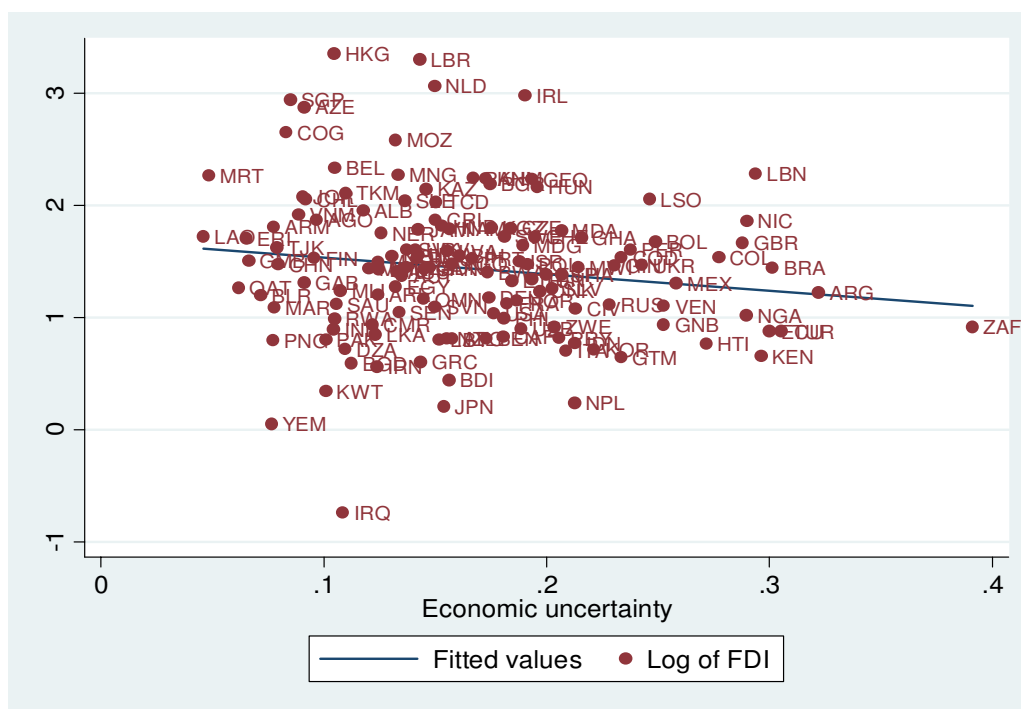
In Table 3, we use data over three - years average instead of annual data as a robustness check. We divide the sample period 1996-2018 into 8 non overlapping 3 years period to avoid the influence of idiosyncratic economic dynamics at business cycle frequency, as well as to control for cyclical output movements (1996- 1998; 1999-2001; 2002-2004; 2005-2007; 2008-2010; 2011-2013; 2014-2016; 2017-2018). In column (1) of Table 3, we re-estimate our basic model for all 138 countries. The results show that the coefficient associated with the world economic uncertainty variable remains negative and statistically significant at the 1% level, confirming the results previously established in Table 2. In columns (2-3), the sample is differentiated into advanced economies and emerging and developing countries, according to IMF classification. Overall, the results show that all coefficients associated with the world economic uncertainty are negative and significant, suggesting that WUI reduces FDI both in advanced and emerging and developing economies. However, the magnitude of the effect of world economic uncertainty is greater in emerging and developing countries than in advanced economies, suggesting that the effect of uncertainty shocks varies across the countries. This result is explained by the fact that developed countries have a capacity for rapid adjustment after an uncertainty shock compared to emerging and developing countries which are more sensitive to shocks. This result is consistent with Carrière-Swallow and Céspedes (2013) which demonstrate that uncertainty shocks generate a rapid drop and rebound in investment in developed countries, while emerging countries suffer a much more severe fall in investment and that this effect is more persistent.

When we look at regions (columns 4 to 6 in Table 3), the results show that overall, world economic uncertainty reduces FDI. However, the magnitude of this effect also varies by region. We note that the coefficient associated with the world economic uncertainty variable is greater in sub-Saharan Africa than in the Europe zone. This result confirms the results previously established that the effect of a shock of economic uncertainty is greater in developing countries than in developed countries. Figure 1 shows that two countries, namely Yemen and Iraq, are pulling the curve downwards. To check whether our results are not pulled by these two countries, we have removed them from the sample and the results of the estimates are presented in column (7). Overall, we find that the coefficient associated with EDI remains negative and statistically significant, although the coefficient is slightly lower than in column (1).

Table 3: World Economic policy uncertainty and FDI: different specifications

| | Three-years average data | | | | | | |
| | ALL countries | Advanced economies | Emerging and developing | SSA countries | European countries | Other countries | No Outliers |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
WUI	**-2.146***	**-1.216*****	**-3.224***	**-4.760*****	**-1.348*****	**-0.877*****	**-1.692*****
	(1.225)	**(0.422)**	**(1.674)**	**(1.530)**	**(0.391)**	**(0.321)**	**(0.614)**
GDP growth	0.082***	0.110***	0.684***	0.310***	0.341***	0.0631***	0.145***
	(0.013)	(0.0169)	(0.101)	(0.0556)	(0.0648)	(0.00972)	(0.0272)
Domestic investment	0.093***	0.191***	-0.198***	0.128***	-0.0799*	0.0467***	0.121***
	(0.013)	(0.0147)	(0.0332)	(0.0459)	(0.0447)	(0.00766)	(0.0155)
Human capital	0.001	0.0109**	0.0518***	0.00614	0.0362***	0.0111***	0.00140
	(0.004)	(0.00528)	(0.00728)	(0.0184)	(0.00871)	(0.00377)	(0.00501)
Financial development	-0.00112	-0.00461	0.0188***	0.130***	0.00233	-0.00220	0.00414
	(0.002)	(0.00368)	(0.00561)	(0.0412)	(0.00541)	(0.00189)	(0.00312)
CO2 emissions	-0.00352	-0.234***	0.155**	-2.075***	0.0173	-0.0123	-0.0240
	(0.024)	(0.0449)	(0.0627)	(0.609)	(0.0953)	(0.0289)	(0.0355)
Natural resources	-0.0257***	0.0576***	-0.237***	0.0110	0.0243	-0.00595	-0.0282**
	(0.007)	(0.0104)	(0.0475)	(0.0368)	(0.0526)	(0.00546)	(0.0120)
Trade openness	0.029***	0.0391***	0.0477***	0.0860***	0.0401***	0.0293***	0.0521***
	(0.002)	(0.00360)	(0.00324)	(0.0198)	(0.00925)	(0.00155)	(0.00343)
Lag of FDI	0.536***	0.134***	0.579***	0.108***	0.372***	0.597***	0.182***
	(0.008)	(0.00773)	(0.0201)	(0.0120)	(0.0392)	(0.0146)	(0.0100)
Constant	-2.339***	-4.459***	-7.588***	-6.760***	-0.528	-2.506***	-4.071***
	(0.322)	(0.396)	(1.472)	(1.322)	(1.444)	(0.444)	(0.411)
Observations	1,534	466	133	141	171	736	598
AR(1)	0.002	0.082	0.092	0.003	0.001	0.000	0.0558
AR(2)	0.950	0.590	0.439	0.853	0.392	0.626	0.326
Number of country	125	97	27	33	33	59	123
Instruments	72	81	27	27	27	45	49
Hansen OIR	0.114	0.266	0.324	0.455	0.326	0.396	0.299

Note: The values in the parentheses are the standard error. ***, p<0.01, ** p<0.05, * p<0.1.

4. Conclusion

In the last decades, several empirical and theoretical studies have discussed the effects of uncertainty on macroeconomic variables. Surprisingly, little is known on the cross-country effect of economic policy uncertainty on foreign direct investment. This paper contributes this new and emerging literature by investigating how world economic policy uncertainty index (WUI) affects foreign direct investment on a large panel of 138 developed and developing countries over the period 1996-2018. Using a new measure of economic policy uncertainty by Ahir et al. (2018) and the system generalised method of moments, we provide a strong evidences that WUI reduces foreign direct investment. When the sample is divided according to IMF classification, the magnitude of the effect is more important in emerging and developing countries than in advanced countries. Additionally, the effect of WUI is more important in SSA region than other regions.

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