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Published version

LAGOS, Konstantinos and WANG, Yuan (2022). The threshold effects of global economic uncertainty on foreign direct investment. Transnational Corporations, 29 (1), 75-105.

The threshold effects of global economic uncertainty on foreign direct investment*

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Abstract

This paper investigates the role of global economic uncertainty in Dunning's investment development path (IDP) framework. By applying the dynamic panel threshold model to data from 76 developed and developing countries, we find that countries' net outward investment (NOI) follows a non-linear pattern even after incorporating global economic uncertainty into the analysis. At the same time, global economic uncertainty has non-linear effects on NOI subject to the level of economic development. More importantly, our results show that NOI is path dependent, with correlation coefficients changing across the different stages of IDP, which implies that uncertainty affects countries' progression to the next stage of IDP differently. From a policy perspective, our findings call for special attention to policymakers in less developed nations. Even though global economic uncertainty may not always have a negative effect or may even improve a country's NOI for a while, it may deter the international expansion of local firms. In the presence of high global economic uncertainty, local firms are less likely to become outward foreign direct investors, which implies stagnation in internationalization.

Keywords: investment development path, foreign direct investment, internationalization, developed and developing countries.

JEL classification codes: D80, F21, F23, O50

* Received: 19 November 2021 – Revised: 1 April 2022 – Accepted: 4 April 2022

We would like to thank the editor and three anonymous referees for numerous valuable suggestions and constructive comments that helped to substantially improve the paper. All remaining errors are ours.

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1. Introduction

For decades, international business researchers have devoted a substantial amount of effort to studying the impact of various factors, such as income level, institutional quality, market size and differences in factor endowments, on foreign direct investment (FDI) (e.g. Gao et al. 2013; Papaioannou, 2009; Stoian, 2013; Stoian and Mohr, 2016; Wu and Chen, 2014), while others have focused on the interactions between inward and outward FDI (e.g. Broner et al., 2013; Dunning and Narula, 1996; Li et al., 2016). Among the many factors affecting inward FDI (IFDI) and outward FDI (OFDI), the level of economic development is an important one in determining the volume and direction of international investment. Dunning (1981) formalized this link through the investment development path (IDP) framework, which addresses the dynamic relationship between a country's economic development and its IFDI and OFDI, and suggests that the former has a non-linear impact on the latter. A large number of studies have applied the IDP framework in various contexts (e.g. Barry et al.,2003; Bellak, 2001; Buckley and Castro, 1998; Dunning, 1986; Duran and Ubeda, 2001 and 2005; Ramirez-Aleson and Fleta-Asin, 2016; Stoian, 2013). However, the existing empirical studies are largely descriptive and based on non-linear parametric models that include alternative sets of polynomials (e.g. Bellak, 2001; Buckley and Castro, 1998; Gorynia et al., 2019), which are also challenged by numerous technical imperfections such as multicollinearity, spurious correlation, endogeneity and unobserved heterogeneity (e.g. Duran and Ubeda, 2001 and 2005; Ragoussis, 2011; Stoian and Mohr, 2016). Furthermore, many studies extended the original IDP framework in several ways by incorporating the trade factor (e.g. Dunning et al., 2001), spatial determinants (e.g. Ragoussis, 2011), human mobility (e.g. Gao et al., 2013) and institutional theory (e.g. Gorynia et al., 2019; Stoian, 2013; Stoian and Mohr, 2016).

Aside from economic development, another important factor affecting international investment is economic uncertainty (e.g. Baker, Bloom and Davis, 2016; Bloom, 2009 and 2014, Julio and Yook, 2016; Novy and Taylor, 2020). On one hand, uncertainties discourage investment and consumption (e.g. Bloom, 2009), harm international trade (e.g. Novy and Taylor, 2020) and slow down the recovery of cross-border investment (Julio and Yook, 2016), while having less detrimental impacts on developed countries than on their developing counterparts (e.g. Bloom, 2014; Carriere-Swallow and Cespedes, 2013). On the other hand, uncertainties stimulate innovation and increase investment addressed to coping with a more uncertain future, and promote long-run growth (e.g. Kraft, Schwartz and Weiss, 2018). In addition, uncertainties cause firms to postpone their investment plans (e.g. Carriere-Swallow and Cespedes, 2013; Pindyck, 1998), and create a potential temporary investment boom when uncertain conditions subside (e.g. Julio and Yook, 2016; Stokey, 2016).

Despite the growing literature on the effects of uncertainty on international investment, little attention has been given to the relationship between global economic uncertainty and a country's progression on the IDP. In this paper, we aim to fill this gap by investigating to what extent economic uncertainty can alter the IDP process. It could be argued that depending on a country's level of economic development, global economic uncertainty may affect IFDI and OFDI differently. For instance, it may be the case that developing nations may not be able to progress to the next stage of IDP in the presence of high uncertainty if the latter reduces the IFDI received from the developed nations. Therefore, the developing economies are unable to benefit from positive IFDI spillovers. On the other hand, some developing countries may still be able to progress to the next stage of the IDP, even if high global economic uncertainty reduces IFDI. This could be due to the high absorptive capacities and transaction linkages of their firms or domestic companies' specific advantages that can allow for OFDI generation despite the reduced IFDI. Similar scenarios may also apply to the newly developed (or even the fully developed) countries, as they may also suffer to some extent from investment deterioration in the presence of global economic uncertainty.

Given all of these considerations, this paper intends to build on and extend the existing IDP studies. First, we aim to improve the empirical estimation by correcting some empirical imperfections in the existing studies, to deliver more accurate estimates and therefore more effective policy implications. In particular, we aim to explicitly estimate the turning point of the IDP, accommodating the existing studies which assumed that the different turning points are predetermined. We adopt the dynamic panel threshold method proposed by Seo and Shin (2016), which enables both the threshold variable and the regressors to be endogenous since economic development as the threshold variable is endogenous (e.g. Buckley and Castro, 1998; Narula and Dunning, 2010; Stoian and Mohr, 2016). Furthermore, the Seo and Shin (2016) method allows for non-linear asymmetric dynamics and therefore we can test whether a country's net outward investment (NOI) is history dependent subject to the different stages of the IDP. To the best of our knowledge, no existing IDP study has attempted to look at the pace or direction of transition of countries between the different stages of the IDP or to examine the possibility of countries stagnating in a specific stage without progressing. Hence, we aim to fill this gap.

Second, we are keen to investigate whether global economic uncertainty plays a significant role in affecting countries' NOI positions and the persistence of NOI conditional on the different stages of the IDP. Intuitively, high global uncertainty may discourage OFDI as multinational enterprises (MNEs) have low incentives to substitute domestic investment with international investment. At the same time, uncertainty could also attract foreign MNEs in source destinations, as uncertainties can create investment opportunities, which may in turn trigger IFDI.

It may be true that uncertainty has a significant impact on both IFDI and OFDI; however, it is unclear what its influence is on a country's NOI and more importantly what its influence is on a country's progression on the IDP, which is another gap that we aim to fill.

Finally, our findings could shed some light on understanding FDI activities and patterns in the presence of global economic uncertainty, which could provide essential assistance to policymakers in developing and emerging economies when designing new internationalization strategies to attract FDI and utilize its benefits. In particular, given the increased global economic uncertainties caused by the COVID-19 pandemic, we call for attention by policymakers in developing nations to better prepare for permanently changed FDI patterns in the post-COVID recovery period. For example, we may see less North-South cooperation than before and regional collaborations may become the new norm.

The remainder of the paper is organized as follows. Section 2 provides a brief review of the IDP studies and the nexus of uncertainty and international investment. Section 3 introduces the data. Section 4 explains the dynamic panel threshold method and the estimation procedure. Section 5 reports the estimation results and robustness checks. Section 6 provides a few concluding remarks.

2. Theoretical background

2.1 The investment development path

The IDP evaluates the link between economic development and international investment at the macro level in a dynamic context and claims that a country's investment development tends to go through five main stages (Dunning, 1981 and 1986; Dunning and Narula, 1996; Dunning et al., 2001). In stage 1, a country's income is low and its location factors are not sufficient to attract more than a bare minimum of IFDI. On many occasions, the location factors may even create barriers to entry by foreign companies. Both IFDI and OFDI activity is negligible and foreign firms tend to engage in export-import or non-equity arrangements with local firms.

IFDI starts to rise in stage 2, focusing mainly on resource-seeking activities, while in some countries economic development improves location factors such as economic stability, infrastructure and institutional quality. This in turn makes the country progressively more attractive to foreign firms, leading to a further increase in IFDI, with many firms focusing on the intra-firm transfer of intangible assets. Simultaneously, provided that local firms can benefit from absorbing the transferred knowledge brought by the increased IFDI, the transformation of local firms is initiated through the upgrading of their ownership advantages and OFDI surfaces.

In stage 3, the country's location advantages continue to improve and market efficiency and strategic asset–seeking IFDI take place. Scott-Kennel and Enderwick (2005) argue that during this stage linkages between the foreign affiliates and domestic firms are enhanced, improving the absorptive capacity of the latter and leading eventually to faster upgrading of the domestic firms' ownership advantages. Through this process, local firms' ownership advantages become more firm-specific rather than country-specific, making them easier to deploy when expanding abroad and enhancing OFDI.

In stage 4, the country becomes a net outward investor and the NOI position turns positive, implying that OFDI overtakes IFDI. Both IFDI and OFDI keep increasing, with the former being increasingly strategic asset–seeking, while the latter focuses mainly on market- and asset-seeking objectives. Nevertheless, they both still play a pivotal role in the continued upgrading of local firms' ownership advantages. Stage 4 is completed when economic development reaches the point where NOI peaks and the country transforms from a newly developed economy to a fully developed nation (e.g. Dunning and Narula, 1996; Duran and Ubeda, 2005). Finally, IFDI and OFDI remain permanently high in stage 5, while firms experience a convergence and complementarity of their ownership advantages and are likely to achieve high-intensity competition and transaction linkages, particularly through inter-firm collaboration (Scott-Kennel and Enderwick, 2005).

To summarize, the IDP describes a dynamic concept that relates a country's IFDI, OFDI and the resulting NOI to its level of economic development. The framework assumes that economic development induces economic structural change, and such change has a systematic relationship with the pattern of international investment (Lall, 1996). Although the path should be observed in all countries during their economic development, the speed of progression may not be identical for every country, revealing an idiosyncratic nature of the framework. Narula and Dunning (2010) argue that an increase in MNEs' activities may or may not create a proportionate increase in economic development and lead countries to move quicker through the IDP stages. Narula and Guimon (2010) further argue that the progression on the IDP is a learning process to develop domestic capabilities benefiting from knowledge spillovers and therefore attract higher value added IFDI. The IDP predictions largely rely on the underlying mechanisms for transmitting resources and capabilities, by which IFDI may lead to the gradual economic development and upgrading of local firms' capabilities through spillovers and externalities, eventually prompting indigenous companies to engage in OFDI (e.g. Markusen and Venables, 1999; Rodriguez-Clare, 1996; Scott-Kennel and Enderwick, 2005). The contribution of IFDI to the transformation of local firms into net outward investors, and to the progression of countries through the IDP stages, is positively related to the existence of local linkages created by the presence of MNEs in the host country and the formation of inter-firm networks.

This impact of inter-firm linkages on IFDI has been stressed by Scott-Kennel and Enderwick (2005), who also suggest that the intensity of inter-firm linkages may change subject to the stage of the IDP. Others highlight the importance of a host country's absorptive capacity for providing significant externalities and spillovers (e.g. Criscuolo and Narula, 2008; Li et al., 2016), provided that these positive externalities can be absorbed by local firms. Finally, as discussed previously, since the types of IFDI attracted by host countries may not be the same at different stages of the IDP, IFDI motives are vital in determining the extent of linkages and externalities.

Many empirical studies have found evidence to support the IDP's predictions (e.g. Dunning and Narula, 1996; Narula, 1996; Ramirez-Aleson and Fleta-Asin, 2016), while others highlighted the framework's idiosyncratic nature (e.g. Boudier-Bensebaa, 2008; Duran and Ubeda, 2001 and 2005). Furthermore, some studies extended the original IDP by incorporating further factors in the analysis. For instance, by applying the IDP in studying the level and structure of United States–Japanese FDI, Dunning and Narula (1994) stress the need for the inclusion of macro-level organizational policy variables in the analysis and the importance of the acquisition of ownership advantages. Buckley and Castro (1998) believe that government policies and local indigenous resources also need to be incorporated into the analysis. Bellak (2001) argues that a country's IDP may not reflect its general level of economic development, and that the investment position may also vary depending upon which industry is under investigation. Dunning et al. (2001) introduce the trade factor within the IDP context and find that the growth of both trade and FDI correlates positively with a country's GNP growth, especially in asset-intensive industries. Ragoussis (2011) emphasizes the importance of spatial determinants of IDP and argues that a country's transition to the next stage of IDP is significantly affected by the IDP stages of neighbouring countries. Gao et al. (2013) incorporate the human mobility aspect into the original IDP framework and find that in China OFDI tends to increase in parallel with economic development and human mobility. Stoian (2013) states that the inclusion of institutional variables, such as competition policy and overall institutional reforms, plays a crucial role in explaining outward FDI and enhancing the explanatory power of the IDP. Stoian and Mohr (2016) further emphasize the importance of firms' specific ownership advantages for overcoming particular home-country regulatory voids. Georgopoulos et al. (2018) incorporate the concept of divestment risk within the IDP framework and find that the failure of Greece to upgrade traditional industries to high-tech ones was a considerable source of divestment, hindering the country's progress to higher stages of the IDP. More recently, Gorynia et al. (2019) have confirmed the quadratic relationship between NOI and economic development in a group of Eastern European countries, but they argue that institutional reforms may not uniformly accelerate progress on the IDP.

2.2 Economic uncertainty and international investment

Since the 1990s, cross-border capital flows have skyrocketed because of economic integration and financial globalization, while emerging economies have not only become increasingly crucial as host countries but have also started playing an important role as source countries (e.g. Conconi et al., 2016; Wu and Chen, 2014). However, the pattern of international investment has changed substantially. Avom et al. (2020) indicate that global IFDI growth has been slowing over the past three decades, from 21 per cent in the 1990s to 1 per cent after the 2008/09 financial crisis. Jardet et al. (2022) show that IFDI peaked in 2015–2016 at 2.7 per cent of world gross domestic product (GDP), and then contracted sharply in 2020 to 1.2 per cent. One explanation for this IFDI slowdown may be the historically high economic uncertainty of the past decade (e.g. Ahir et al., 2019; Baker et al., 2016). Bloom (2014) describes overall uncertainty as a concept, including economic uncertainty at both the macro and micro levels and non-economic uncertainty focusing on exogenous shocks, such as civil wars, climate change and pandemics.

At the macro level, economic uncertainty rises dramatically during recessions but falls during expansions. Broner et al. (2013) conclude that gross capital flows are very large and volatile over the business cycle and during financial crises, which is procyclical. Throughout the expansion periods both IFDI and OFDI boom, while during the economic downturns both IFDI and OFDI shrink. Furthermore, crises may affect domestic and foreign firms asymmetrically. According to the real business cycle theory (e.g. Aizenman and Marion, 2004), a negative productivity shock in the home country will cause IFDI to fall and OFDI to rise. This is because domestic MNEs shift their capital abroad while foreign MNEs reallocate their investment towards other markets to minimize potential losses. Zhu et al. (2019) find that higher domestic economic uncertainty reduces IFDI in both developed and emerging economies, whereas Hsieh et al. (2019) show that in the United States higher domestic economic uncertainty tends to trigger more OFDI. In contrast, Canh et al. (2019) indicate that although domestic economic uncertainty negatively affects IFDI, an increase in global economic uncertainty could still attract more IFDI. In addition, Jardet et al. (2022) show that global uncertainty affects IFDI more than domestic uncertainty in a host country, with high global uncertainty having a large negative effect on IFDI and the effect of low uncertainty on IFDI being much smaller. Furthermore, they find that MNEs favour developed economies when global uncertainty remains high for longer periods, highlighting a different impact of uncertainty in the developed versus the developing economies. The country's level of economic development seems to also play a role here. Avom et al. (2020) show that global economic uncertainty reduces IFDI more in emerging and developing economies. Developing nations are mostly IFDI receivers and typically engage in less OFDI, implying that high global economic uncertainty hurts developing nations more, since IFDI cannot offset OFDI in their case. Furthermore, Aizenman and

Marion (2004) argue that less developed economies are characterized by higher uncertainty, owing to their relative factor endowments and economic features that differentiate them from more mature economies. Finally, Carriere-Swallow and Cespedes (2013) show that domestic uncertainty has a greater impact on developing economies than on developed ones.

At the micro level, the real options theory suggests that MNEs may prefer to postpone their investment strategies if market conditions are uncertain (e.g. Carriere-Swallow and Cespedes, 2013; Jahn and Stricker, 2021; Zhu et al., 2019). Pindyck (1998) states that since FDI is mainly irreversible, uncertainty shocks increase a firm's incentives to delay investment until the uncertainty is reduced or eradicated. In addition, MNEs are also likely to adopt a more cautious stance and become reluctant to invest internationally when facing global uncertainty (Stokey, 2016). Conconi et al. (2016) argue that foreign market uncertainty leads firms to prolong their engagement with exporting rather than proceed with OFDI, to mitigate their risks. Hsieh et al. (2019) argue that another strategy adopted by MNEs to limit the impact of uncertainty is to relocate the production to more favourable locations through their internal subsidiaries network. Similarly, Nguyen et al. (2018) claim that since MNEs tend to compare uncertainties across all possible locations and choose the less risky option, higher domestic economic uncertainty may encourage OFDI and reduce IFDI, and vice versa. By contrast, Choi et al. (2021) find that MNEs are less likely to substitute domestic investment with international investment when facing high domestic uncertainty, implying a significant negative impact of the latter on IFDI. Their results implicitly suggest, to some extent, that OFDI does not increase when domestic uncertainty is high.

It is clear from this discussion that uncertainty affects the pattern and volume of IFDI and OFDI, through its impact not only on countries' location advantages but also on MNEs' strategies by altering their ability to fully deploy their ownership advantages abroad. This in turn could potentially affect cross-border transfers of knowledge and intangible assets and the creation of inter- and intra-firm linkages, which can affect the ability of local firms to upgrade their ownership advantages and eventually become outward investors themselves. In other words, it can be argued that uncertainty could ultimately affect countries' NOI positions and progression on the IDP, since the framework's assumptions and predictions are based on the configuration and interaction of the ownership and location advantages affected by uncertainty. In particular, economic uncertainty may deter some developing countries from progressing to the next stage of the IDP, as it may reduce their ability to receive IFDI. Nevertheless, OFDI may still emerge and grow for some developing nations, but not for all. Finally, some developing economies may even suffer a deterioration of their position in the IDP if domestic economic uncertainty is high, which is a situation that may also apply to some newly industrialized or developed nations.

3. Data

We construct a balanced panel data set containing data on 76 countries from 1997 to 2018, covering 36 developed and 40 developing economies.[1] The classification is in line with Ramirez-Aleson and Fleta-Asin (2016), who argue that developed economies have already reached stage 4 (or even stage 5) of the IDP, whereas developing economies are spread over stages 1–3.[2] The list of the sample countries appears in table 1.

Table 1. List of sample countries

Developed economies (36)	Australia, Austria, Canada, Chile, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, the Netherlands, New Zealand, Norway, Poland, Portugal, the Republic of Korea, Romania, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom and the United States
Developing economies (40)	Algeria, Argentina, Bangladesh, Belarus, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Cameroon, China, Colombia, Costa Rica, Egypt, Eswatini, Guatemala, India, Jamaica, Jordan, Kenya, Lebanon, Malaysia, Mali, Mauritius, Mexico, the Republic of Moldova, Morocco, Namibia, Nigeria, Pakistan, the Philippines, the Russian Federation, Seychelles, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Ukraine and Uruguay

Source: Authors' classifications, based on Ramirez-Aleson and Fleta-Asin (2016).

Note: Developing economies here include Belarus, the Republic of Moldova, the Russian Federation and Ukraine, which the United Nations classified as "transition economies" in 2018. According to the recent composition of economies by development status available from UNCTADStat (https://unctadstat.unctad.org/en/Classifications/DimCountries_DevStatus_Hierarchy.pdf), as of June 2021, these four economies are classified as developed economies. The United Nations eliminated the "transition economies" category and reclassified such economies mostly as developed economies in 2021.

The dependent variable in this study is a country's NOI position, defined as the natural logarithm difference between OFDI and IFDI stocks.[3] The key explanatory variable is economic development, measured by the natural logarithm of real

[1] The list of developing economies is based on our classification, not the United Nations classification of economies by development status. The 40 developing economies in this study include some "transition economies" that the United Nations reclassified as developed economies in December 2021. For more information on the UNCTAD classifications of economies, see https://unctadstat.unctad.org/EN/Classifications.html.

[2] As this study covers a long time period, it is possible that some countries had real per capita GDP below $17,000 in the past, which is used in Ramirez-Aleson and Fleta-Asin (2016) as the turning point to stage 5 on the IDP. We have confirmed that less than 5 per cent of observations in the developed-economy group fall below this turning point. Also, as we use the panel threshold model in this paper, these observations would not affect the estimated threshold and the corresponding regime-dependent estimates.

[3] We first attempted to use the level of OFDI and IFDI to compute the NOI position, but it was not stationary; therefore, we take the logs, which is a monotonic transformation not influencing the intrinsic nature of variables. A similar technique was used in Ragoussis (2011). Three observations were missing: OFDI of Senegal in 2001, and both OFDI and IFDI of Brazil in 2000. We interpolated the missing values by using the available FDI stock in the previous year and the FDI flows in the present year.

per capita GDP (adjusted for purchasing power parity (PPP)). Global economic uncertainty is measured by two indicators: the Economic Policy Uncertainty (EPU) Index and the World Uncertainty Index (WUI).[4] Both are superior to other singular indicators such as stock market volatility or political and geopolitical risks, as they capture uncertainties at the aggregate level. The EPU Index, developed by Baker et al. (2016), is the most popular such index used in the literature (e.g. Choi et al., 2021; Hsieh et al., 2019; Nguyen et al., 2018; Zhu et al., 2019). It is computed using 12,000 newspaper articles covering 21 leading and large emerging economies and is used as the main indicator of economic uncertainty in this paper. The WUI, developed by Ahir et al. (2019) using the quarterly Economist Intelligence Unit country report, is a more comprehensive measure of global political and economic uncertainty, covering 143 developed and developing countries. The WUI has become popular recently in FDI studies (e.g. Avom et al., 2020; Canh et al., 2020; Jahn and Stricker, 2021), and is used as a second indicator for robustness checks.

Some other control variables are also included in the analysis, following the existing literature (e.g. Papaioannou, 2009; Stoian, 2013). These include the lagged dependent variable to capture panel dynamics, population and degree of trade openness, to control for the size of the economy and economic integration, and the business freedom index, to control for domestic institutions representing the general business and investment environment. Table 2 summarizes the descriptive statistics, while variable definitions and data sources appear in table 3.

Table 2. Descriptive statistics

A. Summary

Variable	Mean	Median	Std.	Min	Max	Obs.
NOI	-1.525	-1.453	1.529	-6.098	7.097	1 672
lnGDPpc	9.718	9.830	0.9380	7.097	11.49	1 672
lnEPU	4.672	4.662	0.3411	4.154	5.304	1 672
lnWUI	4.738	4.828	0.3494	4.114	5.351	1 672
Openness	-1.844	-1.360	9.700	-52.78	33.14	1 672
lnPOP	16.54	16.38	1.730	11.26	21.06	1 672
lnFreedom	4.243	4.248	0.1978	3.564	4.605	1 672
NaturalRes	3.040	1.169	4.739	-	35.27	1 596

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[4] The EPU index and the WUI are measured using different scales, which are not comparable directly; however, a larger value of the index indicates a higher uncertainty.

Table 2. Descriptive statistics (Concluded)

B. Correlation matrix

Variable	NOI	lnGDPpc	lnEPU	lnWUI	Openness	lnPOP	lnFreedom	NaturalRes
NOI	1							
lnGDPpc	0.6082	1						
lnEPU	0.1079	0.1083	1					
lnWUI	0.0879	0.1052	0.7847	1				
Openness	0.4603	0.4081	0.0061	0.0290	1			
lnPOP	0.0769	-0.2195	0.0272	0.0259	0.1658	1		
lnFreedom	0.2684	0.5043	0.0429	0.0260	0.0916	-0.2572	1	
NaturalRes	-0.1023	-0.3458	0.0016	0.0114	0.2115	0.2373	-0.2023	1

C. Polynomials of log real per capita GDP

Variable	lnGDPpc	$lnGDPpc^2$	$lnGDPpc^3$	$lnGDPpc^4$	$lnGDPpc^5$
lnGDPpc	1				
$lnGDPpc^2$	0.9997	1			
$lnGDPpc^3$	0.9987	0.9997	1		
$lnGDPpc^4$	0.9972	0.9988	0.9997	1	
$lnGDPpc^5$	0.9951	0.9972	0.9988	0.9997	1

Source: Authors' calculations, based on raw data from various data sources reported in table 3.

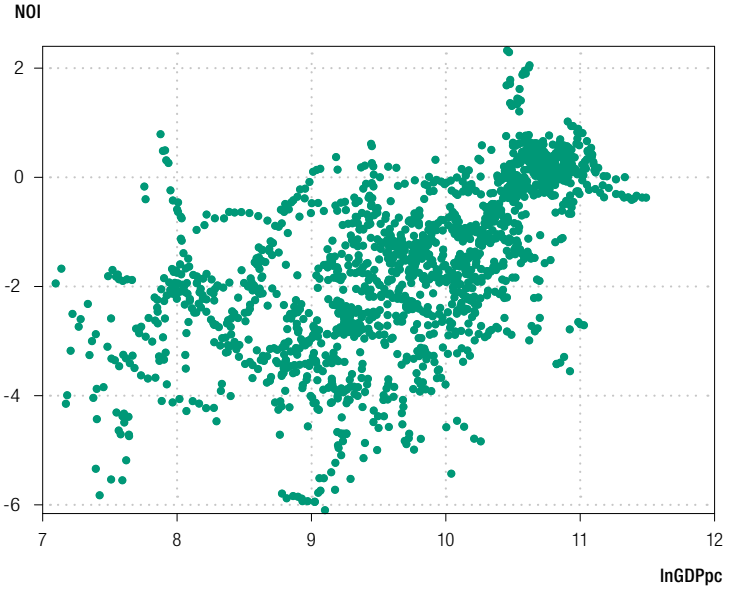
Table 3. Variable definitions and data sources

Variable	Definition	Source
NOI	ln(outward FDI stock, $ millions) – ln(inward FDI stock, $ millions)	United Nations Conference on Trade and Development (UNCTAD) database
lnGDPpc	ln(GDP per capita, constant 2011 international $, PPP adjusted)	World Bank, World Development Indicators
lnEPU	ln(Economic Policy Uncertainty)	Baker, Bloom and Davis (2016)
lnWUI	ln(World Uncertainty Index)	Ahir, Bloom and Furceri (2019)
Openness	(Exports – Imports)/GDP	World Bank, World Development Indicators
lnPOP	ln(population)	World Bank, World Development Indicators
lnFreedom	ln(Index of Business Freedom)	The Heritage Foundation
NaturalRes	Total natural resources/GDP	World Bank, World Development Indicators

Source: Authors' compilations.

Before proceeding with the analysis, we first conduct a visual examination. Figure 1 shows a scatter plot of economic development against the NOI. The dashed vertical line represents the log($17,000) value used as the stage 5 turning point in Ramirez-Aleson and Fleta-Asin (2016). There is clear evidence that economic development and NOI follow a non-linear relationship. The graph also exhibits evidence of heteroscedasticity which needs to be accounted for in econometric modelling. It seems that although NOI exhibits higher variation conditional on lower economic development, it shows lower variation on moderate economic development. However, the variation rises again when economic development passes a higher threshold (about 10.4).

Figure 1. Net outward investment versus economic development



Source: Authors' calculations, based on raw data from various data sources reported in table 3.

We then test for panel stationarity by applying several panel unit root tests including the Levin et al. (2002), Fisher type (Maddala and Wu, 1999) and Im et al. (2003) tests, as non-stationarity can induce spurious correlation. All tests provide consistent evidence of no existence of panel unit roots.[5]

[5] To save space, we do not report panel unit root test results, but they are available upon request.

4. Econometric modelling

The existing empirical studies of IDP adopt non-linear parametric models with alternative sets of polynomials (e.g. Bellak, 2001; Buckley and Castro, 1998; Gorynia et al., 2019). A general concern in modelling non-linear relationships using higher-order polynomials is the identification issue arising from multicollinearity, which is severe in our case (see table 2, panel C). Therefore, we estimate the fixed-effect panel threshold model, which allows for asymmetric effects of regressors on a dependent variable conditional to the threshold variable being above or below the unknown threshold. There is no need to impose a specific functional form to capture non-linearity. In addition, the threshold variable can be included as a regime-dependent regressor.

Threshold models have been widely used in the literature to deal with non-linearity. Hansen (2000) developed a threshold method with an endogenously determined threshold parameter instead of the predetermined exogenous ones used previously; however, all regressors had to be exogenous. Caner and Hansen (2004), in contrast, allow for endogenous regressors in the threshold regression to overcome the previous empirical limitation, whereas Seo and Shin (2016) further allow both threshold variable and regressors to be endogenous. In the IDP, since economic development is endogenous as the key explanatory variable to NOI while also being the threshold variable, we use the Seo and Shin (2016) method to correct for endogeneity by computing the estimates using the first-differenced generalized method of moments (GMM) estimator. Furthermore, the Seo and Shin (2016) method also enables us to capture non-linear asymmetric dynamics, which is superior to the popular linear dynamic panel models computed using the GMM estimator (e.g. Ahn and Schmidt, 1995; Blundell and Bond, 1998). Arguably, a country's NOI is history dependent, whereas countries may follow different dynamic paths subject to their IDP stage. We suspect that the dynamic feature is stronger for countries at some stages, but it may be weaker at others. This aspect has been largely ignored in the empirical IDP literature. However, as large panel data sets have been used increasingly, this is an important issue. In more detail, the Seo and Shin (2016) method is described as follows.

Given a panel of N entities, $i = 1, \dots, N$ over T periods, $t = 1, \dots, T$, the panel threshold method in use is briefly described as follows:

$$NOI_{i,t} = \left(1, x'_{i,t}\right)\phi_1 I\left(q_{i,t} \le \gamma\right) + \left(1, x'_{i,t}\right)\phi_2 I\left(q_{i,t} > \gamma\right) + \epsilon_{i,t} \qquad (1)$$

where $x_{i,t}$ is a $k_1 \times 1$ vector of time-varying regressors, some of which are endogenous. All regressors in $x_{i,t}$ are allowed to be regime dependent. $I(\cdot)$ is an indicator function and $q_{i,t}$ is the threshold (or transition) variable,[6]

[6] Note that transition variable and threshold variable are used interchangeably in this paper for simplicity.

which can also be endogenous; γ is the threshold parameter; and ϕ_1 and ϕ_2 represent regime-dependent slope parameters. The error term $\epsilon_{i,t}$ is given as:

$$\epsilon_{i,t} = \eta_i + \nu_{i,t} \tag{2}$$

where η_i represents an unobserved entity fixed effect and $\nu_{i,t}$ is an idiosyncratic random disturbance, following a martingale difference sequence with mean zero.

Estimating (1) directly produces biased and inconsistent estimates due to endogeneity. So, we transform (1) by taking the first difference:

$$\Delta NOI_{i,t} = \beta' \Delta x_{i,t} + \delta' X'_{i,t} I_{i,t}(\gamma) + \Delta \epsilon_{i,t} \tag{3}$$

where $\underset{k_1 \times 1}{\beta} = (\phi_{1,2}, \phi_{1,3} \ldots, \phi_{1,k_1+1})'$ and $\underset{(k_1+1)\times 1}{\delta} = \phi_2 - \phi_1$.

$\underset{2\times(1+k_1)}{X_{i,t}} = \begin{pmatrix} 1, x'_{i,t} \\ 1, x'_{i,t-1} \end{pmatrix}$ and $\underset{2\times 1}{I_{i,t}(\gamma)} = \begin{pmatrix} 1, & q_{i,t} > \gamma \\ -1, & q_{i,t-1} > \gamma \end{pmatrix}$.

Let $\theta = (\beta', \delta', \gamma)'$, estimated by using the GMM. The GMM estimator of θ is given by

$$\hat{\theta} = \arg \min_{\theta \in \Theta} \bar{g}_n(\theta)' W_n \bar{g}_n(\theta) \tag{4}$$

where $\bar{g}_n(\theta) = \frac{1}{n} \sum_{i=1}^{n} g_i(\theta)$ represents the sample moment conditions.

$\Omega = E[g_i(\theta) g_i(\theta)']$, is assumed to be positive definite and $W_n \xrightarrow{p} \Omega^{-1}$.

The threshold parameter γ is estimated through the grid search. In particular, we first arrange the data according to the threshold variable in ascending order and then trim the smallest and largest 5 per cent of observations. The remaining 90 per cent sample space bounded by threshold values is divided into 300 grids. The grid search is conducted in all grids simultaneously.

After the estimation, we test for linearity against threshold effects. We perform the following hypothesis test:

$$\begin{aligned} H_0&: \delta = 0, for\ any\ \gamma \\ H_1&: \delta \neq 0, for\ some\ \gamma \end{aligned} \tag{5}$$

The test statistic for the null hypothesis (H_0) is:

$$supW = \sup_{\gamma \in \Gamma} W_n(\gamma) \tag{6}$$

where $W_n(\gamma) = n \hat{\delta}(\gamma)' \hat{\Sigma}_\delta(\gamma) \hat{\delta}(\gamma)$ is the standard Wald statistic for each fixed γ; $\hat{\delta}(\gamma)$ is the first-differenced GMM estimate of δ, given γ; and $\hat{\Sigma}_\delta(\gamma)$ is the consistent

asymptotic variance estimator for $\hat{\delta}(\gamma)$. We use 300 bootstrap replications when performing the linearity test, as the asymptotic distribution is not valid as a result of the loss of identification under the H_0 of no threshold effect.

5. Estimation results and robustness checks

5.1 The benchmark model without uncertainty

We first estimate a benchmark model where $x_{i,t}$ includes lagged NOI ($L.NOI$), log real per capita GDP ($lnGDPpc$) and also log population ($lnPOP$), degree of openness ($Openness$) and log business freedom index ($lnFreedom$). $lnGDPpc$ is used as the threshold variable, which is endogenous. To correct endogeneity, we use the first-differenced GMM estimator. We run separate dynamic panel threshold models, including the same regressors for developing economies (panel A) and developed economies (panel B). The estimation results appear in table 4.

Table 4. The benchmark model without uncertainty

	Panel A. 40 developing economies			Panel B. 36 developed economies		
	Lower regime	Upper regime	Difference	Lower regime	Upper regime	Difference
L.NOI	0.8636*** [0.1185]	0.1365 [0.1356]	-0.7271*** [0.1270]	0.4140*** [0.0872]	0.5543*** [0.0562]	0.1403 [0.0975]
lnGDPpc	-3.537*** [1.258]	2.088*** [0.6702]	5.625*** [1.399]	3.014*** [0.6841]	0.2679 [0.3674]	-2.746*** [0.9439]
lnPOP	3.036*** [1.048]	2.984*** [0.8890]	-0.0513 [0.2346]	0.5502 [0.6691]	-1.009* [0.6044]	0.4589** [0.2037]
Openness	0.0126*** [0.0044]	0.0024 [0.0032]	-0.0101 [0.0069]	0.0730*** [0.0171]	-0.0408*** [0.0114]	-0.1138*** [0.0164]
lnFreedom	-0.9335 [0.7053]	0.7278 [0.6253]	1.661 [1.119]	2.062** [0.9647]	-1.340*** [0.2244]	-3.402*** [0.9439]
Threshold	9.053*** [0.2457]			10.17*** [0.0993]		
95% CI	[8.571, 9.535]			[9.972, 10.36]		
Regime (%)	44.43	55.57		20.45	79.55	
Linearity test	0.00			0.00		
Number of observations	880			792		

Source: Authors' estimations.

Notes: ***, ** and * denote 1 per cent, 5 per cent and 10 per cent level of significance, respectively. CI stands for the confidence interval. Robust standard errors are reported in parentheses. P-values are reported for the linearity test, which is computed using 300 bootstrap replications.

We observe clear evidence that economic development and NOI exhibit a non-linear relationship as expected. For the developing-economy group, the estimated threshold is 9.053 ($8,544 PPP adjusted) with the 95 per cent confidence interval between 8.571 and 9.535, suggesting that the effects of economic development on NOI are different across regimes. More specifically, $lnGDPpc$ has a statistically significant negative impact on NOI in the lower regime (least-developed developing economies), and a statistically significant positive impact on NOI in the upper regime (more-developed developing economies). These findings support the hypothesis that economic development causes a decrease in NOI for countries in stages 1–2 of the IDP, but an increase in NOI for those in stage 3 of the process. For the developed-economy group, the estimated threshold is 10.17 ($26,108 PPP adjusted) with the 95 per cent confidence interval between 9.97 and 10.36, suggesting that the effects of economic development on NOI are also different among the developed countries. In contrast to the results in panel A, $lnGDPpc$ has a statistically significant positive impact on NOI in the lower regime (newly developed economies), while it has an insignificant impact on NOI in the upper regime (fully developed economies). These findings suggest that economic development increases NOI for countries in stage 4 but becomes irrelevant when countries reach the final stage (stage 5). The difference of estimated marginal effects of $lnGDPpc$ on NOI is statistically significant in both groups. When cross-comparing the marginal effects of $lnGDPpc$ on NOI in panels A and B, we observe that the magnitude of positive marginal effect of $lnGDPpc$ is larger for the newly developed economies (lower regime of panel B) than for the more-developed developing economies (upper regime of panel A). This suggests that economic development plays a more substantial role for countries in stage 4 of the IDP than it does for those in stage 3. Arguably, NOI is negative in stage 3, whereas it switches to positive in stage 4. Faster economic growth is accompanied by faster MNE expansion in newly developed countries, triggering more OFDI rather than attracting IFDI. In contrast, for countries in stage 3, economic growth is the fastest. Both OFDI and IFDI start increasing substantially, even though OFDI is still likely to be smaller than IFDI.

More importantly, we find that NOI is path dependent among developed economies, whereas the results are mixed among developing economies. More specifically, for the developing-countries sample, the correlation coefficient between NOI and lagged NOI is very high among the least-developed developing countries, implying it is difficult for them to level up and progress to the next stage of the IDP. Yet, NOI is not history dependent among the more-developed developing countries. Overall, the least-developed developing countries exhibit the highest persistence of NOI position, followed by the most developed countries, while newly developed countries show the lowest NOI persistence. These results confirm the asymmetric dynamic nature of the IDP relationship and support the validity of the econometric method selected. One possible explanation for our

results in panel A is that the type of IFDI engagement matters, in the way that IFDI in the least developed economies largely concentrates on natural resources–related projects, which are less likely to generate positive spillover effects on other industries, hence less likely to promote OFDI. In addition, the least developed economies are at the initial IDP stages, implying low inter- and intra-firm linkages between domestic and foreign companies that would enhance creation of both OFDI and IFDI, making it hard for these countries to progress to the next IDP stage. Arguably, a natural resources curse may exist here to some extent; this will be investigated later. In contrast, developing countries in the upper regime have an unstable NOI position (not history dependent), implying that a country's IDP progression may happen by chance. For instance, a windfall caused by changes in domestic economic policies or international investment environment may push a country from stage 3 to stage 4, whereas a negative shock may also trigger a deterioration back to stage 2.

Regarding the other control variables, we find that country size plays a statistically significant positive role on NOI for the developing countries, with no significant difference across regimes. In contrast, the impact of country size on NOI is negative among fully developed economies. It may be that small, fully developed countries tend to engage in more OFDI relative to IFDI. Finally, the impact of country size is negligible for developed economies in the lower regime. Regarding the degree of openness, a positive impact on NOI for the lower regime in both samples was discovered, suggesting that net exports may complement NOI depending on the country's stage of economic development (e.g. Dunning et al. 2001). Nevertheless, in alignment with Helpman et al. (2004) who argue that exports and FDI may act as substitutes as they provide alternative ways for MNEs to capture foreign markets, we also observe that net exports and NOI substitute each other for the developed economies in the upper regime. Interestingly, our findings regarding the impact of institutional quality measured by business freedom are in alignment with the literature, which provides inconclusive results relating to the link between institutional factors and FDI attractiveness (e.g. Wu and Chen, 2014). Some studies find that institutional factors such as democracy and political stability are likely to promote FDI (e.g. Loree and Guisinger, 1995), whereas others find no significant impact on FDI (e.g. Globerman and Shapiro, 2003). In our case, business freedom does not seem to affect NOI in developing countries, while playing a vital role in improving NOI in the newly developed countries. Finally, business freedom has a small statistically significant negative effect on NOI for the fully developed countries, possibly implying that these economies attract more IFDI relative to producing OFDI as their domestic business environment becomes more appealing.

5.2 The extended model with uncertainty

Next, we estimate an extended model, where $x_{i,t}$ includes the same regressors as before plus global economic uncertainty. We use the EPU index ($lnEPU$) as the main indicator, following many others (e.g. Choi et al., 2021; Hsieh et al., 2019; Nguyen et al., 2018; Zhu et al., 2019). We still run separate dynamic panel threshold models, including the same regressors for the developing- and developed-economy groups using $lnGDPpc$ as the threshold variable. Our estimation results appear in table 5.

Table 5. The extended model with uncertainty (EPU)

	Panel A. 40 developing economies			Panel B. 36 developed economies		
	Lower regime	Upper regime	Difference	Lower regime	Upper regime	Difference
L.NOI	0.8584*** [0.1524]	0.1305 [0.1248]	-0.7279*** [0.1347]	0.6950*** [0.0933]	0.2909*** [0.0408]	-0.4041*** [0.0846]
lnGDPpc	-4.391*** [1.509]	2.686*** [0.9424]	7.076*** [1.634]	4.131*** [0.6410]	-0.0558 [0.4201]	-4.187*** [0.9930]
lnEPU	0.2614 [0.1756]	-0.1966* [0.1122]	-0.4580* [0.2578]	-0.3687** [0.1765]	0.1053*** [0.0391]	0.4740** [0.0219]
lnPOP	3.029*** [1.158]	2.891*** [1.344]	-0.1383 [0.3806]	0.5749 [0.9751]	0.0951 [0.8773]	-0.6700*** [0.1789]
Openness	0.0116* [0.0061]	0.0112*** [0.0059]	-0.0004 [0.0088]	0.0258 [0.0230]	0.0037 [0.0095]	-0.0221 [0.0299]
lnFreedom	-1.915** [0.7927]	0.5440 [0.6466]	2.459** [1.128]	-0.1761 [0.6462]	-0.2730* [0.1508]	-0.0968 [0.6078]
Threshold	9.050*** [0.2447]			10.15*** [0.1245]		
95% CI	[8.571, 9.530]			[9.902, 10.39]		
Regime (%)	44.20	55.80		19.07	80.93	
Linearity test	0.00			0.00		
Number of observations	880			792		

Source: Authors' estimations.

Notes: ***, ** and * denote 1 per cent, 5 per cent and 10 per cent level of significance, respectively. CI stands for the confidence interval. Robust standard errors are reported in parentheses. P-values are reported for the linearity test, which is computed using 300 bootstrap replications.

First, the EPU index appears to have a non-linear impact on NOI in both groups. For the developing countries, global economic uncertainty has a statistically significant negative effect on NOI for countries in the upper regime, implying that the NOI positions of those countries worsen in the presence of a highly uncertain

global economic environment. However, global economic uncertainty does not have a statistically significant impact on countries in the lower regime. Countries' NOI positions in the lower regime are largely explained by history, economic development, country size and degree of openness, as laid out in table 4. We also find that the domestic business environment tends to have a negative effect on NOI in the lower regime. When countries are in stages 1–2 of the IDP, IFDI starts increasing but OFDI is negligible. An unfriendly domestic business environment breeds corruption, which may not be a bad thing for foreign investors as MNEs and local officials may get involved in money-politics in exchange for mutual benefits (e.g. Jain et al., 2017). For developed countries, global economic uncertainty has a statistically significant negative impact on NOI in the lower regime, which implicitly implies that under uncertainty, OFDI declines more relative to IFDI. In the upper regime, global economic uncertainty has a statistically significant positive impact on NOI, indicating that OFDI may decline less relative to IFDI when facing a severe global economic environment. This finding aligns with those of Kraft et al. (2018), who claim that uncertainty can stimulate innovation and increase investment to cope with a more uncertain future.

After controlling for global economic uncertainty, we still find solid evidence that economic development shows a non-linear effect on NOI. In panel A, economic development has a statistically significant negative effect on NOI in the lower regime but a positive effect in the higher regime. In panel B, economic development positively affects NOI in the lower regime, while it becomes insignificant in the upper regime. The estimated thresholds do not change much compared with the ones in table 4.

One may argue that global economic uncertainty could affect real per capita GDP and therefore also affect NOI through its interaction with economic development. To account for this, we attempt to include in the regression an interaction term created using global economic uncertainty and economic development ($lnEPU \times lnGDPpc$).[7] The remaining specification is identical to the one in table 5.

The results in table 6 indicate that the interaction term is not statistically significant in the developing-country group. However, we observe a statistically significant positive effect of the interaction term in the lower regime of the developed countries, implying that economic development and global economic uncertainty jointly affect NOI in the newly developed countries. The positive sign suggests that when global economic uncertainty is high, improving economic development has a higher positive impact on NOI. By estimating the interactive models,

[7] Note that it is not feasible to include both the interaction term and global economic uncertainty in the same regression due to multicollinearity. We have checked that the correction between $lnGDPpc$ and the interaction term is not high.

we are still able to find results consistent with those presented in tables 4–5. Table 6 also provides some evidence to suggest that even though correlation coefficients may vary across stages, NOI is history dependent in any stage of the IDP, further supporting the validity of using the Seo and Shin (2016) method in capturing the asymmetric dynamic nature of the relationship. In particular, lagged NOI is now found statistically significant in the upper regime of developing countries. This result was not found in tables 4–5, and only emerged here after accounting for the interaction between economic development and uncertainty.

Table 6. The extended model with uncertainty (EPU): interaction effect

	Panel A. 40 developing economies			Panel B. 36 developed economies		
	Lower regime	Upper regime	Difference	Lower regime	Upper regime	Difference
L.NOI	0.7350*** [0.1771]	0.2581** [0.1082]	-0.4769** [0.1979]	0.8954*** [0.1191]	0.2009** [0.0813]	-0.6945*** [0.1073]
lnGDPpc	-3.702** [1.513]	3.438*** [1.051]	7.140*** [1.749]	2.860*** [0.7883]	-0.7787 [0.6340]	-3.638*** [1.236]
lnEPU x lnGDPpc	0.0090 [0.0193]	-0.0079 [0.0122]	-0.0170 [0.0302]	0.0587*** [0.0223]	-0.0010 [0.0047]	-0.0577*** [0.0219]
lnPOP	2.160 [1.475]	1.599 [1.364]	-0.5602 [0.3647]	-0.2034 [1.334]	1.698 [1.400]	1.902*** [0.2690]
Openness	0.0025 [0.0074]	0.0120** [0.0058]	0.0095 [0.0116]	0.0863*** [0.0334]	-0.0517*** [0.0168]	-0.1380*** [0.0296]
lnFreedom	-2.041* [1.086]	0.7623 [0.5571]	2.803** [1.398]	2.175 [1.813]	-0.6439 [0.4730]	-1.531 [1.901]
Threshold	9.047*** [0.3537]			10.07*** [0.1632]		
95% CI	[8.354, 9.741]			[9.750, 10.39]		
Regime (%)	43.98	56.02		14.39	85.61	
Linearity test	0.00			0.00		
Number of observations	880			792		

Source: Authors' estimations.

Notes: ***, ** and * denote 1 per cent, 5 per cent and 10 per cent level of significance, respectively. CI stands for the confidence interval. Robust standard errors are reported in parentheses. P-values are reported for the linearity test, which is computed using 300 bootstrap replications.

5.3 Robustness checks

We perform several robustness tests to check the sensitivity of our findings. As discussed previously, we are cautious about whether natural resource endowments affect the results. Since one of the major drivers of FDI is natural resource seeking (e.g. Dunning and Lundan, 2008; Duran and Ubeda, 2005), we introduce a new control variable to account for it, measured as the total natural resources share of GDP ($NaturalRes$). Given the availability of data, we construct balanced panels from 1998 to 2017 covering 76 countries. We report the estimation results of the extended model, including the new control variable, in table 7.[8] To ensure comparability with results in table 5, we still use the EPU.

Table 7. The extended model with uncertainty (EPU): robustness check

	Panel A. 40 developing economies			Panel B. 36 developed economies		
	Lower regime	Upper regime	Difference	Lower regime	Upper regime	Difference
L.NOI	0.6119*** [0.0597]	0.5419*** [0.1034]	-0.0700 [0.1306]	0.4552** [0.1969]	0.5883*** [0.0866]	0.1331 [0.1937]
lnGDPpc	-4.232** [1.879]	1.916** [0.8649]	6.148*** [2.217]	1.482* [0.7626]	-0.7888 [0.8328]	-2.271 [1.448]
lnEPU	0.6081*** [0.2232]	-0.3397 [0.2731]	-0.9478*** [0.3036]	-0.2546* [0.1396]	0.1503** [0.0715]	0.4049** [0.1615]
lnPOP	2.287* [1.384]	2.044 [1.448]	-0.2429 [0.1551]	1.826 [1.790]	0.7154 [1.749]	-1.111*** [0.3082]
Openness	0.0098 [0.0121]	-0.0018 [0.0097]	-0.0117 [0.0207]	0.0365 [0.0223]	-0.0506*** [0.0170]	-0.0871*** [0.0242]
NaturalRes	0.0179 [0.0191]	0.0227 [0.0169]	0.0048 [0.0207]	-0.0826 [0.0765]	0.1253*** [0.0408]	0.2079** [0.1028]
lnFreedom	0.1862 [0.4090]	0.7389 [0.8570]	-0.9251 [1.050]	2.709*** [1.019]	0.1208 [0.6124]	-2.830*** [1.059]
Threshold	9.153*** [0.4873]			10.41*** [0.1249]		
95% CI	[8.197, 10.11]			[10.16, 10.65]		
Regime (%)	48.75	51.25		36.77	63.23	
Linearity test	0.00			0.00		
Number of observations	840			756		

Source: Authors' estimations.

Notes: ***, ** and * denote 1 per cent, 5 per cent and 10 per cent level of significance, respectively. CI stands for the confidence interval. Robust standard errors are reported in parentheses. P-values are reported for the linearity test, which is computed using 300 bootstrap replications.

[8] Note that we also estimated the benchmark model and the extended model, including the interaction term. The estimated effects of economic development on NOI show the same patterns as in the main results. NOI is still history dependent. To save space, we do not report them, but they are available upon request.

We still observe clear evidence supporting our main results following the IDP process. The results for the developed-country group are consistent with those presented in table 5 regarding uncertainty. Natural resources abundance shows a positive effect on NOI in the upper regime. For the developing-country group, the EPU has a statistically significant positive effect on NOI in the lower regime after controlling for natural resources abundance, implying that when global economic uncertainty is high, IFDI goes down and OFDI is negligible. This was not identified previously in table 5. One may argue that natural resources abundance captures some elements of the type of investment projects mentioned previously to which the estimated impact of uncertainty on NOI may be sensitive.

As another robustness check, we re-estimate all model specifications by using the WUI as the global economic uncertainty indicator instead.[9] The extended model results, including an interaction term ($lnWUI \times lnGDPpc$), appear in table 8.

Table 8. The extended model with uncertainty (WUI): robustness check

	Panel A. 40 developing economies			Panel B. 36 developed economies		
	Lower regime	Upper regime	Difference	Lower regime	Upper regime	Difference
L.NOI	0.6918*** [0.0816]	0.4024** [0.1601]	-0.2894** [0.1465]	0.6340*** [0.1310]	0.5143*** [0.0760]	-0.1192 [0.1073]
lnGDPpc	-2.961** [1.496]	1.981** [1.051]	4.942*** [1.906]	1.913** [0.7883]	-0.0279* [0.0167]	-2.110 [1.555]
lnWUI x lnGDPpc	0.0204 [0.0135]	0.0161 [0.0128]	-0.0043 [0.0256]	0.0358*** [0.0121]	-0.0010 [0.0047]	-0.0637*** [0.0119]
lnPOP	-0.6786 [1.319]	-0.5112 [1.139]	0.1674 [0.3843]	-2.976 [1.861]	-3.451* [1.858]	-0.4502*** [0.1261]
Openness	0.0349*** [0.0103]	-0.0073 [0.0138]	-0.0422** [0.0166]	0.0260 [0.0179]	-0.0225 [0.0152]	-0.0483** [0.0231]
lnFreedom	-2.209* [1.242]	0.7717 [1.164]	2.980 [2.222]	1.030 [0.9294]	0.0148 [0.4951]	-1.007 [1.248]
Threshold	9.168*** [0.3833]			10.54*** [0.2622]		
95% CI	[8.417, 9.919]			[10.02, 11.05]		
Regime (%)	49.55	50.45		48.99	51.01	
Linearity test	0.00			0.00		
Number of observations	880			792		

Source: Authors' estimations.

Notes: ****, ** and * denote 1 per cent, 5 per cent and 10 per cent level of significance, respectively. CI stands for the confidence interval. Robust standard errors are reported in parentheses. P-values are reported for the linearity test, which is computed using 300 bootstrap replications.

[9] The estimation results of the benchmark model and the extended model do not change much. These results are not reported but can be made available upon request.

Comparing these results with the ones in table 6 where we used the EPU index, NOI is still history dependent for both the developing- and developed-country groups, while the estimated thresholds go up only slightly. To some extent, once both political and economic uncertainties are taken into account, countries tend to move to the next IDP stage slower than when accounting for only the economic policy uncertainty. Intuitively, this could happen if MNEs become more mindful of political stability in host countries when experiencing higher uncertainty, resulting in OFDI taking longer to develop. Economic development still has a non-linear impact on NOI. We also observe that the estimated interaction effect is statistically significant only in the lower regime of developed economies, which is consistent with the result obtained when using the EPU. The effects of control variables on NOI do not change much. Overall, our main results remain the same when using the WUI.

6. Conclusions and policy implications

This study provides some new evidence for the IDP framework. Applying the dynamic panel threshold method, we have endogenously determined the turning points of the IDP. We find that NOI is path dependent, although the correlation coefficients change across different stages of the IDP. Our results also show that NOI still follows a non-linear pattern as economic development continues after considering global economic uncertainty, whereas global economic uncertainty also exhibits a non-linear impact on NOI conditional on the different stages of the IDP. For the developed countries, the uncertainty has a positive effect on NOI among fully developed economies, whereas it has a negative effect on NOI in newly developed economies. For the developing countries, the results are inconclusive with and without considering natural resources abundance. We also find some evidence that economic development and global economic uncertainty jointly affect NOI in newly developed countries.

In particular, our findings could suggest the following policy implications. First, as results indicated that the least developed countries exhibit the highest persistence of NOI, it may not be enough for governments of those countries to create special economic zones for MNEs when aiming to attract IFDI. Complementing this, in order to progress to the next stage of investment development, governments need to encourage collaboration between domestic firms and MNEs that can enhance knowledge exchange and promote domestic industrial upgrading. Tax relief and subsidies may also be needed for local firms to develop their competitive advantages. Second, the “more developed” developing countries in our study are found to have a non-history-dependent NOI, which implies that their IDP progression may not follow a consistent path but rather happen by chance. The governments and policymakers of those countries may need to keep monitoring

and supporting the expansion of OFDI even after local firms have successfully become MNEs, to ensure a smooth transition to the more advanced stages of the IDP. To avoid investment deterioration, the newly formed MNEs may need similar attention and support as those firms that do not engage in international business, particularly during economic downturns or uncertain times. Third, our findings revealed that improving economic development has a higher positive impact on NOI in the presence of high global economic uncertainty in newly developed countries. Therefore, another important implication for policy could be the provision of instant access to government funds during periods of high global economic uncertainty. Government stimulus may be more valuable for pushing newly developed countries to reach the final stage of the IDP early, even if domestic incomes have not reached the same level as in fully developed countries. Finally, our findings suggest that although global uncertainty may not always have a negative effect or may even improve NOI in the short run, it may deter the internationalization of local firms in developing countries in the long run. Investment deterioration may also appear in both developed and developing countries in the presence of high global economic uncertainty.

From a broader perspective, after the onset of the COVID-19 pandemic, developed countries and regions may become even more popular IFDI destinations and also produce more OFDI, as they are likely to have better facilities to cope with global economic uncertainties in the post-pandemic recovery period. In that case and if FDI activities end up concentrating largely in these regions – particularly among the leading economies, the Western European and Scandinavian countries – internationalization will become a much narrower concept. Using IFDI as a means to reduce dependency on foreign aid may not be feasible for the least developed countries anymore, which may worsen the income gap between developed and developing countries and increase global income inequality. In addition, the tendency for emerging economies to fall into the middle-income trap may also be strengthened if North-South cooperation through various channels (e.g. FDI, trade and aid) becomes less active and inclusive in future. It is debatable whether some comparative advantages of developing countries, such as cheap labour and loose environmental regulations, may become less significant in attracting IFDI. The recent increase in environmental awareness and the COVID-19 pandemic may have caused structural changes to the global economy and the way that individuals, firms and governments view international investment and its impacts, making such destinations potentially less appealing to IFDI. Therefore, progression to higher stages of the IDP could become more difficult for emerging economies, which further hinders their income growth as a second-round effect. In addition, newly industrialized countries may experience investment deterioration and income stagnation if they become less appealing to MNEs, which involves the risk that some countries may fall back to the middle-income level.

For example, this happened to Greece after the eurozone debt crisis in 2011, and several major oil-exporting countries (e.g. Oman, the Russian Federation) because of persistently low oil prices in the 2010s, according to World Bank data.

To prevent any such situations and to minimize potential losses, several suggestions could be put forward. The first avenue for policymakers to explore could be to promote domestic firm upgrading by focusing particularly on enhancing productivity. One prominent example would be the Republic of Korea, which has managed to complete the IDP process by focusing on enhancing domestic firms' productivity in the manufacturing sector. This ultimately has promoted economic growth while helping Korean firms to successfully become prominent international players. As the biggest benefit of IFDI for most developing economies is arguably its spillover effects (or indirect effects) on domestic firms, which can enhance productivity in the long run, governments should underpin a clear, long-run, industrial upgrading plan by carefully selecting the type of IFDI that they want to attract. This can be done by providing specific investment incentives or through upgrading certain location advantages that can attract MNEs, which could potentially bring new technologies or management practices into the domestic economy. To maximize the benefits of IFDI, policymakers should also help domestic firms to improve their absorptive capacities quickly. This can be done, for example, by enhancing human capital by investing in training and education, or by ensuring that trade openness is maintained and enhanced through the existence of an appropriate regulatory and institutional environment.

Furthermore, following from the earlier discussion, policies focusing on creating traditional special economic zones for the MNEs in many developing countries at an early IDP stage may need to be reconsidered if the priority is the growth and expansion of domestic firms. This is because such practices may raise barriers to the exposure of domestic firms to new technologies and better management practices, hindering in that way their development of ownership advantages. A better option could be to allow foreign MNEs to gain ownership of domestic firms, for example through privatization. This could work well for Eastern European countries, given that these countries have solid industrial foundations but lack efficient management practices.

Another possible suggestion is regional collaborations to reduce the dependency of MNEs from developed regions; for example, the Association of Southeast Asian Nations and Asia-Pacific Economic Community in Asia and MERCOSUR in Latin America and even South-South cooperation in general. To some extent, regional collaboration can enhance mutual understanding and complementarity among their members, while may also increase the chance of generating market-seeking horizontal FDI. This is important, as we believe this type of FDI is more beneficial for the less developed economies and can also complement the IFDI

coming from developed countries, which usually is in the form of efficiency-seeking vertical FDI. Even though regional collaboration may be less likely to foster the most advantageous technologies or best management practices, it is likely to increase the productivity of firms in the region faster and therefore enhance economic growth in less developed countries in the region.

Finally, the pandemic has altered the trajectories of economies and the investment strategies of MNEs (see UNCTAD, 2020 and 2021). If FDI host countries become more picky about the type and variety of IFDI they want to receive in order to develop their domestic industries, foreign MNEs may now need to reshape their firm-specific advantages to cope with this new environment. This reshaping of ownership advantage may be more crucial for MNEs coming from the large emerging economies (e.g. Brazil, China and India), as these MNEs need to stand out in the competition with MNEs from developed countries. Working on developing new global supply chains to strengthen their competitive advantages and improve efficiency could be one way of achieving this (e.g. Golgeci et al., 2020). In contrast, following the lessons learned from the pandemic, developing a smaller, trusted, and mutually beneficial regional supply network may also provide benefits for some MNEs, in alignment with Enderwick and Buckley (2020).

This study faces some limitations. First, owing to the econometric method selected, even though we were able to model the net difference between OFDI and IFDI (i.e. the resulting NOI position), we could not explicitly model the interaction between OFDI and IFDI, or the interaction among OFDI, IFDI and global economic uncertainty. Second, to ensure the inclusion of a decent number of developing countries in the study, we incorporated only a few control variables in the empirical work, so that results could be comparable between the developed- and developing-country groups. Last, cross-country regression analysis may hide much of the important idiosyncratic nature of IDP, while high-frequency time series data could reveal country-specific aspects. However, data constraints stopped us from investigating these interesting issues.

For future research, two aspects of our study can be further extended. First, even though we have investigated the impact of global economic uncertainty on the IDP, it would be valuable to further explore the IDP-uncertainty nexus by investigating the effects of domestic economic uncertainty. Arguably, if economic uncertainty is higher domestically than abroad, home-country OFDI may increase as a result of domestic entrepreneurs seeking a relatively more “secure” environment in other countries. The difference between a home country’s level of uncertainty and that of a foreign trading partner or the rest of the world may play an important role in affecting the direction and volume of FDI, in line with Canh et al. (2019) and Choi et al. (2021), which could be a rewarding area for policymakers and practitioners. Second, as mentioned previously, we focused on the interaction between OFDI

and IFDI through the net investment position, but we did not explicitly assess this relationship through the economic development path. Economic development, domestic and global (or foreign) economic uncertainties, OFDI and IFDI are all involved in a complex economic system. Future research could employ panel vector autoregressive-based models to explicitly model the interactions among them.

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