

The effect of institutions on the FDI-growth nexus: What matters most?

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Abstract

This paper examines the extent to which host-country institutions influence the relationship between inward foreign direct investment (FDI) and economic growth. We develop a theoretical model to analyse how different types of institutions condition the FDI-growth relationship and use various institutional proxies to conduct threshold estimations on panel data for 51 developed and developing countries over the period 1991-2016. Our results consistently reveal a robust, contingent effect of political stability on the FDI-growth nexus, suggesting that, among all the institutional factors considered, the absence of civil conflict or violence in the host economy is most critical in terms of yielding both direct and indirect growth-enhancing benefits associated with technology transfer and spillover effects from FDI inflows. This finding is pertinent to both developed and developing countries, although the threshold level of political stability required to achieve sizeable growth benefits from FDI tends to be lower for developing countries.

KEYWORDS

Foreign direct investment, political institutions, economic institutions, economic growth, threshold estimation

JEL CLASSIFICATION

F21; O17; O4; C49

1 | INTRODUCTION

According to the United Nations Conference on Trade and Development, most FDI flows have occurred among the developed regions of the world. In 2019, for example, developed countries were the recipients of around 50 per cent of global FDI flows, worth an estimated US\$ 730 billion (UNCTAD, 2020). A common feature among the developed nations is that they have better quality institutions compared to the developing countries. Furthermore, institutions are found to be positively correlated with long-run economic development (Acemoglu, Johnson & Robinson, 2001, 2005; Acemoglu, Gallego & Robinson, 2014). A natural question to ask, therefore, is whether institutions, and specifically which type of institutions, matter for FDI-induced economic growth.

Many studies have traditionally recognised the potential growth-enhancing benefits that FDI inflows can bring to host country economic development through capital accumulation and technology transfer (e.g. Brems, 1970; Sharma, 1986; Nicolaides, 1992; De Mello, 1999). However, the growth gains derived from inward FDI are typically dependent on host country's absorptive capacity, as represented by factors such as trade openness (Balasubramanyam et al., 1996), human capital (Borensztein et al., 1998), financial development (Hermes & Lensink, 2003; Alfaro et al., 2004), institutions (Azman-Saini et al., 2010), social capability (Kim et al., 2013), among others. Focussing on the role of institutions, Slesman et al. (2015) and Jude and Levieuge (2017) have provided recent evidence to suggest that the growth-inducing properties of FDI are dependent on the quality of institutions, implying that higher growth from inward FDI is realised only when the host country achieves a minimum (threshold) level of institutional quality.

There are in fact several reasons why the quality of institutions may act as a conditioning factor in achieving growth gains from FDI. First, FDI inflows are affected by the level of political or sovereign risk prevalent in host countries. Countries with more developed legal

system and sound institutional environment can provide secure property rights and reduce political and expropriation risk (Busse & Hefeker, 2007; Reinhart & Rogoff, 2009; Kose et al., 2009), thereby serving to attract foreign capital inflows and the interests of multinational enterprises (MNEs). Second, MNEs are keen to invest in sound institutional environments with the capacity to offer high investment returns. Countries with good institutions can facilitate technology transfer and productivity spillovers to domestic firms while fostering capital accumulation and promoting crowding-in effects of domestic investment (Jude & Leveuge, 2017). Third, good institutions that enforce control of corruption, political stability, transparency and accountability can create better incentives for a business-friendly environment, conducive to lower transaction costs and thus enhancing the scope for foreign firms to invest in the host economy (Mengistu & Adhikary, 2011). Fourth, institutional environments that favour greater labour and credit market flexibility can more effectively transmit the growth effects of FDI in recipient countries by helping to shape MNEs' strategies and incentives (Ketteni & Kottaridi, 2019).

Several studies in addition to the above have emphasised that the FDI-growth nexus exhibits a nonlinearity in the relationship that depends on the host country's institutional absorptive capacity, as proxied by various indicators such as economic freedom, rule of law, control of corruption, democracy, external debt, political risk, regulatory quality, among others (see section 2 - and Table 1 - for review of the literature). Nevertheless, while the evidence is generally supportive of the view that institutions facilitate the local absorptive capacity, the empirical literature has not conclusively established specifically what type of institutions matter most in maximising the growth benefits from inward FDI. Studies in the growth literature have found that institutions are fundamental in explaining observed differences in factors of production that are considered the proximate determinants of economic growth, such as innovation, education, and capital accumulation (North and Thomas, 1973; Knack and

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Keefe, 1995; Hall and Jones, 1999; Acemoglu et al., 2001). In this paper, we rely on the hierarchical institutions' view which argues that political institutions may play a deeper role vis-à-vis economic institutions in affecting growth. According to the *hierarchy of institutions hypothesis* (proposed by Acemoglu et al. (2005) amongst others¹), economic institutions are a set of policies and laws, constraining economic interactions that ensure protection of private property rights and contract enforcement, whereas political institutions are highly persistent social and constitutional arrangements which set the stage for how economic institutions can be devised. Essentially, the hypothesis predicts that, in equilibrium, economic institutional arrangements are set up to be in line with the interests of the elites and powerful groups possessing political power (Slesman et al., 2019). It could be inferred from this hypothesis that both types of institutions would facilitate the local absorptive capacity to influence the FDI-growth process directly through channels which foster technological advancement and capital accumulation. Nevertheless, some features of political institutions may have an added, catalytic effect on the FDI-growth nexus through better economic structures and incentives they create within the host country.

More precisely, the idea that institutions may operate at different levels in determining growth has been formalised by Davis (2010) who models the process of institutional change by distinguishing between institutional quality and institutional flexibility, where the latter permits improvements in institutional quality in response to economic conditions. In Davis's model, an increase in institutional quality lowers market transaction costs, producing an immediate but short-lived increase in the rate of economic growth, whereas an increase in institutional flexibility results in a delayed but permanent increase in growth. This difference in dynamic economic performance is a demonstration of how institutional flexibility generates

¹ See, *inter-alia*, Williamson (2000), Acemoglu and Johnson (2005), Roland (2004), Eicher and Lekeurt (2009), and Flachaire et al. (2014) for applications of this hypothesis to long-run economic performance.

an indirect, but sustained, positive impact through its inspirational role in creating sound economic policies and laws, warranted by changing institutional demands for higher quality. In a similar vein, we argue that the attractiveness of the political environment in the host country, driven by better quality and flexibility of its institutional structures, may inspire multinationals to invest (or expand their operations) there, which consequently yields higher growth prospects for the host economy.

Against this backdrop, we analyse the effects of both economic and political institutions on the FDI-growth nexus by developing a theoretical model and providing an empirical assessment of their relative importance using several institutional proxies while acknowledging that certain ‘threshold’ levels of institutional development need to be attained before a country can accrue the growth benefits from FDI inflows. The FDI-growth literature has traditionally focussed on highlighting the possible transmission channels through which economic growth is accrued from FDI, such as learning effects from foreign affiliations of MNEs with domestic firms (Blomström & Kokko, 1998), diffusion of knowledge through domestic employees of MNEs (Fosfuri et al., 2001), spillover effects via backward, forward or horizontal linkages (Spencer, 2008; Li & Tanna, 2018); competition effects of domestic firms with foreign affiliates of MNEs (Wang & Blomström, 1992); or transfer of intellectual property rights associated with R&D (Coe et al., 2009; Bournakis et al., 2018). But these transmission channels are more likely to be influenced, directly or indirectly, by the underlying institutional framework, some elements of which may be more important than others. Although, as argued above, the literature has studied the role of institutions to determine the minimum threshold levels for extracting growth-enhancing benefits from FDI, there has been no systematic study analysing which type of institutions matter most in this regard. Therefore, we contribute to the literature by assessing the core components of the institutional matrix, covering aspects of both economic and political institutions, to examine the threshold effects through which they condition the FDI-growth

relationship

Our overall contribution is two-fold. First, we examine whether institutions play an indirect, catalytic role in influencing growth through FDI, in addition to their direct effect on growth. To facilitate this investigation, we develop a theoretical model of FDI spillover to reveal how institutions exert a contingent (threshold) effect on the FDI-growth nexus, in addition to the conventional growth-enhancing effect through FDI-generated externalities. In this context, we argue that some aspects of the political environment may play a more fundamental role than other features of economic or political institutions in conditioning the nonlinear FDI-growth nexus. Second, we test our inferences from theoretical analysis using threshold estimation methods incorporating a range of political and economic institutional measures to assess their relative importance in affecting the FDI-growth nexus.

Employing threshold estimations on panel data for 51 developed and developing countries over the period 1991-2016, we find that all the institutional features that we consider, whether political or economic, have a direct influence on growth. However, one of them, political stability, stands out in terms of exerting a robust threshold effect on the FDI-growth nexus. More precisely, our results establish that beyond a certain minimum threshold level of political stability (characterised by lack of civil conflict or political violence), the recipient country benefits most from FDI-induced growth, signifying better growth-enhancing prospects associated with FDI spillovers. Thus, our findings suggest that minimising political risk by fostering a safe, violence-free environment, should take greater precedence over other political or economic institutions in securing maximum growth benefits from FDI.

The remainder of this paper is organised as follows: Section 2 discusses the related literature. Section 3 presents the theoretical model exhibiting the conditionality of the FDI-growth relationship on institutional quality. Section 4 describes the empirical methodology to test the inferences from the theoretical model. Data and descriptive statistics are presented in

section 5, while Section 6 discusses the empirical results. Section 7 concludes.

2 | RELATED LITERATURE

Numerous empirical studies have provided supportive evidence that institutions matter not only for FDI inflows but also for enhancing the mechanisms through which they affect economic outcomes. Table 1 (panels a and b) presents a summary of these two sets of FDI-related studies published in the post-2000 period, which employ cross-country data and use a variety of institutional measures.²

Amongst studies investigating the role of institutions in attracting FDI flows (Drabek & Payne, 2002; Bénassy-Quéré et al., 2007; Busse & Hefeker, 2007; Ali et al., 2010; Khoury & Peng, 2011; Buchanan et al., 2012; Li et al., 2017), the evidence suggests that sound institutional quality is a robust predictor of FDI inflows. The common institutional measures that have been associated with these studies relate to the rule of law, political risk (or stability), property rights protection, bureaucratic quality, control of corruption, government stability or effectiveness, democracy, and other industry-specific regulatory features.³ Given the variety of institutional measures available (many of which are often highly correlated - see Table 3 for instance), some studies have relied on using an institutional index to represent the overall quality of institutions, obtained by either aggregating the individual institutional measures or constructing a weighted average using principal components or factor analysis. Thus, it is

² See Ali et al. (2010), among others, for an overview of earlier studies in the literature. Some studies (e.g. Bénassy-Quéré et al., 2007) have considered the effect of institutions on inward and outward FDI but the institutional features are broadly similar except that they pertain to host- and/or source-country settings. For instance, among the recent studies, Sen and Sinha (2017) relate institutions to the location choice of US outward FDI; whereas Li et al. (2020) examine the effects of institutional differences on outward FDI from China.

³ The relevant data for these measures are typically obtained from sources such as the International Country Risk Guide (ICRG), World Governance Indicators (Kaufmann et al., 2011), Index of Economic Freedom (Heritage Foundation), Freedom House (2014), Frazer Institute (Gwartney et al., 2019), Polity IV project (Monty & Gurr, 2013) and other country-specific sources (e.g. Bénassy-Quéré et al., 2007).

difficult to pinpoint which of the individual institutional measures are significant and it is possible that some of them could lose significance while controlling for the effects of other factors like the level of development or prior growth (Jude & Livieuge, 2017). The effects of institutions have also been found to vary in sectoral-level FDI data, being more significant, for instance, in affecting secondary or tertiary FDI sectors than primary sector FDI inflows (Ali et al., 2010; Li et al., 2017).

Whilst not all types of institutions are likely to be important (owing to measurement issues, host-country heterogeneity, or other factors), the recent evidence from growth-related FDI studies (see Table 1, panel b) suggests that good institutions - which serve to attract FDI inflows - may also provide the local absorptive capacity for generating growth or productivity benefits from FDI. Azman-Saini et al. (2010) and Alguacil et al. (2011), using system GMM estimation in dynamic panel data models with interaction effects, reveal the conditionality of the growth effect on institutional quality, proxied by the economic freedom index. Similarly, using an aggregate index of institutional quality, Aziz (2020) and Hayat (2019) show that institutions enhance FDI-induced growth, while Li and Tanna (2019) reveal the superiority of institutions over human capital in determining productivity growth gains from FDI.

Other studies have used different estimation techniques to determine the threshold effects on the FDI-growth relationship using institutional variables. For example, using an index created from ICRG institutional variables and Economic Freedom data, Slesman et al. (2015) apply the Hansen's (2000) threshold estimation method to show that capital inflows (including FDI) influence growth only when host countries achieve a minimum level of institutional quality. Jude and Livieuge (2017) use the ICRG institutional variables and a panel smooth transition regression method to reveal a threshold effect of institutional quality modulating the FDI-growth relationship.

Whilst the above studies have evaluated the importance of institutions in attracting FDI

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inflows or in conditioning the FDI-growth relationship, the choice of institutional variables therein is often ad-hoc and the precise distinction between economic and political institutions is unclear or implicit. Yet, this distinction is important in the hierarchical institutions view as different types of institutions play their distinctive roles in influencing economic growth. Acemoglu et al. (2005) emphasise that economic institutions, by influencing investments in factor accumulation and technology, are the proximate causes of growth. Political institutions, by allocating *de jure* political power, determine the course of economic institutions, and are therefore the fundamental causes of growth – that is, they set the stage for economic institutions to evolve and influence growth. Flachaire et al. (2014) attribute these institutional differences associated with the growth process as ‘growth regimes’; and conclude from their empirical investigation comparing the effectiveness of the two regimes - using cross-country data covering both developed and developing countries - that ‘political institutions are the key determinant of which regime an economy belongs to, while economic institutions have a direct impact on growth rates within each regime’ (p. 212).

Our study seeks to extend the FDI-growth literature by drawing a similar distinction between political and economic institutions and assessing their relative importance in conditioning the FDI-growth relationship. This distinction is important for host countries aiming to reap growth benefits from inward FDI, particularly as the growth benefits derived from FDI may change when the level of institutional absorptive capacity reaches a certain *tipping* (threshold) point. Host country economic institutions that continue to foster a sound business environment through better enforcement of the rule of law, property rights protection or control of corruption, would encourage domestic entrepreneurs to take advantage of the FDI-spillover benefits via technological and knowledge diffusion, while political institutions that provide the assurance of stability by minimising political risks (through containment of civil conflict or other means such as democratization, the establishment of political rights or civil

liberties) may yield added benefits to growth through such investment. Some countries (e.g., China) give more priority to improving economic institutions while keeping reforms of political institutions lagging behind while other countries focus on strengthening their political institutions (Zhu, 1999). In view of these differences in institutional development across countries, it seems opportune to examine their relative roles in influencing the FDI-growth relationship using appropriate theory and empirical analysis.

3 | THEORY

In outlining the relevance of an institutional threshold effect on the FDI-induced growth process, we adopt the modelling approach of Azariadis and Drazen (1990) who showed how developing economies may suffer from low-development traps.⁴ Consider the productivity process (A) of a country with a growth pattern of technology catch-up and domestic innovation, relying on FDI inflows and the domestic institutional setting (I) as follows:

$$\dot{A} = f(I)(\bar{A} - A) + g(I)A \quad (1)$$

Accordingly, the economic growth of the country is

$$g = \frac{\dot{A}}{A} = f(I)\left(\frac{\bar{A}}{A} - 1\right) + g(I) \quad (2)$$

where \bar{A} is the technology frontier determined by the advanced technology brought by MNEs along with foreign capital inflows; $(\bar{A} - A)$ represents technological advancement (or spillover

⁴ While Azariadis and Drazen (1990) use human capital in their model of endogenous growth, the model we present in this section incorporates the role of institutions as a way of representing the absorptive capacity to enhance growth from FDI via the threshold effect.

effect) from FDI-generated externalities (the gap between \bar{A} and domestic productivity A), where the extent of such spillover effect characterising the host country's growth process also depends on the institutional setting related to FDI inflows, represented by the function $f(I)$. More specifically, given that some studies confirm the importance of institutional quality in exerting a threshold effect on the FDI-growth nexus, we assume that a threshold effect exists in the institutional function, $f(I)$. Thus, we utilise the concept of the threshold effect by assuming that

$$f(I) = \begin{cases} \underline{\gamma}, & \text{if } I \leq \theta \\ \bar{\gamma}, & \text{if } I > \theta \end{cases} \quad (3)$$

where $\underline{\gamma} \leq 0 < \bar{\gamma}$ and θ is the threshold value. In this set-up, the positive spillover effects of FDI on growth are realised only when the level of institutional quality of the host country is above the minimum threshold level θ .

As depicted in equation (1), the host country productivity process is partially governed by domestic innovation which relies on the institutional setting and is related to domestic growth, $g(I)$. The relationship between this institutional function and \bar{A} accords with the 'institution-growth' theory and tends to be linear, indicating that better institutional quality leads directly to higher productivity and economic growth. Whereas upon combining the institutional threshold condition associated with FDI as shown in equation (3) with the economy's growth function as in equation (2), we have a contingent effect as follows: if $I > \theta$, the host country will benefit from a positive FDI spillover effect and therefore will have a higher economic growth rate $\bar{\gamma} \left(\frac{\bar{A}}{A} - 1 \right) + g(I)$; otherwise, i.e. if $I \leq \theta$, the spillover effect may not be positive and the host country will have a lower growth rate $\underline{\gamma} \left(\frac{\bar{A}}{A} - 1 \right) + g(I)$.

It should be noted that the effect of institutions *per se* on growth $g(I)$ in the above model

is distinct from the growth effect related to FDI inflows, $f(I)$, which depends on the threshold condition associated with institutional quality. As drivers of FDI, MNEs generally rely on a sound institutional environment in host countries for their long-term investment and growth prospects. Thus, how the host economy's institutional environment interacts with the spillover mechanisms and transmission channels associated with inward FDI is important for deriving FDI-related growth benefits. In distinguishing between institutional quality and institutional flexibility, Davis (2010) argues that "having a good set of economic policies or commercial laws at any one point in time matters less for growth than having political and legal systems that are capable of responding to the changing institutional demands of a growing economy" (p 307). In this regard, the fundamental role of the political environment as a mediating force would be important in conditioning the nonlinear FDI-growth nexus, in addition to its direct role in influencing growth. More precisely, we infer that sound political institutions which have features resembling public good provision that benefits large parts of the population (Campos & Coricelli, 2012) are more likely to harness the scope of economic institutions to generate higher FDI spillovers beyond the minimum quality threshold level θ , implying greater potential to accrue growth benefits from inward FDI.

Among the various political institutions, the effects of regime type (democracy/autocracy) and political stability are particularly noteworthy, especially in developing countries, due to significant cross-country variation in these characteristics. Although both these institutions matter in terms of ensuring the safe provision of public goods, from the viewpoint of foreign investors, political stability - implied by the absence of any violent conflict - could be seen as more important than democratization because countries cannot easily change their democratic orientation (as the transition from democracy to autocracy will erupt in civil violence) while autocracy does not necessarily indicate that the country (e.g. China) lacks public goods. Thus, from the perspective of offering better prospects of returns from foreign investment, we infer

that the stability of the political environment is most critical in influencing MNEs' incentives and enhancing their long-term prospects. Therefore, higher growth benefits are more likely to be sustained from inward FDI beyond a certain minimum threshold level of political stability.

In contrast, economic institutions, while important in facilitating the transmission channels from FDI to growth via technology transfer or knowledge diffusion, may be less effective when it comes to exhibiting a threshold effect on the FDI-growth nexus. This may be because of their narrowly defined function as institutions representing the 'current set of property and contractual rights' (Davis, 2010), which may exert conflicting outcomes on FDI-induced growth. For instance, stronger enforcement of the rule of law can facilitate better intellectual property rights protection through legal systems, which reduces the scope for technology leakage and increases MNEs' incentives to create and use advanced technology. While this may strengthen the investment motivation of foreign investors, such protection can also lower the incentives in the host economy to commercialise new technology and mitigate the FDI spillover effect, thus hindering technology improvement (Acs & Sanders, 2012). Another adverse effect from the economic institutions perspective could be corruption which hinders growth by increasing business costs, although such costs may not be a concern for MNEs because these entities (especially those from countries with high levels of corruption) are willing to spend more money to speed up the process of host-country authorities' decision-making in a situation where there is an inefficient bureaucracy with a rigid regulation system (Bardhan, 1997; Cuervo-Cazurra, 2006). In view of these conflicting outcomes, it is sensible to infer that economic institutions may not be effective in exerting a robust threshold effect on FDI-induced growth although they may have a significant correlation with growth.

4 | EMPIRICAL METHODOLOGY

Given our theoretical priors as discussed above, we test for the existence of a threshold effect

of political and economic institutions in the FDI-growth relationship. We use the Hansen's (1999) threshold method, which requires a balanced panel but can estimate fixed effects in order to address cross-country heterogeneity in the panel data. To our knowledge, this method has not been previously used in estimating the FDI-growth relationship, although it has been frequently applied in other growth-related studies (e.g., Falvey et al., 2012; Pan & Wang, 2013).⁵

To determine the threshold level of institutions on the FDI-growth nexus, the Hansen's approach relies on splitting the sample according to the institutional regime (e.g. low or high institutional values). This method therefore allows parameter heterogeneity to be accommodated through a sample decomposition based on the conditioning regime. In contrast, the standard approach of using interaction terms in regressions can yield marginal effects but effectively imposes the *a priori* restriction that FDI spillovers are monotonically increasing (or decreasing) with the institutional regime change (absorptive capacity). The Hansen's method also has the distinct advantage of determining accurate threshold levels from the estimation, whereas using interaction terms in regressions can yield only approximate threshold values (when marginal effects change sign). Consequently, we use the Hansen's threshold estimation method with the empirical model, which accounts for fixed effects (Hansen, 1999), specified as follows

$$Y_{it} = \delta_1 FDI_{it} I(INS_{it} \leq \gamma) + \delta_2 FDI_{it} I(INS_{it} > \gamma) + \beta_1 Z_{it} + \beta_0 + \mu_i + \varepsilon_{it} \quad (4)$$

where Y_{it} represents economic growth in country i year t ; FDI stands for FDI inflows whose

⁵. Prior studies in the FDI-growth literature (e.g. Kim et al., 2013; Slesman et al., 2015; Tanna et al., 2018) have employed the Hansen (2000) and/or the Canner and Hansen (2004) methods, which accommodate an unbalanced panel but entails pooling data without estimating fixed effects, thus cannot adequately address problems associated with cross-country heterogeneity. Using a balanced panel also helps avoid the cross-section dependence problem typically associated with an unbalanced panel.

impact on growth varies with the type of institutional regime, INS_{it} (determined using institutional quality as a threshold variable); $I(.)$ is the indicator function which is equal to 1 when INS_{it} is higher than the threshold parameter γ and 0 otherwise; Z_{it} refers to a set of control variables (including institutions per se); μ_i is the country-specific fixed effect; and ε_{it} is the error term which follows the distribution $iid(0, \sigma_\varepsilon^2)$.

The first step in the Hansen's method for estimating the model specified in equation (4) requires searching over distinct values of $\hat{\gamma}$ so as to determine the minimised sum of squared residuals (RSS), $\hat{\gamma} = \arg_{\gamma_0} \min S_n(\gamma)$, using a grid search. The next step is to conduct the hypothesis test of whether the threshold effect (nonlinearity) is statistically significant using a likelihood ratio (LR) test, with the null hypothesis $H_0: \gamma = \gamma_0$. The asymptotic distribution of the LR statistic, given by $LR_n(\gamma) = \frac{S_n(\gamma) - S_n(\hat{\gamma})}{\hat{\sigma}^2}$ where $\hat{\sigma}^2$ is the residual variance from equation (4), is obtained using a bootstrap procedure (allowing for a finite number of replications under the grid search) which also constructs the p-value of the threshold point. Hansen (2000) points out that the asymptotic distribution of the LR statistic is non-standard, i.e. $LR_n(\gamma) \rightarrow \xi$ as $N \rightarrow 0$, where ξ is a random variable with the following distribution function $P(\xi \leq x) = (1 - \exp(-x/2))^2$ which has the inverse $c(\alpha) = -2\log(1 - \sqrt{1 - \alpha})$, where $c(\alpha)$ is the α percent critical value. The null hypothesis $H_0: \gamma = \gamma_0$ is rejected at the asymptotic level α if $LR_n(\gamma) > c(\alpha)$, which implies that there is a threshold point in the data. Once the threshold point of INS_{it} and its statistical significance are established (along with the confidence intervals), the coefficients of FDI_{it} are estimated distinctively under the low- INS and high- INS regimes, subject to the proviso that the coefficients of the other explanatory are the same for both regimes. If the null hypothesis is not rejected, implying that there is no institutional threshold, then a standard fixed effects estimation is employed to test the significance of the linear effect of FDI on growth (i.e., where $\delta_1 = \delta_2$).

5 | DATA AND VARIABLES

Our sample selection strategy was to use available data for as many countries as possible, both developed and developing. However, as the empirical method requires a balanced panel, so that there must not be missing data for any of the variables within the time frame considered for estimation, we ended up with a cross-country panel of (annual) data covering 51 countries – as shown in Appendix I - over the period 1991-2016. This time period is constrained by data availability in the sense that we could not consider observations before 1999 and after 2016 without significantly reducing the number of countries in the sample. Furthermore, the requirement of a balanced panel meant that we had to exclude other countries – not listed in Appendix I – because they had missing observations within the range 1991-2016. All data for the variables discussed below - except the institutional variables - are drawn from the World Bank. The institutional data are obtained from a number of sources; see Appendix II for a description of all the variables and their sources.

The dependent variable is economic growth, measured using real GDP per capita based on purchasing power parity and converted to US dollars (at constant prices in 2011). The main explanatory variable is FDI, measured by the ratio of net flows of inward FDI to GDP, as our analysis focuses on the effect of inflows to economies and the net flow measure has been widely used in prior studies (e.g. Alfaro et al., 2004; Azman-Saini et al., 2010; Li & Tanna, 2019; Tanna et al., 2018). The values of net FDI inflows can be negative if the volume of disinvestment (or reverse investment) is larger than gross inflows.

The relevance of institutions as explanatory variables has been emphasised in a number of previous studies on economic growth (e.g. Acemoglu et al., 2001) as well as in studies relating foreign capital inflows to growth (Slesman et al., 2015) and FDI to growth (Jude & Leveuge, 2017). In our main analysis, we capture the effect of institutions using four main indicators:

democracy/autocracy, political stability, rule of law and control of corruption, of which the first two may be considered as political institutions and the last two as economic institutions (see Eicher & Leukert, 2006). As discussed in section 2, several studies have implicitly referred to the importance of both types of institutions in affecting the FDI-growth nexus. For example, in their analysis of the impact of external indebtedness on the FDI-growth nexus, Tanna et al. (2018) use the ICRG indicators for rule of law, control of corruption, democracy and civil conflict. They argue that high levels of external debt (often associated with weak institutions and economic policies associated with high levels of financial repression in developing countries) may adversely affect the FDI-induced growth process as investment incentives of MNEs are distorted. With regard to the indicators of political institutions, democracy is assumed to be positively related to economic growth, as democratic regime checks and constraints on the power of elected officials are relevant to the investment decisions of firms. A higher level of democracy is also important to foreign investors as it can limit government interventions and keep the risk of policy reversals low (Doytch & Eren, 2012). Political stability (implied by absence of civil violence) is another feature of political institutions that is fundamental for guiding resource allocation and providing a strong incentive for investors to undertake long-term investment, as well as affecting the sectoral flow of inward investment to the host economy (Li et al., 2017). Political stability is also essential to the FDI-growth nexus since foreign investors are reluctant to invest in countries with high levels of uncertainty (Morrissey & Udomkerdmongkol, 2012).

While our main institutional indicators are sourced from the ICRG and WGI datasets, in robustness tests we entertain additional institutional data from several different sources. Specifically, we use measures of political institutions representing civil liberties and political rights from Freedom House (2014), and regime type (democracy/autocracy) using Polity2 data from the Polity IV project (Monty & Gurr, 2013). We also use a range of economic institution

measures covering aspects of the legal system, property rights protection, regulation of markets, and ease of doing business, with data obtained from the Index of Economic Freedom (Miller et al., 2019), Fraser Institute (Gwartney et al., 2019) and World Bank.

Turning to control variables, we follow previous studies in selecting them (e.g., Alfaro et al., 2004; Azman-Saini et al., 2010; Kim et al., 2013; Slesman et al., 2015; Tanna et al., 2018). Accordingly, we incorporate the influence of inflation, trade openness, human capital, initial income per capita, and population growth in our estimations.⁶ Inflation is measured by the annual percentage change in the consumer price index (CPI), which reduces real investment returns and the potential for growth through investment. Trade openness is measured as a share of the sum of imports and exports of goods and services to GDP. It is found to exert a positive ‘learning-by-exporting’ effect on productivity (Yang & Mallick, 2014) and, through the expansion of the traded-goods sector, on economic growth (Cooray et al., 2017). Human capital is measured using the net secondary school enrolment ratio. Higher levels of human capital in the economy contribute to the accumulation of knowledge stock, which increases growth (Ali, 2003). Human capital is also found to have a contingent effect on FDI-induced growth (e.g. Borensztein et al., 1998; Ford et al., 2008) although such effect may diminish after accounting for the role of institutions (Li & Tanna, 2019). Finally, we control for the effect of the host country economic size by including population growth and for the possibility of a flexible accelerator effect using initial income per capita in the regressions.

[Insert Table 2 here]

Table 2 displays the summary statistics. Variables showing high variation across the sample

⁶ Other control variables (e.g. financial development) could not be entertained owing to many missing values for the countries included in the sample, and the constraints imposed by a balanced panel.

include inflation, GDP growth, initial income and FDI (% of GDP). The institutional measures (ICRG) range from 0 to 6 for rule of law, control of corruption and democracy, and from 0 to 12 for absence of violence. The WGI institutional variables have slightly reduced range of variability (going from negative to positive values) as indicated by their lower standard deviations. Most of the other institutional measures, in particular Polity2 and Property Rights Protection, display a higher degree of variation than the ICRG measures.

As our dataset has a relatively long time dimension (26 years at maximum), it is important to check the order of integration of all the variables. We use the Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), Fisher-type Augmented Dickey-Fuller (ADF) and Fisher-type Phillips-Perron (PP) tests to examine whether the panel data series for each variable rejects the null of unit root across all the countries in the sample against the alternative that there is no unit root in at least one country. The results are presented in the last three columns of Table 2, indicating that the tests overwhelmingly reject the null of unit root for all the variables, and so we conclude that they are all stationary, i.e., $I(0)$.

Table 3 reports the correlations among the explanatory variables. All the institutional variables are highly correlated compared to the other explanatory variables and, therefore, we include them individually in the estimations to avoid multicollinearity issues.

[Insert Table 3 here]

6 | EMPIRICAL RESULTS

6.1 | Basic results

The main implication that flows from our theoretical model is that institutions have a direct effect on growth and/or a threshold effect on the FDI-growth nexus. Hence, in the empirical analysis, we treat institutions both as an explanatory variable having a direct impact on growth

and as a threshold variable to test their non-linear, contingent effect on FDI-induced growth. We report the results for the full sample covering 51 countries as well as, separately, for subsamples comprising 13 developed and 38 developing countries, respectively. The results are presented, in each case, using both the ICRG and the WGI measures of the institutional variables (democracy, political stability, rule of law and control of corruption) included individually in the regressions. Doing so allow us to assess the consistency of the results across different samples and sets of institutional measures. In estimation, all variables - except the institutional ones - are converted into natural logarithms.⁷ In all the threshold regressions, the bootstrap p-value that determines the statistical significance of the threshold estimates (as shown in the second row of Tables 4 and 5), is obtained by using 1,000 replications under a grid search with 0.25 per cent trim. The p-value indicates whether the relevant institutional threshold effect exists in the FDI-growth nexus, in which case the third row of the tables reveals the threshold values and the relevant confidence intervals.

[Insert Table 4 here]

In Table 4, which reports the full-sample results, the p-value of 0.7067 (column 1) suggests that the null hypothesis of no threshold is not rejected, confirming that democracy does not have a threshold effect on FDI-induced growth, although its direct effect on growth is positive and statistically significant (at 5% level). The effect of FDI on growth is also positive and statistically significant, with coefficient estimate (elasticity) of 0.0046, but it does not depend on the regime type or the extent of democratisation in the economy. By contrast, the p-value in column 2 (statistically significant at 1% level) implies that FDI has a strong contingent effect

⁷ Some variables had to be scaled by a constant factor to avoid negative values. Also, to account for initial values in estimation, the sample size is slightly lower than used for the summary statistics shown in Table 1.

on growth (with an estimated elasticity of 0.0053), governed by the extent of political stability in the host economy that is above a threshold value of 8.5. This threshold value (with 99% confidence interval) is lower than the sample mean of 8.9 (see Table 2), implying that more than 50% (around 59.4%) of the country-year observations from the sample lie above the threshold level. In columns 3 and 4, the results reveal neither a statistically significant threshold effect nor a direct growth-enhancing effect of the rule of law and control of corruption, respectively, although FDI has a directly positive effect on growth regardless of these influences (with coefficient estimate 0.0059 in both cases).

The results in columns 5-8 of Table 4, using the WGI institutional measures, mimic the results in columns 1-4, albeit with slightly different magnitudes of the estimates owing to the smaller sample size (as the WGI dataset has shorter annual time span coverage, 2002-2016). Specifically, the results in column 6 confirm a robust threshold effect of political stability on the FDI-growth nexus, where the magnitude of the FDI effect on growth is significantly higher above the threshold value (with threshold value of -0.5897 being below the sample mean of -0.2015). The other institutional measures do not exert a threshold effect, although their direct effect on growth is positive and statistically significant, while the direct growth-enhancing effect of FDI remains statistically significant regardless of these institutional influences. Overall, the results confirm that, among the four institutional variables, only political stability exerts a nonlinear, contingent effect on the FDI-growth nexus, where the magnitude of the FDI impact on growth is higher beyond the minimum threshold level. It should be noted that among the other three institutional variables, democracy has a stronger impact on growth than rule of law or control of corruption, although the magnitude of the FDI impact on growth is slightly higher in the case of the latter two (after controlling for these influences).

Among the control variables, the results indicate that human capital, trade openness, and initial income have a robustly significant and positive impact on growth, while inflation has a

statistically significant, negative impact on growth (in columns 5-8 only). The significant and negative impact of initial income - analogous to the convergence effect in growth studies - is in line with the empirical results of Slesman et al. (2019) who use threshold estimations to reveal that the financial development-growth nexus for emerging and developing countries is strongly influenced by the quality of political institutions. An explanation for this convergence effect on growth is that initial wealth provides countries with strong incentives to develop innovative products and increase their market share and returns from investment, thus having a positive long-run impact on growth (Ades & Glaeser, 1999). The direct effect of institutions on economic growth is largely consistent with prior studies on growth (Levine & Renelt, 1992; Frankel & Romer, 1999; Acemoglu et al., 2001) while the negative effect of inflation on growth is consistent with that found by Tanna et al. (2018).

[Insert Table 5 here]

The results for the developed and developing countries sub-samples, reported in Table 5, are very similar to the full sample results confirming that political stability exerts a threshold effect on the FDI-growth nexus while the other institutional measures do not. For developing countries (panel A), the ICRG measure of political stability (column 2) has the same threshold value and 99% confidence interval as for the full sample in Table 4, although the threshold of the WGI institutional measure (column 6) is slightly lower (-0.6866 compared to -0.5897) with 95% confidence interval. The corresponding thresholds for the developed countries (panel B) are higher, particularly for the WGI measure. Overall, apart from minor differences in the significance of human capital and population growth, the results for both developed and developing countries are qualitatively similar to the full sample results. Hence, in the robustness tests that follow, we report only the full sample results.

6.2 | Alternative institutional measures

Given the results so far, specifically the robust, contingent impact of political stability in accruing growth dividends from FDI, it is important to see what other types of institutions matter in this regard. In this section, we report the results of full sample regressions run using several alternative institutional measures obtained from different sources, in order to check for the presence of threshold effects in the FDI-growth relationship.

[Insert Table 6 here]

Table 6 shows the results of eight additional measures representing a mixture of political and economic institutions.⁸ In column 1, we use the Polity 2 data from the Polity IV project to represent the influence of democratization, a regime type index whose values range from -10 to +10, so that a country with a higher degree of democracy has a higher non-negative Polity 2 score. The results show neither a direct effect of democratization on growth nor a threshold effect on the FDI-growth nexus. This may be due to its high variability compared to the other institutional variables. In columns 2 and 3, we include the influence of political rights and civil liberties, respectively, as alternative measures of political institutions sourced from the Freedom House. They range in value from 1 to 7, with 1 implying the best rights/liberties for the country while 7 the worst. Thus, higher values of these variables actually signify poor institutional quality. Controlling for these influences yields a negative and statistically significant direct impact on growth, implying that poorer (better) institutions reduce (enhance) growth. However, neither of these institutions exert a threshold effect on the FDI-growth nexus.

⁸ Using the classification suggested by Eicher and Leukert (2006), institutional variables used in columns 1-3 of Table 6 are classed as measures of political institutions while those used in columns 4-8 as economic institutions.

In columns 4-6, following previous studies (e.g. Bournakis et al., 2018; Coe et al., 2009), we test for the influence of economic institutional factors related to property rights protection. Column 4 applies the property rights protection measure from the Heritage Foundation's Index of Economic Freedom (Miller et al., 2019). This measure has a high degree of variability ranging from 10 to 95, with higher values implying better property rights protection. Column 5 accounts for the effect of protection of intellectual property rights (IPR) using data from the World Bank. The value of the IPR index ranges from 1 to 7, with higher values indicating better protection of IPR. Column 6 includes a measure of the 'ease of doing business' using data from the World Bank. Ranging from 0 to 10, this index captures the soundness of institutional settings for doing business along with the adoption level of a protective system for property rights. Higher values of this index thus imply a better institutional environment for doing business as well as greater property rights protection. The results indicate a direct growth-enhancing effect of each of these measures but not a threshold effect on the FDI-growth nexus.

Finally, following Slesman et al. (2019), we check for the sensitivity of our results by including two additional measures of economic institutions based on the Frazer Institute's Economic Freedom index (Gwartney et al., 2019). The first one is a measure of legal system and property rights, whose values range from 4.07 to 9.24, and the second one is a measure reflecting the regulation of credit, labour, and business, whose values range from 2.23 to 9. Higher values of these indicators imply better institutional quality. The results, reported in columns 7 and 8, again suggest a direct positive effect on growth but no threshold effect on the FDI-growth nexus. In most cases, the effect of FDI on growth remains positive irrespective of the institutional environment and the effects of the control variables are similar as before.

6.3 | Endogeneity issues

We now examine the robustness of our results by accounting for the potential endogeneity of

the explanatory variables, including FDI, in the estimations. This includes the possibility of reverse causality (i.e. countries with higher growth tend to attract more FDI inflows) and simultaneity bias (i.e. other omitted variables correlated with both FDI and growth)⁹. We first use lagged values of all explanatory variables (apart from institutions) in the regressions. Table 7 reports the results using the ICRG institutional measures, to be compared with the results in columns 1-4 of Table 4. The results confirm the threshold effect of political stability on the FDI-growth nexus, implying that the FDI effect on growth is positive beyond the threshold level of 8.5 (as in Table 4). In this case, the impact of FDI on growth below the threshold level is perversely negative but otherwise the results are similar to Table 4.

[Insert Table 7 here]

In Table 8, we further check for robustness by tackling the potential endogeneity problem using an alternative estimation method proposed by Seo and Shin (2016), which uses GMM estimation with the first-difference transformation of instruments along with the Hansen's (2000) type method to split the sample based on the threshold value of the conditioning variable. This method, owing to the imposition of fixed effects, also requires a strongly balanced panel which makes it difficult to find suitable instruments with adequate data. We use lagged FDI, exchange rate change and real interest rate as instruments¹⁰. Using both ICRG and WGI measures of political stability (columns 1 and 2), the results reveal a significant nonlinear effect, yielding a positive FDI-induced effect on growth above the threshold, whereas below the

⁹ We believe that the simultaneity issue is less important as we include fixed effects and control for the effect of institutions, which are fundamental to long-run growth (Acemoglu et al., 2014). Our concern here is mainly reverse causality.

¹⁰ Effectively, this may imply that we treat FDI as endogenous and other control variables as exogenous, but finding adequate data for other, more appropriate, potential instruments (e.g. territory size of host country, legal origin, etc.) is extremely difficult given the requirement of a balanced panel.

threshold level, the FDI effect is negative, implying that the growth effect from FDI is diminished for countries that do not meet the threshold level of political stability. Unreported results also confirm that none of the other institutional variables exert a threshold effect under this estimation method.

[Insert Table 8 here]

Based on the above results, we conclude that while institutions generally have a direct, positive impact on growth, among the measures considered, only political stability is found to be influential in terms of yielding a robust threshold effect on the FDI-growth nexus, inducing a nonlinearity in the relationship. It should be noted that the beneficial impact of FDI on growth is normally achieved through technology transmission and spillover effects, as revealed by the statistically significant impact of FDI on growth (in the absence of the threshold effect) while controlling for the effect of institutions. What our results show, in addition, is that political stability (characterised by lack of civil conflict or violence) is more critical than other institutional features (democracy, rule of law, control of corruption, legal system, property rights protection, ease of doing business, etc.) in yielding growth-enhancing benefits, as the FDI-related spillover effects are significantly higher if the host country meets the required threshold level of political stability.

7 | CONCLUSION

This paper investigates the importance of institutions in indexing the FDI-growth relationship. We contribute to the literature by assessing the relative importance of political and economic institutions in enhancing the growth gains from FDI, drawing upon recent studies which suggest that institutions play a more indirect role by influencing host countries' abilities to

utilise and transform factors of production associated with foreign investment.

Using threshold estimations on panel data for 51 countries over the period 1991-2016, while examining a range of institutional measures as threshold variables in the FDI-growth relationship, we find that political stability takes precedence over other measures of political and economic institutions in yielding a nonlinear (threshold) effect of FDI on growth, in addition to the direct growth-enhancing benefits normally associated with technology transfer and spillover effects from FDI. We interpret this finding to mean that a country with a sufficiently sound record of political stability, which may be induced by the quality and flexibility of its institutional set-up, has the capacity to generate better FDI-spillover effects through its benign role in stimulating domestic entrepreneurial incentives, thus boosting the FDI-growth process. While this finding is pertinent to both developed and developing countries, our results reveal that the thresholds of political stability are lower for the developing countries.

An important policy implication that flows from our analysis is that the host countries aiming to maximise growth benefits from FDI inflows should focus on improving political stability by reducing the risk of violence, at minimum, although a sound economic and political environment that fosters good governance, protection of property rights, and democratic accountability are nonetheless important for economic development. But a regime that is successful in enforcing and maintaining political stability is most critical for stimulating growth effects from FDI, vis-à-vis other institutions that enforce the rule of law, democratization, control of corruption, property rights protection, and other economic policies such as ease of doing business and regulation of markets.

As a caveat, it should be noted that while we distinguish between economic and political institutions in accordance with the hierarchical institutions view, such a distinction might, to some extent, be arbitrary as these institutions are more likely to be interdependent. Although our theoretical analysis acknowledges this distinction among institutions for the purpose of

clarifying the direct and indirect (i.e. threshold) growth benefits from inward FDI, the empirical analysis reveals that, among the types of institutional measures considered, political stability is most critical in terms of yielding maximum growth gains in this respect. Data permitting, future research could explore the existence of multiple threshold effects in the FDI-institutions-growth nexus by analysing the conditions under which, for example, political risk or instability - or poor institutions in general - could undermine the transmission of FDI spillover effects and how other institutional determinants could mitigate their adverse impact on growth.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Conflicting Interest

The authors declare that there is no conflict of interest.

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Appendix I

| Country list | | | |
|---------------|--------------------|-------------|----------------|
| Australia | Dominican Republic | Madagascar | Saudi Arabia |
| Bahamas | Ecuador | Malawi | Senegal |
| Bangladesh | Egypt | Malaysia | South Korea |
| Bolivia | El Salvador | Mali | Sri Lanka |
| Botswana | Ghana | Mexico | Sweden |
| Brazil | Guatemala | Morocco | Switzerland |
| Burkina Faso | Honduras | Niger | Thailand |
| Cameroon | Indonesia | Norway | Togo |
| Chile | Israel | Pakistan | Turkey |
| Colombia | Jamaica | Panama | United Kingdom |
| Costa Rica | Japan | Paraguay | United States |
| Cote d'Ivoire | Jordan | Peru | Uruguay |
| Denmark | Kenya | Philippines | |

Appendix II

| Variable | Definition | Source |
|-------------------------------------|---|---|
| GDP growth | Real GDP per capita (y) growth. The natural logarithm form is calculated as $\ln y_t - \ln y_{t-1}$. | World Bank |
| Initial income | Lagged value of GDP per capita | World Bank |
| FDI inflows | The ratio of net FDI inflows to GDP | World Bank |
| Trade openness | The ratio of merchandise trade (sum of imports and exports) to GDP | World Bank |
| Inflation | The annual change in consumer price index (CPI) | World Bank |
| Human capital | The ratio of secondary school enrolment | World Bank |
| Population growth | The ratio of population growth rate | International Country Risk Guide (ICRG) |
| Control of corruption (ICRG) | An index of corruption control, ranging from 0 to 6, representing the level (actual or potential) of corruption in various forms (e.g. excessive patronage, nepotism, job reservations) from high to low. | ICRG |
| Rule of law (ICRG) | An index ranging from 0 to 6, representing the strength and impartiality of the legal system as well as the popular observance of the law from low to high. | ICRG |
| Democracy (ICRG) | An index ranging from 0 to 6, representing the level of democracy from low to high. | ICRG |
| Political stability (ICRG) | An index ranging from 0 to 12, representing the degree of political stability (absence of political violence, civil war and civil disorder) in the country and its actual or potential impact on governance from low to high. | ICRG |
| Control of corruption (WGI) | An index ranging from -1.4965 to 2.47, representing the level of democracy from low to high | Worldwide Governance Indicators (WGI) |
| Rule of law (WGI) | An index ranging from -1.4796 to 2.0964, representing the level of rule of law from low to high | WGI |
| Democracy (WGI) | An index ranging from -1.9072 to 1.8010, representing the level of democracy from low to high | WGI |
| Political stability (WGI) | An index ranging from -2.81 to 1.6102, representing the level of 'political stability and absence of violence' from low to high | WGI |
| Polity2 | An alternative measure of political institutions ranging from -10 (autocracy) to +10 (democracy). | Polity IV Project |
| Political rights | An index ranging from 1 to 7, with a higher score indicating a lower level of political | Freedom House |

| | | |
|---|---|--|
| | rights. | |
| Civil liberties | An index ranging from 1 to 7, with a higher score indicating a lower level of civil liberties. | Freedom House |
| Property rights protection | An index ranging from 10 to 95, with a higher score indicating a higher level of property rights protection. | Index of Economic Freedom (Heritage Foundation) |
| Protection of intellectual property rights | An index ranging from 1 to 7, with a higher score indicating a higher level of intellectual property rights protection. | World Bank |
| Ease of doing business | An index ranging from 0 to 10 to capture the degree of the easiness of doing business and also measure the adoption level of protective system for property rights. | World Bank |
| Legal system and property rights | An index ranging from 4.07 to 9.24, representing the quality of the legal system and property rights from low to high | Component of Economic Freedom (Fraser Institute) |
| Regulation of credit, labour, and business | An index ranging from 2.23 to 9, representing the quality of regulation of credit, labour, and business from low to high | Component of Economic Freedom (Fraser Institute) |

Table 1 Studies related to institutions affecting FDI and FDI-growth

| Selected studies | Data and sample | Empirical method | Institutional measures | Findings |
|-------------------------------|---|--|---|--|
| <i>Institutions-FDI nexus</i> | | | | |
| Drabek and Payne (2002) | 52 countries over the period 1991-1995 | Ordinary least square (OLS) and two-stage least-squares (TSLS) | Transparency (institutional) index comprising the effects of corruption, law and order, bureaucratic quality, contract viability, and expropriation risk | High levels of non-transparency (or low levels of institutional quality) can reduce the amount of FDI inflows |
| Bénassy-Quéré et al. (2007) | 52 countries over the period 1995-2000 | Gravity model and fixed effects estimation | A variety of institutional measures to represent bureaucracy, corruption, banking sector and legal institutions | Institutions are more important determinants of FDI inflows than outflows. |
| Busse and Hefeker (2007) | 83 developing countries over the period 1984-2000 | System generalised method of moments (GMM) | 12 International Country Risk Guide (ICRG) indicators including political risk (represented by internal and external conflict) | Investment profile, internal and external conflict, ethnic tensions and democratic accountability are important determinants of FDI inflows. |
| Daude and Stein (2007) | From 34 source countries to 152 host countries in 2002 | OLS and Instrumental Variables (IV) estimation | Voice and accountability, political stability and lack of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. | Government effectiveness and regulatory quality have positive effects on bilateral FDI flows. |
| Ali et al. (2010) | 107 countries over the period 1981-2005 | System GMM | propriety rights, rule of law, and expropriation risk | Institutions have a significant effect on FDI in secondary and tertiary sectors but not primary sector. |
| Khoury and Peng (2011) | 18 Latin American and Caribbean countries over the period 1990-2003 | Pooled OLS | Institutional reform of intellectual property rights (IPRs) | IPRs reform is negatively correlated to FDI inflows. |
| Buchanan et al. (2012) | 164 countries over the period 1996-2006 | OLS, IV, fixed effects and random effects | An institutional index to combine all institutional indicators from Worldwide Governance Indicators (WGI) | Institutions have a positive effect on FDI inflows |
| Li et al. (2017) | 128 developing countries covering the period 2003-2012 | System GMM | Government stability, control of corruption, law and order, | Institutions have a mixed effect, but government stability and |

| | | | | |
|---|---|---|---|--|
| | | | bureaucratic quality, democracy, and political risk (civil war/ conflict) | control of corruption are more significant than democracy, bureaucratic quality, and law and order. |
| <i>Institutions-FDI-growth/productivity nexus</i> | | | | |
| Azman-Saini et al. (2010) | 85 countries over the period 1976-2004 | System GMM | Index of Economic Freedom | FDI-induced growth is conditioned on minimum level of institutional quality |
| Alguacil et al. (2011) | 26 developing countries over the period 1976-2005 | System GMM | Index of Economic Freedom | Institutional quality has a contingent effect on the FDI-growth nexus. |
| Slesman et al. (2015) | 80 developing and developed countries over the period 1975-2005 | Hansen's (2000) threshold estimation | Institutional index using ICRG and Economic Freedom data | Institutions exert a threshold effect on growth associated with foreign capital (including FDI). |
| Jude and Levieuge (2017) | 93 developing countries over the period 1984-2009 | Panel smooth transition regression (PSTR) method | 11 institutional indicators from ICRG and some WGI measures | Institutional quality exerts a threshold effect on the FDI-growth nexus. |
| Tanna et al. (2018) | 39 developing countries over the period 1984-2010 | Hansen's (2000) and Caner and Hansen's (2004) threshold estimations | Rule of law, control of corruption, democracy, civil conflict and external debt | High external debt negatively affects the FDI-growth nexus, but financial development mitigates this effect. |
| Li and Tanna (2019) | 51 developing countries over the period 1984-2010 | System GMM | Institutional indices based on ICRG, WGI, Economic Freedom and Polity IV data | Institutions increase host countries' aggregate productivity growth from FDI inflows. |
| Hayat (2019) | 104 countries over the period 1996-2015 | System GMM | Mean of six different indicators: control of corruption, rule of law, regulatory quality, government efficiency, voice and accountability and political stability | Institutional quality enhances FDI-induced growth. |
| Aziz (2020) | 11 Arab countries over the period 1988-2012 | System GMM | Overall institutional index using principal components analysis on data from Ease of Doing Business (World Bank), ICRG, and Economic Freedom index. | Institutional quality plays an important role in enhancing economic growth via FDI inflows. |

Table 2 summary statistics

| Variable | Obs. | Mean | Std. Dev. | Min | Max | LLC | IPS | ADF | PP |
|--|------|---------|-----------|----------|-----------|-------------|-------------|-------------|-------------|
| GDP per capita growth (%) | 1326 | 1.9188 | 3.1982 | -17.0090 | 15.4081 | -19.8651*** | -14.9015*** | -6.5902*** | -21.9619*** |
| Initial income (US\$) | 1326 | 14433.5 | 15045.86 | 711.1924 | 65083.26 | 0.1231 | -1.8854** | -6.9457*** | 1.7271 |
| FDI inflows (% of GDP) | 1326 | 2.7172 | 2.9482 | -6.8977 | 23.5374 | -11.3884*** | -10.6249*** | -8.5010*** | -14.0968*** |
| Trade openness (% of GDP) | 1326 | 67.8173 | 31.4449 | 15.6356 | 220.4074 | -2.1722** | -4.3456*** | -10.0947*** | -1.5605* |
| Inflation (%) | 1326 | 12.0346 | 84.0415 | -7.7966 | 2075.8880 | -32.4789*** | -11.6748*** | -9.0561*** | -15.8773*** |
| Human capital (%) | 1326 | 66.9773 | 24.8932 | 5.3524 | 99.9083 | -10.1838*** | -18.4959*** | -1.4446* | -28.8139*** |
| Population growth (%) | 1326 | 1.7392 | 0.9355 | -0.1852 | 6.0170 | -4.9553*** | -3.0631** | -9.9462*** | -3.8025*** |
| Control of corruption (ICRG) | 1326 | 2.9536 | 1.1906 | 0 | 6 | -5.4453*** | -3.9230*** | -4.0613*** | -5.8977*** |
| Rule of law (ICRG) | 1326 | 3.5060 | 1.3579 | 0 | 6 | -12.6614*** | -5.9719*** | -6.7085*** | -7.9411*** |
| Democracy (ICRG) | 1326 | 4.1619 | 1.3933 | 0 | 6 | -9.6526*** | -2.8232*** | -5.3533*** | -4.0031*** |
| Political stability (ICRG) | 1326 | 8.9046 | 1.9200 | 0 | 12 | -9.2290*** | -3.6695*** | -4.3433*** | -5.0192*** |
| Control of corruption (WGI) | 918 | 0.0814 | 1.0183 | -1.4965 | 2.4700 | -5.6454*** | -3.2288*** | -9.1936*** | -5.3807*** |
| Rule of law (WGI) | 918 | 0.0707 | 0.9424 | -1.4796 | 2.0964 | -5.9254*** | -1.7941** | -1.5372* | -3.1838*** |
| Democracy (WGI) | 918 | 0.1399 | 0.8076 | -1.9072 | 1.8010 | -6.6516*** | -1.4546* | -4.6794*** | -3.2609*** |
| Political stability (WGI) | 918 | -0.2015 | 0.8866 | -2.8100 | 1.6102 | -6.8066*** | -2.1485** | -7.9423*** | -4.8889*** |
| Polity2 | 1274 | 5.4733 | 5.2412 | -10 | 10 | -17.4073*** | -9.5706*** | -3.7644*** | -13.2627*** |
| Political rights | 1326 | 2.9644 | 1.7779 | 1 | 7 | -7.6438*** | -5.3703*** | -4.0612*** | -7.0391*** |
| Civil liberty | 1326 | 3.1373 | 1.4812 | 1 | 7 | -5.9643*** | -4.9601*** | -2.5041*** | -6.1265*** |
| Property rights protection | 1100 | 52.7273 | 21.7484 | 10 | 95 | -8.8239*** | -3.0363*** | -5.0996*** | -4.5497*** |
| Protection of intellectual property rights | 460 | 3.7994 | 1.1004 | 1.3132 | 6.3084 | -13.5562*** | -2.5908*** | -7.3666*** | -1.5018* |
| Ease of doing business | 576 | 5.7635 | 2.5715 | 0 | 10 | 4.7632 | 2.5345 | -1.7355** | 3.1992 |
| Legal system and property rights | 852 | 6.8113 | 1.0051 | 4.07 | 9.24 | -6.9533*** | -1.8826** | -4.0145*** | -3.0996*** |
| Regulation of credit, labour, and business | 867 | 5.2014 | 1.6833 | 2.23 | 9 | -9.3275*** | -1.7438** | -3.9537*** | -4.4724*** |

Note: All the panel unit root tests include a constant term and control for cross-sectional correlations, with the lag length chosen by minimising the Akaike Information Criterion (AIC), subject to a maximum of 4 lags. All variables, except institutional ones, are represented in natural logarithms (and scaled where appropriate) for unit root tests. LLC = Levin-Lin-Chu test; IPS = Im-Pesaran-Shin test; ADF = Fisher-type Augmented Dickey-Fuller test; PP = Fisher-type Phillips-Perron (PP) test. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).

Table 3 Correlation matrix

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------------------|-----------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|----|
| 1. Initial income | 1 | | | | | | | | | |
| 2. FDI inflows | 0.061** | 1 | | | | | | | | |
| 3. Trade openness | 0.080*** | 0.169*** | 1 | | | | | | | |
| 4. Inflation | -0.114*** | -0.056** | -0.105*** | 1 | | | | | | |
| 5. Human capital | 0.470*** | 0.092*** | 0.084*** | -0.042 | 1 | | | | | |
| 6. Population growth | -0.493*** | -0.011 | 0.109*** | 0.092*** | -0.299*** | 1 | | | | |
| 7. Control of corruption | 0.562*** | 0.005 | -0.03 | -0.077*** | 0.211*** | -0.363*** | 1 | | | |
| 8. Rule of law | 0.652*** | -0.011 | 0.045* | -0.183*** | 0.303*** | -0.322*** | 0.698*** | 1 | | |
| 9. Democracy | 0.525*** | 0.121*** | 0.046* | -0.109*** | 0.315*** | -0.393*** | 0.531*** | 0.434*** | 1 | |
| 10. Political stability | 0.458*** | 0.101*** | 0.178*** | -0.143*** | 0.228*** | -0.261*** | 0.425*** | 0.556*** | 0.447*** | 1 |

Notes: Institutions are the ICRG measures here. The correlations of other institutional measures with the explanatory variables are similar and therefore excluded from the table, most of which are highly correlated as with the ICRG measures. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).

Table 4 The impact of institutions on the FDI-growth nexus: full-sample results

| | ICRG institution measures | | | | WGI institution measures | | | |
|--|---------------------------|--|------------------------|------------------------|--------------------------|--|------------------------|-----------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| p-value of threshold test | 0.7067 | 0.0000*** | 0.8500 | 0.2100 | 0.5000 | 0.0333** | 0.4967 | 0.5333 |
| Threshold value (γ) | | 8.5000 | | | | -0.5897 | | |
| Confidence intervals | | [8.4375, 8.5417] | | | | [-0.5907, -0.5885] | | |
| | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | |
| FDI | 0.0046** (0.0019) | -0.0013 0.0053*** (0.0022) (0.0018) | 0.0059*** (0.0019) | 0.0059*** (0.0019) | 0.0119*** (0.0037) | 0.0076* 0.0123*** (0.0041) (0.0038) | 0.0117*** (0.0038) | 0.0116*** (0.0038) |
| Initial income | -0.0340*** (0.0057) | -0.0318*** (0.0054) | -0.0390*** (0.0060) | -0.0301*** (0.0055) | -0.0351*** (0.0074) | -0.0326*** (0.0074) | -0.0355*** (0.0075) | - (0.0075) |
| Inflation | 0.0005 (0.0013) | -0.0017 (0.0014) | -0.0016 (0.0014) | -0.0015 (0.0014) | -0.0123*** (0.0033) | -0.0116*** (0.0033) | -0.0134*** (0.0033) | - (0.0033) |
| Human capital | 0.0251*** (0.0048) | 0.0257*** (0.0055) | 0.0293*** (0.0056) | 0.0299*** (0.0056) | 0.0421*** (0.0108) | 0.0458*** (0.0109) | 0.0441*** (0.0110) | 0.0403*** (0.0108) |
| Trade openness | 0.0056* (0.0031) | 0.0193*** (0.0048) | 0.0170*** (0.0049) | 0.0171*** (0.0049) | 0.0151** (0.0059) | 0.0185*** (0.0060) | 0.0151** (0.0059) | 0.0144** (0.0059) |
| Population growth | -0.0014 (0.0016) | -0.0011 (0.0017) | -0.0007 (0.0018) | -0.0006 (0.0018) | -0.0013 (0.0017) | -0.0012 (0.0017) | -0.0013 (0.0017) | -0.0008 (0.0017) |
| Democracy | 0.0022** (0.0009) | | | | 0.0245*** (0.0048) | | | |
| Political stability | | 0.0062*** (0.0009) | | | | 0.0142*** (0.0034) | | |
| Rule of law | | | 0.0005 (0.0015) | | | | 0.0162*** (0.0057) | |

| | | | | | | | | |
|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Control of corruption | | | | 0.0009 (0.0014) | | | | 0.0198*** (0.0056) |
| Constant | 0.0900*** (0.0167) | 0.2638*** (0.0490) | 0.3071*** (0.0508) | 0.2794*** (0.0495) | 0.3505*** (0.0667) | 0.2638*** (0.0490) | 0.3558*** (0.0676) | 0.3476*** (0.0673) |
| N (n) | 1326 (51) | 1326 (51) | 1326 (51) | 1326 (51) | 918 (51) | 918 (51) | 918 (51) | 918 (51) |
| R² | 0.0972 | 0.0974 | 0.0972 | 0.0973 | 0.0970 | 0.0974 | 0.0969 | 0.0969 |

Note: All variables except institutions and intercept dummies are represented in natural logarithms. N and n are number of observations and number of countries respectively. Estimation by Hansen's (1999) threshold method. Standard errors are reported in parenthesis (below coefficient estimates). Dependent variable is real GDP per capita growth. The institutional variable in each column served as the threshold variable for testing the impact of FDI on growth. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).

Table 5 The impact of institutions on the FDI-growth nexus in developing and developed countries

| | ICRG institution measures | | | | WGI institution measures | | | |
|---|---------------------------|--|------------------------|------------------------|--------------------------|--|------------------------|-------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| <i>Panel A: Developing countries</i> | | | | | | | | |
| p-value of threshold test | 0.7433 | 0.0000*** | 0.3400 | 0.3167 | 0.6267 | 0.0500** | 0.8700 | 0.4733 |
| Threshold value (γ) and confidence intervals | | 8.5000 [8.4375, 8.5417] | | | | -0.6866 [-0.6926, -0.6855] | | |
| | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | |
| FDI | 0.0049** (0.0022) | -0.0014 0.0048 ** (0.0025) (0.0020) | 0.0051** (0.0024) | 0.0051** (0.0024) | 0.0167** (0.0065) | 0.0152 0.0198*** (0.0536) (0.0052) | 0.0167** (0.0068) | 0.0169** (0.0066) |
| Initial income | -0.0295*** (0.0098) | -0.0321*** (0.0066) | -0.0247*** (0.0088) | -0.0256*** (0.0088) | -0.0370*** (0.0111) | -0.0357*** (0.0086) | -0.0366*** (0.0112) | -0.0365 *** (0.0109) |
| Inflation | -0.0007 (0.0017) | -0.0012 (0.0015) | -0.0011 (0.0018) | -0.0010 (0.0018) | -0.0097* (0.0057) | -0.0093** (0.0036) | -0.0105* (0.0060) | -0.0099 (0.0059) |
| Human capital | 0.02679*** (0.0084) | 0.0252*** (0.0061) | 0.0267*** (0.0095) | 0.0258*** (0.0090) | 0.0337*** (0.0112) | 0.0375*** (0.0119) | 0.0371*** (0.0138) | 0.0343** (0.0143) |
| Trade openness | 0.0130** (0.0059) | 0.0149*** (0.0057) | 0.0166* (0.0096) | 0.0168*** (0.0058) | 0.0126* (0.0069) | 0.0171** (0.0070) | 0.0141** (0.0070) | 0.0129* (0.0069) |
| Population growth | -0.0081 (0.0061) | -0.0097* (0.0057) | -0.0086 (0.0065) | -0.0073 (0.0065) | -0.0316*** (0.0096) | -0.0306*** (0.0079) | -0.0289*** (0.0092) | -0.0287*** (0.0086) |
| Democracy | 0.0039** (0.0019) | | | | 0.0248** (0.0094) | | | |
| Political stability | | 0.0064*** (0.0010) | | | | 0.0167*** (0.0036) | | |
| Rule of law | | | 0.0019 (0.0016) | | | | 0.0133* (0.0078) | |
| Control of corruption | | | | -0.0011 (0.0021) | | | | 0.0238 ** (0.0093) |
| Constant | 0.2415*** (0.0833) | 0.2110*** (0.0542) | 0.2100** (0.0792) | 0.2312 *** (0.0792) | 0.2435** (0.1016) | 0.2460*** (0.0757) | 0.2520** (0.1018) | 0.2555** (0.1006) |
| N (n) | 988 (38) | 988 (38) | 988 (38) | 988 (38) | 988 (38) | 684 (38) | 684 (38) | 684 (38) |
| R² | 0.0613 | 0.0901 | 0.0527 | 0.0519 | 0.1190 | 0.1152 | 0.0963 | 0.1076 |
| <i>Panel B: Developed countries</i> | | | | | | | | |

| p-value of threshold test | 0.8899 | 0.0000*** | | 0.6770 | 0.4267 | 0.2300 | 0.0920* | | 0.5667 | 0.5367 |
|---|------------------------|--|----------------------|------------------------|------------------------|------------------------|--|-----------------------|------------------------|-------------------------|
| Threshold value (γ) and confidence intervals | | 8.9167** [8.8975, 8.9333] | | | | | 0.4939 [0.4895, 0.4984] | | | |
| | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | | | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | | |
| FDI | 0.0098*** (0.0034) | 0.0003 (0.0056) | 0.0105** (0.0048) | 0.0110** (0.0030) | 0.0114*** (0.0025) | 0.0067** (0.0029) | -0.0011 (0.0058) | 0.0037*** (0.0005) | 0.0052 (0.0031) | 0.0048* (0.0024) |
| Initial income | -0.0710*** (0.0114) | -0.0663*** (0.0123) | | -0.0747*** (0.0091) | -0.0681*** (0.0098) | -0.0864*** (0.0154) | -0.0737*** (0.0172) | | -0.0915*** (0.0179) | -0.0787 *** (0.0121) |
| Inflation | -0.0081 (0.0082) | -0.0141** (0.0066) | | -0.0096 (0.0092) | -0.0108 (0.0086) | -0.0211* (0.0098) | -0.0208** (0.0103) | | -0.0308** (0.0101) | -0.0274** (0.0096) |
| Human capital | 0.0421** (0.0167) | -0.0040 (0.0205) | | 0.0071 (0.0194) | -0.0125 (0.0209) | 0.0679*** (0.0174) | 0.0563 (0.0345) | | 0.0471* (0.0241) | 0.0328 (0.0217) |
| Trade openness | 0.0331** (0.0126) | 0.0149*** (0.0057) | | 0.0369** (0.0133) | 0.0511** (0.0173) | 0.0339*** (0.0099) | 0.0362*** (0.0126) | | 0.0340*** (0.0089) | 0.0316*** (0.0101) |
| Population growth | 0.0011 (0.0011) | 0.0011 (0.0015) | | 0.0014 (0.0011) | 0.0022 (0.0013) | 0.0011 (0.0009) | 0.0010*** (0.0015) | | 0.0009 (0.0008) | 0.0013 (0.0012) |
| Democracy | -0.0076 (0.0051) | | | | | 0.0579*** (0.0091) | | | | |
| Political stability | | 0.0041** (0.0019) | | | | | 0.0213** (0.0096) | | | |
| Rule of law | | | | -0.0040 (0.0052) | | | | | 0.0306*** (0.0087) | |
| Control of corruption | | | | | 0.0088** (0.0039) | | | | | 0.0175 (0.0203) |
| Constant | 0.8121*** (0.0998) | 0.6842*** (0.1358) | | 0.8450*** (0.0984) | 0.7340*** (0.1060) | 0.8305*** (0.1688) | 0.7349*** (0.1768) | | 0.8799*** (0.1847) | 0.7747*** (0.1463) |
| N (n) | 338 (13) | 338 (13) | | 338 (13) | 338 (13) | 234 (13) | 234 (13) | | 234 (13) | 234 (13) |
| R ² | 0.1295 | 0.1635 | | 0.1302 | 0.1638 | 0.1426 | 0.1241 | | 0.1273 | 0.1121 |

Note: All variables except institutions and intercept dummies are represented in natural logarithms. N and n are number of observations and number of countries respectively. Estimation by Hansen's (1999) threshold method. Standard errors are reported in parenthesis (below coefficient estimates). Dependent variable is real GDP per capita growth. The institutional variable in each column served as the threshold variable for testing the impact of FDI on growth. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).

Table 6 The impact of alternative institutional measures on the FDI-growth nexus

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| p-value of threshold test | 0.7300 | 0.2833 | 0.3000 | 0.5333 | 0.3667 | 0.3233 | 0.1833 | 0.6100 |
| FDI | 0.0058*** (0.0019) | 0.0059*** (0.0019) | 0.0055*** (0.0019) | 0.0130*** (0.0036) | 0.0025 (0.0061) | 0.0091* (0.0049) | 0.0132*** (0.0039) | 0.0098** (0.0038) |
| Initial income | -0.0319*** (0.0056) | -0.0319*** (0.0054) | -0.0337*** (0.0055) | -0.0332*** (0.0067) | -0.0980*** (0.0235) | -0.1008*** (0.1592) | -0.0483*** (0.0095) | -0.0399*** (0.0088) |
| Inflation | -0.0015 (0.0014) | -0.0016 (0.0014) | -0.0014 (0.0014) | -0.0081*** (0.0029) | -0.0206 (0.0062) | -0.0120** (0.0051) | -0.0166*** (0.0039) | -0.0164*** (0.0038) |
| Human capital | 0.0274*** (0.0059) | 0.0285*** (0.0056) | 0.0273*** (0.0056) | 0.0202** (0.0093) | 0.1523*** (0.0463) | 0.1036*** (0.0311) | 0.0678*** (0.0169) | 0.0335* (0.0173) |
| Trade openness | 0.0183*** (0.0049) | 0.0166*** (0.0049) | 0.0156*** (0.0049) | 0.0137** (0.0055) | 0.0607*** (0.0137) | 0.0388*** (0.0102) | 0.0311*** (0.0068) | 0.0365*** (0.0065) |
| Population growth | -0.0007 (0.0018) | -0.0007 (0.0018) | -0.0008 (0.0018) | -0.0012 (0.0017) | -0.0004 (0.0018) | -0.0001 (0.0017) | -0.0003 (0.0016) | -0.0006 (0.0016) |
| Polity2 | 0.0004 (0.0003) | | | | | | | |
| Political rights | | -0.0021** (0.0010) | | | | | | |
| Civil liberty | | | -0.0046*** (0.0016) | | | | | |
| Property rights protection | | | | 0.0004*** (0.0001) | | | | |

| | | | | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Protection of intellectual property rights | | | | | 0.0064*** (0.0023) | | | |
| Ease of doing business | | | | | | 0.0071*** (0.0026) | | |
| Legal system and property rights | | | | | | | 0.0096*** (0.0027) | |
| Regulation of credit, labour, and business | | | | | | | | 0.0215*** (0.0035) |
| Constant | 0.3142*** (0.0503) | 0.3237*** (0.0498) | 0.3519*** (0.0514) | 0.3650*** (0.0627) | 0.8628*** (0.2082) | 0.8962*** (0.1405) | 0.3935*** (0.0816) | 0.2689*** (0.0818) |
| N (n) | 1274 (49) | 1326 (51) | 1326 (51) | 1100 (50) | 414 (46) | 528 (48) | 784 (49) | 816 (51) |
| R² | 0.0972 | 0.0973 | 0.0973 | 0.0970 | 0.1232 | 0.1410 | 0.1244 | 0.1381 |

Note: All variables except institutions and intercept dummies are represented in natural logarithms. N and n are number of observations and number of countries respectively. Estimation is by Hansen's (1999) threshold method. Standard errors are reported in parenthesis (below coefficient estimates). Dependent variable is real GDP per capita growth. The institutional variable in each column served as the threshold variable for testing the impact of FDI on growth. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).

Table 7 Dealing with endogeneity (using lagged values)

| | 1 | 2 | 3 | 4 |
|--|------------------------|--|------------------------|------------------------|
| p-value of threshold test | 0.6167 | 0.0067*** | 0.6067 | 0.2100 |
| Threshold value (γ) | | 8.5000 | | |
| Confidence intervals | | [8.4375, 8.5417] | | |
| | | $\widehat{\beta}_1 \leq \gamma$ $\widehat{\beta}_2 > \gamma$ | | |
| FDI (-1) | 0.0016* (0.0010) | -0.0046** 0.0018*** (0.0022) (0.0002) | 0.0017* (0.0010) | 0.0018* (0.0010) |
| Initial income | -0.0327*** (0.0083) | -0.0290*** (0.0056) | -0.0287*** (0.0080) | -0.0301*** (0.0080) |
| Inflation (-1) | 0.0038** (0.0016) | 0.0029** (0.0013) | 0.0035* (0.0018) | 0.0035* (0.0018) |
| Human capital (-1) | 0.0333*** (0.0094) | 0.0296*** (0.0056) | 0.0335*** (0.0107) | 0.0325*** (0.0104) |
| Trade openness (-1) | 0.0056 (0.0078) | 0.0120** (0.0050) | 0.0087 (0.0076) | 0.0081 (0.0076) |
| Population growth (-1) | -0.0037 (0.0024) | -0.0041** (0.0017) | -0.0036 (0.0025) | -0.0036 (0.0024) |
| Democracy | 0.0045** (0.0018) | | | |
| Political stability | | 0.0065*** (0.0009) | | |
| Rule of law | | | 0.0007 (0.0019) | |
| Control of corruption | | | | -0.0014 (0.0015) |
| Constant | 0.2913*** (0.0737) | 0.2127*** (0.0520) | 0.2741*** (0.0737) | 0.2932*** (0.0731) |
| N (n) | 1275 (51) | 1275 (51) | 1275 (51) | 1275 (51) |
| R² | 0.0619 | 0.0892 | 0.0501 | 0.0508 |

Note: All variables except institutions and intercept dummies are represented in natural logarithms. N and n are number of observations and number of countries respectively. Estimation is by Hansen's (1999) threshold method. Standard errors are reported in parenthesis (below coefficient estimates). Dependent variable is real GDP per capita growth. The institutional variable in each column served as the threshold variable for testing the impact of FDI on growth. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).

Table 8 Dealing with endogeneity (alternative estimation)

| | 1 | | 2 | |
|-----------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|
| p-value of threshold test | 0.0000*** | | 0.0000*** | |
| | $\widehat{\beta}_1 \leq \gamma$ | $\widehat{\beta}_2 > \gamma$ | $\widehat{\beta}_1 \leq \gamma$ | $\widehat{\beta}_2 > \gamma$ |
| FDI | -0.1525*** (0.0387) | 0.1539*** (0.0339) | -0.1486*** (0.0382) | 0.1336*** (0.0388) |
| Initial income | -0.0667*** (0.0119) | -0.1263** (0.0509) | -0.0139 (0.0154) | -0.5916*** (0.0703) |
| Inflation | 0.0160*** (0.0047) | -0.0044*** (0.0011) | -0.0470*** (0.0163) | 0.0184* (0.0096) |
| Human capital | 0.0489 (0.0532) | 0.0942 (0.0818) | 0.2899*** (0.0870) | 1.1044*** (0.1627) |
| Trade openness | -0.0155 (0.0279) | 0.0775*** (0.0253) | 0.0880*** (0.0277) | -0.0001 (0.0358) |
| Population growth | 0.0910** (0.0384) | -0.1004** (0.0436) | -0.0521 (0.0348) | 0.0522 (0.0348) |
| Political stability (ICRG) | -0.0048 (0.0057) | -0.0012 (0.0046) | | |
| Political stability (WGI) | | | -0.0641 (0.1878) | 0.0710*** (0.0112) |
| N (n) | 1248 (48) | | 735 (49) | |

Note: All variables except institutions and intercept dummies are represented in natural logarithms. N and n are number of observations and number of countries respectively. Estimation uses the threshold method of Seo and Shin (2016). Standard errors are reported in parenthesis (below coefficient estimates). Dependent variable is real GDP per capita growth. The institutional variable in each column served as the threshold variable for testing the impact of FDI on growth. *** Statistical significance at 1% level (p-value < 0.01); ** Statistical significance at 5% level (p-value < 0.05); * Statistical significance at 10% level (p-value < 0.1).