

Nexus between Ease of Doing Business and Foreign Direct Investment: Evidence from 130 Economies

Xinxin Xu¹, Yue Hu^{2,*}, and Safdar Husain Tahir³

¹Business School, Chengdu University, Chengdu, 610106, People's Republic of China

²Chengdu University of Information Technolog, Chengdu, 610103, People's Republic of China

³LYALLPUR BUSINESS SCHOOL Government College University, Faisalabad,38000,Pakistan

Abstract. Based on both yearly data of 130 economies, this paper studies the association between the ease of doing business and FDI from three characteristics, i.e., internationalization, legalization, and facilitation. The results demonstrate that the ease of doing business and its three characteristics, i.e., internationalization, legalization, and facilitation all have a statistical positive influence in attracting FDI inflows. Second, this paper finds that in the legalization of doing business, the resolving insolvency indicator is the most statistically positive on attracting FDI, and in the facilitation of doing business, the paying taxes indicator plays an essential role in attracting FDI. Third, this paper finds that the ease of doing business has a vital impact on FDI inflows in developing countries, but not significant for developed countries. The implications of this paper are helpful for local governments optimizing their business environment to attract FDI. **Keywords:** Investments, Business machines, International trade.

1 Introduction

According to United Nations Conference on Trade and Development (UNCTAD), global FDI flows dropped by 35 percent from \$1.5 trillion in 2019 to \$1 trillion in 2020, which is almost 20 percent below 2009 trough after the global financial crisis [1]. Foreign investors are more attracted by stable business environment than low taxes, low labor costs, and rich natural resources [2]. UNCTAD also aware of the change, claiming that foreign investment geared towards exploiting factors of resources and low-cost labor are shrinking [3]. Whether the ease of doing business can influence investor's motivation of FDI? What factors of business environment can pull FDI effectively? Whether this impact has heterogeneity for different country pattern and time period? Research on these questions is of significant concern in academia and helpful for both host country and home country. Home country investors can select the most attractive FDI host countries; for host countries, to expand the scale of FDI, the government can focus on improving the specific aspects of business environment that the foreign investors care about most.

However, the previous research mainly studies the motivation factors of FDI from aspects of economy, resource endowment, and institution difference. This is consistent with Dunning's eclectic paradigm of FDI which proposed three motivations of markets-seeking, resource-seeking, and efficiency-seeking for FDI [4]. Market size has been a popular variable

*e-mail: huyue0818@stu.cdu.edu.cn

in previous research and has proven to be positively related to FDI [5–7]; market size expansion stimulates market demand, decreases marginal costs for foreign investors, and assists in achieving better economies of scale [8]. The natural resources have been found to be a key motivator in vertical FDI activities that need scarce or cheaper resources for the downstream production chain [9]. Institutional factors are incorporated into the eclectic paradigm by Dunning and Lundan [10] when studying developing countries. The institutional distance between the home country and host country plays an important role in FDI location choice, the greater the level of institutional risk in the home country, the less sensitive to institutional risk the foreign investors tend to be. A few research studied the FDI motivation from the aspect of business environment, and most of them agree that the ease of doing business is positive to attract FDI [11–14]. Pineli et al. [15] pointed out that lowering market entry barriers of host country pulls FDI significantly. Shammari et al. [16] found that trade openness, location advantage, and investment agreement of international trade are more important for efficiency-seeking FDI. For further study, this paper analyzes how the ease of doing business affects FDI inflows from three perspectives, i.e., internationalization, legalization, and facilitation.

First, this paper examines how the ease of doing business attract FDI inflows in 130 economies. It finds that the ease of doing business has a statistical influence on attracting FDI inflows. Second, this paper finds that in the legalization of doing business, the resolving insolvency indicator is the most statistically positive on attracting FDI, and in the facilitation of doing business, the paying taxes indicator plays an essential role in attracting FDI. Third, this paper explores whether the role of doing business in motivating FDI has heterogeneity between developing and developed countries. It shows that the ease of doing business has a vital impact on FDI in developing countries, but not significant for developed countries. Finally, based on the empirical results, this paper contributes for governments to take actions that can optimize their business environment to attract FDI.

This paper is structured as follows. Section 2 first provides the literature review and hypotheses development. Section 3 introduces the data and model used to estimate the relationship between doing business and FDI. Section 4 presents and discusses the empirical study results and addresses the robustness of the results, and Section 5 concludes the paper.

2 Literature Review and Hypothesis Development

2.1 Ease of Doing Business and FDI

Dunning [4] proposed the OLI paradigm, which summarized that foreign investors mainly consider the ownership-specific endowment, location-specific endowment, and internalization endowment of a region when making an investment decision. Among the three factors, the location-specific endowment is the most important factor to attract FDI, which includes two aspects: one is the advantage of the host country's immovable factor endowment, such as rich natural resources and convenient geographical location. The other is the host country's economic system and flexible policies formed favorable conditions and good infrastructure. The theory shows that an economy can not only rely on rich natural resources, low labor costs, and superior geographical location to build its location-specific endowment, but also rely on its economic system, flexible policies, and a stable business environment.

As the World Bank's Doing Business 2020 states, the ease of doing business is a valuable tool that local governments can use to improve their location-specific endowment [2]. Because the ease of doing business evaluate one region's business environment from ten indicators, i.e., trading across borders, protecting minority investors, getting credit, enforcing

contracts, resolving insolvency, starting a business, dealing with construction permits, getting electricity, registering property, and paying taxes. To attract FDI, many researchers have studied the relationship between FDI and the ease of doing business. Cai [17] proved that a one-level increase in a country's doing-business ranking could result in more than 44 million dollars for the government. However, Jayasuriya [18] showed that the effect of an improved ranking on FDI inflows is positive but not statistically significant. Based on the previous studies, this paper tested the relationship between the ease of doing business and FDI inflows by proposing the following hypothesis:

Hypotheses 1. The ease of doing business is positively related to FDI inflows

The transaction cost theory put forward by Coase [19] plays a significant role in studying FDI [20]. Furthermore, Dahlman [21] proposed that transaction costs include searching for information, negotiating and making decisions, developing contracts, and supervising and executing transactions. In other words, the theory argues that reducing the cost of each link in the transaction is conducive to attracting FDI. The ease of doing business is divided into ten indicators: starting a business, getting credit, dealing with construction permits, registering property, protecting minority investors, getting electricity, paying taxes, trading across borders, enforcing contracts, and resolving insolvency. These indicators, which relate to the costs and duration of doing business in full compliance with regulations [22], represent the legalization, internationalization, and facilitation of the business environment.

First, internationalization is an essential step for optimizing the business environment. The internationalized business environment is conducive to enhancing the adaptability of transnational enterprises, lessening the differences between the home and host countries of multinational enterprises, and reducing the costs of searching for information and of negotiation and decision-making. The only indicator representing the internationalization of doing business is trading across borders, which refers to the flow of goods and services across international land borders [23], and which could improve international competitiveness by streamlining the transaction process and reducing the cost of the transaction [24]. Groenewald and Grater [25] constructed a trade facilitation index for policymakers to improve their transaction performance. This paper proposes the following hypothesis: . *Hypotheses 2.* Foreign direct investment is more attracted to the internationalized business environment.

The facilitation of the business environment draws multinational enterprises into host markets by lowering entry barriers and reduces time costs by simplifying approval procedures [26, 27]. Moreover, facilitation is measured by five indicators: starting a business, getting electricity, dealing with construction permits, registering property, and paying taxes. In recent studies, Mahuni and Bonga [28] analyzed how Zimbabwe performed on the ease of doing business indicators and their effects on FDI inflows. They found that paying taxes and getting electricity had a significant positive impact on FDI inflows. Yu et al. [29] found that the tax burden of the host country may only play a "marginal" role in attracting FDI and that tax facilitation has a much more significant positive affect on attracting FDI, which means investors pay more attention to the degree of political transparency and efficiency rather than the host country's tax rate. This paper proposes the following hypothesis:

Hypotheses 3. Foreign direct investment is more attracted to the convenient business environment.

The legalization of the business environment can weaken or overcome the disadvantages to outsiders [30] and reduce the cost of rent-seeking [31] by providing enterprises with safe, reliable, orderly, and fair security. Four indicators can measure it, including protecting minority investors, resolving insolvency, enforcing contracts, and getting credit. Hanusch [32] examined the ease of doing business indicators and found that getting credit and enforcing contracts are the most vital for economic growth. Nangpiire et al. [13] found that protecting minority investors and resolving insolvency in a region are statistically significant in influenc-

ing FDI in that region. Therefore, this paper used the legalization of the business environment as an independent variable and proposed the following hypothesis:

Hypotheses 4. Foreign direct investment is more attracted to the regulated business environment.

2.2 Ease of Doing Business and FDI in Different Country Pattern

According to the human development index, GDP per capita, and level of industrialization, the global economies can be divided into developed and developing countries. Developed countries refer to those productivity level is highly developed, gross domestic product is relatively high, and industrial structure advanced country. Developing countries refer to those regions whose economy, technology, and people's living standards are lower than those of developed countries.

In previous studies, Morris and Aziz [33] discussed the factors influencing FDI in developing countries. They found that two factors are related to FDI: registering property and trading across borders. However, Corcoran and Gillanders [34] found that the doing business rank is significant when included in a standard empirical analysis of FDI. The relationship is significant for middle-income countries but not for developed countries. Given the confusion in previous studies, this paper further tests the heterogeneity of the ease of doing business and FDI inflows in developed and developing countries. Therefore, this paper proposed the following hypothesis:

Hypotheses 5. The ease of doing business has a more significant impact on FDI inflows to developing countries than developed countries.

3 The Data and Methodology

3.1 Dependent Variable

The dependent variable is represented by FDI, which is the net flow of foreign direct investment to the host country in current US dollars. The FDI data on 130 economies are available from the World Bank's World Development Indicators database. Moreover, the negative value data are processed by referring to the method of Yeyati and Panizza [35].

3.2 Independent Variables

Based on the hypotheses developed in Section 2, the independent variables are selected as follows. The ease of doing business score (*EODB*) assesses the absolute level of regulatory performance in doing business over time. The *EODB* ranges from 0 to 100, where 100 represents the best performance, and 0 represents the worst performance. The data are available from Doing Business 2010-2020.

The ease of doing business indicators include starting a business, dealing with construction permits, getting credit, getting electricity, registering property, protecting minority investors, paying taxes, enforcing contracts, trading across borders, and resolving insolvency. To examine the different effects of these indicators on FDI, this paper sorts the independent variables into three categories: internationalization, legalization, and facilitation.

(1) Internationalization Variable

The variable that describes the internationalization characteristic of doing business is trading across borders (*TRA*), which best reflects the internationalized business environment. The *TRA* indicator is calculated by the time and the costs required to export product with

comparative advantage and import products. The data are taken from the World Bank's Doing Business 2010-2020.

(2) Legalization Variables

The variables that describe the legalization characteristic of doing business include four indicators: protecting minority investors (*MIN*), getting credit (*CRE*), enforcing contracts (*CONT*), and resolving insolvency (*INSOL*). The *MIN* indicator means protecting minority shareholders' rights and is measured by the extent of disclosure, the extent of director liability, and the strength of minority investor protection, etc. The *CRE* indicator measures credit information systems, focusing on the strength of legal rights and the depth of credit information [36]. The *CONT* indicator measures the time and costs required to resolve a commercial dispute and the quality of the judicial processes [36]. The *INSOL* indicator is built by the duration, cost, outcome, and recovery rate of commercial insolvency and the strength of the legal framework for insolvency. The data of the four indicators are from the World Bank's Doing Business 2010-2020.

(3) Facilitation Variables

The variables that describe the facilitation characteristic of doing business include five indicators, i.e., starting a business (*START*), dealing with construction permits (*CONS*), getting electricity (*ELE*), registering property (*PROP*), and paying taxes (*TAX*). The *START* indicator is measured by the procedures, time, and cost required to start a limited liability company. The *CONS* indicator is measured by the procedures, time, and cost required to complete all formalities in the construction permitting system [36]. The *ELE* indicator is measured by the procedures, time, and cost needed to the reliability of the electricity supply, etc. The *PROP* indicator is measured by the procedures, time, and cost required to transfer a property and the quality of the land administration system. The *TAX* indicator is measured by the payments, time, total tax, and contribution rate required for a firm to comply with all relevant tax regulations [36]. The data of the five indicators are collected from the World Bank's Doing Business 2010-2020.

3.3 Moderating Variables

According to hypotheses 5, one moderating variable are established. *CT* means different levels of country development, which equals 1 if one country is a developed country and equals 0 if one country is a developing country.

3.4 Control Variables

Referring to Zhang [37], this paper controls an additional number of variables that may influence the attraction of FDI inflows. The control variables are natural resources (*Resource*), technology level (*Tech*), labor force (*Labor*), inflation (*Inflation*), market openness (*Open*), and GDP growth (*GDPg*). Natural resources (*Resource*) are the unique location advantage and substantial revenue source of some regions [38], which will attract resource-seeking FDI. Shittu and Musibau [39] found that most FDI inflows to MENA region depend on natural resources. The technology level (*Tech*) represents the production efficiency of the host country, which can meet the large-scale production requirements of multinational enterprises. The labor force (*Labor*) variable represents the total population between the ages of 15 and 64, which could show that the country's labor could support the production of enterprises. Inflation (*Inflation*) has been commonly used as a measure of macroeconomic stability in the host country. Boateng et al. [40] observed that inflation is significantly negative for FDI. Market openness (*Open*) captures the openness level of the host country, which indicates whether there will be reduced communication barriers between multinational

enterprises [26]. It is measured by merchandise trade as a percentage of GDP. GDP growth ($GDPg$) represents the level of economic development of the host country, which has been perceived as an essential driver in attracting FDI [37]. It is measured by the annual growth rate of GDP in current US dollars. All the data of the control variables are collected from the World Bank’s World Development Indicators database.

The various characteristics of the ease of doing business and the corresponding indicators are presented in table 1. The description and sources of all variables are presented in table 2.

Table 1. Summary of the ten indicators of doing business

Characteristics	Indicator	Description
Internationalization	Trading across borders (TRA)	Time and cost required to export product with comparative advantage and import products
	Protecting minority investors (MIN)	Protecting minority shareholders’ rights in related-party transactions and in corporate governance
Legalization	Getting credit (CRE)	Movable collateral laws and credit information systems
	Enforcing contracts (CONT)	Time and cost required to resolve a commercial dispute and the quality of the judicial processes
	Resolving insolvency (INSOL)	Duration, cost, outcome, and recovery rate of a commercial insolvency and the strength of the legal framework for insolvency
	Starting a business (START)	Procedures, time, cost, and paid-in minimum capital required to start a limited liability company
Facilitation	Dealing with construction permits (CONS)	Procedures, time, and cost required to complete all formalities to build a warehouse and comply with the quality control and safety mechanisms in the construction permitting system
	Getting electricity (ELE)	Procedures, time, and cost required to connect to the electrical grid; the reliability of the electricity supply; and the transparency of tariffs
	Registering property (PROP)	Procedures, time, and cost required to transfer a property and the quality of the land administration system for men and women
	Paying taxes (TAX)	Payments, time, and total tax and contribution rate required for a firm to comply with all relevant tax regulations

Note: Doing business also measures regulations on employing workers and contracting with the government, which are not included in the ease of doing business score and ranking.

3.5 Methodology

Unlike the previous studies, this paper explores the association between the ease of doing business and FDI from three aspects, i.e., internationalization, legalization, and facilitation. Based on the hypotheses developed in Section 2, and learning the research methodology [41], the basic estimation equations are expressed as follows:

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln EODB_{i,t} + \beta_2 Resource_{i,t} + \beta_3 Tech_{i,t} + \beta_4 \ln Labor_{i,t} + \beta_5 Inflation_{i,t} + \beta_6 Open_{i,t} + \beta_7 GDPg_{i,t} + u_{i,t} \tag{1}$$

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln EODB_{inter}_{i,t} + \beta_2 Resource_{i,t} + \beta_3 Tech_{i,t} + \beta_4 \ln Labor_{i,t} + \beta_5 Inflation_{i,t} + \beta_6 Open_{i,t} + \beta_7 GDPg_{i,t} + u_{i,t} \tag{2}$$

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln EODB_{legal}_{i,t} + \beta_2 Resource_{i,t} + \beta_3 Tech_{i,t} + \beta_4 \ln Labor_{i,t} + \beta_5 Inflation_{i,t} + \beta_6 Open_{i,t} + \beta_7 GDPg_{i,t} + u_{i,t} \tag{3}$$

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln EODB_{facil}_{i,t} + \beta_2 Resource_{i,t} + \beta_3 Tech_{i,t} + \beta_4 \ln Labor_{i,t} + \beta_5 Inflation_{i,t} + \beta_6 Open_{i,t} + \beta_7 GDPg_{i,t} + u_{i,t} \tag{4}$$

4 Results of the Analysis and Discussion

4.1 Estimation Results of the Basic Model with Different Country Patterns

The estimation results of hypothesis 1 and hypothesis 5 are shown in table 3. The first column shows the estimation results of the model with $EODB$ as an independent variable in

Table 2. Variable names and definitions

Variable Type	Variable	Description	Source
Dependent Variable	FDI	Foreign direct investment; net inflows (current US dollars)	World Development Indicators database
Independent Variables	EODB	The ease of doing business score	Doing Business 2010-2020
	<i>EODB_{nter}</i>	The internationalization of doing business	Doing Business 2010-2020
	<i>EODB_{egal}</i>	The legalization of doing business	Doing Business 2010-2020
	<i>EODB_{acil}</i>	The facilitation of doing business	Doing Business 2010-2020
Moderating Variables Control Variables	CT	If one country is the developed country, it takes 1 and, otherwise, 0	World Development Indicators database
	Resource	Fuels, ores, and metals exports as a share of GDP	World Development Indicators database
	Tech	High-technology exports (% of manufactured exports)	World Development Indicators database
	Labor	Population ages 15 to 64 (total)	World Development Indicators database
	Inflation	GDP deflator (annual %)	World Development Indicators database
	Open	Merchandise trade (% of GDP)	World Development Indicators database
		GDP growth (annual %)	World Development Indicators database

130 economies, the second column shows the estimation results of the model of developing countries, and the third column shows the estimation results of the model of developed countries.

For 130 economies, the results show that the *EODB* variable, which has been found to be statistically significant with FDI in previous studies [14, 18, 34, 42], significantly affects FDI in this paper.

For developed countries, the results show that the ease of doing business is statistically positive with FDI inflows, but it is not significant, which consists with Corcoran and Gillanders [34], which expressed that the doing business rank is not significant for FDI in developed countries. Among the control variables, the variable has a significant effect on FDI in all developed countries at the 10% level, and the *Tech* is the most significant variable affecting FDI inflows to developed countries. The *Resource*, *Open*, and *GDPg* variables are statistically positive with FDI inflows, but they are not significant. And *Inflation* variable is negative with FDI, indicating that the higher the inflation rate, the less FDI inflows to the developed countries. These estimation results mean that foreign investors are more interested in the technological capabilities and high-quality labor force of developed countries.

For developing countries, the results show that the ease of doing business significantly affects FDI inflows at 1% level, which contradicts the view that most FDI inflows to developing countries are only dependent on natural resources and cheaper labor force [39]]. And the result is consistent with the view that the FDI is changing, more foreign investors are attracted by a stable business environment and reasonable regulation policy. Among the control variables, the *Labor* variable has a significant effect on FDI inflows at 1% level, the *Resource* variable and *Open* variable both impact on FDI inflows at 5% level, and the *Tech* variable is positively correlated with FDI inflows at 10% level, indicating that the FDI to developing countries are still pulled by natural resources, labor force, and technological capabilities to attract FDI, but these variable are not the most important influencing factors. This is mainly because, on the one hand, with the shortage of natural resources and the increase of labor costs, some developing countries' location advantages are weakened; on the other hand, the ease of doing business provides legal, convenient and international environment for market participators, reduce market participators' operating burden, improve production efficiency and stimulate economic growth, thus attracting more FDI.

Table 3. Regression results of the basic model with different country patterns

	(1) Total Sample	(2) Developing Country	(3) Developed country
Ln(EODB)	.0698***	.0422***	.0347
	(.0475)	(.0034)	(.0361)
Resource	-.0013**	.0121**	.0015
	(.0003)	(.0197)	(.0022)
Ln(Labor)	.0153***	.0120***	.0402*
	(.0007)	(.0007)	(.0025)
Tech	.0010***	.0105*	.0832***
	(.0001)	(.0925)	(.0365)
Open	.0005**	.0161***	.0018
	(.0003)	(.0282)	(.0059)
GDPg	.0122	-.0145	.0014
	(.0021)	(.0178)	(.0011)
Inflation	-.0051***	-.0269*	-.0018
	(.0017)	(.0135)	(.0013)
_cons	25.6871***	25.8444***	25.3173***
	(.0260)	(.0202)	(.1686)
Number	1300	940	360
Prob> F	0.0000	0.0000	0.0000

Standard errors in parentheses. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level.

4.2 Estimation Results of the Basic Model with Three Characteristics

The estimation results of the basic model with three characteristics of doing business are shown in table 4. In table 4, the column (1) shows the estimation results of the model with internationalization variable $EODB_{inter}$, i.e., trading across borders (TRA). The column (2) to column (5) show the estimation results of the model with legalization variables ($EODB_{legal}$), i.e., protecting minority investors (MIN), getting credit (CRE), enforcing contracts ($CONT$), and resolving insolvency ($INSOL$). The column (6) to column (7) show the estimation results of the model with facilitation variables ($EODB_{facil}$), which are starting a business ($START$), dealing with construction permits ($CONS$), getting electricity (ELE), registering property ($PROP$), and paying taxes (TAX).

In the $EODB_{inter}$ variable, the indicator TRA is statistically positive at the 1% level. This is consistent with Martincus et al. [43], which stated that a 10% increase in customs delays results in a 4% decline in exports due to the higher costs for exporters.

Among the $EODB_{legal}$ variables, the protecting minority investors (MIN) indicator is significantly correlated with FDI, indicating that the protection of minority investors contributes to attracting FDI. And getting credit (CRE) measures the legal and procedural aspects of borrowing and lending, which also positively affects FDI. Enforcing contracts ($CONT$) and resolving insolvency ($INSOL$) are also positive at the 1% level. The reason is that the legalization of doing business can reduce the risk of investment, and unstable institutional environments will lead to more costs, such as corruption [44] and rent-seeking [31].

The first $EODB_{facil}$ variable, the starting a business ($START$) indicator, has a positive impact on attracting FDI, which is consistent with Demenet et al. [45] who found that when the government eased the start-up regulations in Vietnam, the value of the firms increased by

Table 4. Regression results of the basic model with three characteristics.

	Internationalization	Legalization				Facilitation				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(TRA)	.0198*** (.0027)									
Ln(MIN)		.0205*** (.0021)								
Ln(CRE)			.0098*** (.0015)							
Ln(CONT)				.0300*** (.0033)						
Ln(INSOL)					.0610*** (.0219)					
Ln(START)						.0287*** (.0043)				
Ln(CONS)							.0088*** (.0028)			
Ln(ELE)								.0247*** (.0027)		
Ln(PROP)									.0175*** (.0029)	
Ln(TAX)										.0661*** (.0132)
Resource	-.0005 (.0007)	-.0008*** (.0007)	-.0011*** (.0039)	-.0008*** (.0006)	-.0007** (.0017)	-.0013*** (.0003)	-.0012*** (.0007)	-.0011** (.0006)	-.0012*** (.0003)	-.0010 (.0003)
Tech	.0123*** (.0012)	.0111*** (.0011)	.0132*** (.0012)	.0011*** (.0001)	.0119*** (.0012)	.0012*** (.0121)	.0131*** (.0119)	.0112*** (.0011)	.0013*** (.0013)	.0122*** (.0013)
Ln(Labor)	.0136*** (.0008)	.0135*** (.0008)	.0143*** (.0008)	.0145*** (.0008)	.0143*** (.0008)	.0146*** (.0008)	.0148*** (.0008)	.0137*** (.0008)	.0146*** (.0083)	.0149*** (.0084)
Inflation	-.0004* (.0002)	-.0005*** (.0020)	-.0006*** (.0197)	-.0006*** (.0197)	-.0005*** (.0103)	-.0008*** (.0021)	-.0006 (.0002)	-.0047** (.0018)	-.0007 (.0021)	-.0079 (.0020)
Open	.0040 (.0036)	.0009 (.0003)	.0275** (.0147)	.0011*** (.0017)	.0005* (.0089)	.0012*** (.0003)	.0067* (.0034)	-.0032* (.0033)	-.0008 (.0034)	.0005 (.0034)
GDPg	-.0015 (.0037)	-.0071** (.0039)	-.0082* (.0029)	-.0006 (.0027)	-.0051 (.0029)	-.0054* (.0029)	-.0084 (.0030)	-.0071 (.0281)	-.0086 (.0301)	-.0042 (.0127)
_cons	25.9154*** (.0194)	25.9203*** (.0171)	25.9514*** (.0147)	25.8640*** (.0229)	25.9493*** (.0152)	25.8584*** (.0256)	25.9472*** (.0178)	25.8957*** (.0193)	25.9112*** (.0205)	25.871*** (.0216)
Number	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level

20% on average. The dealing with construction permits (*CONS*) indicator is also statistically positive at the 1% level, which suggests that the simplification of construction permit procedures can remove the obstacles in the initial stage of investment for foreign investors. Getting electricity (*ELE*) positively provides a basic security in operating a business, which also affects FDI inflows. The registering property (*PROP*) indicator is statistically positive at the 1% level, which is consistent with Karas et al. [46], which found that the registration of property rights facilitates access to external financing and promotes investment. The paying taxes (*TAX*) indicator focuses on the procedural aspect of tax payment [47] and is also statistically positive at the 1% level.

Among the control variables, *Resource* is statistically negative at the 1% level, indicating that richer resources will decrease FDI inflows. Inflation is statistically negative with FDI, but it is not significant. Labor is statistically significant at the 1% level, indicating that an enough labor force could attract more FDI inflows. Open is statistically positive, showing that increasing host country openness could attract more FDI inflows. Tech is statistically significantly correlated with FDI at the 1% level, which means that the higher the technology level of the host country is, the greater the FDI inflows will be.

4.3 Robustness Checks

To test the robustness of the empirical results, the endogeneity problem is also considered. This paper uses system GMM with corrected standard errors, which helps address the potential econometric problems of endogeneity and measurement errors [48, 49]. Unlike the basic

ordinary least squares (OLS), random effects (RE), and fixed effects (FE) estimations, system GMM can accommodate heteroscedasticity of any unknown form. The extended models are as follows:

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln FDI_{i,t-1} + \beta_2 \ln EODB_{i,t} + \beta_3 Resource_{i,t} + \beta_4 Tech_{i,t} + \beta_5 \ln Labor_{i,t} + \beta_6 Inflation_{i,t} + \beta_7 Open_{i,t} + \beta_8 GDPg_{i,t} + u_{i,t} \quad (5)$$

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln FDI_{i,t-1} + \beta_2 \ln EODB_inter_{i,t} + \beta_3 Resource_{i,t} + \beta_4 Tech_{i,t} + \beta_5 \ln Labor_{i,t} + \beta_6 Inflation_{i,t} + \beta_7 Open_{i,t} + \beta_8 GDPg_{i,t} + u_{i,t} \quad (6)$$

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln FDI_{i,t-1} + \beta_2 \ln EODB_legal_{i,t} + \beta_3 Resource_{i,t} + \beta_4 Tech_{i,t} + \beta_5 \ln Labor_{i,t} + \beta_6 Inflation_{i,t} + \beta_7 Open_{i,t} + \beta_8 GDPg_{i,t} + u_{i,t} \quad (7)$$

$$\ln FDI_{i,t} = \alpha + \beta_1 \ln FDI_{i,t-1} + \beta_2 \ln EODB_facil_{i,t} + \beta_3 Resource_{i,t} + \beta_4 Tech_{i,t} + \beta_5 \ln Labor_{i,t} + \beta_6 Inflation_{i,t} + \beta_7 Open_{i,t} + \beta_8 GDPg_{i,t} + u_{i,t} \quad (8)$$

Before GMM estimator, this paper uses LLC test [50] and IPS test [51], the unit root test, to discuss the data's suitability for this research. Among them, the LLC test considers a model that the coefficient of the lagged dependent variable is restricted to be homogenous across all panel units; While the IPS test, which assumes that there are independent individuals in the panel data, so regression is performed for each individual.

In table 5, only one variable that lnEODB is non-stationary at its log levels in line 2. The first differences of the variables are tested. Column (3) and (4) suggest that all variables are stationary at their logged first differences. Thus, the unit root tests warrant the use of the system GMM technique in the empirical estimations [52, 53].

Table 5. Panel LLC and IPS unit root tests

	Level		First Difference	
	LLC	IPS	LLC	IPS
Ln(FDI)	(-12.2105) ***	(-1.8499) ***	(-17.6437) ***	(-1.6594) ***
Ln(EODB)	(-10.1750) ***	0.4083	(-20.0101) ***	(-1.8166) ***
Resource	(-5.5173) ***	(-1.1129) ***	(-4.3703) ***	(-2.4730) ***
Ln(Labor)	(-11.7927) ***	(1.8724) ***	(-3.6781) ***	(-1.8890) ***
Tech	(-14.3053) ***	(-1.9253) ***	(-21.2974) ***	(-1.7889) ***
Open	(-14.1994) ***	(-1.754) **	(-15.3746) ***	(-1.9143) ***
GDPg	(-16.7743) ***	(-1.4583) ***	(-21.2554) ***	(-2.5572) ***
Inflation	(-23.4636) ***	(-1.5856) ***	(-24.1730) ***	(-1.8902) ***

table 6 provides the robustness checks with the extended model to test the reliability of the previous results. The estimation results for the extended models are consistent with the variable in the basic model. There are three characteristics in the estimation results of the extended mode. Furthermore, in table 7, the GMM regression results of the extended models with different country patterns show that the ease of doing business has a vital impact on FDI inflows in developing countries, and it is not significant for developed countries. The above results verify the rationality of the basic model specification.

Table 6. GMM regression results of the extended model. Robustness check.

	Internationalization	Legalization		Facilitation						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ln(FDI)_L1	.4450*** (.0023)	.4596*** (.0035)	.4581*** (.0036)	.4638*** (.0034)	.4556*** (.0016)	.4366*** (.0063)	.4376*** (.0039)	.4579*** (.0034)	.4150*** (.0029)	.4370*** (.0048)
Ln(TRA)	.0323*** (.0134)									
Ln(MIN)		.0265*** (.0104)								
Ln(CRE)			.0125*** (.0018)							
Ln(CONT)				.0117*** (.0030)						
Ln(INSOL)					.0677*** (.0050)					
Ln(START)						.0472*** (.022)				
Ln(CONS)							.0263*** (.0154)			
Ln(ELE)								.0389*** (.0138)		
Ln(PROP)									.0298*** (.0153)	
Ln(TAX)										.0702*** (.0143)
Resource	-.0002 (.0015)	-.0004** (.0014)	-.0036*** (.0014)	-.0033** (.0014)	-.0034** (.0014)	-.0036** (.0014)	-.0038*** (.0014)	-.0039*** (.0024)	-.0003*** (.0004)	-.0004** (.0016)
Tech	.0034*** (.0014)	.0135*** (.0043)	.0136*** (.0043)	.0032*** (.0005)	.0036*** (.0043)	.0035*** (.0143)	.0036*** (.0144)	.0034*** (.0043)	.0035*** (.0043)	.0033*** (.0004)
Ln(Labor)	.03136*** (.0022)	.0301*** (.0022)	.0308*** (.0023)	.0307*** (.0023)	.0305*** (.0023)	.0312*** (.0028)	.0312*** (.0022)	.0312*** (.0022)	.0313*** (.0022)	.0322*** (.0022)
Inflation	-.0037** (.0013)	-.0038*** (.0013)	-.0042*** (.0012)	-.0041*** (.0122)	-.0041*** (.0126)	-.0042*** (.0013)	-.0043 (.0012)	-.0037** (.0013)	-.0042*** (.0012)	-.0040 (.0012)
Open	.0015* (.0008)	.0015* (.0008)	.0217** (.0086)	.0013 (.0085)	.0017** (.0085)	.0017*** (.0008)	.0018** (.0008)	-.0015* (.0085)	-.0016* (.0008)	.0001 (.0008)
GDPg	-.0036 (.0021)	-.0041** (.0021)	-.0049** (.0020)	-.0046** (.0020)	-.0045** (.0021)	-.0039* (.0021)	-.0051 (.0020)	-.0044 (.0020)	-.0058 (.0020)	-.0042** (.0020)
_cons	25.6052*** (.0681)	25.659*** (.0494)	25.7484*** (.0348)	25.6937*** (.0372)	25.7293*** (.0369)	25.5389*** (.1049)	25.7390*** (.0744)	25.5857*** (.0673)	25.6258*** (.0723)	25.5229*** (.0730)
Number	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AR(1) P	.0005	0.004	0.005	0.005	0.005	0.005	0.004	0.005	0.005	0.004
AR(2) P	0.376	0.365	0.367	0.369	0.369	0.368	0.352	0.383	0.361	0.370
Hansen Test	0.478	0.406	0.575	0.496	0.548	0.542	0.426	0.262	0.392	0.369
Sargan Test	0.0978	0.1609	0.2868	0.1427	0.1723	0.1730	0.1225	0.0715	0.1396	0.100

Furthermore, in table 7, the GMM regression results of the extended models with different country patterns show that the ease of doing business has a vital impact on FDI inflows in developing countries, and it is not significant for developed countries. The above results verify the rationality of the basic model specification.

Table 7. GMM regression results of the extended model with different country patterns

	(1) Total Sample	(2) Developing Country	(3) Developed Country
Ln(FDI)_L1	.4739*** (.0469)	.4567*** (.2886)	.3990*** (.0278)
Ln(EODB)	.0940*** (.0257)	.0442*** (.0178)	.0639 (.1531)
Resource	-.0003** (.0014)	.0126** (.0009)	-.0004 (.0008)
Ln(Labor)	.0307*** (.0022)	.0246*** (.0017)	.0538* (.0076)
Tech	.0032*** (.0004)	.0017* (.0034)	.0870*** (.0013)
Open	.0012 (.0003)	.0004*** (.0182)	.0026 (.0022)
GDPg	.0031 (.0021)	-.0015 (.0176)	.0039 (.0081)
Inflation	-.0034*** (.0014)	-.0024*** (.0186)	-.0014 (.0012)
_cons	25.3644*** (.1100)	25.6416*** (.0753)	25.0933*** (.6217)
Number	1300	940	360
Prob>F	0.0000	0.0000	0.0000
AR(1) P	0.004	0.016	0.326
AR(2) P	0.366	0.292	0.240
Hansen Test	0.618	1.000	1.000
Sargan Test	0.1352	1.000	1.000

Standard errors in parentheses. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level.

5 Conclusion

Based on both yearly data of 130 economies, this paper studies the association between the ease of doing business and FDI from three aspects, i.e., internationalization, legalization, and facilitation, and explores whether the role of doing business in motivating FDI has heterogeneity between developing and developed countries. The findings are as follows.

(1) The ease of doing business positively influences FDI inflows by using both yearly and quarterly data of 130 economies.

(2) The trading across borders indicator representing the internationalization of doing business is positive with FDI, which means that shorter time and lower costs of importing and exporting products will attract more FDI. In the legalization of doing business, the resolving insolvency indicator plays an essential role in attracting FDI, which means that the investors not only focus on how to enter the foreign market, but also focus on how to exit it. And in the facilitation of doing business, the paying taxes indicator is the most statistically positive on attracting FDI, which shows that governments reduce tax and ease operating costs will attract FDI.

(3) The ease of doing business has a vital impact on FDI inflows in developing countries, but not significant for developed countries. For developed countries, the most significant

factor attracting FDI inflows is the high-technology level, indicating that foreign investors prefer the technological capabilities of developed countries.

The results of this paper provide valuable insights for host countries to optimize their business environment. First, it is meaningful for policymakers to construct an international business environment to attract as much FDI as possible. They should focus on reducing export and import costs and shortening customs approval times and procedures to promote trading across borders and continuously strengthen international exchanges. Second, host countries should also construct legal business environments by optimizing their legal systems, i.e., develop a credit evaluation system as a critical element for sound risk management and economic stability in terms of getting credit.

In addition, to resolve insolvency, they could adopt reforms strengthening reorganization procedures, which would help resolve insolvency and allow enterprises to exit the market. Finally, the facilitation of business environment should be improved, i.e., online systems for paying taxes, registering property, and dealing with construction permits are essential for host countries to implement, making the tax, registration, and approval processes easier for investors. In addition, host countries should reduce or eliminate the requirements for minimum paid-in capital to start a company, removing obstacles for multinational enterprises in the start-up period.

Furthermore, this paper makes different suggestions to attract FDI for different country pattern. For developing countries, their natural resources, labor, the openness level impact FDI significantly, indicating that use abundant natural resources, low labor costs, and more open market environment can attract foreign direct investment. Besides, optimizing the business environment from the perspective of facilitation, legalization, and internationalization helps to maintain sustainable FDI. However, for developed countries where the relationship between the ease of doing business and FDI is not significant, while the technology level is the most significant factor affecting FDI inflows. Therefore, the government should focus on improving their technology level, which is a specific aspect of business environment that the foreign investors care about most.

This research was supported by the Youth Program of National Social Science Foundation [Grant numbers 19CJL047].

References

- [1] United Nations Conference on Trade and Development, *World investment report (2021)*, [Online]. Available: https://unctad.org/system/files/official-document/ldcmisc20064_en.pdf (2021)
- [2] World Bank, *Global Investment Competitiveness Report 2019/2020* (2020)
- [3] United Nations Conference on Trade and Development, *World investment report (2020)* (2020)
- [4] J.H. Dunning, *J. Int. Bus. Stud.* **19**, 1 (1988)
- [5] Y. Wang, X.L. Wang, Y.Q. Feng, L.N. Liu, *Expert Syst. App.* **210**, 118514 (2022)
- [6] B. Meivitanli, *J. Asian Fin. Econ.* **8**, 53 (2021)
- [7] M. Azam, M. Haseeb, *Energy Strateg. Rev.* **35**, 100638 (2021)
- [8] H. Su, S.J. Hong, *E. Asian Econ. Rev.* **26**, 119 (2022)
- [9] S. Ma, X. Xu, Z. Zeng, L. Wang, *Sustainability* **12**, 674 (2020)
- [10] J.H. Dunning, S. Lundan, *Asia Pac. J. Manag.* **25**, 573 (2008)
- [11] D.B. Chewaka, C.Z. Zhang, *Sustainability* **13**, 24 (2021)
- [12] M. Hossain, Z. Hassan, S. Shafiq, A. Basit, *J. Manag. Bus Econ.* **01**, 52 (2018)
- [13] C. Nangpiire, R. Rodrigues, I. Adam, *Int. J. Bus. Emerg. Mark.* **10**, 289 (2018)

- [14] Y. Zhang, L. Liu, *Int. Bus.* **01**, 59 (2020)
- [15] A. Pineli, R. Narula, R. Belderbos, *Res. Pap. Econ.* (2019)
- [16] N. Al-Shammari, S. Al-Halaq, D. Al-Shammari, *J. App. Bus. Res.* **32**, 597 (2016)
- [17] X.S. Cai, *Int. Econ. Trade Res.* **38**, 101 (2022)
- [18] D. Jayasuriya, *World Bank Policy Research Working Paper* pp. 1–18 (2016)
- [19] R. Coase, *Econ.* **4**, 386 (1937)
- [20] A. Rygh, G.R. Benito, *J. Manag. Int. Rev.* **58**, 389 (2018)
- [21] C. Dahlman, *J. Legal Stud.* **2**, 141 (1979)
- [22] N. Rogge, G. Archer, *Eur. J. Oper. Res.* **290**, 373 (2021)
- [23] P. Mody, T. Abo, T. Gombu, *Asian J. Res. Mark.* **4**, 181 (2015)
- [24] World Trade Organization (2013)
- [25] C. Groenewald, S. Grater, *Int. J. Policy. Emerg.* **10**, 332 (2017)
- [26] W. Wu, L. Yuan, X. Wang, X. Cao, S. Zhou, *Emerg. Mark. Financ. Trade.* **56**, 2594 (2020)
- [27] Z. Li, Z. Huang, H. Dong, *Emerg. Mark. Financ. Trade.* **55**, 3211 (2019)
- [28] K. Mahuni, W.G. Bonga, *J. Econ. Financ.* **2**, 1 (2017)
- [29] Z. Yu, M. Chen, L. Cheng, *Asia-Pacific Econ. Rev.* **06**, 80 (2019)
- [30] H.W. Zhang, *J. Inter Mongolia Univ. Financ. Econ.* **17**, 48 (2019)
- [31] H.X. Xia, Q.M. Tan, J.H. Bai, *J. Econ. Res.* **54**, 84 (2019)
- [32] M. Hanusch, *Soc. Sci. Elect. Publ.* pp. 1–21 (2012)
- [33] R. Morris, A. Aziz, *Cross. Cult. Manag.* **18**, 400 (2011)
- [34] A. Corcoran, R. Gillanders, *Rev. World Econ.* **151**, 103 (2015)
- [35] E.L. Yeyati, S. Panizzau, *J. Int. Money. Financ.* **26**, 104 (2007)
- [36] *Doing business 2020. world bank* (2019)
- [37] Z. Zhang, L. Xin, *Int. Tax.* **10**, 16 (2020)
- [38] A. Rodríguez-Pose, G. Cols, *Reg. Sci. Policy. Pract.* **09**, 63 (2017)
- [39] W. Shittu, H.O. Musibau, *Environ. Dev. Sustain.* **24**, 7936 (2022)
- [40] A. Boateng, X. Hua, S. Nisar, J. Wu, *Econ Model.* **47**, 118 (2015)
- [41] J. Wooldridge, **1**, 206 (2010)
- [42] E. Nketiah-Amponsah, B. Sarpong, *Int. Adv. Econ. Res.* **26**, 209 (2020)
- [43] C.V. Martincus, J. Carballo, A. Graziano, *J. Int. Econ.* **96**, 119 (2015)
- [44] L.X. Huang, X.X. Sun, X.B. Wang, *J. Sun Yat-sen Univ. (Soc. Sci. Ed.)* **59**, 178 (2019)
- [45] A. Demenet, M. Razafindrakoto, F. Roubaud, *World Dev.* **84**, 326 (2016)
- [46] A. Karas, W. Pyle, K. Schoors, *J. Law. Econ.* **58**, 451 (2015)
- [47] B. Haliti, S. Merovci, A. Hetemi, S. Sherpa, *Ekonomika (Econ)* **98**, 19 (2019)
- [48] M. Arellano, O. Bover, *J. Econ.* **68**, 29 (1995)
- [49] R. Blundell, S. Bond, *J. Econ.* **87**, 115 (1998)
- [50] A. Levin, C.F. Lin, C.S.J. Chu, *J. Econ.* **108**, 1 (2002)
- [51] K.S. Im, M.H. Pesaran, Y. Shin, *J. Econ.* **115**, 53 (2003)
- [52] Y. Kitamura, P.C. Phillips, *Journal of Econometrics* **80**, 85 (1997)
- [53] G. Okafor, J. Piesse, A. Webster, *Journal of Policy Modeling* **37**, 875 (2015)