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Institutional quality, asset specificity, and foreign direct investment

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ABSTRACT

This article demonstrates that MNC's foreign direct investment decision is linked with institutional quality and hinges on the asset-specificity intensity of FDI. Using a comprehensive global FDI database between 2003 and 2019, our results show that MNCs tend to engage in FDI of high asset-specificity in countries with superior institutional quality, while they launch FDI of low asset-specificity in countries with inferior institutional quality. Moreover, when engaging in FDI of high asset-specificity, MNCs take property rights institutions more seriously, and prefer the sole proprietorship model to the joint venture model there.

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1. Introduction

There are mixed findings regarding the relationship between the institutional quality of host countries and FDI. Some economists argue that countries with high-quality institutions are more desirable for FDI because they play an important role in reducing investment risks. For example, better property rights institutions can reduce the risk of expropriation (Li and Resnick, 2003; Ali et al., 2010; Mina, 2012). Strong contracting institutions help to resolute business disputes, reduce corruption and crime, facilitate the development of financial markets, and ensure that competition policies are enforced effectively (Cuervo-Cazurra, 2006; Chinn and Ito, 2006; Daude and Stein, 2007; Fan et al., 2009; Daniele and Marani, 2011; Buchanan et al., 2012; Mariotti and Riccardo, 2021).

Meanwhile, others contend that FDI favors countries with poor institutional quality because of the relatively greater rate of return. Specifically, in those countries, (i) capital is severely scarce, and MNCs can earn better returns than do with good institutions, especially when MNCs know how to operate in the challenging institutional environment - poorer regulatory quality and lower control of corruption (Alfaro et al., 2008; Cuervo-Cazurra, 2008); (ii) MNCs can maintain oligopolistic positions and gain access to publicly funded projects easily, which makes it advantageous to collect larger rents (Li and Resnick, 2003; Egger and Winner, 2005; Wiig and Kolstad, 2010; Mariotti and Riccardo, 2021); and (iii) there usually are abundant

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natural resources, inexpensive labor, and laxer environmental regulation, allowing MNCs to fully capitalize on these factor endowments (Robinson et al., 2006; Asiedu and Lien, 2011; Hajzler, 2014; Yang et al., 2018; Bu and Wagner, 2016).

In this paper, we try to clarify this debate by emphasizing the role of the asset-specificity intensity of FDI, a critical consideration when MNCs trade off attractive returns and substantial risks in choosing a destination. According to the incomplete contract theory, the investment of high asset-specificity is prone to encounter 'hold-up' problems (Klein et al., 1978; Williamson, 1985; Grossman and Hart, 1986; Hart and Moore, 1990), leading to higher risks for investors. For a low asset-specificity investor, the risk of being held up is low, while returns are alluring in countries with poor institutional quality. MNCs, therefore, prefer to locate FDI of low asset-specificity in those countries to get higher returns. However, with an increase in the asset-specificity intensity of FDI, the risks faced by MNCs rise sharply, outweighing the higher returns that accompany poor institutional quality. In this case, MNCs are inclined to locate FDI of high asset-specificity in countries with superior institutional quality. As a result, institutional quality is negatively correlated with FDI of low asset-specificity, while positively correlated with FDI of high asset-specificity.

Additionally, we further explore this analysis noting that MNCs would encounter contractual risks related to commercial disputes, and political risks related to property rights expropriation by the host governments and elite, respectively. Accordingly, MNCs demand for good contracting institutions and good property rights institutions (Acemoglu and Johnson, 2005; Kluge, 2017). Compared with contractual risks due to commercial disputes, MNCs are powerless to resist political risks from host governments, since they are the monopolists of legal violence and the ultimate arbiters of contractual disputes. As a result, MNCs, especially for FDI of high asset-specificity, are more eager for good property rights institutions although they also want good contracting institutions in the host country.

Based on the above analysis, we also discuss the ownership strategy of MNCs. MNCs could form joint ventures to jointly address political risks, or choose the sole proprietorship model to reduce contractual risks. In countries with good property rights institutions, where political risks are relatively low, MNCs are more inclined to adopt the sole proprietorship model so as to reduce potential contractual risks, especially for FDI of high asset-specificity.

Using a dataset that contains the firm-level greenfield FDI data for 149 home countries to 196 host countries during 2003–2019, we empirically uncover the moderating effect of the asset-specificity of the investing industry, which is referred to as contract intensity across industries in Nunn (2007), on the relationship between institutional quality and FDI. Fortunately, relevant empirical results support our hypotheses.

We contribute to the literature on the relationship between institutional quality and FDI by exploring the role of the asset-specificity intensity of FDI. In contrast to studies that simply discuss the connection between institutional quality / distance and FDI (Godinez and Liu, 2015; Beazer and Blake, 2018; Filippaios et al., 2019; Kurul, 2017), our findings indicate that the impact of institutional quality on FDI is closely related to the asset-specificity intensity of FDI, which reconciles the above controversy and expands discussions about factors that moderate this relationship, e.g. natural resources and economic development in the destination (Asiedu and Lien, 2011; Peres et al., 2018; Sabir et al., 2019; Bailey, 2018). In addition, we identify that property rights institutions are more attractive for FDI of high asset-specificity, which complements discussions about the heterogeneous roles of different institutions on FDI (Cuervo-Cazurra, 2008).

Besides, this study expands studies about global sourcing strategy. For instance, Antras and Helpman (2004) and Antras (2005) have modeled how firms in the North outsource to the South. These studies suggest that MNCs tend to undertake tasks that require significant asset-specific investments in the North, while outsourcing routine tasks to the South. In this regard, there is literature that provides empirical evidence (Nunn and Trefler, 2013; Corcos et al., 2013). However, these papers have ignored the location choice of non-outsourcers in the North and MNCs in alternative investing patterns, such as North to North, South to North, and South to South. Our findings show that all MNCs, whether outsourcers or not, from developed countries or developing countries, prefer countries with superior institutional quality if their investments are highly asset-specific.

Furthermore, we add to the literature on the international division of labor. For instance, Levchenko (2007) models that Northern countries with excellent institutions but scant labor focus on developing capital-intensive industries that require asset-specific investments, while Southern countries with poor institutions but abundant labor focus on labor-intensive industries that do not require asset-specific investments. Based on industry-level export data, Nunn (2007) tries to support this perception by finding that countries with good contract enforcement export more products that require asset-specific inputs. Wang et al. (2014), examining the connection between judicial quality and firms' export across 30 provinces in China, also support this theoretical analysis. Our paper explores the location choice of FDI to provide more direct evidence for Levchenko (2007), and thus enhances our understanding of the role of institutional quality in boosting industries of high asset-specificity. This paper reveals that the impacts of property rights institutions and contracting institutions on industries of high asset-specificity are heterogeneous, which is a significant addition to the literature.

Moreover, we also relate to studies that explore the ownership structure of MNCs. For FDI of high asset-specificity, concerning greater contractual risks, MNCs prefer a high degree of ownership control (Antras and Helpman, 2004; Antras, 2005; Nunn and Trefler, 2013). Furthermore, Zhang et al. (2014) argue that the regulatory distance strengthens the positive effect of asset-specificity on ownership control, because it increases MNCs' concerns about business partners' opportunism.¹ As

¹ As an external safeguarding mechanism against the threat of free-riding by local firms, Dikova and van Witteloostuijn (2007) propose that institutional advancement in transition economies has a positive moderating effect on the tendency of asset-specific intensive MNCs to establish subsidiaries with the shared ownership. However, the results are of no significance.

these studies support strong links between local partners' opportunism and MNCs' ownership strategy, this paper highlights that host governments' opportunism also matters. Besides, based on greenfield FDI for 149 home countries to 196 host countries from 2003 to 2019, this paper provides more representative evidence.

In addition, our research is broadly related to the literature on institutions and economic growth (Acemoglu et al., 2002). As studies suggest that superior institutional equality attracts FDI, thereby increasing available capital and stimulating economic growth (Alfaro et al., 2008). Our research elaborates that differences in institutional quality between countries affect the global industrial layout. Specifically, good institutions, especially good property rights institutions, attract more FDI of high asset-specificity, helping companies adopt more advanced technologies and thus promoting economic growth (Acemoglu et al., 2007).

The remainder of the paper is organized as follows: the second part is theoretical hypotheses, the third part is the identification strategy and data sources, the fourth and the fifth parts are empirical analyses, and the sixth part concludes the paper.

2. Hypotheses

Location advantage, a condition for firms to invest abroad, has been widely addressed. Studies have discussed the influence of traditional factor endowments, arguing that the richer the natural resources, the more abundant the labor forces, and the larger the market, the higher potential returns for MNCs and the more attractive for FDI (Asiedu and Lien, 2011; Nielsen et al., 2017). At the same time, the institutional environment also has a great impact on the location choice of MNCs (Meyer and Nguyen, 2005; Daude and Stein, 2007; Sabir et al., 2019). That's because, in the whole process of investment and operation, MNCs must deal with the business partners and host governments for a long time and thus may suffer from various opportunistic behaviors, which rely on the local institutions to ease disputes and reduce investment risks (Dixit, 2009).

Other things being equal, MNCs prefer investing in areas that offer high returns, such as countries that are rich in resources and have more rents. However, the institutional environment in most of them is so poor that MNCs are often under great risk of being held up by the business partners and the host governments (Egger and Winner, 2005; Robinson et al., 2006; Asiedu and Lien, 2011; Hajzler, 2014). That means, MNCs trade off the lucrative returns and high institutional risks in making the location choice, which is closely related to the asset-specificity intensity of FDI. If MNCs make FDI of low asset-specificity, the risk of being harmed is not high enough to offset the lure of high returns. However, if the asset-specificity of FDI is very strong, MNCs may confront seriously opportunistic behaviors of the business partners and host governments, and then the loss from institutional risks may significantly reduce or even offset the entire returns on their investments.

Taken together, the above analysis implies that the effect of institutional quality on FDI is related to the asset-specificity intensity of FDI. For industries with lower asset-specificity, MNCs tend to choose countries that have high returns, even if these countries have poor institutions, because there is less risk of being held up in the absence of asset-specific contracts. For industries with higher asset-specificity, MNCs are prone to choose countries with good institutions to offset the risk of being held up in asset-specific contracts. In summary, we propose hypothesis 1.

Hypothesis 1. The effect of institutional quality on FDI is related to the asset-specificity of the investing industry, and countries with good institutions are more attractive to FDI of high asset-specificity.

With well-developed legal systems and impartial third-party institutions, when contractual disputes between MNCs and their business partners arise, judicial authorities will deal with them impartially by legal provisions and administrative regulations. That means, countries with good contracting institutions can solve underinvestment problems better, thus reducing the cost of products that require significant asset-specific inputs (Acemoglu et al., 2007; Levchenko, 2007). For this reason, MNCs tend to locate R&D and production processes that require significant asset-specific investments in countries with a favorable institutional environment (Antras, 2005; Nunn and Trefler, 2013; Corcos et al., 2013).

In addition to signing contracts with business partners, MNCs also implicitly or explicitly sign contracts with host governments. For example, host governments are expected to safeguard MNCs' assets, and usually provide them with financial incentives such as lower interest rates. However, multinational investments usually involve huge amounts of fixed costs, which are usually difficult to recover. Therefore, once an investment occurs, MNCs may also face opportunistic acts from the host governments. For instance, due to the lobbying of some interest groups, the host governments may remove preferential policies or set relatively high barriers for MNCs to invest. The host governments may also take actions such as expropriating property without compensation, imposing high tax burdens, forcing low-priced mergers and acquisitions, canceling licenses, and soliciting bribes for interest, especially when such actions are in line with its political objectives (Henisz and Williamson, 1999).

In contrast to contractual disputes with competitors or local partners, MNCs are often powerless to resist the predatory behaviors of the host governments, because they are mostly the monopolists of legal violence and the ultimate arbiter of contractual disputes. MNCs, therefore, prefer the host countries to have good property rights institutions rather than good contracting institutions, especially for projects aimed at producing products that require significant asset-specific investments.

Hypothesis 2. Compared with good contracting institutions, good property rights institutions are the key to attracting FDI of high asset-specificity.

The institutional environment not only affects the location choice of MNCs, but also their ownership structure. Due to the inability to foresee all possible future scenarios, contracts are usually incomplete, and investors are usually exposed to the risk of being held up when there are significant asset-specific inputs. To avoid opportunistic behaviors ex post, parties should choose the optimal governance structure ex ante to reduce the transaction costs associated with contractual incompleteness (Williamson, 1996).

As discussed above, MNCs may be exposed to political risks from the host governments. By forming joint ventures with other companies, MNCs can leverage the political and economic resources of business partners to jointly address the political risks in host countries (Meyer et al., 2009). However, there are certain risks associated with joint ventures because the business partners may take advantage of the equity and information to commit acts that are detrimental to MNCs, such as profit transfer, income concealment, and hollowing out.

Therefore, MNCs will choose the optimal governance model based on the potential political risks and contractual risks (Henisz and Williamson, 1999). In regions with large political risks, MNCs tend to form joint ventures to deal with them. For highly asset-specific investments, MNCs tend to choose the sole proprietorship model to avoid potential contractual risks (Williamson, 1996). Therefore, in countries with good property rights institutions, where potential political risks are relatively low, MNCs' projects with high asset-specificity tend to adopt the sole proprietorship model to avoid potential contractual risks. In summary, we propose hypothesis 3.

Hypothesis 3. In countries with good property rights institutions, MNCs' high asset-specificity investments tend to choose the sole proprietorship model.

3. Data and identification strategy

3.1. Methodology

To identify the role of asset-specificity in affecting the relationship between the institutional quality of host countries and FDI, we devised the following equation:

$$FDI_{ij,l,m,t} = \alpha_0 + \beta_1 \ln s_{j,t} + \beta_2 (\ln s_{j,t} \times Z_l) + \sum_{q=1}^n \alpha_q X_{j,t} + \sum_{\rho=1}^n \gamma_\rho X_{m,t} + CP_{j,m} + Year_t + Industry_l + \zeta_{ij,l,m,t} \quad (1)$$

where i refers to firms, j to host countries, l to industries, m to home countries, t to time, FDI denotes the inflation-adjusted greenfield FDI (in 100 million USD); Z is the asset-specificity intensity of the investing industries, and $\ln s$ is a measure of institutional quality. The main coefficients of interest are β_1 and β_2 . Specifically, β_1 is the estimated coefficient of institutional quality. If $\beta_1 < 0$, this indicates that countries with poorer institutions attract more FDI. β_2 is the estimated coefficient of the interaction term between the institutional quality of the host country and the asset-specificity intensity of the investing industry. If $\beta_2 > 0$, this indicates that countries with higher institutional quality have a comparative advantage in attracting FDI to industries that require significant asset-specific inputs.² In addition, CP , $Industry$, and $Year$ denote factors related to each country pair, the industry and year fixed effects, respectively.

A host country might attract more FDI if it has a larger market size, a more developed economy, better growth prospects, lower labor costs, favorable capital flow restrictions, and stable exchange rate volatility (Li and Resnick, 2003; Li et al., 2018). In addition to the pull factors in the host country, the push factors from the source economy also matter (Ng et al., 2022). Thus, we employ the following macro variables of both the home and host country as controls: the real GDP (GDP), the growth rate of GDP (GGDP), the change in the monthly minimum wage (GWage), the index of capital control stringency (CCapital), exchange rate risk (RExchange), inflation rate (Inflation), real capital per worker (Capital), and corporate tax rate (Tax) (in the host country). Recent literature which studies the FDI found that factors relevant to the country pair (home country, host country) are important (Burchardi et al., 2019; Mayda et al., 2022; Ng et al., 2022). Therefore, we also include the FDI value of each country pair in the previous year (FDI persistence), the exchange rate of each country pair (Exchange), and other FDI barriers including contiguity (Contig), common official language (Language), and distance (Distance).

3.2. Main variables

3.2.1. Institutional quality

Currently, there are four main sources of data on the measurement of institutional quality: the Economic Freedom Index (EFI) jointly published by the Heritage Foundation and the Wall Street Journal,³ the International Country Risk Guide (ICRG)

² Z_l isn't in this equation because of its collinearity with the industry fixed effect.

³ Since 1995, the IEF has measured the economic freedom of 186 countries in the world along four dimensions: legal rules, government size, regulatory efficiency, and market openness, with a total of 10 indicators. In addition, two indices, 'judicial effectiveness' and 'fiscal health', have been added since 2016.

published by the Political Risk Services Group (PRS Group),⁴ the Global Competitiveness Index (GCI) published by the World Economic Forum,⁵ and the World Governance Index (WGI) of the World Bank. It is generally believed that the WGI is superior in terms of assessment content and sample representativeness, and is the most informative and widely used indicator (Amighini et al., 2013; Buchanan et al., 2012; Yang et al., 2018). Specifically, the World Bank has been assessing the institutional environment of 200 countries and regions since 1996 based on more than 30 data sources in six dimensions: Voice and Accountability (VA), Political Stability and Absence of Violence / Terrorism (PV), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC). The value of each indicator mostly ranges from -2.5 to 2.5 , with higher values indicating better quality. For this reason, this paper uses data originating from the WGI. Due to the strong covariance between indicators, we use the first-order principal components of the six indicators to measure the institutional quality for each country (Globerman and Shapiro, 2003; Buchanan et al., 2012), while other measures are used for robustness checks.

The WGI, however, lacks disaggregated indices measuring the property rights institutions and contracting institutions of host countries.⁶ For this reason, this paper uses those disaggregated indices from the EFI, the GCI, and the ICRG. The proxies measuring property rights institutions are the property rights protection index from the GCI (Ins^{pro1})⁷ and the property rights index from the EFI (Ins^{pro2})⁸. The proxy indicators for contracting institutions are the contractual index from the GCI (Ins^{con1})⁹ and the law and order from the ICRG (Ins^{con2})¹⁰, respectively.

3.2.2. Asset specificity

Based on the 1997 U.S. input–output table, Nunn (2007) classifies intermediate inputs across industries into three categories: (1) commodities with open market transactions; (2) commodities with reference prices; and (3) commodities that neither have reference prices nor are traded on the open market. Among them, commodities with publicly-traded markets usually have a large number of buyers and sellers while facing a lower risk of being held up, commodities with reference prices have a certain degree of asset-specificity, and commodities that neither have reference prices nor are traded on the open market have a higher degree of asset-specificity. According to the above information, Nunn uses the following methods to measure the asset-specificity intensity of each industry,

$$Z_l^1 = \sum_k \theta_{lk} R_k^{neither}, Z_l^2 = \sum_k \theta_{lk} (R_k^{neither} + R_k^{refprice}) \quad (2)$$

$\theta_{lk} = u_{lk}/u_l$, where u_{lk} is the value of input k used in industry l and u_l is the total value of all inputs used in industry l ; $R_k^{neither}$ is the proportion of input k that is neither sold on the open market nor reference priced. Similarly, $R_k^{refprice}$ is the proportion of input k that is not on the open market but is reference priced. The difference between Z_l^1 and Z_l^2 is that Z_l^2 treats reference priced input k as being asset-specific.

Ciccone and Papaioannou (2009), based on Nunn (2007), re-measure the contract intensity for 28 manufacturing industries at the three-digit International Standard Industrial Classification (ISIC) level, defined as the cost-weighted proportion of differentiated inputs, which is then widely used (Ma et al., 2010; Wang et al., 2014). Concerning existing studies, we also apply this to measure the asset-specificity intensity of the investing industry. In addition, we use alternative proxies, the external financing dependence of each industry and the redeployability of each industry, to ensure the robustness of the results. The descriptive statistics of the main variables in this paper are shown in Table 1. Detailed definitions of these variables are provided in Table A2.

3.3. Data Source

Compared with cross-border mergers and acquisitions (M&A), greenfield investment is more suitable for analyzing the location choice of FDI, since the latter has few identification problems caused by sample selection. For example, countries with good institutions usually have more potential objected entities, thus leading to more cross-border M&A there. The fDi Markets collects firm-level greenfield FDI data all over the world since 2003, compared with studies that are limited in samples (Dikova and van Witteloostuijn, 2007; Zhang et al., 2014; Mourao, 2018), thus this database can guarantee the

⁴ Since 1984, the ICRG has assessed risk in more than 140 countries worldwide along three dimensions: political, financial, and economic, of which the existing studies usually take the political dimension to measure the institutional environment.

⁵ Since 2004, the GCI has provided a comprehensive interpretation of the competitiveness status of more than 150 countries on 12 indicators, including institutions, infrastructure, innovation, etc.

⁶ The WGI's rule of law index captures the quality of contract enforcement, the protection of property rights, and the likelihood of crime and violence, and is a composite proxy for the property right protection and contractual systems in a host country, and therefore cannot distinguish between property right protection system and contractual system.

⁷ The test question is 'To what extent are property rights protected in your country?' The range of value is (1, 7), and the higher the value, the better the protection of property rights.

⁸ It measures the recognition of private property rights and an effective rule of law to protect them, and takes value in the range (0, 6), with larger value reflecting better property protection.

⁹ The index measures the efficiency of legal framework in settling disputes, with value ranging from (1, 7); the higher the value, the more efficient the legal framework is.

¹⁰ This index measures the strength of the legal system, its fairness, public compliance with the law and takes value in the range (0, 6), with higher value associated with lower risk.

Table 1
Descriptive statistics.

Dependent Variables	N	Mean	St. Dev	Min	Max
FDI	108,219	0.5577	2.4860	0	231.8205
JVC	110,557	0.0451	0.2076	0	1
Independent Variables	N	Mean	St. Dev	Min	Max
Ins ^{va}	110,534	0.3251	1.0552	-2.3134	1.8010
Ins ^{pv}	110,519	0.0778	0.7829	-3.2805	1.6881
Ins ^{se}	110,512	0.7463	0.8478	-2.4459	2.4370
Ins ^{sq}	110,511	0.6836	0.8763	-2.6450	2.2605
Ins ^{rl}	110,529	0.5952	0.9745	-2.6064	2.1003
Ins ^{sc}	110,525	0.5455	1.0331	-1.8687	2.4700
Ins	110,508	-0.0019	2.2782	-7.9649	3.9234
Ins ^{CRG}	109,162	72.6490	10.2872	23.6250	94.5000
Ins ^{GCI}	73,010	4.8377	0.5901	2.7392	5.8577
Ins ^{pro1}	73,010	4.8238	0.9669	1.5575	6.6058
Ins ^{con1}	73,010	3.9684	0.7529	1.4059	6.0541
Ins ^{pro2}	109,768	3.6544	1.4852	0	5.904
Ins ^{con2}	109,162	4.2638	1.0943	0.5	6
Z ¹	110,554	0.6080	0.2113	0.058	0.859
Z ²	110,554	0.9172	0.1194	0.4602	0.9953
Extfin	110,554	0.5235	0.3286	-0.45	1.14
Redeploy ¹	107,202	0.3456	0.0275	0.2190	0.4520
Redeploy ²	58,468	0.3853	0.0376	0.2385	0.5190
Control Variables	N	Mean	St. Dev	Min	Max
GDP (host)	109,536	14.3697	1.6507	6.0552	16.8534
GDP (home)	108,634	14.8283	1.4540	7.5679	16.8534
GGDP (host)	109,536	4.5135	5.2346	-81.2570	81.7555
GGDP (home)	108,634	2.6082	3.6095	-81.2570	52.0325
GWage (host)	87,322	5.8083	20.1738	-95.0154	944.0436
GWage (home)	80,047	3.8329	11.5143	-44.8456	944.0436
Control Variables	N	Mean	St. Dev	Min	Max
CCapital (host)	108,531	0.9511	1.5355	-1.9270	2.3106
CCapital (home)	107,775	1.8929	1.0554	-1.9270	2.3106
RExchange (host)	109,536	1.0352	1.7690	0	18.0936
RExchange (home)	108,634	0.5546	1.1297	0	18.0936
Inflation (host)	108,219	3.6221	4.5923	-10.0675	255.3050
Inflation (home)	108,263	2.0231	2.8508	-4.8633	254.9485
Capital (host)	109,518	12.2286	1.0555	7.9130	13.9528
Capital (home)	108,633	12.8743	0.5949	8.7249	13.9528
Tax (host)	78,730	16.7230	8.4617	-0.2	58.9
FDI Persistence (country pair)	108,219	14.4301	26.2845	0	229.6618
Exchange (country pair)	107,698	0.9820	1.4047	0	0.5613
Contig (country pair)	110,443	0.1190	0.3238	0	1
Language (country pair)	110,443	0.1977	0.3982	0	1
Distance (country pair)	110,443	8.2930	1.0786	1.8195	9.9010
Regulation (host)	110,005	7.8377	0.8606	0	7.9764
Tariff (host)	110,002	7.9202	0.9112	3.3486	8.2233
Non-tariff Trade barriers (host)	109,962	6.4144	0.9032	0	6.4198
Transfers and Subsidies (host)	109,851	17.4107	7.1437	0	16.3122
Tax Burden (host)	109,845	70.9806	12.0501	0	70.2000
Ethnocentrism (host)	110,064	6.5922	2.0746	0	6.8648
Institutional distance (country pair)	110,455	2.4437	1.8493	0.0002	13.7010
Scale	85,924	7.9541	2.9400	0	13.2727
Age	75,572	70.9146	64.2423	0	1872

geographical representativeness of our results. Furthermore, the firm-level data allow us to conduct deeper analyses, for example, the asset-specificity intensity of the investing industry and the ownership structure of MNCs, other than the host country and the investment value as most of the literature does.

Given that data on the asset-specificity intensity of each industry are available for manufacturing and in ISIC.Rev2, for research needs, this study undertakes the following processes: (1) excludes sectors in business services, financial services, renewable energy, real estate, hotels and tourism, leisure and entertainment, transportation and warehousing, healthcare, software and IT services, coal, oil and gas (except petroleum refineries, other petroleum, and coal products), and minerals (except other non-metallic mineral products); (2) excludes investments in tax havens such as Virgin Islands, Cayman Islands, and Bermuda; and (3) corresponds each firm's investing industry to ISIC.Rev2 according to the "sector" and "sub-sector"

Table 2
Distribution of greenfield FDI in manufacturing.

Industry	Value (100 million USD)	Number	Z ¹	Z ²
Transport equipment	11564.072	16,292	0.859	0.985
Professional and scientific equipment	501.986	2584	0.785	0.981
Machinery, except electrical	5906.364	19,258	0.764	0.975
Wearing apparel, except footwear	304.878	1547	0.745	0.975
Machinery, electrical	10258.215	20,884	0.74	0.96
Beverages	874.979	1953	0.713	0.949
Printing and publishing	10.745	40	0.713	0.995
Footwear, except rubber or plastic	71.313	296	0.65	0.934
Leather products	14.242	74	0.571	0.848
Furniture, except metal	67.920	168	0.568	0.91
Glass and glass products	484.860	753	0.557	0.967
Other manufactured products	1178.743	4510	0.547	0.863
Wood products, except furniture	328.915	566	0.516	0.67
Chemicals, other	2033.692	5461	0.49	0.946
Fabricated metal products	6172.124	5715	0.435	0.945
Plastic products	1558.278	4825	0.408	0.985
Rubber products	1177.569	1755	0.407	0.923
Misc. petroleum and coal products	2545.246	1015	0.395	0.895
Other non-metallic mineral products	1711.084	2292	0.377	0.963
Textiles	386.376	931	0.376	0.82
Paper and products	1520.652	1882	0.348	0.885
Food products	2853.717	7240	0.331	0.557
Pottery, china, earthenware	113.155	346	0.329	0.946
Tobacco	144.592	269	0.317	0.483
Iron and steel	927.313	318	0.242	0.816
Industrial chemicals	7014.225	8041	0.24	0.884
Non-ferrous metals	1830.335	1337	0.16	0.46
Petroleum refineries	3136.3674	202	0.058	0.759

information in the fDi Markets. Ultimately, we get 31,495 investing companies from 149 home countries to 196 host countries during 2003–2019.¹¹

These investments involve 28 industries, and there are large differences in the value and number of projects. Table 2 shows that for industries with high asset-specificity intensity, such as transport equipment, professional and scientific equipment, and machinery (except electrical) industries, the value and number of projects are large. For industries with lower asset-specificity intensity, for example, printing and publishing, leather products, and furniture (except metal) industries, the value and number of projects are less. For industries with low asset-specificity intensity, petroleum refineries, non-ferrous metals, and chemicals industries, the value of projects is large, but the number of projects is less.

4. Empirical results

4.1. Baseline results

Table 3 reports the estimation results of equation (1). Column (1) of Table 3 shows that the estimated coefficient of institutional quality is significantly negative at the 1% level. However, the coefficient of the interaction term between institutional quality and asset-specificity intensity of the investing industry is significantly positive at the 1% level. This means that the asset-specificity intensity of the investing industry will affect the relationship between the institutional quality of host countries and FDI. Column (2) of Table 3 shows that, $\hat{\beta}_1$ and $\hat{\beta}_2$ are still significant at the 1% level when we control for the pull factors in the host country.

Column (3) of Table 3 shows that, $\hat{\beta}_1$ and $\hat{\beta}_2$ are still significant at the 1% level when we control for the push factors from the home country. $\hat{\beta}_1$, however, increases from -0.141 to -0.126 , while $\hat{\beta}_2$ decreases from 0.193 to 0.175 . That means the push factors from the home country do affect the location of FDI. Since factors relevant to the country pair (home country, host country) are of great importance for FDI (Burchardi et al., 2019; Ng et al., 2022; Mayda et al., 2022), we also control for the FDI persistence, the exchange rate, and geographical variables of each country pair. Column (4) of Table 3 shows that, $\hat{\beta}_1$ is negative and significant and $\hat{\beta}_2$ is positive and significant, when alternative determinants of FDI are controlled for.

To elucidate our results, we evaluate the estimated value of $\partial FDI / \partial Ins$ at reasonable values of Z , which are shown in Table 4. Specifically, we estimate the value of $\partial FDI / \partial Ins$ at the corresponding level according to the 10th, 25th, 50th, 75th, 90th percentile, and the average value of Z , which is close to the asset-specificity intensity of industrial chemicals, paper and products, fabricated metal products, footwear (except rubber or plastic), machinery (except electrical), and

¹¹ See Table A1 for a detailed list of home countries and host countries.

Table 3
Baseline results.

	(1)	(2)	(3)	(4)
Ins	-0.166*** (0.018)	-0.141*** (0.024)	-0.129*** (0.025)	-0.136*** (0.025)
Ins × Z ¹	0.171*** (0.025)	0.193** (0.036)	0.176*** (0.038)	0.175*** (0.039)
GDP (host)		0.034*** (0.010)	0.024** (0.011)	0.011 (0.010)
GGDP (host)		0.002 (0.003)	-0.001 (0.003)	-0.001 (0.003)
GWage (host)		-0.000 (0.001)	-0.001*** (0.000)	-0.001** (0.000)
CCapital (host)		0.000 (0.016)	-0.002 (0.019)	0.005 (0.018)
RExchange (host)		0.009 (0.009)	0.007 (0.009)	0.007 (0.009)
Inflation (host)		-0.006 (0.004)	-0.006 (0.004)	-0.006 (0.004)
Tax (host)		-0.003* (0.002)	-0.006** (0.002)	-0.006** (0.003)
Capital (host)		-0.111*** (1)	-0.094*** (3)	-0.066** (4)
GDP (home)		(0.026)	(0.028)	(0.028)
GGDP (home)			0.022* (0.011)	0.008 (0.012)
GWage (home)			0.005 (0.004)	0.002 (0.004)
CCapital (home)			-0.001 (0.000)	-0.000 (0.000)
RExchange (home)			0.002 (0.024)	-0.015 (0.024)
Inflation (home)			0.055 (0.040)	0.081 (0.059)
Capital (home)			-0.014** (0.006)	-0.019*** (0.007)
FDI Persistence			-0.082 (0.053)	-0.072 (0.051)
Exchange				0.002** (0.001)
Contig				-0.024 (0.024)
Language				0.051 (0.054)
Distance				0.090** (0.038)
Cons	1.732*** (0.196)	2.638*** (0.436)	2.988*** (0.699)	2.733*** (0.693)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	108,203	58,599	42,752	42,752
R ²	0.054	0.049	0.050	0.050

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significance at the 10 %, 5 %, and 1 % levels, respectively.

Table 4
 $\partial \text{FDI} / \partial \text{Ins} = \hat{\beta}_1 + \hat{\beta}_2 \times Z$, evaluated at various values of Z.

Value of Z	Percentile of Z	Close Value of Z	Corresponding Industry	$\partial \text{FDI} / \partial \text{Ins}$
0.240	10th	0.240	Industrial chemicals	-0.094
0.340	25th	0.331	Paper and products	-0.078
0.463	50th	0.435	Fabricated metal products	-0.060
0.682	75th	0.650	Footwear, except rubber or plastic	-0.022
0.764	90th	0.764	Machinery, except electrical	-0.002
0.487	Mean	0.49	Chemicals, other	-0.050
0.777	-	0.785	Professional and scientific equipment	0.001

machinery (electrical) industries, respectively. Results show that $\partial\text{FDI}/\partial\text{Ins}$ increases substantially as Z increases from the 10th to the 90th percentile, suggesting that the asset-specificity intensity of the investing industry significantly alters the relationship between institutional quality and FDI by reducing the negative effect of institutional quality on FDI. In general, when the asset-specificity intensity of the investing industry is less than the 90th percentile, the value of $\partial\text{FDI}/\partial\text{Ins}$ is negative, which means the institutional quality has a negative impact on FDI at least in half of the industries. However, when the asset-specificity intensity of the investing industry is over the 90th percentile, the value of $\partial\text{FDI}/\partial\text{Ins}$ changes from negative to positive.

In other words, there is a threshold of Z^* , 0.78, which clarifies the relationship between institutional quality and FDI. When the asset-specificity intensity of the investing industry is greater than 0.78, that is, investing in the professional and scientific equipment industry and the transportation manufacturing industry, institutional quality has a significantly positive effect on FDI. In summary, the impact of the institutional quality of host countries on the location choice of FDI is closely related to the asset-specificity intensity of the investing industry, and countries with good institutions are more attractive to FDI of high asset-specificity.

4.2. Robustness and sensitivity analysis

In the benchmark regression, we use the first principal component of the six indices in the WGI to measure the institutional quality of host countries. However, there may be estimation errors caused by variable measurement errors. So, we use alternative measures of institutional quality. First, we use the six indices in the WGI respectively¹², and the regression results are shown in the 1st through 6th columns of Table 5. Second, we apply the political risk index in the ICRG to measure institutional quality, and the regression result is shown in the 7th column of Table 5. Third, the GCI institutional index is used, and the relevant regression result is shown in the 8th column of Table 5. The results show that $\hat{\beta}_1$ is negative and significant, and $\hat{\beta}_2$ is positive and significant. Thus, our results are not affected by the measurement of institutional quality.

In the benchmark regression, to measure the asset-specificity intensity of investments, we use the contract intensity (Z^1), which does not indicate reference-priced inputs are asset-specific. In order to ensure the robustness of the regression results, we also use other measurements. First, we use contract intensity (Z^2), which deems reference-priced inputs to be asset-specific, to measure the asset-specificity intensity of the investing industry, and the regression result is shown in the first column of Table 6. Second, considering industries with high asset-specificity are often finance-intensive, we use the dependence on external financing of each industry (Extfin) to measure the asset-specificity intensity of the investing industry, and the result is shown in the second column of Table 6. Third, from the perspective of real options, Kim and Kung (2017) develop measures of asset redeployability by accounting for the usability of assets within and across industries. Therefore, we use this index as an alternative proxy, and the results are shown in columns (3) and (4) of Table 6.¹³ The results still hold when the measurement of asset specificity changes.

We also address the concern that other country characteristics, rather than institutional quality, impact FDI. For instance, countries with higher institutional quality often have more stringent antitrust regulations and less generous tax incentives to foreign investors which adversely affect FDI. Similarly, countries with poorer institutional quality tend to adopt more protection for domestic firms, which discourages FDI. Additionally, the rise of ethnocentrism in industrialized countries undermines economic integration and makes it challenging for foreign investors (Li et al., 2018; Andrews et al., 2018). We do this by interacting Z^1 with country characteristics from Table 7 and including these variables in our estimation equation.¹⁴ The results in columns (1)–(6) show that, countries with laxer regulations, less protection for domestic firms, reduced tax burden, and minor ethnocentrism do attract FDI of high asset-specificity. Despite this, the estimated coefficients for institutional quality and its interaction remain statistically significant when these variables are controlled for.¹⁵

¹² Voice and Accountability (VA), Political Stability and Absence of Violence/Terrorism (PV), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC).

¹³ Kim and Kung (2017) construct an industry-level redeployability index by multiplying the proportion of the expenditure of each asset in the industry and the frequency of asset use. Among them, the frequency of asset use is expressed by the weighted average of the product of whether an asset is used by the industry and the economic weight of the industry. The difference of Redeploy, lies in the economic proportion of the industry when measuring the frequency of asset use: Redeploy¹ takes the industry as the weight, and Redeploy² takes the market value of the industry's listed companies as the weight. The larger the value, the stronger the redeployability of the asset and the lower the degree of asset-specificity. For ease of understanding, this article uses the reciprocal of the redeployability index to measure asset specificity. In order to avoid the influence of extreme values, the table shows the regression results after 1% tailing of all variables.

¹⁴ The most direct approach would be to find variables precisely measure antitrust regulation, protective industrial policies, tax policy and ethnocentrism of the host country. Unfortunately, it is difficult to find internationally comparable measures of these variables. According to Mudambi et al. (2013) and Aghion et al. (2015), we use the regulation burden index to measure the antitrust regulation, employ indices such as the tariffs, non-tariff barriers, and subsidies to measure the protective industrial policies, and estimate the tax policy by tax burden. Subject to data availability, we employ the index that measure controls of the movement of capital and people to estimate ethnocentrism of the host country. Given the truth that, antitrust regulation, protective industrial policies, tax policy and ethnocentrism are closely related to economic freedom, we also address this concern by interacting Z^1 with indices that measure the economic freedom of the host country and including these variables in our estimation equation. The estimated coefficients for the institutional quality and its interaction remain statistically significant. The results are provided in Table A3.

¹⁵ Countries with higher institutional quality usually have an advantage in financing and human capital, thus attracting FDI of high asset-specificity. The results remain unchanged when we interact Z^1 with financial development and human capital conditions of the host country and include these variables in the equation. The results are provided in Table A4.

Table 5
Alternative measures of institutional quality.

	(1) Ins ^{VA}	(2) Ins ^{PA}	(3) Ins ^{GE}	(4) Ins ^{RO}	(5) Ins ^{RL}	(6) Ins ^{CC}	(7) Ins ^{CRG}	(8) Ins ^{GCI}
Ins	-0.234*** (0.064)	-0.318*** (0.070)	-0.361*** (0.071)	-0.362*** (0.065)	-0.322*** (0.056)	-0.283*** (0.054)	-0.021*** (0.007)	-0.409*** (0.103)
Ins × Z ¹	0.274*** (0.090)	0.475*** (0.074)	0.526*** (0.110)	0.453*** (0.108)	0.397*** (0.083)	0.376*** (0.087)	0.032*** (0.010)	0.037*** (0.006)
Controls	Yes	Yes						
Year	Yes	Yes						
Industry	Yes	Yes						
N	42,752	42,752	42,752	42,752	42,752	42,752	42,259	29,406
R ²	0.050	0.050	0.051	0.050	0.050	0.050	0.050	0.063

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significance at the 10 %, 5 %, and 1 % levels, respectively.

Table 6
Alternative measures of asset-specificity.

	(1) Z ²	(2) Extfin	(3) Redeploy ¹	(4) Redeploy ²
Ins	-0.093*** (0.034)	-0.075*** (0.017)	-0.114*** (0.028)	-0.059** (0.024)
Ins × Z ²	0.069* (0.037)			
Ins × Extfin		0.082*** (0.017)		
Ins × Redeploy ¹			0.030*** (0.009)	
Ins × Redeploy ²				0.018** (0.008)
Controls	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	42,752	42,752	30,015	15,414
R ²	0.048	0.050	0.107	0.111

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significant at the 10 %, 5 %, and 1 % levels, respectively.

We also report the results of several additional robustness tests. Firstly, MNCs pay organizational adaptation costs when they invest abroad; therefore, it is possible that the institutional difference between the home country and the host country other than the institutional environment of the host country matters (Kang and Jiang, 2012). To assess whether this is the case, we control for the institutional distance between the home country and the host country in the first column of Table 8. The inclusion of this variable does not alter the baseline results. We also control for the firms' age and size, which represent the ownership and internalization advantages of MNCs, in the second column of Table 8.¹⁶ Reassuringly, they are qualitatively similar to the baseline results. In the third column of Table 8, considering the impact of extreme values, we use the number of projects received by the host country as an alternative proxy for the dependent variable, the result remains essentially unchanged.

4.3. Endogeneity

This study may have endogeneity problems. First, the inflow of highly asset-specific FDI may stimulate government reforms and create an institutional environment conducive to these investments (Ahluquist and Prakash, 2010; Bak and Moon, 2016). Moreover, since the institutional quality score is calculated by experts, they may recognize that countries attracting FDI of high asset-specificity have better institutions, and therefore give them higher scores. Second, countries may have the motivation to improve their institutional quality so as to attract FDI of high asset-specificity. Third, the relationship between institutional quality and FDI of high asset-specificity may be caused by other missing variables.

As we have controlled for as many variables as possible and excluded the influence of other factors, it is less likely that omitted variables will lead to endogeneity. So, we intend to use instrumental variables to deal with other potential problems. Referring to Nunn (2007), we believe that the legal origin of each country (e.g., common law versus civil law) is a suitable instrumental variable for institutional quality. Firstly, existing studies have shown that legal origin determines the judicial

¹⁶ Since only 23,003 and 27,673 firms have age and size data, respectively, this regression causes large sample loss.

Table 7
Additional Results.

	(1) Regulation	(2) Protective Industrial Policies	(3)	(4)	(5) Tax Policy	(6) Ethnocentrism	(7) All
Ins	-0.126*** (0.042)	-0.136*** (0.044)	-0.134*** (0.043)	-0.132*** (0.044)	-0.083*** (0.031)	-0.130*** (0.044)	-0.085* (0.045)
Ins × Z ¹	0.156*** (0.048)	0.173*** (0.052)	0.165*** (0.052)	0.173*** (0.055)	0.106*** (0.041)	0.166*** (0.055)	0.107*** (0.054)
Regulation	-0.314*** (0.097)						-0.405** (0.166)
Regulation × Z ¹	0.518*** (0.146)						0.495** (0.212)
Tariff		-0.002 (0.105)					0.189 (0.200)
Tariff × Z ¹		0.045 (0.116)					-0.273 (0.221)
Non-tariff Trade Barriers			-0.023 (0.073)				0.099 (0.091)
Non-tariff Trade Barriers × Z ¹			0.197 (0.123)				0.006 (0.158)
Transfers and Subsidies				-0.062*** (0.019)			-0.069** (0.033)
Transfers and Subsidies × Z ¹				0.081*** (0.026)			0.084* (0.047)
Tax Burden					0.019*** (0.006)		0.017** (0.008)
Tax Burden × Z ¹					-0.023** (0.010)		-0.021* (0.012)
Ethnocentrism						-0.092** (0.041)	0.055 (0.089)
Ethnocentrism × Z ¹						0.204*** (0.060)	-0.027 (0.132)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	42,668	42,668	42,657	42,592	42,660	42,696	42,480
R ²	0.052	0.051	0.051	0.054	0.051	0.053	0.057

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significant at the 10 %, 5 %, and 1 % levels, respectively.

Table 8
Additional robustness checks.

	(1) FDI	(2) FDI	(3) Number of Projects
Ins	-0.130*** (0.025)	-0.115*** (0.035)	-0.110** (0.045)
Ins × Z ¹	0.172*** (0.038)	0.170*** (0.045)	0.210*** (0.052)
Institutional distance	-0.041*** (0.008)		
Scale		0.083*** (0.009)	
Age		-0.001*** (0.000)	
Controls	Yes	Yes	Yes
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	42,752	27,011	24,753
R ²	0.051	0.060	0.210

Notes: *, **, and *** represent results significant at the 10 %, 5 %, and 1 % levels, respectively. Column (1) to column (3) are adjusted for sample clustering at the firm level, while column (4) is adjusted for sample clustering at the country level, and standard errors are in parentheses.

quality and contract enforcement of a country (Acemoglu and Johnson, 2005; Lerner and Schoar, 2005). Secondly, the legal origin of a country is determined early and not affected by FDI and other factors, which can isolate external changes in the institutional environment. Therefore, this article uses the legal origin of the host country to construct an interactive term as an instrumental variable for Ins × Z¹. La Porta et al. (2008) believes that common law has more advantages in protecting the

Table 9
Instrumental variable estimation.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>First stage IV estimates: Dependent variable is $\ln s^* Z^1$</i>						
French legal origin $\times Z^1$	-0.791*** (0.018)				-0.925*** (0.020)	
Mortality $\times Z^1$			-0.483*** (0.009)		-0.474*** (0.008)	
F Value	437.32		2466.76			1393.71
Hansen J test (p-value)						0.67
<i>Second stage IV estimates: Dependent variable is FDI</i>						
Ins		-0.299** (0.121)		-0.483*** (0.009)		-0.050 (0.091)
Ins $\times Z^1$		0.443** (0.197)		0.257*** (0.083)		0.249*** (0.078)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
N	41,996	41,996	27,585	27,212	27,585	27,212

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significant at the 10 %, 5 %, and 1 % levels, respectively.

interests of investors, while civil law, especially French civil law, is the worst in terms of legal protection. Therefore, we use the interaction term of French civil law and asset-specificity intensity of the investing industry (French legal origin $\times Z^1$) as an instrumental variable.¹⁷

Columns (1) and (2) of Table 9 show the estimation results of the two-stage least squares method (2SLS). The first stage IV estimation shows that, compared with other countries, French legal origin countries have a worse institutional environment, which is consistent with La Porta et al. (2008) and Papaioannou (2009). In addition, the F value is significantly greater than 10, which means that countries' legal origin is not a weak instrumental variable. The second stage IV estimation shows that the coefficient of Ins $\times Z^1$ is significantly positive at the 5 % level, which corresponds with the baseline results.

However, Acemoglu et al. (2002) believe that the early experience of European colonization, rather than the legal origin, determines a country's institutional quality. Specifically, if early European colonists had a low mortality rate in a certain area, they tended to immigrate to that area, where they would establish good institutions that imitated their home countries. On the contrary, if the mortality rate was high, they tended to establish a predatory colonial government and transfer resources to the home country as much as possible. For this reason, we use the mortality of European colonists in a country as an instrumental variable for its institutional quality.¹⁸

Columns (3) and (4) of Table 9 show the results of the instrumental variable regression. The first stage regression shows that countries whose European colonists had a higher mortality rate have inferior institutional quality. This result is consistent with Acemoglu et al. (2002). The F-value in the first stage is significantly greater than 10, so the mortality rate of European colonists is not a weak instrumental variable. The results of the second stage show that the IV estimation coefficient of Ins $\times Z^1$ is also significantly positive at the 1 % level.

In addition, we re-estimate the above estimations by using both the legal origin and the mortality rate of European colonists as instrumental variables of institutional quality, and the results are shown in columns (5)-(6) of Table 9. The first stage of the regression shows that French civil law countries and countries whose European colonists had a higher mortality rate have inferior institutional quality. The result of the second stage shows that the IV estimation coefficient of Ins $\times Z^1$ is significantly positive at the 1 % level. The P-value of the Hansen J test is 0.67, thus there is no over-identification problem. In summary, after considering potential endogeneity issues, the results are still robust.

5. Further analysis

5.1. Contracting institutions versus property rights institutions

The above analysis shows that countries with superior institutional quality have some comparative advantage in attracting MNCs to invest in industries with a high degree of asset-specificity. On one hand, good property rights institutions can reduce the risk of infringement of property rights and guarantee investment security. On the other hand, fair and efficient contracting institutions can reduce the risk of being held up and promote asset-specific investments, thereby reducing investment costs and improving investment efficiency. Then which type of institution has a greater impact on FDI of high asset-specificity? To answer this question, we designed the following equation:

¹⁷ French legal origin is a dummy variable. If a country's legal origin is from French law, the value is 1, otherwise it is 0.

¹⁸ Since there are only data for 84 countries, this regression has a large sample loss.

Table 10
Contracting institutions versus property rights institutions.

	(1) GCI ^{pro}	(2) GCI ^{con}	(3) GCI ^{all}
Ins ^{pro1}	-0.151*** (0.048)		-0.279*** (0.069)
Ins ^{pro1} × Z ¹	0.201*** (0.069)		0.287*** (0.100)
Ins ^{con1}		0.017 (0.081)	0.400*** (0.093)
Ins ^{con1} × Z ¹		0.050 (0.071)	-0.482*** (0.144)
Controls	Yes	Yes	Yes
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	29,406	29,406	29,406
R ²	0.062	0.061	0.061

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significant at the 10 %, 5 %, and 1 % levels, respectively.

$$\begin{aligned}
 FDI_{ij,l,m,t} = & \sigma_0 + \sigma_1 Ins_{j,t}^{pro} + \sigma_2 (Ins_{j,t}^{pro} \times Z_l) + v_2 Ins_{j,t}^{con} + v_2 (Ins_{j,t}^{con} \times Z_l) + \sum_{q=1}^n \alpha_q X_{j,t} + \sum_{\rho=1}^n \gamma_\rho X_{m,t} + CP_{j,m} + Year_t \\
 & + Industry_l + \varepsilon_{ij,l,m,t}
 \end{aligned} \tag{3}$$

where $Ins^{pro} \times Z_l$ and $Ins^{con} \times Z_l$ respectively represent the interaction term between property rights institutions of the host country and asset-specificity intensity of the investing industry, and the interaction term between contracting institutions of the host country and asset-specificity intensity of the investing industry. $\sigma_2 > 0$, and $\sigma_2 > v_2$ indicate that countries with strong property rights institutions outperform those with good contracting institutions in attracting FDI of high asset-specificity. In the empirical analysis, we use the property rights index (Ins^{pro1}) in the GCI to measure property rights institutions, and the government efficiency index (Ins^{con1}) in the GCI to measure contracting institutions.

Table 10 presents the estimation results. The first column of Table 10 shows that the estimated coefficient of σ_2 is 0.201 and is significantly positive at the statistical level of 1 %, which indicates that countries with good property rights institutions have a comparative advantage in attracting FDI of high asset-specificity. The second column of Table 10 shows that the estimated coefficient of v_2 is 0.050 but not statistically significant, which suggests that good contracting institutions may help to attract FDI of high asset-specificity but only so much. The third column of Table 10 shows that, when $Ins_{j,t}^{pro} \times Z_l$ and $Ins_{j,t}^{con} \times Z_l$ are put into the same equation, the coefficient of σ_2 is 0.287 and is significant at the 1 % statistical level, but the coefficient of v_2 is -0.482 and is significant at the 1 % statistical level. This signifies that, compared with contracting institutions, the host country's property rights institutions are the key to attracting FDI of high asset-specificity.¹⁹

5.2. FDI ownership structure

In order to identify the impact of the institutional quality of the host country and the asset-specificity intensity of FDI on a MNC's ownership structure, we have designed the following estimation:

$$JVC_{ij,l,m,t} = \theta_0 + \lambda_1 Ins_{j,t} + \lambda_2 (Ins_{j,t} \times Z_l) + \hat{I}EC_{Controls} + Year_t + Industry_l + \bar{\omega}_{ij,l,m,t} \tag{4}$$

where i refers to firms, j to host countries, l to industries, m to home countries, t to time; JVC represents the ownership structure, which equals 1 if a MNC chooses the joint venture for its investments, otherwise it is 0; Ins represents the institutional equality, and Z is the asset-specificity intensity of the investing industry. We are interested in the coefficient of $Ins \times Z$, λ_1 . If $\lambda_1 < 0$, this indicates that MNCs tend to employ sole proprietorship rather than joint venture in countries with good institutions when they make FDI of high asset-specificity. Control variables include the home and host economy's macro-variables, factors related to each country pair, and the enterprise's scale (Scale) and age (Age); $Industry_l$ and $Year_t$ represent the industry and year fixed effects, respectively.

To investigate the heterogeneous effects of different types of institutions on the ownership structure of MNCs, we use the interaction of the host country's property rights institutions with the investing industry's asset-specificity intensity ($Ins_{j,t}^{pro} \times Z_l$), and the interaction of the host country's contracting institutions with the investing industry's asset-specificity intensity ($Ins_{j,t}^{con} \times Z_l$) for further analysis. The measurements are the same as above.

¹⁹ Table A5 represents the above regression with alternative measurement of property rights institutions and contracting institutions, and the estimated results are essentially the same.

Table 11
Sole proprietorship versus joint venture.

	(1)	(2)	(3)	(4)
Ins	-0.192*** (0.021)	-0.029 (0.055)		
Ins × Z ¹	-0.177*** (0.035)	-0.311*** (0.070)		
Ins ^{pro1}			0.096 (0.207)	
Ins ^{pro1} × Z ¹			-0.868*** (0.296)	
Ins ^{con1}			0.281 (0.257)	
Ins ^{con1} × Z ¹			0.611 (0.372)	
Ins ^{pro2}				-0.064 (0.098)
Ins ^{pro2} × Z ¹				-0.416*** (0.124)
Ins ^{con2}				0.086 (0.114)
Ins ^{con2} × Z ¹				-0.019 (0.165)
Controls	No	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
N	110,508	27,011	18,748	26,738

Notes: All standard errors are adjusted for sample clustering at the firm level, and standard errors are in parentheses. *, **, and *** represent results significant at the 10 %, 5 %, and 1 % levels, respectively.

We take the ownership of a multinational (JVC) as the explained variable and employ a logit model to estimate the equation (4). The results are shown in Table 11. The first column shows that the estimated coefficient of institutional quality is -0.192 and is significant at the 1 % statistical level, which means that good institutions help fairly and efficiently resolve disputes faced by MNCs in the host country. In that case, companies tend to adopt the sole proprietorship model, as they have less motivation to integrate firms to resist opportunistic acts of the local governments. At the same time, the coefficient of the interaction term between the institutional quality of host countries and asset-specificity intensity of investing industries is -0.177 , and is significant at the 1 % statistical level. This suggests that when a host country enjoys better institutions, and the investment has higher asset-specificity, MNCs are inclined to adopt the sole proprietorship model. The second column shows that results do not change after including the control variables.

We further compare the impact of different types of institutions, property rights institutions and contracting institutions, on MNCs' ownership structure. The third column shows that the interaction term between property rights institutions and industries' asset-specificity intensity is significantly negative. This means, for investments with high asset-specificity intensity, when the political risk is low in the host country, MNCs tend to adopt the sole proprietorship model to avoid the contractual risks associated with the joint venture model. On the contrary, the interaction term between contracting institutions and industries' asset-specificity intensity is positive. This signifies that, for investments with high asset-specificity intensity, when contractual risk is low in the host country, MNCs tend to adopt the joint venture model to resist potential political risks of the host government, or to use local partners' information and specific resources. The fourth column of Table 11 estimates the above regression with alternative measurements of property rights institutions and contracting institutions from the EFI and the ICRG respectively, and the results are essentially the same. Taken together, the above analysis suggests that property rights institutions not only affect the location choice of FDI, but also MNCs' ownership structure.

6. Conclusion

There has been a controversy over the topic that whether countries with good institutions have a comparative advantage in attracting FDI. One strand of literature says "yes", emphasizing that there are relatively fewer institutional risks for FDI in countries with good institutions. On the contrary, another strand says "no", believing that FDI can earn high returns in countries with poor institutions, because there is a lack of capital, an abundance of cheap resources, lax regulation, and unique business-government relationships. Obviously, the two strands above are reasonable but one-sided, since the former ignores the potentially higher returns in countries with poor institutions, while the latter neglects the institutional risks in those countries.

Our paper resorts to the incomplete contract theory and offers a framework to reconcile the controversy. We emphasize that FDI is essentially a series of contracts signed by MNCs, business partners, host governments, etc., while contracts are usually incomplete. Therefore, during the whole process of investment and operation, MNCs may face contractual risks from

business partners and political risks from host governments. Other things being equal, MNCs prefer countries that offer high returns. Unfortunately, the institutional quality in these regions is generally low, exposing investors to greater risks. MNCs then face a trade-off between attractive returns and high institutional risks when choosing a destination, which is closely related to the asset-specificity intensity of FDI.

In other words, the impact of the institutional quality of host countries on FDI is related to the asset-specificity intensity of investments. Countries with poor institutions probably attract FDI of low asset-specificity, while countries with good institutions, particularly better property rights institutions, have a comparative advantage in attracting FDI of high asset-specificity. Moreover, in countries with good property rights protection, FDI of high asset-specificity would prefer the sole proprietorship model to the joint venture model. The rationale is that while MNCs have confidence that few expropriation acts would be committed by the host governments, they are nevertheless concerned that their business partners may engage in opportunistic acts. Fortunately, these hypotheses are supported by empirical research based on the greenfield FDI data of 149 home countries in 196 host countries from 2003 to 2019.

Our research has some very important policy implications for various countries, especially for developing and emerging economies. Good institutions, in particular good property rights institutions, are the domain in attracting FDI of high asset-specificity, which are the key to promoting technological progress and stimulating long-term economic growth, and even successfully overcoming the middle-income trap.

CRedit authorship contribution statement

Man Tan: Formal analysis, Writing – original draft, Visualization. **Dengyu Yang:** Data curation, Writing – review & editing. **Qijing Yang:** Conceptualization, Writing – review & editing, Supervision, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary material

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