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Article

Determinants of India's Outward Foreign Direct Investment to BRICS Countries: An Augmented Gravity Model Approach

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Abstract: This paper examines the determinants of India's outward foreign direct investment (ODI) to its BRICS partners over 2007 to 2024. Using a country-year panel for Brazil, Russia, China, South Africa, Indonesia and Saudi Arabia, it relates India's ODI to each partner to economic mass, geographical distance, bilateral trade integration, macroeconomic conditions, institutional quality, digital and human development, economic complexity and global value chain participation. Because the data form a short panel of six recipients, the analysis uses pooled, random-effects, fixed-effects and Poisson pseudo-maximum-likelihood (PPML) estimators rather than the time-series cointegration and causality methods that dominate the India-BRICS trade literature (Kubendran, 2020; Singh, Chauhan, & Kumar, 2023; Singh, R. K., Chauhan, A. K., & Kumar, A. 2023a), and it draws inference from a wild cluster bootstrap that is appropriate when only six clusters are available (Cameron, Gelbach, & Miller, 2008). The cross-sectional gravity relationship is weak: conventional mass and distance terms explain between two and five per cent of how India distributes ODI across the six economies, a result that holds under both log-linear and PPML estimation and that fits the lumpy, deal-driven nature of direct investment. Within countries over time, ODI carries the expected signs on internet penetration, human development, economic complexity and, with a negative sign, capital-account openness, but once inference is corrected for the six-country cross-section none of these associations is statistically robust. The negative association with capital-account openness is the most consistent feature across specifications, yet it is identified from only three partners that changed their capital-account regime and it weakens when Brazil is removed or the regressors are lagged. Saudi Arabia, Russia and South Africa together receive about two-thirds of the cumulative USD 20.3 billion that India placed in the group, while China receives the least despite the largest economy and a shared land border. The results describe a strategic and resource-oriented pattern of Indian ODI that gravity fundamentals capture only in part, and the paper's contribution is a transparent, correctly-benchmarked account of that pattern rather than a set of confirmed structural determinants.
Keywords: outward foreign direct investment; BRICS; India; gravity model; panel data; wild cluster bootstrap; economic complexity

1. Introduction

India has changed over the past two decades from a country that mainly received foreign capital to one that also sends a growing amount abroad. Indian firms in software, pharmaceuticals, energy, automobiles and metals have acquired assets and established subsidiaries across developed and developing markets, and outward foreign direct investment has become a settled feature of the country's external economic policy (Kaushal, 2018). The BRICS grouping, which brings India together with Brazil, Russia, China and South Africa and, more recently, with Indonesia and Saudi Arabia, is one arena in which this outward turn can be studied. Its members are large emerging economies

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with a stated interest in deeper South-South cooperation, and India engages with them through summit diplomacy, a development bank and a widening set of bilateral treaties. Whether these political ties are matched by real investment flows, and what shapes those flows, is an empirical question.

Most quantitative work on India and BRICS has concentrated on merchandise trade. Studies by Singh, Chauhan, and Kumar (2023) and by Kubendran (2020) apply the gravity model to India's exports and bilateral trade with the group and report that market size, distance and trade openness account for a large share of the variation in trade. Investment has received less attention, even though the determinants of direct investment differ from those of trade. Trade responds to relative prices and transport costs within a given year, while direct investment reflects longer-horizon decisions about ownership, control and the location of production, and it is often concentrated in a small number of large transactions (Boddewyn, 1983; Buckley, 2018; Kaushal, V., Chauhan, M., & Pathania, K. S., 2026a). A framework built to explain trade will not, without modification, explain where and why Indian firms invest.

This paper addresses that gap, and it does so with attention to the statistical limits that a six-country panel imposes. The question is what determines India's ODI to its BRICS partners over 2007 to 2024. The dependent variable is India's ODI to each partner economy, measured in United States dollars. The explanatory variables are drawn from an assembled country-year panel and cover economic mass and geographical distance, which form the core of any gravity model; bilateral trade integration; macroeconomic conditions such as inflation and the exchange rate; institutional quality and financial openness; digital and human development; and two structural characteristics that have entered the recent literature, namely economic complexity and participation in global value chains. India itself is excluded from the set of recipients, since a country cannot invest in itself, so the analysis covers the six partner economies.

The study makes three contributions. The first is substantive: it moves the India-BRICS gravity literature from trade to direct investment and shows that the tight gravity fit reported for India's exports does not carry over to its investment. The second is methodological. Where the trade studies apply unit-root, cointegration and dynamic least-squares methods designed for long single time series, this paper treats the data as the short panel that they are and estimates them with pooled, random-effects, fixed-effects and PPML models. It also takes seriously a problem that studies of small country groups often set aside: with six cross-sectional units, conventional cluster-robust standard errors over-reject, so inference is drawn from a wild cluster bootstrap (Cameron et al., 2008; MacKinnon; Kaushal, V., Singh, R., & Pathania, K. S., 2026b; ; Nielsen, & Webb, 2019;Singh, R. K., & Kumar, A., 2019), and every central result is checked by removing one partner at a time. The third contribution is one of candour about evidence. When corrected inference is applied, several associations that look significant under naive standard errors are no longer robust, and the paper reports this rather than presenting fragile coefficients as findings.

The remainder of the paper is organised as follows. Section 2 reviews the relevant literature. Section 3 sets out the conceptual framework and the hypotheses. Section 4 describes the data and the estimation strategy. Section 5 presents trends and descriptive statistics. Section 6 reports the empirical results, and Section 7 examines each partner in turn. Section 8 discusses the findings and their policy implications, Section 9 states the limitations, and Section 10 concludes.

2. Review of the literature

The theoretical account of why firms invest abroad rests on the eclectic paradigm and on internalisation theory. A firm undertakes direct investment when it holds ownership advantages, when a foreign location offers advantages that make production there worthwhile, and when it is more profitable to exploit those advantages within the firm than through arm's-length markets (Dunning, 1988). Buckley (2018) extends internalisation theory to multinationals from emerging markets and argues that their outward investment can be understood with the same tools used for firms from advanced economies, once the imperfections of home-country capital and factor markets are allowed for. Ozawa (1992) places outward investment within a stages framework, in which firms from catching-up economies move abroad as their home economy upgrades, while Kojima (1975) draws the classic distinction between trade-oriented and anti-trade-oriented investment and asks whether direct investment substitutes for or complements trade.

Boddewyn (1983) reminds us that investment and divestment decisions are not mirror images, which matters for a dependent variable that moves in discrete and sometimes reversed steps.

A large empirical literature applies the gravity model to bilateral investment. Borrowed from trade, the model predicts that flows between two economies rise with their combined economic size and fall with the distance between them. Its modern, structural form requires terms for multilateral resistance, so that a bilateral flow depends on the two partners' openness relative to the rest of the world rather than on their bilateral friction alone (Anderson & van Wincoop, 2003; Head & Mayer, 2014). Arora and Sharma (2025) apply a gravity framework to intra-SAARC direct investment and find that market size and proximity shape capital flows within South Asia, while institutional and structural frictions hold them back. Khamphengvong, Xia, and Srithilat (2018) estimate static and dynamic gravity models for inward investment into the Lao People's Democratic Republic and report that market size, trade openness, inflation, labour cost and the exchange rate are the main attractants, while distance and a shared border do not help to explain the flows. Harvey (1989) had earlier questioned how far the determinants of direct investment can be read from aggregate variables at all. These results are a useful caution: the gravity variables that work well for trade do not always transfer cleanly to investment, and Blonigen (2005) makes the same point in his review of the empirical FDI literature.

Several determinants have been studied in their own right. The exchange rate enters through the imperfect-capital-markets channel of Froot and Stein (1991), in which a depreciation of the host currency raises the relative wealth of foreign investors and makes host-country assets cheaper to acquire; MacDermott (2008) provides further evidence linking exchange rates to direct investment. Institutions matter as well. Habib and Zurawicki (2002) show that corruption deters foreign investment and that investors dislike the uncertainty it creates, while García-Herrero, Sengupta, and Vujanović (2026) argue that structural and institutional barriers, rather than tariffs alone, hold back investment into manufacturing in economies such as India. Jamsheed, Mingxing, Hussain, and Hussain (2026) find that geopolitical risk depresses inward investment across the G20, a channel of direct relevance to a grouping that includes Russia. Danakol, Estrin, Reynolds, and Weitzel (2013) examine how foreign investment interacts with domestic entrepreneurship, and Luo (1998) shows that the timing of entry conditions the performance of investment in a large emerging host, a finding that speaks to the episodic character of Indian investment in China.

Two recent strands inform the present study. The first concerns economic complexity, the productive knowledge embedded in an economy's export basket. Leão, Gonçalves, and Perobelli (2025) treat complexity as a structural attribute that conditions how economies interact. The second concerns global value chains. Adarov (2021) models the two-way relationship between value chains and direct investment as a network and shows that the two reinforce each other; Fambeu and Tsambou (2026) find that value-chain participation shapes the investment behaviour of firms in sub-Saharan Africa; and Sun (2024) documents how developed and developing economies occupy different positions in these chains. Saggi (2002) surveys the links between trade, investment and technology transfer and connects these literatures. For India specifically, Kaushal (2018) reviews the country's outward investment experience and traces its growth, its sectoral pattern and the motives behind it, from market-seeking and resource-seeking investment to the pursuit of strategic assets. The gap that this paper fills is therefore twofold. There is little work that applies a gravity framework to India's outward investment to the BRICS economies as a panel, and there is little that brings the newer structural determinants to bear on that question while remaining honest about where the data, and the available degrees of freedom, run out.

3. Conceptual framework and hypotheses

The gravity model provides the organising structure for the analysis. In its trade form, the flow between two economies is proportional to the product of their economic masses and inversely proportional to the distance between them. Applied to direct investment, the home economy's outward flow to a host is taken to rise with the host's market size, which stands for the demand that market-seeking investment aims to serve, and to fall with distance, which stands for the information, coordination and cultural costs that separate the two economies. This bare model is then augmented with variables that capture the location advantages of the eclectic paradigm (Dunning, 1988). One

qualification is set out at the start. Because the data contain a single origin, India, and six hosts, the design is closer to a single-origin determinants model motivated by gravity than to the structural gravity system of Anderson and van Wincoop (2003); the multilateral-resistance terms of that system cannot be identified from one origin, and the distance, contiguity and language terms are absorbed once host fixed effects are included. The paper therefore reads the gravity terms only in the pooled and PPML specifications, where they are identified, and treats their weakness as a result rather than as something to be explained away.

The available data are mapped onto the location advantages that theory identifies. Market size is measured by the partner's gross domestic product, and the level of development by gross domestic product per capita. Distance enters directly, joined by a common land border and a shared official language, which proxy for proximity and ease of communication. Trade integration is captured by bilateral trade with India, by the share of the partner's trade conducted with India, which is termed trade affinity, and by the presence of an active regional trade agreement; these variables test whether investment follows trade, as the complementarity view of Kojima (1975) would suggest. Macroeconomic conditions enter through inflation, a measure of instability that is expected to deter investment, and through the exchange rate, which operates through the wealth channel of Froot and Stein (1991). Institutional quality is measured by an overall governance score, a logistics performance index and a fragile-states score, while financial openness is measured by the Chinn-Ito index of capital-account openness (Chinn & Ito, 2006). Human and digital development enter through the Human Development Index and the share of the population using the internet. Two structural determinants are included where the data permit: economic complexity, measured by the Economic Complexity Index, and participation in global value chains, measured by forward and backward linkages.

These mappings lead to a set of hypotheses, each tied to a variable present in the dataset. H1 states that India's ODI rises with the partner's market size. H2 states that it falls with distance, though the structural gravity terms are weakly identified across only six recipients and are testable only in the pooled and PPML models. H3 states that ODI is greater to partners with which India trades more and with which trade is more concentrated. H4 states that macroeconomic instability, proxied by inflation, reduces ODI, while host-currency depreciation raises it. H5 states that better governance and greater financial openness attract ODI, though the sign of the capital-account term is treated as an open question, since much of India's investment in the group is resource-oriented and may not depend on general financial openness. H6 states that ODI rises with human and digital development. H7 states that ODI is greater to partners that are more economically complex and more deeply embedded in global value chains. The empirical work tests these propositions and, where the data or the available inference are too thin to support a firm test, says so.

4. Data and methods

4.1 Data and sources

The analysis uses a country-year panel assembled for the BRICS economies. The panel is filtered to the members for which the source provides consistent coverage, namely Brazil, Russia, India, China, South Africa, Indonesia and Saudi Arabia, and it merges an investment dataset with a trade datasheet. India is the home economy and is removed from the set of recipients, which leaves six partner countries. A point of definition is worth stating plainly, because it bears on interpretation. The grouping is treated as it stood at the end of the sample, but its membership is recent: Indonesia joined in January 2025 and Saudi Arabia in July 2025, while the founding members are Brazil, Russia, India, China and South Africa. The panel applies the label across the whole window for continuity, and the results for Indonesia and Saudi Arabia are best read as evidence on prospective and new members rather than on a settled bloc; Section 6 reports how the findings change when the two are removed.

The dependent variable, India's ODI to each partner, is recorded from 2007 onward; values before 2007 are absent for every partner. Although the ODI series itself extends to 2025, the core economic, trade and institutional regressors end in 2024, so the estimation window runs from 2007 to 2024. This yields a balanced panel of six countries over eighteen years, or 108 observations. The dependent variable is expressed in United States dollars. Its distribution is strongly right-skewed, with a raw skewness of 4.32, because a handful of large investments sit alongside many small ones; taking natural logarithms brings the skewness to −0.31. Every recorded value is strictly positive, so the

logarithmic transformation loses no observations, but positivity is itself a feature of this particular series and the paper does not rely on it, reporting PPML estimates on the level of ODI alongside the log-linear models.

Coverage varies across variables, and honesty about this shapes the specification. The core economic, trade, macroeconomic and institutional variables are observed for almost all 108 country-years. Three structural variables are only partly recorded, and their gaps are systematic rather than random: the value-chain linkages are available only for Brazil, China and Indonesia; the Economic Complexity Index is missing for Russia and begins in 2012; and a financial-development index is missing for China and stops in 2020. These gaps are not imputed and the structural variables are not carried into the main model; instead they are examined in separate extended specifications on the sub-samples for which they exist, with the number of observations stated in each case. Two further points of transparency should be recorded. The logistics performance index is published only in selected years and has been carried forward between editions, and the Chinn-Ito index is released with a lag, so its most recent values may be provisional; neither variable is central to the preferred model. Table 1 lists the variables, the channel each represents, the expected sign and the primary source.

Table 1. Variables, channels, expected signs and sources

Variable	Measure	Channel	Sign	Primary source
Partner GDP	GDP, USD bn (log)	Economic mass	+	World Bank WDI
GDP per capita	GDP per head, USD (log)	Development	+ / −	World Bank WDI
Distance	Capital-to-capital, km (log)	Gravity friction	−	CEPII
Contiguity	Shared land border (0/1)	Gravity proximity	+ / −	CEPII
Common language	Shared official language (0/1)	Gravity proximity	+	CEPII
Bilateral trade	Trade with India, USD bn (log)	Trade integration	+	Trade datasheet (UN Comtrade)
Trade affinity	Trade with India, % partner world trade	Trade integration	+	Author calc.
RTA	Active trade agreement (0/1)	Trade integration	+	Assembled panel
Inflation	Consumer price inflation, %	Macro stability	−	World Bank WDI
Exchange rate / REER	Official rate; REER 2010=100 (log)	Wealth channel	+ / −	IMF / BIS
Governance	Overall governance score, 0–100	Institutions	+	Assembled panel
Capital-account openness	Chinn-Ito index	Financial openness	?	Chinn & Ito (2006)
Logistics (LPI)	Logistics performance index	Institutions	+	World Bank LPI
Fragile states	Fragile States Index	Institutions	−	Fund for Peace
Human Development Index	HDI, 0–1	Development	+	UNDP

Internet users	% of population online	Digital development	+	World Bank WDI
Economic complexity	ECI (OEC)	Capabilities	+	OEC / Atlas
GVC linkages	Forward and backward linkages	Value chains	+	Assembled panel (ADB/Eora)
BIT	Active bilateral investment treaty (0/1)	Policy	+	Assembled panel
India inward FDI	India inward FDI from partner, USD bn	Bilateral linkage	+	RBI / assembled panel

Notes: Sources indicate the primary origin of each series in the assembled panel; where a series is a composite or its ultimate source is not separately documented, it is marked as from the assembled panel. Constant columns (a group label and the double-taxation-avoidance flag, invariant across the six partners) are omitted. Distance, contiguity, common language and the RTA flag do not vary within a country over time and are absorbed by the country fixed effects.

4.2 Estimation strategy

The augmented gravity equation is estimated in log-linear form. For partner i in year t, the baseline specification is

$$ln(ODI_it) = \alpha + \beta 1\ ln(GDP_it) + \beta 2\ ln(GDPpc_it) + \beta 3\ ln(Dist_i) + \gamma' X_it + \mu_i + \lambda_t + \varepsilon_it,$$

where ODI is India's outward direct investment to the partner, GDP and GDP per capita measure economic mass and development, Dist is distance, X is the vector of augmenting variables set out in Table 1, μ_i is a country effect, λ_t is a year effect and ε is the error term. The equation is estimated by four methods. Pooled ordinary least squares treats the panel as a single cross-section and retains the time-invariant gravity terms. Random effects allow for an unobserved country component assumed uncorrelated with the regressors. Fixed effects remove the country component by working with deviations from country means, which controls for all time-invariant partner characteristics at the cost of dropping distance and the other structural gravity terms; a two-way variant adds year effects to absorb global shocks. Because the log-linear model is known to be biased when the dependent variable is heteroskedastic, the equation is also estimated by Poisson pseudo-maximum-likelihood on the level of ODI, which is consistent under heteroskedasticity and admits zero flows (Santos Silva & Tenreyro, 2006); the PPML specification carries country fixed effects, and a pooled PPML model retains the gravity terms. The preferred specification is fixed at market size, trade affinity, internet penetration and capital-account openness, and is stated here rather than selected afterwards.

Inference receives particular care. With only six cross-sectional units, standard errors that cluster on the country are unreliable, because cluster-robust methods rely on a large number of clusters and over-reject when clusters are few (Cameron et al., 2008). The paper therefore treats the wild cluster bootstrap as the primary source of inference for the preferred model, imposing the null on the coefficient of interest, resampling cluster-level residuals with Rademacher weights and enumerating all sixty-four sign combinations, which gives an exact bootstrap distribution for six clusters (MacKinnon et al., 2019). Heteroskedasticity-robust and Driscoll-Kraay standard errors are reported as secondary, with the caveat that both are large-sample devices. Three further checks guard against the fragility that a six-country panel invites. The preferred model is re-estimated six times, each time removing one partner, to see whether any result depends on a single country. The time-varying regressors are entered with a one-period lag, which reduces the simultaneity between investment and its correlates; dynamic panel estimators of the Arellano-Bond family are not used, because they are designed for panels with many cross-sectional units and are not valid at N = 6. Country-

specific linear trends are added to check that the estimates are not an artefact of common movement over time. The extended structural variables, economic complexity and value-chain linkages, enter through additional regressions on their respective sub-samples rather than through the main model.

5. Trends and descriptive analysis

India placed about USD 20.3 billion of direct investment in the six BRICS partners over 2007 to 2024. The annual total is uneven from year to year, which is the signature of direct investment that moves in discrete transactions rather than in a smooth stream. Flows were small in the late 2000s, rose through the middle of the following decade, and reached local peaks of about USD 2.7 billion in 2017, USD 3.1 billion in 2019 and USD 3.1 billion again in 2024. The total fell to about USD 0.57 billion in 2020, at the onset of the pandemic and the associated freeze in cross-border deal-making. The overall drift is upward, but the year-to-year variation around that drift is large.

The distribution across partners is uneven as well. Saudi Arabia is the largest single destination, with USD 5.98 billion, or about 30 per cent of the group total, concentrated towards the end of the period. Russia follows with USD 4.16 billion, or 21 per cent, but its flows are front-loaded, with the highest annual value early in the sample and a compound growth rate that is slightly negative over the full window. South Africa and Brazil each account for between 17 and 19 per cent. Indonesia takes about 11 per cent on a steep upward path, and China is last, with USD 0.75 billion, under 4 per cent of the total. Table 2 sets out the totals, shares and growth rates.

Table 2. India's outward direct investment to BRICS partners, 2007–2024

Partner	Total (USD bn)	Share (%)	Mean (USD bn)	Max (USD bn)	CAGR (%)	Peak year
Saudi Arabia	5.98	29.5	0.332	2.616	40.7	2024
Russia	4.16	20.5	0.231	0.546	-1.0	2008
South Africa	3.77	18.6	0.209	0.670	15.6	2016
Brazil	3.45	17.0	0.192	1.532	21.8	2017
Indonesia	2.17	10.7	0.121	0.598	25.6	2018
China	0.75	3.7	0.042	0.083	5.9	2014
Total	20.29	100.0	0.188	2.616	—	—

Notes: CAGR is the compound annual growth rate of annual ODI between 2007 and 2024. The peak year is the year of the partner's highest annual inflow.

China deserves comment at the outset, because it runs against the gravity model. China has by far the largest economy in the group, its capital lies closer to Delhi than any other partner's, and it is the only partner that shares a land border with India. On the logic of gravity it should receive the most Indian investment; instead it receives the least. This gap between prediction and outcome is a theme that the empirical section takes up, and it points to a role for strategic and political factors that the standard variables do not measure.

Table 3 reports descriptive statistics for the dependent variable and the main regressors. The partners differ widely in size, from South Africa's economy of a few hundred billion dollars to China's, which exceeds eighteen trillion by the end of the period. Bilateral trade with India averages USD 28.5 billion but ranges from under USD 3 billion to over USD 140 billion. Capital-account openness, measured by the Chinn-Ito index, averages below zero, since several partners maintain restrictions on cross-border finance, and it spans the full range from the most closed to the most open value. Internet penetration averages 56 per cent but runs from single digits early in the sample to full coverage by its end. A first look at the correlations foreshadows the regression results: the simple correlation between the logarithm of ODI and each candidate determinant is weak, and none exceeds an absolute value of about 0.26. Internet penetration, human development and trade affinity are the strongest positive correlates, while economic

complexity and the regional-trade-agreement dummy correlate negatively. The partner's own gross domestic product correlates slightly negatively with ODI, the opposite of the gravity prediction, because the largest economy in the group receives the smallest inflow.

Table 3. Descriptive statistics, 2007–2024

Variable	N	Mean	SD	Min	Max
India ODI to partner (USD bn)	108	0.188	0.348	0.001	2.616
Partner GDP (USD bn)	108	2915.0	4424.6	316.1	18743.8
GDP per capita (USD)	108	11289	8133	1823	38510
Population (bn)	108	0.345	0.471	0.022	1.412
Bilateral trade with India (USD bn)	108	28.51	29.33	2.78	141.86
Trade affinity with India (%)	105	4.19	2.70	0.65	9.76
Inflation, CPI (%)	108	4.85	2.96	−1.19	15.53
Governance score (0–100)	108	50.81	5.30	38.73	62.33
Capital-account openness (Chinn-Ito)	108	−0.33	0.95	−1.25	1.08
Internet users (%)	108	56.22	25.81	5.79	100.0
Human Development Index	108	0.748	0.072	0.598	0.900
Logistics performance (LPI)	108	3.14	0.35	2.37	3.78
India inward FDI from partner (USD bn)	108	0.076	0.291	0.000	2.816
Economic complexity (ECI)	65	0.473	0.597	−0.283	1.666
Distance (km)	108	6405	3857	3053	14252

Notes: The Economic Complexity Index is observed for five partners from 2012, and trade affinity for 105 of 108 country-years.

6. Empirical results

6.1 Cross-sectional and random-effects estimates

Table 4 reports the pooled and random-effects estimates. The first column is the bare gravity model, with economic mass, development and distance. The model explains under two per cent of the variation in the logarithm of ODI, and only development enters with any precision. The second column adds bilateral trade and the regional-trade-agreement dummy; the fit improves only marginally, and the distance term switches sign. The third column adds inflation, governance and capital-account openness in a random-effects specification, and the overall fit remains low at five per cent. The message of Table 4 is that the cross-sectional gravity relationship for India's ODI to BRICS is weak. Across six large economies, differences in size, distance and trade do not explain how India divides its investment among them. A Hausman test of the augmented model gives a chi-squared statistic of 8.49 on four degrees of freedom, with a p-value of 0.075, which favours the fixed-effects specification only weakly; the paper adopts fixed effects for the stronger reason that they control for the many time-invariant partner characteristics that a six-country cross-section cannot otherwise separate.

Table 4. Pooled OLS and random-effects estimates (dependent variable: ln ODI)

Variable	(1) POLS	(2) POLS	(3) RE
ln GDP	−0.180 (0.127)	0.011 (0.160)	−0.378 (0.207)
ln GDP per capita	0.165 (0.080)**	−0.173 (0.083)**	0.326 (0.271)
ln Distance	−0.075 (0.232)	0.329 (0.317)	−0.233 (0.436)
ln Bilateral trade		0.191 (0.275)	
RTA		−0.891 (0.282)***	
Inflation			−0.051 (0.069)
Governance			−0.017 (0.046)
Capital-account openness			−0.396 (0.232)*
Observations	108	108	108
R-squared	0.017	0.038	0.060

*Notes: Cluster-robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. Columns (1) and (2) are pooled OLS; column (3) is a random-effects model. With six clusters these standard errors are indicative only; see Section 6.3.*

6.2 Fixed-effects and PPML estimates

Table 5 reports the fixed-effects results. Because economic mass and development move almost in lockstep within a country over eighteen years, the two cannot be separated in the within dimension, and the partner's gross domestic product is retained as the single scale term. The first column is the fixed-effects analogue of the augmented model; capital-account openness is negative and marginally significant, and inflation carries a negative sign. The second column adds internet penetration, which is positive and marginally significant, and lifts the within fit. The third and fourth columns give the preferred specification, which combines market size, trade affinity, internet penetration and capital-account openness, estimated with country effects alone and then with country and year effects. In both, capital-account openness is the only regressor that reaches conventional significance under cluster-robust standard errors, and market size, trade affinity and internet penetration are individually insignificant once entered together. The fifth column adds country-specific linear trends and leaves the capital-account coefficient close to its earlier value. The variance inflation factors for the preferred regressors are all below 2.1, so multicollinearity is not the reason the other terms are imprecise.

Table 5. Fixed-effects estimates (dependent variable: ln ODI)

Variable	(1) FE aug.	(2) FE +digital	(3) FE pref.	(4) Two-way	(5) FE +trends
ln GDP	1.076 (1.085)	0.237 (1.093)	−0.110 (0.517)	−0.455 (0.950)	1.110 (0.809)
ln Bilateral trade	−0.574 (0.362)	−0.887 (0.398)**			
Trade affinity			0.218 (0.235)	0.188 (0.251)	0.207 (0.243)
Inflation	−0.073 (0.044)*				
Governance	0.001 (0.133)	0.033 (0.113)			
Internet users		0.026 (0.015)*	0.015 (0.012)	0.037 (0.032)	0.024 (0.030)
Capital-account openness	−0.906 (0.463)*	−0.794 (0.294)***	−0.893 (0.263)***	−1.171 (0.463)**	−1.182 (0.375)***
Country effects	Yes	Yes	Yes	Yes	Yes
Year effects	No	No	No	Yes	No
Country trends	No	No	No	No	Yes
Observations	108	108	105	105	105
Within R-squared	0.083	0.128	0.178	0.099	0.299

*Notes: Cluster-robust (entity) standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. GDP per capita is excluded from the within models because it is collinear with GDP in the time dimension. The significance stars in this table use cluster-robust standard errors and over-state precision at N = 6; wild-bootstrap inference is reported in Table 7.*

Table 6 reports the PPML estimates, which model the level of ODI and are robust to the heteroskedasticity that biases the log-linear model. With country fixed effects, the picture matches the log-linear result: capital-account openness is negative, internet penetration is positive and marginally significant, and market size and trade affinity are insignificant. The pooled PPML model, which retains the gravity terms, confirms the descriptive pattern. Distance carries the expected negative sign but is far from significant, contiguity is negative rather than positive, reflecting the position of China, and only development enters with any precision. The gravity fundamentals, in short, are as weak in levels as they are in logs.

Table 6. PPML estimates (dependent variable: ODI level, USD bn)

Variable	(1) PPML, country FE	(2) PPML, pooled gravity
ln GDP	1.362 (1.301)	0.747 (0.831)
ln GDP per capita		0.667 (0.344)*
ln Distance		−0.802 (0.926)
Contiguity		−3.791 (2.750)
Common language		1.857 (2.000)
RTA		0.697 (0.990)
Trade affinity	−0.234 (0.250)	
Internet users	0.012 (0.007)*	
Capital-account openness	−0.801 (0.269)***	

Observations	105	108

*Notes: Poisson pseudo-maximum-likelihood; cluster-robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. Column (1) includes country fixed effects; column (2) is pooled and retains the time-invariant gravity terms.*

6.3 Corrected inference and robustness

The results to this point rest on cluster-robust standard errors, which over-reject with six clusters. Table 7 subjects the capital-account coefficient, the one term that is significant throughout, to the wild cluster bootstrap and to three robustness checks. The lesson is sobering. The preferred coefficient of −0.893 has a cluster-robust t-statistic of −3.12, which would ordinarily be significant at the one per cent level, but its wild-bootstrap p-value is 0.203. The bootstrap, which is the appropriate procedure when clusters are few, does not reject the hypothesis that the coefficient is zero. The negative sign is nonetheless the most consistent feature of the estimates: it survives the two-way model, the addition of country-specific trends, the PPML specification and a cumulative-stock version of the dependent variable, and the point estimate lies between −0.64 and −1.18 across these forms. It is, however, identified from only three partners, Brazil, Russia and Indonesia, whose capital-account regime changed within the window; the other three held their regime constant. When the regressors are lagged by one year the coefficient is essentially unchanged in size but loses significance even under cluster-robust standard errors. The honest reading is that the negative association between capital-account openness and Indian ODI is a real regularity in this sample, driven by a few partners that tightened their capital accounts while Indian investment held up, but that it cannot be established as statistically robust on six countries.

Table 7. Robustness of the capital-account openness coefficient

Specification	Coefficient	SE	Inference
Preferred FE (cluster-robust)	−0.893	0.263	p < 0.01 (over-rejects)
Preferred FE (wild cluster bootstrap)	−0.893	—	p = 0.203
Two-way FE	−1.171	0.463	p < 0.05 (cluster)
FE + country-specific trends	−1.182	0.375	p < 0.01 (cluster)
PPML, country FE	−0.801	0.269	p < 0.01 (cluster)
Cumulative ODI stock, two-way FE	−0.641	0.108	p < 0.01 (cluster)
Lagged regressors, two-way FE	−0.894	0.568	n.s.
Leave-one-out: drop Brazil	−0.618	0.421	n.s. (p = 0.15)
Leave-one-out: drop China	−0.827	0.275	p < 0.01
Leave-one-out: drop Indonesia	−1.047	0.137	p < 0.01
Leave-one-out: drop Russia	−0.921	0.481	p = 0.06
Leave-one-out: drop Saudi Arabia	−1.092	0.230	p < 0.01

Leave-one-out: drop South Africa	−0.681	0.283	$p < 0.05$

Notes: All rows are variants of the preferred fixed-effects model. The wild cluster bootstrap imposes the null and enumerates all 64 Rademacher sign combinations for the six clusters. Capital-account openness varies within only three partners (Brazil, Indonesia, Russia); removing Brazil, which contributes much of that variation, is what most weakens the estimate.

A second exercise characterises the within-country determinants without over-claiming. Table 8 enters each candidate on its own, alongside market size, in a country fixed-effects regression, and reports both the raw p-value and a Holm-Bonferroni adjustment for the fifteen tests performed. Under the raw p-values several determinants look significant, among them trade affinity, internet penetration, human development and two structural-similarity measures. Once the multiple-testing correction is applied, only three survive at the five per cent level: market capitalisation, human development and the Heckscher-Ohlin factor difference. The human-development coefficient is large and moves closely with the general upgrading of these economies, so it is best read as a summary of development rather than as a separate channel, and the same collinearity applies to the similarity measures. This screen is exploratory; its standard errors share the six-cluster over-rejection problem, so even the survivors should be treated as suggestive rather than as established effects.

Table 8. Within-country determinant screen with multiple-testing adjustment

Determinant	Coefficient	Raw p	Holm p	Within R^2
Market capitalisation (% GDP)	0.005	0.001	0.009	0.052
Human Development Index	12.534	0.001	0.009	0.076
Heckscher-Ohlin factor difference	−1.840	0.001	0.011	0.110
Linder similarity	5.396	0.031	0.369	0.080
Internet users	0.023	0.034	0.377	0.085
Trade affinity	0.497	0.076	0.763	0.092
Military expenditure (% GDP)	−0.364	0.088	0.789	0.057
Inflation	−0.073	0.095	0.757	0.040
ln REER	−2.151	0.141	0.984	0.040
Capital-account openness	−0.598	0.212	1.000	0.059
Partner GDP	0.950	0.269	1.000	0.030
Fragile States Index	0.022	0.763	1.000	0.032
BIT active	−0.077	0.892	1.000	0.030
India inward FDI	−0.027	0.920	1.000	0.030
Governance	−0.002	0.989	0.989	0.030

Notes: Each row is a separate country fixed-effects regression of ln ODI on the listed determinant and the partner's GDP, with cluster-robust standard errors. Holm p applies the Holm-Bonferroni step-down correction across the fifteen tests. The screen is exploratory and its inference is subject to the six-cluster caveat.

6.4 Economic complexity and value chains

The two structural determinants are examined on the sub-samples for which they exist. Economic complexity is available for five partners from 2012, which gives sixty-five observations. Its coefficient is positive in both the pooled and the fixed-effects specifications, and in the within model it reaches significance at the five per cent level under cluster-robust standard errors, with a point estimate of about 1.53. The direction supports the hypothesis that India invests more in economies with greater productive capabilities, but the sample is short and selective, it omits Russia, and its inference carries the same six-cluster caveat, so the result is reported as suggestive rather than confirmed. Value-chain linkages are available only for Brazil, China and Indonesia, which leaves fifty-four observations across three countries. Neither the forward nor the backward linkage is significant, and the coefficients are close to zero. This sub-sample is too small and too selective to support any firm conclusion, and the result is a null rather than evidence of no effect. Both findings are best read as an invitation to revisit the structural determinants once fuller data become available.

Table 9. Extended specifications: economic complexity and global value chains (dependent variable: ln ODI)

Variable	ECI, pooled	ECI, FE	GVC, pooled	GVC, FE
ln GDP	−0.498 (0.145)***	−0.272 (1.035)	0.042 (0.126)	0.570 (0.731)
Economic complexity	0.302 (0.358)	1.525 (0.613)**		
GVC forward linkage			0.265 (0.483)	0.048 (0.464)
GVC backward linkage			−0.000 (0.638)	0.311 (0.848)
Country effects	No	Yes	No	Yes
Observations	65	65	54	54
Partners covered	5	5	3	3

*Notes: Cluster-robust standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01. The Economic Complexity Index is missing for Russia and begins in 2012; value-chain linkages are recorded only for Brazil, China and Indonesia. Inference is subject to the six-cluster caveat.*

Taken together, the empirical results describe a form of investment that gravity fundamentals explain only in part. The cross-sectional model has almost no explanatory power, because the six recipients are all large and India's choice among them turns on factors the standard variables miss. The within-country model does a little better and identifies determinants that move with India's ODI in the expected direction, but once inference is corrected for the small cross-section none of them is robust. The negative association with capital-account openness is the most durable regularity, though it too fails the bootstrap and rests on three partners; the positive association with economic complexity is the most promising of the structural terms, but rests on a short and selective sample.

7. Partner-level analysis

The aggregate results conceal wide differences among the six partners. This section examines each in turn, drawing on the totals and series described above.

7.1 Saudi Arabia

Saudi Arabia is the largest destination for India's ODI in the group, at USD 5.98 billion, and its flows peak in the final year of the sample. The relationship is two-way: the largest single inflow of partner investment into India in the whole panel, USD 2.8 billion in 2020, also comes from Saudi Arabia. The kingdom kept its capital account open throughout the period, its governance score improved over the window, and its population moved to near-universal

internet use. The pattern fits a deepening investment corridor tied to energy and to the diversification ambitions of both economies, and it is the clearest case in the sample of investment following a broad economic partnership rather than mere proximity. Because Saudi Arabia held its capital account open and constant, it contributes little to the identification of the capital-account coefficient, and removing it leaves that coefficient near its full-sample value.

7.2 Russia

Russia is the second-largest destination, at USD 4.16 billion, but its profile is the reverse of Saudi Arabia's. Its flows are front-loaded, peaking in 2008, and its compound growth rate over the full window is slightly negative. Over the same years the country's capital-account openness fell to the most restricted value in the index, its governance score declined, and bilateral trade with India rose from under USD 4 billion to about USD 72 billion, driven by energy purchases after 2022. The divergence between rising trade and stagnant investment is instructive, and it is consistent with the geopolitical-risk channel that Jamsheed et al. (2026) identify: India buys a great deal from Russia but has not translated that into a rising stock of direct investment.

7.3 China

China is the anomaly of the study. Its economy grew several-fold over the period, to more than eighteen trillion dollars, it is the closest partner to India and the only one sharing a land border, and its bilateral trade with India, at about USD 142 billion in 2024, is the largest in the group. On every gravity fundamental it should attract the most Indian investment. It attracts the least, USD 0.75 billion in total, under four per cent of the group figure. The explanation lies outside the standard variables, in the strategic tension between the two economies and in the restrictions each places on the other's investment. China's case accounts for the weak cross-sectional fit and for the negative sign on contiguity in the pooled PPML model. It should be stressed that the panel contains no direct measure of bilateral political tension, so this account is an interpretation of the residual rather than a tested channel; a variable capturing the state of the relationship would be needed to confirm it.

7.4 South Africa

South Africa receives USD 3.77 billion, or 19 per cent of the total, on a fairly steady upward path to a peak in 2016. It is the only partner that shares an official language with India, a link that lowers the cost of doing business and that the pooled models pick up even though the fixed effects absorb it. Its economy is the smallest in the group and grew slowly, and its governance score, though high early in the period, drifted down. Indian investment there is spread across mining, financial services and consumer goods, and its steadiness contrasts with the lumpier flows to the resource exporters.

7.5 Brazil

Brazil receives USD 3.45 billion, or 17 per cent, but the total is dominated by a single large year, 2017, when the annual flow reached USD 1.53 billion. Its economy is among the largest recipients by size, internet use more than doubled over the window, and bilateral trade with India rose from under USD 3 billion to about USD 12 billion. Its capital account, open at the start of the period, closed sharply to the most restricted value by the end. This combination of a closing capital account and rising Indian investment is the main source of the negative capital-account coefficient in the panel, which is why removing Brazil weakens that coefficient more than removing any other partner.

7.6 Indonesia

Indonesia is the fastest-growing destination, with a compound growth rate of about 26 per cent from a low base, to a total of USD 2.17 billion. Its economy tripled over the period, its internet penetration rose from about 6 per cent to over 70 per cent, the steepest digital transition in the group, and its capital account moved from open to mildly restricted. Indian investment there, in resources, palm oil and manufacturing, tracks the country's growing market and improving connectivity, and Indonesia is the partner whose experience fits the positive within-country determinants most neatly.

8. Discussion and policy implications

The central finding is that India's outward investment to the BRICS economies does not follow the smooth gravity pattern that its exports to the same group follow. The trade studies report that gravity variables explain most of the variation in India's exports to BRICS (Kubendran, 2020; Singh et al., 2023); the same variables explain very little of its investment, whether the equation is estimated in logs or by PPML. The reason is structural. Direct investment is lumpy and strategic. It arrives in a small number of large transactions, driven by the search for resources, markets and strategic assets, and those motives do not line up with the size and distance of the host economy in the way that trade flows do. The clearest illustration is China, which tops every gravity fundamental yet sits at the bottom of the investment table.

Where the data hint at determinants, they operate over time within each partner, and they must be reported with care. India's ODI moves with a partner's internet penetration, human development and economic complexity in the expected positive direction, and against its capital-account openness, but corrected inference does not let any of these be called robust on six countries. The negative association with financial openness is the most consistent, and it reflects the resource-oriented character of much Indian investment in this group, which flows to energy and mining regardless of a partner's financial regime and in some cases grew as partners tightened their capital accounts. This should be read as a feature of this particular sample and period, identified from a few partners, rather than as a general law.

Several policy implications follow, and they are framed as conditional on the weak evidence rather than as firm prescriptions. The first concerns the instruments of investment promotion. India already has double-taxation-avoidance agreements with every partner in the group and bilateral investment treaties with several, and the results suggest that the binding constraints lie less in these formal instruments, whose presence does not predict investment in the screen, than in the strategic and institutional environment of each host. The measures needed to deepen the Saudi corridor differ from those needed to revive investment in Russia, where sanctions and a closing financial system weigh against new commitments, or to unlock investment in China, where the obstacles are political. Investment diplomacy within BRICS is therefore better tailored to each partner than pursued as a single bloc-wide programme. The second implication concerns diversification. India's investment in the group leans towards resources and energy, which makes it sensitive to commodity cycles and to a few large deals. The suggestive within-country evidence that connectivity, human development and complexity accompany investment points to room to broaden the base towards consumer-facing and technology-intensive sectors in the larger and more digitally advanced partners. The third implication is informational. The gaps in the value-chain and complexity data for exactly the partners where India is most active limit what can be said about structural drivers, and better bilateral investment statistics would repay the effort.

9. Limitations

The study has limits that also mark out where further work would help, and several bear directly on how much weight the results can carry. The cross-section of six recipients is small, so the gravity terms are weakly identified and all cluster-based inference is fragile; this is why the paper leans on the wild cluster bootstrap and on leave-one-out checks rather than on cluster-robust stars, and why it declines to present the capital-account coefficient as an established effect. The dependent variable records annual flows, which are volatile and deal-driven, and although a cumulative-stock version is reported as a check, a longer run of data or a proper stock series would smooth some of that volatility. The determinants are treated as conditional correlates rather than as causes: the regressors are entered with a lag to reduce simultaneity, but the design does not identify causal effects, and dynamic panel methods that might help are not valid at this cross-sectional size. The value-chain and complexity series are incomplete for the partners where India is most active, which prevents a firm test of the structural hypotheses. The panel contains no direct measure of bilateral political relations, so the interpretation of the China result remains a conjecture. Finally, the grouping's membership changed only recently, so the results for Indonesia and Saudi Arabia describe new and prospective members rather than a long-standing bloc.

10. Conclusion

This paper has examined the determinants of India's outward foreign direct investment to its BRICS partners over 2007 to 2024, using an augmented gravity model estimated on a country-year panel and with inference corrected for the small cross-section. India placed about USD 20.3 billion in the six partner economies over the period, unevenly across both time and countries. Saudi Arabia, Russia and South Africa together absorbed roughly two-thirds of the total, while China, the largest and closest economy in the group, absorbed the least.

The methodology was chosen to fit the data. Because the panel is short and its cross-section small, the analysis used pooled, random-effects, fixed-effects and PPML estimators and drew inference from a wild cluster bootstrap, setting aside the cointegration and causality methods of the India-BRICS trade literature. The cross-sectional gravity model explained little of India's investment, in logs and in levels alike, which is consistent with the lumpy and strategic nature of direct investment. Within countries over time, ODI carried the expected signs on internet penetration, human development, economic complexity and, negatively, capital-account openness, but corrected inference showed that none of these associations is robust on six countries; the negative capital-account association is the most consistent yet rests on three partners and fails the bootstrap. The paper's contribution is therefore a transparent and correctly-benchmarked account of a strategic, resource-oriented pattern of Indian ODI, rather than a set of confirmed determinants. Future research could extend the panel as coverage improves, distinguish investment by sector and motive, and set India's behaviour alongside that of the other BRICS investors, so that the strategic logic that the aggregate figures only hint at can be observed directly.

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