Going Overseas: FDI Decisions and Supply-Chain Integration

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Abstract

This paper asks whether Chinese outbound FDI (OFDI) reorients global value-chain trade toward China. I assemble a new panel that links project-level Chinese OFDI to bilateral HS6 trade flows and input–output coefficients that map upstream–downstream sectoral linkages. Exploiting staggered variation in OFDI across host country–sector pairs, I estimate difference-in-differences and event-study specifications using both aggregate exposure and "vertical" exposure along production networks.

Three results emerge. First, Chinese OFDI is systematically patterned: it is more upstream in lower-income hosts and more downstream in higher-income hosts, and it is more distance-sensitive than China's trade. Second, downstream OFDI increases China's value and quantity market shares in vertically linked upstream industries within the host economy, with substantially larger effects for vertical links than for total exposure. Third, upstream OFDI raises host-country exports back to China with a 2–3 year lag, strongest in lower-income hosts and driven disproportionately by quantities. Taken together, the evidence indicates that Chinese OFDI operates as a supply-chain integration mechanism, reallocating trade along production networks rather than merely expanding bilateral activity.

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1 Introduction

What happens when one of the world's largest economies decides to strategically rewrite the global playbook on investment? Over the past decade, the concept of "Going Overseas" (*Chu Hai*) has not only become a buzzword in Chinese policy discourse but has also reshaped boardroom strategies and academic discussions worldwide. As Chinese firms confront saturated domestic markets, escalating production costs, and growing technological demands, they increasingly ask themselves: *Where next?* The answer, echoed in government white papers, state media narratives, and global business forums, marks a fundamental shift—from China being the prime recipient of foreign investment to becoming one of the world's leading exporters of capital. Leading media outlets, such as *The Financial Times*, *Reuters*, and *The Wall Street Journal*, have chronicled China's expanding role in global mergers and acquisitions (M&A), infrastructure development, and greenfield investment projects, often underscoring their strategic and geopolitical implications.[1]

Yet, how has China sustained this aggressive global investment strategy amid tightening domestic regulations and heightened international scrutiny? Despite stricter capital account controls imposed since 2017, China's outward direct investment (OFDI) stock continues to outpace inward FDI. In 2023 alone, China's OFDI reached approximately US$147.9 billion, registering modest growth even as inward FDI plunged by 13.7% to US$163.3 billion.[2] Remarkably, announced greenfield investments by Chinese firms soared by an unprecedented 224.6% between 2022 and 2023, hitting a record high of US$165.4 billion. What strategic ambitions drive this pronounced divergence?

Chinese OFDI distinguishes itself from traditional outward investments by developed nations through its explicit integration of state strategy and oversight. Most cross-border Chinese investments—particularly in politically sensitive sectors or emerging markets—must pass stringent reviews by regulators like the National Development and Reform Commission (NDRC) and the Ministry of Commerce (MOFCOM). Since tightening capital controls and sector-specific guidelines in 2017, authorities have carefully channeled OFDI towards projects aligned with national priorities: securing strategic natural resources, accelerating industrial upgrading, and managing geopolitical risks.[3]

But what are the real-world implications of such state-guided investments? Reflecting explicit directives outlined in the 13th and 14th Five-Year Plans, China has prioritized investments in high-tech manufacturing, resource extraction, and infrastructure projects linked to the Belt and Road Initiative (BRI). State-owned enterprises (SOEs), especially in the energy, logistics, and mining sectors, continue to dominate China's OFDI landscape.[4] Recent research further indicates that Chinese FDI responds not only to economic incentives but also to diplomatic considerations, suggesting a sophisticated interplay between commerce and geopolitics.[5]

In an increasingly cautious global investment environment, why does China continue aggressively expanding its greenfield investments? The answer likely lies in strategic coordi-

[1] See, for instance, Bradsher (2023), Reuters (2022), and EY Global (2023) reports.
[2] UNCTAD, World Investment Report 2024.
[3] MOFCOM, 2018; Garcia-Herrero and Xu, 2019.
[4] OECD, 2023.
[5] See Chen and Garcia-Herrero (2020), and Dreher et al. (2019).

nation rather than opportunistic expansion. Today, Chinese OFDI represents a calculated effort to extend geopolitical influence, secure critical technological and resource assets, and reconfigure global supply chains to favor Chinese economic and strategic interests.

Beyond headlines, this transformation has sparked intense scholarly curiosity and policy concern. Economists and policymakers alike now question the broader implications of China's overseas investments. Is outbound FDI becoming a critical instrument to mitigate the risks of trade frictions, technological decoupling, and regional geopolitical volatility? Recent analyses by Erşahin et al. (2024) and Garred and Yuan (2025) highlight how firms from major economies utilize foreign investments not merely to access new markets, but also to proactively restructure global supply chains. This insight is particularly relevant for Chinese companies—especially SOEs and large conglomerates—which increasingly invest in upstream sectors like mining, semiconductors, and intermediate goods to buffer themselves against future economic and political disruptions.

Yet, despite its profound strategic relevance, the scholarly literature on Chinese outbound FDI remains surprisingly limited compared to extensive studies examining inbound foreign investments into China. While productivity spillovers, labor market impacts, and policy distortions caused by foreign firms in China have received substantial academic scrutiny, far fewer studies explore how Chinese firms investing abroad reshape host-country industries and trade patterns.

Motivated by this gap, this paper asks a critical and timely question: *Does Chinese FDI foster deeper integration of host countries into China's global supply network?* To address this, I leverage a novel, firm-level dataset on large-scale Chinese overseas investments across multiple sectors and regions, recently released by the American Enterprise Institute (AEI). The empirical analysis specifically examines how Chinese investments into upstream and downstream industries correspond with significant shifts in trade flows—such as enhanced host-country exports to China and altered market shares within targeted sectors.

Ultimately, this research aims to accomplish two goals. Empirically, it provides fresh, granular data on a strategically crucial topic. Theoretically, it lays the groundwork for developing a structural model capturing firms' decisions about market entry, vertical integration, and trade-offs between market access and supply chain control. Furthermore, I will simulate counterfactual scenarios regarding potential investment shifts under conditions of heightened trade uncertainty or stricter international investment restrictions—issues of acute contemporary relevance given today's turbulent geopolitical landscape.

2 Literature Overview

This paper contributes to three interrelated strands of economic literature. First, it builds on the extensive work examining the productivity spillovers and vertical linkages generated by foreign direct investment (FDI). Seminal studies such as Javorcik (2004) show that backward linkages from multinational firms can enhance domestic firm productivity through technology transfer and supplier upgrading. Helpman, Melitz, and Yeaple (2004) further emphasize that the most productive firms—those able to absorb the fixed costs of internationalization—are also the ones most likely to receive FDI inflows. More recent empirical work, such as Leblebicioğlu et al. (2016), confirms the presence of such productivity spillovers in

firm-level data from emerging economies like Korea. While this literature has traditionally focused on the host-country benefits from inbound FDI, my paper shifts attention to how outbound FDI—particularly from China—might endogenously reshape value-added linkages and generate strategic spillovers in reverse, altering both production and trade patterns in the host and home countries.

Second, my work speaks directly to the literature on global value chains (GVCs) and production upstreamness. Antràs and Chor (2012, 2013) offer foundational frameworks for understanding how firms make sourcing and organizational decisions along the value chain, emphasizing the role of contractual frictions and input criticality. More recent studies, such as Bayhaqi et al. (2024), explore the strategic trade-offs firms face when positioning themselves upstream or downstream in global production. In parallel, Mercer-Blackman et al. (2021) highlight the importance of FDI as a conduit for embedding host economies more deeply into GVCs. My contribution lies in providing novel empirical evidence on how Chinese outward FDI—by targeting upstream sectors such as resource extraction and intermediate manufacturing—can create export-enhancing effects that strengthen bilateral supply chain links. By relating investment directionality to sectoral upstreamness, I offer a new lens for analyzing how GVC integration is engineered through capital flows.

Third, I engage with a growing literature on vertical integration and market power. Recent studies have revisited classic questions of whether vertical mergers lead to efficiency gains or anticompetitive outcomes. Bellucci and Rungi (2022), for instance, find that vertical takeovers can reduce marginal costs and increase firm-level efficiency. Ursino (2015) emphasizes how integration can improve bargaining leverage within complex supplier networks. These insights resonate with my research, which frames Chinese OFDI not merely as a financial allocation but as a strategic tool for controlling upstream supply and enhancing market power in global sectors. My theoretical extension aims to formalize these mechanisms by simulating how vertical FDI reallocations shift relative power across nodes in the supply chain.

In sum, my research makes four key contributions. First, I address a clear gap in the literature by shifting focus from inbound to outbound FDI, especially in the context of China's systemic rise as a global investor. Second, I introduce a novel micro-level dataset combining firm-level FDI transactions and sectoral trade data, allowing for disaggregated analysis across industries and partner countries. Third, I integrate reduced-form econometric techniques with a theoretical model to identify both stylized facts and underlying mechanisms—providing a bridge between empirical regularities and structural interpretation. Finally, my findings carry concrete policy implications, shedding light on how outward investment strategies can be used to mitigate trade risk, enhance supply chain control, and influence host-country integration into China's economic orbit.

3 Data

The analysis combines project-level measures of Chinese outbound investment with product-level bilateral trade flows and input–output linkages. Together, these data allow me to (i) locate Chinese FDI shocks at the host-country–sector–year level, (ii) measure how trade patterns adjust along both value and quantity margins, and (iii) trace the propagation of

investment shocks through upstream–downstream production networks.

Chinese Global Investment Tracker (CGIT). Chinese outbound investment is measured using the *Chinese Global Investment Tracker* (CGIT) compiled by the American Enterprise Institute and the Heritage Foundation.[6] CGIT records publicly reported Chinese overseas investment and construction projects with transaction values of at least $100 million since 2005. The dataset reports the host country, sector, year, transaction value, and project type, covering 2,241 investment transactions (US$1.46 trillion) and 2,226 construction projects (US$985 billion). Because it focuses on large, visible projects, CGIT is well suited to studying the sectoral footprint of China's outbound investment, including transactions undertaken by state-owned enterprises and other national champions.

World Bank Harmonized Bilateral FDI (HBFDI). To benchmark China's outbound investment patterns against global investors and to study bilateral FDI using a standardized reporting framework, I use the World Bank *Harmonized Bilateral FDI* (HBFDI) databases (Steenbergen, et al., 2022). HBFDI consolidates and harmonizes official bilateral FDI statistics reported by national sources, improving cross-country comparability through consistent definitions and reconciliation across reporting systems. The database provides bilateral FDI positions (stocks) and transactions (flows) at the origin–destination–year level for a broad set of reporting economies over 2000–2019, and it also includes a complementary bilateral sectoral module for 2008–2019. In this paper, HBFDI serves two purposes. First, it supports gravity-style comparisons of distance gradients in FDI that are directly comparable across origin and destination countries, which is central for assessing whether China's investment is unusually distance-sensitive relative to the global baseline. Second, because HBFDI is built from official statistics rather than media-based reporting, it provides an external benchmark for the patterns obtained from project-level datasets such as CGIT.

BACI trade data. Bilateral trade flows are drawn from BACI (CEPII), a harmonized version of UN Comtrade at the HS6 level.[7] BACI covers over 200 reporting economies and provides both trade values and physical quantities. I use BACI to construct sector-level measures of import penetration and export reorientation, separately for value and quantity, which is important for distinguishing price from volume adjustments following Chinese FDI.

OECD inter-country input–output tables (ICIO). To map production linkages across industries, I use the OECD Inter-Country Input–Output (ICIO) tables.[8] ICIO provides technical coefficients that quantify how output from one sector is used as an intermediate input by another. These coefficients are used to construct "vertical" exposure measures that weight Chinese investment in downstream sectors by their input demand from upstream suppliers, allowing investment shocks to propagate through production networks.

[6] Scissors, D. (2024). Chinese Global Investment Tracker. American Enterprise Institute. https://www.aei.org/china-global-investment-tracker/

[7] Gaulier, G., & Zignago, S. (2010). BACI: International Trade Database at the Product-Level. CEPII Working Paper No. 2010–23.

[8] OECD (2023). Inter-Country Input–Output (ICIO) Tables. https://www.oecd.org/sti/ind/inter-country-input-output-tables.htm

Sector concordances and ISIC Rev. 4. All datasets are harmonized to a common sector classification. CGIT sector tags are mapped to ISIC Rev. 4. BACI HS6 products are concorded to ISIC Rev. 4 using standard crosswalks, and the ICIO sectors are mapped to the same ISIC backbone. This harmonization yields a consistent host-country–sector–year panel in which investment, trade, and IO linkages are defined on a common set of industries.

Upstreamness. To characterize where sectors lie along the value chain, I use upstreamness measures based on input–output paths. The baseline concept follows Antràs and Chor (2012, 2013), and I draw on recent refinements that emphasize cross-country input propagation and global production reorganization.[9] These measures discipline both the descriptive analysis of where China invests and the heterogeneity analyses that contrast upstream and downstream investment shocks.

4 Empirical Models and Results

This section empirically evaluates the hypothesis that Chinese outward foreign direct investment (FDI) contributes to the restructuring of global supply chains in a way that deepens host-country integration into China-centric trade networks. Two main empirical channels are investigated.

First, the **downstream investment channel** assesses whether Chinese investments in the downstream segments of host economies—such as final goods manufacturing or assembly—lead to increases in China's upstream export performance. This mechanism captures how downstream presence can generate backward demand linkages that benefit Chinese suppliers higher in the value chain. Second, the **upstream investment channel** examines the reverse logic: whether Chinese investment in upstream sectors of foreign economies—particularly those with high upstreamness in the input-output structure—is followed by increased exports from those countries to China, particularly over a multi-year adjustment horizon.

4.1 A Stylized Fact: China's Trade Is Less Distance-Sensitive than Its OFDI

Before turning to the network-based identification strategy, it is useful to document a basic empirical regularity that helps interpret the mechanisms in the paper: China's *trade* exhibits an unusually weak distance gradient, while China's *outbound FDI* exhibits an unusually steep distance gradient. This divergence matters for the interpretation of the reduced-form results below. If China's OFDI is geographically concentrated even when its trade is not, then OFDI is unlikely to be a passive mirror of trade patterns; instead, it is consistent with a distinct channel through which investment reallocates trade along production networks.

To quantify this pattern, I estimate standard gravity specifications for (i) bilateral trade flows and (ii) bilateral FDI stocks and flows, augmenting the baseline gravity covariates with

[9] Mancini, G., Lo Turco, A., & Maggioni, D. (2024). Upstreamness and Global Production Reorganization. *Journal of International Economics*, 144, 103735.

indicators for China as origin or destination and interactions between these indicators and bilateral distance. The estimating equation is:

$$Y_{odt} = \exp\left(\begin{array}{l}\beta_1 \ln GDP_{ot} + \beta_2 \ln GDP_{dt} + \beta_3 \ln Dist_{od} + \mathbf{B}'_{od}\boldsymbol{\beta} \\ + \theta_1 \mathbb{1}\{o = \text{China}\} + \theta_2 \mathbb{1}\{d = \text{China}\} \\ + \theta_3 \mathbb{1}\{o = \text{China}\} \ln Dist_{od} + \theta_4 \mathbb{1}\{d = \text{China}\} \ln Dist_{od} + \lambda_t\end{array}\right). \tag{1}$$

where Y_{odt} is either trade, FDI stock, or FDI flow from origin o to destination d in year t; $Dist_{od}$ is bilateral distance; and $\mathbf{B}_{od}$ includes standard dyadic controls (contiguity, common language, colonial ties, and legal origin). I estimate (1) by PPML, which is standard in the gravity literature and accommodates zeros in trade and investment outcomes.

Table 1 reports the estimates. The baseline distance coefficient is negative and large in magnitude for both trade and FDI, but the China interactions differ sharply across outcomes. For trade, the distance gradient is substantially *attenuated* when China is either the exporter or the importer: the implied distance semi-elasticity is $-0.3726 + 0.2209 = -0.1517$ when China is the origin and $-0.3726 + 0.3121 = -0.0605$ when China is the destination. In contrast, for FDI the China $\times \ln(Distance)$ interactions are negative, implying that China's investment is *more* distance-sensitive than the global baseline. For example, the implied distance semi-elasticity for China-origin FDI flows is $-0.5698 - 0.8324 = -1.4022$, and for China-destination FDI flows it is $-0.5698 - 0.8012 = -1.3710$.

This wedge—globally scaled trade but regionally concentrated investment—provides a useful organizing fact for the remainder of the paper. It suggests that Chinese OFDI is not simply an extension of China's trading reach. Instead, it is consistent with OFDI reflecting constraints and frictions specific to ownership, control, monitoring, and screening that bind more tightly for investment than for arm's-length trade. In the main analysis, I exploit the timing and sectoral placement of Chinese OFDI and show that, despite its geographic concentration, Chinese investment is associated with sizable reallocation of trade along input–output linkages, consistent with a supply-chain integration mechanism.

Table 1: Distance Gradients in Trade and FDI: China Relative to the Global Baseline

	(1) Trade Flow	(2) FDI Stock	(3) FDI Flow
ln(GDP origin)	0.7190***	0.7776***	0.7512***
ln(GDP destination)	0.7445***	0.6087***	0.5823***
ln(Distance)	-0.3726***	-0.6612***	-0.5698***
Contiguity	0.8577***	-0.3998***	-0.3245***
Common language	0.3536***	1.3376***	1.2891***
Colonial tie (ever)	0.1419***	0.0282	0.0156
Common legal origin	-0.0214	-0.2489***	-0.2312***
China origin	-1.1502**	5.6461***	5.4823***
China destination	-2.5977***	4.8852***	5.8956***
China origin × ln(Distance)	0.2209***	-0.8559***	-0.8324***
China destination × ln(Distance)	0.3121***	-0.6336***	-0.8012***
Implied distance semi-elasticity (baseline)	−0.3726	−0.6612	−0.5698
Implied distance semi-elasticity (China as origin)	−0.1517	−1.5171	−1.4022
Implied distance semi-elasticity (China as destination)	−0.0605	−1.2948	−1.3710
Observations	688,410	131,531	87,380
Pseudo R^2	0.8450	0.5506	0.4892

Notes: PPML estimates with robust standard errors. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Trade flows are from BACI (CEPII). Bilateral FDI stocks and flows are from the World Bank HBFDI databases. Samples differ across columns due to data coverage. The implied distance semi-elasticities for China add the baseline ln(Distance) coefficient and the relevant China× ln(Distance) interaction.

4.2 Reduced-Form Regression Model

To evaluate the downstream channel through which Chinese FDI may influence upstream trade outcomes, I estimate the following reduced-form model at the country-sector-year level:

$$Y_{c,u,t} = \alpha_{c,u} + \lambda_t + \beta_1 \,\text{treatment}_{c,u,t} + \beta_2 \,\text{hasBRIproject}_{c,u,t} + \varepsilon_{c,u,t}.$$

In this specification, the dependent variable $Y_{c,u,t}$ represents either the value or quantity share of Chinese exports in the total imports of country c within upstream sector u in year t. The fixed effects $\alpha_{c,u}$ and λ_t absorb time-invariant heterogeneity at the country-sector level and common global shocks across years, respectively. The main coefficient of interest, β_1, captures the effect of significant Chinese FDI exposure, measured through the variable $\text{treatment}_{c,u,t}$. This treatment indicator is constructed based on a vertically weighted measure of FDI exposure, designed to reflect the indirect impact of Chinese investments in downstream sectors on upstream sectors that supply inputs to them. The vertical propagation mechanism draws from the methodological frameworks of Autor, Dorn, and Hanson (2013) and Acemoglu et al. (2016), where investment flows are mapped across the input-output structure of the economy to identify downstream-induced demand shifts upstream.

The FDI exposure measure is constructed as the weighted sum of downstream Chinese FDI received by each sector, where the weights are the technical input coefficients derived

from the OECD ICIO tables. These coefficients reflect the share of output from upstream sectors that is used as intermediate input in downstream sectors receiving direct Chinese investment. After calculating this exposure for each country-sector-year cell, I define a treatment threshold at the 75th percentile of the distribution of non-zero exposure values. Country-sector-year observations with FDI exposure above this threshold are considered "treated." For each treated unit, the first year of exposure is identified, and the treatment variable is set equal to one in that year and all subsequent years (i.e., using an absorbing treatment logic). The final treatment indicator, $\text{treatment}_{c,u,t}$, is defined as the interaction of an indicator for treated units with an indicator for the post-treatment period. In addition to this key regressor, the model includes a control variable, $\text{hasBRIproject}_{c,u,t}$, which captures whether the country-sector cell is involved in a Belt and Road Initiative (BRI) project in a given year. This variable accounts for broader geopolitical or strategic influences that might confound the relationship between FDI exposure and Chinese trade outcomes.

This empirical strategy allows me to isolate whether vertically linked Chinese investment—rather than simple co-location—predicts increases in China's upstream market share across host country import portfolios. The use of fixed effects and a staggered treatment design ensures that the estimated coefficient reflects plausibly exogenous variation in supply chain-oriented investment exposure, conditional on sector-specific trade trends and country-year macro shocks.

4.3 Regression Results

The results in Table 2 provide baseline evidence on the relationship between significant Chinese FDI exposure and market share outcomes. In the two-way fixed effects specification, treatment is associated with a statistically significant increase of approximately 1.05 percentage points in value market share and 0.67 percentage points in quantity share. However, in the more demanding triple fixed effects model—which absorbs country-year and sector-year shocks—the treatment effect becomes statistically insignificant. This suggests that part of the variation may be absorbed by sectoral or national trends, motivating additional controls and robustness checks.

Table 2: Impact of Significant FDI Exposure on Chinese Market Share

	Value Market Share		Quantity Market Share	
	Two-way DiD	Triple FE	Two-way DiD	Triple FE
Treatment	1.054*** (0.242)	0.004 (0.002)	0.671** (0.269)	0.001 (0.003)
BRI Project	-0.125 (0.693)	0.004 (0.006)	-0.398 (0.687)	-0.004 (0.006)
Observations	106,805	110,788	108,640	108,592
Country-Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Country-Year FE	No	Yes	No	Yes
Sector-Year FE	No	Yes	No	Yes

Notes: Standard errors are clustered at the country-sector level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To probe the robustness of these findings, a richer specification adds controls for sector size (log total trade) and distinguishes between total FDI exposure and vertically propagated exposure. As reported in the table below, the core results are strengthened: the treatment effect remains significant across both value and quantity outcomes, and the impact of direct investment—absent vertical linkages—is statistically weaker or negative. These findings underscore the importance of considering input-output propagation of FDI spillovers.

Table 3: Controlling for Sector Size and Direct Investment: Vertical vs. Total FDI Exposure

	Value Market Share		**Quantity Market Share**	
	(1) Total Exposure	(2) Vertical Only	(3) Total Exposure	(4) Vertical Only
Treatment	1.656***	1.911***	0.726**	1.169***
	(0.301)	(0.273)	(0.348)	(0.318)
Log(Total Trade)	-0.039	-0.034	-0.470**	-0.481**
	(0.187)	(0.187)	(0.201)	(0.200)
Has BRI Project	-0.103	0.204	-0.279	0.088
	(0.700)	(0.723)	(0.692)	(0.716)
Significant Direct Investment		-0.810**		-1.656***
		(0.404)		(0.591)
Country-Sector FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Treatment Type	Total	Vertical Only	Total	Vertical Only
Observations	108,114	108,121	106,076	106,153
Number of Entities	6,094	6,087	5,948	5,952

Notes: Treatment is defined as normalized FDI exposure above the 75th percentile. "Significant Direct Investment" controls for FDI into the same sector. Log total trade is included to capture sector size. Standard errors clustered at the country-sector level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table 2 evaluates the robustness of the vertical FDI spillover effects by introducing two key refinements. First, I control for the log of total sectoral trade, which effectively turns the dependent variable into a relative market share and ensures that the treatment effect reflects FDI-driven shifts in trade composition rather than scale effects. Second, the regression includes an indicator for significant direct Chinese FDI into the same sector, allowing us to isolate the vertical linkage effect from simple co-location. The results show that the treatment effects remain large and statistically significant across all specifications—especially when the treatment is defined through input-output propagation rather than direct exposure—underscoring the importance of vertical spillovers in driving Chinese market share gains.

Notably, the coefficients on the direct investment indicator are negative and statistically significant in both value and quantity terms. This pattern is consistent with the theoretical prediction in Melitz et al. (2004), which suggests that horizontal FDI may act as a substitute for exports: when Chinese firms set up operations directly in a sector abroad, they may reduce the need to export from China, leading to lower measured import shares in that sector. By contrast, vertically mediated FDI (captured through upstream exposure to downstream investment) appears to complement trade, expanding China's reach in sectors where its firms are not physically present but benefit from downstream demand created by affiliated or co-financed projects.

Taken together, these results reinforce the central premise of this paper: the trade impact of Chinese outbound FDI operates most powerfully through vertical production linkages rather than direct sectoral presence, and accounting for these linkages is crucial for identifying the true extent of China's global economic integration strategy.

Finally, Table 4 shows that the strongest sector-level impacts of vertical FDI exposure are concentrated in manufacturing industries with global supply chain significance—such as electronics, basic metals, and machinery. These sectors likely benefit most from improved input procurement efficiency and demand coordination facilitated by Chinese firms operating across multiple nodes of the chain.

Table 4: Sector-Specific Impacts of Vertical Linkage FDI Exposure

Sector Name	**ISIC Code**	**Value (pp)**	**Quantity (pp)**
Manufacture of computer, electronic and optical products	26	6.168^{***}	8.974^{***}
Manufacture of basic metals	24	8.594^{***}	6.485^{**}
Manufacture of electrical equipment	27	6.016^{***}	5.568^{***}
Manufacture of machinery and equipment n.e.c.	28	4.302^{***}	7.130^{***}
Manufacture of rubber and plastics products	22	4.769^{***}	4.050^{***}
Manufacture of leather and related products	15	5.437^{**}	7.009^{**}
Manufacture of textiles	13	4.878^{***}	3.721^{**}
Manufacture of motor vehicles and trailers	29	3.325^{***}	3.919^{***}
Manufacture of wearing apparel	14	5.044^{**}	5.645^{**}
Creative, arts and entertainment activities	90	2.671^{**}	5.179^{**}
Manufacture of paper and paper products	17	3.668^{***}	1.984^{*}

Notes: This table shows the sectors with the strongest impacts from vertical linkage FDI exposure under the normalized staggered DiD specification. Effects are measured in percentage points (pp) of China's market share. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

4.4 Heterogeneity by Development Level

To explore how the impact of Chinese downstream FDI varies by the level of host-country development, I estimate the staggered difference-in-differences model separately by GDP per capita quartiles. Table 5 reports the estimated treatment effects on China's import market share in both value and quantity terms.

Table 5: Downstream FDI Effects by Development Level

	Treatment Effect on Greater China's Market Share					
	Value Share			Quantity Share		
	Coefficient	Std. Error	N	Coefficient	Std. Error	N
Full Sample	0.953***	(0.241)	103,381	0.464*	(0.268)	101,433
Q1 ($\leq \$1,722$)	0.950	(0.610)	25,937	-0.180	(0.637)	25,515
Q2 ($1,724–$5,647)	0.301	(0.541)	25,959	-0.177	(0.580)	25,496
Q3 ($5,651–$23,271)	2.194***	(0.454)	25,452	2.228***	(0.540)	24,925
Q4 ($\geq \$23,303$)	0.716***	(0.269)	26,033	0.791**	(0.351)	25,497

Notes: All models include country-sector and year fixed effects. Standard errors are clustered at the country-sector level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

The results reveal striking heterogeneity. The strongest and most statistically significant effects appear in the third quartile (Q3), where GDP per capita ranges from approximately $5,651 to $23,271. In this group, Chinese FDI exposure is associated with an increase of over 2 percentage points in China's import market share in both value and quantity terms. By contrast, the treatment effects are smaller and statistically insignificant in the lowest two quartiles (Q1 and Q2), and more moderate in the highest quartile (Q4).

This pattern suggests that downstream FDI spillovers require certain enabling conditions in the host country to manifest—such as basic infrastructure, sufficient absorptive capacity, or a minimum level of institutional quality. Countries in Q3 typically strike a balance: they are developed enough to benefit from integration with Chinese supply chains, yet not so advanced that the marginal benefit of Chinese FDI diminishes due to already saturated trade linkages or more rigid regulatory environments.

This interpretation aligns with prior findings in the literature. Borensztein, De Gregorio, and Lee (1998) show that the positive growth impact of FDI is contingent on the host country's stock of human capital. Similarly, Alfaro et al. (2004) emphasize that the presence of deep financial markets plays a key role in facilitating the growth-enhancing effects of foreign investment. These studies support the view that FDI effectiveness is conditional on domestic economic fundamentals—particularly for downstream FDI, where demand realization, supply coordination, and investment absorption all depend on a country's development level.

4.5 Upstream Investment Perspective

In contrast to the downstream FDI channel, where Chinese investment creates backward demand linkages for upstream Chinese suppliers, the upstream channel examines whether Chinese investment in high-upstreamness sectors of host countries facilitates forward linkages that eventually increase those countries' exports to China. To evaluate this possibility, I estimate the following distributed-lag model, which allows for both contemporaneous and dynamic effects:

$$\ln(ExportsChina_{i,s,t}) = \alpha_{i,s} + \gamma_t + \sum_{l=0}^{3} \beta_l \cdot HighUpFDI_{i,s,t-l} + \delta \cdot Controls_{i,s,t} + \varepsilon_{i,s,t},$$

where the dependent variable is the log of exports from country i in sector s to China at time t; $\alpha_{i,s}$ and γ_t are country-sector and year fixed effects, respectively; $HighUpFDI_{i,s,t-l}$ is a binary indicator equal to one if sector s in country i received significant Chinese FDI with high upstreamness at lag l; and the controls include country-sector-year characteristics such as BRI project participation. The use of four leads captures both immediate and lagged responses in export behavior.

Table 6: Effects of Chinese Investment in High Upstreamness Sectors on Exports to China

	Log Export Value		Log Export Quantity	
	Manufacturing	Services	Manufacturing	Services
Year 0	-0.1549 (0.2085)	-0.0381* (0.0225)	0.0949 (0.3618)	0.0635 (0.0398)
Year 1	-0.0273 (0.1364)	-0.0121 (0.0095)	-0.0606 (0.2356)	0.0895*** (0.0346)
Year 2	0.1653* (0.0981)	-0.0121 (0.0107)	0.3105* (0.1669)	0.0677** (0.0340)
Year 3	0.2043** (0.0944)	-0.0017 (0.0048)	0.3313** (0.1591)	0.0482* (0.0289)
Controls	Yes	Yes	Yes	Yes
Entity FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: In this semi-log model, coefficients are interpreted as approximate percentage changes: $100 \times [\exp(\beta) - 1]$. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6 shows that the effects of upstream investment take time to materialize. For manufacturing sectors, no statistically significant export response is observed in the year of investment (year 0), but coefficients become positive and significant in years 2 and 3. The estimated effect on export quantities reaches over 33% in year 3, with a slightly smaller effect on export values, suggesting that the increase is volume-driven. For services, while the absolute magnitudes are smaller, we observe similar lagged patterns, particularly in export quantities.

These results are consistent with the interpretation that Chinese upstream FDI facilitates integration of host countries into Chinese production networks, but that such integration requires time to manifest—due to production setup, supply chain restructuring, and logistics. The pattern of stronger effects in lagged years also helps alleviate concerns that the results merely reflect anticipatory behavior or pre-trends.

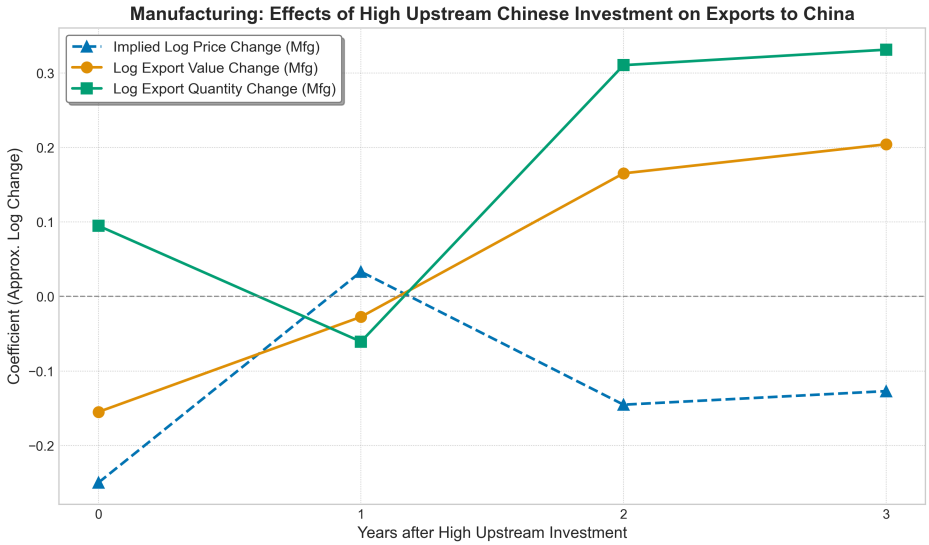

Figure 1: Declining Avg. Implied Prices

The implications of upstream FDI extend beyond quantity responses alone. Figure 1 visualizes the gap between the estimated effects on export value and export quantity in the manufacturing sector. Across the post-investment horizon, the expansion in export quantities consistently outpaces the corresponding increase in export values, leading to a decline in the implied average price per unit. This wedge between value and quantity—interpreted as an inverse proxy for unit prices—suggests that Chinese upstream investments are associated with cost reductions or efficiency gains in host-country production processes.

One plausible interpretation is that Chinese FDI improves sourcing by introducing access to lower-cost intermediate goods, better production coordination, or more competitive procurement practices. This is particularly consistent with the vertical control hypothesis, whereby Chinese firms invest in critical upstream suppliers not simply to increase output, but also to shape pricing and contract terms within the value chain. The decline in unit prices may thus reflect tighter integration between host-country producers and Chinese lead firms, as well as improved supply chain orchestration.

To assess whether the gains from upstream investment differ by development level, I examine heterogeneity in the cumulative export response by GDP per capita quartile. Table 7 presents the summed effects over years 0–3 for manufacturing exports.

Table 7: Cumulative Effects of Significant FDI on Export by Development (Manufacturing)

	Treatment Effect on Log Exports to China					
	Export Value			Export Quantity		
	Coefficient	Std. Error	N	Coefficient	Std. Error	N
Full Sample	0.268**	(0.114)	29,086	0.307**	(0.154)	29,086
Q1 ($\leq \$1,722$)	0.422***	(0.155)	7,272	0.461**	(0.202)	7,272
Q2 ($1,724–$5,647)	0.283*	(0.167)	7,280	0.342*	(0.187)	7,280
Q3 ($5,651–$23,271)	0.129	(0.098)	7,274	0.217	(0.156)	7,274
Q4 ($\geq \$23,303$)	0.053	(0.117)	7,260	0.071	(0.142)	7,260
Lower Income ($\leq \$5,647$)	0.371***	(0.137)	14,552	0.425***	(0.158)	14,552
Higher Income ($\geq \$5,651$)	0.106	(0.092)	14,534	0.178	(0.119)	14,534

Notes: Dependent variables are log-transformed exports to China in manufacturing sectors. Coefficients represent the cumulative sum of contemporaneous and 1–3 year lagged effects of significant upstream Chinese FDI. Standard errors clustered at the country-sector level.

The findings in Table 7 reveal that upstream FDI effects are highly concentrated in lower-income countries. The largest cumulative effects are observed in Q1 and Q2, with increases of over 40% in export quantities to China. In contrast, effects in Q3 and Q4 are small and statistically insignificant. This pattern may reflect that Chinese FDI in low- and lower-middle-income countries is often motivated by resource-seeking or cost efficiency, and these economies may be more elastic in their production response to new capital inflows. Additionally, labor-intensive and upstream manufacturing activities in such contexts are more easily aligned with Chinese intermediate input demands.

Overall, the evidence suggests that upstream Chinese FDI facilitates new export linkages back to China, but these gains take time to develop and depend critically on the economic structure of the host country. The differential results by income level further reinforce the idea that FDI spillovers operate through supply-side conditions, where production flexibility, capacity constraints, and the marginal productivity of capital all play a role in shaping the export response.

5 Theoretical Model

In this section, we develop a theoretical framework to rationalize the structural anomalies observed in Chinese Outward Foreign Direct Investment (OFDI). We depart from standard heterogeneous firm models (e.g., Helpman, Melitz, and Yeaple, 2004) by characterizing the investment decision not merely as a profit-maximization problem for the firm, but as a *dual-agent constrained optimization* problem.

The central tension in our framework arises from the interaction between private firms seeking market access and a State acting as a gatekeeper for the capital account. While firms maximize operating profits given market signals, the State manages a scarcity trade-off: it seeks to advance strategic industrial goals—specifically supply chain security—but is constrained by a finite stock of foreign currency reserves. This interaction endogenizes the

fixed cost of investment, creating a "State Wedge" that distorts the firm's choice between trade, horizontal FDI, and vertical integration.

5.1 Environment and Preferences

Consider a global economy consisting of N asymmetric countries. We focus on the decision of firms in the Home country (China, denoted c) regarding how to serve a destination market j. Consumers in country j possess constant elasticity of substitution (C.E.S.) preferences over a continuum of differentiated varieties ω. The demand for a specific variety with price $p_j(\omega)$ is given by $q_j(\omega) = A_j p_j(\omega)^{-\sigma}$, where $A_j \equiv E_j P_j^{\sigma-1}$ represents the aggregate market demand, E_j is total expenditure, and P_j is the price index.

On the supply side, firms are heterogeneous in their productivity φ, drawn from a distribution $G(\varphi)$. We adopt a production structure following Antrès and Chor (2013), where the production of a final good requires the assembly of two distinct inputs: headquarter services (h), which are capital-intensive and produced in the Home country (encompassing R&D, management, and core components), and manufacturing inputs (m), which are labor-intensive and tradable. The production technology is Cobb-Douglas:

$$y(\varphi) = \varphi \left(\frac{h}{1-\alpha} \right)^{1-\alpha} \left(\frac{m}{\alpha} \right)^{\alpha}, \tag{2}$$

where $\alpha \in (0,1)$ represents the sector's *vertical intensity* or upstreamness. A higher α implies a stronger technological reliance on physical intermediates, which serves as the conduit for the supply chain dynamics we analyze.

5.2 The State's Screening Problem

A defining feature of the institutional context is that firms do not face a perfectly elastic supply of capital for overseas investment. Instead, the State rations access to foreign exchange (FX) through a screening process. We model the State as a planner that manages a finite stock of reserves, $\mathcal{R}$. The State views OFDI as a policy instrument with a dual return: it generates aggregate economic profits, Π, and a non-monetary *Strategic Utility*, S, which captures the State's preference for supply chain control and geopolitical influence.

We posit that the strategic utility $S_{ij}(\omega)$ is conditional on the firm's supply chain configuration. Specifically, the State derives positive strategic utility if the overseas subsidiary maintains vertical linkages to the domestic economy (i.e., importing inputs from China), thereby anchoring the host country to the Home supply chain. If the subsidiary localizes production entirely, severing the link, the strategic utility is zero.

The State chooses a set of approved investment projects, Ω_{FDI}, to maximize total welfare subject to the reserve constraint:

$$\max_{\Omega_{FDI}} \quad \int_{\omega \in \Omega_{FDI}} \left[\Pi_{ij}(\omega) + \xi \cdot S_{ij}(\omega) \right] d\omega \tag{3}$$

$$\text{s.t.} \quad \int_{\omega \in \Omega_{FDI}} f_I \, d\omega \leq \mathcal{R}, \tag{4}$$

where f_I is the exogenous fixed cost of establishing a foreign subsidiary (denominated in foreign currency) and ξ is the State's valuation of strategic alignment relative to profits.

Let λ denote the Lagrange multiplier associated with the reserve constraint. This parameter represents the shadow price of foreign exchange. The first-order condition for the State's problem implies that a project is approved if and only if its social return exceeds its shadow cost: $\Pi + \xi S \geq \lambda f_I$.

From the firm's perspective, this screening process manifests as an *effective* fixed cost of investment, $\tilde{f}_I$, which includes the shadow cost of regulatory approval. Rearranging the screening condition, the firm faces:

$$\tilde{f}_I(S_{ij}) = f_I \left(\lambda - \frac{\xi \cdot S_{ij}}{f_I} \right). \tag{5}$$

Equation (5) defines the mechanism of the "State Wedge." If a firm commits to sourcing inputs from China ($S_{ij} = 1$), the effective fixed cost is subsidized by the strategic term ξ / f_I, leading to a lower regulatory barrier (the "Encouraged" regime). Conversely, if the firm localizes sourcing ($S_{ij} = 0$), it faces the full shadow cost λf_I (the "Restricted" regime). We denote these effective costs as $\Gamma_L f_I$ and $\Gamma_H f_I$, respectively, where $\Gamma_L < \Gamma_H$.

5.3 The Firm's Sourcing Strategy

The firm observes the State's screening parameters Γ and maximizes profit by choosing among three distinct organizational modes.

Mode 1: Pure Exporting (X). The firm produces entirely in China and exports the final good. It pays standard iceberg trade costs τ_{cj}^{final} on the final output. The profit function is standard:

$$\pi_X(\varphi) = B_j (\tau_{cj}^{final} w_c)^{1-\sigma} \varphi^{\sigma-1} - f_X, \tag{6}$$

where B_j is a demand shifter and w_c is the Home wage.

Mode 2: State-Linked Vertical FDI (V). This mode corresponds to the "Encouraged" investment observed in the data. The firm establishes a downstream assembly plant in j but, to secure the State subsidy Γ_L, it commits to importing manufacturing inputs m from China. The firm pays local assembly wages w_j but incurs trade costs τ_{cj}^{input} on the intermediate components. The profit is:

$$\pi_V(\varphi) = B_j \left[(w_c \tau_{cj}^{input})^{\alpha} (w_j)^{1-\alpha} \right]^{1-\sigma} \varphi^{\sigma-1} - \Gamma_L f_I. \tag{7}$$

Mode 3: Horizontal FDI (H). The firm establishes a plant in j and sources inputs locally to minimize marginal costs, behaving as a standard multinational. However, by severing the supply chain link ($S_{ij} = 0$), the firm forfeits the strategic subsidy. It faces the high capital cost $\Gamma_H = \lambda$. The profit is:

$$\pi_H(\varphi) = B_j (w_j)^{1-\sigma} \varphi^{\sigma-1} - \Gamma_H f_I. \tag{8}$$

5.4 Equilibrium Mechanisms

The interaction between the firm's cost minimization and the State's reserve constraint generates two theoretical propositions that rationalize our empirical findings.

Proposition 1 (**The Vertical Sourcing Loop**). *There exists a parameter space under which profit-maximizing firms choose to source inputs from China (Mode V) even when local sourcing offers strictly lower marginal costs.*

Proof. A firm prefers Mode V over Mode H if $\pi_V > \pi_H$. This inequality holds if:

$$\underbrace{\left(\frac{w_c \tau_{cj}^{input}}{w_j}\right)}_{\text{Relative Input Cost}} < \underbrace{\left(\frac{\Gamma_H}{\Gamma_L}\right)^{\frac{1}{\alpha(\sigma-1)}}}_{\text{State Subsidy Wedge}} . \tag{9}$$

The left-hand side represents the marginal cost penalty of importing inputs from home. The right-hand side represents the capital cost advantage provided by the State. If the shadow price of reserves λ is sufficiently high (tight capital controls), the wedge Γ_H/Γ_L becomes large enough to offset the inefficiency of cross-border trade. This mechanism explains the "stickiness" of Chinese upstream exports: the State effectively purchases upstream export demand by subsidizing downstream capital. ■

Proposition 2 (**The Gravity Interaction**). *The elasticity of FDI flows with respect to distance is strictly larger in magnitude than the elasticity of trade flows, with the difference increasing in vertical intensity α.*

Proof. We parameterize trade costs as $\tau(d) \approx d^{\delta}$ and monitoring costs as $f_I(d) \approx d^{\mu}$. For pure Exporting (Mode X), profitability is driven by the shipping cost of the final good. The distance elasticity is simply $\varepsilon_{Trade} = -\delta(\sigma - 1)$.

For State-Linked FDI (Mode V), the firm faces a dual distance penalty. It must pay the fixed cost of monitoring the foreign subsidiary (scaling with d^{μ}) *and* it must pay the transport cost for the intermediate inputs (scaling with $d^{\delta\alpha}$). Differentiating Equation (7) with respect to distance yields:

$$\varepsilon_{FDI} = -\left[\mu + \alpha\delta(\sigma - 1)\right]. \tag{10}$$

Comparing the two elasticities, we see that $|\varepsilon_{FDI}| > |\varepsilon_{Trade}|$ whenever $\mu > \delta(\sigma - 1)(1 - \alpha)$. Unlike Western Horizontal FDI, which often substitutes for trade (tariff-jumping) and thus may be less sensitive to distance, Chinese State-Linked FDI is complementary to trade. The necessity of maintaining the physical input link tethers the investment to the Home country, restricting such FDI to a "regional" range where both monitoring and input-shipping costs are sustainable. ■

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