Relationship between direct investment (DI) and outward foreign direct investment (OFDI) in China: The influence of region-specific factors

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Research background

- China adopted an opening-up policy and underwent economic reform by the late 1970s.

- Since 2013, the Chinese Government has adopted a new global development strategy and implemented the Belt and Road Initiative, which has stimulated a number of major overseas projects, including finance, mining, wholesale and retail, manufacturing and transport services.

- According to the *World Investment Report 2020*, despite China's recent decline in OFDI, China ranked as the world's fourth largest source of foreign direct investment (FDI) outflows in 2019, only behind Japan, the United States, and the Netherlands.

Central research questions

The crucial questions arise as to:

1) whether and how these large volume of FDI outflows react to DI in the country and its three macro-regions; and

2) explore how DI interacts with OFDI across Chinese regions on the basis of the different motivations of OFDI.

Research gaps and significances (1)

- **The first research gap: Are OFDI complementary to or substitution for DI?**

  ➤ OFDI and DI have a **complementary** relationship

  ❑ The complementary relationship is due to possible interactions and interdependencies between OFDI and DI through backward and forward production links between domestic subsidiaries and foreign parent companies (Hsu *et al.*, 2015).

  ➤ OFDI **substitutes** for DI

  ❑ OFDI displaces local investment as FDI outflows substitute domestic activities for foreign activities when firms shift part of their production abroad and the available financial resources are scarce (Ali and Wang, 2018).

  ➤ Conclusion: It seems that there is no conclusive evidence of the association between OFDI and DI.

Research gaps and significances (2)

- **The second research gap: How may OFDI react to DI in a transition economy at the regional level?**

  - ➢ Numerous studies have been conducted to examine how OFDI responds differently to DI in developed countries such as the United States, Germany, and Italy, as well as in newly industrialized countries such as Taiwan and Korea (Herzer, 2007; Herzer and Schrooten, 2008), but limited research studies emerging and transition countries.

  - ➢ Previous studies assume that a country is a homogeneous entity, but overlooks enormous regional variations across regions (Hsu *et al*., 2015).

  - ➢ Conclusion: Though many studies demonstrate a positive/ negative association between OFDI and DI at the country level, there is no clear evidence that similar OFDI-DI nexus may be incurred in the regional context.

Research gaps and significances (3)

- **The third research gap: How may different OFDI motivations influence DI?**

  - Based on the Ownership-Location-Internalization framework proposed by John H. Dunning (Dunning and Lundan, 2008), Hejazi and Pauly (2003) showed that different motivations of OFDI may affect DI remarkably.

  - A number of studies examines the impact of different OFDI motivations, such as natural-resource seeking, efficiency seeking, market seeking, and strategic-asset seeking, on DI in the context of developed countries, but few researches attempt to investigate the OFDI-DI association in developing economies.

  - Conclusion: There is no concrete evidence that indicates how and to what extent various OFDI motivations can influence DI in a developing and emerging country, particularly at the regional level.

1. **Classical substitution assumption** (Hufbauer and Adler, 1968) - OFDI completely replaces foreign activities with domestic activities and entirely complements foreign investment when firms relocate part of their production abroad.

2. Two prominent viewpoints on the OFDI-DI nexus:

➢ **OFDI discourages DI** (Stevens and Lipsey, 1992) - Two mechanisms by which OFDI can influence DI locally are:

❑ The first channel will be through domestic financial markets.

❑ The second channel is when firms influence the product markets by relocating their production lines abroad.

➢ **OFDI complements DI** (Desai *et al.*, 2005) - Higher OFDI is correlated with higher DI levels.

❑ OFDI allows parent companies located in the United States to import raw materials from foreign affiliates at a cheaper rate and to generate exports of intermediate inputs used by foreign affiliates.

❑ Industries that integrate domestic production with foreign affiliates can lower the cost of production and produce economies of scale, thereby increasing domestic output and DI.

❑ As a result, the entire domestic economy can benefit from the backward and forward-looking production links between local firms and multinational enterprises and upgrade its global value chain.

Literature review - Interaction between OFDI and DI in China

- **Ameer *et al*. (2017)** - DI and OFDI do not have Granger causality in the short term, but there is a positive long-term uni-directional association between OFDI and DI. The underlying reason is that the Chinese financial market is underdeveloped, and China's multinationals face more financial constraints than the advanced-country multinationals.

- **You and Solomon (2015)** - the majority of Chinese multinationals engaged in FDI outflows are state-owned enterprises (SOEs) that exploit the advantages of excess foreign exchange reserves accumulated from trade surpluses and abundant domestic savings. Thus, Chinese overseas investment may have little impact on the financial liquidity of local markets and, as a result, OFDI may not replace domestic capital.

Data and variable selection

- This study uses a panel dataset covering 31 Chinese provinces, municipalities, and autonomous regions in 2005–2017.

- The data were collected from various *China Statistical Yearbooks*, *China Provincial Statistical Yearbooks*, and *Chinese Outward Foreign Direct Investment Statistical Bulletins*.

- Since all variables are provincial-level data, we disaggregated provincial-level data into sub-datasets of three different macro-region – Eastern, Central and Western China.

Empirical model specification (1)

- We based on two conceptual frameworks to set DI as the dependent variable, with a number of control variables that capture China's economic transition process considered.

  ➢ First, we followed Desai *et al*. (2005) and Feldstein (1994) and adopted the extended **Feldstein and Horioka (1980) model**, which assumes that the level of DI is determined by OFDI, domestic saving (DS), and inward foreign direct investment (IFDI) in this study.

  ➢ Second, we also grounded this study on the works of He *et al*. (2008) and Wei (2007), which highlight that China's regional development has been sharply transformed by the fundamental processes of globalizing efforts (globalization), the infusion of market mechanisms (marketization) and the decentralized control of local economic development (decentralization).

$$DI_{it} = \alpha_i + \beta_1 OFDI_{it} + \beta_2 IFDI_{it} + \beta_3 DS_{it} + \beta_4 PGR_{it} + \beta_5 EDUL_{it} + \beta_6 RD_{it} + \beta_7 EXPT_{it} + \beta_8 INF_{it} + \beta_9 IND_{it} + \varepsilon_{it}$$

where i (i = 1, 2, 3, ..., 31) denotes to individual provinces, t (t = 1, 2, ..., 12) refers to the years spanning 2005–2017, α is the intercept, β_i is the estimator, and ε_{it} is the error term. **Flexible generalized least squares** (Flexible GLS) and **panel data analysis** with **two-stage least squares estimation** (2SLS) were conducted to test the hypotheses.

Table 1. Variable, Measurement and Data Source

Variable	Measurement	Variable classification	Expected sign	Data source
DI	Domestic investment, measured by total investment in fixed assets invested by private enterprises over GRP	F-H model	N.A.	China Provincial Statistical Yearbook
OFDI	Outward foreign direct investment, measured by outward direct investment flows divided by GRP	F-H model	+/ - or neutral	The Statistical Bulletin of China's Outward Foreign Direct Investment
IFDI	Inward foreign direct investment, defined by inbound foreign direct investment flows divided by GRP	F-H model	+/ - or neutral	China Provincial and Municipal Statistical Yearbook
DS	Domestic savings, measured by the deposits held by financial intermediaries over GRP.	F-H model	+	China Provincial Statistical Yearbook
PGR	Population growth, defined by annual growth rate of *de-facto* population at year end	Marketization	+	China Statistical Yearbook
EDUL	Education level, measured by the number of people who have completed at least secondary education divided by the total number of *de-facto* population at year end	Marketization	+	China Statistical Yearbook
RD	Research and development intensity, defined by research and development expenditure as a share of GRP	Marketization	+	China Statistical Yearbook
EXPT	Export, defined by the total amount of the region's exports to the host country over GRP	Globalization	+	China Statistical Yearbook
INF	Investment in infrastructure, defined by gross fixed capital formation over GRP	Decentralization	+	China Statistical Yearbook
IND	Level of industrial development, measured by industrial added value divided by GRP	Decentralization	+	China Statistical Yearbook

Note: N.A. means not applicable. Unless specified, the above variables are independent variables.

Source: Compiled by authors.

Qualitative analysis - Identification of OFDI motivation on DI

- Our research team identified the top 100 Chinese multinationals ranked by OFDI stock in 2017 in the *Outward Foreign Direct Investment Statistics Bulletins of China*.

- We then examined the recent information on merger and acquisition (M&A) transactions from the financial intelligence, annual reports and corporate announcements of those companies.

- After studying the details of relevant M&A transactions, we agree with the locations of the Chinese MNE and encapsulate the motivations of OFDI for the respective macro-regions.

Table 2. Main Empirical Results for the Whole of China

Dependent variables	Domestic investment (DI)			
	Model (1) – Flexible GLS	Model (2) - POLS	Model (3) – Random-effects	Model (4) – Random-effects, 2SLS
Intercept	0.107**	0.019	-0.351***	-0.283*
	(0.037)	(0.049)	(0.064)	(0.124)
OFDI	1.591***	3.284***	1.659*	10.695***
	(0.456)	(0.937)	(0.774)	(3.085)
IFDI	-0.054	-0.588	0.948	-0.877
	(0.251)	(0.407)	(0.488)	(1.965)
DS	0.114***	0.141***	0.271***	0.311***
	(0.015)	(0.017)	(0.021)	(0.051)
PGR	-0.747***	-1.954**	-0.316	0.733
	(0.235)	(0.641)	(0.555)	(0.921)
EDUL	15.806***	15.961**	14.173*	4.234
	(4.259)	(5.414)	(5.852)	(8.894)
RD	15.181***	16.691***	24.293***	13.943***
	(1.693)	(1.431)	(2.016)	(3.258)
EXPT	-8.337***	-8.424***	-9.149***	-11.156***
	(0.563)	(0.493)	(0.525)	(0.995)
INF	0.499***	0.603***	0.659***	0.709***
	(0.037)	(0.043)	(0.048)	(0.115)
IND	-0.195*	-0.089	-0.059	1.029
	(0.091)	(0.188)	(0.172)	(0.627)
Observations	403	403	403	403
R-squared	0.741	0.771	0.796	0.709
Lagrange Multiplier Test (p-value)			16.393	15.216
			(0.000)	(0.000)
Hausman Test (p-value)			16.111	767.687
			(0.065)	(0.996)

Note: The symbols *, ** and ***denote statistical significance at the 5%, 1% and 0.1%, respectively (* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$).

Table 3. Main Empirical Results for Eastern China

Dependent variable	Domestic investment (DI)			
	Model (5) – Flexible GLS	Model (6) - POLS	Model (7) – Random-effects	Model (8) – Random-effects, 2SLS
Intercept	0.468***	0.081	-0.194	-0.175
	(0.019)	(0.088)	(0.122)	(0.159)
OFDI	7.948***	1.292	1.598	1.699
	(0.858)	(0.871)	(0.872)	(1.029)
IFDI	2.074***	-2.169***	0.341	7.582***
	(0.138)	(0.416)	(0.684)	(2.143)
DS	0.074***	0.135***	0.175***	0.139**
	(0.004)	(0.029)	(0.041)	(0.046)
PGR	-1.228***	-1.383*	-0.201	-0.338
	(0.151)	(0.642)	(0.656)	(0.729)
EDUL	-0.514	-18.401*	-5.974	1.465
	(0.393)	(9.291)	(9.645)	(10.421)
RD	44.501***	7.624***	17.595***	17.898***
	(0.323)	(1.686)	(2.997)	(4.182)
EXPT	-31.671***	-5.803***	-6.577***	-5.763***
	(0.109)	(0.591)	(0.668)	(0.852)
INF	0.153***	0.832***	0.644***	-0.031
	(0.012)	(0.091)	(0.112)	(0.174)
IND	0.386***	0.946*	0.581	-0.566
	(0.019)	(0.368)	(0.401)	(0.542)
Observations	156	156	156	156
R-squared	0.931	0.778	0.667	0.662
Lagrange Multiplier Test (p-value)			2.872	3.814
			(0.002)	(0.000)
Hausman Test (p-value)			6.217	3.295
			(0.718)	(0.998)

Note: The symbols *, ** and ***denote statistical significance at the 5%, 1% and 0.1%, respectively (* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$).

Table 4. Main Empirical Results for Central China

Dependent variable	Domestic investment (DI)			
	Model (9) – Flexible GLS	Model (10) - POLS	Model (11) – Random-effects	Model (12) – Random-effects, 2SLS
Intercept	0.111**	0.452***	0.374***	0.394***
	(0.043)	(0.066)	(0.075)	(0.079)
OFDI	2.111***	8.643*	8.691*	8.499*
	(0.358)	(4.062)	(4.039)	(4.043)
IFDI	-0.339***	2.172**	1.003	1.009
	(0.114)	(0.739)	(0.901)	(0.894)
DS	0.149***	0.077***	0.139***	0.143***
	(0.014)	(0.019)	(0.028)	(0.029)
PGR	-0.807***	-1.168	-1.159	-1.211
	(0.183)	(0.825)	(0.844)	(0.844)
EDUL	31.009***	-0.374	6.372	3.418
	(2.969)	(5.815)	(7.355)	(8.523)
RD	35.462***	45.046***	43.244***	41.913***
	(1.368)	(2.213)	(2.851)	(3.558)
EXPT	-24.771***	-31.838***	-31.074***	-30.764***
	(0.702)	(1.535)	(1.846)	(1.914)
INF	0.378***	0.163**	0.134	0.126
	(0.021)	(0.062)	(0.075)	(0.075)
IND	-0.637***	0.372**	0.448**	0.424**
	(0.056)	(0.139)	(0.149)	(0.153)
Observations	117	117	117	117
R-squared	0.906	0.925	0.928	0.929
Lagrange Multiplier Test (p-value)			1.901	1.831
			(0.029)	(0.034)
Hausman Test (p-value)			3.622	5.728
			(0.935)	(0.838)

Note: The symbols *, ** and ***denote statistical significance at the 5%, 1% and 0.1%, respectively (* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$).

Table 5. Main Empirical Results for Western China

Dependent variable	Domestic investment (DI)			
	Model (13) – Flexible GLS	Model (14) - POLS	Model (15) – Random-effects	Model (16) – Random-effects, 2SLS
Intercept	0.111*	0.069	–0.016	–0.043
	(0.043)	(0.056)	(0.066)	(0.097)
OFDI	2.111***	2.241	2.235	2.332
	(0.358)	(1.878)	(1.591)	(1.621)
IFDI	–0.339**	–0.274	–0.089	2.391
	(0.114)	(0.723)	(0.689)	(2.536)
DS	0.149***	0.162***	0.176***	0.152***
	(0.014)	(0.019)	(0.022)	(0.035)
PGR	–0.807***	–1.212	1.733	1.321
	(0.183)	(1.164)	(1.208)	(1.279)
EDUL	31.009***	32.195***	44.269***	57.331
	(2.969)	(6.138)	(8.193)	(9.393)
RD	35.462***	35.908***	31.184***	32.598***
	(1.368)	(3.335)	(3.934)	(4.331)
EXPT	–24.771***	–25.563***	–22.374***	–23.277***
	(0.702)	(2.027)	(1.641)	(1.806)
INF	0.378***	0.414***	0.431***	0.433***
	(0.021)	(0.041)	(0.052)	(0.075)
IND	–0.637***	–0.597***	–1.183***	–1.193***
	(0.056)	(0.189)	(0.244)	(0.272)
Observations	130	130	130	130
R-squared	0.906	0.906	0.935	0.937
Lagrange Multiplier Test (p-value)			5.484	3.324
			(0.000)	(0.000)
Hausman Test (p-value)			4.043	4.123
			(0.909)	(0.997)

Note: The symbols *, ** and ***denote statistical significance at the 5%, 1% and 0.1%, respectively (* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$).

Table 6. Main Empirical Results for China and her Macro-regions

Dependent variable	Outward foreign direct investment (OFDI)			
	Model (13)	Model (14)	Model (15)	Model (16)
DI	0.005	0.011	0.004	0.008
	(0.003)	(0.008)	(0.002)	(0.005)
IFDI	-0.072*	-0.015	-0.018	-0.029
	(0.034)	(0.071)	(0.024)	(0.041)
DS	0.006**	0.015***	0.001	-0.001
	(0.002)	(0.004)	(0.001)	(0.002)
PGR	-0.165***	-0.169**	-0.026	-0.047
	(0.037)	(0.062)	(0.021)	(0.074)
EDUL	-0.119	-0.329	-0.018	0.022
	(0.401)	(0.939)	(0.186)	(0.566)
RD	0.311	0.145	0.065	0.445
	(0.169)	(0.349)	(0.126)	(0.322)
EXPT	0.119*	0.043	0.091	0.086
	(0.047)	(0.084)	(0.086)	(0.154)
INF	-0.002	-0.001	-0.001	0.001
	(0.004)	(0.012)	(0.002)	(0.004)
IND	0.005	-0.041	0.002	0.026
	(0.012)	(0.039)	(0.004)	(0.017)
Observations	403	156	117	130
R-squared	0.288	0.369	0.341	0.128
Hausman Test (p-value)	65.266	165.05	165.05	32.25
	(0.000)	(0.000)	(0.000)	(0.001)

Note: The symbols *, ** and ***denote statistical significance at the 5%, 1% and 0.1%, respectively (* $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$).

Research findings

1. The salient effect of OFDI on DI in China, but the association their association varies across the regions.

2. OFDI has a positively significant effect on DI in Central China, implying that there is a strong complementary relationship between FDI outflows and home investment in the inland central region. However, the same relationship cannot be found in Eastern and Western China. These findings are also validated by the 2SLS estimates.

3. Our study shows how different motivations for OFDI interact with DI in different macro-regions and shows that efficiency-seeking OFDI promotes DI whereas other motivations for OFDI, such as natural resource-seeking, market-seeking and strategic asset-seeking, do not have any impact on domestic capital formation.

Policy implications (1)

- A large number of SOEs in Eastern and Western China play a crucial role in investing in overseas projects. However, an increasing number of overseas M&A agreements undertaken by SOEs cannot further increase DI or strengthen local industries at the regional level.

  ➢ Since SOEs have well-established institutional frameworks, strong state-local relations, and a wealth of financial resources, they can act as leading companies in the local value chain and promote technological spillovers.

  ➢ Local governments may consider regional endogenous conditions for promoting economic development, such as the availability of human capital and managerial skills, institutional capacity, and financial capacity, and provide a suitable environment in stimulating domestic activities between SOEs and private enterprises.

Policy implications (2)

- The complementary relationship between OFDI and DI in Central China shows that the Chinese government can further liberalize the prevailing OFDI policies.

  - Local governments not only facilitate the participation of SOEs in overseas investment, but also encourage private conglomerates to engage in small and medium-sized M&A deals that can expand foreign markets, acquire strategic assets, and encourage the transfer of knowledge from OFDI to the domestic provincial economy and accelerate the process of domestic capital acceleration.

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