Pandemic Arbitrage in Foreign Direct Investments:
A Perspective on the Modes of Entry

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Abstract

Foreign Direct Investments (FDI) are considered long-term and less sensitive to global shocks as they involve large amounts of capital investment that are costly to reverse. This study examines whether there was a reallocation of FDI flows from destination markets more affected by the pandemic, resulting in a pandemic arbitrage. Using bilateral FDI inflows data from January 2019 to December 2020, we show that FDI flows declined to destination markets that performed worse than source markets in COVID-19 infection rates, with the effect more evident in greenfield FDI. Our results also show that strong social connections and loose COVID-19 policy stringency alleviate the pandemic arbitrage in FDI flows, especially for M&As.

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1   Introduction

Foreign direct investments (FDI) are a significant component of long-term investments that enables recovery from economic recessions (Smarzynska Javorcik, 2004; Ito and Rodrik, 2008), including the current one due to the coronavirus disease 2019 (COVID-19). Tracking FDI allocation during the COVID-19 pandemic is crucial for insights on the path toward recovery.

The literature on FDI considers FDI as long-term oriented and less sensitive to global shocks (Lipsey et al., 1999). In this paper, we propose that a pandemic arbitrage may arise in the sense that destinations coping well with the COVID-19 pandemic emerge as favorable FDI destinations, causing a reallocation of FDI flows from destination markets more adversely affected by the pandemic. The main contribution of this paper lies in identifying the pandemic arbitrage in FDI flows by entry modes.

Applying a continuous treatment difference-in-differences (DID) approach to bilateral cross-border investment data between January 2019 and December 2020, we find that the pandemic shock deters FDI flows to destination markets with a higher COVID-19 infection rate than the source market. The result is intuitive as the pandemic generates negative economic shocks, disrupts supply chains, impedes business operations, and cuts international connections, which all discourage profit-seeking and cost-minimizing FDI going to pandemic-stricken destinations. Our study also finds such pandemic arbitrage to differ between entry modes, with the impact felt more by greenfield FDI than cross-border mergers and acquisitions (M&As). We further show that strong social connections and loose COVID-19 policy stringency mitigate such adverse effects of the pandemic on FDI, especially for M&As.

Related literature: The nascent FDI literature on the COVID-19 pandemic comprises studies dealing with FDI flows to individual countries. For example, Fang et al. (2021) provide empirical evidence concerning the impact of the COVID-19 pandemic on FDI flows to China (outward and inward). Our paper is more related to FDI studies with a cross-country perspective. Fu et al. (2021) identify the pandemic impact on bilateral FDI margins. Our study is distinct in three ways. Second, we use a more robust empirical specification in terms of a continuous difference-in-difference framework. Third, we use a bilateral COVID-19 infection covariate to examine whether there was an arbitrage in FDI flows post-pandemic.

2   Empirical framework

To examine FDI response to the COVID-19 pandemic, we employ the below empirical framework as our baseline model.

$$ln(1 + FDI_{ijt}) = \beta covid_{ijt} + c_{ij} + \delta_t + \gamma_{iy} + \lambda_{jy} + \epsilon_{ijt} \tag{1}$$

where,

- FDI_{ijt} is the bilateral FDI inflow from source market i to destination market j at period t. We use $ln(1 + FDI_{ijt})$ specification to tackle the issue of zero FDI values.

- $covid_{ijt}$ denotes the difference in newly infected cases as a ratio of the total population between destination market j and source market i at period t. Hence, $covid_{jit}$ equals 0 for all market pairs before the outbreak of the COVID-19 pandemic. This makes Eq. (1) a continuous treatment DID specification.

- The fixed effects in Eq. (1) automatically control for important factors determining determine FDI flows. c_{ij} pertains to fixed effects that account for time-invariant bilateral variables like whether the source and destination markets share a common language, common border, common history, etc. δ_t refers to time fixed effects. Finally, γ_{iy} and λ_{jy} account for source market-year and destination market-year fixed effects, respectively. The inclusion of γ_{iy} and λ_{jy} automatically controls time-varying source and destination market variables commonly found to determine FDI inflows.

An estimate of $\beta < 0$ indicates that a rise in the COVID-19 infections in the destination market relative to the source market deters bilateral FDI inflows. The negative value of the coefficient also implies that source markets increased FDI flows to destination markets which handled the pandemic better than them. Thus, a statistically significant $\beta < 0$ gives evidence for pandemic arbitrage in FDI flows.

2.1 Data on FDI

We use Orbis cross-border investment database, which tracks daily information on greenfield FDI projects and cross-border M&A deals. Using this transaction-level data, we construct monthly bilateral FDI flows by aggregating the announced or completed investments by source and destination markets for each month. We define aggregate FDI as the sum of greenfield FDI and M&As.

Our sample period extends from January 2019 to December 2020, 12 months before and 12 months after the pandemic onset. We drop bilateral pairs who recorded investment flows for less than six months during the pre-treatment period (January 2019 to December 2019) to avoid irregular investment patterns. The data sample is a balanced panel of 11,592 observations from 483 bilateral pairs comprising 46 source and 67 destination markets.

2.2 Data on COVID-19

The monthly data on newly infected COVID-19 cases as a ratio of the total population is collected from Johns Hopkins Coronavirus Resource Center. We map this country-specific COVID-19 infec-

tions data to the FDI dataset for both source and destination markets and construct the following time-varying COVID-19 measure for each bilateral pair:

$$covid_{ijt} = -\left[\frac{Covid_{it}^{new}}{Population_{it}} - \frac{Covid_{jt}^{new}}{Population_{jt}}\right] \tag{2}$$

where $Covid_{it}^{new}$ and $Population_{it}$ denotes the new COVID-19 cases and population, respectively of market i in period t. $covid_{ijt} = 0$ for all periods before January 2020.

3 Results

Before discussing the empirical results, we show the dynamics in global FDI inflows during the study period in Fig. 1. As the figure shows, global FDI declined after the onset of the COVID-19 pandemic. Among the modes of entry, greenfield FDI declined more substantially than M&As.
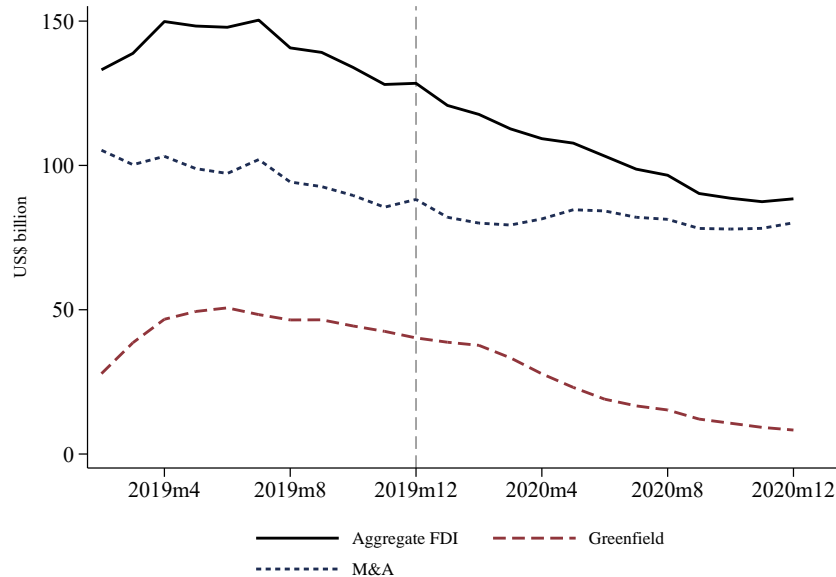

Figure 1: Global Foreign Direct Investment Flows (Jan 2019 - Dec 2020)

3.1 Baseline

Table 1 reports the results from estimating the baseline model in Eq. (1). Column (1) shows the results from the OLS estimation with aggregate FDI as the dependent variable. A negative and statistically significant $covid_{ijt}$ coefficient in column (1) indicates that foreign investors do not prefer to invest in destinations that perform worse than source markets in COVID-19 infections. The value of $covid_{ijt}$ coefficient implies that a one percentage point increase in the COVID-19 infection rate

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difference between destination and source markets corresponds to a drop in bilateral FDI flows by 9 percent. We next decompose FDI into greenfield and M&As to identify the pandemic's impact by different modes of FDI entry. The results from column (2) and (3) highlight the pandemic arbitrage as statistically significant in the case of greenfield FDI alone.

As a robustness check, we re-estimate the baseline model using the Poisson Pseudo-Maximum Likelihood (PPML) estimator established by existing literature to provide consistent coefficient estimates in the presence of heteroscedasticity and measurement error. Additionally, the PPML estimator helps tackle zero FDI values in our balanced panel, where missing bilateral FDI entries are replaced with zero observations. Columns (4) to (6) reveal the robustness of the baseline results with PPML estimation.

Table 1: Baseline results

Dependent var.	$ln(1 + FDI_{ijt})$			FDI_{ijt}		
	FDI	Greenfield	M&A	FDI	Greenfield	M&A
	(1)	(2)	(3)	(4)	(5)	(6)
$covid_{ijt}$	-0.09**	-0.12***	0.02	-0.03	-0.74***	0.03
	(0.01)	(0.00)	(0.00)	(0.05)	(0.11)	(0.04)
Constant	2.15***	1.36***	1.14***	6.43***	4.90***	6.54***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.03)	(0.00)
Source-destination fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Source-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Destination-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,592	11,592	11,592	11,544	10,968	10,044
R-squared	0.42	0.47	0.38	0.52	0.56	0.51

*, **, *** denotes significance levels at 1, 5 and 10 percent, respectively. Robust standard errors clustered by market pair and year are reported in the parenthesis.

3.2 Do social connection and COVID-19 policy stringency matter?

Social connection According to the existing literature on FDI mode of entry (Nocke and Yeaple, 2008), M&As involve corporate assets purchase (existing facilities, firm ownership, etc.) in the destination country. Such transactions become more effective when the acquirers understand the preferences, culture and norms of the destination markets (Stahl and Voigt, 2008). This suggests that negotiations and ownership transfer in M&A deals can be performed online if the acquirer and target have social connections. A similar social or cultural connection argument cannot be inferred for greenfield FDI which involves building production capacity in the destination market to enable MNC to transfer the corporate assets abroad (Harzing, 2002). Physical connections are essential in

greenfield FDI. Since M&As require less mobile capabilities than greenfield FDI, a social connection may substitute physical connection for M&As during the pandemic, but less so for greenfield FDI.

To investigate the role of social connection on determining the pandemic arbitrage in FDI flows, we estimate the below equation:

$$ln(1 + FDI_{ijt}) = \beta_1 covid_{ijt} + \beta_2 covid_{ijt} \times social_{ij} + c_{ij} + \delta_t + \gamma_{iy} + \lambda_{jy} + \epsilon_{ijt} \qquad (3)$$

where $social_{ij}$ refers to the social connection between source and destination market. First, we use the bilateral social connectedness index from Facebook friendship data as a proxy for $social_{ij}$. The results from columns (1) to (3) in Table 2 show no evidence that the social connection index (SCI_{ij}) impacts the pandemic arbitrage in FDI flows. Such a result could arise because friendship connections derived from Facebook are not a good proxy for business connections. We next consider common colonial history from the CEPII gravity dataset as an indicator of social connection. Hence, $social_{ij} = Colonial_{ij}$ in Eq. (3), where $Colonial_{ij}$ is a binary variable that takes the value 1 when markets i and j share common colonial history and 0 otherwise. The results reported from columns (4) to (6) show $covid_{ijt} \times social_{ij}$ coefficient as positive and significant for M&As alone. In line with our expectations, a common colonial history representing similar culture, institutions, and rules between source and destination markets weakens the pandemic arbitrage in M&As.

COVID-19 policy Throughout the pandemic, governments worldwide undertook policy measures to manage COVID-19 transmission. If MNCs expect the COVID-19 policies of the destination market to be effective in curbing future infection, the arbitrages in FDI flows should dissipate. On the other hand, if the COVID-19 policy imposed further constraints on business operations, policy responses may deepen the decline in FDI flows to destination markets more affected by the pandemic than source markets. We estimate the below equation to identify which of the aforementioned effect dominates:

$$ln(1 + FDI_{ijt}) = \beta_1 covid_{jit} + \beta_2 covid_{jit} \times PolicyStringency_{jt} + \beta_3 PolicyStringency_{jt} + c_{ij} + \delta_t + \gamma_{iy} + \lambda_{jy} + \epsilon_{ijt}$$
$$(4)$$

where $PolicyStringency_{jt}$ denotes the COVID-19 policy stringency in the destination market j at period t. We use the stringency Index from Oxford COVID-19 Government Response Tracker (OxCGRT) to proxy for destination market policy stringency. The negative and significant interaction term coefficient from columns (1) to (3) in Table 3 shows the second effect to dominate i.e., COVID-19 policy stringency in the destination market strengthens the pandemic arbitrage in FDI flows primarily through M&A mode of entry.

Table 2: Role of social connection

Dependent var.	$ln(1 + FDI_{ijt})$					
	FDI (1)	Greenfield (2)	M&A (3)	FDI (4)	Greenfield (5)	M&A (6)
$covid_{ijt}$	-0.04 (0.02)	-0.06 (0.02)	-0.00 (0.02)	-0.10** (0.01)	-0.12*** (0.00)	0.01 (0.00)
$covid_{ijt} \times SCI_{ij}$	-0.08 (0.05)	-0.01 (0.06)	-0.02 (0.04)			
$covid_{ijt} \times Colonial_{ij}$				1.00 (0.17)	0.39 (0.14)	0.67*** (0.00)
Constant	2.10*** (0.00)	1.38*** (0.00)	1.06*** (0.00)	2.20*** (0.01)	1.37*** (0.03)	1.17*** (0.00)
Source-destination fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Source-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Destination-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,672	9,672	9,672	11,160	11,160	11,160
R-squared	0.41	0.47	0.34	0.42	0.47	0.38

*, **, *** denotes significance levels at 1, 5 and 10 percent, respectively. Robust standard errors clustered by market pair and year are reported in the parenthesis.

4 Conclusion

This study examines the COVID-19 pandemic impact on FDI using a bilateral panel dataset of FDI inflows from 46 source markets to 67 destination markets from January 2019 to December 2020. Using the difference in COVID-19 infections between destination and source markets in a continuous treatment difference in difference specification, we show that FDI inflows declined to destination markets that faced a higher COVID-19 infection rate than source markets, leading to a pandemic arbitrage in FDI flows. Such an effect differs by the FDI entry mode, with the impact more evident in greenfield FDI. Furthermore, we show that strong social connections and loose COVID-19 policy stringency mitigate the pandemic arbitrage in FDI, especially for M&As.

Table 3: Role of COVID-19 policy stringency

Dependent var.	$ln(1 + FDI_{ijt})$		
	FDI (1)	Greenfield (2)	M&A (3)
$covid_{ijt}$	-0.06* (0.01)	-0.10** (0.00)	0.02 (0.01)
$covid_{ijt} \times PolicyStringency_{jt}$	-0.78* (0.10)	-0.26 (0.07)	-0.59* (0.05)
$PolicyStringency_{jt}$	-0.38** (0.02)	-0.21 (0.04)	-0.14 (0.03)
Constant	2.16*** (0.00)	1.36*** (0.00)	1.14*** (0.00)
Source-destination fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Source-year fixed effects	Yes	Yes	Yess
Destination-year fixed effects	Yes	Yes	Yes
Observations	11,592	11,592	11,592
R-squared	0.43	0.47	0.38

*, **, *** denotes significance levels at 1, 5 and 10 percent, respectively. Robust standard errors clustered by market pair and year are reported in the parenthesis.

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