



Navigating Uncertainty: Multinationals' Investment Strategies after the Pandemic Shock

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Abstract

Recent debates suggest that the global economy may enter a deglobalization phase accelerated after COVID-19 and the ongoing conflict in Ukraine. This study investigates the investment decisions by multinational enterprises (MNEs) in 2019–2022. We build on a unique data set of about 2 million parent-affiliate linkages to show that there has been a general reorganization of MNEs' investment strategies since: (i) a relevant share of divestments (33%) has not been compensated by new investment decisions (14%); (ii) domestic subsidiaries are more likely to be established and less likely to be divested; (iii) the average distance of a subsidiary from a parent company has increased; (iv) the number of countries in which the average MNE operates is higher than before. Therefore, after a basic empirical strategy for foreign direct investments and gravity controls, we first confirm a higher revealed preference for domestic investment by MNEs, among others, induced by higher exposure to COVID-19. When we delve deeper into divestment choices at the firm level, we find evidence of reshoring, i.e., when a divestment abroad by a parent company in a specific industry is positively associated with a domestic investment in the same industry.

Keywords Multinational firms · Foreign direct investments · Reshoring · Firm location choice · COVID-19

JEL Classifications F23 · F15 · F61 · L22 · L23

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1 Introduction

Are we living in an era of *deglobalization*? Prior to the emergence of the COVID-19 pandemic, the terms *deglobalization* and *slowbalization* had already gained traction to describe the evolving global economic landscape, marked by a return to domestic economies and a gradual regionalization of production networks. The pandemic crisis may have accelerated this process, as unprecedented disruptions to supply chains resulted in bottlenecks and shortages of intermediate goods. Eventually, the conflict in Ukraine started in February 2021 and led to a severe energy crisis, with direct consequences in Europe and indirect effects felt in countries worldwide. According to UNCTAD (2023), foreign direct investment fell globally by 12% in 2022 to 1.3 trillion dollars, and the decline has been mainly driven by developed economies, where foreign direct investment fell by 37% to 378 billion dollars. Therefore, scholars and policymakers underscore the essential role of enhanced supply chain resilience in times of increased uncertainty. Companies have already become aware of the need to build supply chains that prioritize profitability, resilience, and adaptability in the face of unforeseen disruptions. This recognition has triggered a reevaluation of business models and investment strategies, emphasizing the strength of production networks over cost-saving strategies.

Against the previous background, this study examines firms' investment and divestment decisions in times of heightened uncertainty, like a pandemic shock and an armed conflict. As far as we know, ours is the first attempt to catch how MNEs are changing their location investment strategies, driving a reconfiguration of global economic activities that can have a long-lasting impact on the degree of global economic integration in the long run. For our scope, we employ an innovative data set that compiles firm-level information to reconstruct parent-affiliate linkages and aggregate them at the country level. This data set enables us to identify the number of investment and divestment decisions made by multinational enterprises (MNEs) between 2019 and 2022, thus offering novel insights into MNEs' location choices at a granular level. While FDI data is typically available in terms of stocks and flows at the country level, such information does not allow for the differentiation of investments from divestments. Our data set, instead, permits us to isolate these strategic choices and analyze investment and divestment patterns using the most recent data up to the end of 2022.

At first, looking at descriptive evidence, we find that between 2019 and 2022, multinational enterprises (MNEs) made nearly twice as many divestments as new investments. Across all sectors, we observe that the number of divestments exceeds that of investments, although there is a relevant country-level heterogeneity that we describe. Notably, we find that, on average, a parent company establishes in the domestic country about three out of four new investment projects in 2019–2022. Unsurprisingly, the highest ratio of divestment to investment decisions by MNEs is in the Russian Federation due to the ongoing conflict and economic sanctions. In general, European countries have suffered from a relevant investment turnover, where divestment choices are, on average, higher than new investment choices.

Interestingly, as a result of a reconfiguration of investment strategies, we find that, on average, foreign subsidiaries are geographically more distant from parent companies in 2022 than in 2019. The latter evidence should not come as a surprise to us. After

the disruptions due to COVID-19 and the conflict, headquarters chose to differentiate the locations of their economic activities (Javorcik 2020). Our conjecture is confirmed by statistical evidence, as we also find that MNEs are present, on average, in more countries in 2022 than in 2019.

Eventually, we propose a basic empirical strategy to catch changing investment patterns. First, we estimate a simple gravity model for corporate control *à la* Head and Ries (2008) to study investment and divestment choices at the country level, which we augment with a COVID-19 measure of risk. From our perspective, COVID-19 risk catches investors' uncertainty when dealing with an unprecedented shock, and we measure it by borrowing from Hassan et al. (2023). The authors develop a metric based on a text-classification method, which identifies firms' exposure to the COVID-19 outbreak. This is achieved by counting the times the virus is mentioned during the quarterly earnings conference calls that publicly listed firms had with financial analysts. We find that a higher COVID-19 risk correlates with more domestic investment decisions. On the other hand, COVID-19 risk is negatively correlated with the propensity to invest in new investment projects abroad.

In the second stage of our basic analysis, we delve deeper into the decision to divest by introducing a parent-level specification that better catches the reshoring decision. We assume that reshoring occurs when a multinational parent company associates foreign divestment choices in an industry with domestic investments in the same industry. Interestingly, we find that this is the case in our period of analysis.

Our investigation contributes to the rapidly expanding body of literature assessing the consequences of the COVID-19 pandemic on the economy, specifically regarding investment strategies and their influence on global supply chains. Espitia et al. (2022) study the trade effects of COVID-19 using a gravity model and find that participation in global value chains increased traders' vulnerability to shocks suffered by trading partners. Still, it also reduced their vulnerability to domestic shocks. Javorcik (2020) advocates for reevaluating global value chains post-pandemic and diversifying suppliers directed towards new destinations. On the contrary, Di Stefano et al. (2022) look at Italian MNEs and find that COVID-19 did not spur large waves of reshoring nor plant closures, but rather, trade policy uncertainty is more likely to provoke such outcomes in the medium term. Muzi et al. (2022) examine whether the COVID-19 pandemic exhibits a Schumpeterian "cleansing" of less productive firms and find that less productive firms have a higher probability of permanently closing during the crisis, especially smaller businesses. Hassan et al. (2023) delve into the granular level by constructing text-based measures of the primary concerns listed firms associated with the spread of COVID-19 and identify which firms perceive to lose or gain from the epidemic. Their findings reveal that the effects of COVID-19 manifest as a simultaneous shock to demand and supply, with both shocks affecting firms' market valuations in equal measure on average.

When it comes to our choice of an empirical strategy, our work relates to a substantial body of literature that has expanded the application of gravity models—initially developed to estimate trade flows among countries (Anderson and Van Wincoop 2003; Yotov et al. 2016)—to the context of FDIs (Bergstrand and Egger 2007; Baltagi et al. 2008; Baier et al. 2019; Anderson et al. 2019). In fact, the theory that derives determinants of trade flows posits that similar frictions apply to FDIs. Numerous empirical

studies have sought to identify the most significant determinants of FDI (Blonigen and Piger 2014; Bruno et al. 2017; Blonigen et al. 2007). Agglomeration effects (Crozet et al. (2004)), quality of institutions (Alfaro et al. (2007)) and bilateral investment agreements are examples of well-studied determinants. Gravity models for FDI have already been used to analyze investment decisions following shocks. Specifically, several works have focused on Brexit as a source of shock and investigated market exits (Bruno et al. 2017; Welfens and Baier 2018). On the contrary, few studies have focused on the drivers of divestment decisions (Borga et al. 2020). To the best of our knowledge, our study represents the first application of a gravity model for FDI to examine the effects of COVID-19 with global coverage. We employ the structural gravity model for FDI initially proposed by Head and Ries (2008) and augmented with the COVID-19 risk measure sourced from Hassan et al. (2023).

The remainder of the paper is structured as follows. Section 2 outlines the data used and offers descriptive evidence. Section 3 details the empirical strategy and the analysis results. Specifically, Sect. 3.1 investigates the impact of COVID-19 on domestic versus foreign investment strategies at the aggregate level, while Sect. 3.2 explores divestment choices at the parent level. Section 4 discusses the main limitations of our study and how they could be overcome in the next future, when the right data will be available. Section 5 offers a few conclusive remarks.

2 Data and Descriptive Evidence

We obtain firm-level financial accounts and ownership information from the Orbis database, compiled by Bureau Van Dijk.¹ Our data set comprises information on 219,365 multinational enterprises (MNEs) and their 2,066,428 affiliates worldwide, accounting for changes in parent-affiliate linkages between 2019 and 2022. Notably, ownership changes are updated regularly as soon as original providers retrieve new information. Usefully, ownership changes allow us to track changes in the set of subsidiaries controlled by multinational enterprises at the end of 2022. However, firm-level financial accounts for that year are still unavailable when we write.² Nonetheless, we can always control for firm size with a categorical variable that indicates whether the subsidiary is small, medium, large, or very large, according to a combination of thresholds on basic accounts at the moment of the registration.³

¹ The Orbis database standardizes firm-level financial accounts and ownership on a global scale. It also includes an ownership module that tracks changing shareholding information at the firm level. Orbis data have been increasingly used for firm-level studies on multinational enterprises. See for example Cravino and Levchenko (2016); Del Prete and Rungi (2017); Del Prete and Rungi (2020); Alviarez et al. (2020); Rungi et al. (2023); Miricola et al. (2023)

² A firm produces records of financial accounts only at the end of the fiscal year, which in most countries is usually well into the following calendar year. According to our experience, we can expect full financial accounts with about 1 year lag in our source.

³ Companies on Orbis are considered to be very large when they match at least one of the following: (i) revenue \geq 100 million EUR; (ii) total assets \geq 200 million EUR; (iii) number of employees \geq 1000; (iv) they are listed. Large companies match at least one of the following conditions: (i) revenues \geq 10 million EUR; (ii) total assets \geq 20 million EUR; (iii) number of employees \geq 150. Medium companies match at least one of the following: revenues \geq 1 million EUR; (ii) total assets \geq 2 million EUR; number of employees \geq than 15. Small companies are companies that do not fit into previous categories.

We define an affiliate as a company controlled by a multinational enterprise possessing an absolute direct or indirect majority ($> 50\%$) of voting rights at the shareholder assembly.⁴ A company is considered a multinational if it has at least one affiliate in a country other than that of the parent company. Eventually, we show how our sample exhibits extensive country coverage, encompassing both parent companies and their affiliates worldwide. In Table 1, we report sample coverage by hosting economies in 2019, i.e., before the pandemic shock and the conflict in Ukraine. That year, we had 219,365 parent companies controlling 1,785,368 affiliates worldwide. The most represented area is the European Union, where we have 32.25% of affiliates, followed by the United States (21.82%), while Asian countries host 20.08% of affiliates altogether. As expected, these three areas collect the bulk of activities by multinational enterprises.

To proceed with our analysis, we need to derive changes in the corporate perimeter in the following years, up to 2022, with an eye on the changing geography.⁵ Thus, investment operations are proxied by the changes in parent-affiliate linkages observed in our data.⁶ Therefore, by comparing parent-affiliate linkages before and after the shocks, we can identify three possible investment strategies:

1. maintaining the affiliates that existed in 2019, henceforth *incumbent* affiliates;
2. divesting from an affiliate because the majority link with the parent is not retrieved in 2022,⁷ henceforth *divestments*;
3. acquiring/establishing a new affiliate, when we find a new majority link that did not exist in 2022, henceforth *investments*.

Eventually, changes in the corporate perimeters of multinational enterprises provide us with a broader picture of the geography trends emerging as a response to the changing economic environment. In Table 2, when we consider the picture at the end of 2022, we observe that there has been an important reorganization by multinational enterprises. Only 53% of parent-affiliate linkages that existed in 2019 were also found in 2022. Interestingly, we record a relevant number of divestment operations (33%) that have been only partially compensated by new investment operations (14%).

At this stage, we assume that the high proportion of divestment operations in our sample is due to the unprecedented shocks in recent years, first the spread of the COVID-19 pandemic and then the outbreak of the conflict in Ukraine. In regular times, we would not observe such a high turnover in corporate control. Our preliminary evidence seems in line with the most recent data provided by UNCTAD (2023), which indicate that FDI flows dropped significantly at the global level on a year-to-year basis (12%), and the trend is mainly driven by developed economies (37%). On the one

⁴ The majority of voting rights is a standard set by international definitions of multinationals' perimeters (OECD 2005, 2008; UNCTAD 2009).

⁵ For the scope of our analysis, we keep fixed the set of parent firms in the sample to study within-MNE decisions; therefore, it is not relevant for us whether divested affiliates have been acquired by other parent firms that were not active in 2019.

⁶ Please note how, in this way, we can catch both cases of brownfield investment, when a parent acquires an existing firm, and greenfield investment, when a parent decides to establish a new affiliate.

⁷ In this way, we consider a case of divestment when the parent firm no longer holds an absolute majority, completely divests from the firm, or if the affiliate firm ceases to exist.

Table 1 Sample coverage by hosting economy: parents and affiliates, year 2019

Hosting Economy	Affiliates		Parent companies	
	N. obs.	%	N. obs.	%
European Union	576,015	32.26%	80,281	36.60%
<i>Of which</i>				
<i>Germany</i>	107,643	6.03%	9919	4.52%
<i>France</i>	51,442	2.88%	6640	3.03%
<i>Italy</i>	41,623	2.33%	7416	3.38%
<i>Spain</i>	43,432	2.43%	5508	2.51%
United States	389,635	21.82%	23,367	10.65%
Russian Federation	37,287	2.09%	2979	1.36%
Other Europe	71,387	4.00%	32,276	14.71%
<i>Of which</i>				
<i>United Kingdom</i>	133,422	7.47%	14,112	6.43%
Asia	358,577	20.08%	43,667	19.91%
<i>Of which</i>				
<i>Japan</i>	33,359	1.87%	4886	2.23%
<i>China</i>	127,203	7.12%	5558	2.53%
<i>India</i>	19,585	1.10%	2971	1.35%
Africa	43,682	2.45%	5891	2.69%
Latin America	80,911	4.53%	22,414	10.22%
<i>Of which</i>				
<i>Brazil</i>	11,791	0.66%	443	0.20%
<i>Argentina</i>	3451	0.19%	132	0.06%
<i>Mexico</i>	11,903	0.67%	310	0.14%
<i>The Caribbean countries</i>	4571	0.26%	1,619	0.74%
Australia	41,358	2.32%	4281	1.95%
Rest of the world	186,516	10.45%	4209	1.92%
Total	1,785,368	100%	219,365	100%

Note: The table reports geographic coverage of multinational enterprises at the beginning of the period, in 2019, considering affiliates and parent companies, respectively, by hosting economy

hand, disruptions caused by the pandemic have prompted many firms to reconsider their global supply chain organization and prioritize resilience over cost savings. On the other hand, after the sanctions against the Russian Federation, high energy and material costs have reduced the scope of new investment operations while imposing a burden on existing subsidiaries that the parent companies can decide to divest because they are no longer profitable.

A snapshot of the geography of the changing investment strategies is provided by the map of Fig. 1, where we display the ratio of divestments over investments made between 2019 and 2022 by destination countries. Specifically, we observe how the Russian Federation experienced the largest amount of divestment operations from MNEs if compared to new investments, as expected after the beginning of the conflict

Table 2 Changes in parent-affiliate linkages, 2019–2022

	Parents	Affiliates	%
Incumbents		1,100,262	53%
Divestments		685,106	33%
Investments		281,060	14%
Total	219,365	2,066,428	100%

Note: The table records the changing corporate perimeter of multinational enterprises after we compare the years 2019 and 2022. Incumbents are subsidiaries that existed in both periods. Divestments are subsidiaries that are not controlled anymore in 2022. Investments are subsidiaries that were not controlled in 2019, but they are in 2022

in Ukraine. On one hand, Western firms may have been incentivised to divest from the Russian Federation due to economic sanctions. On the other hand, the ongoing war has increased geopolitical and economic uncertainty, which could have motivated firms to give up on investment projects in that area. Interestingly, a few countries sharing a border with Ukraine, such as Hungary, Belarus, and Moldova, actually experienced more investments over divestments, as indicated by their yellow shading in the map. This suggests that the war possibly prompted firms to relocate some operations to the nearest safe countries that were not directly involved in the conflict. More notably, as displayed in Appendix Figs. 6 and 7, we observe a significant amount of divestments by parent companies in Asia and Western Europe from their affiliates located in Eastern Europe. Conversely, we note a higher amount of domestic investment in Eastern Europe, which could also reflect changes scenarios after the Russian invasion of Ukraine in February 2021.

Eventually, in Table 3, we provide evidence of the changing distributions by firm size. Consistent with expectations, most affiliates fall within the category of small firms, accounting for nearly 60% of the incumbents, while approximately 7% of incumbents are classified as very large companies. Generally, the percentage of investments is higher for small firms, while divestments outweigh investments for all other size categories. In Appendix Table 8, we also present evidence of the changing patterns across industries, and we notice that all sectors experienced a relatively higher number of divestment operations if compared to new investments, with the manufacturing and financial sectors showing the highest proportions.

In the following analysis, after a snapshot of what happens at the country level, we delve deeper into the decision of the parent companies to invest or divest, specifically exploring the presence of home bias in MNEs' choices. To this end, we construct a ratio that catches how the parent company combined divestment and investment operations in 2019–2022. We measure the net divestment ratio at the level of parent companies, eventually separating domestic and foreign operations. We propose two alternative ratios, calculated as:

$$divestment\ ratio_i = \frac{divestments_i - investments_i}{divestments_i + incumbents_i} \tag{1}$$

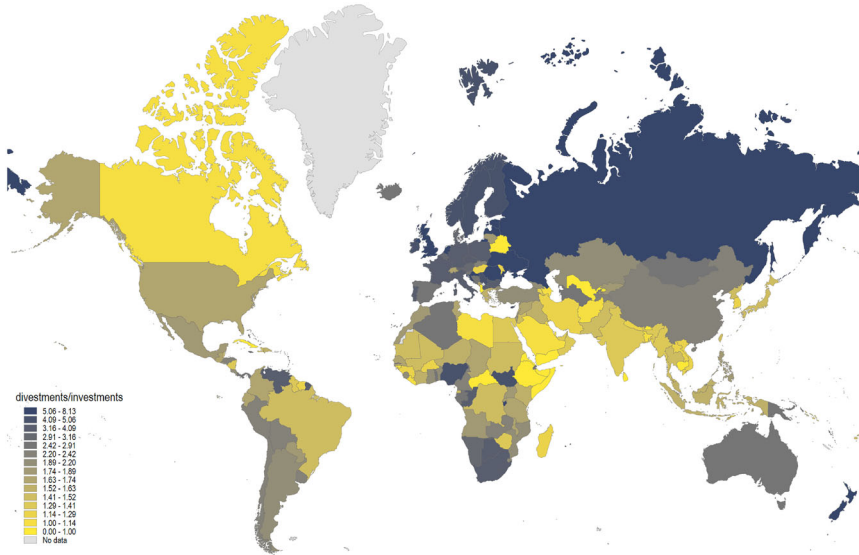


Fig. 1 Divestments over investments ratio at global level. Note: The map shows the ratio of divestments over investments of affiliates at the global level between 2019 and 2022. The yellow shade indicates a higher proportion of investments over divestments, while shades towards blue suggest a higher proportion of divestments

Table 3 Distribution of MNEs choices by size

Size classification	Divestments		Investments		Incumbents	
	Freq	Percent	Freq	Percent	Freq	Percent
Small	366,719	63.51	209,583	75.15	656,273	59.77
Medium sized	105,953	18.35	37,965	13.61	203,281	18.52
Large	73,835	12.79	22,754	8.16	160,057	14.58
Very large	30,935	5.36	8,567	3.07	78,299	7.13
Total	577,442	100	278,869	100	1,097,910	100

Note: The table reports firm size by main categories for incumbent subsidiaries, new investment operations, and divestment operations following a combination of thresholds (revenues, employees, total assets) as provided by our official source

and

$$divestment\ balance_i = \frac{divestments_i - investments_i}{divestments_i + investments_i} \tag{2}$$

In the first case, Eq. 1, the denominator indicates the stock of affiliates at the beginning of the period at the end of 2019, before the shocks occur. Please, note that the divestment ratio has an upper bound of 1 when there are either zero incumbent links or zero new investment operations. In the second case, Eq. 2, the denominator focuses on new operations, thus excluding subsidiaries that persist at the end of the

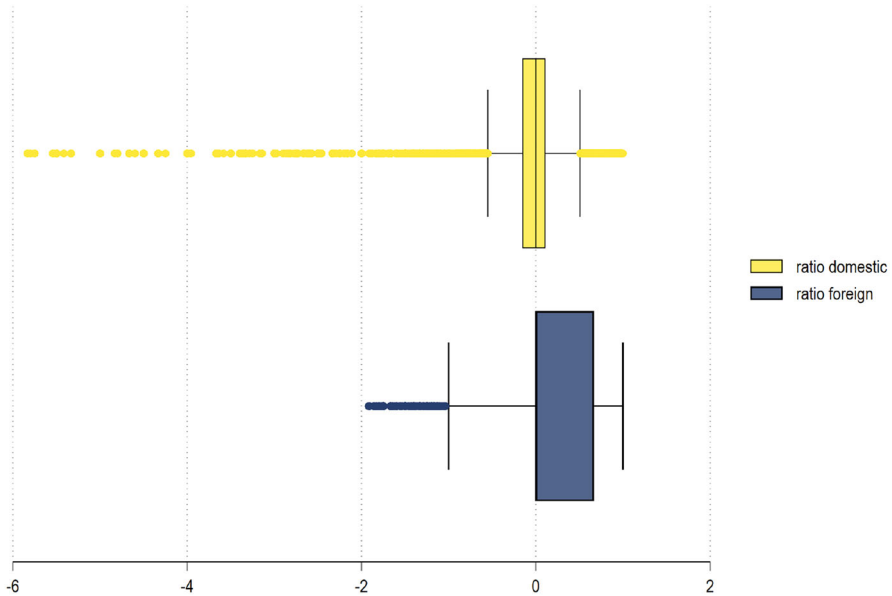


Fig. 2 Domestic and foreign net divestment ratios in 2019–2022. Note: The figure reports the parent-level distribution in a box plot format of the divestment ratio for domestic (above) and foreign (below) subsidiaries by MNEs in our sample, as from Eq. 1. A positive ratio indicates an excess of divestment operations, while a negative ratio indicates an excess of investment operations

period. In either case, positive values indicate that the number of divestments exceeds investments, while negative values suggest the opposite. Eventually, we calculate the indicators of Eqs. 1 and 2 separately for domestic and foreign choices.

Figure 2 illustrates the distribution of the divestment ratio with a box plot format, while Table 4 reports difference in means with t-tests for statistical significance. Notably, the distribution for domestic cases exhibits skewness on the left, indicating that, on average, the amount of domestic investments exceeds divestments (−0.17), although with many outliers before the first quartile of the ratio. Conversely, the distribution for foreign activities reveals a higher average of divestments (0.25). Please note how the central quartile of the distribution insists entirely on the positive side of the x-axis, indicating an excess of divestments. Latter evidence suggests a potential substitution pattern in investment choices at the aggregate level, such that MNEs are more inclined to invest at home than abroad, which we will investigate further in the following analyses.

More simply, we can investigate whether there has been a higher increase in domestic vs. foreign operations between 2019 and 2022, and we construct a measure of investment rate for any *i*-th parent for domestic and foreign operations, respectively, following:

$$investment\ rate_i = \frac{investments_i}{divestments_i + incumbents_i} \tag{3}$$

Table 4 Difference in means and standard deviations of main descriptive statistics

Indicator variable	N. obs	Sample mean	Std. dev
Divestment ratio - domestic subsidiaries	65,176	-0.17	0.739
Divestment ratio - foreign subsidiaries	215,783	0.25	0.486
<i>Difference in means</i>		-0.42***	
Divestment balance - domestic	45,827	0.002	0.88
Divestment balance - foreign	115,646	0.589	0.71
<i>Difference in means</i>		-0.59***	
Investment rate - domestic subsidiaries	65,174	0.30	0.675
Investment rate - foreign subsidiaries	217,170	0.08	0.291
<i>Difference in means</i>		0.208***	
% domestic affiliates 2019	55,280	54.71	24.183
% domestic affiliates 2022	107,611	60.81	27.330
<i>Difference in means</i>		-6.1***	
Weighted distance from the parent 2019	441,866	4958	3820
Weighted distance from the parent 2022	365,603	5165	3735
<i>Difference in means</i>		-206.8***	
Weighted distance foreign investments	186,114	5797.93	3738.32
Weighted distance foreign divestments	288,107	5067.15	3737.23
<i>Difference in means</i>		730.78***	
Number countries 2019	219,364	2.11	4.133
Number countries 2022	165,642	2.32	4.190
<i>Difference in means</i>		-0.208***	

Note: The figure reports the differences in sample means, standard deviations, and t-tests with unequal variances for descriptive statistics about MNEs' investment changing strategies. *** stands for $p < 0.001$

where the denominator indicates the stock of affiliates at the beginning of analysis period, at the end of 2019. Sample averages of investment rates by parents are reported in Fig. 3 with a 95% confidence interval that accounts for standard deviations. The graphs reveal that the domestic investment rates have been, on average, significantly higher than the foreign ones. Out of four new investment operations, only one has been abroad, and three have been in the country of origin of the MNE. Once again, descriptive statistics support the idea that MNEs strongly prefer domestic investments in our analysis period.

In Table 4, we report sample means of our descriptive statistics with t-tests for the significance of the difference in means. We observe that each indicator we have been using so far always points to a higher revealed preference for domestic activities. MNEs are less likely to divest from domestic subsidiaries. They are also more likely to invest in domestic subsidiaries.

Eventually, we provide three indicators that catch the changing geographical strategy by MNEs. We want to check whether they engage in nearshoring and country diversification. We define nearshoring as a transfer of production to countries close to the parent's origin. If MNEs engaged in nearshoring in 2019–2022, we would expect to observe a lower average distance between the parent company and its subsidiaries in

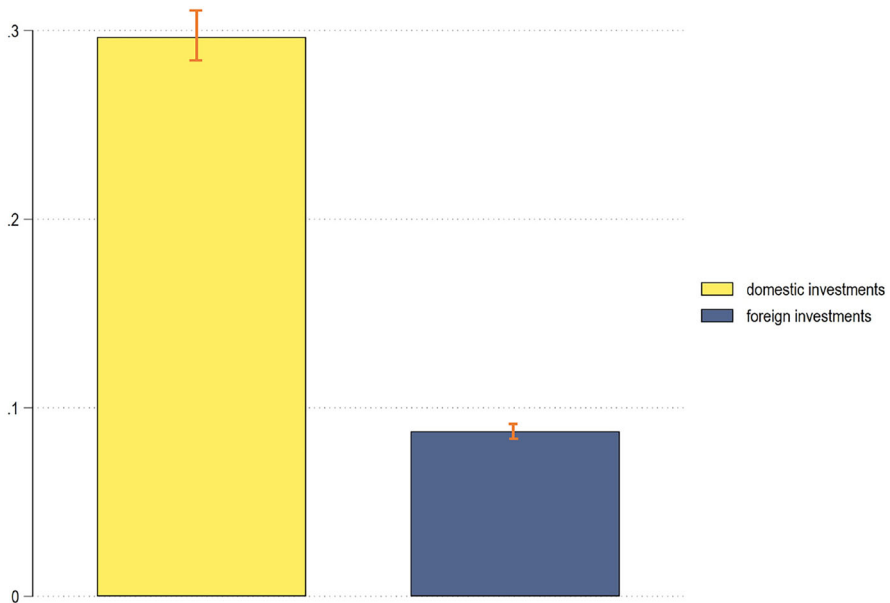


Fig. 3 Domestic vs foreign investment rates. Note: The figure reports the parent-level sample averages for domestic (on the left) and foreign (on the right) investment rates from 2019–2022, as from Eq. 3

2022 compared to 2019. Therefore, we calculate the average distance between the parents’ and affiliates’ countries weighted by the number of affiliates in each country. Means and their difference are indicated in Table 4. Interestingly, we find that the average weighted distance actually increased in 2022, indicating that the necessity to diversify geographically prevailed on cost efficiency. MNEs prefer to keep more complex geographical locations to differentiate their portfolio of economic activities.

Notably, we also report in Table 4 an indicator that considers the weighted distances of foreign investment and divestment operations separately, and we find that, on average, new subsidiaries abroad are more distant from the parent company than recently divested foreign subsidiaries.

Finally, we measure the geographic diversification of investments by MNEs by adopting a basic indicator that counts the number of countries in which a parent company controls subsidiaries at the beginning and at the end of our analysis period. Notably, at the bottom of Table 4, we report that MNEs are, on average, exposed in more countries in 2022 if compared to 2019.

3 Investment Decisions in Periods of Uncertainty

Firms’ investment decisions are influenced by a range of factors, including country-level characteristics like institutional quality, business environment, human capital, and geographic and cultural proximity. Additionally, firm-level attributes can impact the attractiveness of investment opportunities. Our empirical strategy involves two levels of analysis to account for both country-level and firm-level determinants of investment

and divestment choices. Firstly, in Sect. 3.1, we estimate a gravity model for FDIs to investigate changing patterns of investment by MNEs in the aftermath of the COVID-19 shock at country level, with a specific focus on domestic versus foreign firms. Our preferred strategy is based on the structural model proposed by Head and Ries (2008), which we augment with a measure of COVID-19 risk exposure, assuming that the latter represents additional friction for the decision to invest. Second, in Sect. 3.2, we adopt the perspective of the parent company for the decision to divest. We aim to gauge evidence on whether there is, indeed, a higher preference for domestic activities, possibly pointing to a broader reshoring process at the firm level.

3.1 Country-Level Investment and Divestment Patterns

Firm location choices between 2019 and 2022 were significantly influenced by the shocks that afflicted the global economy. The unforeseen emergence and the spread of the COVID-19 pandemic had no precedent in modern history. As governments implemented lockdowns to restrict population movements, supply chains across various industries experienced disruptions due to workforce shortages for input production and halted transportation routes within and between countries. This chain of events increased global uncertainty and made firms aware of new problems in managing established production networks that extend across national borders.

Supply chains were revealed to be highly reliant on a few countries responsible for producing essential intermediate inputs for the fabrication of final products. The most conspicuous example is the stringent lockdown imposed in China at the outset of the pandemic, which immediately halted the production of a wide array of goods and caused a severe shortage in countries worldwide. Over recent decades, firms have shifted product manufacturing to countries with lower labour costs to pursue cost-saving strategies. Many Western firms have relocated significant portions of their assembly and manufacturing processes to Eastern European and Asian countries. The risk is that production processes can depend on a limited number of node countries where suppliers are geographically concentrated, escalating the risk of shock propagation through production networks if a supply shock occurs. This is precisely what occurred during the COVID-19 pandemic. As the recovery phase continues, firms have recognized the importance of establishing more resilient supply chains capable of withstanding shocks. This realization may have triggered a phenomenon of relocating production stages to the firms' countries of origin or geographically proximate countries, resulting in the emergence of *reshoring* or *nearshoring*. Reshoring is defined as the process of ceasing a foreign investment and substituting it with the same investment in the home country. Nearshoring encompasses geographical proximity between parent companies and subsidiaries. Recently, a new category of *friendshoring* has been proposed to encompass geopolitical proximity between countries that are allies or participate in the same trade bloc.

In this Section, we aim to examine how investment strategies are shaping at the aggregate level. For our scope, we draw upon the structural model proposed by Head and Ries (2008) and estimate an augmented gravity model for investment and divestment operations between 2019 and 2022. The baseline specification is as follows:

$$\begin{aligned}
 Y_{od} = \exp[\beta_1 Domestic_{od} + \beta_2 \log(COVID_{od}) + \\
 + \beta_3 \log(COVID_{od}) \times Domestic_{od} + \beta_4 X_{od} + \beta_5 Z_o + \beta_6 W_d] \times \epsilon_{od}
 \end{aligned}
 \tag{4}$$

where Y_{od} is the number of investments (divestments) from country o to country d , X_{od} is the vector containing the following bilateral control variables: geographical distance, common language, colonial relationship, common legal origins, WTO affiliation, EU affiliation, and regional trade agreement (RTA) affiliations. Z_o and W_d include GDP levels and GDP per capita for origin and destination countries, respectively. The binary variable $Domestic_{od}$ takes value one if the investments are domestic, i.e., when the parent company invests in affiliates in the same country of origin, and zero otherwise. Appendix Table 9 provides a brief description of the main variables we use.

Considering that other significant shocks may have impacted the economy during the period under analysis - such as the conflict in Ukraine - it is crucial to isolate the COVID-19 shock to determine whether the pandemic drives a reorganization of investment strategies. To achieve this, we incorporate a country-level COVID-19 risk measure ($COVID$) sourced from Hassan et al. (2023). The authors develop a metric based on a text-classification method, which identifies firms' exposure to the COVID-19 outbreak. This is achieved by counting the times the virus is mentioned during the quarterly earnings conference calls that publicly listed firms conduct with financial analysts. In Appendix Figs. 9 and 10, we display the measure for the 76 available countries in 2020 and 2022, respectively. Although temporal heterogeneity is detected, our analysis capitalizes on country-level heterogeneity. We observe that North America, Western Europe, and Southeast Asia—particularly China—are where firms' COVID-19 exposure remains elevated in 2022. By accounting for such variation in our gravity model, we aim to understand the association between COVID-19 risk and investment and divestment decisions. We look at COVID-19 risk at the bilateral level by taking the average observed between the origin and destination countries. Finally, to investigate whether firms have shifted their investment strategies toward a domestic dimension in the wake of the pandemic outbreak, we examine the interaction between domestic investments (divestments) and COVID-19 risk.

Results are presented in Table 5. Columns (1) and (2) display results for all sectors, while columns (3) and (4) focus on the services industries, and columns (5) and (6) on intermediate goods. Our analysis reveals that, as expected, there is a high home bias for both investment and divestment operations. Such a bias is higher in the case of new investment operations when countries have been exposed more to the risk of COVID-19, as captured by the positive and significant interaction terms when we consider total investments (column 2) and, more specifically if we look at investment operations in services (column 4). We argue that a stronger home bias driven by the pandemic is a hint to possible reshoring decisions, which we will investigate further in the next Section.

Interestingly, the intensity of the pandemic shock does not seem to correlate *per se* with any aggregate pattern in divestment operations. Although we observe a considerable share of divestment operations, demonstrated in Sect. 2, it is not the intensity of the exposure to COVID that explains them.

Table 5 COVID-19 and the preference for domestic subsidiaries

Variables	Total		Services		Intermediates	
	(1) Divestments	(2) Investments	(3) Divestments	(4) Investments	(5) Divestments	(6) Investments
Domestic	3.6191*** (0.92)	4.3316*** (0.391)	3.2370** (1.271)	4.0426*** (0.521)	3.6894*** (1.109)	3.1662*** (0.528)
log of (COVID)	-0.1436 (0.109)	-0.1939** (0.087)	-0.1059 (0.139)	-0.1274 (0.094)	-0.1431 (0.14)	-0.1437 (0.148)
log of (COVID) x Domestic	0.3988 (0.205)	0.3604*** (0.129)	0.3209 (0.264)	0.2491** (0.111)	0.5071 (0.294)	0.2196 (0.225)
Gravity controls	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,711	3,711	3,711	3,711	3,711	3,711

Note: We estimate a Poisson Pseudo Maximum Likelihood (PPML) model with controls for standard gravity variables and a COVID-19 risk measure for the destination countries in 2022, which we source from Hassan et al. (2023). Standard errors in parentheses are clustered at the origin and destination level. Significance levels are: *** p<0.01; ** p<0.05; * p<0.1

3.2 Firm-Level Choices

In this Section, we delve deeper into the parent-level decision to divest. Divestment decisions are not solely influenced by country-specific factors, but they also depend on firm-level characteristics. A parent company might opt to divest from an affiliate if the latter is an underperforming business, even if it is situated in a country with an attractive business environment and high-quality institutions. Conversely, a parent firm may choose to invest in a company with specialized know-how, even if it is located in a developing country with weak institutions. To this aim, we exploit the data granularity to estimate each parent firm's divestment probability conditional on other characteristics. Our baseline specification is a Linear Probability Model (LPM) that we can write as follows:

$$P(\text{divestment}_{i(o)j(d)}) = \beta_0 + \beta_1 \text{domestic}_{ij} + \beta_2 \text{intermediate}_{ij} + \beta_3 \log(\text{COVID}_{od}) + \beta_4 X_{od} + \beta_5 \text{size}_j + \alpha_o + \gamma_d + \epsilon_{i(o)j(d)} \quad (5)$$

where the dependent variable is binary and equal to one if the i -th parent in the o -th origin country divested the j -th subsidiary in the d -th destination country, and it is equal to zero if the subsidiary was not divested. X_{od} collects standard gravity variables. We control that the parent and the affiliate are in the same country with the binary variable *domestic* equal to one and zero otherwise. We are also interested in spotting affiliates that produce intermediate inputs with the variable *intermediate*, as we assume that, in this case, they participate in global supply chains.⁸ We control for *COVID* exposure at the bilateral level and the affiliate's size. Finally, we include fixed effects for the origin and destination countries.

Table 6 presents results. Column (1) shows our baseline specification. We find that if a parent and its affiliate are in the same country, the probability of divesting significantly decreases, similarly in the case of affiliates producing an intermediate input. We do not find significant changes in the probability of divesting in connection with the intensity of COVID-19 risk. In Column (2), we investigate whether COVID Risk has differential effects depending on whether the affiliate is domestic or foreign. Consistently with the aggregated analysis of Sect. 3.1, we find that COVID Risk has no significant impact on the probability of domestic divestments. Nonetheless, when looking at the predictive margins of the impact of COVID-19 on the probability of domestic divestments, we find that at higher levels of COVID-19 risk, the probability of making a domestic divestment decreases significantly compared to foreign divestments, as shown in Fig. 4.⁹ The result suggests that when facing higher uncertainty induced by higher COVID-19 risk, MNEs tend to have a higher home bias related to divestment choices. In Column (3), we investigate whether there is a differential effect for affiliates producing intermediate inputs located in home countries or abroad. We find that while the probability of divesting decreases in foreign countries, it does not change significantly when the

⁸ We classify intermediate goods according to Main Industrial Grouping (MIG) classification by Eurostat.

⁹ Note that for highest values of COVID Risk the difference between foreign and domestic is not significant anymore. However, those values correspond to the maximum values of the distribution of COVID risk, and only a few countries record such extreme values.

Table 6 Firm-level divestment choices

Variables	(1) LPM Div. choice	(2) LPM Div. choice	(3) LPM Div. choice	(4) LPM Div. choice
Domestic	-0.028** (0.012)	-0.056 (0.034)	-0.029** (0.012)	-0.028** (0.012)
Intermediate	-0.043*** (0.009)	-0.043*** (0.009)	-0.047*** (0.007)	0.008 (0.023)
Log (<i>COVID</i>)	-0.009 (0.010)	-0.013 (0.010)	-0.009 (0.010)	-0.009 (0.010)
Domestic*log (<i>COVID</i>)		-0.008 (0.009)		
Intermediate*domestic			0.009 (0.014)	
Intermediate*log (distance)				-0.007** (0.003)
Observations	1,528,978	1,528,978	1,528,978	1,528,978
R-squared	0.028	0.028	0.028	0.028
Gravity controls	Yes	Yes	Yes	Yes
Size category affiliate FE	Yes	Yes	Yes	Yes
Country-origin FE	Yes	Yes	Yes	Yes
Country-destination FE	Yes	Yes	Yes	Yes

We estimate a Linear Probability Model (LPM) with standard gravity variables and COVID-19 risk exposure, where the dependent variable indicates whether the parent company divested the subsidiary in 2019–2022. COVID risk exposure is measured by borrowing from Hassan et al. (2023). Standard errors in parentheses are clustered by parent company and reported in parenthesis; significance levels are *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

affiliate is domestic. This result might suggest that firms operating in a supply chain are relatively more resilient, and parent firms might find it difficult to substitute them with domestic ones.

In Column (4), we study whether there are differential effects of affiliates producing intermediate inputs depending on the distance. We find that there aren't signals of nearshoring. On the contrary, at higher distances, the probability of divesting from an affiliate producing intermediate inputs is significantly lower. This is clearly shown in Fig. 5, where we report predicted margins at increasing (logs of) distance in the case of foreign subsidiaries: the higher the distance, the less the predicted propensity to divest. It may be the case that parent firms with established investments in distant foreign countries are less prone to divest because decoupling from global supply chains may have relevant fixed costs. Considering that the pandemic shock was expected to be temporary, they may have implemented a more cautious strategy on more distant investment projects when they were plunged into complex production networks.¹⁰

¹⁰ Interestingly, before the pandemic, Clò et al. (2023) notice that there was a difference between state-owned and privately owned enterprises. The first tended to concentrate their investments towards less risky

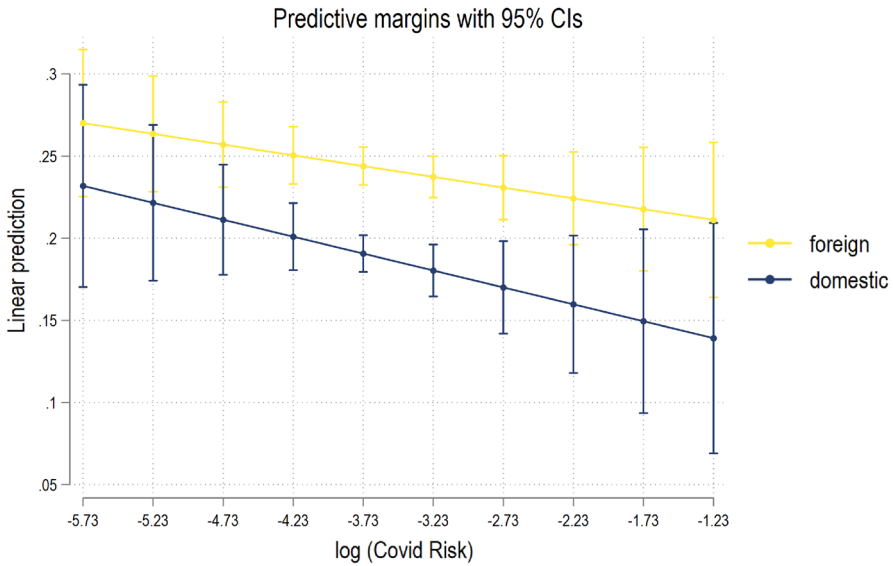


Fig. 4 Predicted probability of divestment at changing COVID Risk. Predicted probability of divestment at changing COVID Risk. The x-axis takes values of the entire distribution of COVID-19 risk, where -5.73 corresponds to the lowest average, and -1.23 corresponds to the highest average value

We can read this evidence in connection with the descriptive statistics we introduced in Sect. 2. At the end of the period, we find that MNEs present a higher geographic diversification of investment, i.e., a higher number of countries in which they located subsidiaries. Against this background, we can argue that the dominant strategy has been to add more destinations rather than simplify geographic exposure. Although distant, sourcing intermediate inputs from more countries may increase the resilience of the MNEs' supply chain.

Finally, please note that our data set of linkages between parents and affiliates also includes financial activities, which may follow a different logic than industrial productive networks. To avoid the financial industry confounding our results, we exclude affiliates operating in financial, insurance and real estate activities. We find consistent results reported in Appendix Table 11.

So far, the evidence suggests a higher revealed preference for domestic investments, especially when there is higher uncertainty related to COVID-19. To better understand whether that implies a proper reshoring process, we propose an augmentation of our baseline specification. We define a proxy variable called *reshoring* that catches whether the probability of divesting abroad by a parent company in a specific industry in 2019–2022 is associated with the acquisition of control of a new subsidiary at home in the same industry of the divestment. We report results in Table 7. Interestingly, we find that there is indeed a positive and significant association, and this is valid both in the case of subsidiaries involved in the production of intermediate inputs

countries that were geographically and culturally closer, with better institutional quality and a more central position in the trade network.

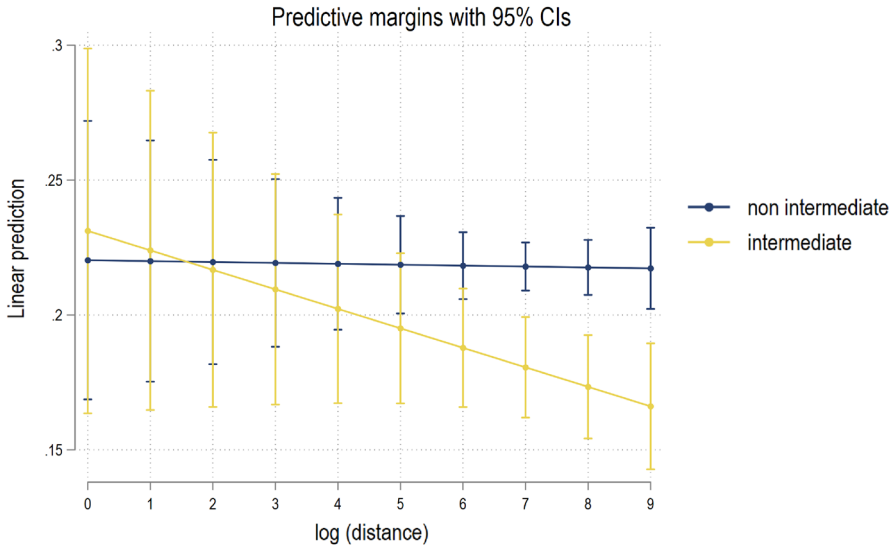


Fig. 5 Predicted probability of divestment on intermediates at changing distance. Predicted probability of divestment at changing distance over intermediates. The x-axis takes values of the entire distribution of (log) distance, where 0 corresponds to the minimum, and 9.89 corresponds to the highest average value

(Column 3) and all the other activities (Column 4). Overall, coefficients suggest that, in our analysis period, there is a non-negligible share of parent companies that dismiss operations abroad in a specific industry while they invest at home in the same industry.

4 Limitations of this Study

In this Section, we highlight three main limitations of our study, which future studies could hopefully overcome. The first is a lack of firms' complete financial accounts on a global scale for the entire period of analysis. While ownership data are made available almost in real-time, mainly due to national regulations, financial accounts are registered only yearly and officially made public in the first quarter of the following year. Then, it takes some time to update them in electronic sources. Therefore, in this study, we managed to control for firm size, industry affiliation and location based on the basic information provided by companies to national registries. Yet, more detailed financial accounts could be helpful to have a clearer picture of how firm performance interacts with a geographic reorganization of subsidiaries coordinated by MNEs.

A second important limitation concerns the definition of reshoring that we adopted above. We assume that reshoring is detected when headquarters divest abroad (at least) a subsidiary that was active in a specific industry and invests in (at least) a new subsidiary in the origin country in the same industry. We are aware that there could be cases in which the activities that were performed by the divested affiliate abroad may still be different from the ones performed by the new affiliate in the origin country, regardless of the industrial affiliation. At the end of the day, the real

Table 7 Firm-level divestment choices and reshoring

	(1)	(2)	(3)	(4)
Variables reshoring	LPM All foreign 0.028*** (0.010)	LPM All foreign 0.031*** (0.011)	LPM Foreign interm 0.045** (0.021)	LPM Foreign no interm 0.028** (0.012)
Observations	849,599	696,101	53,123	642,943
R-squared	0.036	0.040	0.055	0.041
Gravity controls	No	Yes	Yes	Yes
Size category affiliate FE	Yes	Yes	Yes	Yes
Country-origin FE	Yes	Yes	Yes	Yes
Country-destination FE	Yes	Yes	Yes	Yes

Note. We report estimates of a Linear Probability Model where the variable of interest (reshoring) is a dummy indicating whether the parent company made at least one domestic investment in the same 2-digit sector in which it made a foreign divestment. Columns (3) and (4) report results related to foreign subsidiaries in intermediate industries and the remaining sectors, respectively. Standard errors in parentheses are clustered by parent company and reported in parentheses; significance levels are p<0.01, ** p<0.05, * p<0.1

reason for a divestment or an investment can only be revealed by the company's management. And yet, we may assume that companies do not always want to disclose their investment strategies fully. Against this background, we argue that our proxy may overestimate the actual phenomenon. Nonetheless, we believed it was important to highlight that such an association between investment and divestment decisions by the parent companies was detected in our analysis period when a higher preference for domestic investment was detected without any doubt. Future studies could possibly go deeper into the investment motivations to understand how significant the bias is.

A third relevant limitation we want to discuss is the descriptive nature of this study. As far as we know, ours is the first study that reports stylized facts about a reorganization by MNEs with global coverage. However, it is beyond the scope of this paper to investigate the economic channels that drive such a reorganization. We leave it to future studies, for example, to understand whether the pandemic or the changing geopolitical scenarios prevailed in the reshaping of investment strategies and under which conditions such changes are temporary or permanent.

5 Conclusion

Recent discussions among scholars and policymakers have raised important questions about the future of globalization. The COVID-19 pandemic, trade wars, and geopolitical conflicts triggered a series of shocks that have exposed the fragility of supply chains and raised concerns about the global economy's resilience. As a result, many firms are reassessing their investment strategies and exploring ways to build more flexible and reliable supply chains. This study addresses this critical topic by analyzing MNEs' investment and divestment decisions from 2019–2022. First, we provide a country-level picture of the role of COVID-19 in reshaping investment strategies. Our results suggest that firms have started investing relatively more in their country of origin, the higher the exposure to COVID-19 risk, possibly because they perceive a higher degree of economic uncertainty. Second, we investigate MNEs' divestment choices leveraging the richness and granularity of our data, with a specification at the parent-affiliate level, to estimate the probability of divesting conditional on firm-level characteristics. Our intuition is that reshoring can be defined as a statistical association between the decision of a parent to divest abroad in an industry and invest at home in the same industry. We find that such a statistical association is detected in our data, and we also discuss the limits of our approach, i.e., when the investment motivation is not made apparent by headquarters.

Most interestingly, we do not find signs of nearshoring. On the contrary, we find that, on average, the distance between the parent and its affiliates is higher in 2022 than in 2019, possibly because MNEs differentiate their portfolio of locations to avoid the level of disruption experienced after the outburst of the pandemic.

To conclude, our study confirms that recent events initiated a crucial reorganization of investment strategies by MNEs, whose preference for investments at home has increased dramatically. Future analyses could tell us whether this phenomenon can be

reversed or whether it will have a long-lasting impact on the degree of global economic integration.

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Data availability Data on changing ownership by multinational enterprises are sourced from Orbis by Bureau Van Dijk under a private license. Firm-level exposure to COVID-19 are available on www.firmlevelrisk.com.

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Appendix A: Tables and Graphs

See Tables 8, 9, 10, 11, and Figs. 6, 7, 8, 9, 10, 11.

Table 8 Number of investment and divestment operations, 2019–2022

Industry	Divestments	Investments
Primary	4025	53
Mining and Quarrying	5372	103
Manufacturing	61,980	31,550
Utilities	16,994	5618
Construction	19,822	5739
Information and Communication	29,938	11,290
Financial and Insurance Activities	71,181	24,489
Other Services	224,224	76,234
N.A	251,570	125,985

Note. The table shows the distribution of divestments and investments across main sectoral aggregates

Table 9 Variables description

Variables	Description	Source
Distance	Simple distance between most populated cities, measured in km	CEPII -Geo Dist
GDP	GDP of origin and destination country	CEPII -Geo Dist
GDP per capita	GDP per capita of origin and destination country	CEPII -Geo Dist
Common language	1 for common official of primary language, 0 otherwise	CEPII -Geo Dist
Colony	1 for pairs ever in colonial relationship, 0 otherwise	CEPII -Geo Dist
Common legal origins	1 if countries share common legal origins after 1991, 0 otherwise	CEPII -Geo Dist
Colonial siblings	1 if countries share common colonizer, 0 otherwise	CEPII -Geo Dist
WTO	1 if country currently is a WTO member, 0 otherwise	CEPII -Geo Dist
EU	1 if country currently is a EU member, 0 otherwise	CEPII -Geo Dist
FTA (WTO)	1 if the country pair is engaged in a RTA, 0 otherwise	WTO supplemented by Thierry Mayer
COVID-19 Risk	Average of country-level COVID-19 Risk	Hassan et al. (2023)

Note. Table describes the variables used in the empirical analysis. We source gravity variables from the most updated version of BACI-CEPII data set (2022)

Table 10 Investment, divestment and affiliates' size

Variables	inv. LPM	div. LPM
Medium company	-0.016*** (0.002)	0.021*** (0.003)
Large company	-0.051*** (0.003)	0.028*** (0.003)
Very large company	-0.076*** (0.003)	0.005 (0.004)
Observations	1,136,606	1,294,172
R-squared	0.276	0.043
Country-origin FE	YES	YES
Country-destination FE	YES	YES
Sector affiliate	YES	YES

The table shows the correlations between an investment (left column) and divestment (right column) and main subsidiary size categories. The baseline is a small-sized representative firm

Table 11 Firm-level divestment choices, excluding the financial industry

Variables	(1) LPM div. choice	(2) LPM div. choice	(3) LPM div. choice	(4) LPM div. choice
Domestic	-0.025** (0.012)	-0.051 (0.034)	-0.026** (0.012)	-0.026** (0.012)
Intermediate	-0.039*** (0.009)	-0.039*** (0.009)	-0.043*** (0.008)	0.006 (0.023)
log (COVID)	-0.011 (0.011)	-0.015 (0.011)	-0.011 (0.011)	-0.011 (0.011)
Domestic*log (COVID)		-0.007 (0.009)		
Intermediate*domestic			0.009 (0.015)	
Intermediate*log(distance)				-0.006** (0.003)
Observations	1,281,489	1,281,489	1,281,489	1,281,489
R-squared	0.028	0.028	0.028	0.028
Gravity controls	Yes	Yes	Yes	Yes
Size category affiliate FE	Yes	Yes	Yes	Yes
Country-origin FE	Yes	Yes	Yes	Yes
Country-destination FE	Yes	Yes	Yes	Yes

We estimate a Linear Probability Model (LPM) comparable with the one presented in Table 6 of Section 3.2. We exclude affiliates operating in financial, insurance and real estate activities. Standard errors in parentheses are clustered at the origin and destination level and reported in parenthesis; significance levels are *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

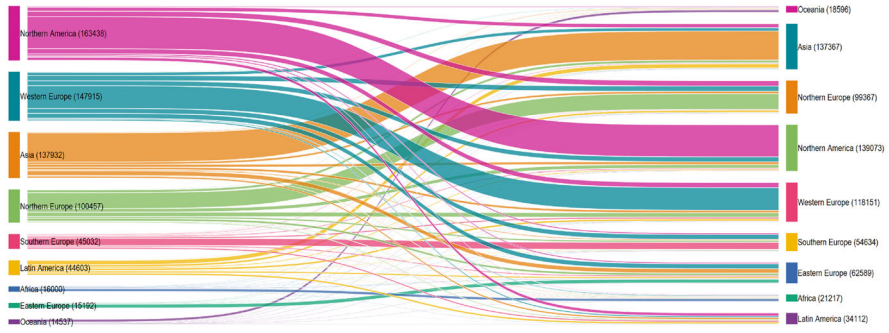


Fig. 6 Divestments flows 2019–2022. Note: The figure displays the number of divestment operations from the destination country/areas (on the right) by MNEs’ countries/areas of origin (on the left) between 2019 and 2022

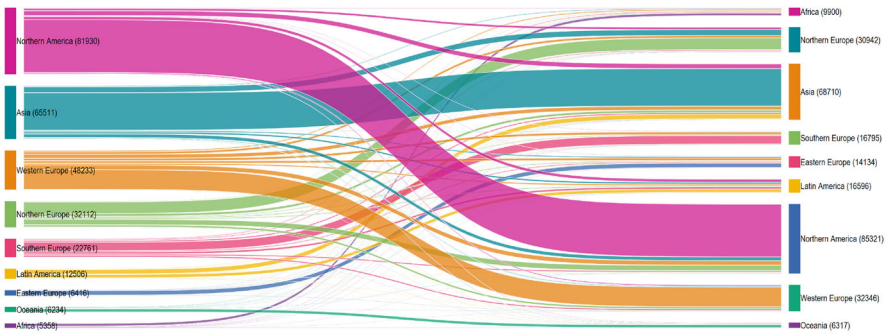
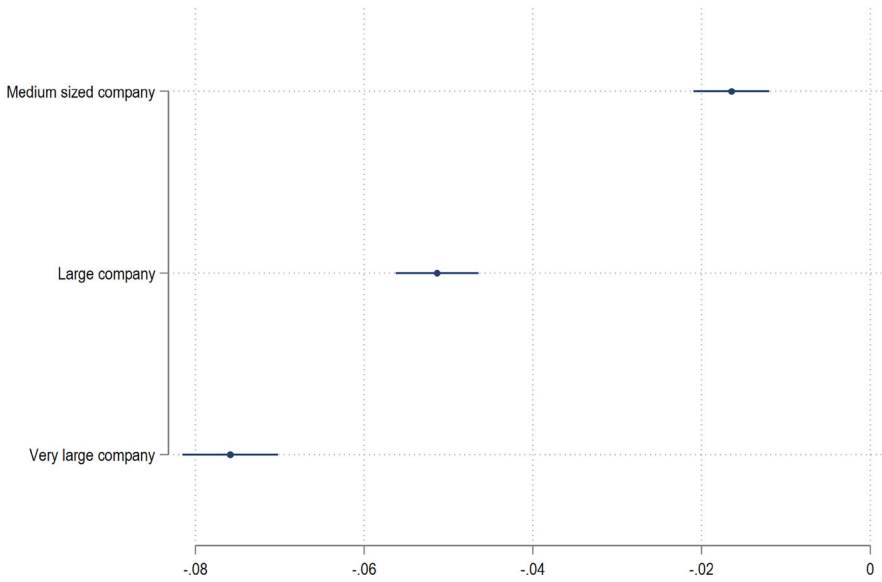
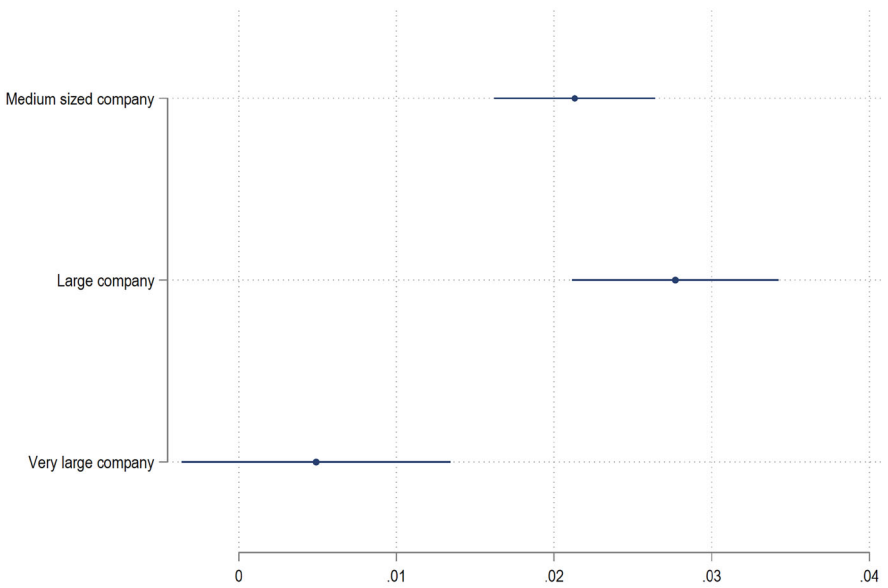


Fig. 7 Investments flows 2019–2022. Note: The figure displays the number of investment operations in the destination country/areas (on the right) by MNEs’ countries/areas of origin (on the left) between 2019 and 2022



(a) Probability of investment



(b) Probability of divestment

Fig. 8 Size and probability of investment and divestment. The figure shows coefficients and confidence intervals, as from Table 10, for the predicted probability of investment/divestment conditional on subsidiary size

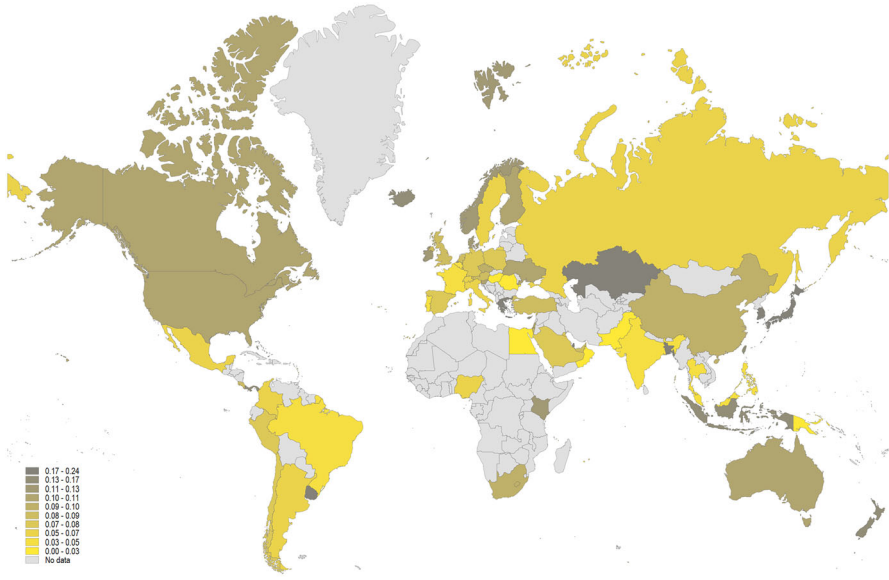


Fig. 9 Heterogeneity of COVID-19 exposure across countries in 2020

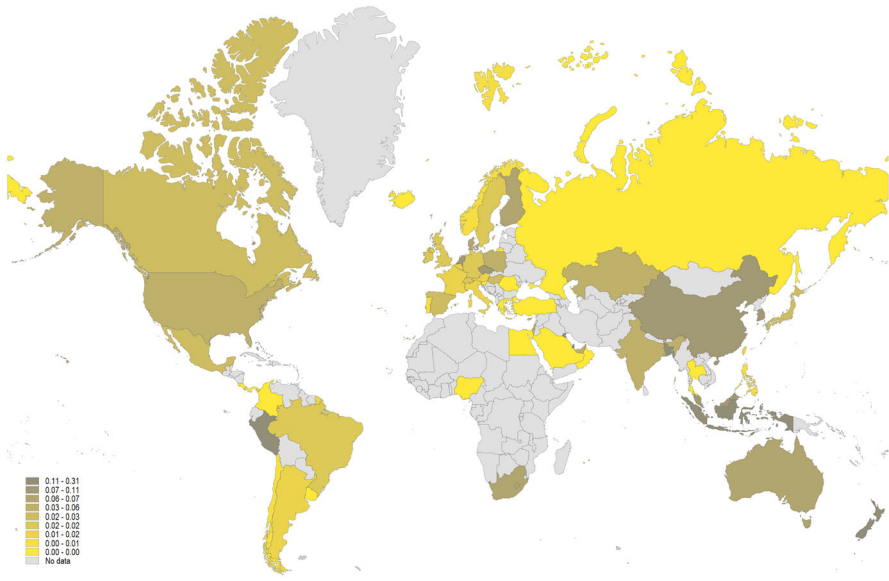


Fig. 10 Heterogeneity of COVID-19 exposure across countries in 2022. Note. Figures A4 and A5 show the level of COVID-19 Risk measure across countries for 2020 and 2022. Comparison between the map shows that there is a higher degree of heterogeneity across countries than during time. For our analysis, we exploit country variation and use the level of 2022

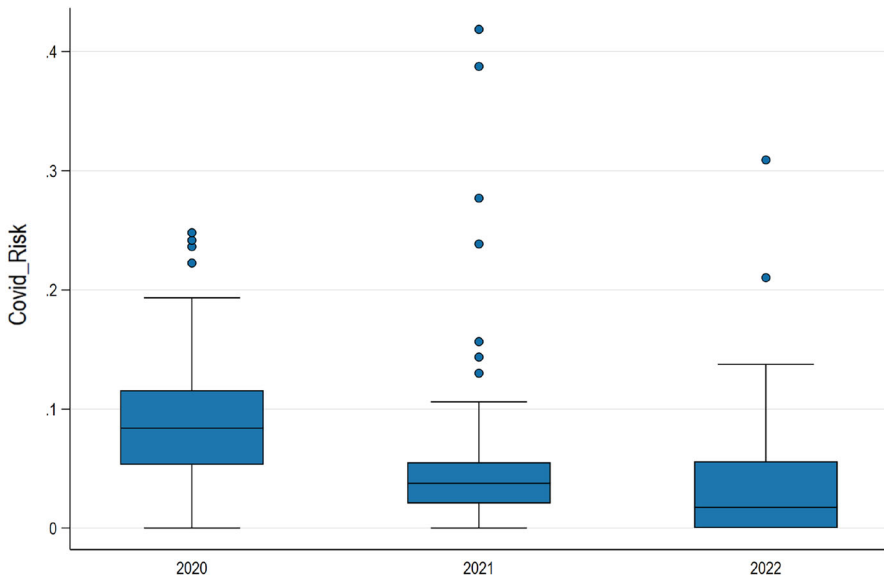


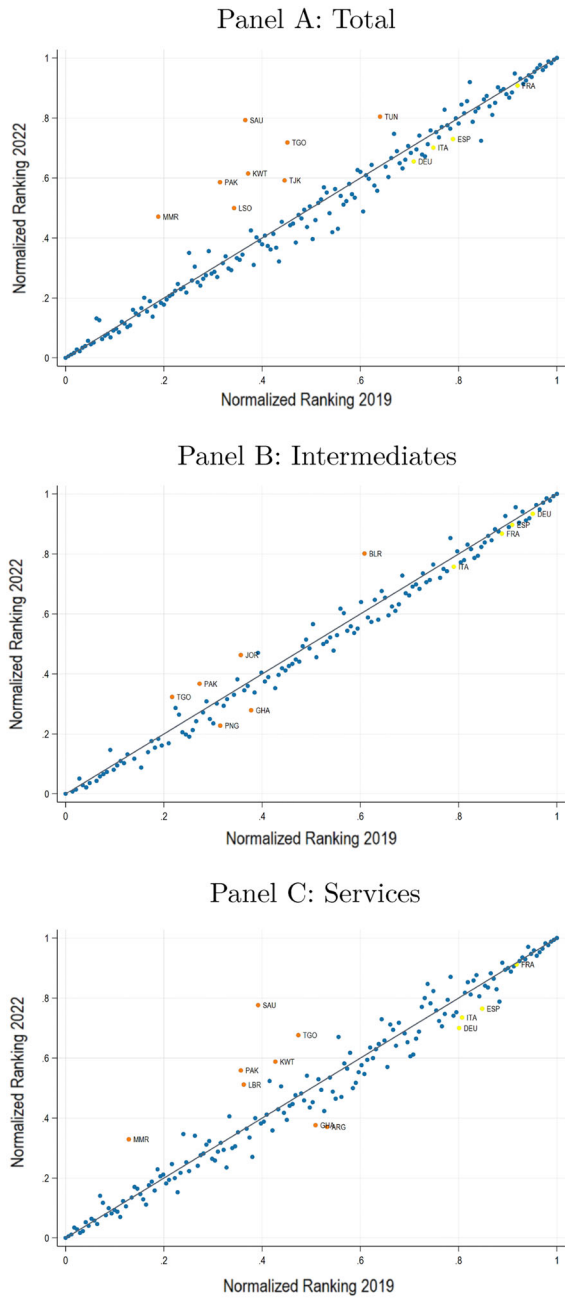
Fig. 11 Average COVID-19 risk across years. Note. The figure shows the distribution of COVID-19 risk measure for the last three years available. We note over time a progressive reduction in the perceived risk by looking at median value, despite there are still countries with high values, as shown by the right skewed distribution

Appendix B: Changing Countries' Attractiveness

To evaluate the attractiveness of countries as destinations for foreign direct investment (FDI), we employ a gravity model following (Head and Ries 2008) and, thus, we record fixed effects after controlling for bilateral and country-structural characteristics. Gravity models for FDIs are a natural extension of the widely used gravity models for trade, as they recognize that bilateral investment stocks are positively associated with the product of origin and destination size variables and negatively associated with the measure of bilateral distance, just like in trade models. Our preferred specification includes standard frictions to bilateral exchanges (distance, common language, common legal origins, colonial relationship, affiliation to the European Union, WTO membership, and Regional Trade Agreement). Additionally, we augment the standard structural model with two indexes from the World Bank's Doing Business Indicators, which we bilateralize by taking the average between the two countries in an investment relationship. The intuition is that they should catch additional investment-specific frictions among countries. Origin and destination country fixed effects are added for country-specific idiosyncrasies. In particular, destination fixed effects are of interest to us because they allow us to capture the residual unobservable factors that determine the attractiveness of a country not explained by structural characteristics.

We separately estimate the model for cross-sectional data on investment operations in 2019 and 2022, yielding distinct destination fixed effects for each year. By ordering these fixed effects, we rank countries based on their attractiveness. Comparing these

Fig. 12 Changing attractiveness of FDI destinations. Note. The figure plots changing countries' attractiveness, estimated as the residual after a gravity model, from 2019 to 2022. Dots above the bisector indicates increased attractiveness, while dots below indicate a decrease. Yellow dots represent France, Germany, Italy, and Spain, whereas orange dots denote countries with fixed effect differences exceeding two standard deviations between 2019 and 2022



rankings, we observe whether shifts occurred before and after the shocks between 2019 and 2022. Usefully, we calculate the fixed effects at an aggregate level; then we generate separate rankings for investment operations in services industries and intermediate inputs. We classify intermediate goods according to Eurostat's Main Industrial Grouping (MIG) classification. Figure 12 draws a visual comparative analysis of destination countries' fixed effects for 2019 and 2022. The graph displays changes in FDI attractiveness between 2019 (x-axis) and 2022 (y-axis) for the pooled sample in Panel A, the intermediate sector in Panel B, and the service sector in Panel C. The two rankings exhibit a ranking correlation of 0.97 according to Pearson's tests and 0.89 according to Kendall's test when measured on the total industries. A strong rank correlation persists when considering the intermediate and service sectors separately. Each dot indicates a destination country. Dots aligned with the bisector imply unchanged attractiveness between the two years; dots above the bisector indicate improved attractiveness in 2022 compared to 2019, while those below the bisector denote a lower investment appeal at the end of the period. We highlight selected countries: yellow dots represent France, Germany, Italy, and Spain, whereas orange dots denote countries with fixed effect differences exceeding two standard deviations between 2019 and 2022.

We observe that developed countries slightly decreased their level of attractiveness in the observed period while developing countries showed sharp increases. In particular, countries like Saudi Arabia and Pakistan significantly improved their attractiveness, especially in services industries. This might signal a longer-term trend of growth in developing countries that goes well beyond the short period we consider. Looking at intermediate inputs, we can detect which are the countries where MNEs decide to locate part of their supply chains between 2019 and 2022. Interestingly enough, Belarus seems to have gained significant attractiveness in 2022 as a destination for investments in producing intermediate inputs. This could be partly the reflection of the ongoing war in Ukraine. A few investors can consider Belarus as an alternative location for both the Russian Federation and Ukraine, given its geographical proximity.

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