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Multinationals Here and There: Affiliates' Response to Global Crises

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Highlights

- Multinational enterprises (MNEs) outperformed domestic firms after the pandemic, especially through stronger domestic affiliate performance.
- The paper uses the COVID-19 pandemic as a natural experiment and applies a difference-in-differences approach with firm-level data across countries.
- MNEs exhibited a clear home bias, with significantly greater employment growth in domestic affiliates compared to foreign ones.
- Employment adjustment patterns within MNEs continued through 2022, indicating lasting changes in global location strategies.

Abstract

This paper investigates how multinational enterprises (MNEs) adapted their global operations in the post COVID-19 period. Using the pandemic as a natural experiment, we analyze how MNEs adjusted employment across their foreign and domestic affiliates in response to economic disruptions and shifting perceptions. Leveraging a cross-country, firm-level dataset, we employ a difference-in-differences approach among treated groups to assess the causal differential response of MNEs relative to domestic firms. MNEs outperformed domestic firms following the pandemic, driven primarily by the stronger performance of their domestic affiliates. We also find evidence of home bias in adjustments within MNEs: employment growth was significantly higher in domestic affiliates than in foreign ones. These patterns intensified through 2022, suggesting persistent shifts in MNE strategies.

Keywords

Multinational enterprises, COVID-19 crisis, Globalization, Reshoring, Establishment response, Affiliates' network, Foreign ownership.

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RESEARCH AND EXPERTISE
ON THE WORLD ECONOMY

Multinationals here and there: affiliates' response to global crises [1]

Constance Marette* and Camilo Umana-Dajud† and Vincent Vicard‡

1 Introduction

The COVID-19 pandemic exposed the vulnerabilities of global supply chains, particularly for essential goods, prompting a broad reassessment of the benefits of trade integration by both firms and governments. Subsequent geopolitical events, such as the war in Ukraine and Russia's weaponization of gas supplies, further underscored the multifaceted risks associated with trade openness. Shortages of strategic goods and critical inputs led to renewed scrutiny of global sourcing strategies and sparked calls for reshoring or nearshoring that question the future of globalization.[2]

Despite these concerns, macroeconomic data on trade and foreign direct investment (FDI) do not indicate a broad retreat from globalization. Rather, they suggest evolving trade patterns, possibly pointing toward a more fragmented global trade system (Gopinath et al., 2024). Multinational enterprises (MNEs), which play a central role in structuring global value chains and the international division of labor, are key agents in this reorganization. MNEs influence not only cross-border production networks but also shape the internationalization of countries and regions (Crescenzi and Iammarino, 2017), and mediate the transmission of international shocks to local labor markets (Cravino and Levchenko, 2016; Kleinert et al., 2015). Because MNEs operate a network of affiliates across multiple countries, they are

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[2] Surveys of global investors and multinationals' executives since the pandemic regularly indicate a willingness to relocate production at home or in neighboring countries. In the 2022 EY Europe attractiveness survey, 43% of respondent planned to reshore their production, and another 53% to nearshore (EY, 2022). The Allianz Trade Global Survey reports that 53% of respondents in 2024 were considering relocating part of their supply chain, a figure similar to 2020 (Allianz research, 2023, 2024).

uniquely positioned to respond to shocks by reallocating resources and adjusting production across locations. This paper examines the microeconomic adjustments of MNEs in the aftermath of the COVID-19 pandemic, focusing on changes in employment across their domestic and foreign affiliates.

The literature on multinational enterprises has extensively studied the determinants of FDI and the effects of MNEs on host countries (see e.g. Blonigen and Piger (2014) or Javorcik (2004)). However, there is comparatively limited research on how MNEs adjust the geographic distribution of employment in response to external shocks, and how this adjustment affects local labor markets. The literature has shown that MNEs are footloose and therefore more likely to close establishments than comparable domestic firms.[3] These responses may vary depending on whether the shock is local or global: foreign owned affiliates fared better on the intensive margin during the Great Financial Crisis in 2008 (Alfaro and Chen, 2012). The literature however focuses on foreign-owned affiliates, neglecting the role of domestic operations, while foreign activities account for less than one-third of total MNE operations (Cadestin et al., 2018). Examining the behavior of home affiliates provides important insight into how MNEs react to global shocks and transmit or absorb them in different labor markets.

This paper aims to fill this gap by using the COVID-19 pandemic as a natural experiment to analyze how MNEs adjust employment across locations in response to external shocks. We combine data on firm performance to ownership information to identify MNEs affiliates by nationality and domestic firms, i.e. standalone firms or firms belonging to non-multinational groups, using data from Orbis, a global database containing detailed financial and ownership information on companies worldwide. Our final dataset covers more than 650,000 firms in 29 European and Asian countries, including affiliates of 35,679 different MNEs worldwide.

We use the COVID-19 pandemic as an exogenous shock to identify its causal effect on the distribution of employment by multinational enterprises (MNEs) across different locations. While the pandemic impacted all firms, preventing us from identifying the causal average treatment effect, we can assess the differential response of MNEs to the shock relative to domestic firms. To achieve this, we demonstrate that, under the assumption of parallel trends between different treated groups, the causal effect of the shock on MNEs' distribution of employment across locations can be identified using a difference-in-differences framework. This is our primary methodological strategy in this paper, though we also employ additional strategies as robustness checks.

[3] See Section 2 for a more detailed review of this strand of the literature.

Our results show that MNEs adjusted their employment across locations in a heterogeneous way in response to the COVID-19 shock. MNE affiliates outperformed domestic firms following the pandemic, with domestic affiliates of MNEs driving this effect. We find similar patterns using total wages or sales as performance metrics. This effect is long-lasting and persists, and even magnifies, throughout 2022, suggesting structural adjustments.

We then focus on MNEs and compare directly affiliates' performances depending on their location. Within an MNE, foreign affiliates performed worse than domestic affiliates following the pandemic. We reject several explanations for this home bias. It is not driven by differences of sector of activity of foreign vs. domestic affiliates. Nor is it by social pressure or informational advantage at the local level: the home country premium is country specific and is not confined to affiliates located in the same region as the headquarters. We also uncover heterogeneity across MNEs: home bias is especially prevalent for MNEs with a smaller geographical footprint.

These findings have important implications for both policymakers and firms. For policymakers, the results underscore the uneven distribution of employment adjustments by MNEs across locations. MNEs appear to cushion the transmission of global shocks to home-country labor markets more than either their foreign affiliates or domestic firms. Regional internationalization strategies based on the attraction of foreign MNEs may therefore increase employment response to shocks. At the firm level, our finding provides microeconomic evidence of shifting strategies: MNEs appear to have engaged in a process of partial reshoring, increasing employment in their home countries relative to foreign affiliates.

The rest of the paper is organized as follows. Section 2 reviews the literature on MNE adjustment to shocks. Section 3 describes our cross-country firm-level dataset and MNE classification. Section 4 presents our difference-in-differences empirical strategy. Section 5 discusses the main results and Section 6 explores further the home bias within MNEs. Section 7 concludes.

2 Literature review: MNEs' adjustment to shocks

The gains from the presence of affiliates of foreign multinationals for the host economies have been largely documented (e.g. Guadalupe et al. (2012) or Javorcik (2004)). The literature also shows that multinationals exhibit more volatility at the extensive margin, in line with the idea that MNEs are more footloose than

similar domestic firms. Bernard and Jensen (2007) show that plants owned by U.S. multinationals are more likely to shutdown than domestic firms. However, foreign owned plants exhibit characteristics – they are larger, older, more productive and more skill and capital intensive – that are associated with a larger survival probability. Controlling for firm level characteristics, foreign multinationals were more likely to close plants than similar firms. Evidence from the UK and Ireland similarly confirms that foreign-owned subsidiaries are more likely to exit after controlling for firm characteristics (Fabbri et al., 2003; Görg and Strobl, 2003). Using Chilean data, Alvarez and Görg (2009) emphasize a higher likelihood of foreign-owned subsidiaries closure during downturns.

Another strand of the literature has focused on the employment dynamics within multinational firms during economic crises. McAleese and Counahan (1979) pioneered this field by examining whether MNEs act as stabilizing forces in labor markets. Their analysis found no significant difference workforce reduction rates between foreign-owned and domestic firms during recessions. Görg and Strobl (2003) find, on Irish data, that foreign-owned subsidiaries tend to recover lost jobs more quickly in post-crisis periods. Abraham et al. (2010) distinguish between headquarters and affiliates and finds stronger employment growth in headquarters and lower employment decline during restructuring. In case of restructuring, subsidiaries located farther away from the headquarters were more vulnerable to lay-offs, especially in the manufacturing sector.

More recently Alfaro and Chen (2012) look at the reaction of MNEs to the Great Financial crisis in 2008 and find that affiliates of foreign MNEs have fared better than similar non-foreign owned affiliates on average. While foreign owned affiliates resist better during crisis, they do not exhibit better performance during normal times. Their analysis further highlights that affiliates with stronger vertical integration or financial linkages with their parents fared better than other affiliates.

All these papers focuses on foreign multinationals and compare their likelihood of plant closure to all other non-foreign owned affiliates. The argument that MNE can trade off activities between affiliates and more easily substitute away from labor in one of their country of operation is however also valid in the case of their domestic affiliates. Two studies differentiate foreign MNEs from national MNEs and compare their plant closure probability to similar domestic firms. Both confirm the higher likelihood of exit of foreign MNEs in Belgium when controlling for firm characteristics, but do not find similar patterns for national MNEs (Van Beveren, 2007; Blanchard et al., 2016). Domestic affiliates of MNEs are not more likely to exit than similar domestic firms, suggesting that MNEs do not react similarly in

their different countries of operation.

Such differential response may be explained by socio-economic linkages specific to local or proximate ownership of affiliates. Focusing on multi-establishment within country, several papers have indeed shown a better resilience of locally owned firms or close establishment in case of firm restructuring. Kolko and Neumark (2010) found that locally-owned businesses, particularly headquarters of multi-establishment firms and locally-owned chains, partly insulate local labor markets from economic downturns. Landier et al. (2009) show that geographically dispersed multinationals tend to favor layoffs in distant subsidiaries, while retaining workers closer to their headquarters. They argue that the internalization of the costs of layoffs to local communities may partly explains this pattern. Giroud and Mueller (2019) similarly find that when an MNE's headquarters is impacted by a local economic shock, labor demand elasticity increases in distant subsidiaries, making them more prone to layoffs. Finally, Bassanini et al. (2017) provided further evidence in the French context, showing that subsidiaries located farther from headquarters face higher layoff rates, especially when social ties to the local region are strong. Such mechanisms have not been tested on domestic vs. foreign affiliates of MNEs.

We contribute to all these strands of the literature by investigating the reaction of MNEs to a global shock, COVID-19, and its aftermath including the Russian invasion of Ukraine, using cross-country firm-level data on domestic firms and MNEs. We carefully account for the difference between foreign-owned and domestically-owned affiliates of MNEs to assess the heterogeneous reaction of MNEs in different countries.

3 Data and descriptive statistics

This section presents the source of firm-level financial data and the matched ownership information that allows distinguishing between domestic firms and different types of MNE affiliates. We then present some relevant descriptive statistics for different categories of firms.

3.1 Data Sources

The main source of data comes from Orbis. The Orbis dataset, managed by Moody's, is a global database containing firm-level financial, operational, and ownership information on listed and unlisted firms collected from national sources. It offers standardized financial statements, company profiles, ownership structures, making it a valuable resource to study MNEs and their subsidiaries responses to shocks in a cross-country setting. The dataset has been widely used by other researchers to study various aspects of MNEs – including their ownership structures, financial performance, and internationalization or fiscal strategies – or macro outcomes (Huizinga and Laeven, 2008; Cravino and Levchenko, 2016; Kalemli-Özcan et al., 2024).

We retrieve information on employment, net sales, total assets and wages over 2015-2022 for firms registered in 29 countries. We focus on firms of more than 10 employees in 2019 and reporting data at least pre-2020 and in 2021. We additionally collected information on the sectoral classification of the firm (NACE codes at the 2-digit level), incorporation dates, and location (NUTS codes at the 3-digit level). See Appendix A for more detailed information on data selection and cleaning.

3.2 Ownership information

An important dimension of the data is the identification of affiliates and their parent firms. To determine the ownership structure of the firms, we relied on Orbis Global Ultimate Owner (GUO) classification. A Global Ultimate Owner (GUO) is defined as a company that has no identified corporate shareholders. The minimum percentage of control in the path from a subject company to its GUO must be 50.01%, with the highest quoted company considered to be the GUO. Information on GUOs and their location are available at the global level.[4]

Orbis assigns a unique ID code to each firm, beginning with the ISO Country Codes Alpha-2 (e.g., France is "FR"). However, some GUOs cannot be located due to their specific status. These unlocated GUOs include natural persons such as individuals or families (referred to as Family GUOs) and other unlocated firms.[5]

[4] Table A6 in the appendix reports the distribution of MNEs by country of origin. The top 3 countries of origin are Germany, the US and the UK.

[5] These firms are identified in Orbis with temporary codes starting with "WW," "YY," or "ZZ."

To address this issue, we reconstructed a pseudo-GUO by tracing the ownership structure through corresponding and direct shareholders. Corresponding shareholders are parent firms identified from the direct shareholder up to the highest parent firm. The ID codes are linked to levels within the ownership hierarchy, allowing us to identify the highest parent firm. By either identifying the highest parent firm among the corresponding shareholders or by tracing the chain of affiliates and direct shareholders until no further linkages can be found, we are able to locate the highest localized shareholders within the groups. Table A4 in the appendix provides a summary of the different types of highest parent firms collected.

The ownership structure and GUO location allows us to distinguish stand-alone firms from affiliate of groups and the type (national or multinational) and nationality of the groups. In the following, we will distinguish 5 categories of firms depending on their ownership and location:

- MNE affiliates = Affiliates of MNEs (held by a GUO with affiliates in at least two countries);
- Non-MNE firms = All domestic firms that are not affiliates of MNEs;
- Non-MNE affiliates = Affiliates of multi-affiliate domestic groups that are not affiliates of MNEs (GUO with no foreign affiliate);
- Domestic MNEs = Affiliates of MNEs with headquarters (GUO) in the same country as the affiliate;
- Foreign MNEs = Affiliates of MNEs with headquarters (GUO) in a different country than the affiliate.

3.3 Descriptive Statistics

This section presents the descriptive statistics of the final sample used in the analysis. A key characteristic of the data is the significant average number of affiliates per country. Foreign MNEs — defined as multinational enterprises with headquarters located in a different country than their affiliates — have an average of over 2,000 affiliates per country (Table 1). In contrast, domestic MNEs, which have headquarters in the same country as their affiliates, exhibit a lower but still substantial average of around 1,500 affiliates per country. Finally, domestic firms, defined as firms having multiple affiliates within the same country but without any foreign affiliates, have the highest average number of affiliates, with approximately 3,500 per country.

The data also highlights a substantial average number of MNEs with affiliates in a given country. As shown in Table A5, each country hosts, on average, 260 MNEs. This contrasts with the average number of Global Ultimate Owners (GUOs), which stands at around 900. The discrepancy show that most GUOs own multi-affiliate domestic groups, while only a smaller fraction own MNEs. This pattern points to a concentration of global ownership within a relatively limited number of multinational enterprises, with the majority of GUOs focusing primarily on domestic operations.

Table A12 show the distribution of NACE codes of affiliates at the chapter level.[6] Manufacturing is the dominant sector in our data, particularly for MNEs' affiliates. Wholesale and retail trade, Information and communication and Professional, scientific and technical activities also feature a significant share of both domestic firms and MNEs' affiliates.

Our data underscores also the global reach of MNEs and the varying degrees of domestic and foreign affiliate integration across different countries. Table 2 provides a detailed breakdown of the number of affiliates by country, categorized into three groups: foreign affiliates, domestic affiliates of MNEs, and domestic affiliates of non-MNEs. Notably, countries like the UK, Italy, and Spain exhibit a high number of both foreign and domestic MNE affiliates, indicating their significant role as hubs for multinational operations. The table also shows that in many Central and Eastern European countries, such as Poland and Romania, a substantial percentage of affiliates belong to MNEs, highlighting the strong presence and influence of multinational enterprises within these economies.

Table 1 – Descriptive statistics - Distribution of subsidiaries across countries

	mean	sd	min	max	sum
Subsidiaries of foreign MNEs	3,535	3,866	71	15,421	106,055
Share of foreign MNEs' subsidiaries	3	4	0	15	100
Subsidiaries of domestic companies	6,196	8,430	311	31,513	185,889
Share domestic companies' subsidiaries	3	5	0	17	100
Subsidiaries of domestic MNEs	2,295	2,749	60	9,294	68,835
Share of domestic MNEs' subsidiaries	3	4	0	14	100

Note: From final dataset.

Information on economic variables highlight the differences between domestic firms and affiliates of MNEs. Notably, the data confirms a clear distinction between firms

[6] Likewise, Tables A12 and A13 present the distribution of NACE codes for GUOs, either as reported by Orbis or estimated from the distribution of NACE codes among their affiliates, respectively.

Table 2 – Number of affiliates by Country

	Foreign affiliates	Domestic affiliates of MNEs	Domestic affiliates of non-MNEs	Percentage of MNEs' affiliates
UK	15,421	7,304	31,513	41.90
Germany	14,945	9,294	29,135	45.41
Italy	8,391	7,239	17,778	46.79
Spain	7,925	5,923	12,522	52.51
Poland	7,075	1,209	4,032	67.26
France	5,682	6,932	10,650	54.22
Belgium	4,527	2,572	5,719	55.38
Netherlands	4,264	3,397	20,669	27.04
Sweden	4,256	4,672	12,327	42.00
Romania	4,234	166	1,948	69.31
Denmark	3,110	2,199	8,079	39.65
Portugal	3,045	1,528	3,622	55.80
Austria	2,562	2,210	3,838	55.42
Czechia	2,299	872	1,595	66.53
Slovakia	2,098	299	711	77.12
Bulgaria	1,912	404	3,726	38.33
Ireland	1,809	496	2,290	50.16
Finland	1,592	1,253	1,888	60.11
Norway	1,503	1,501	4,885	38.08
Hungary	1,501	208	855	66.65
Serbia	1,426	280	493	77.58
Korea(ROK)	1,058	858	1,556	55.18
Lithuania	1,026	435	858	63.00
Croatia	991	188	569	67.45
Latvia	928	102	809	56.01
Estonia	864	280	770	59.77
Greece	674	194	311	73.62
Slevenia	621	286	558	61.91
Japan	245	6,474	1,864	78.28
Iceland	71	60	319	29.11

Note1: *Percentage of MNE's affiliates* corresponds to the percentage of affiliates belonging to MNEs in the affiliates of a country ((*Foreign affiliates* + *Domestic affiliates of MNEs*) / Total affiliates).
Note2: From final dataset.

that are not MNEs affiliates and those that are part of MNE networks. Table 3 shows that average firm in the data has 82 employees, while the average affiliate of an MNE has 224 (see Table 4). All domestic firms are however not alike and the sub-sample of multi-affiliate purely domestic firms (i.e. firms that have multiple affiliates within the same country but no foreign affiliates) are more similar in size to MNE affiliates than single- domestic firms (127 employees on average vs. 52; see Table A9 and A7).[7] Similarly, the average firm in the data has sales of 32 million USD, while the average affiliate of an MNE has 104 million USD and the average affiliate of multi-affiliate purely domestic firms has 55 million USD.

Comparing Table 4 on all MNEs and Appendix Table A8 on foreign MNEs alone also highlights that domestic affiliates of MNEs are on average slightly larger than foreign affiliates (224 employees for the average MNE against 198 for foreign affiliates). Both their number and their specificities argue in favor of including the domestic subsidiaries of MNE in the analysis.

4 Empirical Strategy

We use the COVID-19 pandemic as a natural experiment to identify the causal effect of the shock on the distribution of employment by multinational enterprises (MNEs) across different locations. While the pandemic impacted all MNEs, preventing us from identifying the causal average treatment effect, we can assess the causal differential response of MNEs to the shock relative to domestic firms. To achieve this, we demonstrate that, under the assumption of parallel trends between different treated groups, the causal effect of the shock on MNEs' distribution of employment across locations can be identified using a difference-in-differences among treated groups approach. This is our primary methodological strategy in this paper, though we also employ additional strategies as robustness checks.

In a classical difference-in-differences framework, there are two clearly defined mutually exclusive groups: a treatment group and a control group. In our setting there is no control group as COVID-19 affected all firms. However, we can still identify the differential causal effect of the shock on MNEs relative to domestic firms. We exploit the fact that the shock affected all firms in the same way, but MNEs and domestic firms may have different responses to the shock.

[7] Table A10 in the appendix provides a detailed breakdown of the distribution of employment observations by firm size, MNE status, and country.

Table 3 – Descriptive statistics - Distribution of values by economic variable

	mean	min	max	p1	p25	p50	p75	p99	count
Employment in 2015-2022	70	0	456,728	2	13	21	43	757	8,175,850
Wages and salaries in 2015-2022 (in kUSD)	3,669	0	155,451,308	19	292	688	1,866	44,145	5,721,557
Total assets in 2015-2022 (in kUSD)	31,605	0	825,574,000	32	746	2,087	6,531	323,990	8,847,477
Net sales in 2015-2022 (in kUSD)	29,903	0	326,331,079	25	1,121	3,068	9,890	361,078	5,836,609
Value Added in 2015-2022 (in kUSD)	8,806	-19,072,932	155,436,044	-361	441	1,063	3,481	106,894	3,387,547

Note: From Final dataset.

Table 4 – Descriptive statistics - Distribution of values by economic variable among affiliates of MNEs

	mean	min	max	p1	p25	p50	p75	p99	count
Employment in 2015-2022	195	0	456,728	4	20	46	126	2,356	1,223,017
Wages and salaries in 2015-2022 (in kUSD)	12,146	0	155,451,308	98	1,125	2,883	7,897	142,672	963,788
Total assets in 2015-2022 (in kUSD)	100,538	0	265,194,565	122	2,760	8,632	30,872	1,472,732	1,307,495
Net sales in 2015-2022 (in kUSD)	98,687	0	258,753,303	50	4,482	14,316	48,804	1,319,107	884,880
Value Added in 2015-2022 (in kUSD)	25,521	-19,072,932	155,436,044	-2,900	1,719	5,135	14,646	339,651	615,979

Note: From Final dataset.

As demonstrated by the detailed descriptive statistics in section 3.3, MNEs, as expected, differ from domestic firms in terms of size, sales, and employment. However, we assume that in the absence of the shock, the evolution of employment and wages would have been parallel between MNEs and domestic firms. This assumption allows us to identify the causal differential effect of the shock on MNEs' distribution of employment and wages across locations.

Following Shahn (2023), let S represent the set of different groups of firms (e.g., MNEs, domestic firms, etc.) affected by COVID-19. For simplicity, we assume that there are only two groups, MNEs and domestic firms. Let Y_0 be the pre-COVID-19 outcome and Y_1 the post-COVID-19 outcome. We also denote $Y_1(0)$ the hypothetical and non-observed post-COVID-19 outcome for firms in the absence of the pandemic. Similarly, we denote $Y_1(1)$ the observed post-COVID-19 outcome. The causal differential response of MNEs relative to domestic firms is given by:

$$E[Y_1(1) - Y_1(0)|S = MNE] - E[Y_1(1) - Y_1(0)|S = Domestic]. \quad (1)$$

Since there is no untreated control group, we never observe $Y_1(0)$. However, we do observe all the terms in the following equation:

$$E[Y_1 - Y_0|S = MNE] - E[Y_1 - Y_0|S = Domestic] \quad (2)$$

since $Y_1(1)$ is observed for all firms and therefore equal to Y_1 and Y_0 is the observed outcome before the Covid-19 shock.

We make an assumption analogous to the one used in the traditional difference-in-differences framework. However, instead of assuming parallel trends between the treatment and control groups, we assume parallel trends between the two treated groups: MNEs and domestic firms. In other words, we assume that in the absence of the COVID-19 shock, the trajectories of employment and wages would have been parallel between MNEs and domestic firms. This parallel trends assumption between MNEs and domestic firms can be formally stated as:

$$E[Y_1(0) - Y_0|S = MNE] = E[Y_1(0) - Y_0|S = Domestic]. \quad (3)$$

Given this assumption we have:

$$E[Y_1(0) - Y_0|S = MNE] - E[Y_1(0) - Y_0|S = Domestic] = 0. \quad (4)$$

We can therefore rewrite equation (2) as[8]:

$$E[Y_1 - Y_1(0)|S = MNE] - E[Y_1 - Y_1(0)|S = Domestic]. \quad (5)$$

[8]See the complete demonstration in appendix F, which is based on Shahn's (2023) demonstration.

As a result, under the parallel trends assumption, Equation (2) is equivalent to Equation (1). Therefore, we can identify the causal differential effect of the shock on MNEs' distribution of employment across locations using a difference-in-differences among treated groups approach.

While the demonstration above requires the parallel trends assumption to hold, this is no different from the classical difference-in-differences setting. In practice, we will test the validity of this assumption by examining the pre-treatment trends in employment and wages between MNEs and domestic firms. We will also conduct several robustness checks to ensure the validity of our results.

5 Results

5.1 Regression Analysis

To estimate the causal differential effect of the shock on employment across subgroups, we use the difference-in-differences approach among treated groups described in section 4. We estimate the following regression model:

$$Y_{it} = \alpha + \beta TG_i + \delta(TG_i \times Post_t) + \gamma_i + \gamma_t + \epsilon_{it} \quad (6)$$

where Y_{it} is the outcome variable (primarily (log) employment) for firm i at time t, TG_i is a dummy variable indicating whether firm i belongs to a given treated group (e.g. MNEs affiliates) and $Post_t$ is a dummy variable for post-treatment years (equal one starting in 2000). δ is the coefficient of interest representing the causal differential effect of the shock on the treated subgroup on employment and wages across locations. γ_i and γ_t are firm and time fixed effects. The error term is denoted by ϵ_{it}. Standard errors are clustered at the sector and country level.

Table 5 shows the results of the difference-in-differences subgroup treatment regression analysis for the log of employment. It presents both the results of the main regression and the results of a difference-in-differences regression with interactions between the treatment and year dummies. These interactions allows us to further investigate the validity of the parallel trends assumption. If the assumption holds, the coefficient of the interaction term should be close to zero before the shock.

The results presented in Table 5 show multiple noteworthy findings. First, column (2) shows that the full group of domestic firms followed a different trajectory to that of MNEs affiliates even before the COVID-19 shock. The parallel trends

assumption does therefore not hold for these two treated group of firms. This is however not the case for the other subgroups. Column (4) shows that MNEs affiliates and affiliates of multi-affiliate non-MNE groups followed parallel trends before the shock. We therefore focus our analysis on the sub-sample of affiliates of multi-affiliate non-MNEs that are closer to MNEs affiliates both in level and trends.

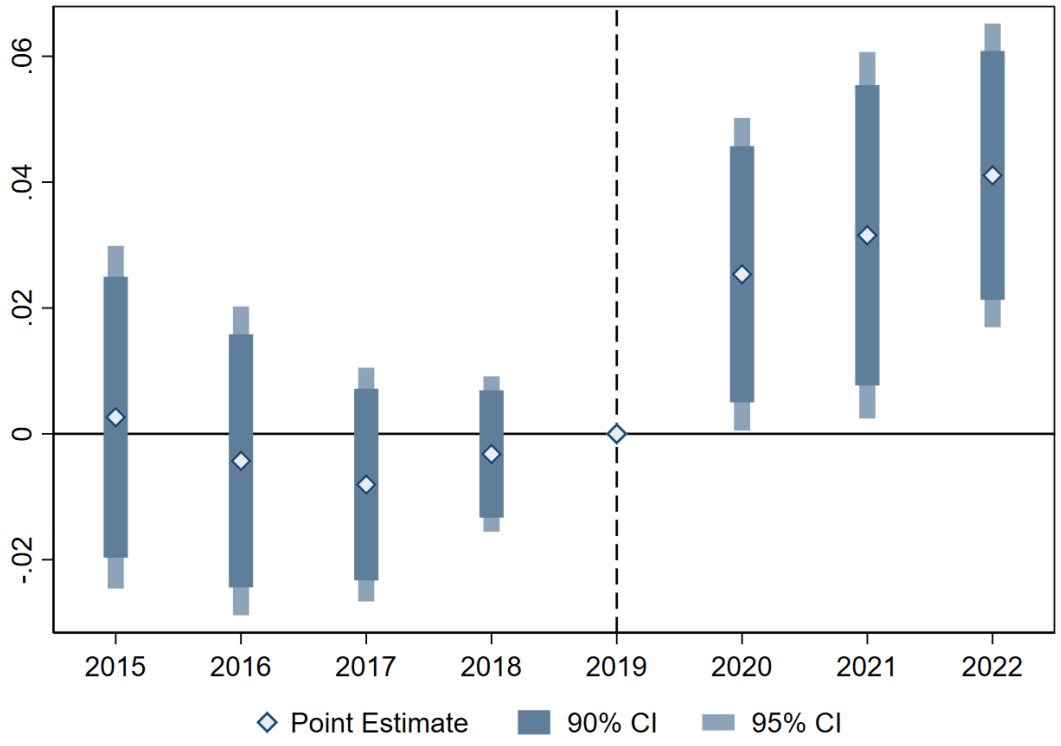
To further investigate the validity of the parallel trends assumption, we conduct a pre-trends power test following the methodology of Roth (2022). The test aims to verify the parallel trends assumption by assessing the power of pre-trends tests to detect meaningful violations of parallel trends. The power of a pre-trends test can be evaluated by calculating the size of a violation required to detect it a specified fraction of the time (e.g., 80%). In our case, the pre-trends test has a power to detect a pre-trend as low as 0.0057 80% of the time. This suggests that the parallel trends assumption holds for the subgroups of MNE affiliates and affiliates of multi-affiliate non-MNEs.

Second, after the shock, MNEs affiliates increased employment relative to Non-MNE affiliates (column (4)). Figure 1 plots the coefficients of the difference-in-differences approach among treated groups for MNE affiliates compared to Non-MNE affiliates. It shows no pre-trend prior to 2020. Following COVID-19, employment of MNE affiliates increases compared to comparable domestic firms. Three years after Covid-19, affiliates of MNEs have on average a 3.3% more employment.

Third, columns (5) to (8) suggests that this causal differential effect was primarily driven by MNEs affiliates with headquarters in the same country as the affiliate (Domestic MNEs; columns (5)-(6)) and not by MNEs affiliates with headquarters in a different country than the affiliate (Foreign MNEs; columns (7)-(8)). Three years after Covid-19, domestic MNEs had on average 4.4% more employement than non-MNE affiliates, and foreign MNEs 2.5%. This result is consistent with the idea that MNEs have performed better following COVID-19 and dampened the global shock, especially in their home countries. Figure D.1a and D.1b in appendix 1 plots firms response compared to non-MNE affiliates for domestic and foreign MNE affiliates respectively, and show no significant pre-trend but a relative increase in employment starting in 2020.

Finally, the timing of firms response is also interesting. Column (4) of Table 5 shows that MNE affiliates start performing better in 2020 and continue so the following years, especially in 2022 the year of the Russian invasion of Ukraine. The estimated impact is almost half larger in 2022 than 2000 and precisely estimated. This pattern is especially relevant for domestic MNE (column (6)) but still true for foreign MNEs (column (8)). Our results show that the COVID-19 shock was

Figure 1 – Differences-in-differences response: MNE affiliates vs Non-MNE affiliates



Note: Coefficient estimates are from Table 5, column (4).

not a one time event and that MNEs maintained a differential performance during its aftermath, including the war in Ukraine and further geopolitical tensions. Such persistence suggests structural shifts in MNE strategies since the pandemics.

Table 5 – Subgroup differences-in-differences OLS $\log(Employment)$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)
Post × Treatment	0.014		0.024^{b}		0.029^{a}		0.020^{c}	
	(0.010)		(0.010)		(0.009)		(0.011)	
Treatment × 2015		0.048^{a}		0.005		0.014		-0.002
		(0.013)		(0.012)		(0.009)		(0.014)
Treatment × 2016		0.036^{a}		0.004		0.006		0.002
		(0.008)		(0.007)		(0.006)		(0.009)
Treatment × 2017		0.022^{a}		0.001		0.000		0.002
		(0.006)		(0.004)		(0.004)		(0.005)
Treatment × 2018		0.015^{a}		0.003		0.003		0.003
		(0.003)		(0.002)		(0.002)		(0.003)
Treatment × 2020		0.031^{a}		0.023^{a}		0.026^{a}		0.021^{b}
		(0.008)		(0.008)		(0.008)		(0.009)
Treatment × 2021		0.035^{a}		0.024^{a}		0.033^{a}		0.019^{b}
		(0.009)		(0.009)		(0.009)		(0.009)
Treatment × 2022		0.052^{a}		0.033^{a}		0.044^{a}		0.025^{a}
		(0.007)		(0.007)		(0.006)		(0.007)
Subgroup	MNE affiliates	MNE affiliates	MNE affiliates	MNE affiliates	Domestic MNE	Domestic MNE	Foreign MNE	Foreign MNE
Baseline	Non-MNE firms	Non-MNE firms	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5299683	5299683	1634597	1634597	1122626	1122626	1295868	1295868

Note: The dependent variable is the log of employment in firm i in year t. Standard errors in parentheses are robust and clustered at the firm and Nace 2 digits level. Statistically significant at ^{c} 10% ^{b} 5% ^{a} 1%.

5.2 Robustness

We conduct robustness analyses on several dimensions. We first test for alternative specifications and performance metrics. Second, we test the sensitivity of the results to alternative control groups and different sets of fixed effects and samples. Finally, we perform a matching analysis instead of our standard difference-in-differences methodology.

We first test the robustness of our results using an alternative specification: instead of a two-way fixed effect specification, we use the yearly log difference of employment as dependent variable and remove country fixed effects. Our estimated coefficients in columns (1)-(3) of Table 6 therefore measure the premium in terms of employment growth of the treated subgroup. The results confirm our main finding: MNE affiliate outperform non-MNE affiliates in terms of employment growth in 2020, a differential that is not reversed in subsequent years. This MNE premium is larger for domestic than foreign MNEs and the impact is persistent and increases over time for them.

The remaining columns of Table 6 test the sensitivity of our results to alternative performance metrics using as dependent variable firm total wages (columns (4)-(6)) and firm turnover (log of net sales, columns (7)-(9)) instead of employment. The results confirms the better performance of MNEs affiliates considering either wages or sales. Similarly to employment, the impact is persistent throughout 2022. When looking at domestic and foreign MNEs separately, the results are less clear-cut: the parallel trend assumption does not seem valid for domestic firms for wages (column (5)) and foreign firms for sales (column (9)), preventing any conclusion on their relative performance.

Table 6 – Subgroup differences-in-differences OLS, alternative dependent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\delta \log(Empl)$	$\delta \log(Empl)$	$\delta \log(Empl)$	$\log(Wages)$	$\log(Wages)$	$\log(Wages)$	$\log(Sales)$	$\log(Sales)$	$\log(Sales)$
Treatment × 2016	-0.001	-0.008^{b}	0.004	-0.001	0.020^{a}	-0.013	-0.012	0.011	-0.028^{b}
	(0.005)	(0.004)	(0.006)	(0.009)	(0.007)	(0.011)	(0.011)	(0.009)	(0.013)
Treatment × 2017	-0.002	-0.006^{b}	0.000	-0.000	0.007	-0.005	-0.008	-0.000	-0.014
	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.009)
Treatment × 2018	0.002	0.003	0.001	0.001	0.004	-0.001	-0.001	0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.005)
Treatment × 2020	0.023^{a}	0.026^{a}	0.020^{b}	0.038^{b}	0.031^{b}	0.043^{b}	0.038	0.032	0.042
	(0.008)	(0.008)	(0.009)	(0.015)	(0.013)	(0.016)	(0.024)	(0.022)	(0.026)
Treatment × 2021	0.002	0.007^{a}	-0.002	0.040^{b}	0.027^{b}	0.048^{a}	0.036^{c}	0.016	0.050^{b}
	(0.002)	(0.002)	(0.003)	(0.015)	(0.013)	(0.016)	(0.020)	(0.020)	(0.021)
Treatment × 2022	0.005	0.007	0.005	0.042^{a}	0.024^{a}	0.053^{a}	0.036^{a}	0.005	0.058^{a}
	(0.004)	(0.004)	(0.005)	(0.007)	(0.007)	(0.008)	(0.011)	(0.016)	(0.011)
Treatment × 2015				0.013	0.036^{a}	-0.000	-0.005	0.025^{b}	-0.027
				(0.013)	(0.010)	(0.018)	(0.015)	(0.011)	(0.019)
Subgroup	MNE affiliates	Domestic MNE	Foreign MNE	MNE affiliates	Domestic MNE	Foreign MNE	MNE affiliates	Domestic MNE	Foreign MNE
Baseline	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1421057	976077	1126575	1435493	935905	1128188	1153126	774695	884864

Note: Standard errors in parentheses are robust and clustered at at the firm and Nace 2 digits level. Statistically significant at ^{c} 10% ^{b} 5% ^{a} 1%.

We then test the sensitivity of our results to the definition of the group of MNE affiliates and controls. Column (1) of Table 7 adopt a definition similar to the literature that focuses on foreign MNEs and does not consider separately domestic MNEs but include them in the control group. We therefore focus on foreign MNEs and compare them to domestic firms, i.e. non-MNE affiliates and domestic MNEs. We still find a larger performance of foreign MNEs post-Covid, but a smaller magnitude at lower significance level and with a different dynamics up to 2022 compared to either column (4) of Table 5 for all MNE affiliates or column (8) for foreign MNEs. It confirms that not considering separately domestic MNEs from non-MNE affiliates provides a biased pattern of the reaction of MNEs following Covid.

Columns (2)-(7) of Table 7 add country×year, sector×year and country×sector×year fixed effects, to further control for all time varying country and sector characteristics that could affect the dynamics of different types of affiliates over our time period. Controlling for such demanding fixed effects reduces the magnitude of the coefficient and the difference between foreign and domestic MNEs, suggesting that differences in the country of location or the sector of activity partly explains the differential response of domestic and foreign MNEs. Finally, columns (8)-(10) of Table 7 relax the sample restriction on missing observations pre-treatment, increasing the number of observation from 1.6 to 2.4 millions. Our main results remain robust on this enlarged sample.

Table 7 – Subgroup differences-in-differences OLS, robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)
Treatment × 2015	-0.006	-0.001	0.002	0.003	0.005	-0.001	0.004	0.003	0.015^{c}	-0.006
	(0.012)	(0.008)	(0.007)	(0.007)	(0.007)	(0.010)	(0.009)	(0.013)	(0.009)	(0.016)
Treatment × 2016	-0.000	-0.000	0.003	0.001	0.002	0.001	0.005	-0.004	0.003	-0.009
	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.007)	(0.007)	(0.010)	(0.007)	(0.012)
Treatment × 2017	0.002	-0.000	0.001	-0.002	-0.001	0.002	0.004	-0.008	-0.001	-0.013
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.007)	(0.005)	(0.009)
Treatment × 2018	0.003	0.003	0.004	0.003	0.004	0.003	0.004	-0.003	0.002	-0.007
	(0.002)	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.006)
Treatment × 2020	0.013^{c}	0.012^{b}	0.011^{b}	0.009^{c}	0.009^{b}	0.013^{b}	0.012^{b}	0.025^{a}	0.027^{a}	0.024^{a}
	(0.007)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)	(0.009)
Treatment × 2021	0.009	0.011	0.011	0.010^{c}	0.010^{c}	0.011	0.011	0.032^{a}	0.036^{a}	0.029^{a}
	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)	(0.008)	(0.011)
Treatment × 2022	0.012^{b}	0.027^{a}	0.027^{a}	0.027^{a}	0.026^{a}	0.026^{a}	0.027^{a}	0.041^{a}	0.046^{a}	0.038^{a}
	(0.006)	(0.007)	(0.007)	(0.005)	(0.005)	(0.009)	(0.010)	(0.008)	(0.006)	(0.009)
Subgroup	Foreign MNE	MNE affiliates	MNE affiliates	Domestic MNE	Domestic MNE	Foreign MNE	Foreign MNE	MNE affiliates	Domestic MNE	Foreign MNE
Baseline	Domestic	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*year FE		Yes	No	Yes	No	Yes	No			
Country*year FE		Yes	No	Yes	No	Yes	No			
Country*sector*year FE		No	Yes	No	Yes	No	Yes			
Observations	1634597	1634597	1633815	1122626	1121454	1295868	1294895	2488712	1748589	2008010

Note: The dependent variable is the log of employment in firm i in year t. Sample including firms with missing observations pre-2020 in columns (7)-(10). Standard errors in parentheses are robust and clustered at the firm and Nace 2 digits level. Statistically significant at ^{c} 10% ^{b} 5% ^{a} 1%.

When the parallel trends assumption holds, the difference-in-differences approach among treated groups produces unbiased estimates of the causal differential effect of the shock on MNEs' distribution of employment. Daw and Hatfield (2018) show that in a setting where the parallel trends assumption holds, matching on covariates can introduce bias in the estimation of the treatment effect. In particular, matching on pre-treatment variables can unintentionally introduce regression to the mean bias. This occurs because matching often selects treatment and control units with values that are extreme relative to their group means, and these units tend to revert toward their original group averages over time. As a result, matched groups may show artificial changes unrelated to the treatment, leading to biased estimates of intervention effects. We present nonetheless the results of a matching analysis in Table A14 in Appendix E. We follow Alfaro and Chen (2012) and match MNE affiliates to a non-MNE firm or non-MNE affiliate using nearest matching within country, sector, and age categories. We then estimate Equation 6 using as our unit of observation the matched country pairs, as dependent variable the difference in (log) employment between the treated MNE affiliate and its matched firm, and including matched pair fixed effects (odd-numbered columns). We alternatively use as dependent variable the difference (between the treated MNE affiliate and its match) of the yearly log difference of employment (even-numbered columns). Overall, the results presented in Table A14 are consistent with a better performance of MNE affiliates in the post-Covid period. The violation of the parallel trend assumption in a number of cases however prevent robust conclusions from the matching analysis.

6 Heterogeneity in MNEs' responses

To further explore the differential impact of the shock on MNEs' employment distribution across locations, we focus on MNE affiliates and compare the performance of the foreign vs. domestic affiliates within MNEs. We then investigate potential explanations for the home bias in MNE responses to the shock and differentiate according to the proximity of affiliates from their headquarters and the characteristics of MNEs.

6.1 Foreign vs domestic affiliates of MNEs

Having established that MNEs have a better performance than domestic firms, we focus on MNEs and investigate how they adjust their employment in different locations. Specifically, we investigate whether, within MNE, foreign and domestic affiliates reacted differently to the shock. To address this question, we estimate the following regression model:

$$Y_{s,g,t} = \sum_{\substack{2015 \leq t \leq 2022, \\ t \neq 2019}} \beta_t (Year = t) \times Foreign_{s,g,t} + \gamma_g + \gamma_t + \varepsilon_{s,g,t} \qquad (7)$$

where $Y_{s,g,t}$ is the outcome variable, employment, in affiliate s of GUO g at time t, $\beta_t(Year = t)$ is a dummy variable indicating the year and $Foreign_{s,g,t}$ is a dummy variable indicating whether the affiliate is located in the same country as the GUO.

γ_g is a fixed effect by GUO. The GUO is the highest parent of the firm and is common to all affiliates of the same MNE. By including γ_g, we effectively compare foreign and domestic affiliates of a given MNE, before and after the COVID-19 shock. γ_t are year fixed effects. The error term is denoted by $\varepsilon_{s,g,t}$. Standard errors are clustered at the GUO level.

Table 8 shows the results of estimating equation (7) for the log of employment. The results confirm in more direct terms the previous findings. In particular, columns (1) and (2) indicate that GUOs increased employment in their home country relative to their foreign affiliates in response to the shock. The coefficient on foreign multinationals post-Covid are negative and statistically significant at the 1% level.

In addition, the coefficient of the interaction term is statistically significant for all post-shock years and increases in absolute value over time, suggesting that the relative reallocation of employment towards the home country became more pronounced as time progressed. The results of Table 8 provide therefore further evidence that MNEs prioritized their home country resources in response to the shock and in the aftermath of Covid.

The remaining columns of Table 8 introduce different sets of additional fixed effects. Columns (3) and (4) control for country fixed effects, columns (5) and (6) control for sector fixed effects, and columns (7) and (8) control for sector× year fixed effects. The later in particular confirm that the differential response of domestic and foreign affiliates is not driven by differences in their main activities, confirming a home bias in employment responses within MNEs for similar affiliates located in different countries.

Table 8 – GUO level analysis OLS log(*Employment*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)
Foreign	-0.431[a]	-0.427[a]	-0.329[a]	-0.325[a]	-0.402[a]	-0.399[a]	-0.402[a]	-0.398[a]
	(0.021)	(0.022)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Post × Foreign	-0.016[a]		-0.012[a]		-0.017[a]		-0.018[a]	
	(0.004)		(0.004)		(0.004)		(0.004)	
Foreign × (Year = 2015)		-0.016[a]		-0.015[a]		-0.016[a]		-0.016[a]
		(0.005)		(0.005)		(0.005)		(0.005)
Foreign × (Year = 2016)		-0.005		-0.005		-0.005		-0.005
		(0.004)		(0.004)		(0.004)		(0.003)
Foreign × (Year = 2017)		0.002		0.002		0.002		0.002
		(0.003)		(0.003)		(0.003)		(0.003)
Foreign × (Year = 2018)		0.001		0.001		0.001		0.001
		(0.002)		(0.002)		(0.002)		(0.002)
Foreign × (Year = 2020)		-0.006[b]		-0.006[b]		-0.006[b]		-0.007[a]
		(0.002)		(0.002)		(0.002)		(0.002)
Foreign × (Year = 2021)		-0.014[a]		-0.014[a]		-0.014[a]		-0.016[a]
		(0.003)		(0.003)		(0.003)		(0.003)
Foreign × (Year = 2022)		-0.043[a]		-0.030[a]		-0.044[a]		-0.044[a]
		(0.005)		(0.005)		(0.005)		(0.005)
GUO fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Country fixed effects	No	No	Yes	Yes	No	No	No	No
NACE chapter fixed effects	No	No	No	No	Yes	Yes	No	No
NACE × Year fixed effects	No	No	No	No	No	No	Yes	Yes
Observations	850700	850700	850700	850700	850700	850700	850700	850700

Note: The dependent variable is the log of employment in firm i in year t. All specifications include year and GUO fixed effects. Standard errors in parentheses are robust and clustered at the GUO level. Statistically significant at [c] 10% [b] 5% [a] 1%.

6.2 Regional proximity between affiliates and headquarters

Section 2 underlines that non-MNE affiliate firms adjust more their employment in their distant affiliates than their local ones in response to a shock due to social or political pressures or informational advantage at the local level. In this section, we test whether these mechanisms at the local level contribute to the home bias in MNE response since the Covid shock. If MNEs favor affiliates located close to their headquarters more than those located in different regions or countries alike, it would generate a home bias in response to a shock. We follow the within-firm identification sets out in Section 6.1 and estimate:

$$Y_{s,g,t} = \beta_1 Domestic_{s,g,t} + \beta_2 Same_{s,g,t} + \beta_3 Domestic_{s,g,t} \times Post_t + \beta_4 Same_{s,g,t} \times Post_t + \gamma_g + \gamma_t + \varepsilon_{s,g,t} \quad (8)$$

where $Y_{s,g,t}$ is the outcome variable, employment, in affiliate s of GUO g at time t. $Domestic_{s,g,t}$ is a dummy variable equal to one when the affiliate is located in the same country as the GUO. $Same_{s,g,t}$ is a dummy for affiliates located in the same region as their MNE headquarters; note that the information on the location at

the NUTS level is available only for a subset of our sample.[9] γ_g and γ_t are a fixed effect by GUO and year respectively. Standard errors are clustered at the GUO level.

Results are presented in Table 9 using different sets of fixed effects in columns (1) to (3). All show that while local affiliates are larger on average, their employment response to the COVID-19 shock does not differ from other domestic affiliates. Our results therefore do not yield support for a differential treatment of affiliates proximate to the headquarters compared to other domestic affiliates in response to recent global shocks. It does not provide support for a home bias related to social pressure or informational advantage at the local level, in contrast with existing evidence on multi-establishment firms within countries (Landier et al., 2009; Giroud and Mueller, 2019; Bassanini et al., 2017). We however focus on different types of firms, MNEs rather than domestic firms, and different shocks, a global shock instead of a firm specific shock. The domestic affiliate performance premium following Covid is not specific to the home region of the MNE but to its home country.

Table 9 – GUO level analysis: regional proximity

	(1)	(2)	(3)
	log(*Empl*)	log(*Empl*)	log(*Empl*)
Affiliate of a domestic group	0.087[a]	0.122[a]	0.059[c]
	(0.033)	(0.033)	(0.032)
Same region	0.278[a]	0.288[a]	0.322[a]
	(0.030)	(0.029)	(0.029)
Post × Domestic	0.004	0.007	0.008
	(0.010)	(0.010)	(0.010)
Same region × Post	0.012	0.014	0.011
	(0.010)	(0.010)	(0.010)
Guo Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Country Fixed Effects	No	Yes	Yes
Nace chapter Fixed Effects	No	No	Yes
Cluster	GUO	GUO	GUO
Observations	339460	339460	339460

Note: The dependent variable is the log of employment in firm i in year t. All specifications include year and GUO fixed effects. Standard errors in parentheses are robust and clustered at the GUO level. Statistically significant at [c] 10% [b] 5% [a] 1%.

[9] Regions are defined at the NUTS 3-digit level for EU countries and available sub-national information for Japan and South Korea. The firm address is however available for a subset of firms only.

6.3 Different types of MNEs

In this section, we further characterize the home bias in MNE response by investigating whether different types of MNEs adjust their employment differently in their domestic and foreign affiliates. We consider several dimensions related to their size or their degree of internationalization: the number of their affiliates, the number of countries in which they operate and the share of foreign affiliates in their affiliate network. For each characteristic, we construct a dummy variable for MNEs above the median and interact it with the $Foreign_{s,g,t}$ and $Post_t$ variables and their interaction, and estimate Equation 7.

Results are presented in Table 10. The first column report our benchmark regression. In column (2), we add variables related to the number of the number of affiliate of the MNE. The coefficient on $Foreign_{s,g,t} \times Post_t \times nbrofaffiliatesdum.$ exhibit a positive and significant sign, meaning that MNEs with a larger network of affiliates had more similar employment dynamics in their domestic and foreign affiliates. We find a similar pattern for MNEs operating in more countries (column (3)), but not for those that have a larger share of foreign affiliates (column (4)). Including all dimensions simultaneously in column (5) shows that the dominant characteristics is the number of different countries in which the MNE has affiliates: the employment premium of domestic affiliates since Covid is particularly important for MNEs operating in few countries. The total number of affiliates or the share of foreign affiliates are not significantly related to the differential response in MNEs' domestic and foreign markets.

7 Conclusion

In this paper we examined how multinational enterprises reacted since the COVID-19 pandemic, and their allocation of employment across different locations. Despite the lack of a control group, we were able to identify the causal differential effect of the shock on MNEs' distribution of employment across locations by exploiting the assumption of parallel trends between MNEs and domestic firms.

Our analysis show that MNEs responded differently than domestic firms, with MNE affiliates exhibiting stronger employment performance during and after the pandemic, through 2022. This differential was largely driven by the stronger performance of domestic MNE affiliates. Within MNE, we find a clear home bias: foreign affiliates experienced weaker employment performance than domestic ones, espe-

Table 10 – GUO level analysis OLS log(*Employment*)

	(1)	(2)	(3)	(4)	(5)
	log(*Empl*)	log(*Empl*)	log(*Empl*)	log(*Empl*)	est5
Foreign	-0.431^{a}	-0.410^{a}	-0.318^{a}	-0.319^{a}	-0.369^{a}
	(0.021)	(0.051)	(0.046)	(0.025)	(0.055)
Post × Foreign	-0.016^{a}	-0.038^{a}	-0.031^{a}	-0.015^{b}	-0.039^{a}
	(0.004)	(0.007)	(0.007)	(0.006)	(0.008)
Post × Foreign × nbr of affiliates dum.		0.026^{a}			0.004
		(0.009)			(0.012)
Post × nbr of affiliates dum.		-0.019^{a}			-0.028^{a}
		(0.006)			(0.007)
Foreign × nbr of affiliates dum.		-0.023			0.106^{c}
		(0.056)			(0.063)
Post × Foreign × nbr of country dum.			0.017^{b}		0.027^{b}
			(0.008)		(0.012)
Post × nbr of country dum.			0.005		0.015^{b}
			(0.006)		(0.007)
Foreign × nbr of country dum.			-0.122^{b}		-0.054
			(0.051)		(0.060)
Post × Foreign × foreign affilate share dum.				-0.004	-0.008
				(0.009)	(0.010)
Post × foreign affilate share dum.				0.002	0.001
				(0.006)	(0.007)
Foreign × foreign affilate share dum.				-0.182^{a}	-0.183^{a}
				(0.040)	(0.042)
GUO fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	850700	850700	850700	850700	850700

Note: The dependent variable is the log of employment in firm i in year t. All specifications include year and GUO fixed effects. Standard errors in parentheses are robust and clustered at the GUO level. Statistically significant at ^{c} 10% ^{b} 5% ^{a} 1%.

cially among MNEs with limited international presence. These patterns indicate a strategic reallocation of resources by MNEs toward home-country operations in response to global uncertainty and emerging risks in the post-pandemic period.

These findings underscore the importance of firm composition – whether domestic firms, domestic MNEs, or foreign MNEs – in shaping labor market responses to global shocks. The varying degrees of employment resilience suggest that local and national internationalization strategies must account for the volatility and responsiveness of different types of firms. By recognizing the distinct roles of domestic and foreign MNEs in the post-pandemic context, policymakers can craft more robust and targeted strategies to support economic resilience.

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Appendix

Appendices

A Data

A.1 Data selection

The data was selected based on five specific criteria: firms included are public limited, limited liability, or foreign companies with standardized legal forms; they are classified as companies or private equity companies; they have recorded values for employment, at least in 2019 and 2021; they have unconsolidated accounts; and they are not governments, public authorities, or States.

Based on these criteria, we selected five main economic variables: employment, net sales, total assets, value added, and wages. We additionally collected NACE codes at the 2-digit level, incorporation dates, and NUTS codes at the 3-digit level[10].

A.2 Data cleaning

This section outlines the steps taken to clean and refine the data.

As a first step, we excluded all observations that met any of the following conditions: (i) they lack a consolidation code[11], or (ii) they contain no information (i.e., zero or missing values) for the period from 2015 to 2022.

Second, we retained only firms located in countries with more than 1,000 affiliates reporting employment data. An affiliate is defined as a firm with a Global Ultimate Owner (GUO). Additionally, we restricted the sample to countries where at least 10% of affiliates have available employment data. This condition ensures that the sample size is sufficient to yield representative results.

Third, we excluded firms operating in countries experiencing active conflict. Based

[10] For Japan and South Korea, we collected alternative sub-national information when NUTS codes were not available.

[11] Orbis provides data for each company through one or more financial statements, where consolidation codes link multiple statements to a single company.

on the availability of Orbis data and the previously established criteria, this exclusion applied solely to firms located in Ukraine and Russia.

Fourth, we excluded firms whose primary economic activities were not relevant to the study. This was achieved by removing firms categorized under NACE divisions[12] 84 to 99[13].

Fifth, firms with extreme or inconsistent values, such as negative employment, were excluded from the sample. Specifically, we removed firms with employment-to-total-assets ratios exceeding the 99.9th percentile (see Table A2 in the appendix) and firms with employment growth rates greater than 100 or less than 0.01 (see Table A1 in the appendix). Additionally, we excluded firms reporting negative values for employment, wages, or total assets, as well as those with incorporation dates prior to 1800 (see Table A3 in the appendix).

Sixth, we only kept firms with employment data from 2015 to 2019, and with at least 10 employees in 2019.

Finally, affiliates were included in the sample if their highest parent firms could be localized based on at least one of three criteria: first, if the Global Ultimate Owner (GUO) was identified and localized; second, if the highest direct shareholder was localized[14]; and third, if the highest parent from the corresponding shareholders was known. Table A4 in the appendix summarizes the different types of highest parent firms collected.

B Cleaning descriptive statistics

Firms facing an increase of employment superior to $\times 100$ or inferior to $\div 100$ are dropped (See Table A1).

Table A2 displays the percentage rate of observations in the Employment and Wages-Salaries variables being part of the 99.9th percentile of the Employment/TotalAssets or Wages-Salaries/TotalAssets distribution across firms.

[12] NACE codes are the European standard classification of economic activities, structured into sections, divisions, groups, and classes, where the first two digits represent the section and the first three represent the division.
[13] NACE divisions 84 to 99 encompass sectors such as public administration, defense, education, arts and entertainment, healthcare, international organizations, households as employers, and social work activities.
[14] i.e., when the GUO Orbis code begins with WW, YY, or ZZ.

Table A1 – Number of firms with growth of Employment by more than * 100 or less than /100 between two years

Employment	No extreme	Percentage	Extreme	Percentage
Less than /100	4,915,246	99.98	929	0.02
More than × 100	4,915,157	99.98	1,018	0.02

Note: From NonSpecificEconomicVariables dataset.

Firms with Employment/TotalAssets that are part of the 99.9th percentile during the whole period are deleted (See Table A2)

Table A2 – Number of firms part of 99.9th percentile of the variable / TotalAssets

Variables	No extreme	Percentage	Extreme	Percentage
Employment	4,898,441	99.64	17,734	0.36
WagesSalaries	2,831,985	99.55	12,661	0.45

Note: From NonSpecificEconomicVariables dataset.

Observations with incorporation dates inferior to 1800 are dropped (See Table A3 for summary statistics on incorporation dates).

Table A3 – Descriptive statistics - creation year with respect to the firms' type

	min	max	p1	p25	p50	p75	p99	mean	count
Creation year of firms	1800	2019	1929	1990	2001	2010	2018	1997	1,195,397
Creation year of affiliates	1800	2019	1924	1989	2000	2009	2018	1996	360,670
Creation year of domestic non-MNE affiliates	1800	2019	1923	1989	2000	2009	2018	1996	185,823
Creation year of Mnes' affiliates	1800	2019	1925	1989	2000	2008	2018	1996	174,847

Note: From NonSpecificEconomicVariables dataset.

Table A4 summarizes the different types of highest parent firms collected.

Table A4 – Classification and Distribution of Highest Parent Firms by Ownership Type

	1 - Located GUOs	2 - Family GUOs	Total
GUO Id number	167,038	0	167,038
Controlling shareholders	1,352	41,164	42,516
Chaining Direct Shareholders	16	0	16
Total	168,406	41,164	209,570

Note: From final dataset.

C Descriptive statistics of the final sample

Table A5 – Descriptive statistics - Distribution of GUOs and MNEs across countries

	mean	sd	min	max	sum
Number of Mne in a country	345	898	0	5,727	51,725
Share of a country hosting Mne	1	2	0	11	100
Number of Guo in a country	1,299	4,272	0	29,941	194,914
Share of a country hosting Guo	1	2	0	15	100

Note: From final dataset.

Table A6 – The 40 countries with the highest number of MNEs

	MNEs	Percentage MNEs
Germany	5,727	11.07
US	4,901	9.48
UK	4,039	7.81
Italy	3,749	7.25
Netherlands	3,566	6.89
France	2,644	5.11
Spain	2,309	4.46
Sweden	1,967	3.80
Switzerland	1,957	3.78
Japan	1,922	3.72
Austria	1,697	3.28
Belgium	1,575	3.04
Denmark	1,526	2.95
Luxembourg	1,070	2.07
Norway	886	1.71
Ireland	768	1.48
Czechia	714	1.38
Cyprus	706	1.36
Finland	688	1.33
China	637	1.23
Portugal	614	1.19
Canada	507	0.98
Poland	463	0.90
Korea(ROK)	458	0.89
Cayman Islands	406	0.78
Virgin Islands, British	340	0.66
India	334	0.65
Hungary	309	0.60
Australia	299	0.58
Lithuania	256	0.49
Estonia	248	0.48
Hong Kong	240	0.46
Israel	240	0.46
Slevenia	232	0.45
Slovakia	231	0.45
Greece	203	0.39
Turkey	202	0.39
Liechtenstein	201	0.39
Bulgaria	186	0.36
Singapore	172	0.33

Note: From final dataset.

Table A7 – Descriptive statistics - Distribution of values by economic variable among mono-establishment firms

	mean	min	max	p1	p25	p50	p75	p99	count
Employment in 2015-2022	46	0	190,087	2	12	18	34	395	5,682,837
Wages and salaries in 2015-2022 (in kUSD)	1,727	0	16,224,658	15	218	489	1,072	16,523	3,984,215
Total assets in 2015-2022 (in kUSD)	21,026	0	825,574,000	25	588	1,559	4,378	136,693	6,157,153
Net sales in 2015-2022 (in kUSD)	17,537	0	326,331,079	22	905	2,275	6,280	165,504	4,268,320
Value Added in 2015-2022 (in kUSD)	4,985	-15,372,738	42,286,877	-133	353	739	1,778	41,866	2,319,331

Note: From Final dataset.

Table A8 – Descriptive statistics - Distribution of values by economic variable among affiliates of foreign MNEs

	mean	min	max	p1	p25	p50	p75	p99	count
Employment in 2015-2022	174	0	77,727	4	20	45	123	2,131	741,620
Wages and salaries in 2015-2022 (in kUSD)	11,373	0	155,451,308	90	1,099	2,887	7,996	131,975	594,015
Total assets in 2015-2022 (in kUSD)	83,924	0	83,417,279	105	2,701	8,323	29,291	1,176,206	792,857
Net sales in 2015-2022 (in kUSD)	86,129	0	126,387,240	69	4,246	13,701	46,217	1,095,089	529,410
Value Added in 2015-2022 (in kUSD)	22,938	-5,134,493	155,436,044	-2,557	1,707	5,146	14,782	298,016	381,188

Note: From Final dataset.

Table A9 – Descriptive statistics - Distribution of values by economic variable among domestic affiliates of multi-establishment groups

	mean	min	max	p1	p25	p50	p75	p99	count
Employment in 2015-2022	105	0	456,728	3	15	28	63	1,180	1,751,393
Wages and salaries in 2015-2022 (in kUSD)	6,434	0	12,814,457	48	675	1,503	3,920	71,169	1,143,327
Total assets in 2015-2022 (in kUSD)	44,074	0	265,194,565	83	1,275	3,450	10,921	566,205	1,897,467
Net sales in 2015-2022 (in kUSD)	52,058	0	258,753,303	35	2,289	6,468	21,252	692,684	1,038,879
Value Added in 2015-2022 (in kUSD)	13,866	-19,072,932	104,860,298	-817	937	2,628	7,294	169,151	687,028

Note: From Final dataset. Multi-establishment groups include MNEs and other groups that have at least two establishments, all located in the same country as their GUOs.

Table A10 – Distribution of Firms' sizes by country (1st row: multi-establishment Firms not being part of a multinational group, 2nd row: MNEs affiliates)

	Between 10 and 49		Between 50 and 249		More than 250		Total	
	N	%	N	%	N	%	N	%
Germany	9,020	21.38	8,183	21.69	1,110	18.52	29,135	15.28
	11,132	26.39	8,547	22.65	2,772	46.25	24,239	12.71
UK	7,992	29.45	7,113	31.07	1,064	21.57	31,513	21.11
	10,472	38.59	7,517	32.84	3,088	62.61	22,725	15.22
Italy	3,693	18.31	3,361	18.99	461	15.16	17,778	12.99
	6,773	33.59	5,149	29.09	1,722	56.64	15,630	11.42
Spain	3,029	17.47	2,722	18.38	375	12.81	12,522	11.45
	6,692	38.59	4,882	32.97	1,882	64.30	13,848	12.66
Japan	998	3.46	755	3.21	261	4.22	1,864	2.02
	4,824	16.74	3,001	12.76	1,878	30.36	6,719	7.27
Romania	691	8.34	521	7.41	180	12.47	1,948	4.01
	2,136	25.79	1,463	20.80	699	48.41	4,400	9.05
Portugal	987	15.71	899	16.23	109	11.98	3,622	8.86
	2,054	32.69	1,504	27.16	584	64.18	4,573	11.19
Netherlands	2,598	45.48	2,525	48.04	177	28.50	20,669	57.80
	2,357	41.26	2,024	38.51	375	60.39	7,661	21.42
France	3,184	26.49	2,873	29.79	366	14.28	10,650	30.03
	6,781	56.41	4,928	51.10	1,936	75.54	12,614	35.57
Poland	1,790	14.57	1,494	15.79	327	10.99	4,032	12.05
	4,712	38.35	2,992	31.61	1,752	58.89	8,284	24.77
Sweden	1,525	27.20	1,462	30.12	108	11.88	12,327	37.05
	3,200	57.07	2,532	52.16	735	80.86	8,928	26.83
Bulgaria	993	18.34	841	17.50	169	22.84	3,726	11.53
	1,043	19.27	770	16.02	284	38.38	2,316	7.16
Hungary	288	5.38	231	5.09	62	6.73	855	2.85
	932	17.40	592	13.04	347	37.68	1,709	5.69
Belgium	757	16.54	712	18.77	74	8.41	5,719	21.88
	2,729	59.64	2,105	55.48	663	75.34	7,099	27.15
Korea(ROK)	954	8.40	755	8.27	216	8.87	1,556	6.59
	1,469	12.93	949	10.39	527	21.63	1,916	8.12
Austria	1,029	21.43	977	23.73	120	12.57	3,838	18.55
	2,218	46.19	1,613	39.18	670	70.16	4,772	23.06
Denmark	929	27.95	903	31.53	53	10.02	8,079	47.28
	1,969	59.24	1,581	55.20	414	78.26	5,309	31.07
Czechia	518	13.05	480	13.97	48	7.95	1,595	11.19
	1,628	41.02	1,206	35.09	440	72.85	3,171	22.25
Finland	432	15.14	385	16.18	55	10.07	1,888	13.60
	1,339	46.93	991	41.64	368	67.40	2,845	20.50
Ireland	400	17.83	395	20.41	17	4.80	2,290	16.53
	937	41.76	732	37.83	215	60.73	2,305	16.64
Norway	1,035	31.97	975	35.75	90	15.49	4,885	36.52
	1,548	47.82	1,137	41.69	427	73.49	3,004	22.46
Lithuania	343	13.61	280	12.83	67	17.68	858	6.54
	691	27.42	502	23.00	194	51.19	1,461	11.14
Greece	104	4.18	88	3.91	20	5.01	311	2.42
	431	17.34	308	13.69	131	32.83	868	6.74
Serbia	154	5.88	131	5.91	24	5.10	493	3.91
	786	30.00	559	25.24	246	52.23	1,706	13.52
Croatia	158	7.41	137	7.63	26	6.62	569	4.78
	535	25.09	373	20.77	170	43.26	1,179	9.91
Slovakia	189	7.65	164	8.04	28	5.86	711	6.23
	1,155	46.74	809	39.64	357	74.69	2,397	21.02
Latvia	272	17.39	237	16.84	40	19.23	809	8.98
	391	25.00	316	22.46	83	39.90	1,030	11.44
Slevenia	170	13.14	151	13.54	21	10.14	558	8.22
	437	33.77	312	27.98	130	62.80	907	13.36
Estonia	157	18.23	156	19.87	7	6.93	770	13.05
	441	51.22	368	46.88	79	78.22	1,144	19.39
Iceland	72	38.10	71	40.57	8	36.36	319	25.34
	45	23.81	33	18.86	12	54.55	131	10.41

Note: From Final dataset.

Finally, even though NACE information is quite available for affiliates (See A11), GUOs NACE codes are not well reported (See A12). Moreover, a disproportionate amount of GUOS are allocated to NACE 64, which includes the activities of holding companies and therefore does not correspond to the real activity of the group. To overcome these issues, we built a new variable estimating GUOs' NACE as follows:

- if GUOs' NACE codes are not missing or different from 64: still relevant, so we do not replace them;
- if they are missing or equal 64, then we replace them by the NACE code that are mostly available among its affiliates.

Table A13 depicts the distribution of estimated NACE codes among GUOs.

Table A11 – Number of observations by NACE description

	Firms	from domestic MNEs	from foreign MNEs
A - Agriculture, Forestry And Fishing	22,329	777	964
	1.87	1.13	0.91
B - Mining And Quarrying	4,084	359	630
	0.34	0.52	0.59
C - Manufacturing	277,243	18,627	29,440
	23.18	27.06	27.76
D - Electricity, Gas, Steam And Air Conditioning Supply	18,114	1,742	1,876
	1.51	2.53	1.77
E - Water Supply; Sewerage, Waste Management And Remediation Activities	14,214	1,002	928
	1.19	1.46	0.88
F - Construction	167,692	5,188	3,440
	14.02	7.54	3.24
G - Wholesale And Retail Trade; Repair Of Motor Vehicles And Motorcycles	262,107	12,966	27,372
	21.91	18.84	25.81
H - Transportation And Storage	74,267	4,966	5,648
	6.21	7.21	5.33
I - Accommodation And Food Service Activities	95,367	2,350	3,122
	7.97	3.41	2.94
J - Information And Communication	61,055	6,495	11,689
	5.10	9.44	11.02
K - Financial And Insurance Activities	9,058	1,033	1,626
	0.76	1.50	1.53
L - Real Estate Activities	20,547	1,224	1,324
	1.72	1.78	1.25
M - Professional, Scientific And Technical Activities	91,432	7,101	11,080
	7.64	10.32	10.45
N - Administrative And Support Service Activities	78,697	5,005	6,916
	6.58	7.27	6.52

*The entire name is *Activities Of Households As Employers; Undifferentiated Goods- And Services- Producing Activities Of Households For Own Use*
Note : From Final Dataset

Table A12 – Number of MNEs from 2 digit Nace

	Firms	Percentage
Unknown Nace	39,507	76.38
64 - Financial service activities, except insurance and pension funding	3,632	7.02
70 - Activities of head offices; management consultancy activities	2,265	4.38
46 - Wholesale trade, except of motor vehicles and motorcycles	844	1.63
68 - Real estate activities	660	1.28
62 - Computer programming, consultancy and related activities	464	0.90
82 - Office administrative, office support and other business support activities	342	0.66
28 - Manufacture of machinery and equipment n.e.c.	264	0.51
71 - Architectural and engineering activities; technical testing and analysis	213	0.41
47 - Retail trade, except of motor vehicles and motorcycles	203	0.39
25 - Manufacture of fabricated metal products, except machinery and equipment	175	0.34
69 - Legal and accounting activities	151	0.29
52 - Warehousing and support activities for transportation	134	0.26
74 - Other professional, scientific and technical activities	127	0.25
22 - Manufacture of rubber and plastic products	126	0.24

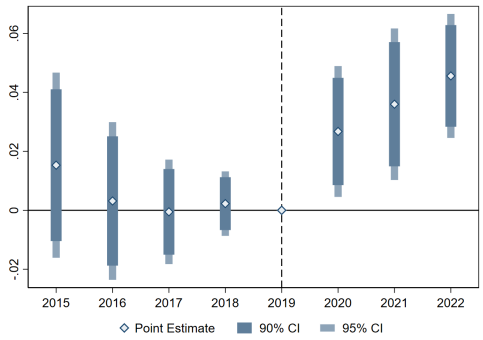
Table A13 – Number of estimated MNEs from 2 digit Nace

	Firms	Percentage
Unknown Nace	39,321	76.02
70 - Activities of head offices; management consultancy activities	2,338	4.52
46 - Wholesale trade, except of motor vehicles and motorcycles	1,437	2.78
64 - Financial service activities, except insurance and pension funding	1,043	2.02
68 - Real estate activities	861	1.66
62 - Computer programming, consultancy and related activities	638	1.23
82 - Office administrative, office support and other business support activities	386	0.75
47 - Retail trade, except of motor vehicles and motorcycles	350	0.68
28 - Manufacture of machinery and equipment n.e.c.	343	0.66
71 - Architectural and engineering activities; technical testing and analysis	293	0.57
25 - Manufacture of fabricated metal products, except machinery and equipment	285	0.55
52 - Warehousing and support activities for transportation	206	0.40
41 - Construction of buildings	185	0.36
43 - Specialised construction activities	180	0.35
49 - Land transport and transport via pipelines	177	0.34

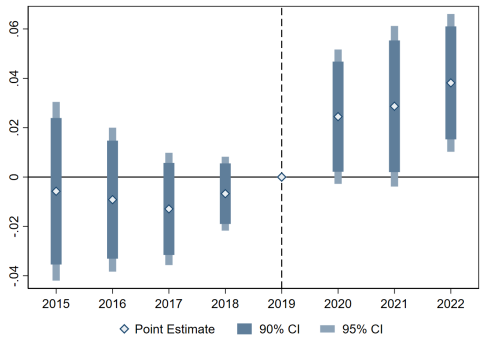
Note: From NonSpecificEconomicVariables dataset.

D Additional figures

Figure D.1 – Differences-in-differences response for domestic and foreign MNEs



(a) Domestic MNEs vs Non-MNE affiliates



(b) Foreign MNEs vs Non-MNE affiliates

Note: Coefficient estimates are from Table 5, column (6) for Figure D.1a, and column (8) for Figure D.1b.

E Additional tables

Table A14 – Matching Difference in differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\log(Empl)$	$\delta \log(Empl)$	$\log(Empl)$	$\delta \log(Empl)$	$\log(Empl)$	$\delta \log(Empl)$	$\log(Empl)$	$\delta \log(Empl)$
Treatment × 2015	0.004		0.005		0.011^{b}		0.006	
	(0.005)		(0.006)		(0.004)		(0.009)	
Treatment × 2016	0.005^{c}	0.003	0.006	0.004	0.010^{b}	0.002	0.005	0.004
	(0.003)	(0.002)	(0.004)	(0.003)	(0.004)	(0.003)	(0.005)	(0.004)
Treatment × 2017	0.003	0.000	0.004	-0.000	0.003	-0.004	0.006	0.007^{a}
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)	(0.002)
Treatment × 2018	0.002^{c}	0.002	0.002^{c}	0.001	0.003	0.003	0.006^{b}	0.006^{a}
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Treatment × 2020	0.005	0.008^{b}	0.002	0.004	0.004	0.006	-0.001	0.005
	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)	(0.004)
Treatment × 2021	0.014^{b}	0.011^{a}	0.007	0.007^{a}	0.006^{b}	0.006	0.005	0.011^{a}
	(0.006)	(0.003)	(0.006)	(0.002)	(0.002)	(0.003)	(0.006)	(0.003)
Treatment × 2022	0.025^{a}	0.015^{a}	0.024^{a}	0.014^{a}	0.018^{a}	0.010^{b}	0.021^{c}	0.020^{a}
	(0.008)	(0.003)	(0.007)	(0.003)	(0.005)	(0.004)	(0.010)	(0.003)
Treatment	MNE affiliates	MNE affiliates	MNE affiliates	MNE affiliates	Domestic MNE	Domestic MNE	Foreign MNE	Foreign MNE
Baseline	Non-MNE firms	Non-MNE firms	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates	Non-MNE affiliates
Couple FE	Yes	No	Yes	No	Yes	No	Yes	No
Observations	595988	515988	556203	481750	231468	200307	316621	274352

Note: The dependent variable is the difference in log of employment (or delta log employment) between treated firm i in year t and its matched control. Standard errors in parentheses are robust and clustered at first NACE level year. Statistically significant at ^{c} 10% ^{b} 5% ^{a} 1%.

F Causal identification demonstration

From the parallel trends assumption, we have:

$$E[Y_1(0) - Y_0|S = MNE] - E[Y_1(0) - Y_0|S = Domestic] = 0 \tag{9}$$

Given this assumption, we can rewrite equation 2 as:

$$\underbrace{E[Y_1 - Y_0|S = MNE]}_{(A)} \underbrace{-E[Y_1 - Y_0|S = Domestic]}_{(B)} - \Bigg(\underbrace{E[Y_1(0) - Y_0|S = MNE]}_{(A)} - \underbrace{E[Y_1(0) - Y_0|S = Do}_{(B)} \tag{10}$$

We have:

$$\begin{aligned} (A) &\Leftrightarrow E[Y_1 - Y_0|S = MNE] - E[Y_1(0) - Y_0|S = MNE] \\ &\Leftrightarrow E[Y_1 - Y_0 - Y_1(0) + Y_0|S = MNE] \\ &\Leftrightarrow E[Y_1 - Y_1(0)|S = MNE] \end{aligned} \tag{11}$$

And:

$$\begin{aligned} (B) &\Leftrightarrow -E[Y_1 - Y_0|S = Domestic] + E[Y_1(0) - Y_0|S = Domestic] \\ &\Leftrightarrow E[Y_1(0) - Y_0|S = Domestic] - E[Y_1 - Y_0|S = Domestic] \\ &\Leftrightarrow E[Y_1(0) - Y_0 - Y_1 + Y_0|S = Domestic] \\ &\Leftrightarrow E[Y_1(0) - Y_1|S = Domestic] \\ &\Leftrightarrow -E[-Y_1(0) + Y_1|S = Domestic] \\ &\Leftrightarrow -E[Y_1 - Y_1(0)|S = Domestic] \end{aligned} \tag{12}$$

Replacing equations 11 and 12 in equation 10, we have:

$$E[Y_1 - Y_1(0)|S = MNE] - E[Y_1 - Y_1(0)|S = Domestic] \tag{13}$$