The Multinational Revenue, Employment, and Investment Database (MREID)

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Abstract

This paper presents a new Multinational Revenue, Employment, and Investment Database (MREID). MREID offers comprehensive and consistent information on international and domestic revenue, employment, and investment variables of multinational enterprises (MNEs) for 185 countries, 25 industries, and (initially) a 12-year annual time series. The database covers a range of industries, including agriculture, mining, energy, manufacturing, and services, enabling a nearly complete description of each economy's foreign direct investment (FDI) activity. MREID currently covers the period 2010 through 2021 and is constructed using reported administrative data from Orbis.

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1 Introduction

This paper outlines the development of the Multinational Revenue, Employment, and Investment Database (MREID), a comprehensive source of information on multinational enterprises' (MNE) foreign direct investment (FDI) related activities with cross-border affiliates across 185 countries, 25 industries, and a period of 12 years. MREID includes annual data from 2010 through 2021, with 2021 being the latest year with complete information for all sectors. MREID offers bilateral sector-level data on numerous MNE variables, covering the four major sectors of agriculture, mining and energy, manufacturing, and services, and provides an exhaustive overview of FDI within each economy.

The main purpose of constructing MREID is for the statistical analysis of bilateral FDI-related variables, and we achieve this by aggregating firm-level data from ORBIS. The database contains international and domestic bilateral FDI-related variables. We do not use estimation models (such as the gravity framework) to fill in any missing observations in MREID, thus making it ideal for estimation purposes.[1] However, MREID is not balanced and includes missing observations for some years and countries.

MREID stands out from other datasets of FDI due to its extensive sectoral coverage at the bilateral level, the number of countries covered, the inclusion of more recent years, and its overall suitability for estimation purposes. Existing FDI or multinational production datasets such as OECD and FDIMarkets only cover certain countries or FDI types. Other datasets, like that of the U.S. Bureau of Economic Analysis (BEA), provide detailed FDI data, but limited to a single economy.

The rest of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes the Orbis dataset and also discusses the search strategy for constructing the MREID database. Section 4 provides a detailed description of the MREID

[1] We include, however, estimated data from Orbis when data are unavailable.

database. Section 5 compares MREID to existing multinational datasets for coverage and validity. Section 6 concludes and outlines future work on the database.

2 Background and literature review

In a recent survey of the effects of international investment agreements (IIAs), Egger et al. (2023) highlight the limitations of FDI measurement. They note that there is no high-quality bilateral FDI data available. The existing datasets from UNCTAD, IMF, and OECD have known limitations, such as heterogeneous reporting standards and the lack of differentiation between financial (e.g., portfolio) and real FDI transactions. For example, Guvenen et al. (2022) show that accounting engineering practices such as profit shifting are common among US affiliates and impact the aggregate measurement of economic variables. Some official sources like the BEA are also compiled through surveys, which might be prone to measurement error.

There is a growing consensus around the advantages of using firm-level data instead of national (income) accounts data for measuring FDI. As discussed in Wildmer et al. (2019), due to profit-shifting motives, there is a divergence between FDI reported in National Income Accounts and their representation of productive activities and investments. For instance, Damgaard et al. (2019) find that nearly 40 percent of reported inward FDI results from financial and tax engineering, which does not effectively benefit the "real" economy. By contrast, firm-level financial data, supplemented with ownership details, can be a much more reliable measure of cross-border investments and multinational firms' activities. Another advantage is the use of uni-directional bilateral data (e.g., American investment in Spain and Spanish investment in America) instead of net bilateral data, an average of the two-way FDI, or country-specific aggregating data from all origins.

With its considerable coverage of countries and sectors and its detailed ownership

information, Orbis has been relied upon increasingly in the recent literature for cross-country firm-level analysis. Gopinath et al. (2017) used Orbis to examine the productivity of manufacturing firms in Spain from 1999-2012. Cravino and Levchenko (2017) used Orbis to investigate how multinational firms contribute to transmitting economic shocks across countries. Alfaro and Chen (2018) used Orbis to analyze the nature of productivity gains arising from multinational production in the host country. Kalemli-Özcan et al. (2023) rely on Orbis to construct a representative firm-level dataset for European countries using financial statements from the Orbis database. The authors show that small-and-medium-sized firms (SMEs) account for a large share of aggregate economic activity.

Orbis has also been used to identify the ownership links between firms. Aminadav and Papaioannou (2020) use Orbis, among other sources, to investigate ownership concentration and the types of corporate control across countries. Alabrese and Casella (2020) rely on Orbis to map the complex linkages between parent firms and foreign affiliates and their broader implications for investment and tax policy. Applying a network framework on Orbis ownership data, Rungi et al. (2017) assessed direct and indirect control of corporations within and across national borders. Fonseca et al. (2023) used 22,000 listed firms in Orbis to study the globalization of corporate control employing a gravity framework.

The Bureau van Dijk phased out the dataset Zephyr, which tracked merger and acquisition (M&A) and "greenfield" transactions; several papers used this dataset to analyze FDI, e.g., Liu (2021). More recently, Bureau van Dijk launched the Orbis Crossborder Investment Monitor, a similar dataset to FDIMarkets, which tracks greenfield investment "announcements"; Linask and Waddle (2023) summarized the trends and features of this dataset.

Despite having detailed ownership information that allows researchers to distinguish between domestic and foreign affiliates, few studies have taken advantage of the Orbis data to build a database that captures several dimensions of multinational enterprise

(MNE) activities at the bilateral level over numerous sectors and years. One exception is the EU Foreign Ownership (FOWN) dataset, constructed using Orbis firm-level data and described in detail in Wildmer et al. (2019).[2] Focusing on foreign-controlled firms that operated in the European Union (EU) for the period 2007 to 2016, the FOWN dataset allows researchers to track how investment in the EU has changed over time and which EU sectors are the ones targeted for foreign investment.[3] Financial variables for EU countries track the revenues, total assets, and the number of employees of firms and are aggregated to the NAICS (Revision 2) two-digit sector level. Compared with official data sources on foreign investment in the EU, Wildmer et al. (2019) find that the FOWN dataset provides similar trends for the number of firms and sales after 2008, but underreports slightly smaller firms before 2008. Beyond the evolution of foreign ownership in the EU, the FOWN database also provides information on M&A and greenfield activity in the EU by relying on some other financial data products released by Moody's. However, the FOWN dataset's insufficient coverage of certain countries and years limits its usefulness for a broader analysis of cross-border investment and MNE activities *worldwide*.

An additional limitation of existing FDI datasets is the lack of accounting for domestic investment, which is important for empirical estimates that generally rely upon structural gravity frameworks. For example, domestic investment is important to identify country-specific variables using the structural gravity equation as shown by Heid et al. (2021) for trade and Carril-Caccia et al. (2023) for greenfield FDI, and Carril-Caccia et al. (2022) for M&As.

The MREID dataset, however, is unique by including *comparable* information on revenues, employment, and assets by ownership and by type of investment.

[2]Another exception is the nationally representative firm-level dataset of European countries created by Kalemli-Özcan et al. (2022, 2023) using Orbis data.

[3]A firm is considered as foreign-controlled if its Global Ultimate Owner in the Orbis database is registered in a country outside the EU.

3 MREID: An Overview

3.1 Data source: Orbis

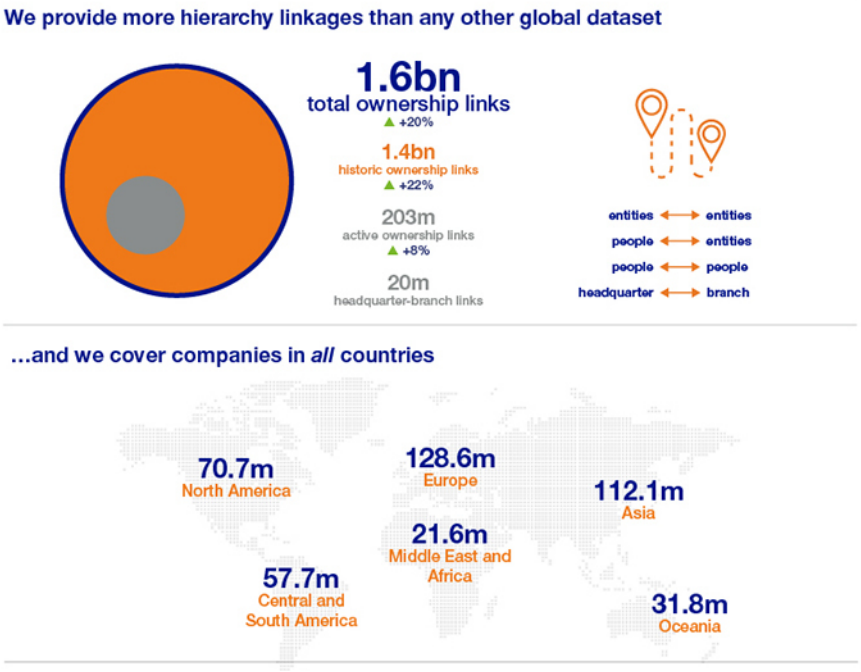
Research on FDI activity is challenged due to different measures of FDI, types of FDI, and data limitations. Establishing a foreign affiliate can be recorded in many ways (e.g., capital investment, employment) and executed in various ways (e.g., greenfield investment or merger and acquisitions (i.e., M&As)). We employ a search strategy from Orbis to overcome several of these limitations.

Orbis is Bureau van Dijk's (a Moody's Analytics company) flagship-company database with data from more than 425 million companies worldwide. It focuses on private company information and presents companies' variables in comparable formats.[4] The sources of information come from over 170 different providers, which are standardized into comparable cross-country information. Figure 1 summarizes Orbis' linkages and country coverage.

Orbis is a popular resource among economists. Kalemli-Özcan et al. (2015) were the first to describe the standard benchmark-search strategy to construct nationally representative firm-level data from the Orbis global database. Using this search strategy, Gopinath et al. (2017) studied capital stock (fixed assets), output (sales), and employees. These authors show that Orbis data coverage is comparable to Spanish administrative data. Osnago et al. (2019) used Orbis to construct an FDI dataset for several European countries and were able to distinguish vertical and horizontal FDI. Garcia-Bernardo et al. (2017) used Orbis data to unravel offshore financial centers.

[4]The MREID database we construct will consist of publicly owned and privately owned corporate firms with assets or sales larger than USD 1 million; hence, most will be publicly owned. It excludes state-owned enterprises and banks. FDI requires ownership of 50.01 percent or larger. Banks are excluded. International generally accepted accounting standards are used.

Figure 1: Orbis linkages and geographical coverage



Source: `www.bvdinfo.com`

3.2 Search strategy

Our search strategy in Orbis to construct a representative FDI dataset from firm-level data follows the best practices in the literature. The key variable to foreign identity ownership in Orbis is the variable "global ultimate owner"(GUO).[5] This variable allows us to track firms that invest in foreign countries. One of the limitations of the Orbis web interface is that the variable GUO is only available for the *current day*. This constraint has resulted in incorrect M&As during the last decade. To overcome this limitation, Kalemli-Özcan et al. (2015) proposed using yearly historical data (in disk format) to track these complex changes in ownership. More recently, in an updated version of their original working paper, Kalemli-Özcan et al. (2022, 2023) used the M&A module in Orbis to track these changes. Following this procedure, we can obtain accurate FDI data without accessing

[5]Focusing on the GUO lets us bypass some of the offshore issues that plague official FDI statistics that are based on the direct owner.

historical data (with the limitation of the ten-year rolling period).

This procedure also allows us to construct a comparable companion dataset recording M&A data. Whenever an affiliate enters the dataset within the observation period (2010-2021), we flag it as a greenfield investment. This way, we construct a second comparable companion dataset recording Greenfiled data.

We limited our search to affiliates with more than USD 1 million in turnover (i.e., sales) or in total assets in at least one year in the sample. Consequently, we reduce the number of affiliates with no "real" activity. Other FDI datasets have similar thresholds (e.g., the BEA established its threshold at USD 25 million). A key feature of our search strategy is that we also include *domestic establishments* (i.e., domestic affiliates). We established an ownership threshold of 50.01%.[6]

We selected economically active affiliates, as recorded by Orbis. We use Orbis' variable date of incorporation to fix the entry criteria of an affiliate into the MREID dataset. We have implemented criteria to detect exits from the market. Affiliates with more than four consecutive years without reports on any of the key financial variables are marked as having exited. The attrition rate with this strategy is around 8 percent of affiliates per year.

Some data in Orbis contains errors and typos from the original source. For example, some key financial variables contain negative values coded incorrectly or reflect local accounting practices. Following Kalemli-Özcan et al. (2022), we drop all negative values.

In the Appendix (section A), we outline a search example that captures the search details in ORBIS.

[6]The Fifth Edition of the IMF Balance of Payments Manual defines the owner of 10% or more of a company's capital as a direct investor. However, the majority control threshold (50.01%) aligns with the IMF and OECD definition of FDI to obtain a *lasting* interest by a resident entity of one economy in another.

3.3 FDI Variables

We selected the following as the key variables to obtain from Orbis for each subsidiary at the closing date of each year per 2-digit NAICS 2017 (core code). Our variables are the key financial variables selected from the global format accounting balance sheet, consolidating US and non-US accounting practices.[7]

- Investment: Investment is measured as either total assets or fixed assets.
  - Total assets: The sum of current assets and fixed assets, including intangibles.
  - Fixed assets: Tangible fixed assets, intangible fixed assets, and other fixed assets (exploration, long-term receivables, investments, long-term associated companies, investment properties, and other long-term assets).
- Revenue (Turnover or Sales): Total operating revenues (= net sales + other operating revenues + stock variations[8]) excluding taxes. However, for some companies, no information is provided on value added taxes (VAT); alternatively, the figure is stated as after indirect taxes or excluding sales-related taxes.[9]
- Number of employees: Total number of employees included in the company's payroll.

Orbis uses estimates for turnover, number of employees, and total assets when these data are not available. The estimation procedure uses country and industry averages to impute missing data and does *not* use gravity estimates.[10]

[7]Detailed accounting items and formulas are accessible here: `https://help.bvdinfo.com/mergedProjects/65_EN/Data_Osiris/Understanding_Osiris_data_and_formats/DataFormulas/globalformatalltemus_nonus.htm`

[8]The stock variation is the difference between the value of the initial inventory and the end of the fiscal year. According to international accounting practices if the stock valuation at the beginning of the fiscal year is lower than at the end of the fiscal year, this difference must be reflected as income.

[9]Some reported turnover might contain negative values. As stated earlier, we have dropped them.

[10]The estimation procedure is described in detail here: `https://help.bvdinfo.com/mergedProjects/65_EN/Data/Financial/Estimates.htm`

4 Description of the Database

4.1 Country, industry, and year overview

The procedures implemented guarantee that each country within MREID has a sufficient number of meaningful observations in each industry for estimation purposes. The dimensions of our database are as follows: MREID (initially) spans 12 years from 2010 through 2021. The dataset contains the financial data of 362,845 parent companies (or Global Ultimate Owners) of 1,132,707 affiliates. Of those, 351,600 are foreign affiliates from 70,661 parent companies, and the rest are domestic. Raw data from the 25 sectors are combined, and after undergoing data cleaning, we have approximately 27,000 raw observations per year at the country-sector (two-digit) level.

MREID provides data on FDI for 186 countries, including 11 countries that only have outward FDI[11] and 14 countries that only have inward FDI.[12] Therefore, the dataset covers data from 175 countries that host affiliates from 172 countries. Table B.2 in the Appendix (section B) displays the list of countries MREID covers. It also shows each country's average and maximum number of affiliates.

As noted earlier, domestic affiliates are included in the dataset. These are affiliates of a parent MNE located in the same country as the parent. There are 47 countries for which data is not available for domestic affiliates. Therefore, MREID coverage of multinational domestic and international investment is limited to 139 countries.[13]

[11] These countries are Aruba, Antigua and Barbuda, Brunei, Central African Republic, Dominica, Korea, North, San Marino, Suriname, Turkmenistan, Saint Vincent and the Grenadines, Samoa, and Yemen.

[12] These countries are Burundi, Benin, Burkina Faso, Cameroon, Republic of the Congo, Djibouti, Guinea, Grenada, Kyrgyzstan, Maldives, Mali, Mauritania, Sao Tome and Principe, and Swaziland.

[13] Domestic flows are a relevant element of structural gravity estimation, cf., Bergstrand et al. (2015) and Yotov (2022). Domestic investment is also needed to merge the MREID dataset with other trade datasets that include domestic trade (e.g., ITPD-E).

4.2 Countries

4.2.1 Statistics and distributions

Table 1 reports summary statistics for foreign affiliates at the country-pair level (averages of years 2010-2021). Panel A reports (time-averaged) total statistics for all country-pairs where there are positive observations. Panel B reports revenues, employees, and total and fixed assets *per affiliate*.

As noted above, MREID has data on FDI for 186 countries; hence, there are potentially 34,410 (=186x185) FDI measures (for each year). However, FDI investments are characterized by a large number of zeros. As noted in Table 1, there are only 4,817 country-pairs with at least one foreign affiliate investment. The mean number of active foreign affiliates across country-pairs in the sample is 90.

Table 1: Summary statistics for foreign affiliates at the country-pair level

	Panel A: Totals			Panel B: Average per affiliate		
	mean	max	sd	mean	max	sd
No. of For. Affiliates	77	19,873	428			
Revenue	3,940	609,312	20,362	59	10,782	293
Employees	7,029	1,735,375	43,965	200	156,239	2,666
Total assets	14,480	6,309,828	132,300	218	56,616	1,472
Fixed assets	5,198	1,615,221	48,817	66	22,530	610
Revenue/employee	48,251	65,794,332	1,282,092			
N					4,273	

Notes: N denotes number of country-pairs with foreign affiliates.
In both panels, revenue and total and fixed assets are in million USD.
In Panel A, revenue per employee is in thousands of USD.
In both panels, employees denotes the actual number.

Table 2 reports summary statistics on (time-averaged) revenues, employees, and total and fixed assets by ownership (i.e., domestic vs. foreign). Domestic affiliate statistics include all affiliates of parent companies from the same country. As discussed earlier,

only 139 countries in the sample report domestic affiliates. Countries have 5,687 active domestic affiliates, on average. Foreign affiliate statistics include all affiliates of parent companies from different countries; hence, statistics in Table 2 (Panels A and B) are at the country level. As expected, aggregate values are higher for domestic than foreign affiliates.

Table 2: Summary statistics at the host country by ownership (totals)

	Panel A: Domestic			Panel B: Foreign		
	mean	max	sd	mean	max	sd
No. of Affiliates	5,141	128,363	17,232	1,704	44,747	4,729
Revenue	136,628	3,570,717	471,000	86,441	1,666,594	238,122
Employees	246,864	4,783,207	764,243	152,329	3,968,938	482,269
Total assets	763,302	28,438,464	3,351,904	316,189	12,108,262	1,174,622
Fixed assets	132,133	5,199,483	540,606	113,942	4,000,906	473,700
Revenue/employee	1,029	21,801	2,667	3,583	227,384	21,773
N		123			164	

Notes: Revenue and assets in million USD . Revenue/employee in thousands USD.
Foreign statistics are at the host country level.
N denotes number of countries in the sample.

Table 3 reports summary statistics on (time-averaged) revenue, number of employees, and total and fixed assets *per affiliate* and *by ownership* (i.e., domestic vs. foreign). Note that the average foreign affiliate tends to be larger in (per affiliate) revenues, number of employees, and assets than the domestic one. Moreover, the largest foreign affiliates (max) are larger than the domestic ones in (per affiliate) revenues, number of employees, and fixed assets.

Table 3: Summary statistics at the host country by ownership (per affiliate)

	Panel A: Domestic			Panel B: Foreign		
	mean	max	sd	mean	max	sd
Revenue	76	970	171	93	1,224	188
Employees	250	3,829	624	282	5,095	697
Total assets	424	11,394	1,224	431	5,505	749
Fixed assets	51	1,490	160	94	3,915	428
N		137			172	

Notes: Revenue and assets in millions of USD.
Foreign statistics are at the host country level.
N denotes number of countries in the sample.

However, means, maximum values, and standard deviations provide only a limited picture. Figure 2 shows the distributions of the (time-averaged) variables in Table 2 (totals per host country). Figure 2a shows that the distribution of foreign affiliate sales is similar to that of domestic affiliate sales; this figure confirms visually that a larger share of the distribution of foreign affiliate revenues is at smaller values relative to domestic revenues. However, the left tail of the domestic revenue's distribution is longer than that of the foreign distribution. This means that the mass of very small domestic affiliates is larger than that of foreign affiliates. Not surprisingly, Figure 2b shows similarly that a larger share of the distribution of the number of foreign affiliate employees is at smaller values than domestic employees. Although foreign and domestic total (and fixed) assets show similar distributions, foreign affiliates have a larger share of their assets at lower levels than domestic affiliates. The distributions of revenue per employee are similar for foreign and domestic affiliates.

Figure 3 shows the distributions of the variables of Table 3 (averages per affiliate and per host country). On a per affiliate basis, the revenue and numbers of employee distributions reveal a different story for foreign and domestic affiliates relative to aggregate values in Figure 2. On a per affiliate basis, the share of revenues per affiliate in panel 3a

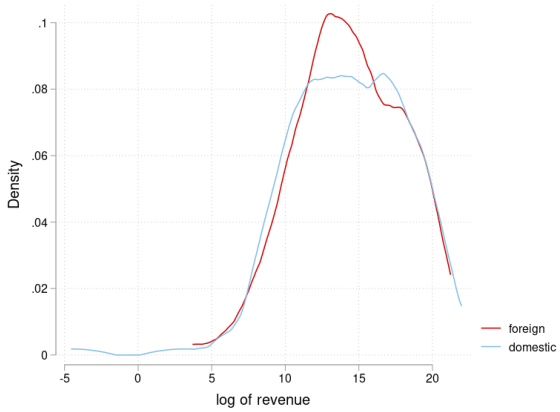
is thicker for foreign affiliates relative to domestic affiliates. The left tail of the distribution of dometic affiliates' revenue is much thicker than that of foreign. Conversely, the right tail is longer for foreign than for domestic revenues. Foreign affiliates are more concentrated around the (larger) mean of revenue per affiliate and the largest foreign affiliates exhibit higher revenues than domestic affiliates. While the share of employees in panel 3b per affiliate is also relatively larger for foreign affiliates (and with similar left and right tails), the evidence is suggestive that profits per foreign affiliate may exceed profits per domestic affiliate, which is consistent with theoretical models' hypotheses that foreign affiliates need to recover larger profits than domestic affiliates to cover the extra fixed costs of establishing a foreign affiliate, cf., Bergstrand and Egger (2007), Ramondo and Rodriguez-Clare (2013), and Arkolakis et al. (2018).

4.2.2 Country coverage and maps

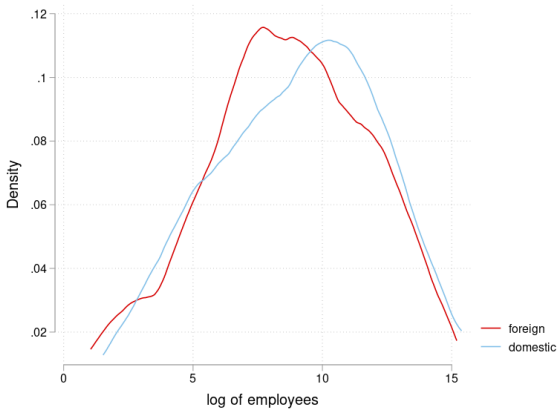
Figure 4 provides a heatmap of the spatial distribution of the multinational activity flows in each country. Panel 4a in the top shows the number of inward affiliates by country. This refers to the number of affiliates owned by foreign parents in that country. Panel 4b in the top shows the number of outward affiliates. This refers to the number of affiliates in foreign countries owned by parents of the designated country. The bottom figures show the number of parent firms in a country (panel 4c) and the number of domestic affiliates of parents in a country (panel 4d). Since the figures are readily interpretable, we need not provide extensive commentary. However, a few results are worth noting. First, while the United States has one of the largest number of outward affiliates (owned by US parents), it is not among the countries with the largest number of inward affiliates (but the United Kingdom is). Second, though China has fewer outward affiliates than the United States, China is close in numbers to the United States in number of inward affiliates. Third, the United States and China are similar in size in terms of domestic affiliates.

Figure 2: Distributions per host country (aggregates)

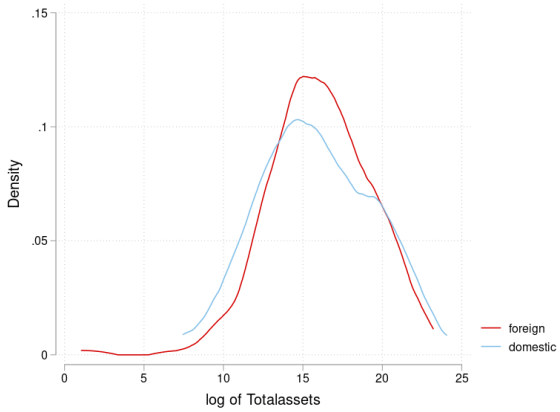
(a) Revenue (million USD)



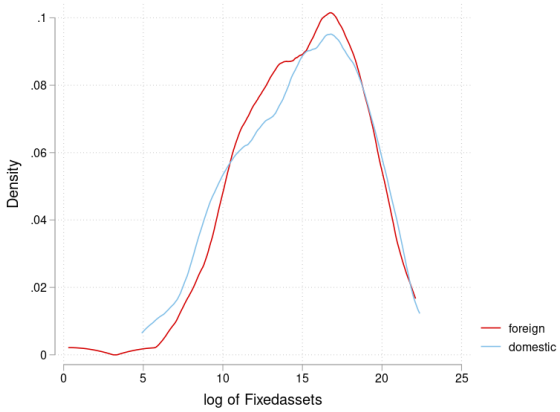
(b) Employees



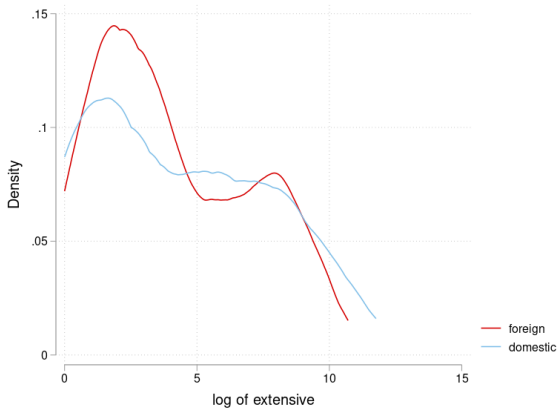
(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



(e) Number of affiliates



(f) Revenue per employee

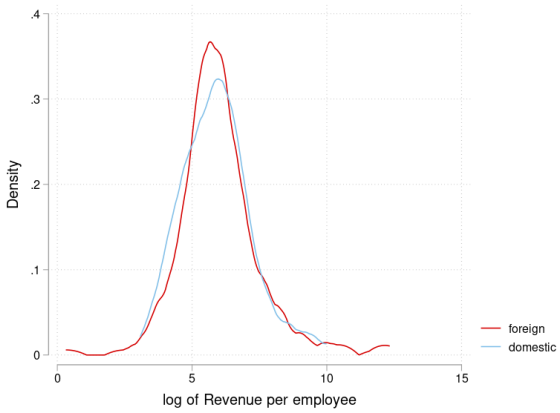
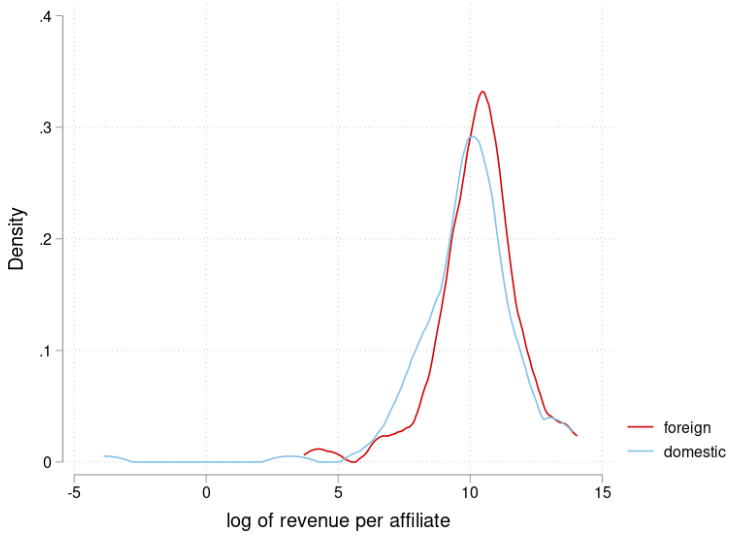
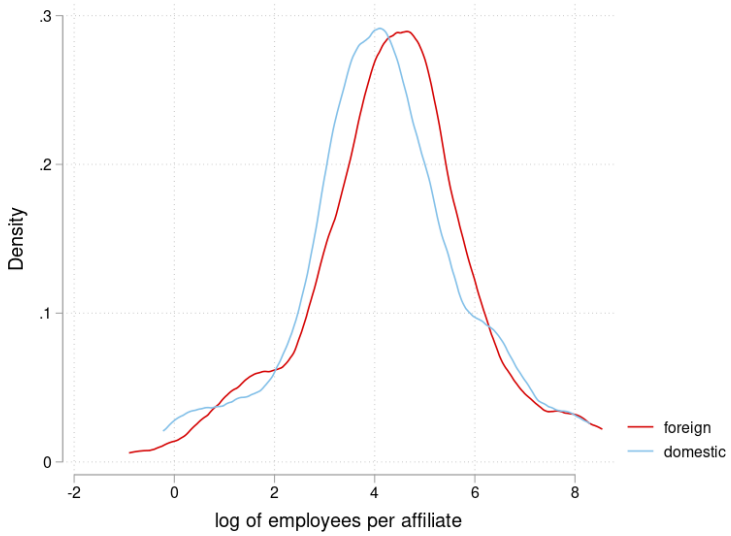


Figure 3: Distributions per host country (average per affiliate)

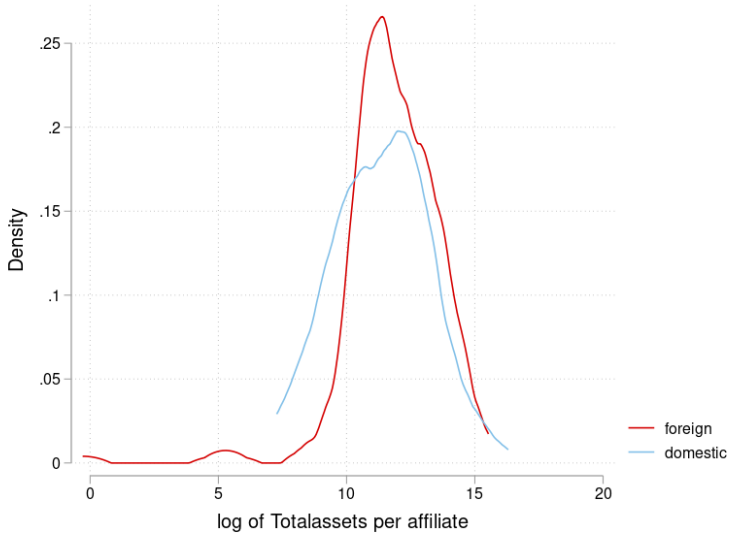
(a) Revenue (million USD)



(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)

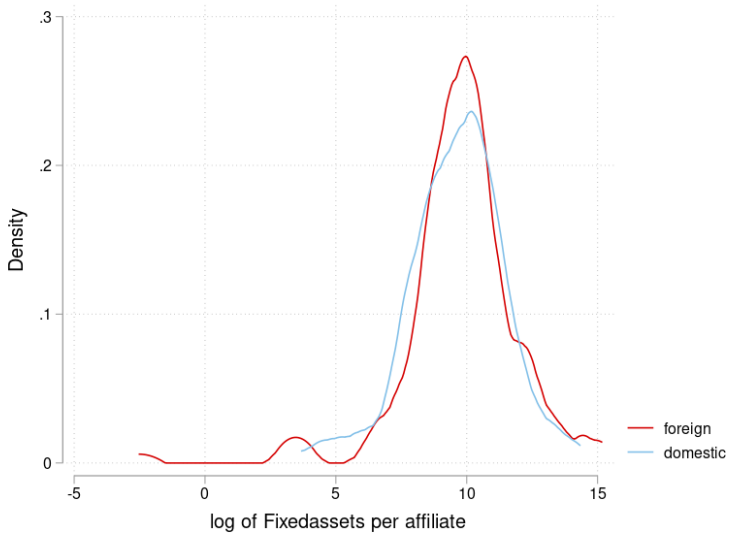
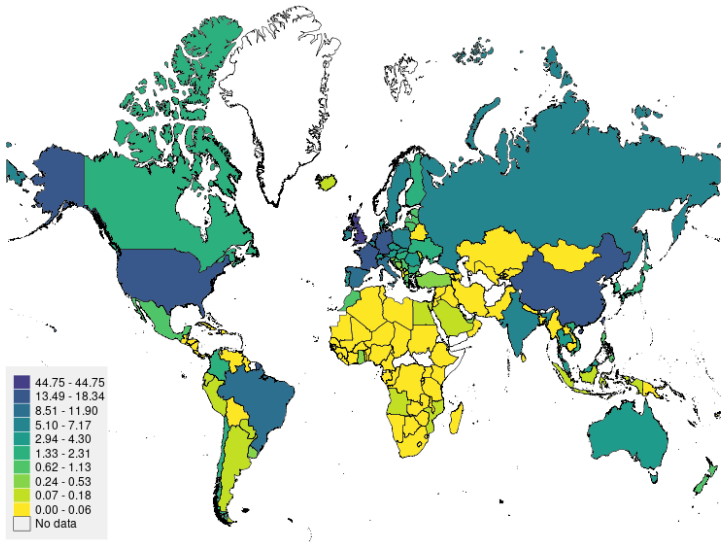
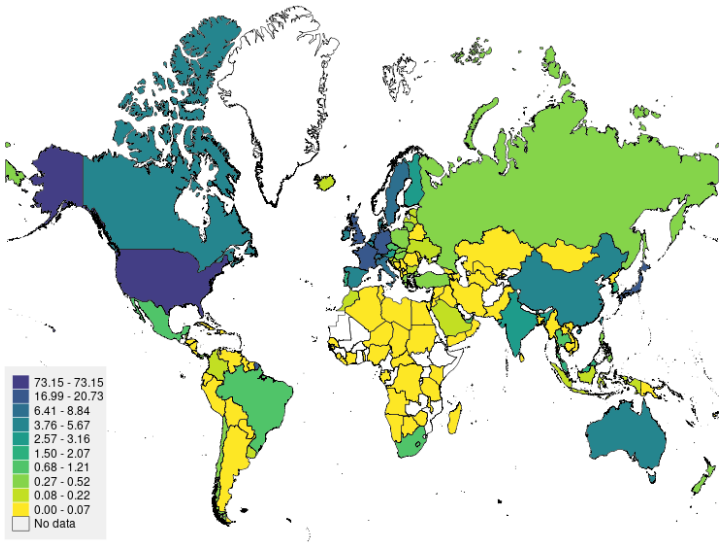


Figure 4: Affiliates world map

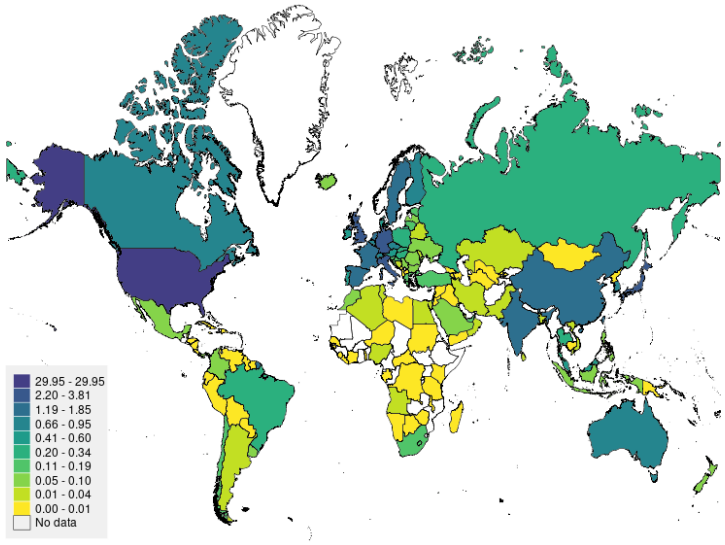
(a) Inward affiliates



(b) Outward affiliates



(c) Parent firm (Global Ultimate Owner)



(d) Domestic Affiliates

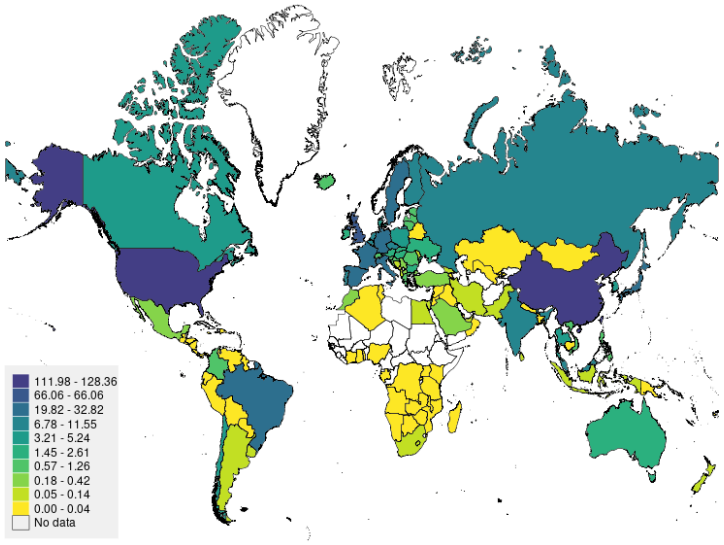


Figure 5 provides a heatmap of the spatial distribution by (parent firm) country of the revenues earned in foreign countries (panel 5a), employees based at foreign affiliates (panel 5b), and revenues per employee in foreign affiliates (panel 5c). We note a couple of insights. First, China, Germany, and the United Kingdom are among the countries with the largest revenue earned from foreign countries, and not the United States. Second, China is also among the countries with the highest number of employees in foreign countries. Third, China and the United States earn comparable levels of revenue per employee in foreign countries; however, Chad and Tunisia are among the highest in revenue per employee in foreign countries, presumably for natural resource reasons.

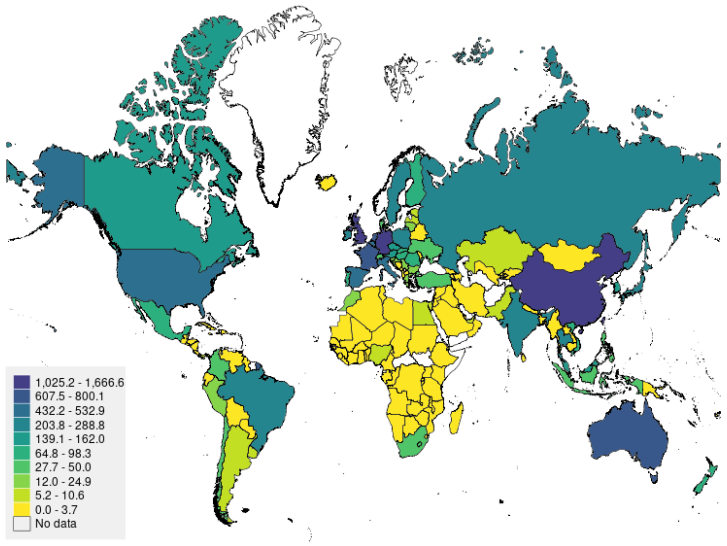
Figure 6 provides a heatmap of the spatial distribution of the total and fixed assets owned by foreigners in a country or that country's liabilities to foreigners (top panels 6a and 6b respectively) and total and fixed assets owned in foreign countries by the designated country (bottom panels 6c and 6d respectively).

4.2.3 Bilateral flows

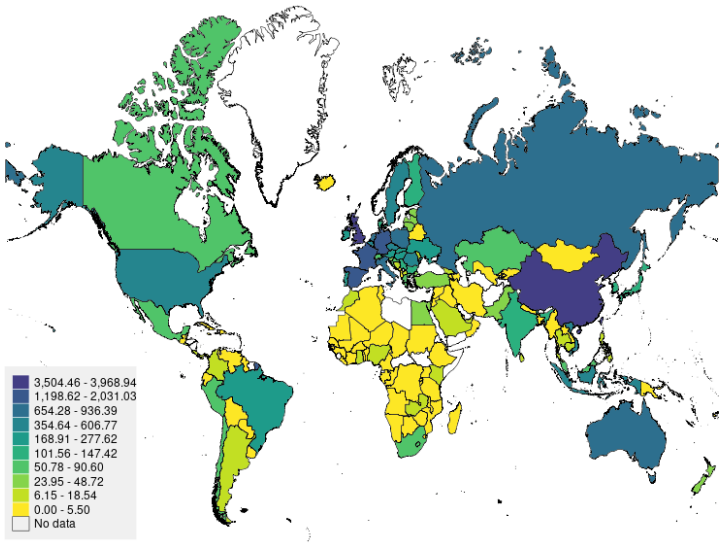
Figure 7 shows a bilateral flow diagram for our sample's "top 25" home and host countries. This particular figure illustrates the (time-averaged) relative numbers of affiliates created by a parent in a country on the left-hand-side (LHS) into a foreign country on the right-hand-side, or RHS. We note several points. First, as expected, the USA is the relatively largest investor (in terms of number of foreign affiliates), followed in size by Japan, Germany, the United Kingdom, and France. Second, the figure indicates that the largest FDI flow is to the United Kingdom, with significant flows to Japan, Germany, and France. Third, one can see the importance of distance from the figure. For example, the sizes of the Japanese FDI flows to Thailand and the United States are relatively similar despite Thailand's relatively smaller economic size, because of Thailand's relative proximity to Japan.

Figure 5: Revenue and employees maps

(a) Revenue in foreign countries



(b) Employees in foreign countries



(c) Revenues/employee in foreign countries

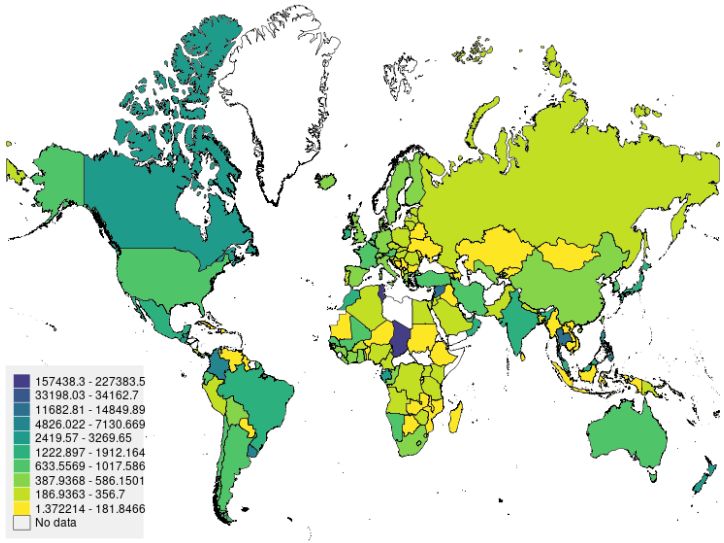
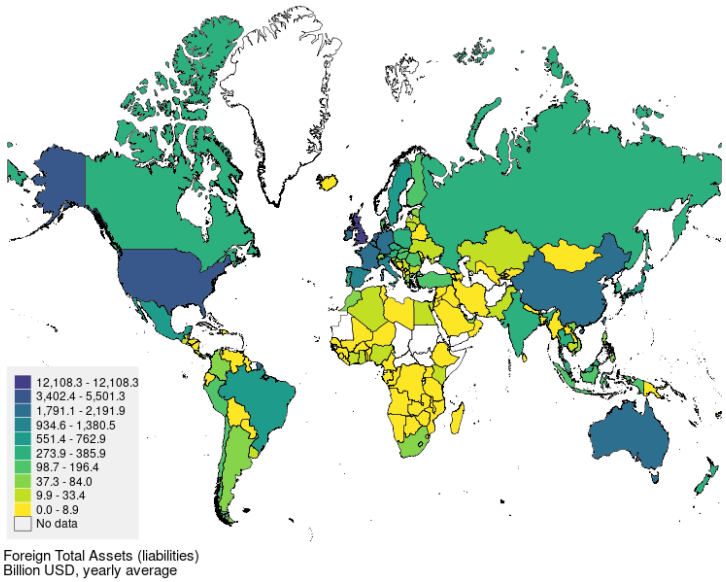


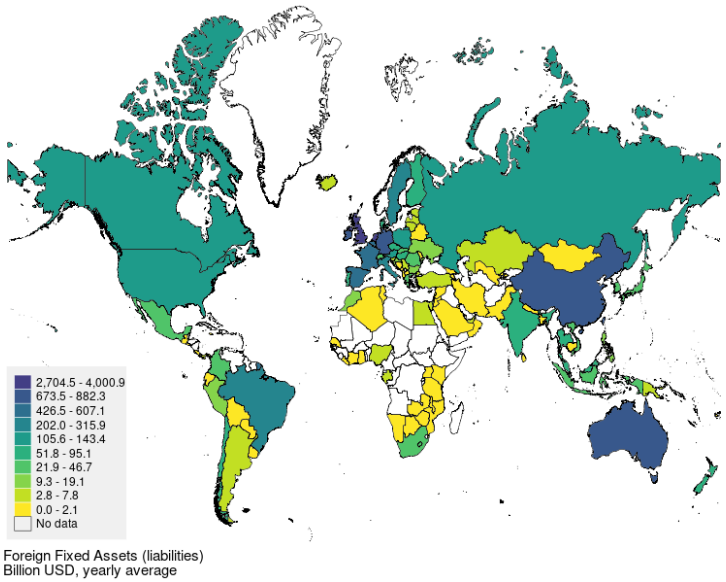
Figure 6: Foreign Assets

(a) Foreign Total Assets (liabilities)



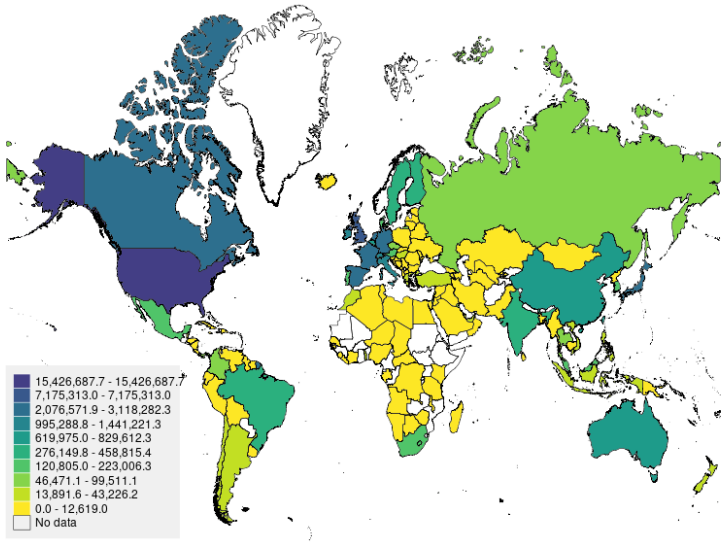
Foreign Total Assets (liabilities)
Billion USD, yearly average

(b) Foreign Fixed Assets (liabilities)



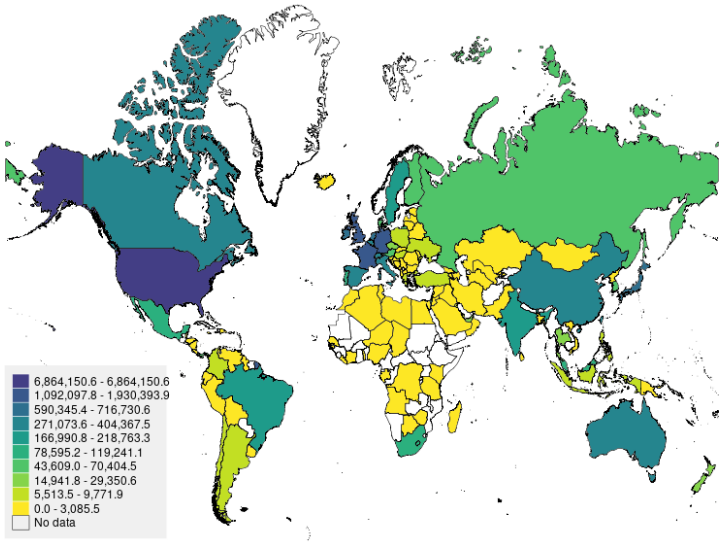
Foreign Fixed Assets (liabilities)
Billion USD, yearly average

(c) Total Assets in Foreign Countries



Total Assets in Foreign countries
Billion USD, yearly average

(d) Fixed Assets in Foreign Contries



Fixed Assets in Foreign countries
Billion USD, yearly average

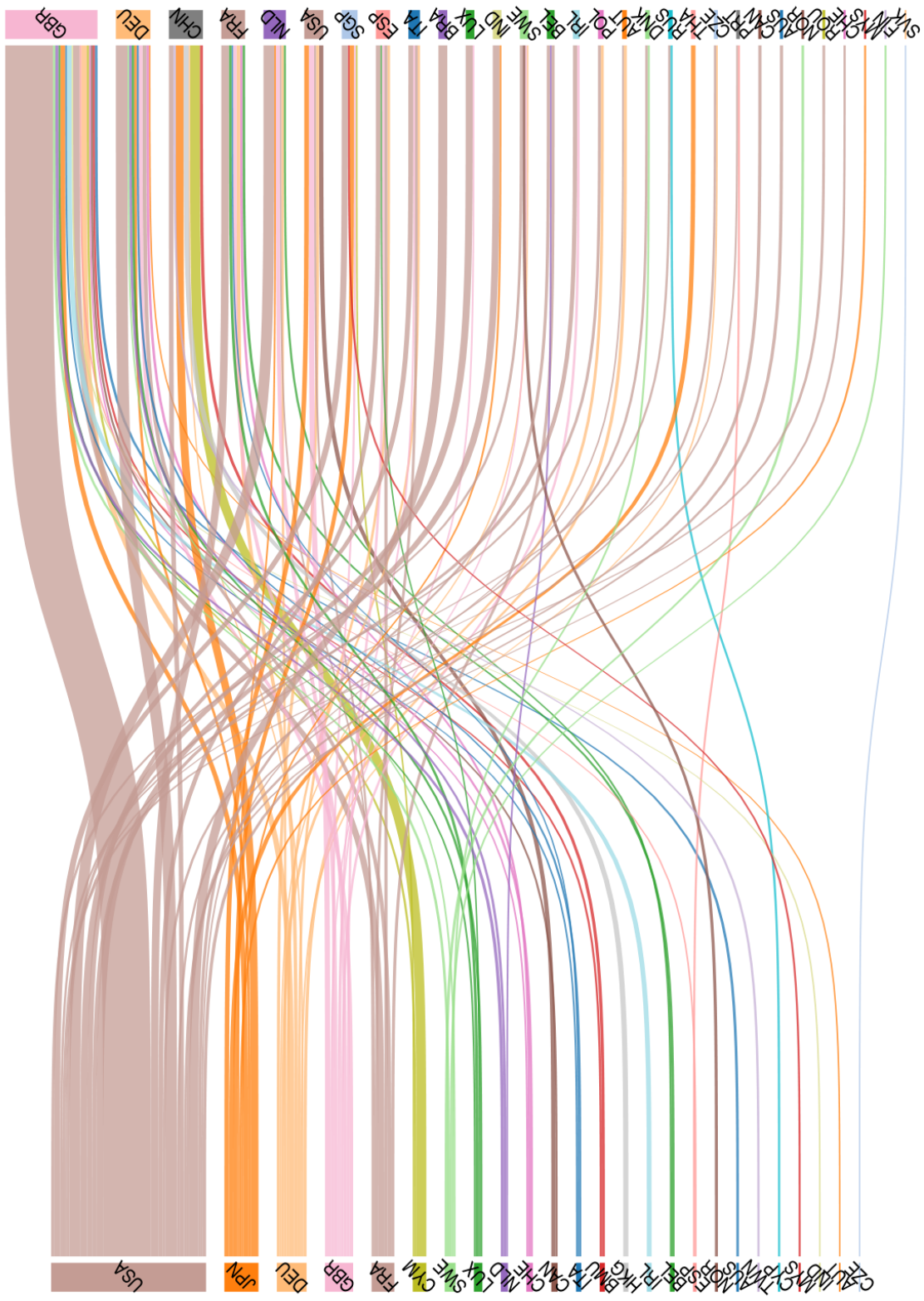


Figure 7: Foreign direct investment flows (number of foreign affiliates)

Figure 8 provides four flow figures similar to that in figure 7. Here, we show various other measures of parent activities in foreign affiliates. Top panels 8a and 8b show, respectively, revenues earned by parents on the LHS from affiliates in the RHS countries and numbers of employees at such affiliates. The bottom two panels 8c and 8d show, respectively, the total bilateral total and fixed assets of parent countries on the LHS in foreign countries on the RHS.

4.3 Sectors

This section describes the sectoral distribution of the data. As discussed earlier, we look at 25 two-digit SITC sectors. In panels 9a – 9d of Figure 9, we provide four measures of (aggregate) FDI/MNE activity for *each* of the 25 sectors. The data is time-averaged across the 12 years of data, as earlier. We note several results. We note that – similar to data at the aggregate level reported in Table 2 – domestic affiliates' (total) revenues, number of employees, and total and fixed assets at the sectoral level are typically larger than those for foreign affiliates. Similarly, in panel 9e, the number of affiliates domestically by sector exceeds that abroad. Also similar to the aggregate data, as shown in panel 9f, at the sector level, revenues per employee are typically larger for foreign affiliates than their domestic counterparts.

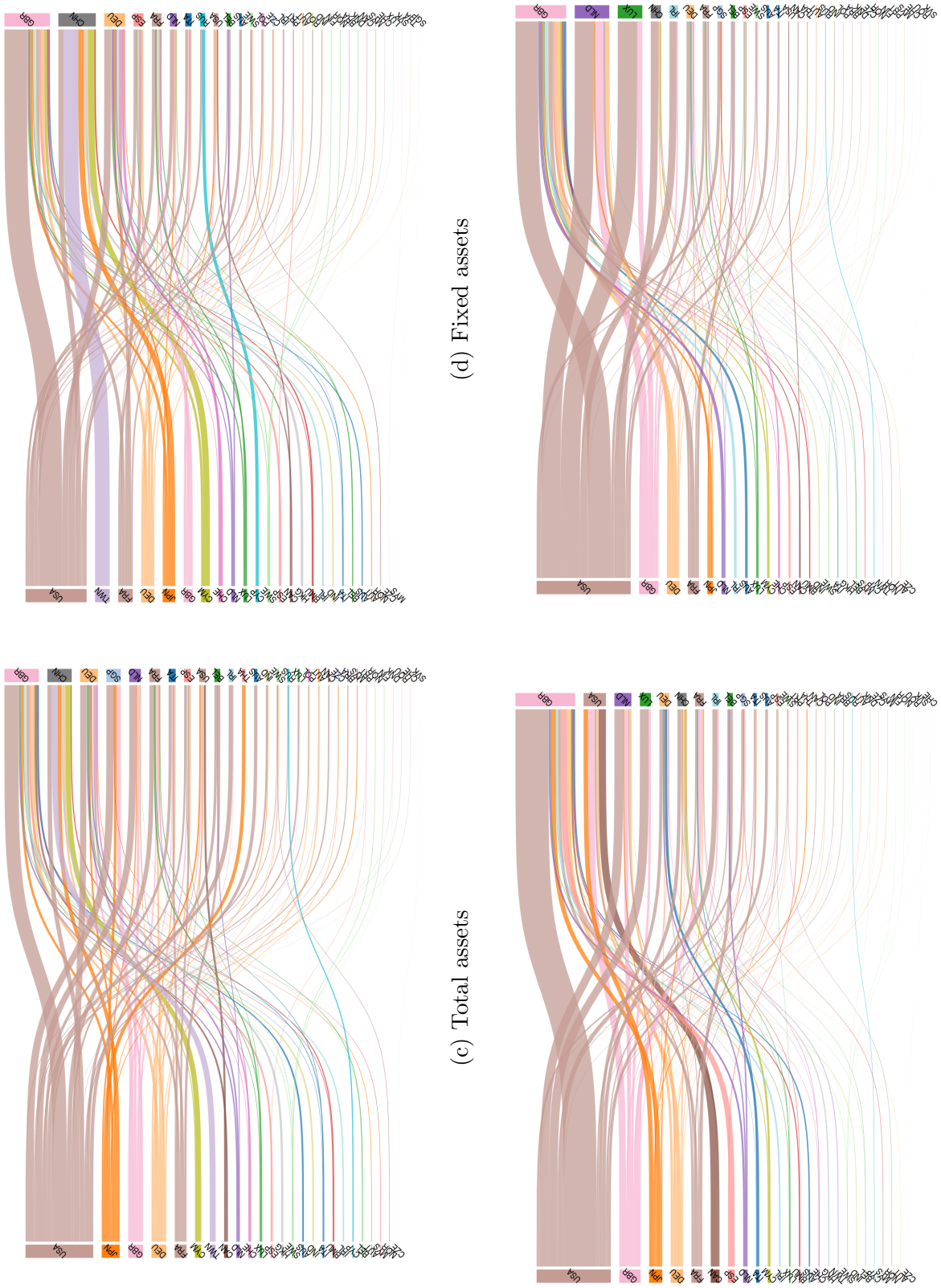
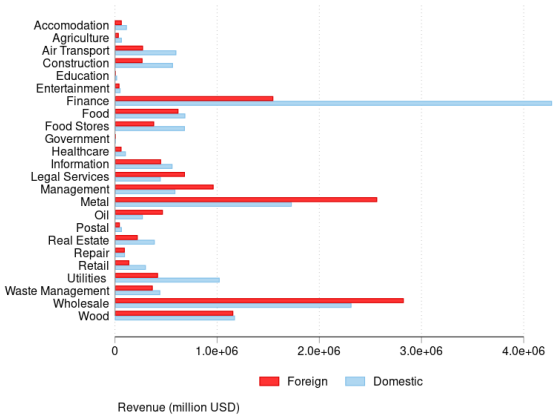


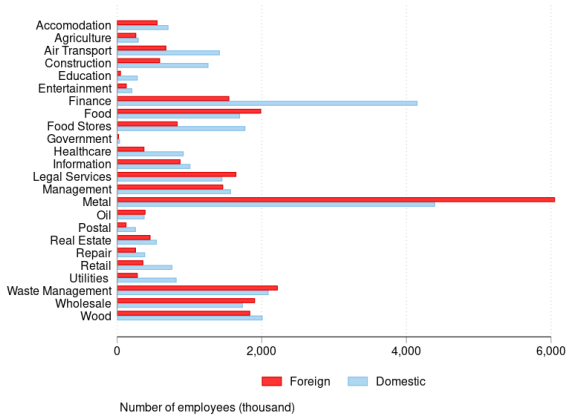
Figure 8: Foreign investment flows

Figure 9: Aggregate Foreign Revenue, Employees, Assets (total and fixed) by Sector

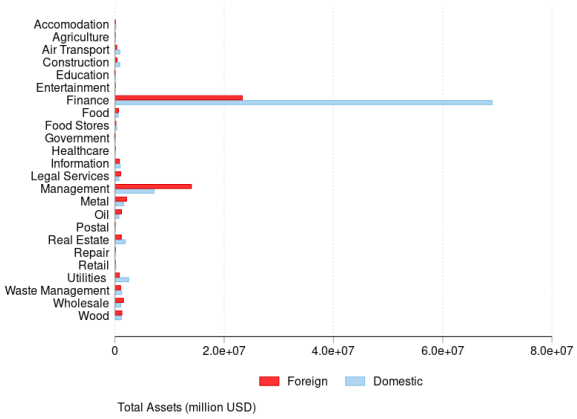
(a) Revenue (million USD)



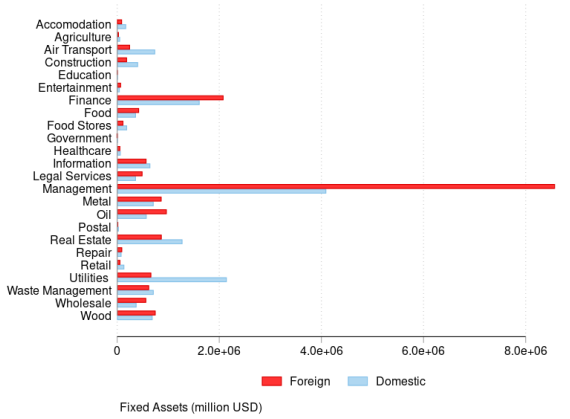
(b) Employees



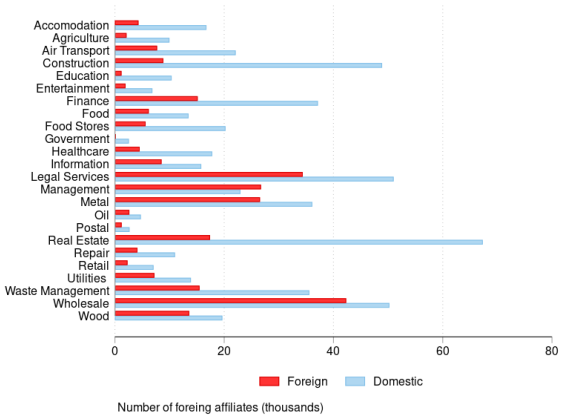
(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



(e) Sector Affiliates



(f) Revenues per employee

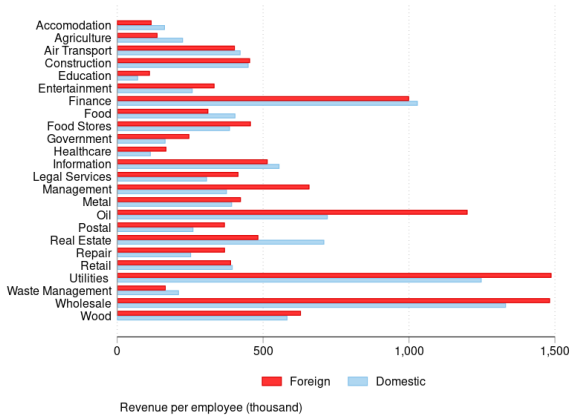


Figure 10 shows the (time-averaged) distribution of the sectors' total revenues (10a), employees (10b), and total (10c) and fixed assets (10d) *per affiliate* for domestic and foreign affiliates. Similar to the comparable data on total revenues, employees, and total and fixed assets per affiliate for aggregate data in Table 3, this figure shows that foreign affiliates' revenues, employees, and total and fixed assets per affiliate typically exceeds those of domestic affiliates.

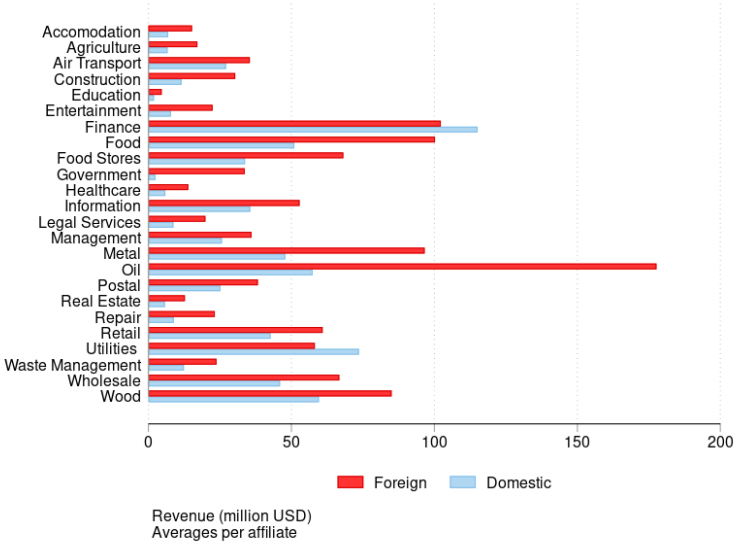
Figure 11 provides a similar bilateral flow diagram for the top 25 countries in our sample to that earlier for aggregate FDI. However, by considering the sectoral decomposition, this figure adds *another dimension* to the analysis. As before for Figure 7, the LHS lists the top 25 (largest) outward FDI countries. Also as before, the RHS lists the top 25 FDI countries. The difference in this figure is the *sector* identification in the middle column.

To appreciate insights from this figure, consider US outward FDI; the United States is the largest FDI investor abroad (cf., Figure 4, panels b and c). However, consider the middle sector identification for the Wholesale industry (in green, at the top). The United States is a large foreign direct investor in the Wholesale industry. Moreover, the number of ultimate foreign affiliate destinations is large, as shown by inward US wholesale FDI into the United Kingdom (GBR, at the top) down to South Korea (KOR, at the bottom).

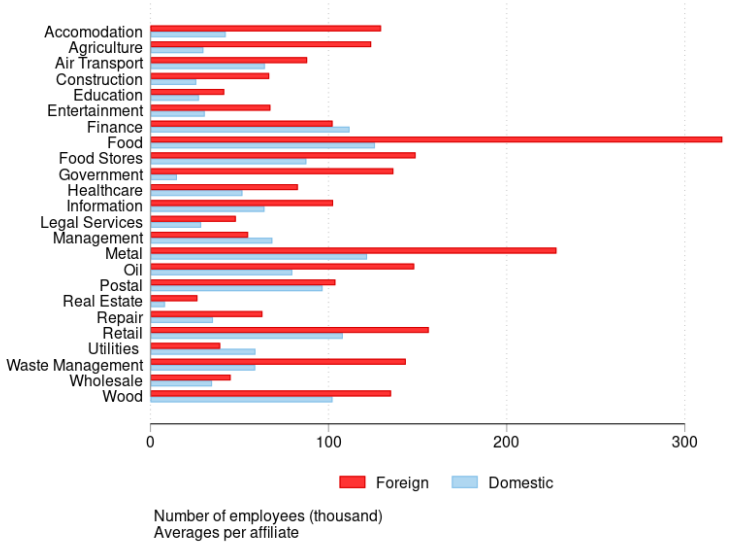
While the previous figure displays the bilateral flow pattern by sector for*numbers* of foreign affiliates (which we label the extensive margin), Figure 12 provides a flow diagram for the top 25 countries in our sample for revenues (i.e., turnover for foreign affiliate sales), employees, total assets and fixed assets per country pair and sector in panels 12a, 12b, 12c, and 12d respectively. While a detailed examination of each of the flows within these figures is beyond the scope of this paper, we note – consistent with Figure 11 – that the United States (in panel 12a) has relatively large foreign affiliate sales in the Wholesale industry as well. However, the richness of our data set is that it reveals that US FDI activity by employment is highest in Metals, by total assets is highest in Finance, and by

Figure 10: Sectors: Foreign Revenue, Employees, Assets per affiliate and by ownership

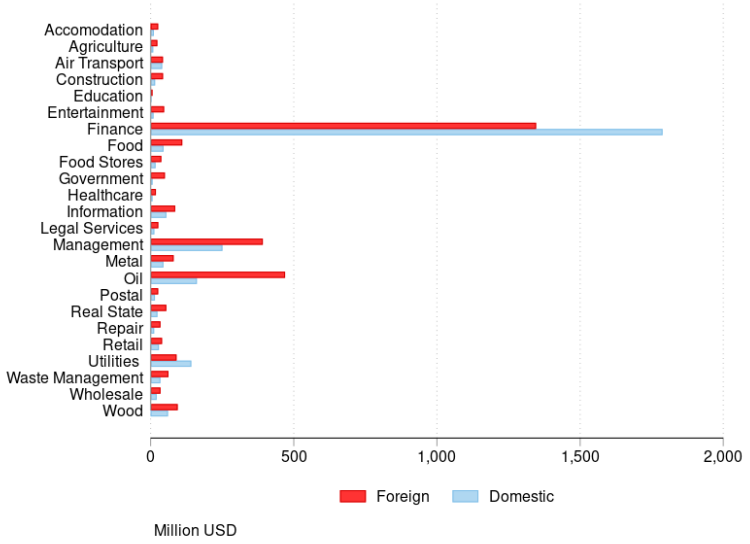
(a) Revenue (Million USD)



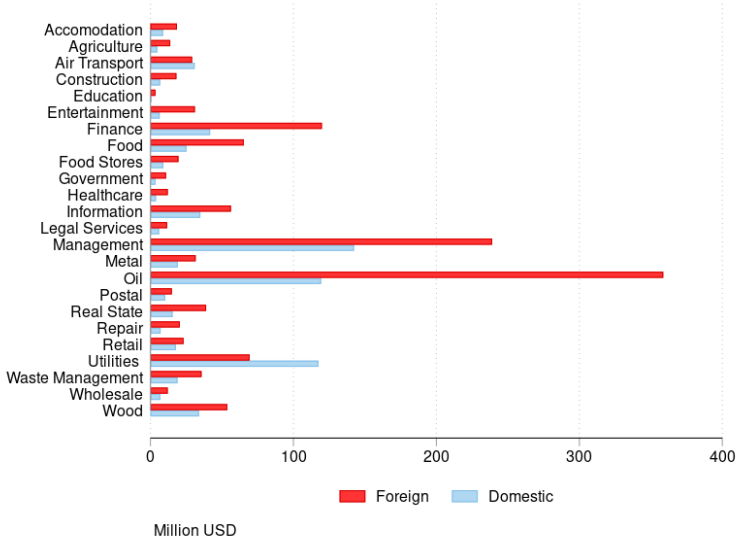
(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



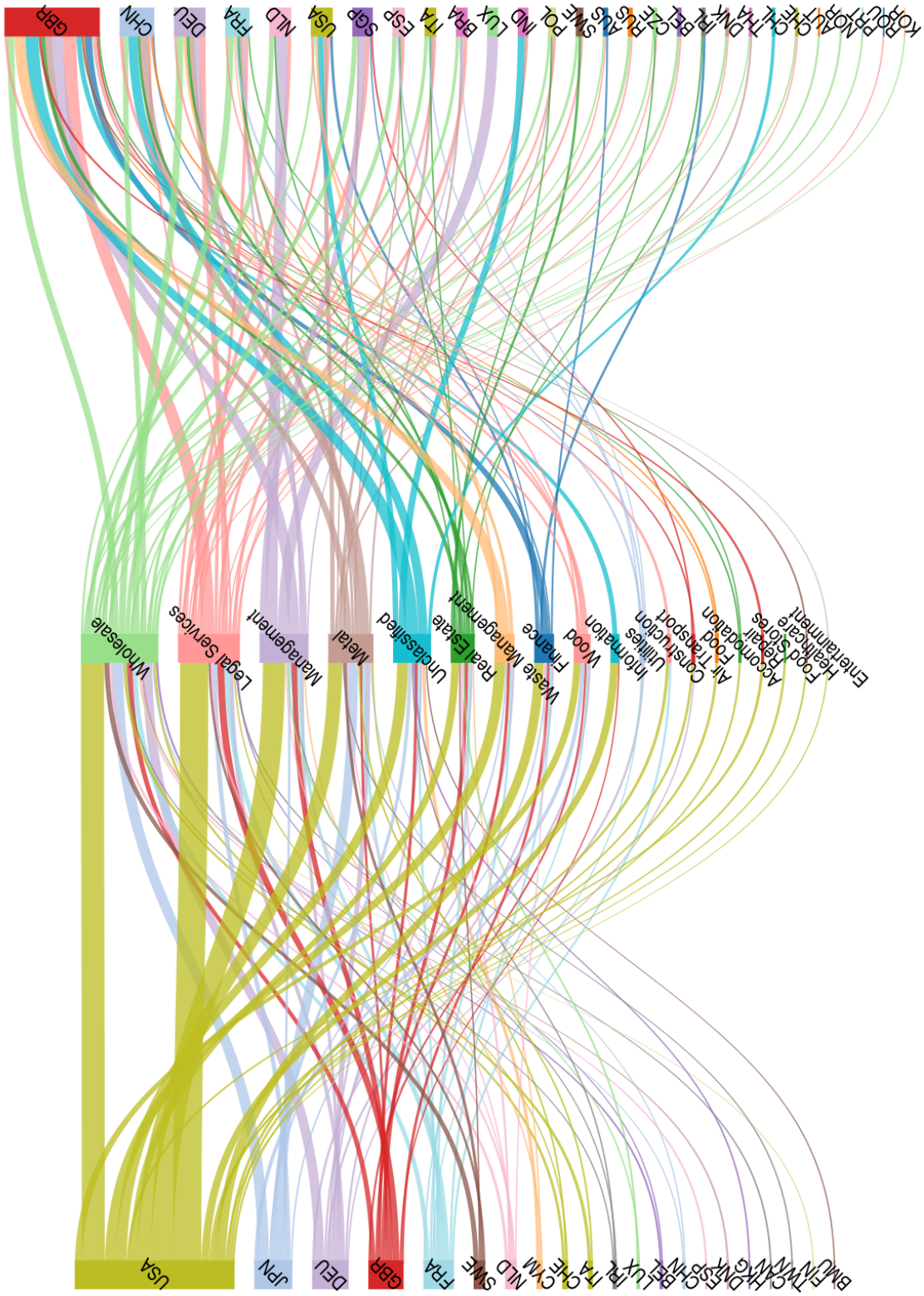


Figure 11: Foreign investment flows per country and sector (affiliates)

total fixed assets is highest in Management. Thus, our data set contributes information across *various dimensions* (or measures) of MNE/FDI activity.

4.4 Greenfield FDI

A relevant and distinctive feature of the MREID dataset is information regarding the entry mode in foreign markets. Greenfield FDI refers to an investment from a parent company into a *new* affiliate abroad during the sample period. Table 4 reports the summary statistics for greenfield FDI for foreign affiliates at the country-pair level (averages of years 2010-2012). Panel A reports (time-averaged) total statistics for all country-pairs with positive observations. Panel B reports revenues, employees, and total and fixed assets *per affiliate.* As noted in Table 4, there are only 3,008 country-pairs with at least one foreign affiliate investment. The mean number of active foreign affiliates across country-pairs in the sample is 7.

Table 4: Summary statistics at the country-pair level, Greenfield FDI

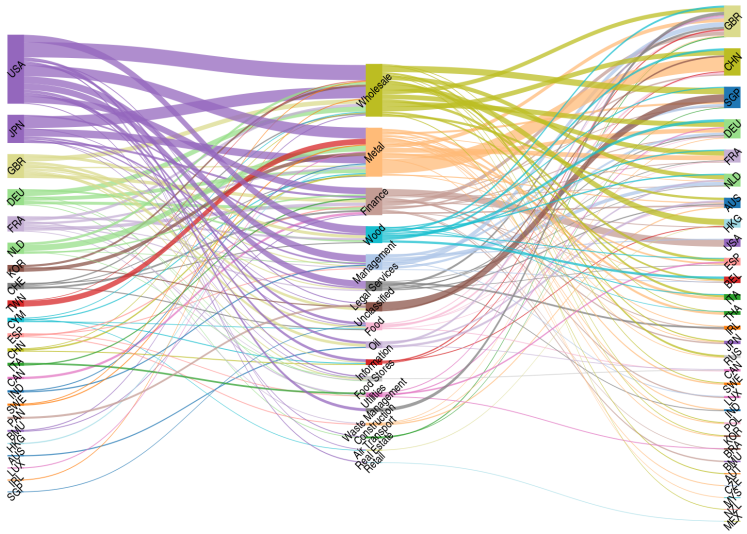
	Panel A: Totals			Panel B: Average per affiliate		
	mean	max	sd	mean	max	sd
No. of Affiliates	7	1,129	36			
Revenue	33	7,917	269	10	6,678	178
Employees	92	8,867	425	32	28,546	614
Total assets	376	114,551	3,749	47	24,526	662
Fixed assets	206	42,850	1,950	25	13,388	370
Revenue/employee	3,944	2,293,292	78,316			
N					3,008	

Notes: N denotes number of country-pairs with foreign affiliates.
In both panels, revenue and total and fixed assets are in millions of USD.
In Panel A, revenue per employee is in thousands of USD.
In both panels, employees denotes the actual number.

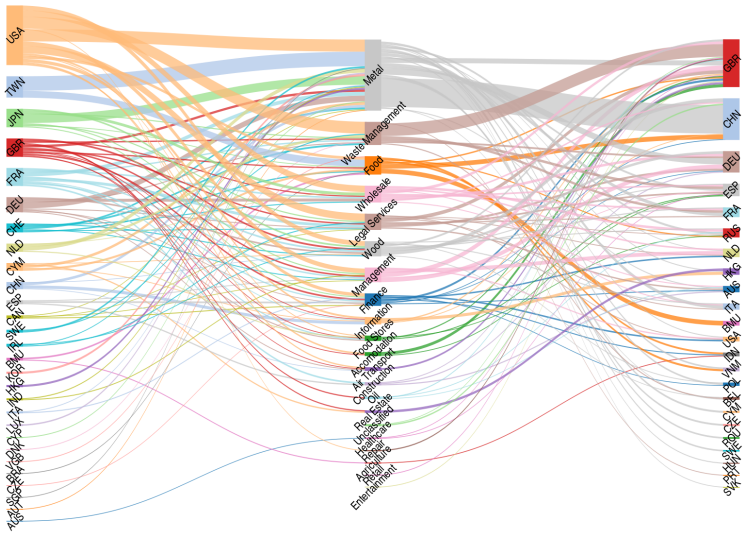
Table 5 reports summary statistics for (time-averaged) revenues, employees, and total

Figure 12: Foreign investment flows per country and sector

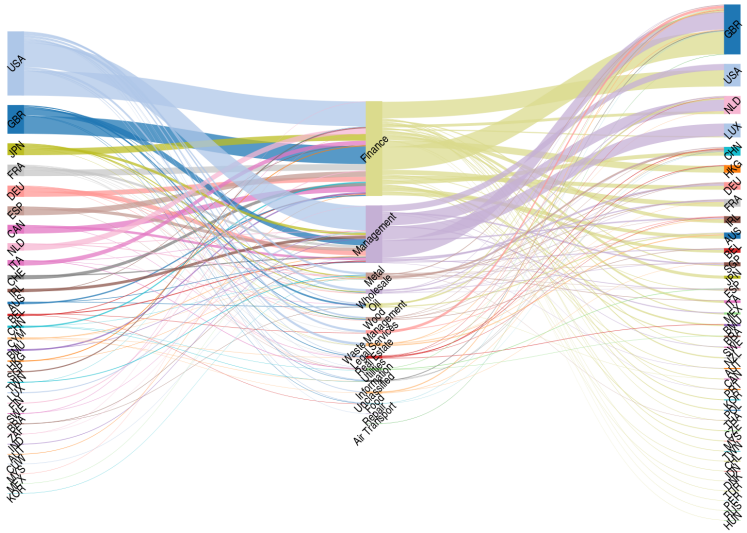
(a) Revenue



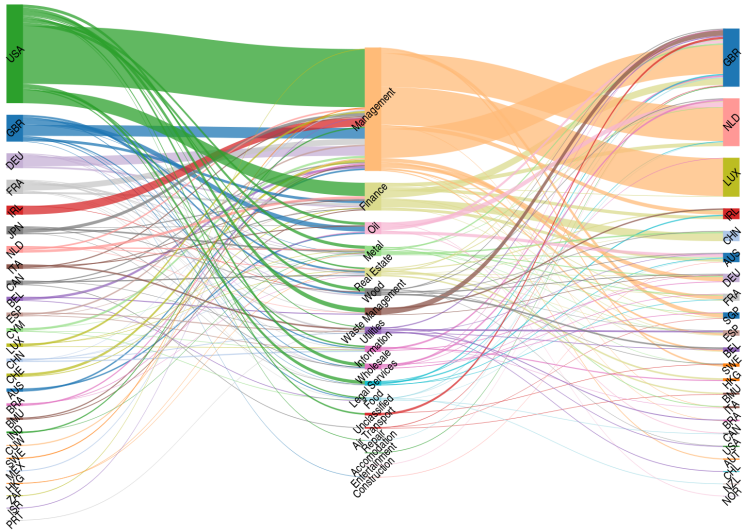
(b) Employees



(c) Total assets



(d) Fixed assets



and fixed assets by ownership, i.e., domestic vs. foreign. Domestic affiliate statistics include all affiliates of parent companies from the same country. As discussed earlier, only 139 countries in the sample report domestic affiliates. Foreign affiliate statistics include all affiliates of parent companies from different countries; hence, statistics in Table 5 (Panels A and B) are at the country level. As expected, aggregate greenfield values are higher for domestic than foreign affiliates.

Table 5: Summary statistics by ownership (totals), greenfield FDI

	Panel A: Domestic			Panel B: Foreign		
	mean	max	sd	mean	max	sd
Extensive	423	10,200	1,322	175	2,050	321
Revenue	1,002	21,276	3,100	775	13,470	2,015
Employees	2,690	37,893	6,683	1,943	19,036	4,137
Total assets	6,786	130,465	21,171	8,706	188,444	27,415
Fixed assets	2,870	69,970	9,165	4,938	85,471	16,318
Revenue/emp	570	7,637	1,111	8,528	405,700	49,269

Notes: Revenue and assets in million USD. Revenue/employee in thousands USD. Foreign statistics are at the host country level.

Table 6 reports summary statistics for (time-averaged) revenue, number of employees, and total and fixed assets *per affiliate* and *by ownership* (i.e., domestic vs. foreign). Note that the average foreign affiliate tends to be larger in (per affiliate) revenues, number of employees, and assets than the domestic one. Moreover, the largest foreign affiliates (max) are larger than the domestic ones in (per affiliate) revenues, number of employees, and total and fixed assets.

Table 6: Summary statistics by ownership (per affiliate), greenfield FDI

	Panel A: Domestic			Panel B: Foreign		
	mean	max	sd	mean	max	sd
Revenue	8	211	27	40	1,446	193
Employees	36	1,257	157	65	3,005	350
Total assets	54	1,355	166	172	5,885	750
Fixed assets	28	1,118	121	99	4,467	546

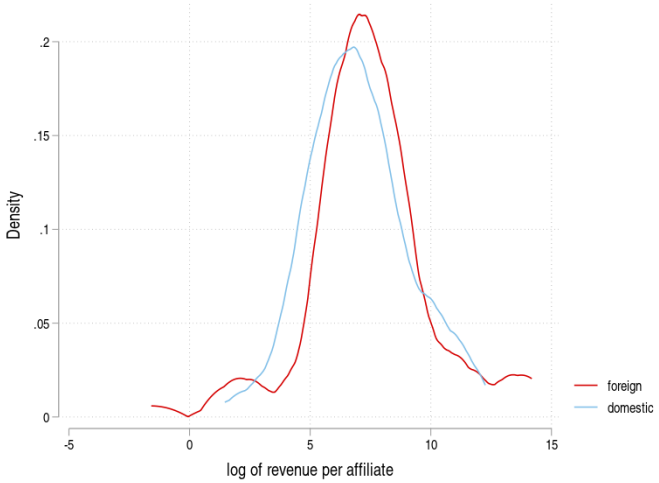
Notes: Revenue and assets in millions of USD.
Foreign statistics are at the host country level.

Figure 13 shows the distributions (average per affiliate) of revenues, employees, and assets (total and fixed) in the host country per ownership (domestic vs. foreign) for greenfield FDI. These distributions have some similarities to the total distributions per affiliate shown in Figure 3, with some relevant differences. As in the general case, the average greenfield foreign affiliate is larger in terms of revenues, employees, and assets than the domestic greenfield affiliate. However, foreign greenfield affiliates exhibit thicker right *and* left tails in the distribution of revenues (panel 13a). In the general case (shown in Panel 3a), foreign affiliates had shorter left tails. This means that foreign greenfield affiliates are more heterogeneous in terms of revenue dispersion than domestic affiliates or established affiliates. This is compatible with initial greendfield investments at lower levels and scaling up afterward. We observe the same pattern for employees (panel 13b) and assets (panels 13c and 13d).

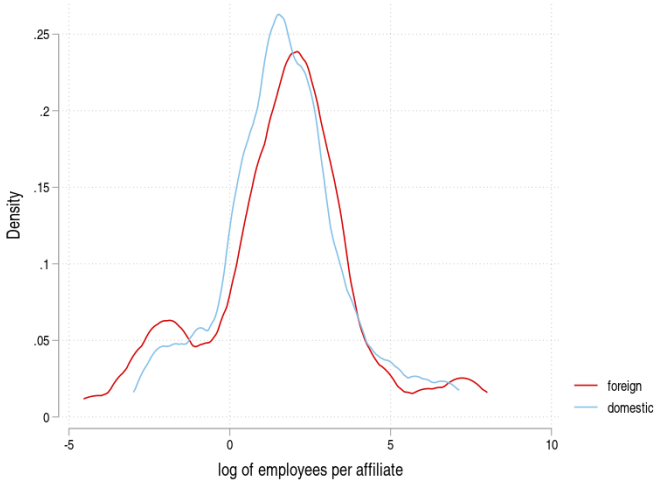
Figure 14 shows the bilateral flows between the top 25 home and host countries for greenfield FDI. The country ranking is similar to the general case shown in Figure 7. We do observe a significant difference in the case of the Cayman Islands (CYM), which is ranked as the third country in terms of greenfield outward FDI. This highlights the presence of tax havens and possible profit shifting in greenfield operations.

Figure 13: Distributions in the host country (average per affiliate) per ownership, greenfield

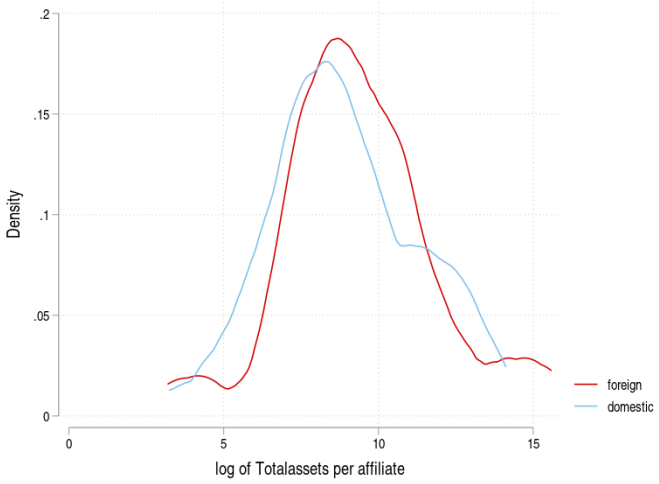
(a) Revenue (million USD)



(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)

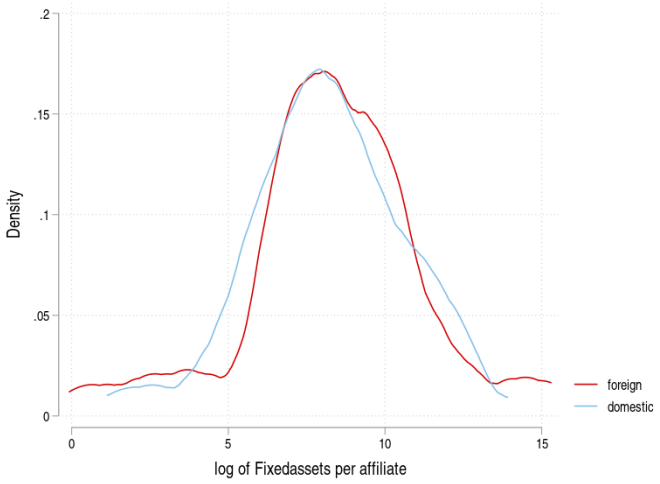
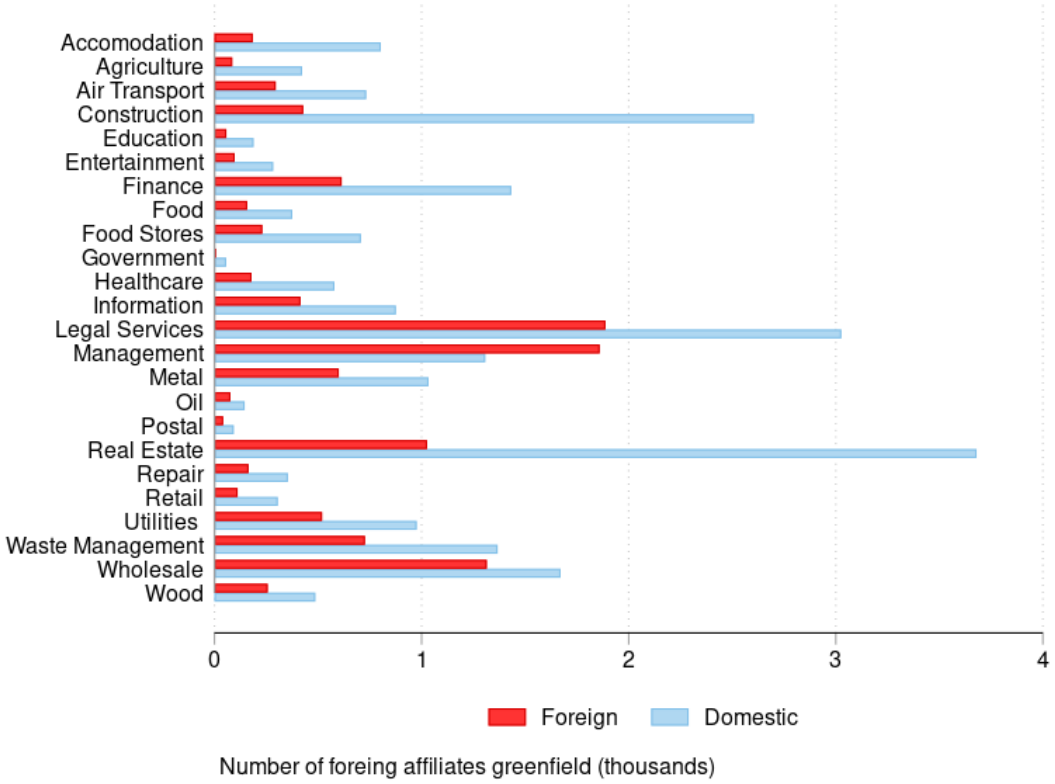
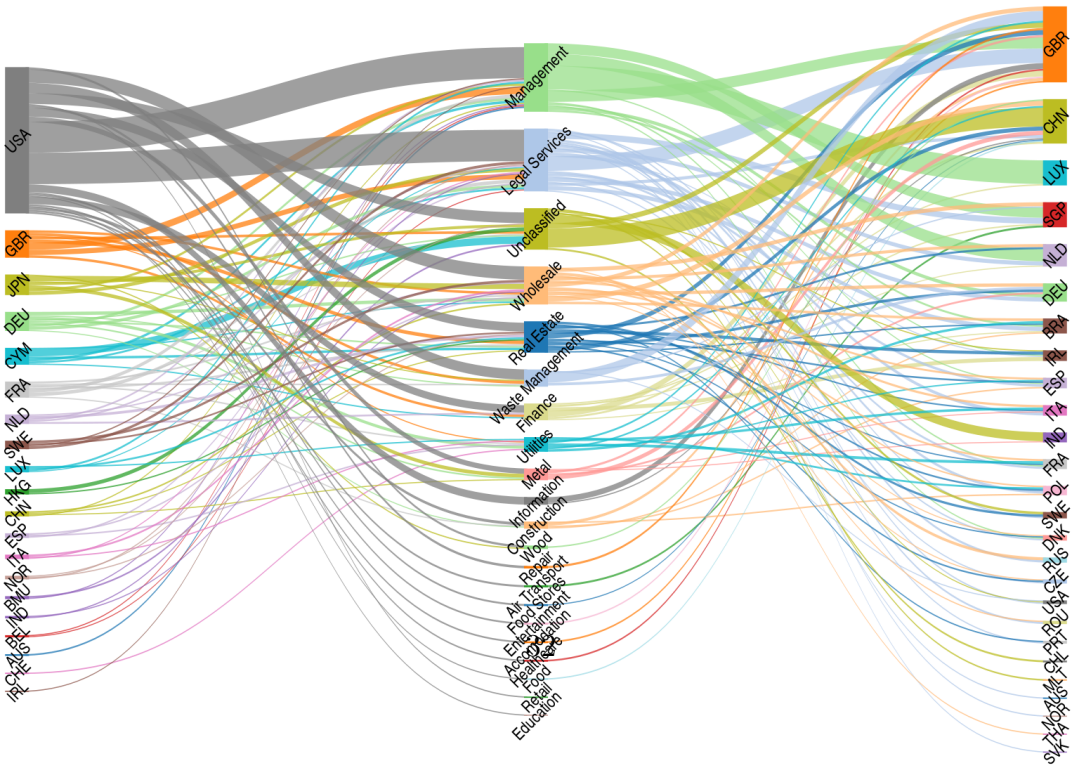


Figure 15: Greenfield FDI, Sectors

(a) Greenfield (new) affiliates per sector



(b) Greenfield flows per country pair and sector



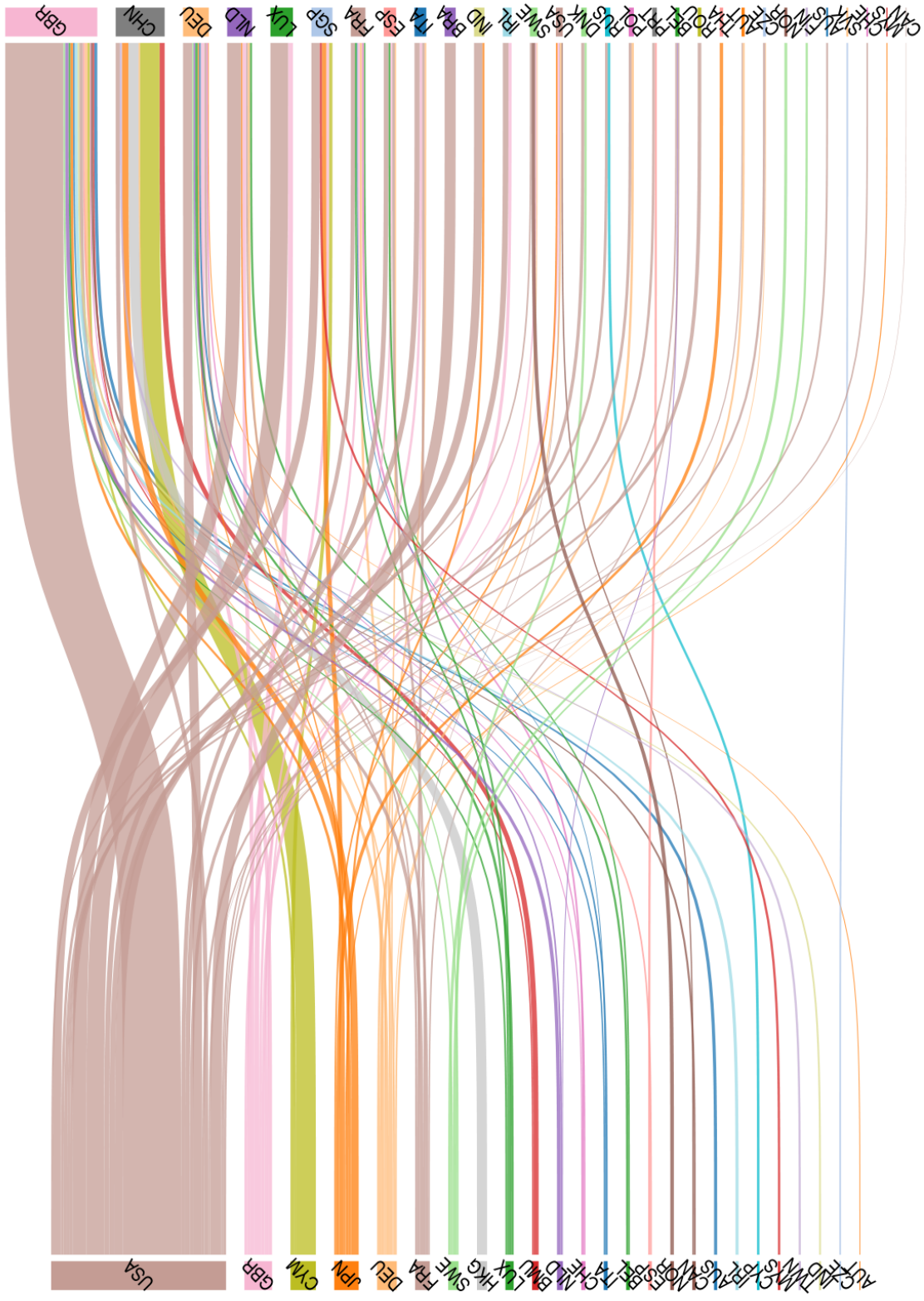


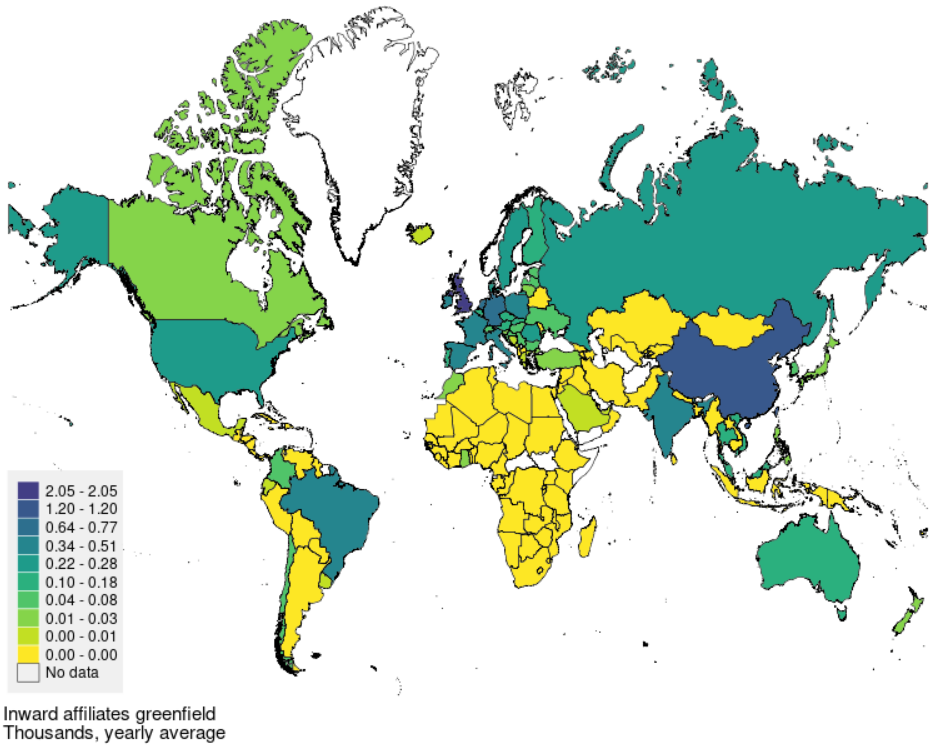
Figure 14: Greenfield FDI flows (number of affiliates)

Figure 15 shows the sectoral breakdown for greenfield investments (new affiliates) in panel 15a. The sectoral distribution (with top sectors real estate, legal services, and construction) is similar to the general sectoral distribution shown in panel 9e. The bilateral flows for the top 25 host and home countries by sector are shown in panel 15b. The bulk of affiliates from the Cayman Islands are unclassified, followed by real estate and finance sectors.

Figure 16 depicts the spatial distribution of greenfield FDI in a world heatmap for inward (panel 16a) and outward (panel 16b) foreign affiliates. The spatial distribution of greenfield investment is qualitatively similar to the general spatial distribution shown in Figure 4.

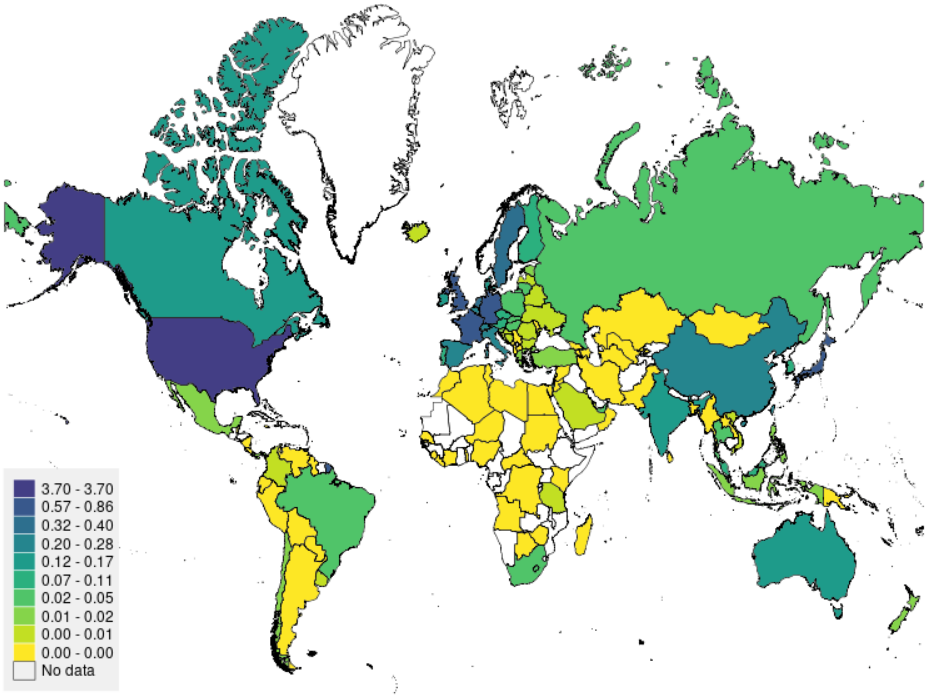
Figure 16: Affiliates world map (greenfield, new)

(a) Inward affiliates



Inward affiliates greenfield
Thousands, yearly average

(b) Outward affiliates



Outward affiliates greenfield
Thousands, yearly average

4.5 Mergers and Acquisitions FDI

The second type of entry mode in foreign markets is mergers and acquisitions (M&As) FDI. This investment refers to a parent firm's acquisition or merger with a foreign firm.

Table 7 reports the summary statistics at the country-pair level for foreign M&As (time-averaged). Panel A reports statistics for all country-pairs where there are positive observations. Panel B reports statistics on (time-averaged) revenues, employees, and total and fixed assets *per affiliate*. As noted in Table 7, there are only 1,498 country-pairs with at least one foreign affiliate investment. The mean number of active foreign affiliates across country-pairs in the sample is 5.

Table 7: Summary statistics at the country-pair level, M&A FDI

	Panel A: Totals			Panel B: Average per affiliate		
	mean	max	sd	mean	max	sd
No. of Affiliates	5	454	17			
Revenue	534	95,466	3,165	132	14,161	622
Employees	1,568	453,219	14,020	365	31,683	1,967
Total assets	1,642	207,900	10,695	361	27,777	1,741
Fixed assets	395	28,668	1,636	109	14,675	593
Revenue/employee	15,947	12,498,113	385,518			
N					1,498	

Notes: N denotes number of country-pairs with foreign affiliates.
In both panels, revenue and total and fixed assets are in millions of USD.
In Panel A, revenue per employee is in thousands of USD.
In both panels, employees denotes the actual number.

Table 8 reports summary statistics on (time-averaged) revenues, employees, and total and fixed assets by ownership, i.e., domestic vs. foreign. Domestic affiliate statistics include all affiliates of parent companies from the same country. Foreign affiliate statistics include all affiliates of parent companies from different countries; hence, statistics in Table 8 (Panels A and B) are at the country level. Aggregate mean values are higher for do-

mestic than foreign firms for revenues, total assets, and fixed assets. However, aggregate numbers of employees on average are higher for foreign affiliates.

Table 8: Summary statistics by ownership (totals), M&A FDI

	Panel A: Domestic			Panel B: Foreign		
	mean	max	sd	mean	max	sd
No. of Affiliates	97	1,268	230	65	1,009	142
Revenue	12,874	363,971	47,339	6,652	118,368	14,778
Employees	18,635	395,166	59,496	18,744	536,559	57,889
Total assets	63,648	1,706,169	234,256	20,162	246,789	43,171
Fixed assets	7,601	166,733	22,277	4,961	37,842	8,664
Revenue/employee	5,980	379,564	41,963	950	25,006	2,730

Notes: Revenue and assets in million USD. Revenue/employee in thousands USD. Foreign statistics are at the host country level.

Table 9 reports summary statistics on (time-averaged) revenue, employees, and assets *per affiliate* and *by ownership* (i.e., domestic vs. foreign). Note that the average foreign affiliate tends to be larger in revenue and employees, but smaller in total and fixed assets.

Table 9: Summary statistics by ownership (per affiliate), M&A FDI

	Panel A: Domestic			Panel B: Foreign		
	mean	max	sd	mean	max	sd
Revenue	116	1,498	213	170	3,767	426
Employees	299	3,309	600	616	11,292	1,602
Total assets	873	21,036	2,608	660	12,517	1,532
Fixed assets	137	4,729	526	149	3,611	420

Notes: Revenue and assets in million USD.
Foreign statistics are at the host country level.

Figure 17 shows the distributions (average per affiliate) of revenues (17a), employees (17b), and assets (total, 17c and fixed, 17d) in the host country per ownership (domestic, foreign) for M&As. Some interesting traits surface from observing these distributions.

First, the average foreign M&A is very similar to the average domestic M&A (both distributions overlap closely). In terms of revenue, the tails follow the same pattern as in greenfield investment: both tails of foreign M&As are thicker than domestic M&As. However, only the right tail of employees is thicker for foreign M&As than domestic M&As. Foreign M&As tend to concentrate less on smaller affiliates in terms of employees.

Figure 18 shows the bilateral flows between the top 25 home and host countries for M&A FDI. The ranking of the sending are receiving countries is very similar to the general case shown in Figure 7.

Figure 19 shows the sectoral breakdown for M&A FDI. The most popular sectors (wholesale, metal, legal services) for M&As are different from the general sectors and greenfield FDI, where real estate was more prominent and had fewer affiliates in the metal sector. The bilateral flows for the top 25 host and home countries by sector are shown in panel 19b.

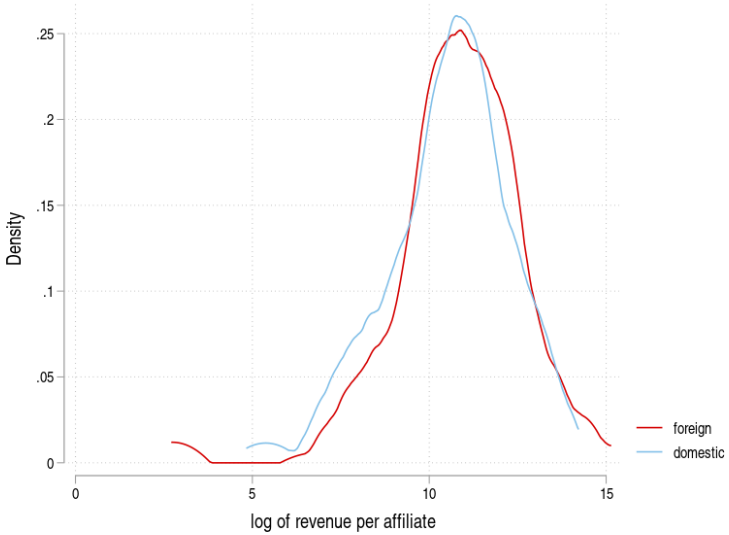
Figure 20 depicts the spatial distribution of M&A FDI in a world heatmap for inward (panel 20a) and outward (panel 20b) foreign affiliates. These maps are qualitatively similar to those of the general case (Figure 4) and greenfield investment (Figure 16).

4.6 Total vs. M&As vs. greenfield FDI

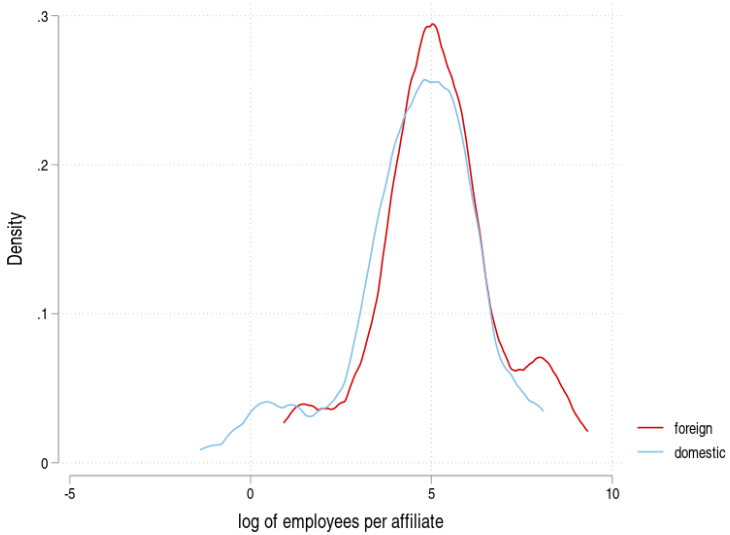
This subsection compares total FDI, greenfield FDI and M&A FDI. Total affiliates include new affiliates entering a foreign market in the period (greenfield), affiliates that changed ownership during the period (M&As) and all other affiliates that entered a foreign market before 2010 (and may or may not change in ownership before 2010). Figure 21a shows that, in line with other standard FDI datasets, the sum of the volumes of greenfield FDI and M&A FDI is lower than total FDI. This means the bulk of affiliates entered before 2010 and explains the difference.

Figure 17: Distributions in the host country (average per affiliate) per ownership, M&As

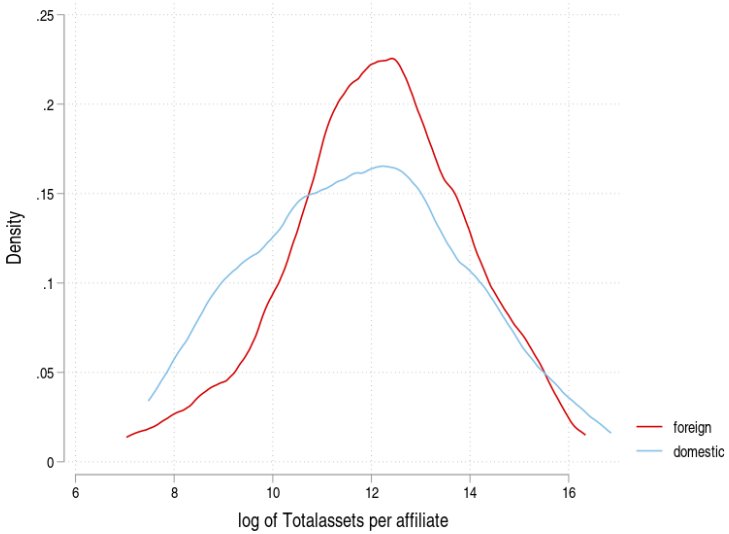
(a) Revenue (million USD)



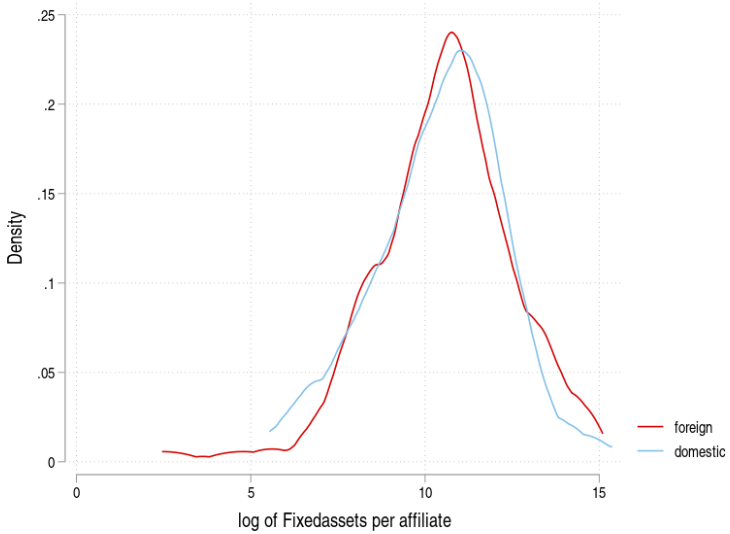
(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



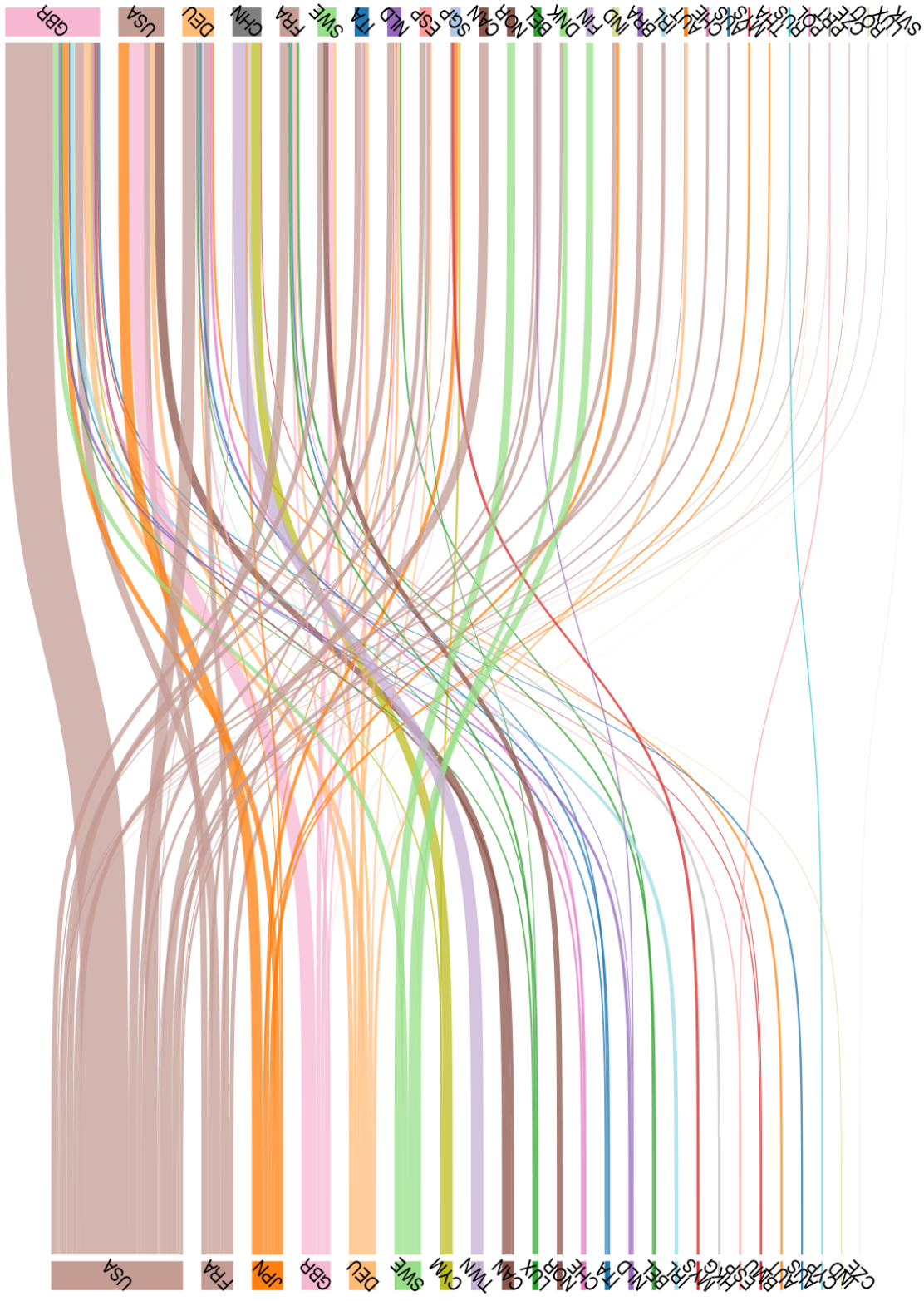
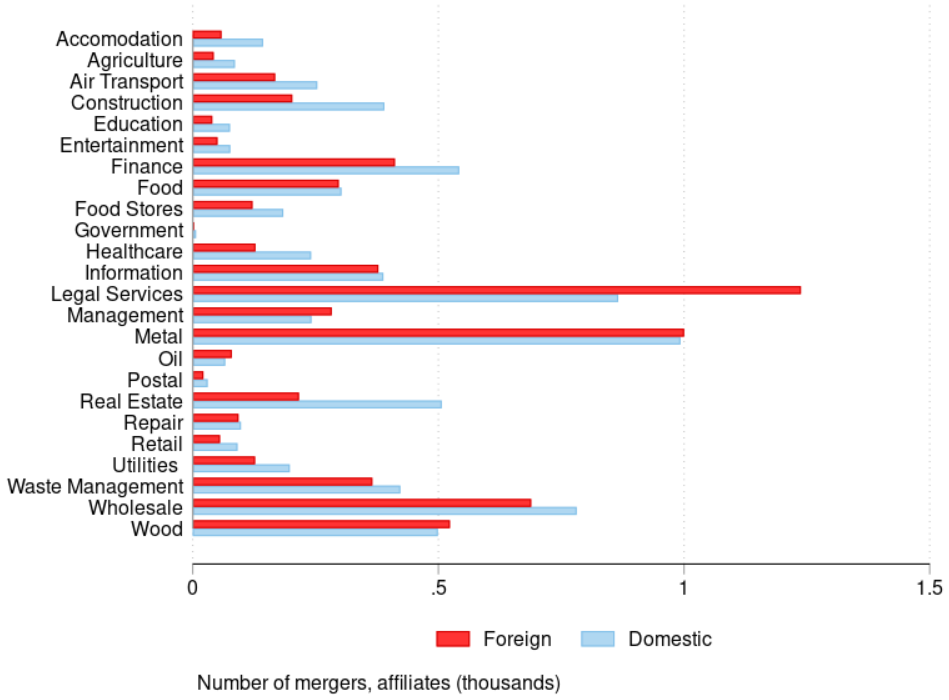


Figure 18: Mergers & Acquisitions Foreign investment flows (affiliates)

Figure 19: M&As, Sectors

(a) Mergers & Acquisitions (new) affiliates per sector



(b) Mergers & Acquisitions flows per country pair and sector

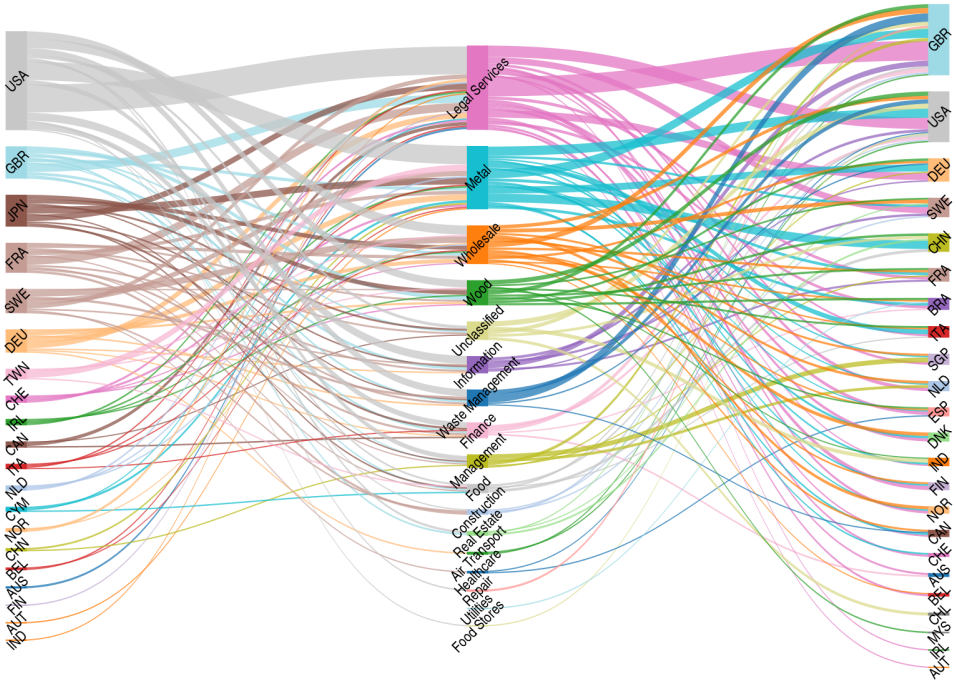
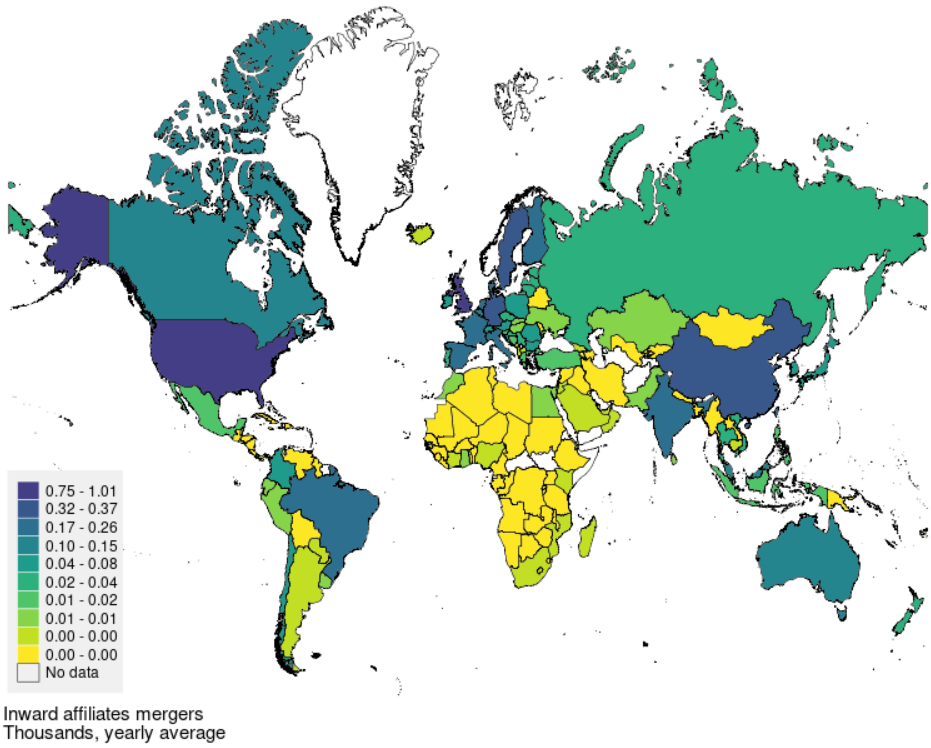


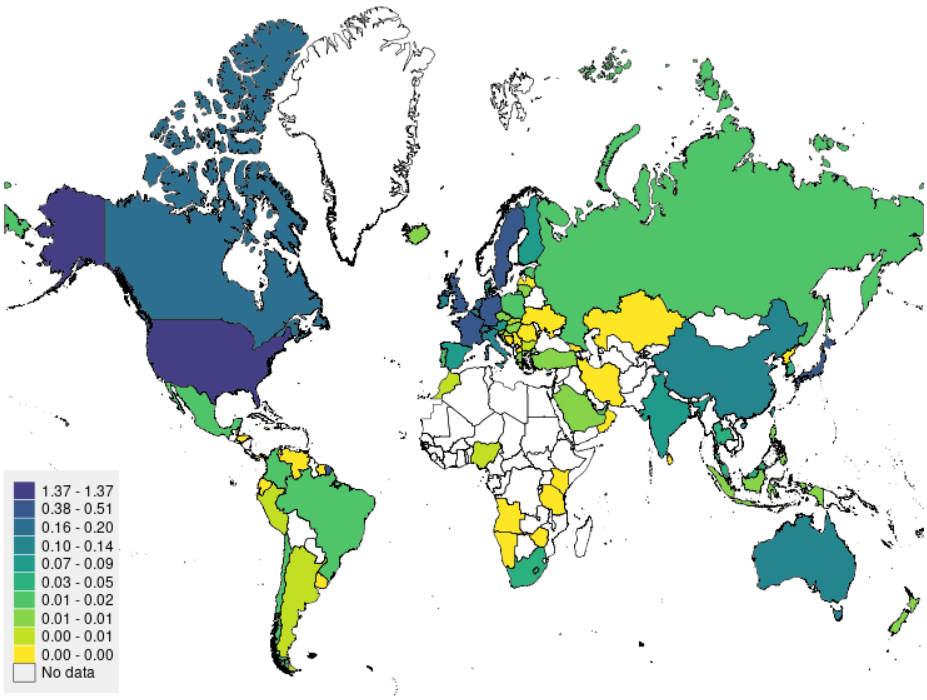
Figure 20: Affiliates world map (M&As)

(a) Inward affiliates



Inward affiliates mergers
Thousands, yearly average

(b) Outward affiliates



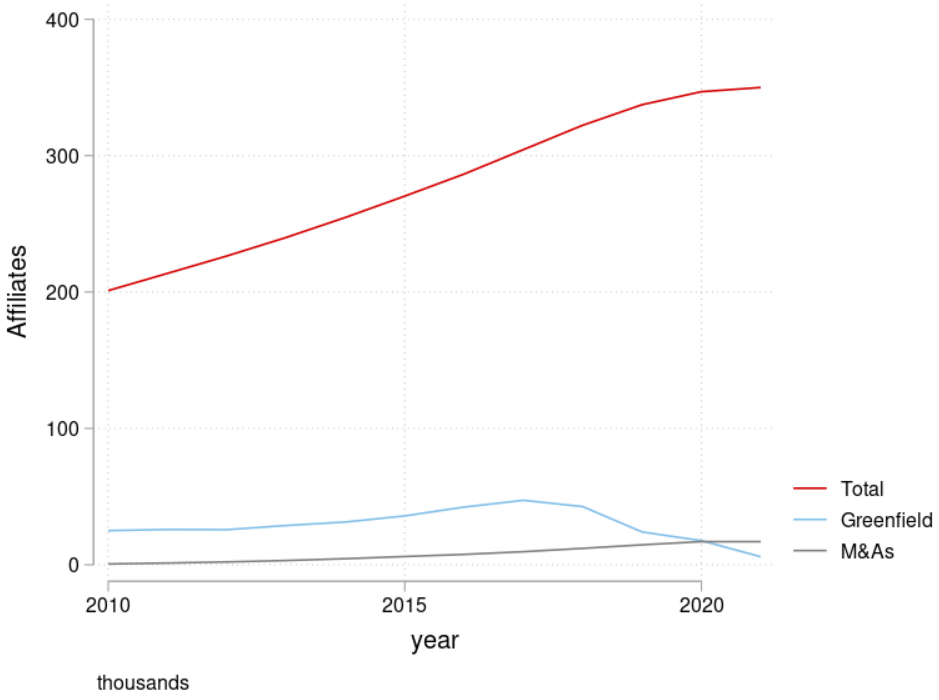
Outward affiliates mergers
Thousands, yearly average

Figure 21b reveals that, while the revenues per employee are similar for total and M&A FDI, they are lower for greenfield FDI. Greenfield and total FDI have thicker tails than M&A FDI, which are more concentrated around the mean.

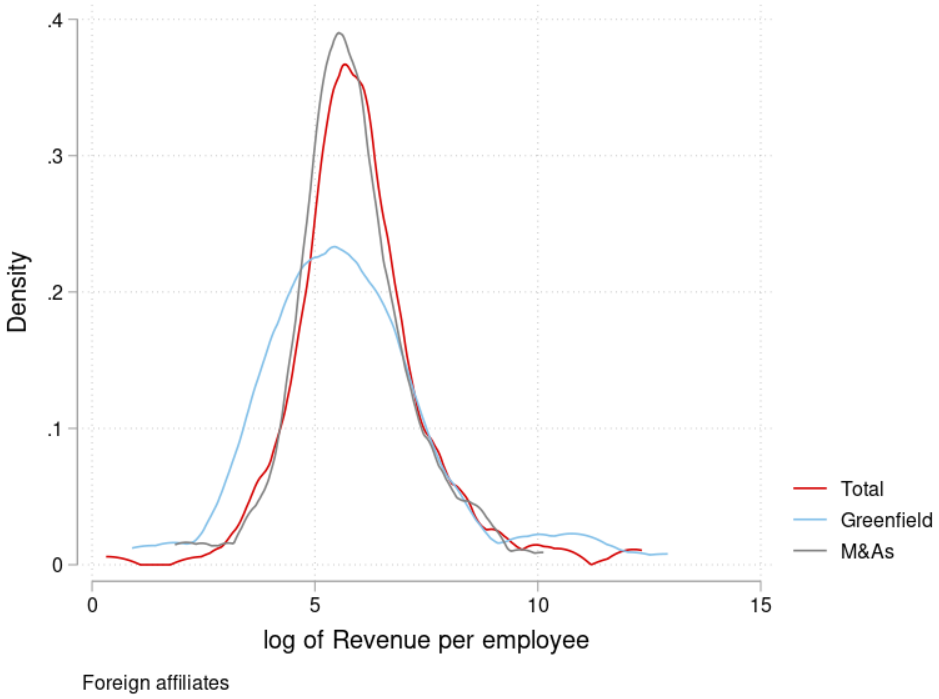
We observe interesting patterns for several *per affiliate* measures of MNE activity in Figure 22. The pattern seems to be that the average affiliate in terms of revenue, employment and assets is higher for M&As FDI, followed by total FDI and greenfield FDI. M&As and total FDI seem to be similar in the shape of the distribution and greenfield FDI flatter and shifted to the left (i.e., lower mean). In terms of tails, M&A seems to have shorter tails than the other two types of FDI. The distribution of greenfield FDI seems to be more spread and heterogeneous than M&A and total FDI.

Figure 21: Total vs. M&As vs. greenfield

(a) Affiliates



(b) Revenue per employee



4.7 Time trends: Annual data

4.7.1 Aggregate data

The next set of figures shows the evolution over time (years) of the number of affiliates, revenue, number of employees, total assets, and fixed assets. Figure 23 shows the evolution over time of the core MREID variables: aggregate revenues (23a), aggregate employees (23b), total assets (23c), fixed assets (23d), number of affiliates (23e), and revenues per employee (23f). The overall trend is upward, as expected. Total revenues and revenues per employee dipped around 2015 with the world's (especially Europe) economic slowdown. In nominal terms, world GDP grew from 2010-2014. After peaking in 2014, it fell and then did not recover past its 2014 peak until 2017. The world shutdown during Covid's surfacing in 2020 explains the last period's dramatic decline.

Figure 24 shows the evolution over time of the core MREID variables *per affiliate*. The time evolutions of the variables are very similar to the aggregates, but scaled down in absolute sizes.

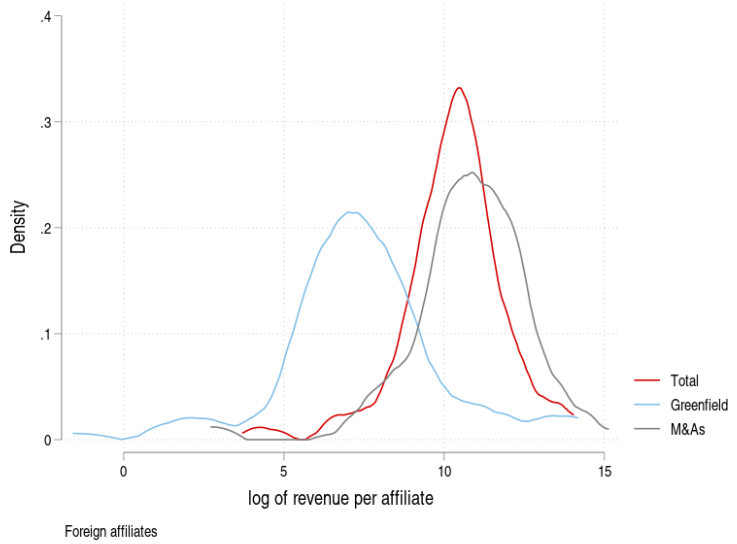
Figure 25 shows the evolution over time of the core MREID variables by ownership (domestic versus foreign). Domestic affiliates dominate in terms of aggregate revenue, number of employees, and total assets, shown in panels 25a, 25b, 25c, respectively. By contrast, foreign affiliates dominate in terms of revenues per employee (panel 25f).

However, focusing instead on the variables *per affiliate* as shown in Figure 26, we observe that foreign affiliates tend to earn higher revenues (panel 26a) and are larger in terms of employees and assets as seen in panels 26b and 26c.

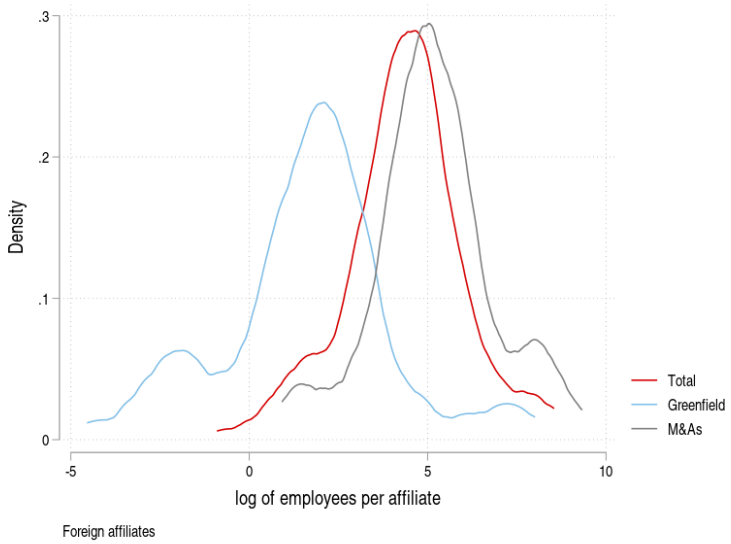
Another way to contextualize the time evolution is by showing the growth rate of the MREID variables. In Figure 27 all variables have been normalized to a value of 100 in the year 2010. This way, we can appreciate that the growth rate of foreign affiliates has been larger than that of domestic affiliates.

Figure 22: Distributions in the host country (average per affiliate) Total vs. M&As vs. greenfield

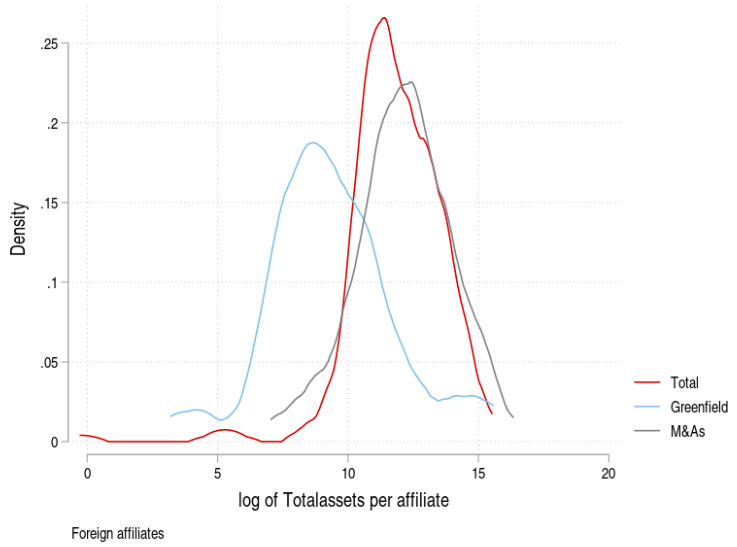
(a) Revenue (million USD)



(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)

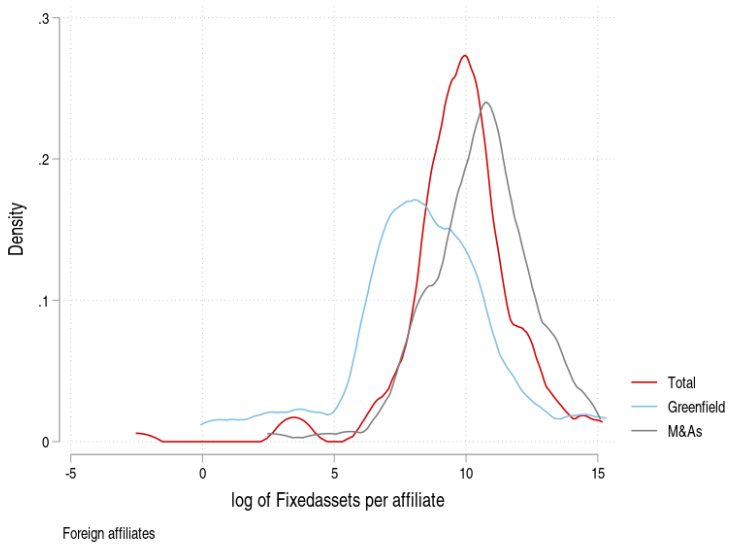
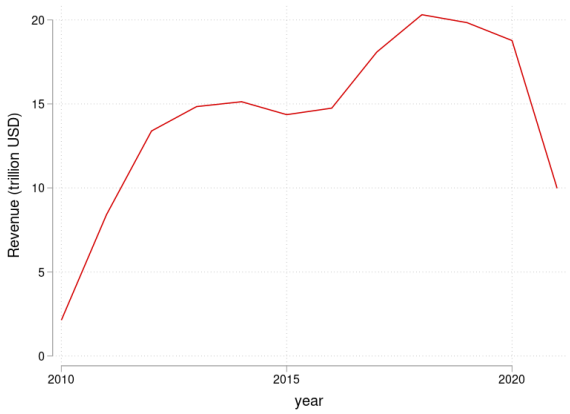
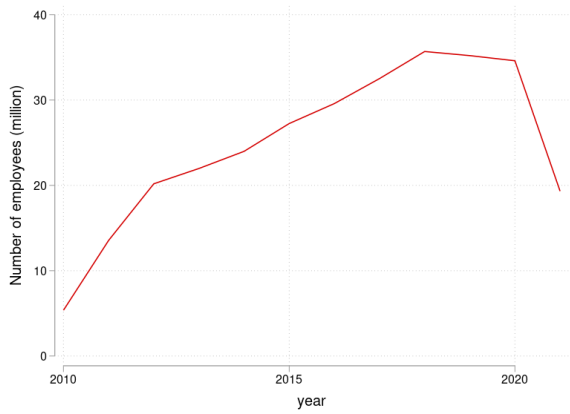


Figure 23: MREID variables over time, aggregates

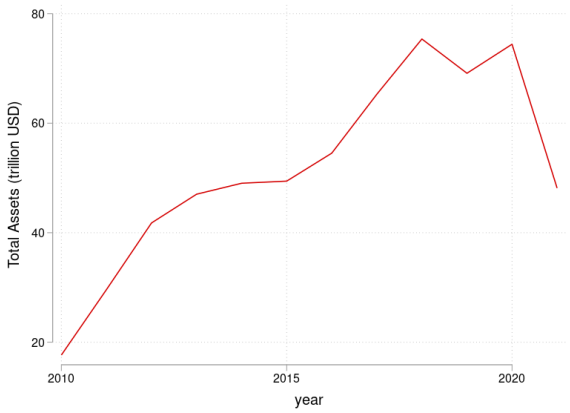
(a) Revenue (million USD)



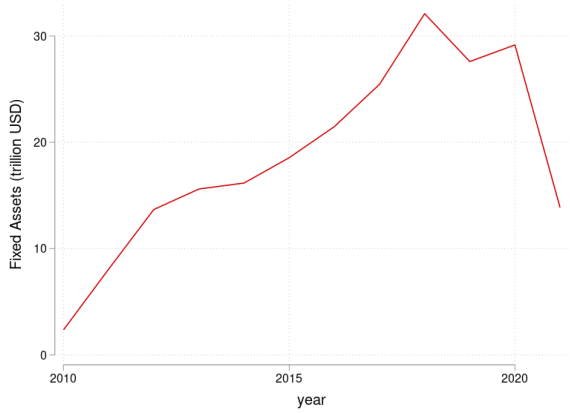
(b) Employees



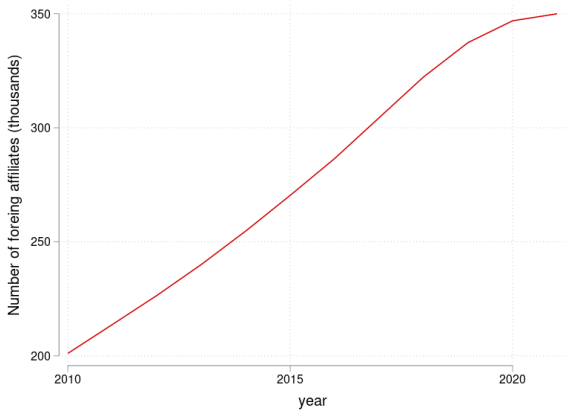
(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



(e) Affiliates



(f) Revenues per employee

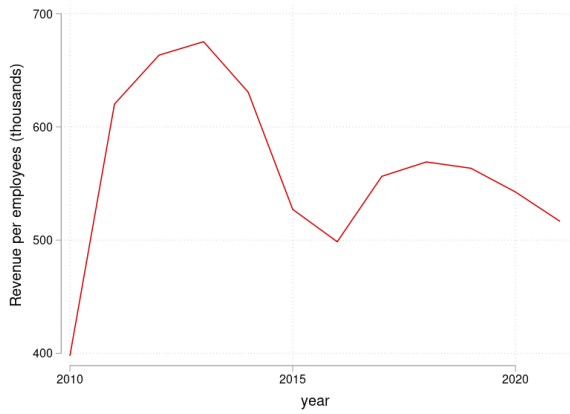
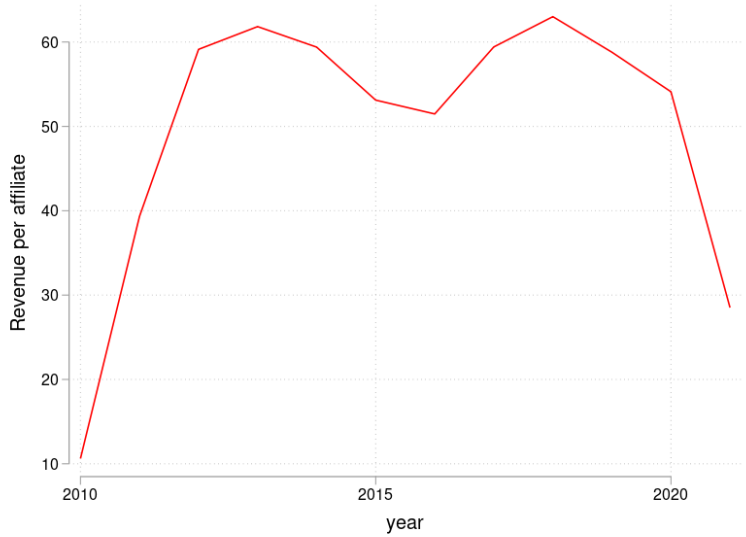
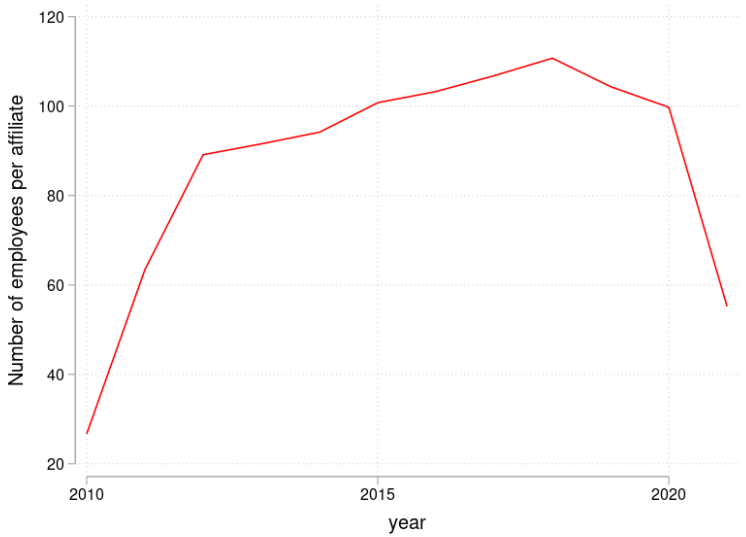


Figure 24: MREID variables time evolution, aggregates per affiliate

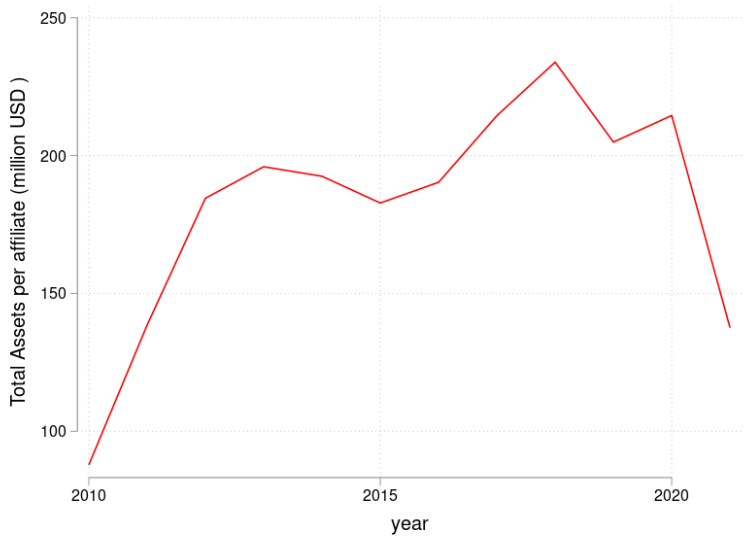
(a) Revenue (million USD)



(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)

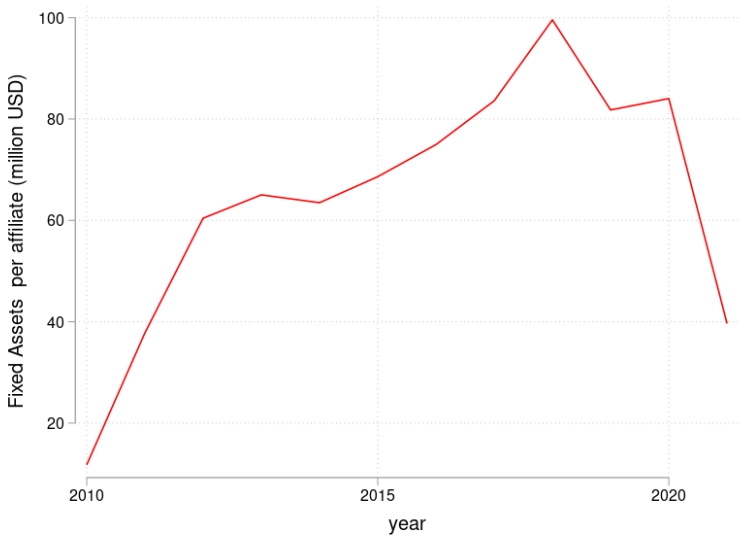
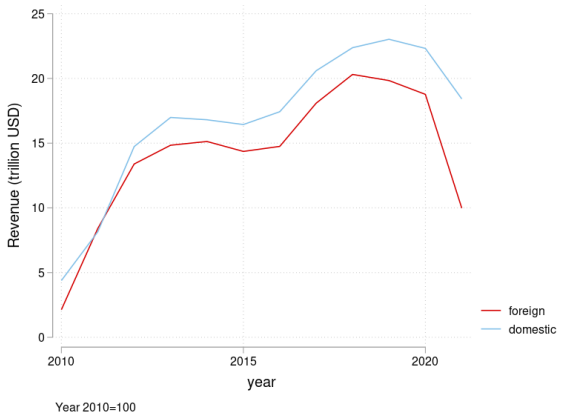
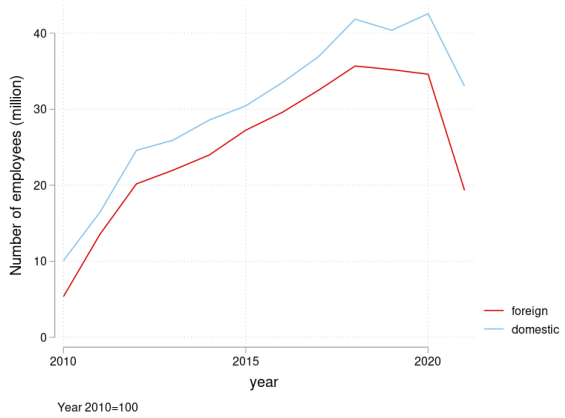


Figure 25: MREID variables time evolution, aggregates by ownership

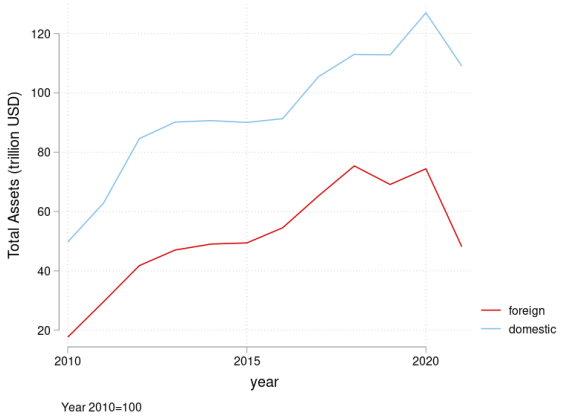
(a) Revenue (million USD)



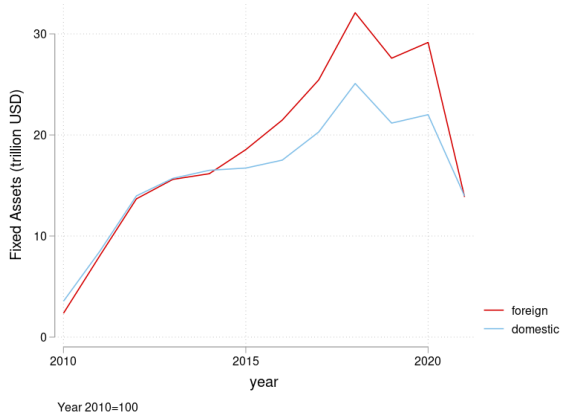
(b) Employees



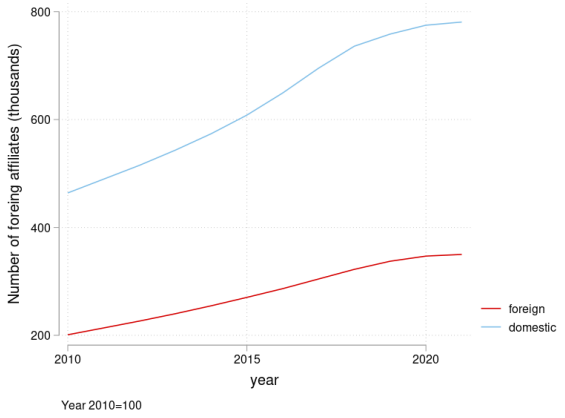
(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



(e) Affiliates



(f) Revenues per employee

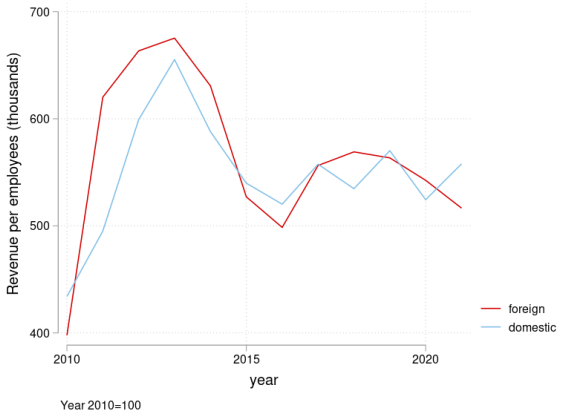
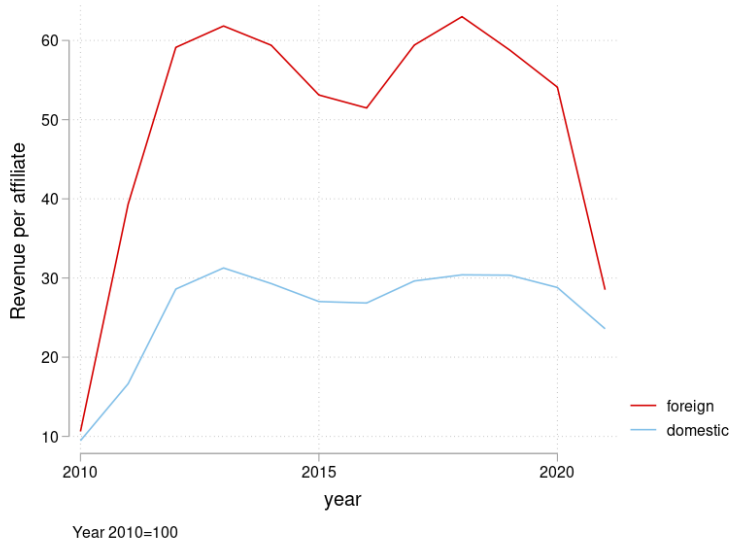
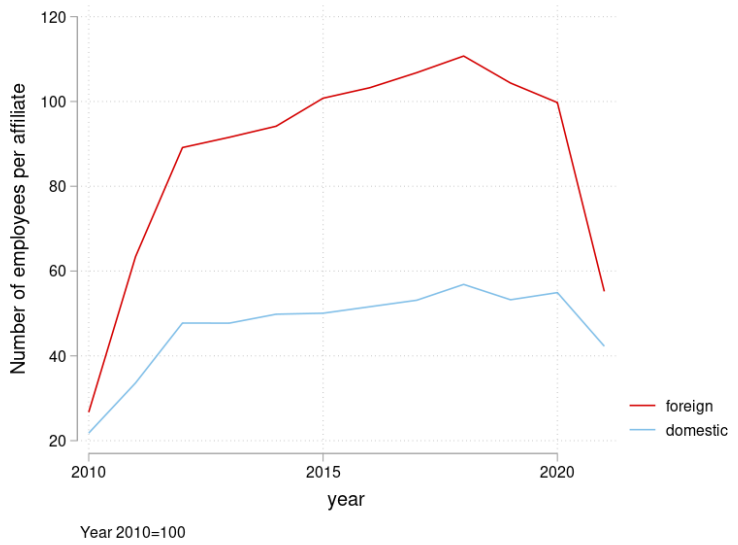


Figure 26: MREID variables time evolution, aggregates per affiliate by ownership

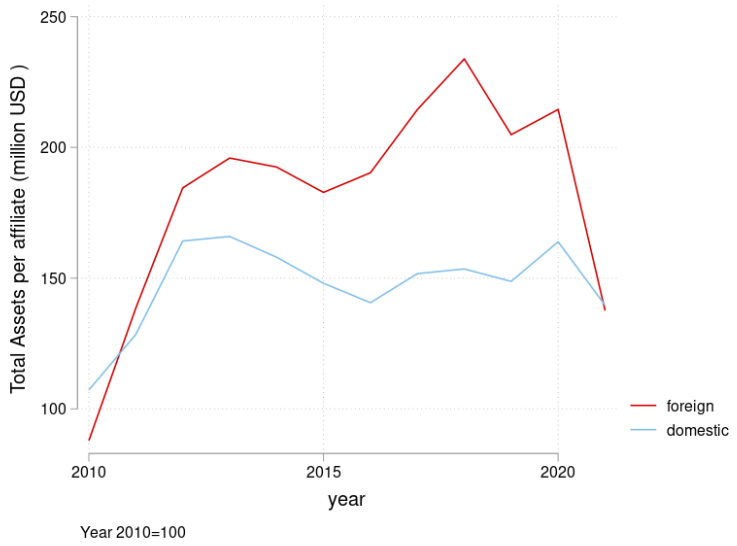
(a) Revenue (million USD)



(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)

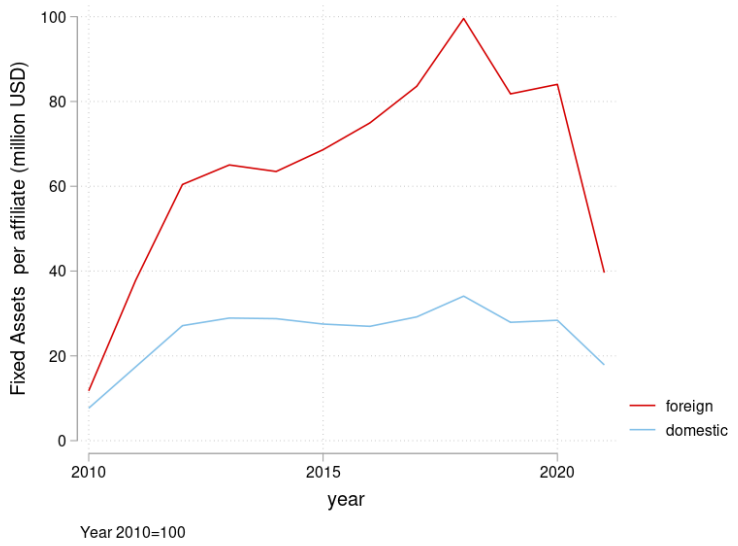
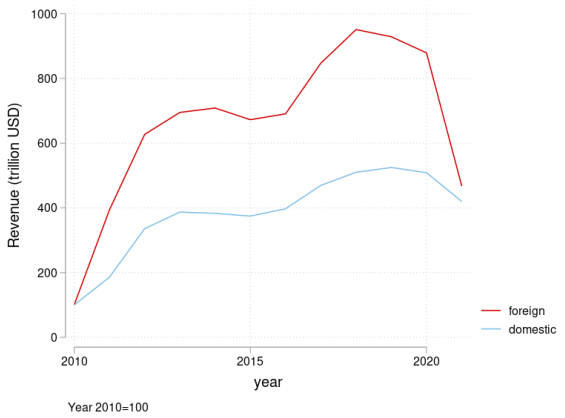
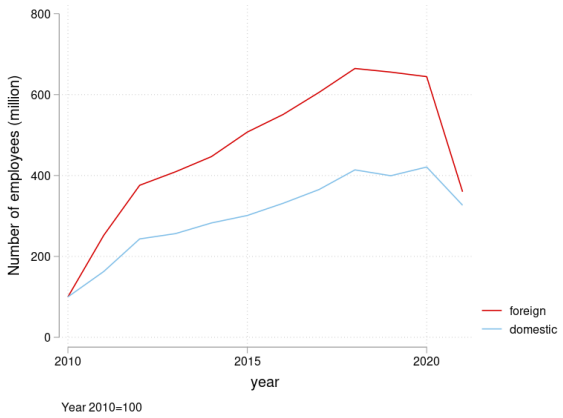


Figure 27: MREID variables growth rate by ownership

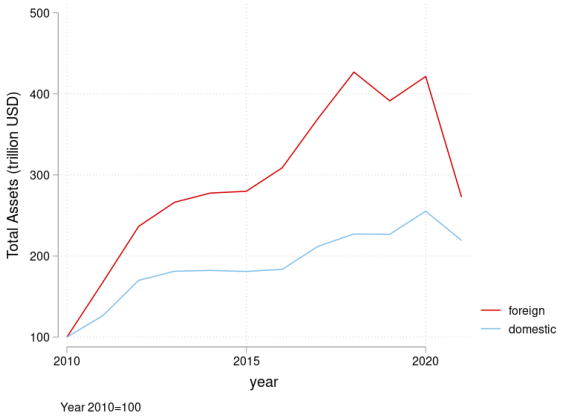
(a) Revenue (Million USD)



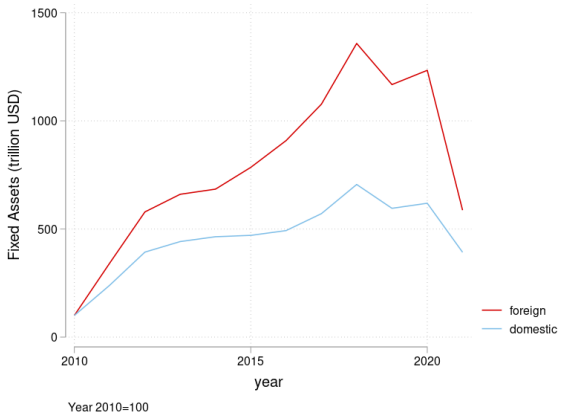
(b) Employees



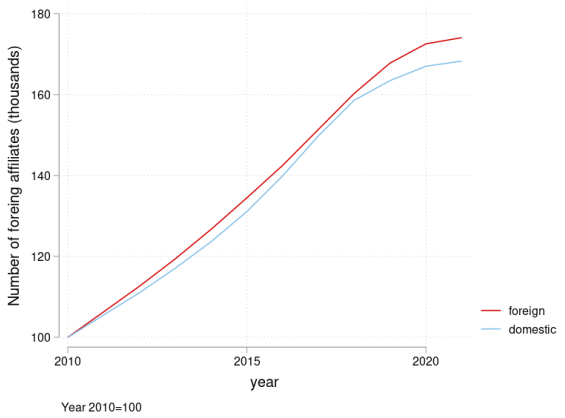
(c) Total Assets (million USD)



(d) Fixed Assets (million USD)



(e) Affiliates growth rate by ownership



(f) Revenue per employee

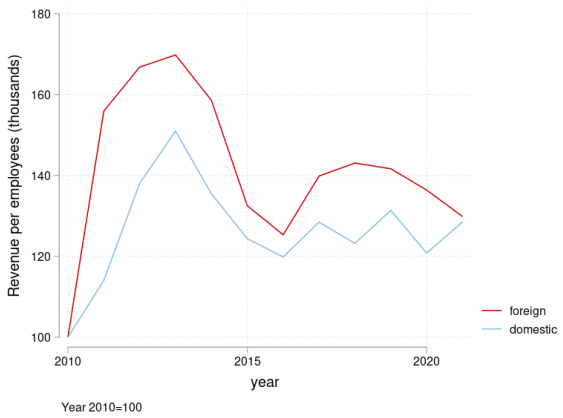


Figure 28 confirms that the growth rate of the MREID variables per affiliate has been larger for foreign firms than that of domestic affiliates.

4.7.2 Separate time trends for greenfield and M&As FDI

This subsection shows the time evolutions and growth rates of the MREID variables for the two entry modes: greenfield FDI in Figure 29 and M&As FDI in Figure 30. There was a notable fall of greenfield FDI during the COVID years (2019, 2020, 2021). In contrast, M&As FDI was flat in 2021.

5 Validity

We take three approaches to validate the data in the MREID dataset. First, we corroborate that the data follows the aggregate trends of FDI assets and liabilities. Second, we correlate the greenfield investment with an independent dataset. Third, we correlate the MREID data with administrative sources and other independent datasets.

5.1 Aggregates: External Wealth of Nations Comparison

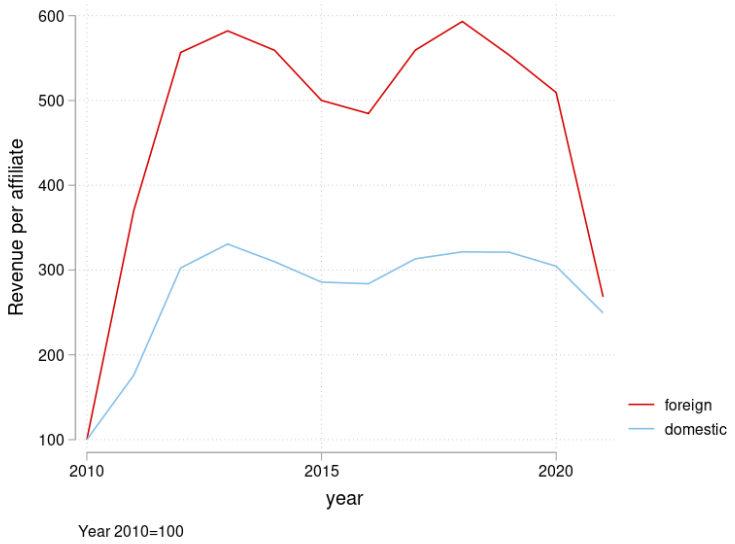
The External Wealth of Nations (EWN) dataset is a comprehensive database of country-level estimates of external financial assets and liabilities. The Brookings Institution compiles the data based on various sources, including balance of payments data, international investment position data, and other statistical sources. The EWN dataset covers 1970 to 2020 and includes data for over 200 economies.[14]

A comparison of MREID Figure 6 with Figure 31 shows the correlation between MREID and EWN. Figure 31a shows the heatmap for the FDI Assets in foreign countries. Their

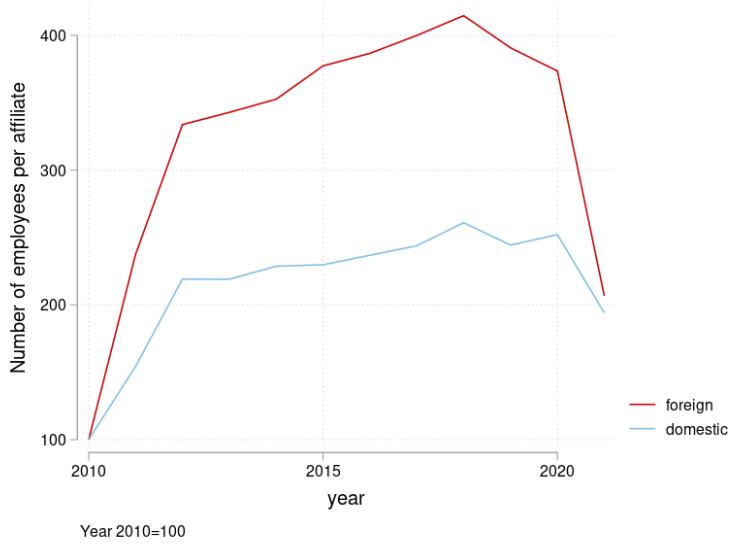
[14]The EWN is available here: `https://www.brookings.edu/research/the-external-wealth-of-nations-database/`

Figure 28: MREID variables growth rate, per affiliate by ownership

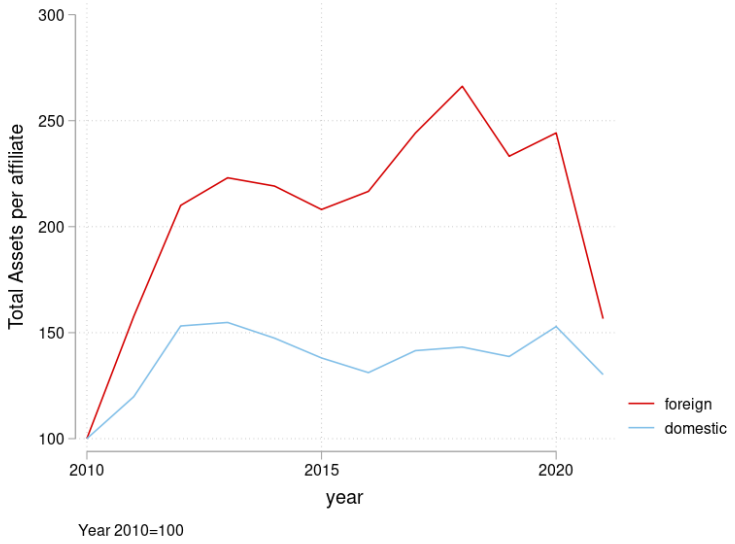
(a) Revenue (Million USD)



(b) Employees



(c) Total Assets (million USD)



(d) Fixed Assets (million USD)

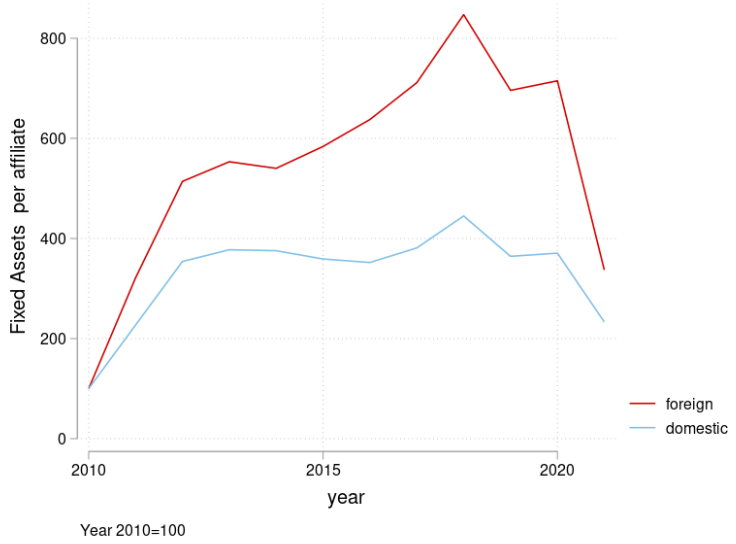
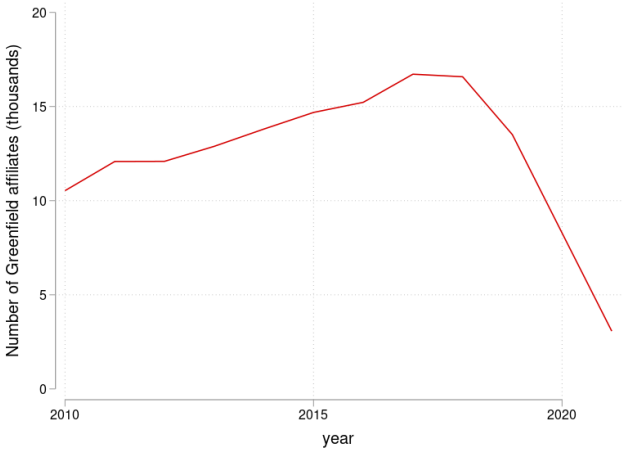
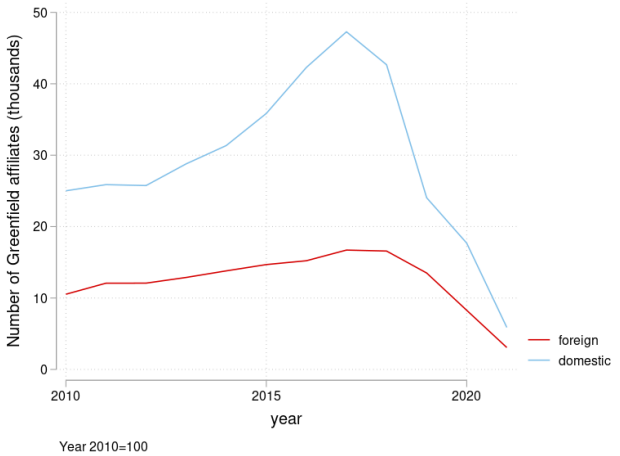


Figure 29: Greenfield FDI time trends

(a) Greenfield (new) affiliates



(b) Greenfield, domestic vs. foreign



(c) Domestic vs. foreign, growth

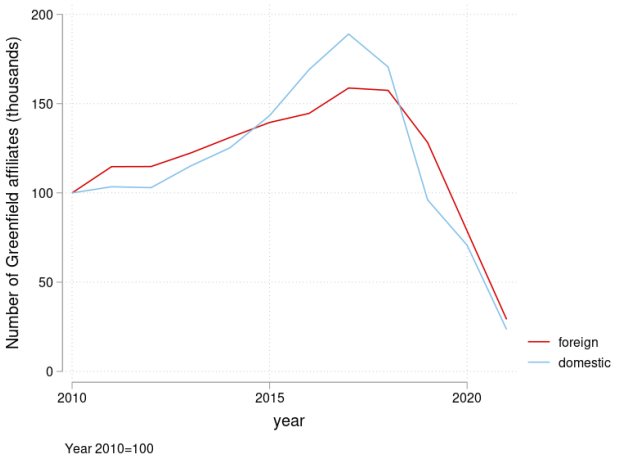
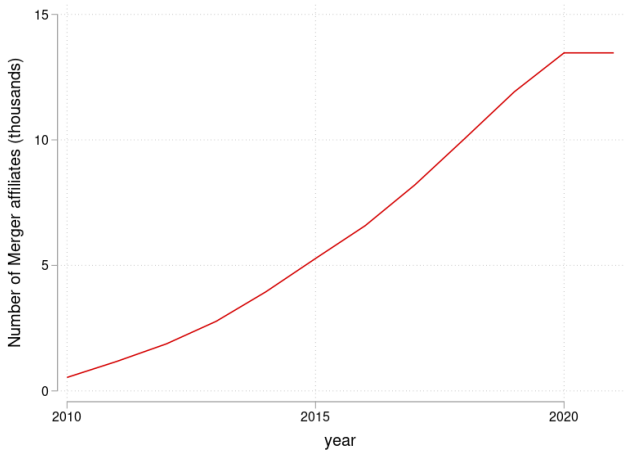
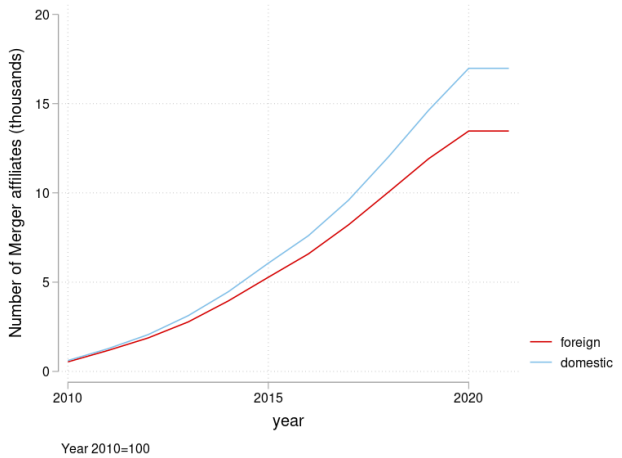


Figure 30: Mergers Acquisitions FDI time trends

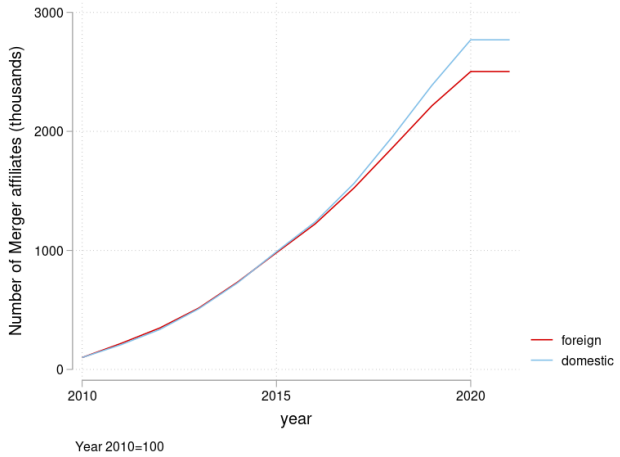
(a) Mergers & Acquisitions (new) affiliates



(b) Mergers & Acquisitions, domestic vs. foreign



(c) Domestic vs. foreign, growth



correlation with MREID assets in foreign countries is 0.70. Figure 31b shows the heatmap for the FDI liabilities from foreign countries. Their correlation with MREID liabilities in foreign countries is 0.77. Last, Figure 31c shows the heatmap of GDP. Their correlation with the MREID crude measures of output, aggregating domestic and foreign revenue and domestic fixed assets, is 0.74.

Figure 32 shows the joint time series of the MREID variables and the EWN FDI assets. The correlation between MREID assets (total and fixed) and EWN FDI assets time series is 0.96 and 0.95, respectively. Figure 32c shows the time evolutions of our crude measure of real output. The correlation between this measure of output and the world's GDP is 0.93.

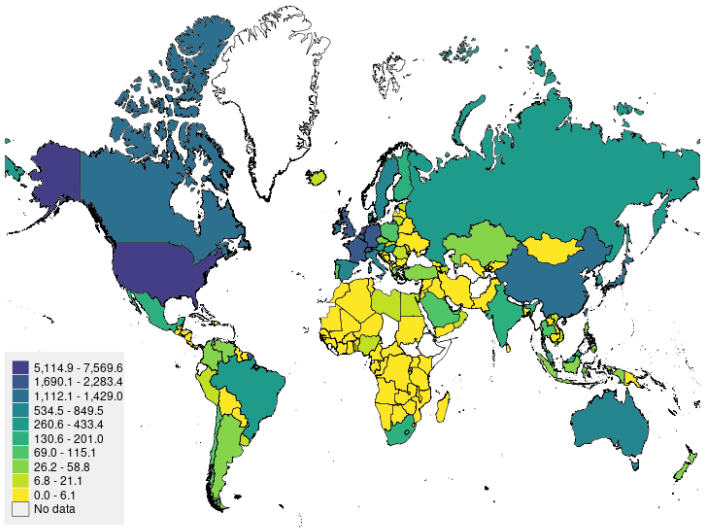
5.2 FDIMarkets

FDIMarkets is a service from the Financial Times that provides real-time monitoring of cross-border greenfield investment announcements. The database covers all countries and sectors worldwide and includes announcements on investment projects, capital investment, and job creation. FDIMarkets also provides tools for tracking and profiling companies investing overseas and conducting in-depth analyses to uncover trends.

Figure 33 shows the spatial distribution of greenfield FDI announcements using FDIMarkets projects and its correlation with MREID greenfield affiliates. The correlation between the number of affiliates (MREID) and projects (FDIMarkets) is 0.70 for inward FDI (shown in panel 33a) and 0.94 for outward FDI (shown in panel 33b).

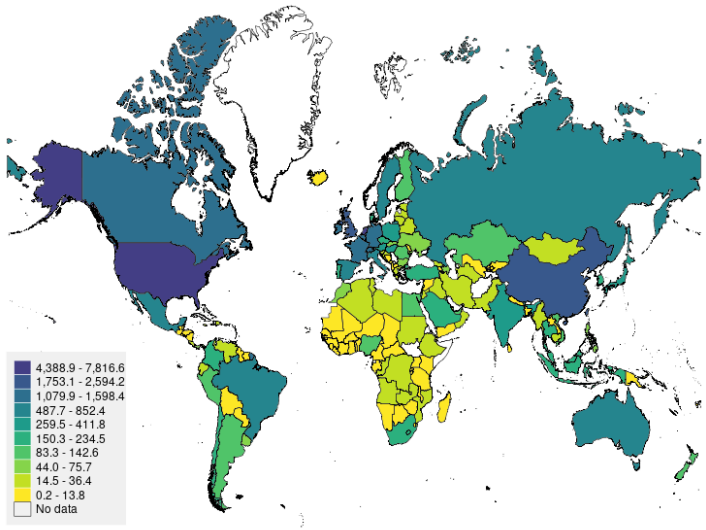
Figure 31: EWN

(a) FDI Assets



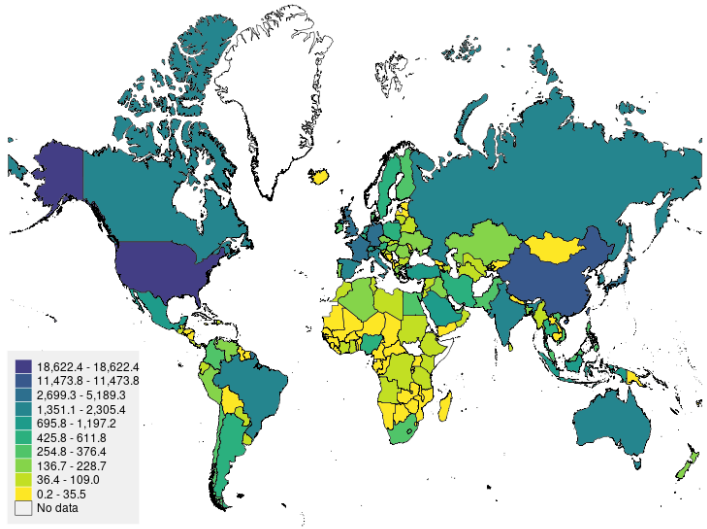
FDI Assets in Foreign countries (Brookings)
Billion USD, yearly average
Spatial corelation with ORBIS Assets: 0.70

(b) FDI liabilities



FDI Liabilities (Brookings)
Billion USD, yearly average
Spatial corelation with ORBIS Assets: 0.77

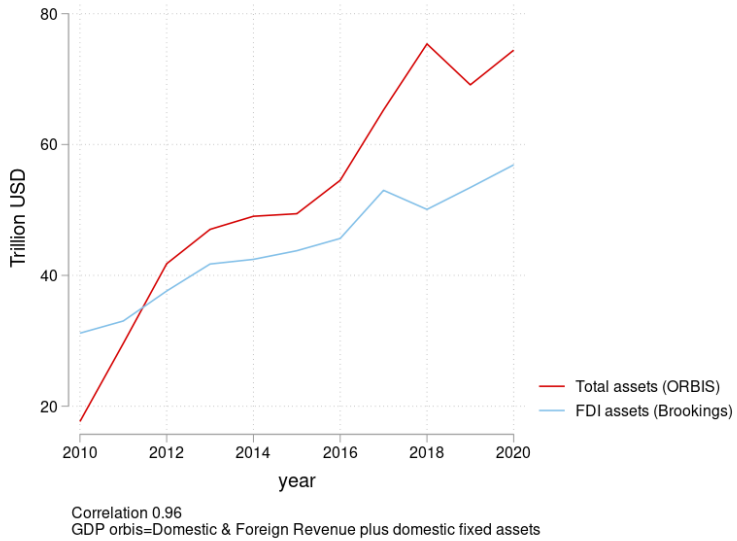
(c) GDP



GDP (WB)
Billion USD, yearly average
Spatial corelation with ORBIS GDP: 0.74

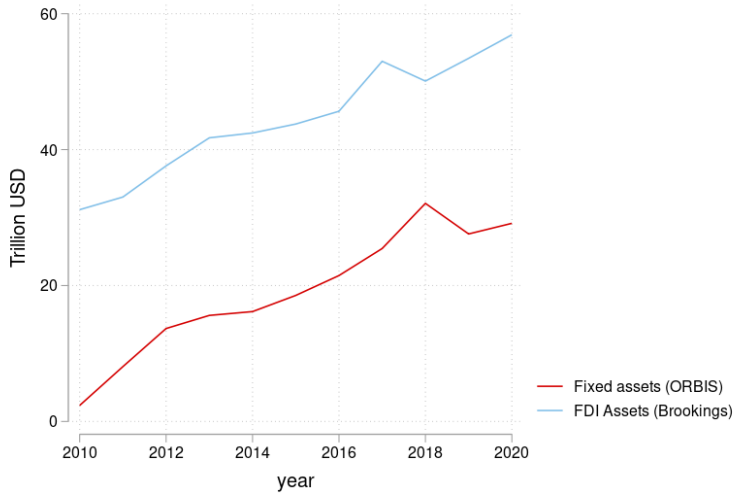
Figure 32: MREID vs EWN, time correlation

(a) Total Assets



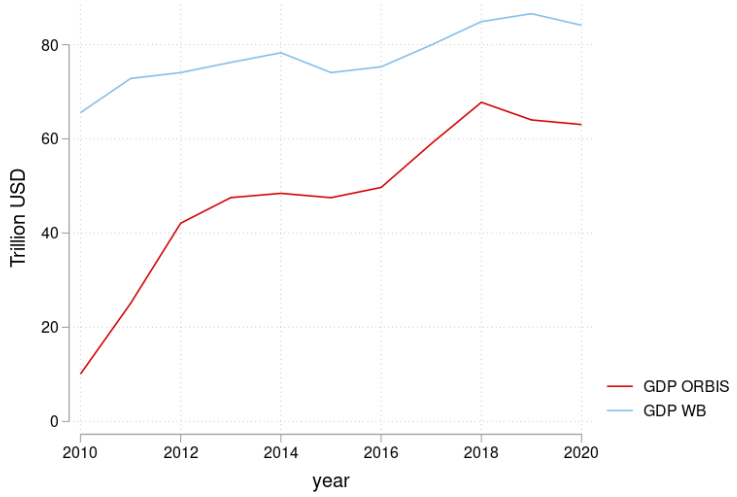
Correlation 0.96
GDP orbis=Domestic & Foreign Revenue plus domestic fixed assets

(b) Fixed Assets



Correlation 0.95
GDP orbis=Domestic & Foreign Revenue plus domestic fixed assets

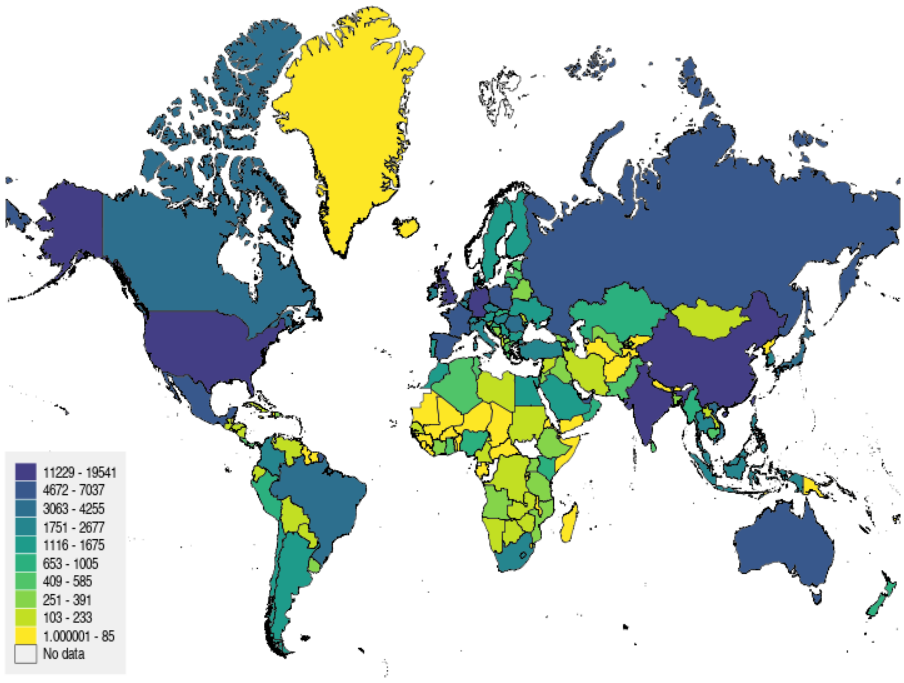
(c) MREID output vs GDP



Correlation 0.93
GDP orbis=Domestic & Foreign Revenue plus domestic fixed assets

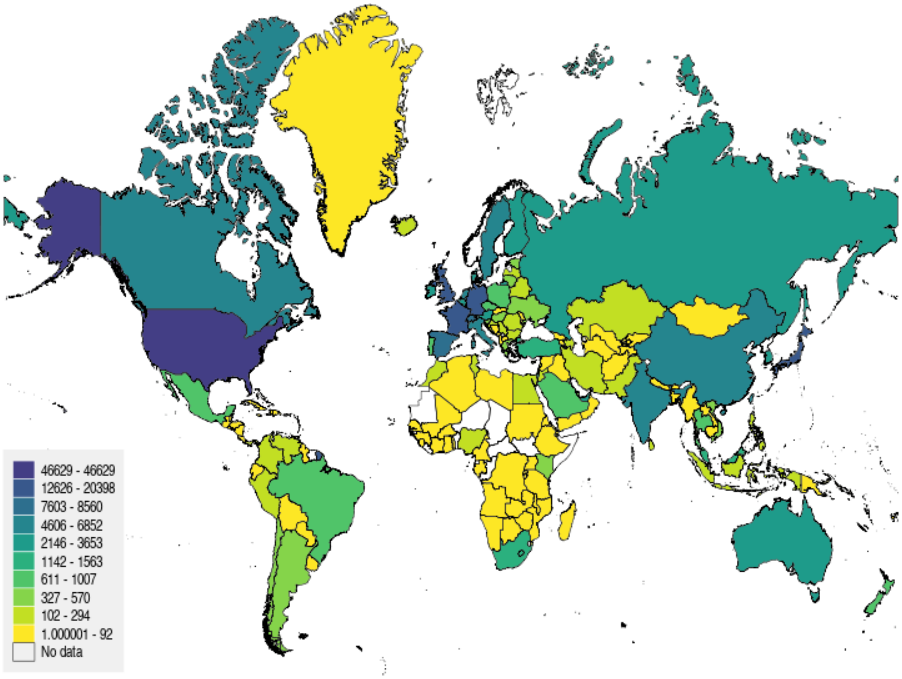
Figure 33: Greenfield Investments, FDI Markets (Projects)

(a) Inward greenfield FDI



Inward affiliates greenfield (FDIMarkets)
Number of projects
Spatial corelation with ORBIS: 0.70

(b) Outward greenfield FDI



Outward affiliates greenfield (FDIMarkets)
Number of projects, yearly average
Spatial corelation with ORBIS: 0.94

Figure 34 shows the time evolutions and correlations between MREID's greenfield FDI variables and FDIMarkets. The correlation between the number of affiliates (MREID) and projects (FDIMarkets) is 0.68 (shown in panel 34a). The correlation between fixed assets (MREID) and capital expenditure (FDIMarkets) shown in panel 34b is somewhat weaker, 0.45. The correlation between the number of employees (MREID) and jobs (FDIMarkets) is 0.59 (shown in panel 34c).

5.3 Country-level: USA affiliates vs. other datasets and administrative data

This section starts by documenting MREID coverage and correlations of American affiliates vis-a-vis other administrative and private data sources. Table 10 reports the aggregate values of several FDI measures of the US investment in Spain in 2019 in three datasets: ORBIS, BEA, and FDIMarkets.

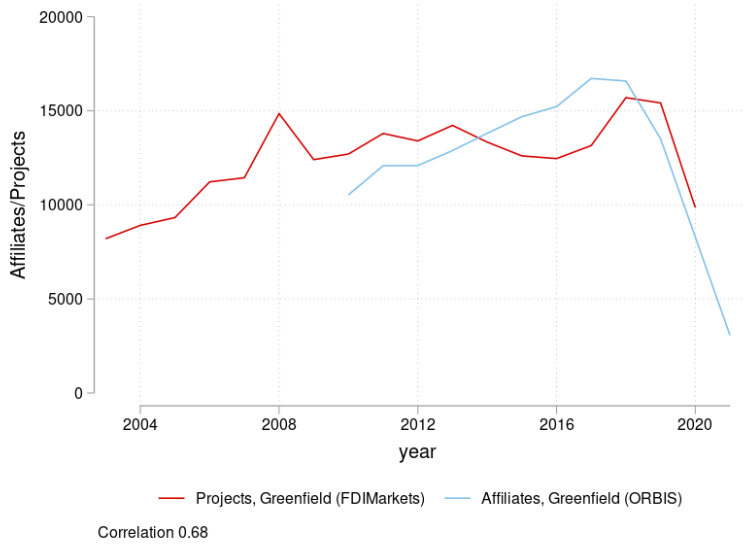
We focus on the US investment in Spain to showcase the search strategy and point out further issues. We choose US-Spanish investment due to our knowledge of both countries and the fact that Gopinath et al. (2017) showed that ORBIS does a good job of tracking Spanish data.

According to the BEA, there are 708 US affiliates established in Spain. Orbis records 2,490 US affiliates in Spain. However, the BEA records statistics for affiliates with more than 25 million USD in assets or sales. When we limit the ORBIS search to those quantities, the number of affiliates reported by ORBIS is similar to BEA: 711 affiliates.

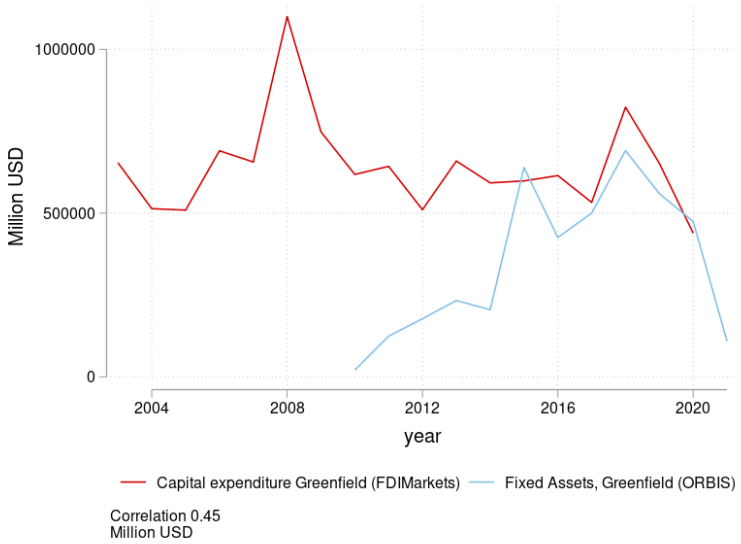
According to the BEA, the total assets of American affiliates are USD 185 million, which is slightly higher than the number recorded by ORBIS (USD 158 million). Compared with Spanish administrative data, Orbis also seems to underestimate fixed assets. The BEA does not report fixed assets, only Net Property, Plant & Equipment (PPE); there-

Figure 34: Greenfield FDI: MREID vs. FDI Markets

(a) Number of affiliates/projects



(b) Fixed Assets/Capital expenditure



(c) Employees/Jobs

fore, we cannot compare the magnitudes of fixed assets.

Table 10: US FDI in Spain in 2019. ORBIS vs BEA & FDIMarkets

	Number of parent companies	Number of affiliates	Total assets	Net property, plant & equipment	Fixed assets	Capital expenditures	Sales	Net income	Value added	Cost of emloyees	Number of employees	M&A value
BEA (> 25M assets)	N/A	708	185,260	17,830		2,367	92,507	7,735	18,022	11,589	180.6	
Spanish Admin. Data (> 0 assets)					92,264		94,380	5,050			317.0	
ORBIS (> 25M assets)	359	711	149,574		72,206		104,940	2,664	22,704	14,436	248.1	
ORBIS-vertical (> 25M assets)	146	323	58,205		34,104		33,018	898	7,402	4,371	76.4	
ORBIS-horizontal (> 25M assets)	213	388	91,369		38,103		71,922	1,765	15,303	10,065	171.7	
ORBIS (> 0 assets)	1,902	2,490	158,059		74,971		115,090	2,484	25,922	17,447	298.7	
Spanish Admin. Data (> 0) Greenfield						**3.628****						
FDIMarkets (> 25M assets); Greenfield	14	**22**				**1,462**	**3034***				**5.3**	
ORBIS (> 25M assets); Greenfield	24	**27**	10,142			**2,941****	**2,669**	330	910	352	**5.4**	
ORBIS (> 25M assets); M&A	1	1	72		69		3	39	59	5	0	78

Notes: *Constructed sales. **New fixed assets. Data in million USD, employee in thousands

In Appendix A, we describe the details to obtain the data presented in Table 10. Sales are fairly similar in all three data sources: BEA (USD 92 million), Spanish administrative data (USD 94 million), and Orbis (USD 104 million). Some quantitative differences arise in the values of net income and value added. It is worthwhile noting that there are differences in the definition of these variables. The BEA defines value added as "The gross output of an industry or a sector less its intermediate inputs"[15]. Value added in Orbis is taken from the corporate balance sheet's Profit and Loss (P/L) account, which is calculated by deducting the cost of capital from the operating profit. Similarly, Orbis' definition of net income, which is directly the balance sheet P/L for the period, might be different from

[15] https://www.bea.gov/help/glossary/value-added

BEA's definition of Net income. While the cost of employees is similar in the BEA and ORBIS, the total number of employees is much lower in the BEA (180,000) than in Orbis (248,000) and Spanish administrative data (317,000).

The BEA reports capital expenditures as the change in property, plant and equipment (PPE). We constructed a similar measure with Spanish administrative data and Orbis. All three measures are qualitatively similar, with some quantitative differences. One limitation of the BEA statistics is that capital expenditure is the only measure of greenfield FDI. We can easily track greenfield investments with Orbis and compare them with other independent datasets, particularly FDIMarkets. The last three columns of Table 10 focus on greenfield investment. Although the capital expenditure is relatively overestimated in Orbis vs. FDIMarkets, sales seem to be relatively close.[16] Interestingly, the number of affiliates and the number of new employees is practically identical in both datasets.

Orbis can overcome a standard limitation in all other datasets related to the activity of the subsidiary. Orbis allows us to distinguish between the activity sector of the parent firm and the subsidiary. Horizontal FDI occurs when those activities are similar (i.e., the subsidiary replicates the parent's activity). Vertical FDI occurs when the activity of the parent and subsidiary are different (i.e., the parent splits the production process along the value chain). Table 10 reveals a relatively even split between both affiliates. However, most assets and sales (over 60%) are concentrated in horizontal FDI.

To validate our search approach, we inspected the linear trends and correlations between ORBIS and several independent sources for the key FDI measures (sales, employees, assets, and fixed assets). Figure 35 shows that the correlations between ORBIS and administrative Spanish data are positive and strong.

Notably, the main use of the dataset is to perform econometric estimations. Therefore,

[16]FDIMarkets do not report directly sales, we constructed this measure as a Cobb-Douglas function of capital and labor.

what is relevant to obtaining accurate estimates (e.g., estimates of policy changes like economic integration agreements) is that the values follow similar trends. That is, the difference in the *levels* we observed in the previous sections should not be an issue to estimate accurately partial effects.

Figure 36 shows the correlations between ORBIS and BEA data for the major American investment locations (Canada, UK, Germany, China, and Spain). The positive correlations between sales, employees, and assets are high.

When we zoom in on individual countries (UK and China) in Figure 37, we observe some heterogeneity. Some variables like assets or sales have higher correlations than others like fixed assets.[17]

6 Conclusions

FDI can be characterized by numerous alternative measures such as total assets, fixed assets, employment, and foreign affiliate sales (FAS) and by various types (total, greenfield, M&As FDI). This paper has described and validated a search strategy to adequately construct a firm-level panel dataset from Orbis that captures many of the complexities and richness of FDI-related variables.

The breadth of coverage of the Orbis data is broad when compared to administrative data of individual countries (e.g., USA, Spain) and greenfield FDI announcement data of FDIMarkets (Financial Times). The search strategy allows us to capture FDI data in 185 countries and initially in 12 years, which can be expanded to subsequent years. Historical data is available (with a subscription cost) to cover time series periods from the past. The search strategy is validated by strong positive correlations across time and space with individual countries' administrative data sources.

[17] Recall that BEA does not report fixed assets, but rather Property, Plant and Equipment

Figure 35: US FDI in Spain in 2003-2019. ORBIS vs. Spanish admin. data

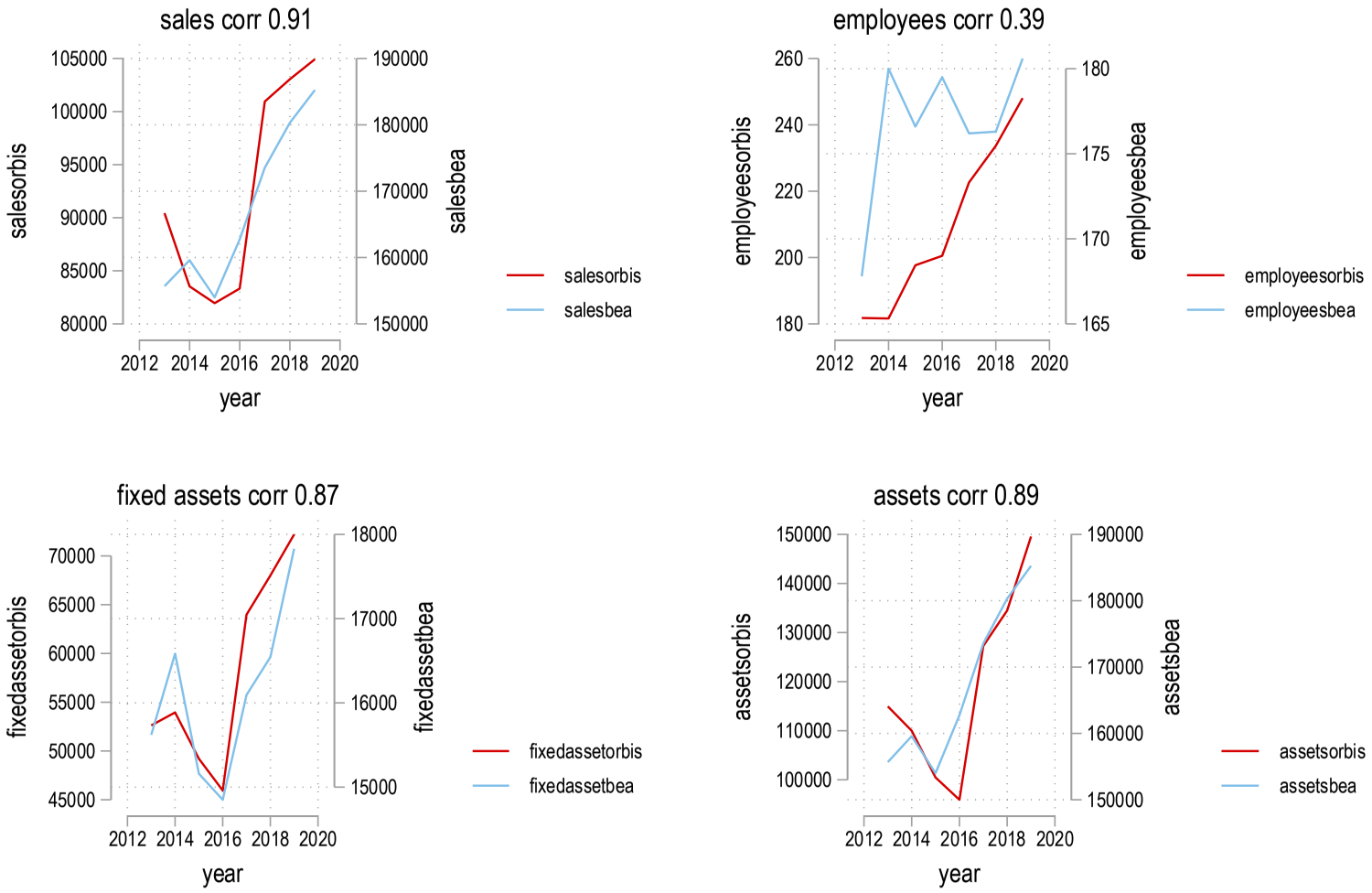


Figure 36: US FDI in Canada, UK, Germany, China, and Spain in 2003-2019. ORBIS vs. BEA

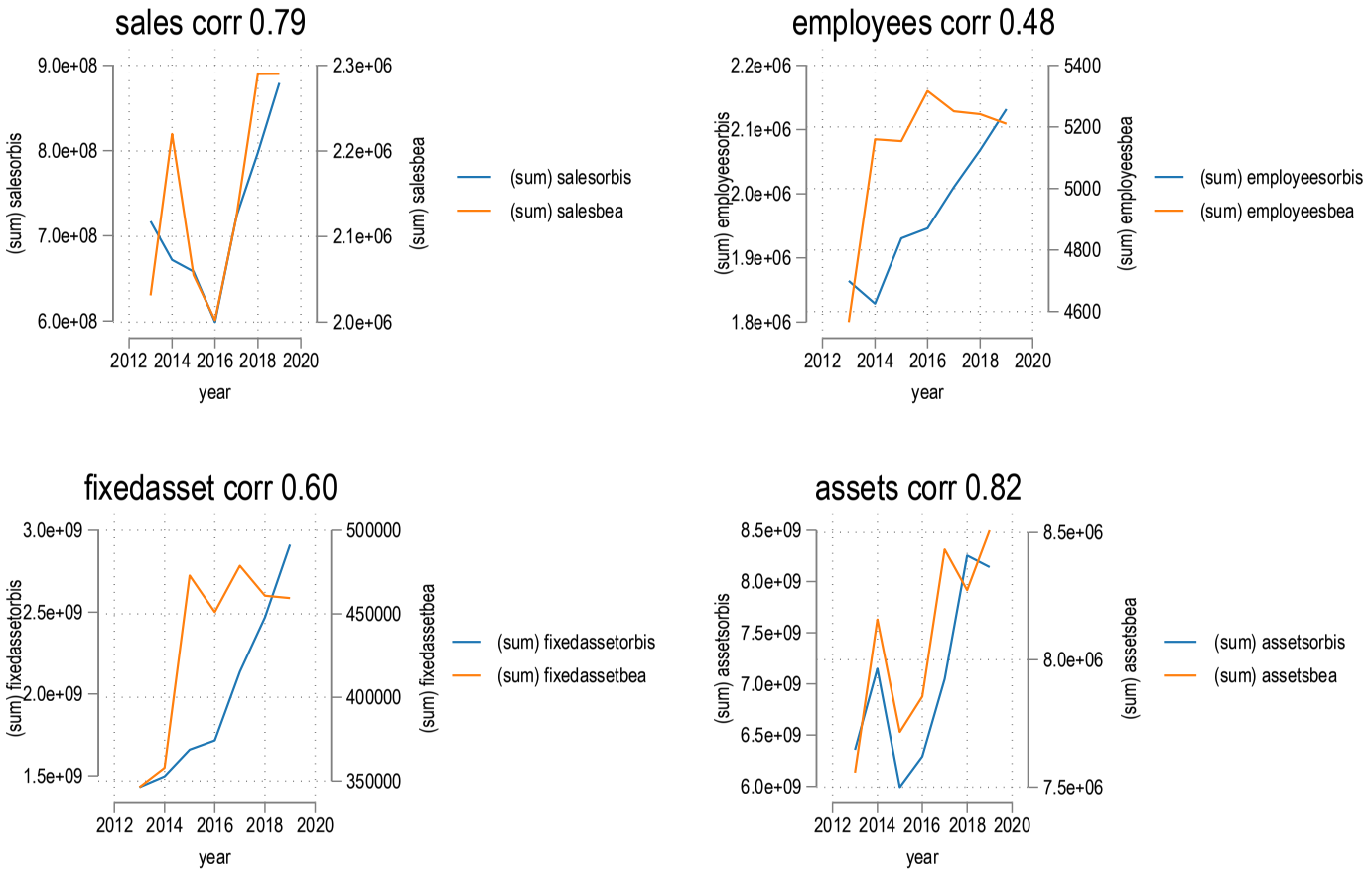
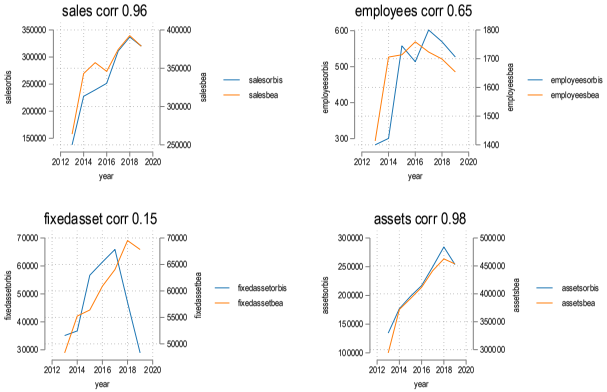
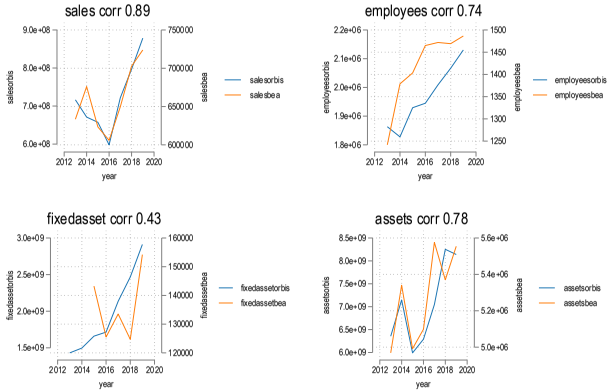


Figure 37: US FDI China and UK, 2003-2019. ORBIS vs. BEA

(a) China



(b) UK



References

Alabrese, E. and Casella, B. (2020). The blurring of corporate investor nationality and complex ownership structures. *Transnational Corporations Journal*, 27(1).

Alfaro, L. and Chen, M. X. (2018). Selection and market reallocation: Productivity gains from multinational production. *American Economic Journal: Economic Policy*, 10(2):1–38.

Aminadav, G. and Papaioannou, E. (2020). Corporate control around the world. *The Journal of finance*, 75(3):1191–1246.

Arkolakis, C., Ramondo, N., Rodriguez-Clare, A., and Yeaple, S. (2018). Innovation and production in the global economy. *American Economic Review*, 108(8):2128–2173.

Bergstrand, J. and Egger, P. (2007). A knowledge-and-physical-capital model of international trade flows, foreign direct investment, and multinational enterprises. *Journal of International Economics*, 73:278–308.

Bergstrand, J., Larch, M., and Yotov, Y. (2015). Economic integration agreements, border effects, and distance elasticities in the gravity equation. *European Economic Review*, 78:307–327.

Carril-Caccia, F., Garmendia-Lazcano, A., and Minondo, A. (2022). The border effect on mergers and acquisitions. *Empirical Economics*, 62(3):1267–1292.

Carril-Caccia, F., Milgram-Baleix, J., and Paniagua, J. (2023). Does terrorism affect foreign greenfield investments? *Defence and Peace Economics*, 34(6):827–844.

Cravino, J. and Levchenko, A. A. (2017). Multinational firms and international business cycle transmission. *The Quarterly Journal of Economics*, 132(2):921–962.

Damgaard, J., Elkjaer, T., and Johannesen, N. (2019). Phantom investments. *IMF Finance & Development*.

Egger, P., Pirotte, A., and Titi, C. (2023). International investment agreements and foreign direct investment: A survey. *The World Economy*.

Fonseca, L., Nikalexi, K., and Papaioannou, E. (2023). The globalization of corporate control. *Journal of International Economics*, page 103754.

Garcia-Bernardo, J., Fichtner, J., Takes, F. W., and Heemskerk, E. M. (2017). Uncovering offshore financial centers: Conduits and sinks in the global corporate ownership network. *Nature (Scientific Reports)*, 7(1):1–10.

Gopinath, G., Kalemli-Özcan, Ş., Karabarbounis, L., and Villegas-Sanchez, C. (2017). Capital allocation and productivity in south europe. *The Quarterly Journal of Economics*, 132(4):1915–1967.

Guvenen, F., Mataloni Jr, R. J., Rassier, D. G., and Ruhl, K. J. (2022). Offshore profit shifting and aggregate measurement: Balance of payments, foreign investment, productivity, and the labor share. *American Economic Review*, 112(6):1848–84.

Heid, B., Larch, M., and Yotov, Y. V. (2021). Estimating the effects of non-discriminatory trade policies within structural gravity models. *Canadian Journal of Economics/Revue canadienne d'économique*, 54(1):376–409.

Kalemli-Özcan, S., Sorensen, B., Villegas-Sanchez, C., Volosovych, V., and Yesiltas, S. (2015). How to construct nationally representative firm level data from the orbis global database: New facts and aggregate implications. Technical report, National Bureau of Economic Research.

Kalemli-Özcan, S., Sorensen, B., Villegas-Sanchez, C., Volosovych, V., and Yesiltas, S. (2022). How to construct nationally representative firm-level data from the orbis global database: New facts and aggregate implications. Technical report, National Bureau of Economic Research.

Kalemli-Özcan, S., Sørensen, B. E., Villegas-Sanchez, C., Volosovych, V., and Yesiltas, S. (2023). How to construct nationally representative firm level data from the orbis global database: New facts on smes and aggregate implications for industry concentration. *American Economic Journal: Macroeconomics*.

Linask, M. and Waddle, A. (2023). Trends in foreign direct investment. *Mimeo, University of Richmond*.

Liu, M. (2021). The missing option in firm boundary decisions. *European Economic Review*, 132:103602.

Osnago, A., Rocha, N., and Ruta, M. (2019). Deep trade agreements and vertical fdi: The devil is in the details. *Canadian Journal of Economics/Revue canadienne d'économique*, 52(4):1558–1599.

Ramondo, N. and Rodriguez-Clare, A. (2013). Trade, multinational production, and the gains from openness. *Journal of Political Economy*, 121(2):273–322.

Rungi, A., Morrison, G., and Pammolli, F. (2017). Global ownership and corporate control networks. *IMT Lucca EIC WP Series*, 7.

Wildmer, G., Michela, N., Nathalie, N., and Michela, R. (2019). Foreign investment in the eu the fown dataset. Technical report, Publications Office of the European Union.

Yotov, Y. V. (2022). On the role of domestic trade flows for estimating the gravity model of trade. *Contemporary Economic Policy*, 40(3):526–540.

Appendix

A Search details example

Figure A1 describes the boolean search steps to obtain the 3,787 American subsidiaries in Spain. Each search step limits the number of firms captured in each part of the search. In the second part of the search process, we limited the total assets to 25 million USD to ease the comparison with BEA's administrative data, which only reports subsidiaries with assets above the USD 25 million threshold.[18]

Figure A1: ORBIS search

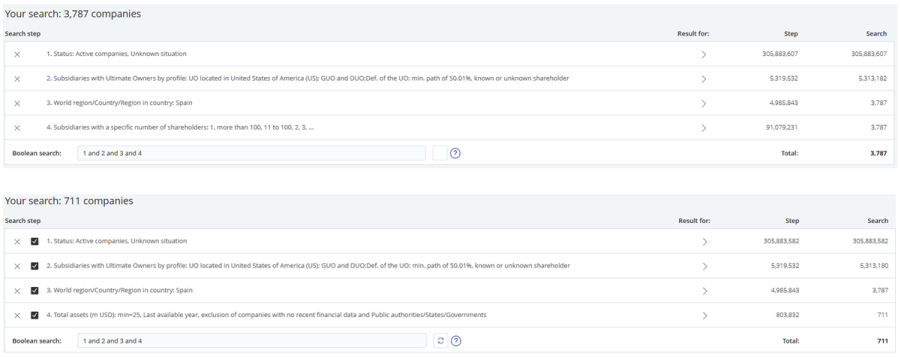


Figure A2 provides a screenshot of the search results as seen on Orbis' interface. American companies that operate in Spain, like Ford, ALCOA, HP, and Dow Chemical, appear in this sample.

The identification of greenfield investment during the last ten years is relatively simple. The variable "date of incorporation" allows us to identify new greenfield investments. For example, Netflix entered the Spanish market in 2018. In Figure A3, we see that Netflix's assets, employees, and sales were zero before 2018.

Orbis' search module allows us to identify M&As during the sample period and resolve

[18]Note that the MREID's threshold is USD 1 million. Sometimes USD 25 million is taken as a threshold for comparison with the BEA data.

Figure A2: ORBIS search result

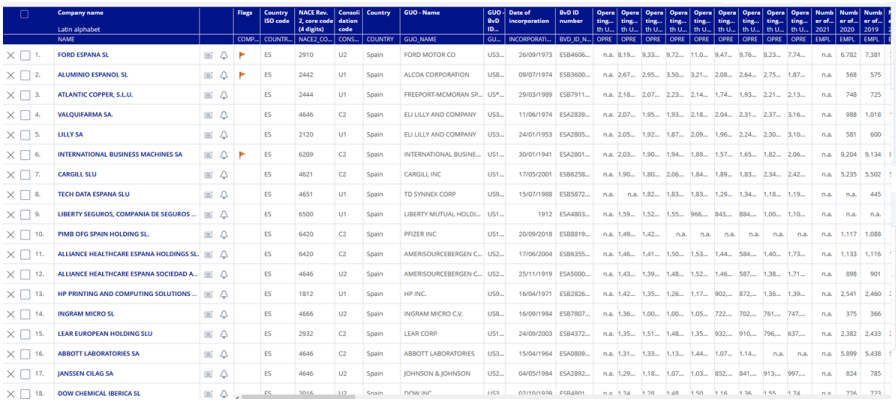
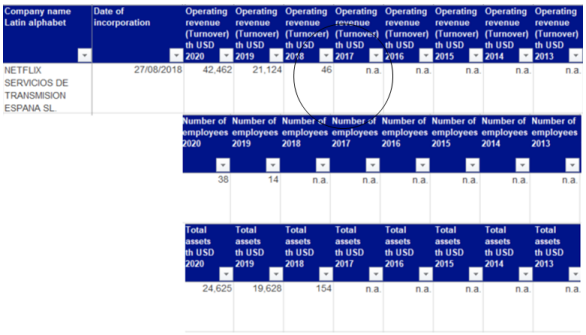


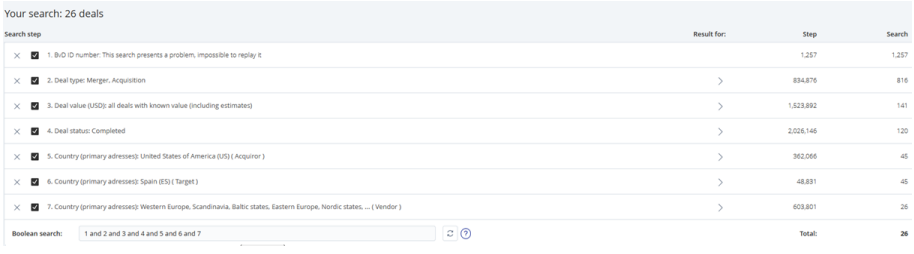
Figure A3: ORBIS greenfield FDI example: Netflix in 2018



changes in ownership.

Figure A4 shows that during the last ten years, American companies have acquired 26 subsidiaries.

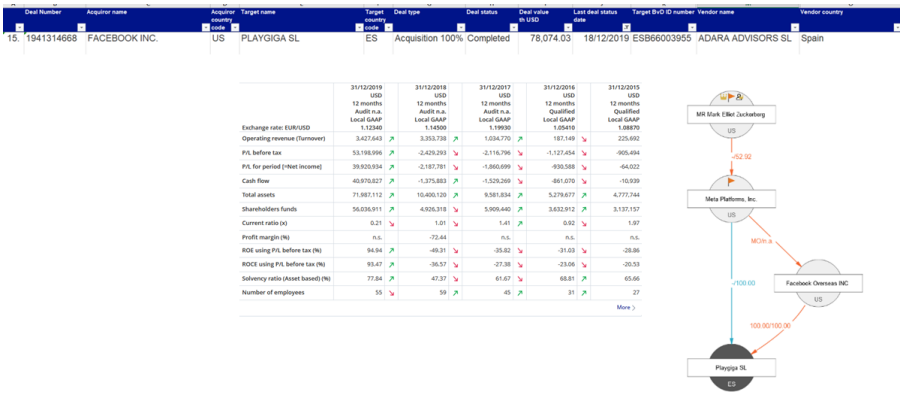
Figure A4: ORBIS M&A deals



For example, Facebook acquired the Spanish company Playgiga in 2019 as shown in Figure A5. This company was owned by Spanish investors until that date, and the initial

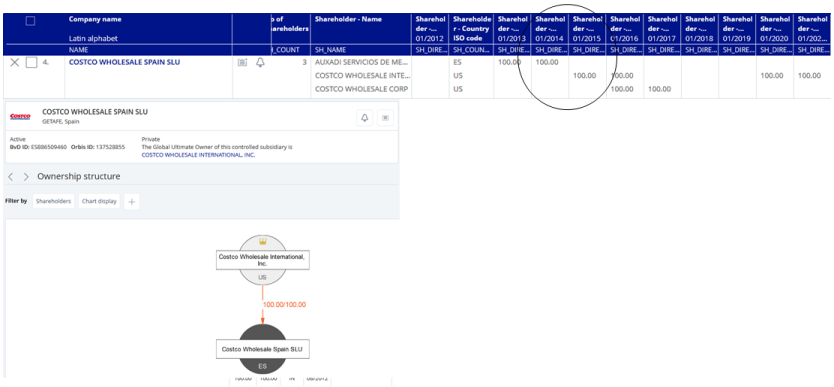
search result would have included it (incorrectly) as an American subsidiary throughout the period. The M&A search strategy resolves this issue.

Figure A5: ORBIS M&A deal example: Facebook



This search strategy allows us to identify complex changes in ownership, like the investment through shell companies. For example, Costco Spain appears to be a M&A 2013 as shown in Figure A6.

Figure A6: ORBIS M&A deal example: Cosco



However, a careful inspection of the changes in ownership in Figure A7 reveals that Costco Spain was owned by a shell company "AUXADI SERVICIOS DE MEDIACION SL" in 2012 and 2013, who registered the name on behalf of Costco Inc. The initial Kalemli-Özcan et al. (2015) procedure would have identified Costco as M&A from a Spanish firm,

when in fact, it was a greenfield investment. The M&A search strategy resolves this issue since Costco was not identified as an M&A.

In sum, our search strategy is salient in three ways. First, using the Global Ultimate Owner (GUO) allows us to overcome shell company issues. Second, the one million threshold is eliminated from the sample of non-active affiliates. Third, the use of M&A data allows us to easily overcome changes in ownership within the sample period.

Figure A7: ORBIS M&A deal example: Cosco (cont.)

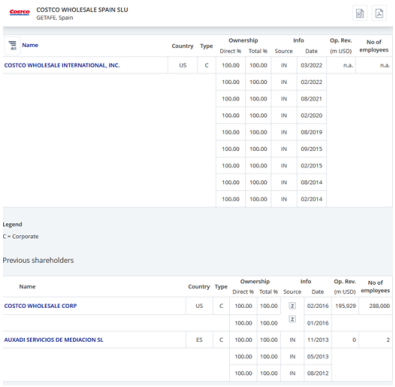


Figure A8 shows in detail the information that ORBIS has for a specific company, in this case, Ford, which operates in Valencia (Spain) since the mid-1970s. We can follow the yearly evolution of its sales, employees, total assets, and the rest of the variables described in section 4.1.

Figure A8: ORBIS search result example in detail: Ford

Company name Latin alphabet	Date of incorporation	Operating revenue (Turnover) th USD 2020	Operating revenue (Turnover) th USD 2019	Operating revenue (Turnover) th USD 2018	Operating revenue (Turnover) th USD 2017	Operating revenue (Turnover) th USD 2016	Operating revenue (Turnover) th USD 2015	Operating revenue (Turnover) th USD 2014	Operating revenue (Turnover) th USD 2013	Number of employees 2021
FORD ESPANA SL	26/09/1973	8,192,268	9,335,711	9,724,681	11,045,112	9,479,463	9,762,205	8,237,819	7,741,234	n.a.

Number of employees 2020	Number of employees 2019	Number of employees 2018	Number of employees 2017	Number of employees 2016	Number of employees 2015	Number of employees 2014	Number of employees 2013
6,782	7,381	7,498	8,100	8,451	10,052	9,794	7,692

Total assets th USD 2020	Total assets th USD 2019	Total assets th USD 2018	Total assets th USD 2017	Total assets th USD 2016	Total assets th USD 2015	Total assets th USD 2014	Total assets th USD 2013
5,343,210	4,953,313	4,902,236	4,446,396	3,479,819	4,111,568	4,038,469	3,575,290

B Other Tables

MREID covers 25 NAICS 2-digit industries reported in Table B.1. We report each industry's average and maximum number of affiliates per country pair. Table B2 provides country coverage and summary statistics.

Table B.1: Industry coverage and summary statistics (number of affiliates per country pair).

NAICS2	NAICS_desc	mean	max
11	Agriculture, Forestry, Fishing and Hunting	3	128
21	Oil and Gas Extraction	4	201
22	Utilities	14	1,227
23	Construction of Buildings	8	1,863
31	Food Manufacturing	2	131
32	Wood Product Manufacturing	2	224
33	Fabricated Metal Product Manufacturing	2	236
42	Wholesale Trade	3	603
44	Food and Beverage Stores	3	304
45	Miscellaneous Store Retailers	3	233
48	Air Transportation	3	268
49	Postal Service	5	222
51	Information	4	571
52	Finance and Insurance	5	1,298
53	Real Estate	13	2,746
54	Legal Services	8	1,782
55	Management of Companies and Enterprises	55	6,669
56	Administrative and Support and Waste Management and Remediation Services	6	1,064
61	Educational Services	9	1,294
62	Health Care and Social Assistance	7	490
71	Arts, Entertainment, and Recreation	5	225
72	Accommodation	9	685
81	Repair and Maintenance	3	294

92	Executive, Legislative, and Other General Government Support	5	209
99	Unclassified Establishments	159	61,605

Note: Statistics at the country-pair level.

Table B.2: Country coverage and summary statistics for Inward, Outward, Domestic affiliates and Global Ultimate Owners).

iso3	Country name	Inward	Outward	Domestic	GUO
ABW	Aruba	1	34	0	1
AGO	Angola	124	25	1	12
AIA	Anguilla	2	9	0	5
ALB	Albania	59	3	70	46
AND	Andorra	1	30	0	5
ARE	United Arab Emirates	292	976	108	242
ARG	Argentina	77	80	140	77
ARM	Armenia	10	6	2	7
ATG	Antigua & Barbuda	0	4	0	1
AUS	Australia	4,415	4,689	2,894	1,941
AUT	Austria	4,412	3,649	2,440	932
AZE	Azerbaijan	3	32	0	7
BDI	Burundi	2	0	0	0
BEL	Belgium	6,576	6,347	8,699	2,660
BEN	Benin	18	0	0	0
BFA	Burkina Faso	6	0	0	0
BGD	Bangladesh	9	18	2	17
BGR	Bulgaria	1,903	115	1,800	922

BHR	Bahrain	27	58	22	40
BHS	Bahamas	5	410	3	52
BIH	Bosnia & Herzegovina	276	71	143	158
BLR	Belarus	20	66	13	44
BLZ	Belize	3	55	0	21
BMU	Bermuda	123	5,298	56	424
BOL	Bolivia	9	3	1	4
BRA	Brazil	12,025	804	47,198	19,720
BRB	Barbados	15	21	1	10
BRN	Brunei	0	8	0	3
BWA	Botswana	12	20	2	4
CAF	Central African Republic	0	2	0	1
CAN	Canada	2,278	5,846	3,331	3,309
CHE	Switzerland	3,195	7,738	930	991
CHL	Chile	2,214	414	4,096	2,122
CHN	China	23,982	5,104	164,203	67,937
CIV	Cote d'Ivoire	29	2	5	3
CMR	Cameroon	7	0	0	0
COD	Dem. R. Congo	6	1	0	2
COG	Congo	2	0	0	0
COL	Colombia	1,687	153	1,220	801
CPV	Cape Verde	19	1	2	4
CRI	Costa Rica	15	9	7	10
CUB	Cuba	1	1	0	1
CUW	Curaçao	6	570	2	30

CYM	Cayman Islands	110	10,977	50	1,258
CYP	Cyprus	202	3,617	112	789
CZE	Czech Republic	5,202	1,461	11,287	4,425
DEU	Germany	21,421	22,858	24,082	6,676
DJI	Djibouti	2	0	0	0
DMA	Dominica	0	7	0	2
DNK	Denmark	5,506	4,416	5,060	1,407
DOM	Dominican Republic	5	5	3	3
DZA	Algeria	40	48	1	22
ECU	Ecuador	196	7	8	14
EGY	Egypt	148	61	94	82
ESP	Spain	12,665	7,268	27,199	11,045
EST	Estonia	1,329	286	1,961	992
ETH	Ethiopia	9	0	0	1
FIN	Finland	2,892	3,408	8,906	4,305
FJI	Fiji	7	1	2	2
FRA	France	16,212	19,913	37,123	9,354
GAB	Gabon	6	5	3	2
GBR	United Kingdom	56,296	24,323	80,871	19,712
GEO	Georgia	50	6	72	63
GHA	Ghana	315	0	9	11
GIB	Gibraltar	12	163	0	37
GIN	Guinea	4	0	0	0
GMB	Gambia	1	1	0	1
GNB	Guinea-Bissau	1	1	0	1

GRC	Greece	710	476	776	466
GRD	Grenada	2	0	0	0
GTM	Guatemala	17	0	6	3
GUY	Guyana	1	4	1	3
HKG	Hong Kong	739	4,033	80	736
HND	Honduras	7	5	3	2
HRV	Croatia	1,158	232	779	620
HUN	Hungary	1,846	684	1,858	1,546
IDN	Indonesia	90	252	49	128
IND	India	8,768	3,871	11,707	5,389
IRL	Ireland	7,002	5,812	2,501	1,254
IRN	Iran	4	26	83	46
IRQ	Iraq	8	4	4	5
ISL	Iceland	139	251	1,332	579
ISR	Israel	143	1,274	320	351
ITA	Italy	11,159	8,429	25,609	12,700
JAM	Jamaica	9	26	8	13
JOR	Jordan	38	17	25	27
JPN	Japan	1,507	23,628	27,326	8,282
KAZ	Kazakhstan	61	29	42	47
KEN	Kenya	24	27	10	17
KGZ	Kyrgyz Republic	3	0	0	0
KHM	Cambodia	15	2	3	6
KNA	Saint Kitts and Nevis	2	47	0	10
KOR	South Korea	1,650	2,321	3,957	2,968

KWT	Kuwait	11	415	55	72
LAO	Laos	4	1	0	1
LBN	Lebanon	15	74	21	43
LBR	Liberia	7	35	0	10
LBY	Libya	1	19	0	2
LCA	Saint Lucia	1	3	1	3
LIE	Liechtenstein	14	594	1	112
LKA	Sri Lanka	42	31	84	58
LSO	Lesotho	47	0	1	1
LTU	Lithuania	877	434	863	514
LUX	Luxembourg	10,390	8,096	948	919
LVA	Latvia	1,152	162	802	414
MAC	Macau	6	34	0	10
MAR	Morocco	735	128	211	89
MCO	Monaco	21	66	0	23
MDA	Moldova	76	21	58	61
MDG	Madagascar	6	3	0	3
MDV	Maldives	2	0	0	0
MEX	Mexico	1,025	754	220	189
MHL	Marshall Islands	2	149	5	31
MKD	Macedonia	119	19	239	161
MLI	Mali	8	0	0	0
MLT	Malta	1,136	504	1,030	413
MMR	Myanmar	1	1	0	2
MNE	Montenegro	95	12	17	27

MNG	Mongolia	3	4	1	3
MOZ	Mozambique	107	0	2	4
MRT	Mauritania	1	0	0	0
MUS	Mauritius	161	500	298	221
MWI	Malawi	11	1	8	4
MYS	Malaysia	4,032	2,086	12,554	4,150
NAM	Namibia	20	2	2	1
NER	Niger	3	1	0	1
NGA	Nigeria	19	47	13	28
NIC	Nicaragua	3	4	1	1
NLD	Netherlands	17,387	10,954	9,955	2,889
NOR	Norway	4,067	4,446	18,924	5,220
NPL	Nepal	2	0	12	15
NZL	New Zealand	1,040	357	131	178
OMN	Oman	43	23	14	25
PAK	Pakistan	49	28	51	51
PAN	Panama	24	506	36	102
PER	Peru	102	33	20	32
PHL	Philippines	862	326	773	208
PNG	Papua New Guinea	2	3	1	2
POL	Poland	8,995	671	6,484	2,868
PRK	North Korea	0	0	0	1
PRT	Portugal	4,880	1,894	10,101	4,452
PRY	Paraguay	175	4	8	12
PSE	Palestine	6	1	3	3

QAT	Qatar	25	126	26	41
ROU	Romania	5,117	112	1,215	830
RUS	Russia	6,648	611	11,576	4,269
RWA	Rwanda	8	0	1	1
SAU	Saudi Arabia	166	148	203	152
SDN	Sudan	2	1	0	1
SEN	Senegal	13	8	0	3
SGP	Singapore	15,801	3,186	6,901	2,248
SLE	Sierra Leone	1	2	0	2
SLV	El Salvador	20	0	3	2
SMR	San Marino	0	26	0	10
SRB	Yugoslavia	1,632	74	462	353
STP	Sao Tome and Principe	1	0	0	0
SUR	Suriname	0	1	0	1
SVK	Slovak Republic	3,750	515	2,584	1,567
SVN	Slovenia	587	282	903	629
SWE	Sweden	8,123	10,907	42,249	12,128
SWZ	Swaziland	10	0	0	0
SYC	Seychelles	8	71	0	32
SYR	Syria	5	7	0	5
TCD	Chad	2	1	0	1
TGO	Togo	4	32	2	3
THA	Thailand	3,888	973	4,364	1,359
TKM	Turkmenistan	0	1	0	1
TTO	Trinidad and Tobago	8	15	5	7

TUN	Tunisia	7	36	3	24
TUR	Turkey	580	476	461	468
TWN	Taiwan	74	2,875	335	883
TZA	Tanzania	26	66	3	6
UGA	Uganda	24	0	1	2
UKR	Ukraine	1,950	131	1,800	995
URY	Uruguay	314	137	50	138
USA	United States	14,730	93,450	138,312	113,556
UZB	Uzbekistan	4	2	5	6
VCT	St. Vincent and Gr.	0	6	0	5
VEN	Venezuela	1	34	2	4
VGB	British Virgin Islands	7	2,739	0	551
VNM	Vietnam	2,045	67	1,494	774
WSM	Samoa	0	42	0	21
YEM	Yemen	0	1	0	1
ZAF	South Africa	25	1,464	49	162
ZMB	Zambia	19	0	2	3
ZWE	Zimbabwe	15	1	6	7