

Multinational Production Data

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Definitions

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- A firm with operations in more than one country, with 10% or more ownership
- Parent and affiliate firms

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- A (financial) flow in the Balance of Payment of countries
- FDI stocks vs FDI flows; Greenfield FDI vs M&A FDI
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- **Multinational Production (MP)**

- The activity of parents and affiliates (e.g., sales, employment)
- MP by country i in l = sales of affiliates belonging to parents in i operating in l
- Outward (Inward) MP = sales of foreign affiliates from (in) i

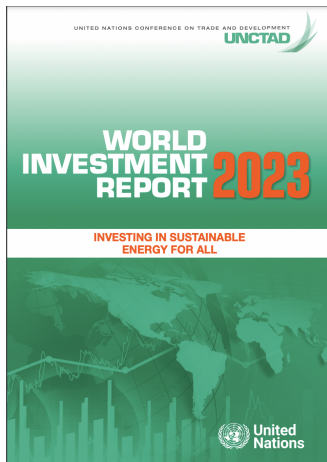
Outline

- Main data sources
 - Aggregate and firm-level sources
 - Common problems with FDI statistics
 - Some facts
- MNEs, international trade, offshoring, and global value chains (GVC)
 - Data sources
 - Some facts
- MNEs and the environment
 - Data sources
 - Some facts
- Evidence on spillovers
 - United States; Ethiopia; Costa Rica

Main Data Sources

Key Data Source: UNCTAD

World Investment Report, WIR



Sources For Aggregate Data

Country-level, country-pair level, country-sector data

1. UNCTAD-WIR

- unctadstat.unctad.org/
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3. Activities of US MNEs (Bureau of Economic Analysis, BEA)

- www.bea.gov/data/intl-trade-investment/
- Many many variables by industry-country, 30+ years

Sources For Firm-Level Data

- **ORBIS (Bureau Van Dijk)**

- Comprehensive global coverage of firms with their ownership trees
- Firm identifier to link with other firm-level datasets
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- **Firm-level country administrative data (e.g. surveys, census)**

- Confidential, except public firms (e.g. Compustat), UNCTAD sample of largest MNEs
- For sale: Chile; Indonesia; India
- Requires nationality and/or agreements: USA; France; Norway; Denmark; Korea; Costa Rica; Mexico; ... In general, all countries have firm-level records ...

Common Problems with FDI Statistics

Common Problems with FDI Statistics

- **Indirect FDI**

- Holding companies (special-purpose entities, SPEs)
- Tax heavens and offshore financial centers (OFCs)
- Ultimate Beneficiary Owner (UBO)
- "Round-tripping" (e.g. Hong Kong-Mainland China)

- **Transfer pricing**

- Guvenen, Mataloni Jr., Rassier, & Ruhl (AER, 2022)

- **See World Investment Report (UNCTAD)**

Holding Companies and SPEs

- Quick solution: get rid of the financial and holding sectors

Box table I.1.1. FDI stock in financial holding companies, 2009
(Per cent)

Economy	Share in total	
	Inward	Outward
Cyprus	33	31
Denmark	22	18
France	9	6
Luxembourg	93	90
Netherlands	79	75
Argentina	2	-
Hong Kong, China	66	73
Singapore	34	-

Source: UNCTAD, FDI/TNC database (www.unctad.org/fdistatistics).

Note: Data for Hong Kong, China, refer to FDI in investment holdings, real estate and various business activities.

Box I.1. UNCTAD FDI data: treatment of transit FDI

TNCs frequently make use of special purpose entities (SPEs) to channel their investments, resulting in large amounts of capital in transit. For example, an investment by a TNC from country A to create a foreign affiliate in country B might be channeled through an SPE in country C. In the capital account of the balance of payments of investor home and host countries, transactions or positions with SPEs are included in either assets or liabilities of direct investors (parent firms) or direct investment enterprises (foreign affiliates) – indistinguishable from other FDI transactions or positions. Such amounts are considerable and can lead to misinterpretations of FDI data. In particular:

- (i) SPE-related investment flows might lead to double counting in global FDI flows (in the example above, the same value of FDI is counted twice, from A to C, and from C to B); and
- (ii) SPE-related flows might lead to misinterpretation of the origin of investment, where ultimate ownership is not taken into account (in the example, country B might consider that its inflows originate from country C, rather than from Country A).

In consultation with a number of countries that offer investors the option to create SPEs, and on the basis of information on SPE-related FDI obtained directly from those countries, UNCTAD removes SPE data from FDI flows and stocks, in order to minimize double counting. These countries include Austria, Hungary, Luxembourg, Mauritius and the Netherlands (box table I.1.1).

Box table I.1.1. FDI with and without SPEs reported by UNCTAD, 2013

FDI	Austria		Hungary		Luxembourg		Mauritius		Netherlands	
	With SPE	Without SPE (UNCTAD use)	With SPE	Without SPE (UNCTAD use)	With SPE	Without SPE (UNCTAD use)	With SPE	Without SPE (UNCTAD use)	With SPE	Without SPE (UNCTAD use)
FDI inflows	11.4	11.1	2.4	3.1	367.3	30.1	27.3	0.3	41.3	24.4
FDI outflows	13.9	13.9	2.4	2.3	363.6	21.6	25.1	0.1	106.8	37.4
Inward FDI stock	286.3	183.6	255.0	111.0	3 204.8	141.4	312.6	3.5	3 861.8	670.1
Outward FDI stock	346.4	238.0	193.9	39.6	3 820.5	181.6	292.8	1.6	4 790.0	1 071.8

Source: UNCTAD, based on data from respective central banks.

Note: Stock data for Mauritius refer to 2012.

Similar issues arise in relation to offshore financial centres such as the British Virgin Islands and Cayman Islands. UNCTAD's FDI data include those economies because no official statistics are available to use in disentangling transit investment from other flows, as in the case of SPEs. However, for the most part UNCTAD excludes flows to and from these economies in interpreting data on investment trends for their respective regions. Offshore financial centres accounted for 8 per cent of global FDI inflows in 2013, with growth rates similar to global FDI; the impact on the analysis of global trends is therefore likely to be limited.

Source: UNCTAD.

Ultimate Beneficiary Owner (UBO)

- Quick solution: get rid of offshore centers ... check how statistics are computed

**Box table I.1.2. Inward FDI stock in the United States,
by immediate and ultimate source economy, 2000 and 2010**
(Millions of dollars)

Source economy	2000		2010	
	By immediate source economy	By economy of ultimate beneficial owner	By immediate source economy	By economy of ultimate beneficial owner
Australia	18 775	18 624	49 543	52 893
Bahamas	1 254	51	128	211
Bermuda	18 336	38 085	5 142	124 804
→ Brazil	882	1 655	1 093	15 476
Canada	114 309	127 941	206 139	238 070
France	125 740	126 256	184 762	209 695
Germany	122 412	131 936	212 915	257 222
Hong Kong, China	1 493	12 655	4 272	11 615
Japan	159 690	161 855	257 273	263 235
Korea, Republic of	3 110	3 224	15 213	16 610
→ Luxembourg	58 930	1 779	181 203	24 437
Mexico	7 462	9 854	12 591	33 995
→ Netherlands	138 894	111 514	217 050	118 012
Netherlands Antilles	3 807	1 195	3 680	12 424
Panama	3 819	377	1 485	761
Singapore	5 087	5 214	21 831	21 283
South Africa	704	1 662	687	2 190
Spain	5 068	6 352	40 723	44 237
Sweden	21 991	23 613	40 758	36 034
Switzerland	64 719	54 265	192 231	61 598
United Arab Emirates	64	1 592	591	13 319
United Kingdom	277 613	326 038	432 488	497 531
Venezuela, Bolivarian Republic of	792	4 032	2 857	3 111

Source: UNCTAD.

Transfer Pricing

- Quick solution: Use indicator variables instead of flow values; get rid of tax heavens

Assets in U.S.-owned foreign affiliates, 2012

	Ratio of U.S.-owned foreign affiliate total assets to		
	PPE	Compensation	Employment (mil. USD)
World	16.8	39.0	1.8
Canada	6.4	21.2	1.2
Ireland	20.0	142.7	10.9
Luxembourg	1,109.6	1,380.0	121.6
Netherlands	97.7	115.3	8.7
Switzerland	59.9	60.0	7.7
Barbados	41.8	1,444.7	43.3
Bermuda	130.8	1,475.5	155.8
U.K.I., Caribbean	101.2	3,330.2	199.8
Hong Kong	40.3	39.3	2.7
Singapore	18.6	50.3	3.1

Guvnen et al. (2022) using BEA data. PPE = Property, plant, & equipment

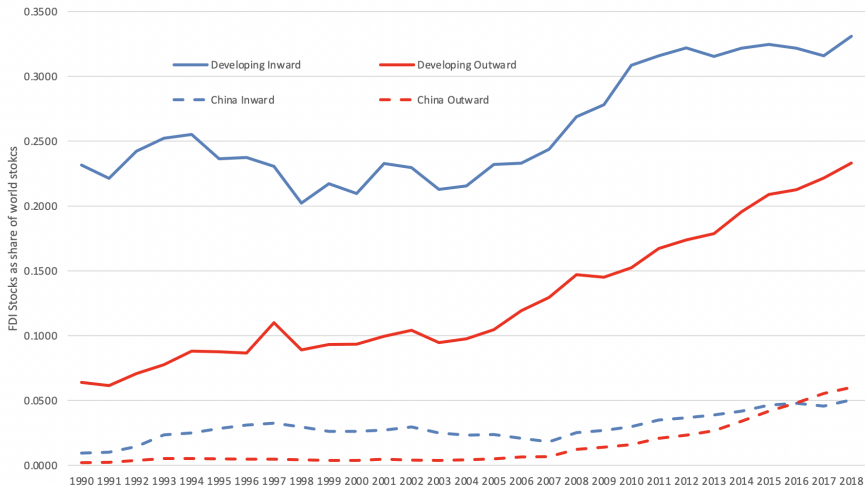
Tax Heavens

Anguilla	Turks and Caicos	Monaco	Antigua and Barbuda	US Virgin Islands
San Marino	Aruba	Belize	Maldives	Bahamas
Costa Rica	Mauritius	Barbados	Panama	Seychelles
British Virgin Islands	Bermuda	Bahrain	Cayman Islands	Macau
Vanuatu	Dominica	Andorra	Marshall Islands	Grenada
Liberia	Samoa	Montserrat	Cyprus	Nauru
Netherlands Antilles	Gibraltar	Tonga	St. Kitts and Nevis	Malta
St Vincent and Grenadines	St Lucia	Liechtenstein		

Source: Gravelle (2015).

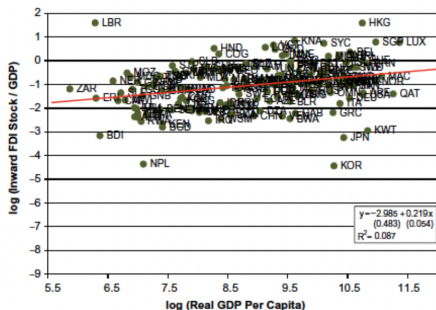
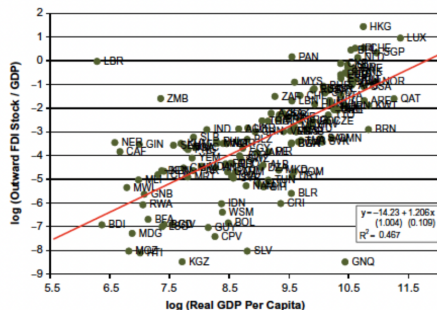
Some Facts

Which Countries Generate and Receive FDI?



Source: UNCTAD.

FDI Activity and Development

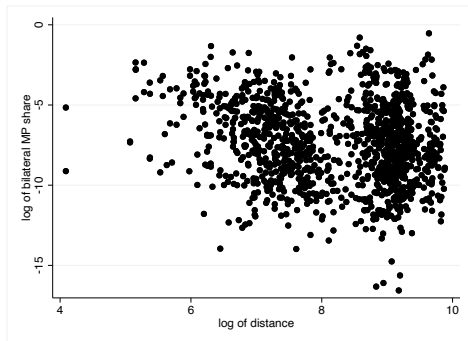


Source: Ántras and Yeaple (2014) using UNCTAD and World Bank.

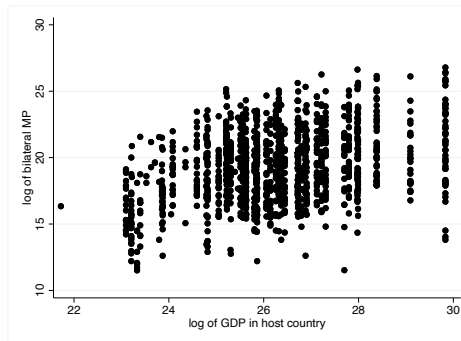
Bilateral MP, Market Size, and Bilateral Distance

Gravity Equations

Distance: OLS coef = -0.38 (0.065)



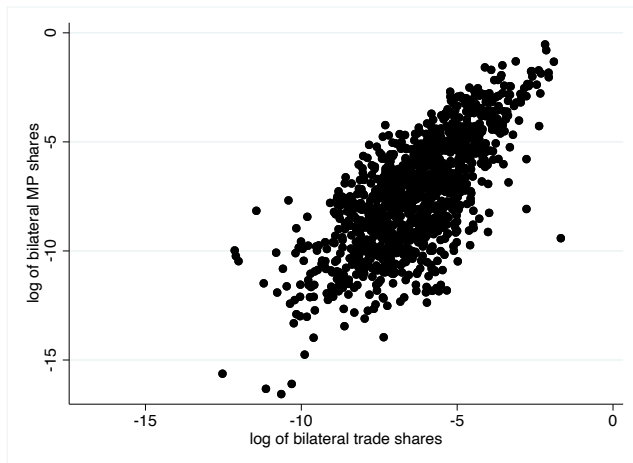
Size: OLS coef = 0.64 (0.047)



Source: Ramondo, Rodríguez-Clare, & Tintelnot (2015) using UNCTAD and ThomsonOne.

Bilateral MP share = MP by i in l as a share of l 's gross output. Non-financial sectors.

Trade and Multinational Production



Source: Source: Ramondo, Rodríguez-Clare, & Tintelnot (2015) using UNCTAD, ThomsonOne, and trade data from Feenstra. Correlation is 0.72.

Multinational Production and Sectors

Inward MP, by sector



Outward MP, by sector



Source: Alvarez (2019) using Eurostat-AMNE-BEA-ORBIS. Inward (Outward) MP: Share of output in sector j and country h produced by foreign affiliates (affiliates overseas).

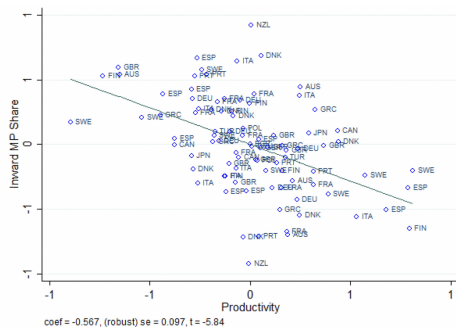
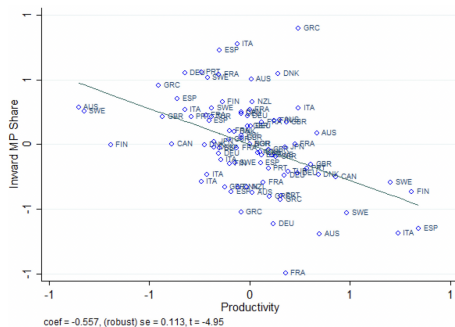
Multinational Production and Sectors



Source: **Alvarez (2019)** using **Eurostat-AMNE-BEA-ORBIS**. Inward MP blue (Outward MP green): Share of output in sector j and country h produced by foreign affiliates (affiliates overseas). Deviation from world sectoral shares.

Sectoral Multinational Production and Productivity

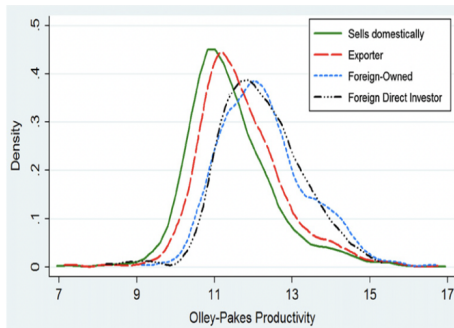
MP share is higher in receiving sectors with lower domestic productivity



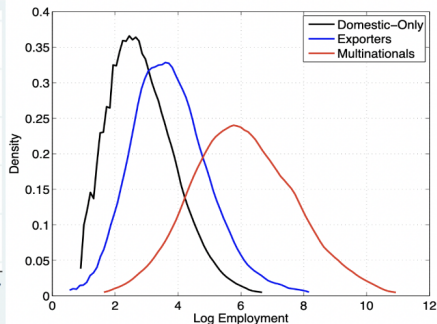
Source: Alvarez (2019) using Eurostat-AMNE-BEA-ORBIS. Inward MP: sales (employment) in left (right) panel of foreign affiliates in sector s and receiving country j after netting out sector fixed effects, location fixed effects, Hecksher Ohlin forces (interaction between factor endowments and factor intensities), effective tax rates at the country-sector level.

Firm-Level Data: MNE Advantage

Spain. 2007.



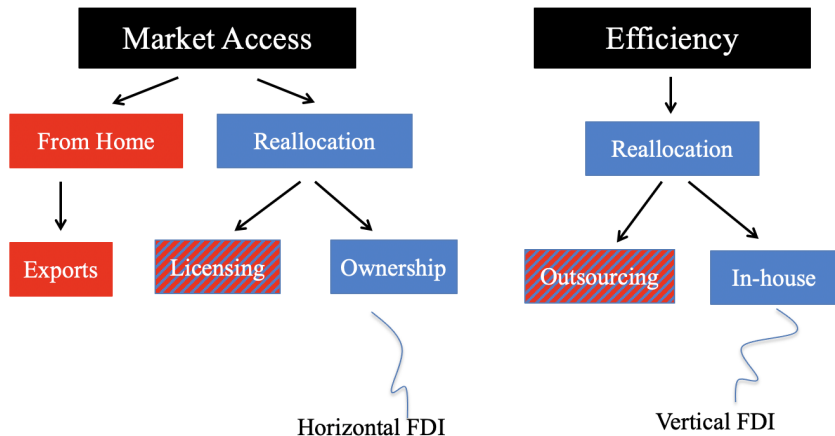
United States. 2007.



Source: **Ántras and Yeaple (2014)** for Spain using the Manufacturing Survey. **Flaeem (2014)** for the United States using US Census and LexisNexis.

MNEs, International Trade, Offshoring, and GVCs

Why Do Firms Engage in International Activities?



Affiliate Activities: Taxonomy

- **Horizontal Activities**

- Sales to the host market
- Median US affiliate sells 66% to host market (Ramondo, Rappoport, Ruhl, 2015, using BEA)

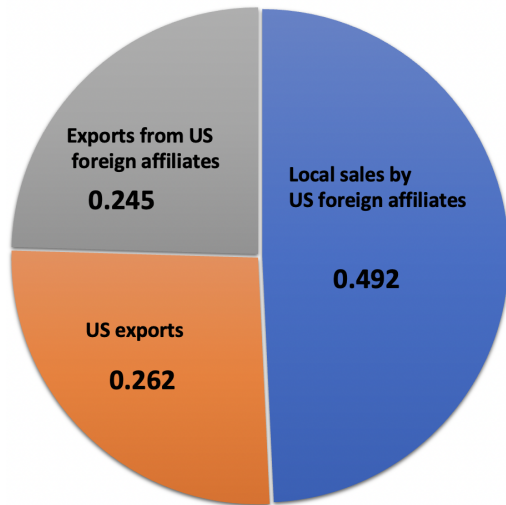
- **Export-Platform Activities**

- Sales outside the host market
- Median US affiliate sells 34% outside host market (Ramondo, Rappoport, Ruhl, 2015, using BEA)

- **Vertical Activities**

- Sales to parent company and other related parties (intra-firm trade)
- Median US affiliate sells 0% to the parent (Ramondo, Rappoport, Ruhl, 2015, using BEA)

Importance of Horizontal FDI



Source: Garetto, Oldenski, & Ramondo (2022) using BEA data.

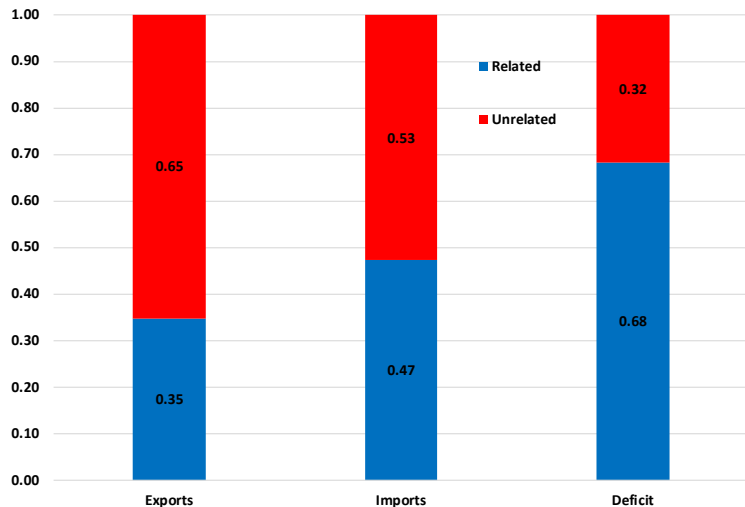
MNEs and International Trade, United States

- **Intra-firm trade gives us a way of measuring offshoring activities**

MNEs and International Trade, United States

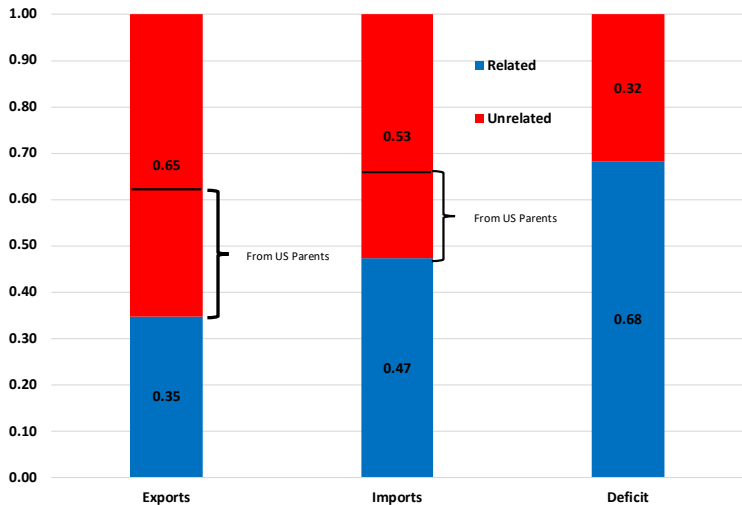
- **Intra-firm trade gives us a way of measuring offshoring activities**
- **Two sources for US intra-firm (also called related-party) trade data**
 - US Census: related- vs unrelated-party trade
 - Transaction-level data from customs
 - Bureau of Economic Analysis (BEA) data on trade of MNEs and affiliates
 - Survey data

U.S. International Trade is Dominated by MNEs



Source: U.S. Census, Related-party trade. Year: 2022.

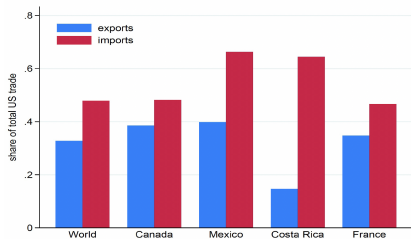
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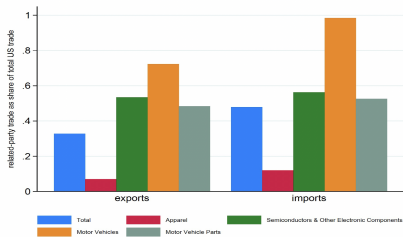
Source: U.S. Census, Related-party trade; and BEA. Year: 2022.

U.S. Intra-Firm Trade, Selected Countries and Industries

Related-party trade, by country



Related-party trade, by industry



Source: U.S. Census, Related-party trade. Year: 2020.

MNEs and International Trade, Other Countries

- France; Germany; Norway; ...
- Chile; Costa Rica; ...
- Korea; ...
- In general, data are available from national customs
 - DataMyne: proprietary dataset with bills of lading (importer-exporter identifiers)

MNEs and Global Value Chains (GVC)

- **The Analytical AMNE database for GVC and MNEs (OECD)**
 - AMNE + Inter-Country Input-Output tables
 - Contribution of domestic firms, MNEs and their affiliates to global trade and production
 - Gross vs value-added magnitudes, by industry-origin country-destination country
- **World Input Output Dataset (WIOD)**
 - e.g. value of steel shipped from Brazil to China for use in the car industry
- **Intra-firm trade data (e.g. U.S. Census)**

MNEs and the Environment

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- **Aggregate data**

- **World Input Output Dataset (WIOD) and Exiobase/Eora**

- Emissions and energy consumption by industry-country-energy type

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- Emissions per dollar for each parent and their country of production (i.e. affiliates)

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- Can be merged with ORBIS (firm-level) and AMNE (country-industry level)

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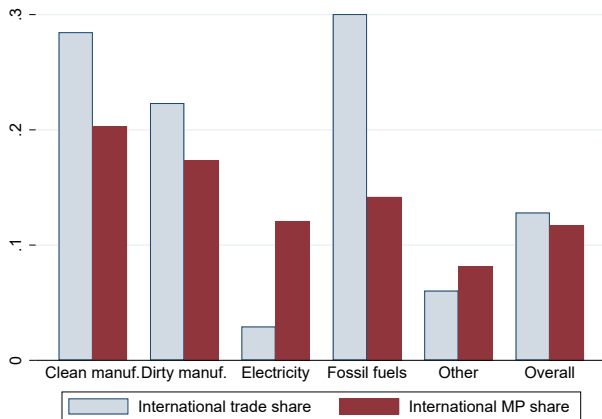
- Emissions per dollar for each parent and their country of production (i.e. affiliates)

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- In 2021, 157 MNEs account for 60% of world industrial CO₂ emissions directly and indirectly (GVC)

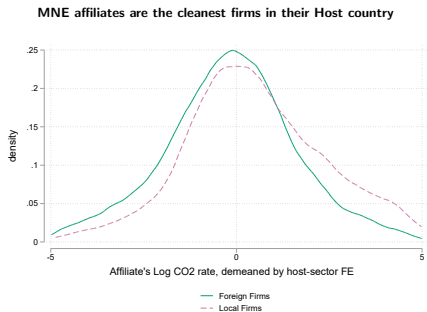
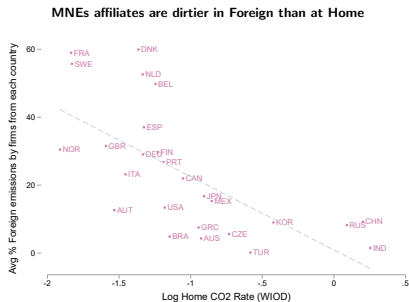
- [See World Bank Report: The Effect of MNEs on Climate Change, 2023]

International Trade vs Multinational Production (MP)



Source: García-Lembergman, Ramondo, Rodríguez-Clare, and Shapiro (2023) using CDP.

Pollution Heaven vs Pollution Halo



Source: García-Lembergman, Ramondo, Rodríguez-Clare, and Shapiro (2023) using CDP.

Right panel: Foreign emissions of Home firms as share of total emissions at Home and Abroad. Average across firms in each home country.

Spillovers from Foreign to Domestic Firms

MNE Spillovers: State-of-the-Art

'Domestic firms improve performance when foreign firm locates nearby'

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- Recently, with firm-level data, refinements to include channels for spillovers
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MNE Spillovers: State-of-the-Art

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 - e.g. Backward linkages: MNE suppliers (Javorcik, 2004, and literature thereafter)
- State-of-the-art: firm-to-firm data; employer-employee data; event studies
 - Much better identification
 - How to get these data? Countries with VAT, social security systems, FDI regulations, ...

Some Very Recent Examples: USA and Costa Rica

- **Employer-Employee data, United States (Setzler & Tintelnot, 2021)**
 - A foreign MNE pays a 7% average higher wage
 - One more job created by a foreign MNE generates in the same labor market
 - Approximately 0.5 more jobs in a domestic firm
 - Avg annual wage gain for incumbent worker of approx. 13,400\$
 - Tradeoff: the cost of mega-deals

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 - One more job created by a foreign MNE generates in the same labor market
 - Approximately 0.5 more jobs in a domestic firm
 - Avg annual wage gain for incumbent worker of approx. 13,400\$
 - Tradeoff: the cost of mega-deals
- **Firm-to-firm data, Costa Rica (Alonso-Ureña, Manelici & Vasquez, 2020)**
 - Effects of start supplying an MNE
 - Strong and persistent gains in performance by domestic firms

Effects of Large Plant Openings: Event Studies

Geographic proximity plays a key role in the acquisition of skills

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US Counties (Greenstone, Hornbeck & Moretti, 10)

- Counties chosen by new million-dollar plants vs counties almost chosen
 - o Compare incumbent plants in winning vs almost-winning counties
 - o Incumbent plants increase TFP by 8% after a large plant locates nearby

MNEs and Transfer Of Capabilities To Receiving Economy

- Data on Management Practices (Bloom, Sadun & Van Reenen, 2007)
 - **World Management Survey**
 - Publicly available data by country and firm

To be Released This Summer

”Foreign Direct Investment and Development”

Editors: Garetto, Pavcnik, and Ramondo

VoxDevLit (CEPR)

THANK YOU!