Multinational Production: Data and Stylized Facts

by Natalia Ramondo, Andrés Rodríguez-Clare, and Felix Tintelnot

Online Appendix

1 Data Description

1.1 Data Sources

The construction of the MP database combines several sources of data. The main information source is published and unpublished data by UNCTAD (the Investment and Enterprise Program, FDI Statistics, FDI Country Profiles).[1] The data on sales by affiliates of foreign firms include both local sales and exports to any other country outside host country, including exports to the home country. Additionally, the UNCTAD data include the number of local affiliates owned by foreign firms, as well as their employment and asset value. Moreover, bilateral FDI flows and stocks from the Balance of Payments are also included.

A foreign affiliate is defined as a firm who has more than ten percent of its shares owned by a foreigner. Some countries report magnitudes for majority-owned affiliates only (more than 50 percent of ownership). Nonetheless, majority-owned affiliates are the largest part of the total number of foreign affiliates in a host economy. The data cover, for the most part, non-financial affiliates in all sectors.[2] Unfortunately, systematic data by industry or sector are not available. The data period considered is 1996-2001. Since data availability varies by year and country we use an average of the variable of interest over those years.[3]

Table 1 shows, for selected countries, the source of information at the country level as well as the characteristics of the data in terms of coverage, availability, criteria of ownership, for bilateral affiliate sales and number of affiliates (inward and/or outward).[4] All countries in our sample report bilateral FDI stocks for the Balance of Payments to UNCTAD.

A country that reports multinational activity can present magnitudes for local affiliates of foreign firms (inward), and foreign affiliates of local firms (outward), or both. Our criteria is that we first

[1] Unpublished data are available upon request at fdistat@unctad.org.

[2] A few countries report data only for foreign affiliates in manufacturing. For consistency of our procedure across countries, we treat these observations as missing observations.

[3] More recent years (2004) are available at UNCTAD for very few countries and variables; we chose not to include those data because they are very sparse.

[4] This is the group of countries for which UNCTAD lists the national statistical source.

choose the data as reported by the source (home) country; if this country does not report any data, we choose as source of information the receiving (host) country. Our criteria reverses the one uses for trade data, which gives priority to the data on trade flows as reported by the importer country.

One reason to reverse the criteria is that it is more likely that if statistics are not reported by "Ultimate Beneficiary Owner" (UBO) in the receiving country, there would be misreporting of the country of origin of such flow. Capturing it from the source country might attenuate this type of problems with the data recording. For instance, suppose that the U.S. operations of a firm in France are owned by a U.S. firm in Netherlands, which in turn depends directly from the parent in the United States. If French statistics followed the UBO criteria (which, in fact, they do not), they would correctly classify this subsidiary in France as American; if they did not follow the UBO criteria, they would incorrectly classify this affiliate as Dutch, and hence, underreporting affiliate revenues from the United States and over-reporting them from Netherlands . In turn, in the U.S. statistics, this French affiliate will appear as French, not Dutch; moreover, in the Dutch statistics this firm, correctly, will not appear as a Dutch multinational with affiliates in French. Hence, giving priority to the statistics reported by the source country will attenuate these reporting problems.

There is an additional source of misreporting when the host, rather than the source, country is considered. The revenues of affiliates from i in n reported by n may be subject to an underreporting problem because the destination country n may report only revenue from local sales of the affiliates as opposed to their revenues from sales to all countries. Unfortunately, the documentation provided by UNCTAD, for each country, does not clearly indicate if the reported magnitudes refer to total or only local sales. Our criteria tries to get around this underreporting problem.

All that said, we find that for MP on the aggregate the numbers would be almost identical if priority were given to the information coming from the host country. In the original sample of 159 countries from UNCTAD, for the period 1990-2002, the average sales reported by the source is U$ 13,009 million, while the same average when reported by the host country is U$ 12,770 million. The correlation between the two series is 0.98, with no country below 0.90. For the sample period 1996-2001 the averages are U$ 9,992 and U$ 9,651 million, respectively. Regarding the bilateral number of affiliates, using as criteria records by the source first and by the host country second delivers averages over the period 1990-2002 of 128, while the reverse criteria delivers 123 affiliates for the average country-pair. The correlation between the two series is 0.94, with no country below 0.88.

Our second main source of data is the Thomson and Reuters Financial data set that records merg-

ers and acquisitions (M&A) across country pairs, for the period 1990-2010, in all sectors. To our knowledge, this database is the most comprehensive description of domestic and international M&A. Consistent with the UNCTAD data, we restrict the sample to the period 1990-2001, accumulating the number of M&A transactions for each country pair during that period. Following the criteria of the UNCTAD data, we also restrict our sample to target firms in the non-financial sectors that are acquired by firms in all sectors. Even though the Thomson and Reuters data records both the value and the number of bilateral M&A transactions, we restrict our attention to the count data, since the value of M&A transactions is only recorded for publicly listed companies.

A major advantage of the M&A database is that it has a much broader coverage of country-pair transactions than the available UNCTAD data on affiliate sales. Furthermore, M&A transactions are a good proxy of economic activity in a country, and hence, a good predictor of sales of firms. Therefore, as discussed further below, we will use the substantial correlation between the number of acquisitions and the sales of affiliates to predict the missing values of MP.

1.2 Sample Selection

The UNCTAD data include a total of 151 countries. We select countries that have a real GDP per capita of more than 5,000 US dollars (PPP-adjusted) and a population of more than three million.[5] We add China, India, and Indonesia, to the sample. In total, our data set contains 59 countries which entails 3,422 (58×59) bilateral (ordered) pairs.

Table 2 lists the sample of countries. Our sample represents more than 90 percent of world GDP and almost 95 percent of world's FDI inward and outward stocks, respectively, for the year 2000.[6]

1.3 Zeros and Missing Values

A pervasive problem with the UNCTAD data on bilateral sales of affiliates is the presence of missing values. But in our sample, we not only encounter missing values, but true bilateral zero MP values. The fairly comprehensive M&A data will help us to better estimate missing values for bilateral affiliate sales and number of affiliates, as explained below.

Table 3 summarizes the number of observations with missing and non-missing values, for affiliate sales and number of affiliates from UNCTAD, and the number of M&A transactions from Thomson

[5] We also exclude Puerto Rico and Taiwan for lack of any data.

[6] Aggregate FDI stocks by country are available at http://unctadstat.unctad.org.

and Reuters.

Out of the $3,422$ (58×59) possible bilateral relationships, we can assign a non-missing value to 2,311 and 2,232 pairs, for affiliate sales and number of affiliates, respectively. We also report non-missing values for FDI stocks across country pairs. We assign a zero value for sales, number of affiliates, and FDI stock, if and only if the six measures of bilateral multinational activity recorded in the UNCTAD data set (i.e., FDI stocks and flows, affiliate sales, assets, and employment, and number of affiliates) are *all* zero or missing for the period 1996-2001. As it can be seen in Table 3, in the UNCTAD data, FDI stocks from the Balance of Payment of countries have substantially better coverage ($3,171$ non-missing values) than the variables directly linked to the activity of affiliates. We assume that there is no missing values in the M&A data; a zero value simply means there was not an M&A transaction in the period 1990-2001.

We will need to estimate 1,111 observations for bilateral affiliate sales, and 1,190 for the number of affiliates across country pairs. Some of those missing values will be zeros. Still, we will be left with missing observations as explained below. Table 4 records missing values from the UNCTAD data, by country, both for inward and outward magnitudes of affiliate sales, number of affiliates, and FDI stocks.

2 Extrapolation Procedure

We exploit the high and tight correlation between the number of cross-M&A deals and either affiliate sales or number of affiliates to estimate missing values. Alternately, we estimate affiliate sales using FDI stocks.

The correlation between (1) affiliate sales of firms from country i in country n as a share of gross production in non-financial sectors in n, and (2) the number of M&A transactions by firms from i in n, as a share of the total number of transactions in n, is 0.80 in logs (0.46 in levels), while the correlation between the bilateral number of affiliates and the number of M&A transactions is 0.82 in logs (0.47 in levels). Furthermore, the correlation between bilateral affiliate sales and FDI stocks, both as a share of gross production in non-financial sectors in the destination country, is very high—0.87 in logs and 0.70 in levels.

Figure 1 shows the strong positive correlation between the measures of MP activity, M&A transactions, and FDI stocks, with more dispersion in the center panel related to the bilateral number of

affiliates.

We start our extrapolation procedure by better estimating zero MP flows. In particular, we assign a zero MP value by country i in n if and only if the six measures of bilateral multinational activity recorded in the UNCTAD data set are all zero or missing for the period 1996-2001, as we did above, *and* there are no M&A transactions between 1990 and 2001 by a firm from i in n. It can be the case that, using only UNCTAD data, we assigned a zero value for MP flows from country i to n, but adding the information on M&A leads us to change that observation from being a zero to being a missing (but positive) value, as long as we observe some positive M&A transaction by firms from i in n, in the period 1990-2001. Hence, after applying the extrapolation procedure, the number of observations with zero MP should (weakly) decrease.

The positive values for affiliate sales, number of affiliates, M&A transactions, and FDI stocks are used in the procedure described below. Denote by Y_{ni} total sales of affiliates from i in n, M_{ni} total number of affiliates from i in n, Q_{ni} total number of M&A transactions by firms from i in n, and S_{ni} FDI stocks from i in n. Our baseline regressions are the following (robust standard errors are in parenthesis):

$$\log Y_{ni} = \underset{(0.056)}{1.022} \log Q_{ni} + O_i + D_n + \epsilon_{ni}, \tag{1}$$

$$\log M_{ni} = \underset{(0.044)}{0.95} \log Q_{ni} + O_i + D_n + \nu_{ni}, \tag{2}$$

and

$$\log Y_{ni} = \underset{(0.045)}{0.76} \log S_{ni} + O_i + D_n + \upsilon_{ni}, \tag{3}$$

for $i \neq n$, and two sets of country fixed-effects, O_i and D_n. In order to have a minimum number of observations to reasonably pin down the fixed effects of a country as both a source and a host, we only include those country pairs in the regressions for which each country has at least three non-missing data points in UNCTAD as a source or destination country, respectively.[7] Notice that the source and destination country fixed effects, among other things, pick up variations across countries in average sales, and in the pattern of greenfield FDI versus M&A.[8] As robustness (not shown), we

[7] The countries that fall into this category for at least one of the three equations above are: Cuba, Guatemala, Lebanon, Libya, Slovakia, Turkmenistan, and Tunisia.

[8] Firms can establish foreign affiliates either via greenfield investment or via acquisition of an existing foreign company.

also interact our main regressor (i.e. Q_{ni} or S_{ni}) with real GDP per capita in the host country, but such interaction is never significant.

We use the results of these regressions to impute the missing values for bilateral foreign affiliate sales and number of foreign affiliates across country pairs. The results from this procedure are described in the next section.

2.1 Results

To be clear, the possibilities after applying our extrapolation procedure are the following: (1) We can have a zero value that becomes a positive value because all UNCTAD variables were zero or missing but we have some M&A transactions, or stay as a zero value; and (2) We can have a missing value that becomes a positive value because we did not have any UNCTAD data for affiliate sales (and/or number of affiliates), but we have some positive value for M&A transactions, or stays as a missing value.

Notice that we can have a missing value for affiliate sales, a positive FDI stock, and zero M&A transactions in which case this observation remains missing when we consider M&A transactions in the extrapolation procedure, but become positive when we consider FDI stocks instead. Conversely, we can have a missing value for FDI stocks, a missing value for affiliate sales, and a positive number of M&A transactions in which case this observation remains missing when we consider FDI stocks in the extrapolation procedure, but become positive when we consider M&A transactions instead. Finally, we can have missing values for all three variables—FDI stocks, affiliate sales, and number of M&A transactions—in which case the observation remains missing in either extrapolation procedure.There are 332 observations that fall into the first case and hence, remain as missing values for the extrapolation that uses the number of M&A transactions, but not in the one that uses FDI stocks. Analogously, there are 82 observations that fall into the second case and hence, remain as missing values for the extrapolation that uses FDI stocks, but become positive for the procedure that uses the number of M&A transactions. 120 observations present missing affiliate sales, FDI stocks, and number of M&A transactions.

One might think that, if there is a large set of firms available in a related sector in the destination country, the newly entering firm may be more likely to acquire an existing firm than to establish a new affiliate via greenfield investment. Using new data collected by the German Bundesbank on the mode of entry of newly established affiliates owned by German companies, from 2005-2009, we find that the ratio of greenfield to M&A investments is falling in real GDP per capita of the destination country.

Additionally, we can have a positive value for affiliate sales (and/or number of affiliates) from UNCTAD, but zero M&A transactions during the period and hence, such observation is not included in the extrapolation procedure. There are 87 observations with a positive value for sales and zero M&A for the period 1990-2001 (69 observations if we consider number of affiliates); these observations present non-missing values before and after the extrapolation procedure.

Finally, it is not possible to have a missing value in the UNCTAD data that becomes zero after we consider the M&A data because this is a case in which, even though the number of M&A transactions is zero for the period 1990-2001, some variable in the UNCTAD data set, other than affiliate sales (and/or number of affiliates), is not missing, indicating that the country pair was involved in an MP relationship.

Analogously to results in Table 3, we present in Table 5 the numbers of missing and non-missing values implied by our extrapolation procedure. Out of the 3,422 possible bilateral MP relationships, almost 45 percent are zeros; the remaining 55 percent present some MP activity. We are still left with 728 positive missing values for affiliate sales (738 for the number of affiliates) because these are observations for which we do not observe any M&A transaction during the period 1990-2001 and, hence, we are not able to apply the extrapolation procedure. Using FDI stocks, brings the number of missing positive observations down to 692. Overall, extrapolating bilateral affiliate sales and number of affiliates using M&A transactions allows us to more than double the number of positive observations of all possible country pairs. For some countries, the coverage is perfect after extrapolation. For example, between the twelve Western European and North American countries used in Tintelnot (2012), all values of affiliate sales are positive and non-missing; similarly for the 18 OECD countries used in Arkolakis, Ramondo, Rodriguez-Clare, and Yeaple (2013).

Table 6 , analogously to Table 4, contains the number of missing values by country with respect to all 59 partner countries after applying the extrapolation procedure. One thing is worth noticing here. For instance, for the United States, the number of missing values for affiliate sales went from 4 to 6 when the imputed data uses the number of M&A transactions. Is that possible? The answer is yes. This is a case in which a zero observation in the UNCTAD data becomes missing after applying the extrapolation procedure even though we observe some M&A transaction. This happens in very few cases in which the extrapolation in (1) cannot be completed because there is not a minimum number of observations to pin down the origin or destination fixed effects. In the example of the United States, Lebanon does not have enough (positive) observations to pin down the origin fixed effects, so

that the missing value for affiliate sales cannot be estimated with M&A transactions.

Table 7 presents sales of affiliates, as a share of non-financial gross production (see the Appendix for a description of these data), both inward ($\sum_{i \neq n} Y_{ni}/Y_n$) and outward ($\sum_{n \neq i} Y_{ni}/Y_i$), both from the extrapolation procedures using the number of M&A transactions and FDI stocks, respectively; we refer to these shares as inward and outward MP shares, respectively.[9] We also present the number of foreign affiliates and affiliates abroad into and from each country, as well as the raw data.

The inward MP share is an important variable since this is the variable that some models use to evaluate the gains of moving from isolation to the situation with the observed MP flows. It is important to have an accurate estimate of inward MP shares: countries with higher inward MP shares are more open, and hence, have higher gains.

As expected, the imputed data deliver higher MP activity, both in terms of total sales and number of affiliates. While the raw data delivers an average inward MP share of 15.4 percent, the imputed data reaches 17.7 percent. At the same time, the average number of foreign affiliates into a receiving country increases from 1,522 in the raw data to 1,857 in the imputed data. Similar increases are present for outward MP magnitudes. Improvements with respect to the raw data are heterogenous across countries. Countries with very complete data, such as the United States and Germany, do not improve after applying the extrapolation procedure. But some countries in the sample present very large improvements. For instance, for Belgium, Colombia, Hungary, Slovakia, Lithuania, and Russia, inward MP shares increase by more than 50 percent using the imputed data. Among poorer countries, the improvement is very large regarding outward MP: Brazil, Greece, India, Uruguay, and Poland, for instance, increase their outward MP shares by almost two fold, reaching almost a four-fold increase in the case of Argentina.

Additionally, using FDI stocks or the number of M&A transactions for extrapolation give very similar results in terms of outward and inward MP, on average. There is, however, considerable variation across countries between the two extrapolation methods. For instance, while for Chile the improvement with respect to the raw data on inward MP shares is of around 25 percent using M&A transactions, it is more than 50 percent when FDI stocks are used instead. The opposite is true for a country like Lithuania: using M&A transactions increases inward MP shares by more than 50 percent,

[9]The data are, of course, available in levels, without any normalization, giving the user the choice about her most convenient normalization. Notice that some countries present very high inward MP shares, such as Hungary or Singapore (for which this share is even bigger than one). One should keep in mind that the denominator of such shares is imputed for most of non-OECD countries, as described in the Appendix.

while using FDI stocks to extrapolate that share leaves the raw data almost unchanged.

The number of M&A transactions may be a better indicator of bilateral MP activity than FDI stocks. Since they are constructed from FDI flows, FDI stocks may be a worse indicator because companies can raise capital locally, phase their investment over a period of time, and channel their investment through different countries for tax efficiency (see IMF, 2004). Even though FDI stocks have broader coverage, we recommend using the variable "sales MandA," which contains the actual data on bilateral affiliate sales completed with the M&A-extrapolation procedure, for empirical exercises that involve data on bilateral MP. Section 2.2 presents the variables contained in our data set.

Finally, notice that missing values do not seem to be random in the UNCTAD data in the following sense. We systematically predict less MP for those pairs that were missing in the UNCTAD data: a missing bilateral pair has (predicted) average sales of U$ 665 million, equivalent to 0.0026 as a share of the host country's gross value of production, while a non-missing (positive) pair in UNCTAD has average sales of U$ 11,347 millions, equivalent to 0.016 as a share of the host country's gross value of production. Comparing the simple average across all country-pairs with the raw and imputed data, respectively, points out to the same bias: while the average MP share calculated with the raw data is 0.0154, the imputed data deliver much lower averages, of around 0.004 for affiliate sales (using either M&A transactions or FDI stocks). That is, the imputed data come from pairs with systematically low MP.

2.2 Data Presentation

We provide both the original UNCTAD data and the data completed with our extrapolation procedure on affiliate sales and number of affiliates from country i to n. The output file is in STATA(12) and

contains the following variables: ,"

Variable Name	Definition	Source
ISO d	code for receiving country	U.N.
ISO o	code for source country	U.N.
sales raw	affiliate sales, original data	UNCTAD
stocks	FDI stocks	UNCTAD
num raw	number of affiliates, original data	UNCTAD
sales MandA	affiliate sales, imputed data from M&A	own calcu
sales stocks	affiliate sales, imputed data from FDI stocks	own calcu
num aff MandA	number of affiliates, imputed data from M&A	own calcu
gross prod nonfin d	gross value of production, receiving country, non-financial sectors	own calcu

Auxiliary Data

As auxiliary data – which is not directly used in the extrapolation procedure for MP but enables the calculation of MP shares – we use the OECD-STAN database for gross production and the World Development Indicators (WDI) for GDP. For countries for which gross production data are not available from STAN—most of non-OECD countries—we use data on GDP to predict the magnitude of gross production in the respective country. Let Y_n denote the gross value of production in non-financial sectors in country n, calculated from STAN for the OECD countries by subtracting the value of gross production in the financial sectors from the total value of gross production. Since such data are available only for OECD countries, we impute values for the remaining countries using data on current GDP. Estimates from ordinary least squares (OLS), with robust standard errors, yield

$$\begin{array}{rccc} \log Y_n = & 0.26 & + & 0.97 \quad \log GDP_n, \\ & (0.0047) & & (0.002) \end{array} \tag{4}$$

with an R-squared of 0.96, and $1,566$ observations. Gross production in non-financial sectors is used to present inward and outward MP shares in Table 7, for the reader convenience.

Tables and Figures

Table 1: **Availability and coverage of affiliate revenues and number of affiliates. UNCTAD. Selected countries.**

Reporting	Availability by year						Coverage				Ownership	National
Country	1996	1997	1998	1999	2000	2001	type of aff.	sectors	inward	outward	Criteria	Source
BEL	n/a	n/a	x	n/a	n/a	n/a	MOA	all	n/a	x	UBO	National Bank of Belgium (Eurostat)
CAN	n/a	n/a	x	n/a	x	x	MOA	all	n/a	x	n/a	CANSIM
CZE	n/a	n/a	n/a	x	n/a	n/a	all	all	x	x	non UBO	Czech National Bank
FIN$^{\flat}$	x	x	x	x	x	x	all	nf	x	x	UBO	Bank of Finland
FRA†	x	x	x	x	x	x	MOA	all	x	x	non UBO	Bank of France and Ministry of Finance
GBR	x	x	n/a	n/a	n/a	n/a	MOA	nf	x	n/a	UBO	Office for National Statistics
GER	x	x	x	x	x	x	all	all	x	x	UBO	Bundesbank
IRL	x	x	x	x	x	n/a	MOA	mfg	x	x	UBO	Central Statistics Office
JPN	x	x	x	x	x	x	all	nf	x	x	UBO	Ministry of Economy, trade, and Industry
NLD‡	n/a	n/a	n/a	n/a	n/a	n/a	MOA	nf	x	x	non UBO	Centrak Bureau of Statistics (CBS)
NOR	x	n/a	n/a	n/a	n/a	n/a	MOA	mfg	x	n/a	UBO	OECD: Measuring Globalization
POL	n/a	n/a	n/a	x	x	n/a	MOA	nf	x	n/a	n/a	Central Statistical Office
PRT	n/a	x	x	x	x	x	MOA	all	x	x	n/a	Bank of Portugal
SWE$^{\natural}$	n/a	n/a	x	x	x	n/a	MOA	nf	x	n/a	UBO	www.itps.se
USA	x	x	x	x	x	x	all	nf	x	x	UBO	Bureau of Economic Analysis

MOA = Majority-owned affiliate. UBO = Ultimate Beneficiary Owner. NF = non-financial affiliates. Inward (Outward) refers to magnitudes for foreign affiliates in (from) country n. Belgium (BEL), Canada (CAN) and Portugal (PRT) only report affiliate revenues, not the number of affiliates. ($\dagger$): France (FRA), for inward magnitudes, only records affiliates in the manufacturing sector. $\flat$: Finland (FIN) reports outward magnitudes for only majority-owned affiliates. ($\ddagger$): Netherlands (NLD) only reports the number of foreign affiliates abroad and at home, not revenues. ($\natural$): Sweden (SWE) reports number of affiliates in all sectors, including the financial sector.

Table 2: **List of countries**

Code	Name	Code	Name
ARG	Argentina	ISR	Israel
AUS	Australia	ITA	Italy
AUT	Austria	JPN	Japan
BEL	Belgium	KOR	Korea
BGR	Bulgaria	LBN	Lebanon
BLR	Belarus	LBY	Libya
BRA	Brazil	LTU	Lithuania
CAN	Canada	MEX	Mexico
CHE	Switzerland	MYS	Malaysia
CHL	Chile	NLD	Netherlands
CHN	China	NOR	Norway
COL	Colombia	NZL	New Zealand
CRI	Costa Rica	POL	Poland
CUB	Cuba	PRT	Portugal
CZE	Czech Republic	ROM	Romania
DNK	Denmark	RUS	Russia
DOM	Dominican Rep.	SAU	Saudi Arabia
ESP	Spain	SGP	Singapore
FIN	Finland	SLV	Slovenia
FRA	France	SVK	Slovakia
GBR	Great Britain	SWE	Sweden
GER	Germany	THA	Thailand
GRC	Greece	TKM	Turkmenistan
GTM	Guatemala	TUN	Tunisia
HRV	Croatia	TUR	Turkey
HUN	Hungary	URY	Uruguay
IDN	Indonesia	USA	United States
IND	India	VEN	Venezuela
IRL	Ireland	ZAF	South Africa
IRN	Iran		

Belgium includes Luxembourg.

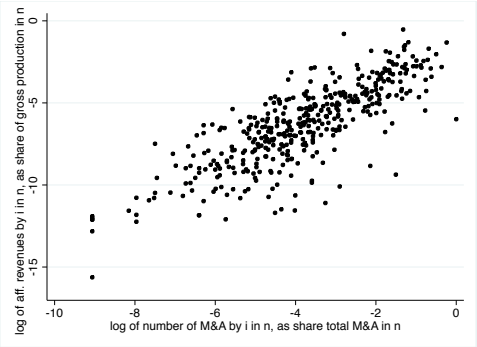
Table 3: **Missing and non-missing values. Original Data.**

	UNCTAD			Thomson and Reuters
	affiliate revenues	number of affiliates	FDI stocks	number of M&A
Non-missing values	2,311	2,232	3,171	3,422
positive	590	511	1,450	1,396
zero	1,721	1,721	1,721	2,026
negative	–	–	10	–
Missing values	1,111	1,190	241	–
Total observations	3,422	3,422	3,422	3,422

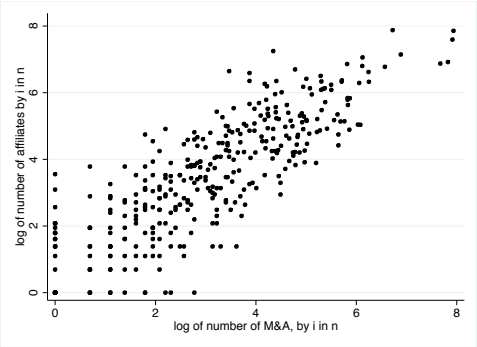
Own calculations based on UNCTAD data for affiliate revenues, number of affiliates, and FDI stocks from i in n, average over 1996-2001, and Thomson and Reuters data for the number of M&A's transactions by firms from i in n between 1990-2001.

Figure 1: Bilateral MP and M&A Transactions. Raw Data.

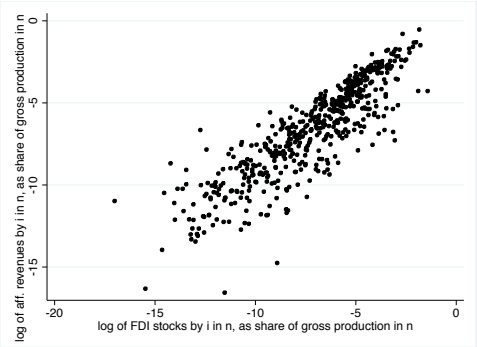
(a) Affiliate revenues and M&A



(b) Number of affiliates and M&A



(c) Affiliate revenues and FDI stocks



Left Panel: (log of) affiliate revenues of firms from i in n, as a share of gross production in non-financial sectors in country n, and the (log of) number of M&A transactions from i in n, as a share of the total number of transactions in n. Center Panel: (log of) number of affiliates and the (log of) number of M&A's transactions from i in n. Right Panel: (log of) affiliate revenues and FDI stocks from i in n, as a share of gross production in non-financial sectors in country n. Number of M&A's transactions are from Thomson and Reuters, 1990-2001. FDI stocks, affiliate revenues, and number of affiliates are from UNCTAD, an average over 1995-2001.

Table 4: **Missing values by country. Original data, UNCTAD.**

	Inward			Outward		
	aff. revenues	num. of aff.	FDI stocks	aff. revenues	num. of aff.	FDI stocks
ARG	18	22	5	29	28	12
AUS	26	29	5	31	28	4
AUT	25	33	3	21	23	2
BEL	12	15	6	11	17	9
BGR	36	35	1	22	22	2
BLR	2	2	3	2	3	1
BRA	34	39	2	27	27	9
CAN	19	33	0	35	38	1
CHE	21	24	1	34	37	4
CHL	27	29	12	24	24	8
CHN	21	18	4	21	18	4
COL	34	35	2	27	27	3
CRI	22	21	17	10	9	4
CUB	4	3	4	4	4	1
CZE	14	37	0	11	36	0
DNK	31	23	2	29	35	0
DOM	8	8	7	3	3	1
ESP	25	38	20	38	39	14
FIN	18	6	3	3	35	2
FRA	30	42	3	30	40	5
GBR	27	28	0	31	35	3
GER	4	4	2	1	1	5
GRC	21	23	4	30	32	4
GTM	7	6	2	5	5	3
HRV	18	17	0	15	14	0
HUN	35	36	0	31	32	6
IDN	17	18	2	15	14	4
IND	13	14	2	21	20	4
IRL	14	5	7	17	21	3
IRN	13	11	4	16	16	6
ISR	16	16	6	24	20	5
ITA	25	15	1	12	2	11
JPN	31	27	7	18	12	7
KOR	29	29	0	42	27	0
LBN	3	2	4	5	5	3
LBY	3	3	3	2	2	2
LTU	6	7	5	2	2	0
MEX	33	36	3	21	24	4
MYS	22	22	5	23	23	1
NLD	24	22	0	31	35	3
NOR	10	20	0	30	34	2
NZL	27	29	1	32	33	3
POL	16	16	1	38	37	1
PRT	21	40	1	16	36	5
ROM	19	19	4	13	13	5
RUS	21	21	2	20	19	5
SAU	5	5	5	8	6	5
SGP	22	22	4	25	23	3
SLV	16	15	1	2	2	2
SVK	24	25	2	26	28	1
SWE	30	20	17	34	37	11
THA	15	16	1	17	17	1
TKM	1	1	1	0	0	0
TUN	20	19	21	0	0	0
TUR	18	29	7	24	22	12
URY	10	10	5	9	10	5
USA	4	3	9	3	1	10
VEN	28	29	0	17	18	5
ZAF	16	18	2	23	19	5
Total	1,111	1,190	241	1,111	1,190	241

Own calculations based on UNCTAD data for affiliate sales, number of affiliates, and FDI stocks from i in n, average over 1996-2001.

Table 5: **Zero, missing, and positive values. Imputed Data.**

	Affiliate revenues		Number of affiliates	Number of M&A
	M&A	FDI stocks		
Non-missing values	2,694	2,730	2,684	3,422
positive	1,215	1,251	1,205	1,396
zero	1,479	1,479	1,479	2,026
Missing values	728	692	738	0
Total observations	3,422	3,422	3,422	3,422

Column 1 corresponds to the extrapolation in (1). Column 2 refers to the extrapolation in (2). Columns 3 corresponds to the extrapolation in (3). Calculations are made using observations which are averages over the period 1996-2001. The data on number of M&A's transactions in column 4 are from Thomson and Reuters, between 1990-2001.

Table 6: **Missing values by country. Imputed data.**

	Inward			Outward		
	aff. rev. with M&A	num. of aff.	aff. rev. with FDI stocks	aff. rev. with M&A	num. of aff.	aff. rev. with FDI stocks
ARG	9	10	14	20	19	16
AUS	12	13	15	2	2	9
AUT	15	16	12	10	13	4
BEL	10	11	24	5	6	26
BGR	14	14	8	20	19	5
BLR	1	2	5	2	3	2
BRA	15	16	12	14	13	14
CAN	13	14	13	9	9	9
CHE	13	15	11	8	8	8
CHL	9	10	16	26	26	26
CHN	14	16	14	9	8	14
COL	19	20	10	27	27	27
CRI	15	14	18	11	10	11
CUB	9	8	9	5	5	5
CZE	11	15	8	10	29	3
DNK	20	19	10	6	6	4
DOM	8	8	7	3	3	3
ESP	16	17	23	11	11	20
FIN	14	5	10	2	5	0
FRA	23	24	17	11	11	10
GBR	16	16	16	8	8	13
GER	4	4	4	1	1	1
GRC	12	12	9	8	9	5
GTM	13	12	13	6	6	6
HRV	5	6	2	15	14	15
HUN	14	15	9	19	19	7
IDN	11	11	11	25	24	25
IND	9	9	14	9	9	20
IRL	10	7	11	6	6	15
IRN	15	13	15	14	14	5
ISR	25	25	25	6	5	15
ITA	16	16	10	6	2	8
JPN	15	15	13	8	7	7
KOR	14	13	9	17	8	7
LBN	6	5	6	6	6	6
LBY	7	7	7	7	7	7
LTU	4	4	15	7	7	7
MEX	18	20	11	13	14	10
MYS	14	14	16	35	35	35
NLD	17	19	11	8	8	11
NOR	7	9	12	7	8	8
NZL	16	16	9	35	36	35
POL	14	14	11	24	22	2
PRT	18	24	11	16	28	6
ROM	19	19	4	13	13	13
RUS	8	8	13	7	6	11
SAU	4	5	11	26	24	26
SGP	13	13	13	36	34	36
SLV	16	15	16	4	4	4
SVK	7	7	4	17	18	1
SWE	23	19	21	6	6	11
THA	8	8	13	26	26	26
TKM	1	1	1	1	1	1
TUN	24	23	24	2	2	2
TUR	11	12	9	15	15	12
URY	8	8	14	7	8	7
USA	4	3	3	3	1	3
VEN	16	17	9	10	10	9
ZAF	6	7	11	38	34	38
Total	728	738	692	728	738	692

Columns 1 and 4 correspond to the extrapolation in (1). Columns 3 and 6 correspond to the extrapolation in (3). Columns 2 and 5 refer to the extrapolation in (2). Inward variables to totals into country n; outward variables refer to totals from country n. Calculations are made using observations which are averages over the period 1996-2001.

Table 7: **Outward and Inward MP. Original and Imputed Data.**

	Inward MP					Outward MP				
	affiliate revenues			number of affiliates		affiliate revenues			number of affiliates	
	raw data	M&A	FDI stocks	raw data	M&A	raw data	M&A	FDI stocks	raw data	M&A
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ARG	0.079	0.108	0.100	657	1,665	0.006	0.039	0.011	31	533
AUS	0.188	0.228	0.227	1,746	2,725	0.055	0.070	0.060	278	741
AUT	0.279	0.297	0.291	3,584	3,942	0.128	0.137	0.140	2,026	2,151
BEL	0.331	0.472	0.342	2,082	3,594	0.271	0.334	0.287	1,408	2,527
BGR	0.030	0.037	0.038	92	203	0.003	0.003	0.006 12	33	
BLR	0.003	0.003	0.003	14	29	0.003	0.003	0.003	5	5
BRA	0.120	0.139	0.137	1,381	2,744	0.005	0.011	0.006	73	371
CAN	0.352	0.354	0.354	2,797	3,718	0.177	0.198	0.195	1,309	2,044
CHE	0.318	0.353	0.365	2,424	3,033	0.689	0.792	0.787	4,191	6,181
CHL	0.098	0.127	0.147	308	624	0.003	0.003	0.003	14	14
CHN	0.038	0.047	0.041	2,557	2,647	0.002	0.004	0.002	136	430
COL	0.070	0.157	0.093	233	880	0.002	0.002	0.002	17	17
CRI	0.098	0.101	0.104	86	131	0.001	0.001	0.001	4	4
CUB	0.000	0.000	0.000	2	2 0.000	0.000	0.000	-	-	
CZE	0.338	0.338	0.338	1,402	1,779	0.016	0.016	0.016	59	101
DNK	0.106	0.135	0.129	1,023	1,046	0.156	0.190	0.180	1,332	1,951
DOM	0.064	0.064	0.066	47	47 0.001	0.001	0.001	3	3	
ESP	0.167	0.172	0.168	2,194	3,816	0.022	0.031	0.028	252	827
FIN	0.195	0.195	0.196	1,615	1,619	0.378	0.379	0.378	770	1,063
FRA	0.201	0.202	0.202	4,655	6,958	0.193	0.206	0.203	3,197	5,572
GBR	0.316	0.318	0.318	6,515	6,635	0.222	0.257	0.245	3,664	7,089
GER	0.290	0.290	0.290	12,241	12,281	0.354	0.354	0.354	28,191	28,191
GRC	0.054	0.072	0.081	289	510	0.006	0.010	0.012	39	121
GTM	0.058	0.058	0.058	109	109	0.001	0.001	0.001	4	4
HRV	0.024	0.031	0.027	131	179	0.006	0.006	0.006	20	20
HUN	0.278	0.444	0.436	1,392	1,903	0.011	0.014	0.015	29	112
IDN	0.103	0.115	0.114	769	1,123	0.004	0.004	0.004	26	26
IND	0.034	0.036	0.037	661	749	0.004	0.006	0.010	35	100
IRL	0.348	0.351	0.348	1,163	1,166	0.122	0.130	0.128	299	464
IRN	0.001	0.001	0.001	20	20	0.003	0.003	0.004	31	47
ISR	0.063	0.063	0.063	149	149	0.022	0.027	0.026	135	279
ITA	0.094	0.127	0.111	3,306	3,315	0.057	0.057	0.057	2,295	2,295
JPN	0.041	0.045	0.043	1,831	1,920	0.143	0.144	0.145	10,588	10,758
KOR	0.050	0.056	0.055	725	935	0.039	0.052	0.050	417	890
LBN	0.007	0.007	0.007	14	14 0.023	0.023	0.023	26	26	
LBY	0.000	0.000	0.000	-	-	0.000	0.000	0.000	-	-
LTU	0.028	0.046	0.029	41	108	0.000	0.000	0.000	-	-
MEX	0.163	0.192	0.178	1,383	2,197	0.019	0.023	0.020	191	1,070
MYS	0.338	0.402	0.378	989	1,482	0.009	0.009	0.009	27	27
NLD	0.407	0.418	0.411	3,587	3,603	0.776	0.978	0.875	4,944	7,741
NOR	0.131	0.134	0.142	382	626	0.147	0.179	0.165	951	1,267
NZL	0.149	0.218	0.178	325	675	0.017	0.017	0.017	22	22
POL	0.222	0.222	0.222	3,342	3,354	0.002	0.004	0.004	74	253
PRT	0.372	0.381	0.373	544	1,048	0.031	0.031	0.031	34	138
ROM	0.024	0.024	0.058	256	256	0.001	0.001	0.001	8	8
RUS	0.017	0.027	0.029	366	667	0.019	0.026	0.021	107	218
SAU	0.037	0.044	0.039	125	187	0.052	0.052	0.052	154	154
SGP	1.095	1.306	1.281	1,637	2,678	0.041	0.041	0.041	99	99
SLV	0.060	0.060	0.060	50	50	0.010	0.010	0.010	5	5
SVK	0.140	0.216	0.214	352	559	0.013	0.019	0.018	12	37
SWE	0.297	0.298	0.298	4,228	4,233	0.251	0.300	0.286	1,902	2,758
THA	0.267	0.309	0.304	1,185	1,663	0.003	0.003	0.003	19	19
TKM	0.002	0.002	0.002	2	2	0.000	0.000	0.000	-	-
TUN	0.020	0.020	0.020	104	104	0.000	0.000	0.000	-	-
TUR	0.063	0.064	0.063	385	607	0.003	0.004	0.004	81	128
URY	0.064	0.104	0.079	77	160	0.006	0.011	0.018	16	118
USA	0.153	0.153	0.153	11,393	11,393	0.189	0.189	0.189	20,145	20,145
VEN	0.098	0.162	0.128	305	747	0.135	0.149	0.143	47	284
ZAF	0.102	0.125	0.119	538	928	0.037	0.037	0.037	56	56
Average	0.154	0.177	0.171	1,522	1,857	0.083	0.095	0.090	1,522	1,857

Columns 2 and 7, 3 and 8 correspond to the extrapolations in (1) and (3), respectively. Columns 5 and 10 refer to the extrapolation in (2). "Raw" refers to the original data from UNCTAD. Inward MP shares are $\sum_{i \neq n} Y_{ni}/Y_n$, while outward MP shares are $\sum_{n \neq i} Y_{ni}/Y_i$. Observations are averages over the period 1996-2001.