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TRANSNATIONAL CORPORATIONS

INVESTMENT AND DEVELOPMENT

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EDITORIAL STATEMENT

Transnational Corporations[1] is a longstanding policy-oriented refereed research journal on issues related to investment, multinational enterprises and development. It is an official journal of the United Nations, managed by the United Nations Conference on Trade and Development (UNCTAD). As such it has a global reach, a strong development policy imprint, and high potential for impact beyond the scholarly community.

Objectives and central terrain

The journal aims to advance academically rigorous research to inform policy dialogue among and across the business, civil society and policymaking communities. Its central research question – feeding into policymaking at subnational, national and international levels – is how to make international investment and multinational enterprises contribute to sustainable development. It invites contributions that provide state-of-the-art knowledge and understanding of the activities conducted by, and the impact of multinational enterprises and other international investors, considering economic, legal, institutional, social, environmental or cultural aspects. Only contributions that draw clear policy conclusions from the research findings will be considered.

Grand challenges and the need for multiple lenses

The scale and complexities of the "grand challenges" faced by the international community, such as climate change, poverty, inequality, food security, health crises, and migration – as embodied in the United Nations' Sustainable Development Goals (SDGs) – are enormous. These challenges, combined with the impact of disruptive technologies on business, rapidly evolving trends in international production and global value chains, new emerging-market players and new types of investors and investment, make it imperative that policymakers tap a wide range of research fields. Therefore, the journal welcomes submissions from a variety of disciplines, including international business, innovation, development studies, international law, economics, political science, international finance, political economy and economic geography. However, submissions should be accessible across disciplines (as a non-specialized journal idiosyncratic research should be avoided); interdisciplinary work is especially welcomed. The journal embraces both quantitative and qualitative research methods, and multiple levels of analyses at macro, industry, firm or individual/group level.

Inclusive: multiple contributors, types of contributions and angles

Transnational Corporations aims to provide a bridge between academia and the policymaking community. It publishes academically rigorous, research-underpinned

[1] Previously: The CTC Reporter. In the past, the Programme on Transnational Corporations was carried out by the United Nations Centre on Transnational Corporations (1975–1992) and by the Transnational Corporations and Management Division of the United Nations Department of Economic and Social Development (1992–1993).

and impactful contributions for evidence-based policymaking, including lessons learned from experiences in different societies and economies, both in developed and developing-country contexts. It welcomes contributions from the academic community, policymakers, research institutes, international organizations, and others. Contributions to the advancement and revision of theories, frameworks and methods are welcomed as long as they are relevant for shedding new light on the investigation of investment for development, such as advancing UNCTAD's *Investment Policy Framework for Sustainable Development*.

The journal publishes original research articles, perspective papers, state-of-the art review articles, point-counterpoint essays, research notes and book reviews. All papers are double blind reviewed and, in line with the aims and mission of the journal, each paper is reviewed by academic experts and experts from the policymaking community to ensure high-quality impactful publications that are both academically rigorous and policy relevant. In addition, the journal features synopses of major UN reports on investment, and periodic reviews of upcoming investment-related issues of interest to the policy and research community.

Unique benefits for authors: direct impact on policymaking processes

Through UNCTAD's wider development community and its global network of investment stakeholders, the journal reaches a large audience of academics, business leaders and, above all, policymakers. UNCTAD's role as the focal point in the United Nations system for investment issues guarantees that its contents gain significant visibility and contribute to debates in global conferences and intergovernmental meetings, including the biennial *World Investment Forum* and the *Investment and Enterprise Commission.* The work published in *Transnational Corporations* feeds directly into UNCTAD's various programmes related to investment for development, including its flagship product, the annual *World Investment Report*, and its technical assistance work (investment policies reviews, investment promotion and facilitation and investment treaty negotiations) in over 160 countries and regional organizations. The journal thus provides a unique venue for authors' academic work to contribute to, and impact on, national and international policymaking.

CONTENTS

Innovation by MNEs in emerging markets

Robert Grosse*

Innovation is a key competitive advantage for companies in the 21st century. R&D and other innovative work was traditionally carried out by MNEs in their home countries, although it spread to some affiliates in other developed countries in the late 20th century, and to some emerging markets more recently. This paper analyzes the assignment of innovative activity, particularly R&D, by MNEs to their affiliates in emerging markets. Using both aggregate data produced by government organizations and company-specific interviews and published commentaries, we find that MNEs assign more responsibility for R&D and innovation to affiliates in emerging markets that have larger markets, lower human resource costs, greater overall R&D activity and to some extent greater activity of the company in question. China and India are huge exceptions to the rule that MNEs tend to assign only development work to emerging market affiliates: they are increasingly assigning core R&D to these two large countries. Corporate strategy can be adjusted to take advantage of low-cost R&D capabilities, particularly in these large markets, and to pull innovations from those affiliates throughout the rest of the firm. Public policy to attract R&D by MNEs should look at offering companies better access to sizable markets, offering incentives for R&D activity and building up R&D activity in the local economy, by companies and government alike.

Keywords: emerging markets, innovation, MNEs, new technology, R&D

1. Introduction

Innovation is one of the most important competitive advantages of the 21st century (Rubera and Kirca 2012; Pisano 2015; Grosse 2015; Chatzoglou and Chatzoudes 2018). Countries as well as companies are interested in stimulating more innovative activity and benefitting from the outcomes (e.g. income, jobs, profits, prestige).

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Many efforts are underway in various countries to try to create a new Silicon Valley or a new Silicon Allee (as in Berlin). Companies large and small, in high-tech and low-tech industries, are aware of the advantages generated by being in the vanguard with new technology, whether it be patented products and processes or unpatented activities such as management of customer relations or internal company information.[1]

The overarching aim of this paper is to explore in detail the expansion of research and development (R&D) activity by traditional multinational corporations (MNEs) (i.e., from the United States, Western Europe and Japan, or the "Triad") into emerging markets. Historically, innovative activity within MNEs was largely limited to the home country and other high-income industrial countries. In the 21st century, companies have discovered compelling reasons to carry out some of their R&D in emerging markets, particularly the largest ones, China and India. With a better understanding of the motivations of companies, governments in emerging markets can pursue public policies to try to attract more of that activity and generally to guide multinationals into providing greater spillover benefits to the host country from their activities. The contribution of this paper is to demonstrate what motivates companies to put innovative activity in emerging markets and to show how government policies and government relations with MNEs have encouraged or discouraged such innovation.

Multinational firms have traditionally carried out their core innovative activities – particularly industrial R&D – in the home country, with occasional extensions to Triad countries (Ronstadt 1978; Patel and Pavitt 1991; Reddy 2000; Belderbos et al. 2013). In the past few decades, MNEs have established R&D activities in emerging markets as well (e.g. UNCTAD 2005a, b; Egan 2017). Initially, these activities were mainly to adapt products and processes to local conditions in emerging markets. In recent years, core R&D itself has sometimes moved to emerging market affiliates, particularly in the very large markets of China and India (OECD 2008, p. 8ff; Gassmann and Han 2004; Yip and McKern 2014). This paper looks at the process of innovation by multinational firms as it is carried out in overseas affiliates, concentrating on emerging markets.

Although innovation can occur in all aspects of business, from production to distribution to the organization of the company and much more, our main focus is on the creation and implementation of product and process technology for which evidence is available. This activity can be measured by indicators such as R&D spending by companies or, in many cases, by the number of patents registered

[1] It should be noted that there are patented systems for both customer relationship management and company data management, for example, those sold by SAP and Oracle.

with the United States Patent and Trademark Office (USPTO), or with some other indicator that perhaps covers the creation of new knowledge and its implementation in business more broadly. Our empirical analysis looks at innovation as captured by various measures of R&D activity along with several more detailed company discussions, and we also consider some issues related to unmeasured innovation activity.[2]

Looking around the world, it is clear that far less R&D activity takes place in Latin America, Africa and most of Asia than elsewhere. Why do companies invest so little in R&D in these emerging markets in comparison with the United States, the European Union (EU), Japan and China? If we compare just emerging markets among themselves, R&D investment in Latin America, Africa and most Asian countries still falls far short of that in China, India, the Czech Republic, South Korea, Israel[3] and a small number of other countries. Table 1a shows the amount of R&D activity in selected countries as a percentage of GDP, and table 1b shows the amount of R&D undertaken by United States multinationals in their foreign affiliates.

Note that the R&D activity in table 1a relates to *all* R&D in each country, including not just companies but the government sector and universities as well. In this ranking, the United States, Japan, the Nordic countries, Germany, Switzerland, Israel, South Korea and China stand out above all others.

In table 1b the R&D spending is that of United States-based multinational companies in their foreign affiliates. Although the data relate only to United States companies, they are probably fairly representative of foreign investors in general in the various countries. These data also show Japan, the Nordic countries, Germany, Switzerland, Israel and China, along with the United Kingdom and India, as top locations for R&D activities by United States MNEs.

Before proceeding to explore innovation in MNE affiliates in detail, it is useful to consider why it is so important. For a company to compete successfully, it needs competitive advantages relative to other companies. Some competitive advantages may come from historical accident or luck: they may involve access to a scarce natural resource such as oil or gold, or a good climate for a primary industry such as farming or fishing. One competitive advantage that does not require any particular physical location, and thus can exist for companies anywhere, is innovation.

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[2] The very important area of business model innovation (e.g., Amit and Zott 2012; Chesbrough 2010) should be included as well, but for lack of measures and data, we leave it aside here, except for some commentary. Similarly, services-sector R&D is quite important in many business services, but it has not been measured in any consistent way, so it is discussed here only in commentary.

[3] Even here, three of these five countries (viz., the Czech Republic, Israel and South Korea) are members of the OECD, so arguably the only emerging markets with a high level of R&D activity are China and perhaps India.

Table 1a. R&D spending as a percentage of GDP, selected countries, 1996–2015

Country	1996	2000	2005	2010	2014	2015
Argentina	0.42	0.44	0.38	0.52	0.61	n.a.
Australia	1.66	1.58	2.18	2.38	2.20	n.a.
Belgium	1.73	1.92	1.78	2.05	2.46	2.46
Brazil	n.a.	1.00	1.00	1.16	1.24	n.a.
Canada	1.62	1.87	1.99	1.84	1.61	n.a.
China	0.57	0.90	1.32	1.73	2.05	2.07
Colombia	0.30	0.11	0.15	0.20	0.20	0.24
Costa Rica	0.30	0.39	0.43	0.48	0.56	n.a.
Czech Republic	0.90	1.12	1.17	1.34	2.00	1.95
Denmark	1.81	2.20	2.39	2.94	3.08	3.01
Egypt	0.21	0.19	0.24	0.42	0.68	0.72
Finland	2.45	3.25	3.33	3.73	3.17	2.90
France	2.21	2.08	2.04	2.18	2.26	2.23
Germany	2.14	2.39	2.42	2.71	2.87	2.88
Hungary	0.63	0.79	0.93	1.15	1.37	1.38
India	0.63	0.74	0.81	0.80	0.82	0.63
Indonesia	n.a.	0.07	n.a.	0.08	0.08	n.a.
Ireland	1.27	1.09	1.19	1.61	1.52	n.a.
Israel	2.60	3.93	4.04	3.93	4.11	4.27
Italy	0.95	1.01	1.05	1.22	1.29	1.33
Japan	2.77	3.00	3.31	3.25	3.58	3.28
Malaysia	0.23	0.47	0.60	1.04	1.26	1.30
Mexico	0.26	0.32	0.40	0.45	0.54	0.55
Netherlands	1.86	1.81	1.79	1.72	1.97	2.01
Poland	0.65	0.64	0.57	0.72	0.94	1.00
Russian Federation	0.97	1.05	1.07	1.13	1.19	1.13
Singapore	1.32	1.82	2.16	2.01	2.19	n.a.
South Africa	0.58	0.72	0.86	0.74	0.73	n.a.
South Korea	2.24	2.18	2.63	3.47	4.29	4.23
Spain	0.79	0.88	1.10	1.35	1.23	1.22
Sweden	3.32	3.91	3.39	3.22	3.16	3.26
Switzerland	2.45	2.33	2.68	2.73	2.97	n.a.
Thailand	0.12	0.24	0.22	0.36	0.48	0.63
Turkey	0.45	0.48	0.59	0.84	1.01	n.a.
United Kingdom	1.71	1.72	1.63	1.69	1.70	1.73
United States	2.44	2.62	2.51	2.74	2.73	2.79
OECD	2.14	2.30	2.22	2.38	2.42	2.55
World	**1.99**	**2.08**	**1.99**	**2.05**	**2.12**	**2.23**

Source: World Bank, *World Development Indicators*, http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.

Table 1b. R&D performed abroad by majority-owned foreign affiliates of United States parent companies, by region/country, selected years, 1982–2015 (Millions of current U.S. dollars)

	1982	1989	1995	2000	2005	2010	2013	2015
Total	3,851	7,922	12,582	19,758	27,653	36,991	48,750	54,797
Manufacturing	3,247	6,446	10,791	17,822	23,508	29,385		
Total expenditures by region/country								
Canada	505	975	1,068	1,874	2,433	3,040	3,148	3,430
Europe	2,892	5,475	9,144	12,938	18,805	24,155	29,825	31,274
Belgium	223	313	292	410	920	1,259	2,608	1,125
France	332	521	1,271	1,445	2,248	2,171	2,359	2,213
Germany	1,079	1,726	3,068	3,105	4,609	7,039	8,272	8,033
Ireland	9	156	171	518	820	1,503	1,858	2,994
Italy	150	393	346	575	580	582	806	835
Netherlands	65	367	495	369	392	1,484	1,478	1,173
Spain	40	58	288	196	257	379	284	380
Sweden	28	31	691	1,335	1,652	1,576	670	708
Switzerland	60	59	242	220	878	1,123	3,735	3,865
United Kingdom	824	1,718	1,935	D	5,406	5,157	5,346	6,165
Asia and Pacific	238	1,272	1,865	3,727	4,764	7,210	10,712	14,425
China						1,579	2,179	3,428
India						1,377	2,557	3,216
Japan	112	1	1,286	1,433	1,717	1,872	2,070	2,438
Australia	114	190	287	330	556	923	1,114	1,039
Singapore	D	24	63	548	576	621	642	1,755
Latin America and the Caribbean	169	155	389	665	841	1,465	2,750	2,374
Argentina						92	161	151
Brazil	97	92	249	250	405	791	1,224	883
Mexico	30	37	58	305	D	329	389	666
Middle East	11	33	97	527	770	1,063	2,187	3,150
Israel	11	29	97	527	767	1,060	2,153	2,955
Saudi Arabia	—	4	—	0	3	4	D	16
Africa	25	11	19	27	40	57	128	145
Egypt						6	3	43
South Africa	23	9	17	22	31	43	94	38

— = less than $500,000.

D = data withheld to avoid disclosing operations of individual companies.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of U.S. Direct Investment Abroad, annual series, http://www.bea.gov/bea/di/di1usdop.htm and http://www.nsf.gov/sbe/srs/seind04/append/c4/at04-51.xls and http://www.bea.gov/international/pdf/fdius_2009p/II%20H1%20to%20H6.pdf.

Note: Data are for majority-owned (more than 50 per cent ownership) non-bank foreign affiliates of non-bank United States parents. Data include R&D expenditures made by affiliates, whether for themselves or for others, under contract. Data exclude R&D expenditures made by others for affiliates under contract. Manufacturing data exclude petroleum manufacturing before 1999.

This kind of advantage can be built, in principle, by any company that is able to identify a need for any product, service or process, and fill it with a new product, service or process. So, innovation allows (companies from) any country, large or small, landlocked or maritime, highly developed or less developed, to pursue potentially sustainable advantages that are based on investment in innovative activities.[4]

The next section looks at why MNEs undertake R&D outside of their home countries. The third section discusses the kinds of activity that constitute innovation and the measures that exist for international comparisons. The subsequent section presents the conceptual structure of the paper, including four hypotheses about the features of companies and countries that are expected to produce greater R&D activity by MNE affiliates. The next section presents empirical evidence and tests of the hypotheses. The final section draws some conclusions, proposes policy options for attracting private sector-led R&D, and suggests directions for future research.

2. Why do MNEs undertake R&D outside of their home countries?

Perhaps 30 years ago or earlier, this was a simple question, and one that had been answered in various studies in the 1970s and 1980s (e.g., Ronstadt 1978) by one general purpose: to carry out local development of products to adapt them to local demand and cost conditions. Even here the answer was somewhat more nuanced. Ronstadt found that some MNEs had acquired companies abroad that conducted their own R&D, so these acquired affiliates had fairly independent R&D activity – though still focused on their local markets. He also found that some overseas R&D was used to adapt products imported from the home country to local conditions, whereas other R&D was done to develop new products for that local market. Finally, he found that in a handful of cases, MNEs operated R&D units outside the home country that had a global orientation, creating products for sale in various countries where the firm operated.

After Ronstadt's early exploration of this subject, a number of other authors entered the discussion, to the point where today one could classify overseas R&D by multinational firms as belonging to four categories (e.g., Egan 2017; Jha et al. 2018):

[4] Of course, this ignores the institutional conditions that make it very difficult to innovate successfully in business in North Korea or the Central African Republic, in comparison with, say, Luxembourg or South Korea.

i. Adapting products originally made elsewhere to local market conditions in the foreign country, that is, product development in the definition of the United States National Science Foundation (NSF) (see below).

ii. Carrying out R&D that could be applied in the home country and elsewhere, because the cost conditions in the host country are favourable in comparison with those of the home country.

iii. Carrying out R&D in a location where other firms in the same industry are doing R&D, to learn from the innovation environment.

iv. Participating in a global network of R&D activity of the firm, on the basis of costs, market features and the availability of knowledge and/or skills.

Under 2, there is a phenomenon labelled "reverse innovation" (e.g. Govindarajan and Ramamurti 2011) in which MNEs use R&D in relatively low-cost emerging market locations to develop or create products and processes that can be applied in the home country and in the rest of the world. To date, this phenomenon has largely been confined to the very large markets of China and India, but the phenomenon of using skilled technical or managerial resources in emerging markets to develop a medical device (e.g. the Lullaby baby warmer by GE in India) or to develop electric cars (by General Motors and Volkswagen in China) is a practice that likely will become more common in the near future as emerging markets grow in importance globally.

As global transport and communications costs have fallen, MNEs have moved to distribute parts of their R&D activities according to these four motives. The analysis in this paper looks only at the activities assigned to emerging-market affiliates of these companies.

3. Types and measures of R&D activity

3.1. Types of R&D activity

Consider the three kinds of scientific R&D that are studied by the NSF – basic, applied and development. ***Basic research*** is generally not pursued by companies in developed countries or in emerging markets. Most of this kind of research is in the domain of universities and government-sponsored programs. Since, by definition, basic research is aimed at discovering new knowledge, which may not necessarily be applicable to business, this is logical. And when government wants to pull firms into such research, the R&D is typically heavily subsidized at government expense. In any event, basic research is largely outside of the scope of industrial, corporate research activity.

Applied research, in contrast, is exactly the kind of activity that is preferred by business, and by MNEs in particular. This research includes the following efforts:

a. creating new products (for local or worldwide use)

b. creating new processes for producing and distributing goods and services

c. adapting products to local circumstances

d. adapting processes to local circumstances

Applied research in emerging markets is a relatively small but growing part of R&D activity carried out by MNEs in overseas affiliates, as they adjust their products, services and processes to the local environment. Major R&D in emerging markets occurs in some automotive firms such as Volkswagen in China and General Motors in Brazil and China, as well as in some information technology and telecommunication firms such as Motorola in Brazil, Samsung in China, and IBM and Microsoft in India.

Development is defined by the NSF as the "systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements"[5]. This activity is pursued extensively by MNEs in their operations in several emerging markets. (See, for example, Cassiolato 2001; UNCTAD 2005; Svartzman 2008; Haakonsson et al. 2015; Jha et al. 2018.) This part of R&D may in fact be the most important for these companies in emerging markets, since their efforts often involve the adaptation of existing products or processes to the local context.[6]

3.2. Measures of R&D activity in emerging markets

3.2.1. Patents from emerging-market registrants in the United States

This kind of data is available annually for "new invention" patents and for all patents, and is also identified by the country of the person or institution that files the patent. In addition, the USPTO has data by company; and the World Intellectual Property Organization (WIPO) has data for filings in the United States by companies from several dozen countries. The USPTO data allow for the identification of patents obtained by emerging-market affiliates of United States companies; as shown in tables 2a and 2b. The data are quite instructive about the level of scientific research in manufacturing and extractive industries, where patent protection is often a good

[5] https://wayback.archive-it.org/5902/20160210164701/http://www.nsf.gov/statistics/randdef/fedgov.cfm.

[6] This is called "tropicalization" in Latin America.

Table 2a. Patent counts by country and year (all patents, all types), 1 January 1977–31 December 2015

State/Country	1977–1982	1983–1987	1988–1992	1993–1997	1998–2002	2003–2007	2008–2012	2013	2014	2015	Total
Argentina	130	94	102	164	271	249	234	75	71	66	1,456
Brazil	144	136	230	326	536	705	790	254	334	323	3,778
Chile	17	15	25	35	73	86	n.a.	n.a.	n.a.	n.a.	251
China	--	--	830†	--	--	2,531	13,343	5,928	7,236	8,116	37,984
Hungary	--	--	583	--	--	262	408	134	159	143	1,689
India	--	--	728	--	--	2,116	5,336	2,424	2,987	3,355	16,946
Israel	--	--	5,955	--	--	5,470	8,844	3,012	3,472	3,628	30,381
Malaysia	--	--	210	--	--	489	883	214	259	256	2,311
Mexico	244	203	207	250	463	468	427	155	172	172	2,761
Russian Federation	--	--	1,153	--	--	880	1273	417	444	440	4,607
Singapore	--	--	1,149	--	--	2,027	2,895	797	946	966	8,780
South Africa	--	--	1,187	--	--	490	565	161	152	166	2,721
South Korea	--	--	20,883	--	--	24,926	53,476	14,548	16,469	17,924	148,226
Venezuela, Bolivarian Republic of	51	79	112	149	160	85	n.a.	n.a.	n.a.	n.a.	636

Source: USPTO, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_all.pdf.

Note: Data for 1977-2002 are grouped for several countries into the middle of that range in the table.

Some multinational firms register patents produced by their overseas affiliates as part of the United States company, thus undercounting the number of patents filed by emerging-market entities (affiliates).

† = Disaggregated data for years before 2003 were not available for several countries. For these countries the total for years before 2003 is shown in the middle column of the five periods.

Table 2b. WIPO list of patents filed in the United States from the listed source countries

	Patents filed in the United States originating from the countries below									
	1996–2000	2001–2005	2006–2010	2011	2012	2013	2014	2015	2016	Total
Argentina	206	238	197	49	63	75	71	66	82	1047
Brazil	388	457	590	215	196	254	334	323	310	3066
Chile	0	35	95	35	37	54	63	75	48	442
China	389	1587	6970	3174	4637	5928	7236	8116	10462	48499
Hungary	193	274	299	100	105	134	159	143	177	1584
India	410	1514	3438	1234	1691	2424	2987	3355	3657	20710
Israel	3298	5155	6714	1981	2474	3012	3471	3628	3713	3446
Malaysia	0	218	783	161	210	214	259	256	275	2376
Mexico	293	425	336	90	122	155	172	172	224	1989
Russian Federation	780	953	1004	298	331	417	445	440	511	5179
Singapore	0	1222	2243	647	810	797	946	966	979	8610
South Africa	548	533	491	123	142	161	152	166	181	2497
South Korea	13519	20048	40185	12262	13233	14548	16469	17924	19494	167682
Venezuela, Bolivarian Republic of	0	45	59	18	25	14	12	22	8	203

Source: WIPO.

mechanism for protecting proprietary knowledge. Such data are not helpful for the services sector, where patents on key knowledge tend not to be feasible. The data presented in table 2a are for all patents registered (granted) in the United States by residents of selected emerging markets for the period 1977–2015.

The patent rates have jumped noticeably in China, India, Brazil and the Russian Federation since the economic opening that began in the early 1990s, with all of these countries surpassing other emerging markets (unless we consider the Asian Tigers – South Korea, Singapore, Taiwan Province of China and Hong Kong, China – to be emerging markets). Table 2b shows patents registered by residents of selected emerging markets in the United States. And if we compare the patent rates to the previous measures of national R&D spending and United States MNE R&D spending, the same countries rank at the top of the list: the United States, Japan, the Nordic countries, Germany, Switzerland, Israel and China. In the case of patents, South Korea, France, the United Kingdom, Canada and Italy also rank near the top of the list.

The aggregate list mentioned earlier does not identify patent registrants by company or name. These data were available only in summary form by country, as shown in the table. Additional data from the USPTO identify patents registered to individuals and companies as well. This list was dominated by affiliates of MNEs for the patents that were listed individually. In China the list includes hundreds of domestic Chinese companies over the past 10 years, along with some subsidiaries of MNEs. A shorter list from the most recent compilation for a somewhat smaller emerging market, Mexico, is shown in table 3.

Note again that this indicator identifies only results of R&D activity that are subject to patent protection, leaving out all other R&D that does not produce such results.[7] In the case of Mexico, the patents come from both companies and research universities, and the number of foreign MNE affiliates is fairly small.

3.2.2. R&D activity of United States-based MNEs in various regions

Looking at the distribution of total R&D activity by United States MNEs in their affiliates around the world over time, table 1b showed that the amount of R&D in emerging markets has grown quite substantially since the end of the 1980s. Nonetheless, the evidence shows that this R&D has grown much more rapidly in the BRIC countries (Brazil, the Russian Federation, India and China) than in most other emerging markets. Based on the data in the table, China is by far the largest emerging-market target of United States firms for offshore R&D, and Brazil and India

[7] Similar patent information for other emerging markets is available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports.htm.

Table 3. Patenting by ownership location country, by organization, 2011–2015

First-Named Owner (Assignee)	Category	2011	2012	2013	2014	2015	Total
Individually Owned Patent	Patent Counts	17	29	42	39	33	160
Grupo Petrotemex, S.A. de C.V.	Patent Counts	18	16	8	8	4	54
Mexichem/Amanco Holding S.A. de C.V.	Patent Counts	0	2	9	10	10	31
Instituto Mexicano del Petroleo	Patent Counts	3	2	4	7	11	27
Mabe, S.A. de C.V.	Patent Counts	1	3	4	6	2	16
Universidad Nacional Autonoma de Mexico	Patent Counts	0	2	5	4	3	14
RFID Mexico, S.A. de C.V.	Patent Counts	4	3	1	1	0	9
Coflex S.A. de C.V.	Patent Counts	1	0	1	3	2	7
Instituto Technologico y de Estudios Superiores de Monterrey	Patent Counts	0	3	1	2	1	7
Sabritas, S. de R.L. de C.V.	Patent Counts	5	1	1	0	0	7
Vitalmex Internacional S.A. de C.V.	Patent Counts	0	1	1	3	2	7
Nucitec S.A. de C.V.	Patent Counts	0	2	1	2	1	6
Universidad de Guanajuato	Patent Counts	0	1	1	4	0	6
Vidrio Plano de Mexico, S.A.	Patent Counts	1	1	2	1	1	6
Centro de Investigacion en Materiales Avanzados S.C.	Patent Counts	0	2	0	2	1	5
Ragasa Industrias, S.A. de C.V.	Patent Counts	0	0	0	3	2	5
Universidad Autonoma Metropolitana	Patent Counts	0	1	3	1	0	5

Source: USPTO, "U.S. Patent Data by Country of Utility Patent: Count of 2005–2011 Utility Patent Grants, by Calendar Year of Grant," http://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports.htm and http://www.uspto.gov/web/offices/ac/ido/oeip/taf/asgstc/mxx_ror.htm.

Note: Utility patents of first-named owners (assignees) located in Mexico.

rival European countries for this activity. The main targets of offshore R&D remain the United Kingdom and Germany. It is still not clear why Latin America, Africa and Asia (excluding China) have not achieved a higher part of the total worldwide R&D by MNEs.[8]

3.3. A comment on missing indicators of R&D in service sectors and in business models

As one might expect, there exists significant R&D activity in *services sectors* such as computer software design and telecommunication services, as well as management consulting and banking. These services are usually left out of measures of R&D, largely because firms providing the services do not have traditional research scientists employed for that purpose and because they generally do not patent their technology.[9] Even so, the people who carry out R&D at such services firms are creating new knowledge that is applied to business and thus should be included in overall R&D activity. This is important in the present context, because services constitute over half of most emerging-market economies, and firms in these regions are clearly doing R&D in the services sector. Although most discussion of services sector R&D is left out of this paper, we do offer below a couple of examples of this activity in India and China. Additional major examples are presented in discussions of R&D activity in India and China in UNCTAD's *World Investment Report 2005*, as well as in OECD (2007), and in Jha et al. (2018) on India, and Motohashi (2010) on China.

Business model innovation should also be considered in the overall analysis of innovation in emerging markets, especially in the cases of China and India, where local and foreign companies are launching platforms for financial services provision (such as Ant Financial, based in China) and for online market operation (as offered by Alibaba, also based in China). In India, business process outsourcing companies including locals Wipro, Tata Consulting and Infosys, along with foreign firms IBM and Microsoft, are developing new models for these activities to compete both locally and globally. Unfortunately, business models are not measured in any systematic way, so their inclusion in this discussion has to be through examples.

[8] One of the reasons that Asian countries have attracted a larger portion of United States companies' R&D activities than Latin American countries may be the much greater FDI in ICT in Asia. This industry tends to undertake more R&D.

[9] A reasonable amount of patent activity is done on telecommunication and computer hardware, but software is generally more difficult to protect with patents.

4. Conceptual base

On the basis of the findings of research on overseas R&D by multinational firms in the past three decades, we expect investment in this activity in emerging markets to be driven by four motives. Therefore, the following hypotheses will be tested.

Hypothesis 1: *R&D activity by MNE affiliates will be greater where the local market size is larger*.

As clearly evidenced by the amount of corporate R&D taking place in the United States, the EU and Japan, as well as in the BRIC countries, multinationals have moved a large amount of their research work to other countries. In the emerging markets it appears that it is mostly development work that has been transferred, where adaptation to local tastes, rules and purchasing power favour products that meet these criteria. China is the exception here and to some extent India as well, because in many cases in these countries companies are carrying out R&D for global application. This is interesting in contrast to the late 20th century, when governments tried to force MNEs to transfer more skills and activities to host countries but were largely rebuffed except on the issue of product adaptation. Now R&D is being assigned increasingly to emerging-market affiliates for the creation of new products that may have application primarily in the local market, but which are not just off-the-shelf products from the firm's home country. Market size is noted as a key attractor in many studies of emerging-market R&D activity by MNEs (e.g., EU 2012; Birkinshaw and Hood 1998; Egan 2017).

Hypothesis 2: *R&D activity by MNE affiliates will be greater where local cost conditions are lower*.

As MNEs become more confident that their intellectual property can be protected locally in many emerging markets, they have moved to rationalize their R&D around the world to achieve cost savings. Especially in India, with large numbers of English-speaking engineers and other technical people, companies have found it attractive to do research (especially IT-related), where salaries are one-third or less of those in the United States or the EU (Jha et al. 2018; OECD 2008; Reddy 2011). And more broadly in emerging markets around the world, cost conditions have been noted as a key attractor of foreign direct investment (FDI) by MNEs in research activity (Lewin et al. 2009; Egan 2017). Now that people can collaborate around the globe in real time (with only time zones remaining as a barrier), scientists and engineers in far-flung affiliates can work side by side with those in the home office of a company, again allowing for major cost savings.

Hypothesis 3: *R&D activity by MNE affiliates will be greater where local R&D or innovation activity is greater*.

The 1990s saw the start of a tendency for companies to place some of their R&D activity in locations where many companies are involved in such activity. Foreign and United States companies have flocked to Silicon Valley to both do their own research and to learn what other companies are doing there. The learning can come from hiring scientific people away from local firms as well as from finding skilled people to migrate to such locations because they are "where the action is". This is true for pharmaceuticals companies in several cities in Ireland, flat-panel display companies in Osaka, Japan, and chemical companies in Rheinhessen-Pfalz, Germany. It has also occurred to a smaller extent in some emerging markets, with several auto manufacturers carrying out R&D in Sao Paulo, Brazil, and even more auto firms carrying out electric vehicle R&D in several cities in China, as well as many software companies carrying out research in Bangalore, India.

In addition to the three main country-specific drivers of MNE decisions to locate R&D in emerging markets – or overseas in general – we would expect greater R&D to take place where an MNE has a greater local presence. That is, when the firm has a greater amount of local activity, it probably will do more local R&D than in locations where less production, distribution and/or other corporate activity is located.

Hypothesis 4: *R&D activity by MNE affiliates will be greater wherever the MNE has a larger local presence.*

MNEs will be more likely to use their operations in emerging markets to carry out local R&D when those operations are more important to the firm. That importance may be due to a large local market or to a concentration of production or assembly by the MNE to take advantage of low costs in the emerging market in question (see e.g. Jha et al. 2018).

Each of these motives may exist by itself or in combination in a particular location. Our empirical analysis explores these four hypotheses.

5. Empirical evidence on factors contributing to the MNE decision for overseas R&D activity

5.1. Aggregate measures of MNE R&D in foreign affiliates

In most emerging markets the relatively low level of R&D activity by MNEs as well as local firms, presumably results from some country-specific factors that combine to deter such activity. An analysis of overseas R&D activity by United States multinationals for which detailed data are available may shed some light on this issue. Using data recently collected and provided by the United States

Department of Commerce, we can create a model of overseas R&D activity for the years 2004–2015.

The model was constructed with the data on United States companies and with data on country characteristics including market size, local cost conditions and local R&D activity, as well as control variables for openness, infrastructure quality, education levels and corruption. Data were not available for individual MNE sales or R&D activity, so those issues had to be explored at the aggregate level. The basic model that was considered was as follows:

$$\text{MNE R\&D}_{\text{country i}} = f(\text{GDP; labour costs; national R\&D; US MNE sales/GDP; openness; infrastructure quality; country education ranking; corruption})$$

This model is based on the expectation that R&D activity by United States MNEs depends on the national market size (+), local labour costs (-), the level of overall R&D activity in the country (+) and the size of the firm's own business activity in that country(+), as baseline conditions. In addition, it was expected that measures of country attractiveness to foreign firms in general would affect R&D activity by those firms, so the degrees of economic openness, infrastructure quality, education level and corruption were included in the attempt to model this R&D. As shown in the correlation matrix in the appendix, several of the "country attractiveness" variables were highly correlated, and so models were run using them alternatively. Also, data availability constraints caused a number of models to lose large quantities of observations, so the available sample was greatly reduced in those cases.

Table 4a shows that the variation in R&D activity by United States MNEs in 48 countries (both emerging markets and developed countries) was best explained by three or four factors. Outcomes were fairly similar across the six specifications, with the country's GDP and the amount of United States MNE sales in that country, along with overall R&D in that country, generally appearing as significant positive contributors to explaining the variation in R&D by United States-based MNEs. Interestingly, the local labour cost was *positively* associated with greater R&D activity in the total set of countries, though only significant in two of the specifications.[10] Among the attractiveness variables, it turned out that economic openness was not highly correlated with the other variables and could be run simultaneously with them. The only infrastructure variable to prove significant was the World Bank's

[10] The finding of higher wages being associated with more overseas R&D in MNEs is consistent with Lewin et al. (2009), who argued that restrictions on foreign scientists and engineers coming to the United States has promoted offshoring of R&D to find those skilled people elsewhere, often in high-wage Western Europe or Japan.

human development index, associated positively with R&D activity. The best models are presented in table 4a. Model 3 produced the most significant results, and all of the models explained about two-thirds of R&D activity by United States MNE affiliates worldwide.

Table 4a. Regression results, US MNE R&D activities in 48 countries

Variable/model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GDP	.0001***	.0002***	.0003***	.0002*	.0006***	
United States MNE sales	.0006***	.003***	.004***	.004***		.006***
R&D/GDP	422.8***	236.2**	305.3**	366.9***	335.2***	544.4***
Hourly compensation	3.438	9.104	11.37*	0.452	13.16**	8.03
Openness	9.051			8.40	7.52	9.07
Ease of starting business		-1.025				
Human development			2341**			1804
Government spending on education				4.87		
Corruption	-3.95	-5.68	-73.04	15.44	-44.97	-92.16
Constant	-1044**	-300.2	-2282**	-1040*	-691.4	-2499**
Adj R^2	0.678	0.686	0.682	0.668	0.439	0.660
Number of observations	265	275	223	219	305	215

Note: * significant at .10 level / ** significant at .05 level / *** significant at .01 level.

Table 4b. Regression results, United States MNE R&D activities in 22 emerging markets, 2004–2015

Variable/model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GDP	.0005***	.0004***	.0005***	.0004***	.0005***	
United States MNE sales	.00004	.00005	.0005	-.0005		.004***
R&D/GDP	109.9*	81.15*	43.95	179.31***	132.2***	69.83
Hourly compensation	-9.72**	-4.24	-5.00	-10.18***	-11.03***	5.35
Openness	-6.43**			-5.89***	-7.83***	-3.66
Ease of starting business		-1.288				
Human development			-25.45			206.3
Government spending on education				16.47		
Corruption	9.35	0.468	-5.88	-1.87	15.04	14.53
Constant	241.6	-47.92	-67.05	172.4	303.42	-165.9
Adj R^2	0.909	0.915	0.902	0.969	0.905	0.675
Number of observations	73	73	60	53	73	60

Note: * significant at .10 level / ** significant at .05 level / *** significant at .01 level.

Looking just at the 22 emerging markets in the overall sample, table 4b shows that market size and overall R&D activity remained significant, while local sales by the MNEs was significant only when presented without GDP in the model. The local cost conditions showed a negative and significant correlation with R&D activity by the United States MNEs in most of the specifications, as expected. For these emerging-markets models, GDP and local MNE sales were very highly correlated, and so model 5 presents the most conclusive results. These results are consistent with hypothesis 1 (market size), hypothesis 2 (low-cost personnel availability) and hypothesis 3 (overall R&D activity in the country). Hypothesis 4 – that MNEs should do more R&D where they have a greater local presence – was not supported, though this may be due to the fact that our measure was aggregated across all firms and not specific to individual ones. Unfortunately, many observations were lost due to missing data for the various indicators. Even so, more than 90 per cent of the variation in R&D activity by MNEs was explained by the models.

The findings in this aggregate-level analysis of R&D by MNE affiliates overseas are consistent with the literature on two of the key drivers of such activity. There was greater R&D in affiliates where the local market was larger and where a greater level of R&D existed in the local economy overall. Results were different for emerging-market affiliates versus developed-country affiliates with respect to the cost of local employees: emerging-market affiliates carried out more R&D in countries with lower labour costs, while in developed-country affiliates greater R&D took place where labour costs (and presumably skills) were higher.

Although the quantitative evidence presented here is useful for understanding some of the probable motivations for MNEs to put R&D activity in emerging markets, it would be additionally valuable to know whether these factors really are recognized by company decision makers in their choices on such activity. The next subsection looks at half a dozen cases of MNE affiliates carrying out R&D activity in Asia, Latin America and Africa. These examples are based on discussions with decision makers in most of the companies and use secondary sources as well.

5.2. Company-specific examples

Despite the various indicators of R&D activity in emerging markets that were presented above, there still is not a completely clear picture of this phenomenon at the corporate level. That is, we do not know how much of the R&D that an MNE carries out in a country is related to product and how much to process, whether the R&D is very much the development type or is more “upstream” applied research, or other details about the precise activities involved. This section therefore adds some detail about the characteristics of R&D, on the basis of a variety of company experiences. The evidence presented here is divided into the manufacturing and the

services sector, to give an idea of the scope of R&D by MNEs in several emerging markets and also to demonstrate some of the most noteworthy ventures of this kind in emerging markets.

5.2.1. Manufacturing

Volkswagen in China

The Chinese auto industry has evolved from a monopoly, tightly controlled by local government before the 1980s, in which First Automotive Works (FAW) began producing the Jiefang CA-30 passenger car in Changchun (Jilin Province) in 1956 and the Nanjing auto works started producing a truck model in 1958. Other local auto manufacturers were set up in Shanghai and Beijing during the period of tightest government control of the economy. At no point during that period were more than 10,000 cars produced per year, and clients were almost exclusively government agencies and state-owned companies, such as taxi service providers.

In the mid-1980s, the Government decided to allow the importation of greater numbers of cars, mainly for use as taxis for the state-owned taxi companies in Beijing and Shanghai. Volkswagen and, subsequently, other foreign automakers were allowed to form joint ventures with a state-owned Chinese partner as long as foreign ownership was limited to a 50 per cent share in the joint ventures. The Government's intent was to rapidly develop a car industry, learning from the foreign companies how to make cars while maintaining control of the car industry. Volkswagen in 1984 signed an agreement with the city of Shanghai to produce cars locally in a joint venture, which initially was used primarily to assemble vehicles from imported kits.

When a greater degree of economic opening began in the early 1990s, the national Government authorized more foreign auto manufacturers to enter China, and more vehicles to be sold. Volkswagen was the clear market leader, operating through its joint ventures with Shanghai Automotive Industrial Corporation (SAIC) as well as with FAW in Changchun. The market grew quite dramatically, and by 2010 the Volkswagen joint ventures were producing over one million cars per year in China.

Volkswagen began significant R&D activity in China with its R&D centre in Shanghai, launched with SAIC in 1996. Over the years, more research work was pursued in the joint ventures involving SAIC and FAW, largely for cars sold locally. Then in 2016 VW announced the establishment of its "Future Center Asia" in Beijing. This R&D centre is developing a range of automotive technology for use globally, including the key electric vehicle technology that is so important in China today. During the launch, the research centre noted specifically that it would focus on autonomous cars and on digitalization of systems used in its vehicles. According to Jochem

Heizmann, the head of VW China, "We view China as an incubator for innovation and new technologies and as a source of solutions that can be transferred to the world. In China, the future is now."[11]

Motorola in Brazil

Motorola began R&D work at its Jaguariuna (Campinas) plant, established in 1997. Two teams of technical staff work at the facility. The Global Software Development group of about 150 Motorola staff and nearly 300 people from partner firms and institutions develops new cell phone applications for use worldwide. The regional engineering development group of about 70 Motorola staff and several dozen people from partner institutions works on process improvement and adaptation for cell phones made and sold in Latin America.[12]

Government incentives have played an important role in attracting this innovative activity to Brazil. The company faces a 70 per cent tax rate on earnings from imported cell phones and other products sold in Brazil. A 40 per cent tax exemption is offered for cell phones produced locally in Brazil, and of that amount, 5 per cent must be spent on local R&D activity.[13] This tax incentive policy has attracted not only Motorola but several other electronics or telecommunication firms such as Siemens, Nokia and Samsung to undertake R&D activity in Brazil. It appears that the incentive policy was able to stimulate an initial R&D commitment from Motorola, but that subsequent expansion in this activity has been undertaken strictly on a business basis (that is, on the basis of the effectiveness and cost of doing the work in Brazil versus doing it in other affiliates of Motorola worldwide).

In 2015 Motorola announced that it had doubled the number of research staff at Jaguariuna, with the 200 additional people working on industrial design, user interface, research, engineering and prototyping, and packaging and web applications. Motorola designated the Brazilian operation as a global product development hub and has been using the added research for applications worldwide. The R&D focuses on 4G technology but also includes cloud computing and big data research. Since 2011 Motorola's cell phone division has been operated

[11] See https://www.volkswagen-media-services.com/en/detailpage/-/detail/New-Future-Center-Asia-to-be-built-in-Beijing/view/3435338/2d19f59bce927f8109b985a499255eb?p_p_auth=DE4YxeQY.

[12] In 1997, Motorola decided to open a semiconductor design centre in Jaguariuna. This group started with key people from the semiconductor industry in Brazil. Today this group employs more than 100 experts in semiconductor design. In early 2005, Motorola decided to spin off its semiconductor operations and created Freescale, which continues to invest in this R&D team.

[13] In force since 1993, the Informatics Law (law 8.248/91, altered by law 10.664/03) reduces the industrialized products tax (IPI). On the other hand, beneficiary firms have to invest 5 per cent of their total net sales in R&D activities (at least 2.3 per cent of which must be invested in cooperation with universities and/or research institutes). The amount also includes the contribution to the Sectoral Fund for Informatics (CTINFO).

as a subsidiary of another company: Google purchased it at that time and then sold the division to Lenovo in 2014.

Continental AG in Queretaro, Mexico

The German tyre and auto parts manufacturer, Continental AG, began production of tyres and parts in Mexico in the 1970s, with plants in Mexico City and San Luis Potosi. Over the years Continental has set up additional manufacturing and now operates 19 plants across the country. The firm's overall product line in Mexico ranges from high-quality surface materials for vehicle interiors, brake systems and turbochargers to instrumentation and control units and chassis control systems for cars, trucks and specialist vehicles. R&D facilities were set up in two of these facilities, with local mandates to support the development of auto parts for the Mexican market and the market in the United States for Mexican-assembled vehicles. Beyond car parts, Continental-Mexico also manufactures conveyor belts for handling bulk goods and industrial hoses for use in the petroleum industry as well as in the cosmetics and food industries.

In 2018 Continental announced the opening of a new research facility in Queretaro (near Mexico City), for R&D on electronic auto parts and on tyres, particularly as related to autonomous vehicles. At the outset in 2018 the R&D facility employed 160 engineers, with plans to expand the group to over 1,000 scientists and engineers within four years. The original two R&D facilities employed more than 1,700 scientists and engineers by 2018 (in a total Mexican workforce of about 24,000 people). The research centres focus on the development of components such as fuel injection control units, infotainment and connectivity solutions, airbags and systems for access control, and vehicle safety and security. Continental-Mexico's research efforts have thus far resulted in 23 patents, 126 patent applications and 837 invention disclosures.

Continental is using its new Mexican research facility for worldwide application of the technology involved in driverless vehicles. This is actually not wholly different from the existing applications of Continental's R&D in Mexico, since the target clients continue to be global auto manufacturers who assemble vehicles in Mexico for sale in the United States and elsewhere.

Intel in Costa Rica

Intel Corporation, the world's leading microprocessor chipmaker, completed a chip assembly and test facility in Costa Rica in 1998. Over the first ten years since start-up, total investment has been estimated at close to half a billion dollars, mainly allocated to the build-up and operation of two major high-volume production facilities and their support infrastructure. By 2014 Intel employed about 2,500 professionals and technicians at this facility. Their main task was to assemble

the company's Xeon, Pentium and later lines of microprocessors for servers and personal computers, as well as chipsets. Intel's first shipment from the Costa Rica facility occurred in April 1998.

Intel's investment in Costa Rica in 1998 was the largest ever made in the country. The cost of constructing the three factory buildings alone represented at that time more than the total amount of FDI that the country typically received annually. Between 1990 and 1996, incoming FDI averaged $272 million per year. By 2010, exports from the Intel plants represented 15 to 20 per cent of overall country exports, at about $8 billion, and overall annual FDI had risen to an average of $500 million. The challenge of putting such a major investment into such a small country was clearly seen in 2014, when Intel closed the manufacturing operation and relocated that work to its other United States and international facilities. Only the chip testing facility was retained, along with about 1,000 of the employees.

Intel's FDI in Costa Rica was an exception to the traditional MNE investment in Latin America, because this FDI was in a high-tech sector in which firms usually have imported into the region from the United States, the EU or Japan. The amount of R&D done at the facility was limited, since the work was primarily used for final chip assembly and quality testing. Nevertheless, Intel did do development work at the facility, and it appears that development work is continuing without the production presence in Costa Rica.

The operation in Costa Rica had three goals:

1. manufacturing and distribution of high-quality, low-defect chips and chipsets;
2. process and product engineering development and quality control; and
3. shared services: support services for multiple Intel locations in the region, such as a call centre, software development, regional back-office support, microprocessor design and accounting services.

In manufacturing, the main activity that relates to R&D was the quality control effort to ensure high-quality chip production. Intel did not consider this to be R&D, though work was done to incrementally improve the production process. In "back-end engineering" 60 to 80 people were involved in product development, which mainly implied work to improve the chips being manufactured. In addition, another 100 people (although some of their number overlapped with the previous category) were involved in software development related to the chip production process.

"Shared services" is similar to work carried out by many MNEs in offshore locations to lower the cost of call centre and back-office business services such as accounting. Intel carries out these two functions at the Costa Rica facility and may identify additional services for the company that could be provided globally or regionally from Costa Rica. When the manufacturing operation was shut down in

2014, only the chip testing and related activities, along with back-office services, were retained, so Intel exports from Costa Rica dropped dramatically – though employment dropped by only somewhat more than half.

5.2.2. Services

Software development by IBM in India

Another MNE research activity that is visible in recent years in India is the development of English-language software by firms taking advantage of India's highly skilled and lower-salaried technical personnel. IBM has established a major research centre there, jointly in Bangalore and New Delhi. This United States-based MNE does a range of IT research in its Indian lab, which was founded in 1998. Its goals are mainly to develop applications for clients in financial services, telecommunications, and health care.

The focus of IBM's efforts is in big data analytics, machine learning and software engineering. In 2018 the group had four major research teams. According to the company, "The Cognitive Solutions and Services department at IBM Research – India is focused on developing the next generation of cognitive technology solutions and services to fundamentally change the way we interact with computers, people, and enterprise scale systems." The Analytics and Optimization team was focused on a number of human resources-related projects, including ones aimed at optimal recruiting of talent, a skills-based internal organizational structure for classifying employees, and a talent management system. The Blockchain and Smart Contracts team aims to develop solutions for their international trade and supply-chain clients who need secure and decentralized information systems for their contracts and inventory management, among other applications. And finally, the Information and Analytics team focuses on cloud computing, data mining and big data management. All of these areas are intended to have global applications of their R&D, though projects tend to be assigned on the basis of local client needs.[14]

R&D by Apple in China

Apple encountered a string of setbacks in China during the 2010s, ranging from market share incursions by government-supported local competitors Huawei and Xiaomi, to demands for the company to stop providing access to its online music and book services (because they violated Chinese media rules), to problems with an iPhone battery. These setbacks were clearly a challenge to Apple, since China is its second-largest market after the United States and will continue to be a major

[14] For background on IBM's R&D in India, see http://www.research.ibm.com/labs/india/.

source of revenue in the future. Much of the assembly of Apple iPhones is done by Foxconn in China as well, although this could change with the possibility of moving assembly to lower-cost countries in the future. In short, China is vital to Apple as a market, as a key point in Apple's supply chain, and as the source of current and future strong, government-backed competition.[15]

In 2016 Apple announced its intent to set up an R&D centre in Beijing the following year. By early 2017 this commitment had blossomed into plans for four R&D centres in China: in Beijing, Shanghai, Shenzhen and Suzhou. Apple committed more than $500 million to this program, which will put several thousand Chinese engineers and scientists to work on next-generation Apple projects. Although the company has not identified the specific assignments of the new research centres, one very likely target will be autonomous car technology. Apple bought the Chinese ride-sharing service Didi Chuxing in 2017 and later also acquired Uber's business in China.

This venture or set of ventures marks an interesting step for Apple, whose key rivals include the Chinese giants Huawei and Xiaomi, and whose interest in the huge Chinese market is central to future sales. Yet at the same time as Apple seeks to build its business there, the Chinese Government explicitly supports local firms in high-tech industries such as telephones and software, and blocks foreign firms from building market share and from selling a wide array of products and services viewed as undesirable or threatening to the Government's interests. Apple has stated its interest in hiring the best Chinese minds to work in its research teams, so the stage is set for some very interesting confrontations in the future.

Adobe's R&D hub in India

Software giant Adobe, the producer of the Acrobat programs, has been operating in India for more than a decade and has established R&D centres in Bangalore and Noida (New Delhi). The company employs about 2,000 scientists and engineers in these research hubs, focusing on not just the two core products but also wide applications in machine learning, natural language processing, information retrieval, big data systems and image processing.

Rather than "tropicalizing" existing Adobe products and services from the United States, several Adobe products are today being developed in India. Adobe Illustrator is being completely designed there, as is Adobe Lightroom. Nearly 80 per cent of the further development of Adobe Acrobat is also being done in India. In 2018 Adobe

[15] An interesting aside is that Apple, like other United States-based MNEs, is finding it increasingly difficult to obtain visas for foreign nationals to come to work in its United States research labs. So, rather than losing these researchers, United States firms are moving some R&D overseas to where those people are, particularly concentrated in China and India.

announced that it would establish a new artificial intelligence lab in Hyderabad to support its work in innovation generally and cloud computing in particular. Overall the company states that one-third of its global R&D is done in India.

Adobe India's client focus is on small and medium-sized enterprises (SMEs), government and education. For SMEs, Adobe became involved with the industry associations for jewelry, ceramic tile and fashion. It then developed software for application in these small-end clients that would be overwhelmed by larger enterprise resource planning programs. The government sector was targeted for building a portal to connect with citizens and also for working with the national education system. As noted by Adobe's head of research in India, "Every interaction with government starts and ends with forms. Adobe has the most used document technology" (i.e. PDF [portable document format], with signature and other security and document management features).[16]

5.3. What are emerging-market MNEs doing for overseas R&D?

Although emerging-market MNEs and their overseas R&D activities are outside the scope of this analysis, they nonetheless deserve mention. Some emerging-market MNEs have moved directly into international R&D structures by acquiring firms with such networks in place. Good examples include Geely, which acquired the Swedish multinational auto firm Volvo, and Cemex, the Mexican cement company, which acquired the Australia-based Rinker. Additional examples include emerging-market companies that acquired Triad-based MNEs and then moved their own headquarters to locations such as London or New York (e.g., mining company Anglo American, which moved from South Africa to London, and Anheuser-Busch InBev, which involved the acquisition of the Belgian brewer Interbrew by the Brazilian brewer Ambev, followed by the acquisition of United States-based Anheuser Busch). In each of these cases the move to overseas R&D came largely or completely from the acquired firm's portfolio of activities. The international expansion of R&D by emerging-market MNEs deserves a separate treatment, and it is not pursued further here.

[16] See https://www.business-standard.com/article/companies/india-significant-player-in-adobe-s-transformation-journey-115061500953_1.html.

6. Conclusions and policy implications

R&D activities of multinationals have extensively moved outside home countries in the past two to three decades. Some of these activities have moved to emerging markets, most often to China or to India. Fairly limited development work for the adaptation of products and services to local conditions is quite common across many emerging markets. Very little R&D is pursued in Latin American and African countries. There are exceptions, such as the auto R&D activities of General Motors, Ford and Toyota in Brazil, and some limited activity such as in mining in South Africa. In Asia (other than China and India) there is similarly a very low level of R&D activity in the affiliates of multinational firms operating there. And this R&D tends to be the most applied (development), least sophisticated activity, used mostly for the adaptation of products and services to local market needs and characteristics. This relatively low level of R&D by MNEs is consistent with overall measures of R&D activity in Latin America, Africa and the smaller countries in Asia, which also trail the other regions noted above.

China and India are clearly the exceptions to this rule. Innovation activity by foreign MNEs has skyrocketed in China, where United States-based firms do more offshore R&D than elsewhere in the world today, except for a handful of EU countries and Canada. India has also attracted a very large amount of R&D by foreign MNEs, also ranking above most other countries outside of the EU and Canada. In China's case much of the R&D has been forced by government policies, whereas in India the MNEs have chosen to take advantage of opportunities there in a very large market with large numbers of relatively low-cost, skilled scientists, engineers and business analysts.

Although companies still tend to carry out R&D in emerging markets for application locally, there is a growing trend to source some activity there for the global market. Continental uses its Mexican R&D facilities to develop auto parts for autonomous vehicles that serve global clients who mainly have their production in Mexico too, where they can use the innovations first. Adobe is using its Indian R&D facilities to do most of the development of new features of Adobe Acrobat, as well as a number of artificial intelligence projects, with application to the company's global market. Apple is clearly targeting the global market for its R&D on autonomous vehicles in China – though the initial application is very local to its recently partially-acquired company, the ride-sharing service Didi, which also bought Uber's local subsidiary. This could be called reverse innovation, since the new technology is transferred to more developed countries later. Interestingly, China is the world's largest auto market, so first carrying out R&D there makes sense for auto companies, auto parts companies, autonomous vehicle companies, electric vehicle companies, and the like.

If emerging-market governments do wish to attract more R&D activity, then our regression results provide some guidance on what they might do. Although it is not

possible for a country to become a much larger market, the existing large markets in China, India and Brazil are attracting a growing amount of MNE R&D. In addition, alliances of smaller emerging markets could form customs unions or free trade areas that form a more-or-less single market. If Latin American, Asian or African countries could form functioning customs unions that really do permit free trade among members, this could create the bigger markets that attract MNE innovation activity.

It also appears that these countries could aim R&D-attracting policies at the negative factors that dissuade companies from investing. Such policies could include an increase in the level of education of workers, or more specifically an increase in the national level of R&D activity carried out by companies, government and universities. Government policies that stimulate the education of scientists and engineers can contribute to attracting the R&D activities of MNEs, though it must be recognized that small markets still may not succeed in this effort because of their small numbers of available technically skilled people. Even so, the case of Costa Rica's policy to attract Intel shows that even a small country may be able to attract MNE R&D activity, which in turn may produce additional investment and R&D by other multinationals in the same or related products and services. The Intel case is the most striking example of a tremendously successful public policy that attracted the company, generated thousands of direct jobs, and built up skills and ancillary businesses in a tiny country (population 4.9 million). Intel mostly used the facility to take processor chips out of wafers produced elsewhere, test the chips, and then ship them to target markets around the world. This investment lasted for more than 17 years – and when Intel decided to consolidate the chip processing elsewhere, they still retained half of the employees in Costa Rica in back-office processing as well as dozens of local and foreign companies doing tech-related activities.

Policies to attract R&D for local market adaptation (the "tropicalization" of products and processes) might seem unimportant. However, the examples cited in interviews and described above show that MNEs move from that adaptation activity into global or at least regional product and process development. Once a base is established, multiple examples show that MNEs do tend to move toward a greater commitment to broadly applicable R&D in their emerging market affiliates. The Brazilian tax incentive policy that reduces taxes for firms that manufacture locally if they spend a percentage of that tax savings on local R&D appears to have worked quite well in the information and communication technology (ICT) and automotive industries.[17]

[17] This policy may be a compelling one for MNE managers, since the environment offered by Costa Rica to attract Intel was largely based on tax incentives – and the Intel investment brought with it a nascent R&D activity in that country. Even so, it must be explored in more detail to ensure that the tax incentive policy really does have generalizable applicability, or if it really only works easily in a large country such as Brazil, and that Costa Rica's dealings with Intel were not just an exception. Still, the policy is very important to explore in detail, because it could be a tool that enables smaller countries to build their attractiveness to MNEs for innovative activities.

These last statements raise a prior question: what roles do MNEs play in emerging markets in R&D and innovation? If the firms were not too heavily involved in the innovative activity in a country, then an expansion of their commitment would generally be helpful. In fact we know that companies carry out a much smaller percentage of R&D activity in most emerging markets (less than one-third of total R&D spending) than in the industrial countries (over two-thirds in the United States). Governments are responsible for most of the rest of R&D spending in emerging markets.[18] One cannot conclude that MNEs are the leading sources of R&D in emerging markets, though they do tend to possess leading-edge technology. For economic development, and to build emerging markets as sources of innovation globally, mechanisms should be developed to entice both foreign MNEs and local firms to undertake more path-breaking R&D activities. This paper focused on the MNEs, and by examining their activities, it may suggest some ways to pursue the development of greater innovative activity in emerging markets.

Future research could pursue the question of what innovation activities emerging markets might attract. A more detailed exploration of this phenomenon could produce lessons that would be applicable more widely. And, of course, additional examination of the policy tools that are used and could be used by governments to attract R&D and other innovation would be very valuable. Tax incentives for R&D activity are clearly one policy that has worked. Many other policies could be considered, from incentives to attract scientists and engineers to do local research, to penalties for importing R&D rather than carrying it out locally. The idea of using free trade zones for R&D activity could be feasible in business hubs such as Singapore, Dubai and Panama. On the business strategy side, it would be useful to look again at which innovation activities MNEs are placing in emerging markets, and how these activities can be utilized to build the competitiveness of the firms globally.

[18] R&D is a substantial and growing enterprise in the United States. All in all, the United States invested an estimated $510 billion in R&D in 2016. This represents about 2.7 per cent of the country's GDP. The largest share of this money (about 72 per cent) came from industrial firms. Most of the balance (22 per cent) came from the federal, state and local governments. Colleges and universities, private foundations, other nonprofit institutions, and state and local governments provided the remainder. See National Science Foundation, *InfoBrief* (December 2017). NSF 18-306, https://www.nsf.gov/statistics/2018/nsf18306/, and NSF, "National Patterns of R&D Resources", https://www.nsf.gov/statistics/2018/nsf18309/.

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Appendix A. Correlation matrix of factors related to R&D by United States MNEs

	RDUSMOFA	GDP	United States MNE sales	R&D/GDP	Openness	Hourly compensation	Human development	Corruption	Ease of starting business
All economies									
RDUSMOFA	1.0000								
GDP	0.5535	1.0000							
United States MNE sales	0.7958	0.5692	1.0000						
R&D/GDP	0.3656	0.2481	0.2142	1.0000					
Openness	0.2311	-0.0621	0.3147	0.2645	1.0000				
Hourly compensation	0.3677	0.1723	0.3070	0.4927	0.3697	1.0000			
Human development	0.2614	0.0188	0.2788	0.5596	0.4956	0.5935	1.0000		
Corruption	0.1962	0.0261	0.3584	0.3250	0.2067	0.1582	0.4813	1.0000	
Ease of starting business	0.1942	-0.0364	0.2971	0.3717	0.5725	0.5089	0.5071	0.2478	1.0000
22 emerging markets only									
RDUSMOFA	1.0000								
GDP	0.7838	1.0000							
United States MNE sales	0.7169	0.8125	1.0000						
R&D/GDP	0.4895	0.5560	0.4130	1.0000					
Openness	-0.1137	-0.1576	0.0456	-0.1087	1.0000				
Hourly compensation	0.1344	0.0775	-0.0235	0.4857	-0.1404	1.0000			
Human development	-0.2483	-0.1272	-0.0895	0.1522	0.1911	0.4370	1.0000		
Corruption	-0.0352	0.0234	-0.0334	-0.0056	0.1911	0.0189	0.1876	1.0000	
Ease of starting business	-0.1696	-0.0595	0.0493	0.0710	0.4462	0.1514	0.1984	0.2209	1.0000

MNEs, human rights and the SDGs – the moderating role of business and human rights governance

Stefan Zagelmeyer and Rudolf R. Sinkovics*

The Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs) ascribe specific roles to business organisations and have thus invigorated discussions on the link between the activities of multinational enterprises (MNEs) and international development. In the development of the MDGs and the SDGs, the human rights-related capabilities approach to development has featured prominently. Yet, so far, international business research on the links between MNEs and sustainable management has largely overlooked the human rights aspect. This paper integrates human rights into the debate on the role of business activities in sustainable development. Drawing on the business and human rights (BHR) governance approach, which analyses the governance mechanisms and structures that govern the relationships between human rights duty-bearers and rights-holders in the business and human rights field, the paper argues that BHR governance can act as moderator in the design, implementation and evaluation of business policies and practices seeking to contribute to the advancement of the SDGs. It shows how BHR governance may support, positively influence and reinforce the impact of private sector activities on international sustainable development.

Keywords: business and human rights governance, international business, Millennium Development Goals, multinational enterprises, Sustainable Development Goals, UNGPs, UN Guiding Principles on Business and Human Rights

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1. Introduction

Since the publication of the Brundtland Report in 1987 (World Commission On Environment and Development, 1987), there has been an increasing interest in the link between international business activities and sustainable development (Hart, 1997; Meyer, 2004). Although international business (IB) as an academic field has traditionally focused on the impact of multinational enterprises (MNEs) and different types of foreign direct investment (FDI) on economic development, usually centred around economic growth, recent research has gradually shifted towards broader approaches to development and the use of additional social indicators. Recent contributions analyse the impact of MNEs on inequality (Giuliani, 2018) and poverty (Kolk, Rivera-Santos and Rufín, 2018), and discuss the role of MNEs in sustainable development (Kolk and van Tulder, 2010; van Tulder, 2018; van Tulder, Verbeke and Strange, 2014; Williams, 2014).

Since the introduction of the United Nations Millennium Declaration and the associated Millennium Development Goals (MDGs) and subsequent Sustainable Development Goals (SDGs), the issue of sustainability has taken centre stage in international development policy, as well as for international business (Organisation for Economic Co-operation and Development [OECD], 2016; van Zanten and van Tulder, 2018). A 2017 special issue of this journal provides an overview of the role of MNEs in the achievement of the SDGs (Witte and Dilyard, 2017), and a review of work on the link between MNEs and the impact of IB on the four sustainable development dimensions: people, planet, peace and prosperity (the 4P approach) (Kolk, Kourula and Pisano, 2017). In related work, Bush, Oosterveer, Bailey and Mol (2015) discuss the role of business in sustainability governance.

Despite agreement on the relevance of sustainable development, there have been debates about the definition of sustainability and its theoretical grounding (Banon Gomis, Guillen Parra, Hoffman and McNulty, 2011; Monkelbaan, 2018). In the development of the MDGs and the SDGs, the human rights-related capabilities approach to development (Sen, 2003, 2005) has featured prominently. However, so far, IB research on the links between MNEs and sustainable development has, to a large extent, ignored human rights, and especially the potential relevance of the 2011 United Nations Guiding Principles on Business and Human Rights (UNGPs).

This paper integrates human rights into the policy debate about the role of business activities in sustainable development. Drawing on the business and human rights (BHR) governance framework suggested by Zagelmeyer (2020), which analyses the governance mechanisms and structures that govern the relationships between human rights duty-bearers and rights-holders in the business and human rights field, the paper argues that BHR governance – as an institutional form of sustainability governance – can provide reference points and analytical tools and thus act as

moderator in the design, implementation and evaluation of international business policies and practices seeking to contribute to the achievement of the SDGs.

In section 2, the paper sets the scene for the subsequent analysis by introducing and analysing the link between MNEs, human rights and sustainable development. This part includes a discussion of the role of business in sustainable development policy initiatives, focusing on the debate about the MDGs and the SDGs. It furthermore analyses the role of human rights in development policy, highlighting the importance of the capabilities approach of Sen (2004), before moving on to discuss the human rights aspect in the transition process from the MDGs to the SDGs. Section 3 discusses the potential role of BHR governance in sustainable development. This part of the paper commences with a critical discussion of the role of business in MDGs/SDGs-related international development policy from a human rights perspective and looks at design principles, implementation, and evaluation. It then discusses how the UNGPs can be used to address the shortcomings identified and concludes by proposing the BHR governance approach. Section 4 discusses how the BHR governance approach can moderate the link between MNE activities and the achievement of the SDGs. Section 5 summarises the findings, discusses the policy relevance of the proposed approach and sets out areas for future research.

2. The role of MNEs and human rights in sustainable development

2.1. International business and sustainable development

The role of business in international development has been widely discussed, ranging from philanthropic approaches to critiques of neo-imperialism to neoliberal approaches (Harriss, 2014; Moran and Stone, 2016). IB has traditionally focused on the role of FDI and MNEs in development (Dunning, 1981; Dunning and Narula, 1996). References to the role of business can be found in early publications on sustainability (Carley and Christie, 1992), management literature (Hart, 1997), and policy papers (Commission of the European Communities, 2002).

While these vigorous discussions have made a valuable contribution, central elements to the debate, such as the practical relevance and impact of international business activities related to cross-border trade, global value chains and foreign direct investment warrant further exploration. Traditionally, most IB activities have been orchestrated through MNEs based in developed economies with relatively mature institutions in terms of the rule of law, competition policy, and human rights, including labour governance. Yet, MNEs often operate in economies where institutions governing international business have been described as less mature,

sophisticated and effective in enabling and supporting market activity, and thus sometimes labelled as "institutional voids" (Doh, Rodrigues, Saka-Helmhout and Makhija, 2017; Khanna and Palepu, 1997). One particular concern is that the positive outcomes of IB activities accrue to MNEs, their owners and supporting local agents, but fail to filter through to local communities in the form of economic and social development. Another concern is that MNEs crowd out local business organisations, thereby increasing developing countries' dependence on foreign direct investment.

International development policy and the debate on sustainable development entered a new stage when the Millennium Declaration, adopted by the UN General Assembly in 2000 (UN, 2000), set out a strategic vision for the twenty-first century and integrated different development initiatives into one framework. One hundred ninety-one UN member states committed themselves to work towards the achievement of eight goals, accompanied by 80 targets and 48 indicators, until 2015. The Millennium Development Goals aimed at supporting human capabilities and development by emphasising human capital, infrastructure and human rights. In 2015 the UN General Assembly adopted Agenda 2030 (UN, 2015b), which encompasses 17 goals and 169 targets. The entire set of goals, targets and measurement indicators is commonly known as the Sustainable Development Goals. They provide orientation for global development efforts for the period 2016 to 2030 (UN, 2015b, 2015a) and build on the MDGs (Pogge and Sengupta, 2016). The MDGs and SDGs represent a significant departure from previous initiatives to assist human and social development, by focusing on, and prioritising, a select number of objectives, emphasising measurement and accountability, setting specific deadlines, and providing an institutional framework for promotion (Alston, 2005). In contrast to the MDGs, the SDGs agenda is more comprehensive, emphasising the environmental dimension, and more universal in focus, addressing all countries' sustainability needs instead of focusing only on developing countries.

The link between MNEs and Agenda 2030 can be discussed at several levels. At the organisational level, SDG target 12.6 encourages the adoption of sustainable practices and engagement in sustainability reporting for companies. SDGs 8 and 9 emphasise the role of small and medium-sized companies in providing both economic growth and decent work. The SDG Compass (GRI [Global Reporting Initiative], UNGC [UN Global Compact] and WBCSD [World Business Council for Sustainable Development], 2015) provides a detailed guide of indicators and tools to assist companies' contribution to the achievement of the SDGs, emphasising the business case related to future business opportunities, the enhanced financial value of corporate sustainability and improved stakeholder relations.

While the OECD (2018b) also emphasises the business opportunities and market potential for goods and services offered by sustainable business, it refers more generally to the macro level by highlighting the potential of the private sector for

contributing "scale and powerful effective transformation" and its "expertise and capacity for innovation" to the implementation and achievement of the SDGs. The MDGs emphasise the role of partnership between the public sector, the private sector and civil society in the pursuit of development (UN, 2000). The SDGs aim at "bringing together governments, the private sector, civil society, the United Nations system and other actors" to mobilise "all available resources" (UN, 2015b), explicitly mentioning micro-enterprises, cooperatives and multinationals "as drivers of productivity, inclusive economic growth and job creation" (UN, 2015b).

Both the MDGs and the SDGs have led business organisations and non-governmental organisations to discuss and address the link between business and sustainability. A joint statement from the Global Agenda Councils of the World Economic Forum endorses the idea of business contributing to sustainable development by, among other things, "offering an image of business sustainability that can begin to inform business decisions and the creation of new business models" (World Economic Forum). Furthermore, there have been various initiatives that relate to the views of business and its stakeholders on sustainability that identify good practice and issue recommendations for business to contribute to the achievement of the sustainability goals (GRI et al., 2015; Oxfam, 2017, 2018; Shift and WBCSD, 2018).

2.2. Business, development policy and human rights

Reflecting on the debate about the role of business in development, Shift (2016) notes that human rights had been ignored for a long time. This position is mirrored by the relatively marginal role human rights played in the international development literature up and into the 1990s (Sano, 2000), and in the IB literature (Wettstein, Giuliani, Santangelo and Stahl, 2019). Alston (2005) claims that the human rights debate and the development debate have largely developed in parallel, with few points of contact. Figure 1 provides an overview of the most important international initiatives with respect to (i) the sustainable development debate; and (ii) the BHR debate. More recently, Gready and Ensor (2016) identified trends of convergence between the two debates.

The late 1990s/early 2000s saw the emergence of Sen's human capabilities approach to international development (Sen, 2003, 2004, 2005), which explicitely links development to human rights. Going beyond the utilitarian approaches traditionally used in economics, Sen's approach provides for a pragmatic orientation by highlighting a critical distinction between, on the one hand, human rights as ethical articulations (i.e. expressions in a debate on ethical norms), and, on the other hand, as agreed norms that constitute rights and obligations for different social actors. While the former highlights philosophical considerations, the latter takes a political and legal perspective that can be expanded to include political processes of negotiation and agreement on an implicit or explicit social contract on human rights.

The capabilities approach of Sen (2004) emphasises the role of individual freedom, which replaces utility as the basis for the ethical evaluation of human rights, distinguishing between two aspects of freedom. Substantive opportunities and freedom of processes refer to procedural (e.g. process equity or due process) and substantive (e.g. having the means to achieve valuable combinations of human functioning) issues related to human rights. In relation to valuable combinations of human functioning (what a person is able to do or be), Sen introduces the concept of capability "as a kind of freedom [that] refers to the extent to which the person is able to choose particular combinations of functioning [...], no matter what the person actually decides to choose." Sen moves the human rights debate towards a normative discussion, placing the capability approach in the context of a theory of knowledge about collective choice that has to consider "the fairness of processes involved and [...] the equity and efficiency of the substantive opportunities that people can enjoy".

Referring to the discussion about the MDGs, Alston (2005) identifies several challenges for a human rights-based approach to development. The first relates to the challenge that human rights-related goals are often stated in abstract and general ways, which makes it difficult to provide concrete guidance to actors in the human rights field and to measure and monitor human rights-related developments. Second, human rights-related policy prescriptions, such as "the corresponding human rights obligations of duty bearers" (Alston, 2005) often state a general problem or dilemma and do not provide guidance for resolving the issue. In this respect Alston also highlights that guidance may be helpful at the micro level, but less so at the macro level. Third, with respect to the involvement of private businesses and partnership between the private and public sectors, policy statements often use buzzwords such as "strategic partnerships" without necessarily outlining the goals, processes and content involved in such partnerships.

Taking a political economy perspective, Schmidt-Traub (2009) and Langford, Malcolm, Sumner, Andy, Yamin and Alicia (2013) attribute the failure of many countries to achieve the MDGs to a multiplicity of reasons, including inadequate governance, failure to respect essential civil and political rights and geographical and demographic factors. Particularly noteworthy is the argument that in the absence of effective governance structures or respect for civil and political rights, national elites lack the will to pursue long-term development goals, enforce the rule of law and realise human rights, and thus are not able to effectively pursue and achieve goals such as the MDGs. In such situations, a human rights-based approach could strengthen development initiatives by emphasising the role of transparency and the accountability of decision-makers, which is ultimately needed to achieve development outcomes.

Figure 1. Timeline of events – international initiatives related to sustainable development and business and human rights

Source: Based on information from Redclift and Springett (2015), van Tulder (2018), Weissbrodt (2005) and Wettstein et al. (2019).

2.3. From the MDGs to the SDGs

The Millennium Declaration placed human rights at the centre of international development (McInerney-Lankford and Sano, 2010; United Nations Development Programme, 2013). Although development policy traditionally was not organised around the human rights approach to development, the Millennium Declaration (UN, 2000) explicitly suggests implementing the MDGs in a human rights-sensitive manner, and using human rights instruments to promote their achievement (Kuruvilla, Singh, Bustreo, Friedman, Hunt and Luchesi, 2012; Office of the United Nations High Commissioner for Human Rights [OHCHR], 2008, 2010). The business sector has taken up these suggestions and implemented projects in a rights-aware fashion (Business Leaders Initiative on Human Rights [BLIHR], 2010).

Nevertheless, the MDGs were also criticised from the human rights perspective, with respect to their technocratic nature, quantitative focus, selection of a limited number of goals, lack of a full human rights framework including civil and political rights, their focus on the state and neglect of the private sector, and an inadequate system of monitoring (Alston, 2005; Fukuda-Parr and Greenstein, 2013). Schmidt-Traub (2009) argued that while the MDGs were consistent and compatible with a human rights-based approach, the focus was on normative questions and aspects, rather than on operational aspects that could inform day-to-day decisions of practitioner governments. Furthermore, Alston claimed that the MDGs potentially distracted governments and donors from human rights issues and that they competed with existing initiatives.

As the SDGs are widely considered an expansion of the MDGs (Figure 2), one may be inclined to assume that the role of human rights has become even more prominent. In fact, the 2030 Agenda was designed with an explicit commitment to human rights, as indicated in the preamble; several references to international human rights treaties and instruments; and the explicit aim to "seek to realise the human rights of all" (UN, 2015b). An analysis by the Danish Institute for Human Rights shows that of the 169 SDGs targets, 156 are linked to international human rights and labour standards (The Danish Institute for Human Rights, 2019).

However, there are several critical views of the role of human rights in the SDGs and Agenda 2030. To start with, while a human rights approach would require the complete end of the non-realisation of human rights, the SDGs – in line with the mainstream development policy discourse – take an incremental approach, thus generating "a false sense of success" and allowing "governments to go slow on the realisation of human rights" (Pogge and Sengupta, 2016). This is particularly relevant for shifting the respective discourses and shaping the narratives of governments with a poor or suspect track record on human rights.

Figure 2. Evolution from MDGs to SDGs

Source: Adapted from van Tulder (2018).

Concerning the content and process, the large number of SDGs – which Langford (2016) attributes to the highly participative drafting process – very much present a menu that allows actors to hand-pick particular goals while neglecting others. As any improvement of the human condition is appreciated, businesses may be tempted to work towards those goals for which they can identify a business case, those that have the highest impact on reputation, or those for which a cost-benefit analysis yields the most favourable ratio, instead of taking a universal approach to human rights.

The SDGs do not specify a clear division of labour, attribution of responsibility or instruments to ensure accountability among agents operating in the field. This has negative implications for transparency, coordination and accountability. Working towards particular goals is an emergent process in which the agents can pick and choose goals and policies as they like, considering what is "nationally appropriate" (UN, 2015b). Powerful agents such as affluent states, international organisations and multinational enterprises are "shielded from concrete responsibilities for achieving the SDGs" (Pogge and Sengupta, 2016). Dealing with an increased number of goals, targets and indicators may draw resources and attention away from either the overall goal of improving the human condition, or distract from fundamental human rights challenges. Both may lead to human rights being treated in a token fashion.

Wagner (2017) argues that the SDGs emphasise economic, social and cultural rights. While this may be adequate for a general development policy approach under which consensus among the involved states may be more easily achieved, it runs the risk of ignoring second-generation political and civil rights. Access to social and economic wealth is very much influenced by national and international social and economic policies and practices, which in turn are heavily influenced by interest groups, such as industry associations, corporations, unions and NGOs that lobby for favourable terms for themselves and their constituencies. A challenge to addressing inequalities is related to the problem of legitimate decision-making and representing the marginalised parts of the population, who are largely deserving but lack access to representation in political and economic decision-making.

3. The role of business and human rights governance in sustainable development

Being influenced by human rights-oriented development thinking, both the UN MDGs and the SDGs envision specific and supportive roles for (private) business and private-public partnerships in international development. Yet, both the MDGs and the SDGs seem to have largely ignored the parallel UN-level debates on the link between transnational business and human rights, an issue first covered by the

preparation and failure of the Draft Norms on the Responsibilities of Transnational Corporations and other Business Enterprises with Regard to Human Rights in 2004 (UN Commission on Human Rights, 2003; Weissbrodt, 2005), which then led to the development and 2011 endorsement of the UN Guiding Principles (UNGPs) (Backer, 2012; OHCHR, 2011). By establishing a specific number of principles, the UNGPs created the nucleus for an international business and human rights governance system (Ruggie, 2014).

This section explores the role that international BHR governance, originating in the UNGPs, can play in moderating the link between international business and sustainable development. To this end, we will first discuss criticism levelled at how business and the private sector are treated in the international development policy debate about the MDGs and the SDGs, from a human rights perspective. We will then discuss the potential contribution of the UNGPs and suggest different ways in which international BHR governance can address these shortcomings.

3.1. A human rights view on the role of business in the sustainable development debate

There are several criticisms of the role ascribed to business in MDGs/SDGs-related international development policy from the human rights perspective. These criticisms fall into three categories: design principles, implementation, and evaluation.

3.1.1. Design

One of the design principles of the SDGs is *voluntarism*, which provides business with a choice of the activities they wish to pursue to support sustainable development. The advantages and disadvantages of this approach have been extensively discussed in the business ethics/human rights debate on voluntary versus mandatory compliance, which focuses on persuading business to pursue or abandon certain behaviours (Mares, 2015; Wettstein and Waddock, 2005). As voluntarism sets a low threshold for companies to engage in any type of socially responsible behaviour, it does not necessarily ensure that all activities of business organisations are socially responsible. As described above, it allows companies to cherry-pick sustainability goals that suit them, while perhaps disregarding human rights that relate to other goals. This creates tensions with respect to priorities and the universal character of human rights as defined by the International Bill of Human Rights.

There are claims that development policy based on voluntarism with regard to business actors encourages *philanthropy* as the paradigmatic fundamental of corporate social responsibility (CSR) (e.g. Shift (2016). Among other things, the philanthropy-related approach focuses on the outcomes of business activities

instead of corporate responsibility in the process of generating profit through business activities at a more fundamental and systemic level, supporting changes in the business model (micro level) or the institutional setting of the business and the economic system (macro level).

While the SDGs emphasise the role of business and private-public partnerships in sustainable development, there is no clear *attribution of roles and responsibilities* to different actors, for example, the distinction between duty-bearers, rights-holders and other actors is not defined (Pogge and Sengupta, 2016). Relatedly, there seems to be no clear focus on either accountability in general, or specific instruments through which actors can be held accountable. The underlying assumption appears to be that every activity supporting the achievement of the SDGs operates in the context of a positive-sum game, thus potentially ignoring conflicts between goals and conflicts of interest between duty-bearers and rights-holders. Consistent with the neglect of conflicts is the lack of stipulations regarding conflict resolution, e.g. grievance or dispute resolution mechanisms.

3.1.2. Implementation

While all the issues raised in the previous sub-section have an impact on the processes of choosing and implementing policies to support the achievement of the SDGs, Shift (2016) draws our attention to the cognitive *framing* of human rights-related policies and practices by claiming that the mainstream of the BHR debate emphasises compliance, i.e. businesses avoiding negative impacts or harm with respect to human rights.

A different perspective from which to look at the positive impacts of the realisation of human rights is frequently taken by the advocates of CSR, social investment and strategic philanthropy approaches, emphasising the positive societal effects of realising human rights. More recently, the CSR and responsible business debate has shifted towards shared value creation (Porter and Kramer, 2006), social value creation (Sinkovics, Sinkovics, Hoque and Czaban, 2015) or shared responsibility (Posner, 2015).

Moving to more specific aspects of the human rights debate, Shift argues that there are significant differences between the discourses about business implications for people and the environment. Whereas environmental discourse focuses on reducing the negative environmental impact of business activities, social discourse focuses on positive impacts generated by a mix of philanthropy, social investment and socially responsible business models. In contrast, the discussion of business and human rights concentrates on reducing the negative impact of business activities on people, while the residual discourse with respect to the environment considers additional opportunities.

Without ignoring the necessity of compliance with respect to human rights regulations, positive framing processes can alter the way in which corporate decision-makers perceive human rights-related policies and practices, and could shift the emphasis within corporations from a more passive, compliance-oriented approach to a more proactive, engagement-oriented approach to support the achievement of the SDGs.

3.1.3. Evaluation

The large number of SDGs and the contested nature of operationalising the respective goals and establishing valid and reliable measurement indicators create another layer of complexity for the achievement of the SDGs. Lack of clarity and guidance in this respect may exacerbate challenges identified with respect to the design characteristics and principles of the SDGs (Pogge and Sengupta, 2016). Among other things, this may add additional degrees of freedom and discretion to business in terms of assessing and reporting its contributions to the achievement of the SDGs, while at the same time generating issues with respect to transparency and accountability.

The idea of separating positive and negative human rights impacts has intriguing implications, as suggested by Shift (2016), with respect to thinking about measurement issues and designing assessment and control. At a general level, for each of the goals, a human rights-based approach to measurement would require the creation of two separate independent variables: one for the negative impact (related to compliance and the avoidance of negative impact on human rights) and one for the positive impact (emphasising the contribution of the realisation of human rights for the achievement of sustainable development).

The 17 goals and 169 targets included in the SDGs, with each of the goals potentially related to a different set of human rights, generate a high degree of complexity for the assessment of business policies from a human rights perspective. Assuming human rights are universal, should the assessment of goals and human rights be based on separate indicators, or can goals and/or human rights be aggregated into a single indicator? Should each of the goals and/or human right have the same weight in the aggregation process? As far as the assessment of corporate behaviour is concerned, one implication would be to check whether and to what degree rights have been abused for each separate aspect of human rights. Compliance would only be achieved if there is no abuse at all. The positive impact would be analysed and measured separately.

3.2. Business and sustainable development: the potential role of the UNGPs

Taking a human rights perspective, the previous section highlighted several issues with respect to the role of business in the 2030 Agenda in terms of design, implementation and evaluation. We next discuss the extent to which the UNGPs can address the shortcomings identified.

Building on the International Bill of Human Rights, the 2011 UNGPs lay the foundations for an emerging multilevel and polycentric business and human rights governance system by establishing a set of global standards that covers all companies in all UN member states (Ruggie, 2013). The UNGPs have been integrated into the OECD Guidelines for Multinational Enterprises (OECD, 2011, 2018a) and the International Labour Organization Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (ILO, 2017). While the UNGPs can be interpreted in a rather simple and passive "not engaging in harmful activities" fashion, their function and potential impact are more complex. In fact, the principles, stipulations and recommendations included in the UNGPs can be used to help clarify issues, address shortcomings, provide practical guidelines and ultimately moderate the role of business in sustainable development.

3.2.1. Design

The design of the SDGs with respect to the role of business involves an inherent tension between voluntarism and compliance. The UNGPs apply universally and unequivocally to all business organisations – be they transnational or domestic, public or private, operating in the formal or the informal sector – and all human rights. They do not offer a menu with options for business organisations to sign up to or disregard.

The UNGPs involve an expectation of "how business organisations make their profits, not how they spend them" (Shift, 2016). Companies are expected to respect the international bill of human rights at all stages of the value creation process. This contrasts with a focus on philanthropic activities that occur after the value creation process has been completed, focusing on distributing the outcomes of successful business to contribute to sustainable development.

The UNGPs define the roles, responsibilities and rights of different actors in the business and human rights field. They confirm the role of the state as primary duty-bearer to protect human rights and its responsibility to prevent, investigate, punish and redress human rights abuses by companies. The UNGPs also include the expectation that companies explicitly commit to human rights, by publicly making such a commitment, by conducting human rights due diligence, and by establishing policies to remedy any adverse human rights impacts of their business

activities. In addition, they require the state and companies to establish governance structures that provide victims of human rights abuses with access to effective remedy through grievance mechanisms (OHCHR, 2011, 2012, 2014). Thus, the UNGPs specify the rights and obligations of the human rights rights-holders and duty-bearers, and include a clear division of labour and responsibilities with respect to the role of governments and states, as well as of business organisations.

3.2.2. Implementation

The UNGPs can support businesses in the achievement of the SDGs in various ways. They involve a set of global standards that orient companies and other actors involved in, and affected by, international business activities as to how to address human rights issues linked to business activities.

With respect to *framing*, the UNGPs allow for both negative framing in terms of compliance with international human rights standards, but also positive framing by encouraging companies to not only contribute to the realisation of human rights by avoiding abuse and violations, but also to support the development of human capabilities. For duty-bearers this ensures a floor of minimum terms and conditions for their business activities. In the discussion on the SDGs, the UNGPs provide a foundation upon which additional, innovative responsible business behaviour can build. If effectively implemented, this floor would take human rights (abuses) out of competition in the respective factor and product markets. Consequently, businesses would no longer be able to compete by undercutting terms and conditions related to human rights standards, regardless of whether these are in the environmental, labour or consumer protection spheres.

At this stage it is important to address a controversial aspect of the human rights discussion related to the definition, specification and operationalisation of human rights standards. We need to distinguish between two aspects of human rights. On the one hand, human rights can be understood as universal minimum standards that may not be abused. This relates to the earlier discussion of negative framing and points towards human rights compliance. On the other hand, beyond this safety net, we may consider higher levels of human rights realisation in relation to the maximisation of human capabilities, with its positive association with sustainable development, linked to positive framing and Sen's capabilities approach.

This distinction allows different elements and interventions in human rights discourses. In this regard, Shift (2016) distinguishes between (i) primary discourses that are about ending human rights abuses; and (ii) additional discourses highlighting opportunities for socially responsible behaviour beyond the human rights minimum standards. Accordingly, one may think about measuring these dimensions separately in order to avoid conflation.

3.2.3. Evaluation

Turning to the issue of evaluation, the implementation of the UNGPs could be analysed with respect to both compliance and supporting capability development. Universal corporate compliance with international minimum human rights standards would remove human rights as a potential pawn in competition between duty-holders and establish a safety net for rights-bearers. Furthermore, with companies going beyond the minimum compliance requirements, the application of the UNGPs implies a positive change in the situation of rights-holders in terms of freedom and unleashing human capabilities for future sustainable development. Using the UNGPs also represents a move away from specific target dates through focusing on long-term sustainability. It would also avoid negative motivational effects if the goals turn out to be unrealistic. Thus, the UNGPs include obligations that can further strengthen actors' long-term commitment.

As far as the evaluation of corporate human rights policies and practices is concerned, the UNGPs do not include any specific stipulations beyond generally requiring companies to engage in human rights risk assessment and due diligence, providing guidelines with which to assess complicity in human rights abuses, and suggesting specific effectiveness criteria for the evaluation of non-traditional grievance mechanisms, such as legitimacy, accessibility, predictability, equity, transparency, rights compatibility and dialogue orientation, as well as acting as a source of continuous learning (OHCHR, 2011). These criteria provide useful starting points for discussion of the design of an evaluation system.

3.3. Building on the UNGPs: the business and human rights governance framework

The UNGPs establish the nucleus for an international BHR governance system that can be used to support the role of MNEs in sustainable development, specifying and defining the roles of states and business, and establishing reference points in terms of expected behaviour. Building on the UNGPs, the BHR governance approach – an adaptation and extension of Budd's (2004) efficiency, equity and voice approach – is designed around the idea of business and human rights being a field that includes actors, actor interests, and relationships between different actors (Zagelmeyer, 2020). Actors can be both individual agents (e.g. workers or managers) and collective agents (e.g. unions, employer organisations or other non-governmental agents). Agents are engaged in bilateral or multilateral relationships, for example between employer and employee or between seller and buyer, in which they are rights-holders and/or human rights duty-bearers. From the perspective of the actors, particular relationships are purposeful and serve particular objectives, i.e. achieving profits, or earning a living.

Each individual and collective actor has their own specific set of interests and related objectives, which influences their choice of strategy and motivates them to engage in goal-directed behaviour and activities. Assuming potentially overlapping, competing and conflicting interests between the different actors, each dyadic relationship between duty-bearer and rights-holder can be interpreted as a bargaining problem that raises questions about the relative distribution of power between these actors and the rules governing their interactions, i.e. governance (Budd, 2004). Thus, society needs to find a way to achieve a workable balance of objectives. This balance needs to equally apply at the micro level of the dyadic relationships as well as at the societal macro level. With respect to the latter, Budd's efficiency, equity and voice approach can be reinterpreted to address broader societal objectives of wealth, justice and democracy. Assuming human rights are universal, the potential tensions between the realisation of different human rights (e.g. property rights and labour rights) show the need to balance the three objectives.

Governance can be defined as "an institutional framework in which the integrity of a transaction or related set of transactions is decided", aiming "to effect good order" (Williamson, 1996). Governance structures involve decision-making procedures for regulating and governing relationships between actors. According to whether, or not, state or state agencies are involved in governance, we can distinguish between public and private governance.

The need to balance the objectives of efficiency, equity and voice can be supported by a BHR governance system that includes a specific configuration of governance structures, which provide the formal and informal institutional rules for the relationships between the different actors. Within such a governance system, a relationship between two or more actors may be regulated by a multiplicity of governance mechanisms and structures at different levels, e.g. individual, company, national, or international level. Governance modes may include, for example, environmental legislation, international labour standards, or multi-stakeholder agreements. A BHR governance system thus consists of a specific arrangement of governance mechanisms and structures within a defined entity, such as an industry, a firm, a country or a value chain, in which each relationship can be regulated by different configurations of governance mechanisms and structures. "Good" governance of the respective relationship requires that the different objectives are balanced.

4. MNEs and sustainable development: the moderating role of human rights governance

4.1. BHR governance and the link between MNEs and sustainable development

The BHR governance approach can be used to analyse the human rights implications of IB activities, such as trade, FDI, different modes of MNE foreign market entry or operation, or specific organisational configurations, such as global value chains (Gereffi, 2014; Gereffi, Humphrey and Sturgeon, 2005) or the global factory (Buckley and Strange, 2015). The UNGPs and the BHR governance approach taken together can support business in contributing to the achievement of the SDGs in a complementary way. The UNGPs define the roles and responsibilities of states and business organisations, provide orientation with respect to the activities of business and the relationship between duty-bearers and rights-holders, and include provisions for access to remedy and the design and evaluation of grievance mechanisms.

Whereas the UNGPs deal with design aspects, such as the assumptions, principles, and values involved, and provide ways of framing human rights issues, the BHR governance approach provides us with a toolbox for describing, analysing and evaluating actors, relationships and the institutions that govern the relationships between human rights duty-bearers and rights-holders. In addition to institutional aspects, considering agency aspects related to interests, objectives and potential goal conflicts enables us to assess the outcome of business activities with respect to the SDGs, and to generate policy recommendations for business as well as other actors in the field. In particular, the framework can inform the analysis and discussion of the assumptions, interests and potential conflicts between actors or actor constellations in the respective international human rights subfields, with respect to the normative goals of efficiency, equity and voice, or the broader societal goals of wealth, justice and democracy.

4.2. The impact of MNEs on the SDGs: the moderating effect of BHR governance

The idea of BHR governance moderating the relationship between MNEs and the SDGs can be further illustrated by using an established graphical model that describes the impact of MNE activities and FDI on emerging economies. The original model of Meyer (2004) focuses on the link between MNE activities and FDI to environmental, social, institutional and economic variables. Kolk (2016) and Kolk et al. (2017) adapt this model to analyse the impact of MNEs on sustainable development. While Kolk et al. (2017) distinguish between four sets of development

goals related to people, planet, peace and prosperity, Kolk (2016) uses the categories "justice" and "dignity" instead of "peace". The different models argue that the SDG categories are affected directly by the activities of MNEs, and indirectly through international business activities' impact on local firms and other organisations. The analysis finds that MNEs "can have a clear impact on sustainable development, both through the negative social and environmental externalities and, as they are increasingly portrayed, as a provider of solutions" (Kolk et al., 2017).

We adapt the model of Kolk et al. (2017) to illustrate the moderating role of BHR governance as an institutional filter to the relationship between MNE activities and outcome variables (Figure 3). Like Kolk et al., the model highlights the linkages between MNE activities and potential outcomes with respect to the sustainable development-related people, planet, peace and prosperity categorisation. Our adaptation and extension add BHR governance as an institutional process. In line with traditional input-output models, business activities as an input factor are moderated (and catalysed) by the institutional processes prescribed by the BHR governance system during which they become social and economic outcomes affecting planet, people, prosperity and peace.

We argue that these behaviour-outcome relationships are moderated by institutional governance systems that regulate (govern) the formal and informal relationships and interactions between business organisations (usually as human rights duty-bearers) and rights-holders in order to pursue their objectives. A combination of the UNGPs and the BHR governance approach may be such a moderating institutional setting. This leads us to a proposition and a testable hypothesis:

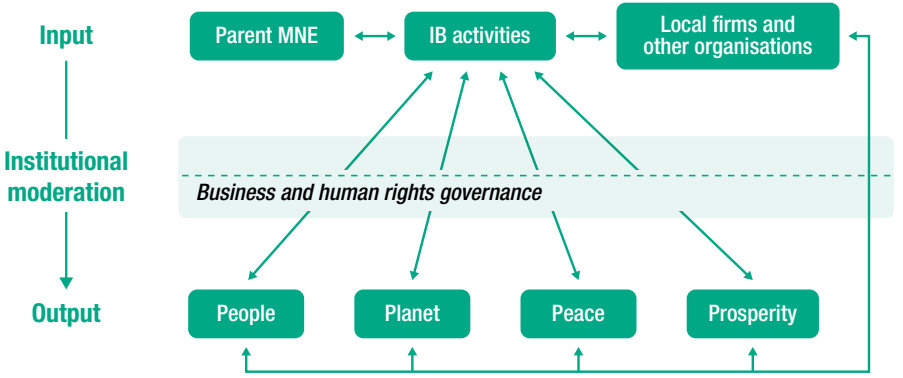
Proposition 1: The business and human rights governance system moderates the relationship between business behaviour and sustainable development outcomes.

Hypothesis 2: Companies' exposure to UNGPs-based business and human rights governance is positively related to their contribution to the achievement of the SDGs.

How can the idea of using BHR governance as moderator in the relationship between business activities and the achievement of the SDGs be used in practice by corporate and public policy actors? Drawing on our earlier distinction between the design, implementation and evaluation stages, the following section uses the topical themes at the interface between IB and business and human rights identified by Wettstein et al. (2019) to illustrate the potential applications of our proposed approach.

From a corporate perspective, MNEs operating in different countries and institutional settings have to find ways to balance different pressures of global standardisation and local responsiveness (Ghoshal and Bartlett, 1989), which can be particularly challenging with respect to CSR and business ethics-related issues, and that

Figure 3. Business and human rights governance moderates the link between MNEs and SDGs



Source: Zagelmeyer and Sinkovics, adapted from Kolk (2016); Kolk et al. (2017); Meyer (2004).

ultimately affect a corporation's contribution (or lack thereof) to the achievement of the SDGs. The issues involved and the potential of the BHR governance approach can be illustrated in three areas: institutional voids, MNE headquarter-subsidiary relations and global value chains governance.

One recurring theme for corporations is the variation in formal and informal institutions across countries. While this issue has been extensively addressed by comparative institutional analysis, discussion of the role of business in the SDGs inevitably leads to the phenomenon of "institutional voids" and "weak" institutions, especially with respect to corruption, government effectiveness, the rule of law and human rights protection. For corporate-level IB strategy, such situations pose a challenge for the development of market and non-market strategies with implications for social responsibility and accountability. As the guidance of "strong" institutions is missing, companies are expected to fill the institutional voids and governance gaps themselves through private governance. In the face of weak institutions and incentives for potential institutional arbitrage through the opportunistic exploitation of the institutional settings, companies may face trade-offs with respect to policies and behaviour consistent with profit maximisation on the one hand and socially responsible behaviour on the other. In this situation, the BHR governance approach, based on the UNGPs, may provide the principles and analytical tools to fill the institutional void and governance gaps. In the respective decision-making processes, the UNGPs may be used as principles to filter and thus identify and design human rights-compatible policies and practices that, on the one hand, avoid human rights-related harm, and, on the other, contribute to the achievement of the SDGs. The principles and tools provided by the governance approach can then be used to design and structure the implementation process,

and to guide the analytical processes at the evaluation stage. From the perspective of public policymakers, involved, for example, in country-level policies addressing forms of modern slavery or the implementation of national action plans on sustainable development, the BHR governance approach may be used to assess corporate activities, by using the UNGPs as a reference point and using the available conceptual and analytical tools in the evaluation process.

While the previous section addresses the issue of institutional voids and governance gaps at a general level, international business has a long tradition of analysing the relationships between the parent organisation/headquarter and subsidiaries. More recently, attention has shifted from the internal organisation of MNEs to the external environment of MNEs, i.e. the relationships between MNEs and their cooperation partners in business ecosystems and the role of MNEs in global value chains. Issues related to governance, control, legitimacy and accountability occur with respect to internal and external organisational configurations of international business activities. Again, BHR governance can act as moderator or filter with respect to the design, implementation and evaluation of corporate policies and their potential impact on the SDGs. This can be very helpful with respect to diligence activities, alliance management, and non-financial reporting. The UNGPs can provide principles and a reference point, while the BHR governance approach can provide the conceptual and analytical framework for (i) assessing strategic choice options in decision-making processes; and (ii) evaluating policies and practices with respect to human rights compatibility and thus their contribution to the SDGs. This equally applies to decision-making and evaluation processes linked to corporate actors and public policymakers.

5. Conclusion, policy relevance, and research agenda

The SDGs represent a milestone in international development policy. In addition to specifying 17 goals and 169 targets, the SDGs ascribe a significant role to business organisations in sustainable development, a challenge many MNEs have accepted. This paper analysed and discussed the link between international business activities and the achievement of the SDGs, and argued that BHR governance can play a potentially important role in moderating the relationship between MNEs and the SDGs. This final section outlines areas for future research and offers some concluding thoughts about the potential implications for public policy.

As far as future research is concerned, BHR governance is connected to the developing research agendas of international business, human rights, and sustainable development. The proposed approach connects different strands in the emerging debates on the links between international business and human rights (Giuliani, 2018; Wettstein et al., 2019), international business and sustainable

development (Kolk et al., 2017; Kolk et al., 2018; van Tulder, 2018; van Zanten and van Tulder, 2018), and human rights in sustainable development (Pogge and Sengupta, 2016; Winkler and Williams, 2017). Furthermore, it relates to the academic and public policy debates on the regulation of MNEs in global governance (Banerjee, 2014; Human Rights Council, 2015; Ruggie, 2018) as well as the link between international business and global justice (Arnold, 2013; Risse, 2012; Wettstein, 2009). Against this background, we briefly outline three suggestions for potentially fruitful future research.

i. *BHR as a moderator between IB activities and the SDGs:* This involves the empirical analysis and evaluation of the contribution of MNEs to the achievement of the SDGs, which could test the proposed moderating role in the link between business and the SDGs. Appreciating the complexity of measuring and assessing the corporate impact on the SDGs, the BHR governance approach provides a holistic view of corporate impact, involving a set of universally applicable principles and reference points (human rights) and the respective conceptual and analytical tools for assessing the impact of actors, strategies and governance structures on efficiency, equity and voice. By using human rights as reference point, corporate policies and practices can be assessed in terms of avoiding human rights-related harm and contributing to the realisation of human rights, and thus the achievement of the SDGs.

ii. *Actor heterogeneity and institutional complexity:* Another potential strand for future research could be to address the issues of actor heterogeneity and institutional complexity. These issues include exploration and analyses with respect to managing international business in the face of institutional voids and cross-country variation in institutional settings, varying combinations of country of origin and host countries with divergent human rights records, and the link between business and human rights-related activities and organisational configurations at different levels (e.g. headquarters versus subsidiaries) and characteristics (e.g. emerging market and/or state-owned enterprises). Distinguishing between these different types of international business activities, such as trade, alliances, FDI, or nonmarket strategies may also yield interesting insights.

iii. *Research on economic and social upgrading in regional and global value chains*: Following the work of Gereffi and Lee (2016) and Sinkovics, Hoque and Sinkovics (2016), future work is encouraged to explore and analyse the implications of BHR governance for the strategic interaction between MNEs (e.g. MNEs from developed countries interacting with emerging market MNEs in different markets and geographical locations) as well as for economic and social development. Such endeavours would offer valuable foundational information for analysing regulatory requirements and capabilities, and the appropriate level, breadth and

depth of public policy regulation to create a level playing field for competitors. An extension of this research could additionally differentiate between industries (e.g. resource extraction, tourism, apparel, pharmaceutical) and sectors (e.g. public versus private, or formal versus informal).

Beyond informing future research, the proposed approach is also relevant for public policymaking. The BHR governance system governs the relationships and interaction between business organisations as human rights duty-bearers and rights-holders as they pursue their interests, which relate to the three objectives of efficiency, equity and voice. The societal need to balance these three objectives can be supported through a BHR governance system that includes specific configurations of governance structures, which provide the formal and informal institutional rules for the relationships between the different actors in the business and human rights field.

The BHR governance approach provides a genuine structure for exploring, analysing and discussing the link between business and the SDGs, highlighting aspects in relation to actors, their relationships, governance and outcomes. With respect to the actors involved, there is a need to identify all relevant actors, their underlying interest and goals with respect to the relationships between human rights duty-bearers and rights-holders, as well as the strategic options, and determinants for respective choices.

The essential elements of the approach are the relationships between different actors that potentially affect the dyadic relationship between human rights duty-bearers and rights-holders. Is every actor considered legitimate by the other actors? What is the balance of power between the different actors? To what extent are their interests, goals and strategies conflicting? In case of conflicting interests, goals and strategies, the question emerges how the institutionalisation of a BHR governance system, for example using the UNGPs as a reference point, can be designed in order to optimise the contribution of business to sustainable development. Which governance mechanisms and governance systems are in place to govern the relationships between human rights duty-bearers and rights-holders? To what extent do the respective governance systems contribute to certain outcomes related to equity (or justice), voice (or legitimacy) and efficiency (or wealth)? To what extent do outcome combinations contribute to stability and peace? To what extent do the outcomes contribute to the achievement of the SDGs?

Finding an optimal balance between equity, voice and efficiency can contribute to the achievement of the SDGs. Considering the 4P categorisation, efficiency in the allocation of scarce resources contributes to achieving prosperity. By ensuring the internalisation of external effects, efficiency, defined as macro-level efficiency, will also contribute to protecting the planet. Ensuring equitable and fair treatment

to provide for effective voice, irrespective of power positions, and drawing on the efficient use of resources will contribute to achieving the SDGs in a people-oriented way.

In the sustainable development context, the BHR governance system can be used, on the one hand, to avoid human rights-related harm by establishing a safety net of minimum human rights-related standards, for example by outlawing slave labour. On the other hand, the BHR governance system can be used to negotiate and agree on substantive and procedural terms and conditions on human rights-related issues, such as environmental and product quality standards that can contribute to the realisation of human rights beyond the absolute minimum standards. Using human rights as a reference point for companies and public policymakers can help identify business policies and practices that avoid human rights-related harm and/or support the realisation of human rights, and thus support the achievement of the SDGs and the underlying sustainable development policy objectives.

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From special economic zones to greater special economic region – Hong Kong Special Administrative Region as a model for legal infrastructure design

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This article examines the key aspects of the legal infrastructure design of special economic zones (SEZs), with reference to the best practice of the Hong Kong Special Administrative Region (Hong Kong SAR) under "One Country, Two Systems" and the Basic Law. It discusses some recent initiatives of the Hong Kong SAR in respect of innovations in dispute resolution mechanisms and creative use of modern technology to illustrate how SEZs can respond to contemporary challenges and opportunities. In particular, this article discusses the Guangdong–Hong Kong–Macao Greater Bay Area, which sheds light on a new model of collaboration and partnership between SEZs, and explores the possibility and potential for SEZs to serve as the building blocks for the eventual establishment of a new paradigm of greater special economic region.

Keywords: special economic zone, legal infrastructure, Hong Kong Special Administrative Region, Greater Bay Area, greater special economic region

1. Introduction

The establishment of special economic zones (SEZs) has generated much interest in recent years, as the world is looking for catalysts for international trade and investment.[1] Although SEZs are economic policy tools with a very long history, they

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[1] As reported in UNCTAD's *World Investment Report 2019* (pp. 128–129), there are now estimates of nearly 5,400 SEZs worldwide. The author provided an overview on the historical development of SEZs, considerations on the legal infrastructure design of SEZs, and the major contemporary challenges and opportunities in relation to the development of SEZs in the article, "Special Economic Zones: A Catalyst for International Trade and Investment in Unsettling Times?" (2019).

are not always successful. Often the dividing line between an SEZ that can serve as a successful role model and one that ends up in disastrous failure hinges on whether the SEZ is supported by a solid legal infrastructure.

This article first considers best practice in the design of the legal infrastructure of an SEZ, with reference to insights from the Hong Kong Special Administrative Region (Hong Kong SAR) of the People's Republic of China. It then discusses various recent initiatives in the Hong Kong SAR that may address the contemporary challenges and build on opportunities in the development of SEZs.[2] In light of the Guangdong–Hong Kong–Macao Greater Bay Area (Greater Bay Area), this article also explores the possibility and potential for SEZs in different jurisdictions to collaborate innovatively and form a greater special economic region.

2. Best practice for the design of legal infrastructure – insights from the Hong Kong SAR

The global experience with SEZs has shown that, apart from geographical location and supporting physical infrastructure, a well-designed legal infrastructure is crucial to success. Generally speaking, a well-designed legal infrastructure would be composed of SEZ laws that are sufficiently stable to ensure consistent, transparent and predictable implementation of SEZ policy, as well as SEZ regulations and SEZ operating procedures that are practical, flexible and responsive to the needs of investors (Gauthier, 2015, p. 10).

In considering the design of the legal infrastructure of an SEZ, the Hong Kong SAR provides an interesting case of reference. Under the unprecedented "One Country, Two Systems", the Hong Kong SAR is a special administrative region of China, and exercises a high degree of autonomy and enjoys executive, legislative and independent judicial power, including that of final adjudication, in accordance with the Basic Law (Basic Law, art. 2).[3] In fact, the Hong Kong SAR exhibits a number

[2] Major contemporary challenges and opportunities in relation to the development of SEZs include (i) innovations in dispute resolution mechanisms of SEZs, (ii) creation of synergy between SEZs and free trade agreement initiatives, (iii) making greater use of modern technology in SEZs, (iv) building a "green" model for SEZs to ensure sustainable development, and (v) enhancing collaboration and partnership among governments as well as international organizations on the development of SEZs (Cheng, 2019, pp. 56–66).

[3] The Basic Law, which came into effect on 1 July 1997, was adopted by the National People's Congress of China and promulgated by the then President of China on 4 April 1990 in accordance with the Constitution of China. The Basic Law sets out the high autonomy enjoyed by the Hong Kong SAR as well as the systems and policies practised in the special administrative region. Such systems include: the social and economic systems; the system for safeguarding the fundamental rights, freedoms and duties of its residents; the executive, legislative and judicial systems; and the relevant policies.

of characteristics of an SEZ,[4] such as having in place a regulatory regime different from that in the rest of the country. Further, the Hong Kong SAR practises the capitalist system instead of the socialist system practised in the rest of China (Basic Law, art. 5). Whereas the legal system of Mainland China is based on civil law, the legal system of the Hong Kong SAR is common law-based (Basic Law, art. 18).[5] It is also worth noting that the Basic Law requires the Hong Kong SAR to maintain the status of a free port (Basic Law, art. 114) and is widely acclaimed for that status. Moreover, it is well known in the international community that the Hong Kong SAR itself is a separate customs territory (Basic Law, art. 116) and a founding member of the World Trade Organization (WTO). With these features, the Hong Kong SAR can provide useful insights with respect to designing the legal infrastructure of modern SEZs.

The discussion in the following section focuses on six major elements in the legal infrastructure design of SEZs, namely (i) key principles and policies, (ii) the institutional framework, (iii) good governance and rule of law, (iv) fiscal incentives and tax administration, (v) an efficient and liberal regulatory regime for business activities in SEZs, and (vi) linkages and integration with national and global initiatives. It is also essential to ensure that the legal infrastructure of SEZs and their operations are compatible with the international trade rules of the WTO as well as the rules under applicable free trade agreements (FTAs) and international investment agreements.

2.1. Key principles and policies

It is important for the high-level design of the legal infrastructure of an SEZ to set out clearly its key principles and policies (Gauthier, 2015, p. 12) to, on one hand, guide the design of the features of the legal infrastructure and, on the other, signal the outside world about the underlying policies and objectives of the SEZ so as to attract the targeted foreign investments. In the Hong Kong SAR, high-level trade policy is set out in the provisions of the Basic Law. For example, the Hong Kong SAR shall pursue the policy of free trade and safeguard the free movement of

[4] In a leading study conducted by the World Bank on SEZs (Farole, 2011, pp. 23–25), an attempt has been made to define SEZs broadly as "demarcated geographic areas contained within a country's national boundaries where the rules of business are different from those that prevail in the national territory". In the same study, the World Bank also observed that those differential rules "principally deal with investment conditions, international trade and customs, taxation, and the regulatory environment" and the determinant structural feature of an SEZ is that it "benefits from a different regulatory regime from that in the rest of the economy".

[5] Art. 18 of the Basic Law provides that the national laws of China shall not be applied in the Hong Kong SAR except for those listed in Annex III of the Basic Law, which are confined to those relating to defence and foreign affairs as well as other matters outside the limits of the autonomy of the Hong Kong SAR as specified by the Basic Law.

goods, intangible assets and capital (Basic Law, art. 115), as well as maintaining its status as a free port (Basic Law, art. 114).

Protection of property rights is also a crucial component of the principles and policies of an SEZ because an obvious goal is to instil confidence in foreign investors about making investments in the zone. In this regard, ensuring adequate protection of property rights has always been high on the agenda of the Hong Kong SAR. The Basic Law expressly provides that the right of private ownership of property shall be protected (Basic Law, art. 6), and that the Hong Kong SAR shall protect the right of individuals and legal persons to the acquisition, use, disposal and inheritance of property and their right to compensation for lawful deprivation of their property (Basic Law, art. 105).[6] Moreover, given the status of the Hong Kong SAR as one of the leading global investment hubs, it has been made expressly clear in the Basic Law that the ownership of enterprises and the investments from outside the Hong Kong SAR shall be protected by law (Basic Law, art. 105).

In today's knowledge-driven economy, intellectual property can be a highly valuable investment. Under the Basic Law, the Hong Kong SAR protects by law achievements in scientific and technological research, patents, discoveries and inventions, as well as the achievements and the lawful rights and interests of authors in their literary and artistic creation (Basic Law, arts. 139 and 140). To ensure that the protection of intellectual property in the Hong Kong SAR meets the highest international standard, the Customs and Excise Department is tasked with helping rights-owners to enforce their rights in relation to copyright and trademark goods through border enforcement measures, in accordance with the Agreement on Trade-Related Aspects of Intellectual Property Rights of the WTO (Intellectual Property Department, 2019).

2.2. Institutional framework

The institutional framework of an SEZ serves as the backbone of the legal infrastructure and typically involves a number of key actors, namely government, regulator, owner, developer, operator and tenants of the SEZ (Farol, 2011, p. 171; ASEAN, 2016, p. 15).[7] In regard to the institutional role of the Government of the

[6] Art. 105 of the Basic Law further provides that the compensation for lawful deprivation shall correspond to the real value of the property concerned at the time and shall be freely convertible and paid without undue delay.

[7] The government is generally responsible for the strategic planning, administration and regulation of an SEZ programme, selecting sites and developers, and providing offsite and connecting infrastructure. The regulator is often considered one of the most important actors in an SEZ. Its authority, quality and capacity will make or break an SEZ programme because the regulator plays a crucial role in monitoring the compliance and enforcement of the legal framework of the SEZ and in facilitating licensing and regulatory services within the SEZ (Farole, 2011, p. 182).

Hong Kong SAR, the Basic Law provides that it shall provide an economic and legal environment for the maintenance of the status of the Hong Kong SAR as an international financial centre and for encouraging investments, technological progress and the development of new industries (Basic Law, arts. 109 and 118).[8] The Basic Law further provides that the Government of the Hong Kong SAR shall formulate appropriate policies to promote and coordinate the development of various trades such as manufacturing, commerce, tourism, real estate, transport, public utilities, services, agriculture and fisheries (Basic Law, art. 119).

The Government of the Hong Kong SAR upholds the free market principle and at the same time seeks to play the role of a facilitator and a promoter to boost the economic vibrancy of the Hong Kong SAR through efforts in various areas, including land supply, talent, government-to-government business, policy directions, investment, business-friendly environment and taxation (Government of the Hong Kong Special Administrative Region, 2017, para. 3; Government of the Hong Kong Special Administrative Region, 2018b, para. 14).

In respect of the regulatory regime, it is worth mentioning that a number of regulatory bodies in the Hong Kong SAR, such as the Securities and Futures Commission,[9] the Competition Commission[10] and the Insurance Authority,[11] are independent statutory bodies.

The institutional structure of an SEZ can range from fully public, with the SEZ being operated, developed and regulated by the government, to fully private, with the SEZ being developed and operated privately.[12] In between the two extremes, there is also the public-private partnership (PPP) model.[13] The PPP model is becoming very important, especially for infrastructure works. In fact, during the early stage of the establishment of the Shenzhen SEZ in China, joint ventures and private developers from Hong Kong have provided significant contributions to the development of basic SEZ infrastructure through PPPs (Yeung et al., 2009, pp. 228–229).

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[8] Art. 128 of the Basic Law also provides that the Government of the Hong Kong SAR shall provide conditions and take measures for the maintenance of the status of the Hong Kong SAR as a centre of international and regional aviation.

[9] See the website of the Securities and Futures Commission at https://www.sfc.hk/web/EN/.

[10] See the website of the Competition Commission at https://www.compcomm.hk/.

[11] See the website of the Insurance Authority at https://www.ia.org.hk/en/index.html.

[12] Back in the 1980s, less than 25 per cent of zones worldwide were in private hands. However, by 2005, 62 per cent of the 2,301 zones in developing and transition countries were developed and operated by the private sector (Akinci et al., 2008, p. 2).

[13] The PPP model can take many forms, such as public provision of off-site infrastructure and facilities as an incentive for private funding of on-site infrastructure and facilities, government assembly of land parcels with secure title and development rights for lease to private zone development groups and build-operate-transfer and build-own-operate approaches to on-site and off-site zone infrastructure and facilities (Akinci et al., 2008, pp. 18–19).

With the increasing participation of private parties in the development and operation of SEZs, one must not overlook the risk that the acts of such private parties can potentially result in violations of the applicable international agreements and that such acts may be attributed to the relevant States under the rules on State responsibility.[14] As a result, one should be careful in the selection and vetting process for private parties' participation in the development, management and operation of SEZs. It would also be prudent to set up monitoring and coordination mechanisms to ensure that the conduct of such private parties does not breach the obligations under the relevant international investment agreements. Furthermore, the actions of private entities such as a private SEZ operator may give rise to concerns under the WTO disciplines if such entities are carrying out a governmental directive, or if the benefits of the WTO-inconsistent incentives provided through such entities are funded by the government (Creskoff et al., 2009, p. 30).

2.3. Good governance and rule of law

In the design of the legal infrastructure of an SEZ, the importance of rule of law cannot be overemphasized. In the Hong Kong SAR, strong rule of law has always been its core value and such rule of law is supported by a robust legal and judicial system. It is worth noting that the Hong Kong SAR is vested with independent judicial power and that the courts of the Hong Kong SAR shall have jurisdiction over most cases in the special administrative region but not over acts of State such as defence and foreign affairs (Basic Law, art. 19).

Furthermore, the Basic Law has vested the power of final adjudication in the Court of Final Appeal of the Hong Kong SAR. A unique feature in the judicial system of the Hong Kong SAR is that the Court of Final Appeal may as required invite judges from other common law jurisdictions to sit on it as non-permanent judges (Basic Law, art. 82). More importantly, it is also expressly provided under the Basic Law

[14] In the case of *Ampal-American Israel Corporation and others v Arab Republic of Egypt*, the investor's company was granted free zone privileges by Egypt and it entered into a contract with two State-owned corporations of Egypt. The company's free zone privileges were subsequently withdrawn by Egypt and its contract terminated by the two State-owned corporations. The tribunal of the International Centre for Settlement of Investment Disputes (ICSID) ruled in favour of the investor and held that the conduct of the two State-owned corporations, which amounted to expropriation, was attributable to Egypt (*Ampal-American Israel Corporation and others v. Arab Republic of Egypt*, ICSID Case No. ARB/12/11, Award, 21 February2017, para. 354). In the proceeding that sought to set aside the arbitral award of *Lee John Beck and Central Asian Development Corporation v. Kyrgyz Republic*, made under the CIS Convention for the Protection of Investors Rights, although the Kyrgyz Republic argued that the SEZ in question was not a State organ, the Moscow Arbitration Court held that attribution was found because the management of the SEZ was an executive body established by the Prime Minister of Kyrgyzstan and the SEZ enjoyed the same executive status under the Kyrgyz legislation as a ministry within the Kyrgyz Government (Boltenko, 2018).

that the courts of the Hong Kong SAR shall exercise judicial power independently, free from any interference (Basic Law, art. 85).

The high degree of rule of law of the Hong Kong SAR is globally recognized. Insofar as judicial independence is concerned, the Hong Kong SAR ranked second among common law jurisdictions and eighth globally among 141 jurisdictions, according to the *Global Competitiveness Report 2019*, prepared by the Word Economic Forum (WEF, 2019, p. 267). Moreover, the Hong Kong SAR ranked fourth among 126 jurisdictions with respect to the "order and security" in the Rule of Law Index 2019 of the World Justice Project (WJP, 2019, p. 84).

Good governance is also a crucial ingredient in the legal infrastructure of a successful SEZ. To achieve good governance, it is necessary to have in place an effective and efficient coordination mechanism for the various government agencies involved in the regulation of an SEZ. Under the Basic Law, the Chief Executive appoints members of the Executive Council of the Hong Kong SAR from among the principal officials of the executive authorities as well as members of the Legislative Council and other public figures (Basic Law, art. 55). The Chief Executive shall also consult the Executive Council before making important policy decisions and introducing bills to the Legislative Council (Basic Law, arts. 54 and 56). Such a mechanism is highly beneficial for effective policy coordination.[15]

Another facet of good governance is the absence of corruption, which is important for attracting foreign direct investment because foreign investors would clearly be reluctant to invest in a region where corruption and uneven enforcement of regulations are rampant (WJP, 2018, p. 11). In 2019, the Hong Kong SAR ranked ninth globally with respect to the "absence of corruption" in the Rule of Law Index 2019 of the World Justice Project (WJP, 2019, p. 84). This ranking can indeed be attributed to the effective functioning of the independent powers of the Independent Commission Against Corruption in investigation, the Department of Justice in prosecution and the Judiciary in adjudication to keep corruption under effective control (Independent Commission Against Corruption, 2019).

[15] The Government of the Hong Kong SAR has also established the Policy Innovation and Co-ordination Office (PICO), which commenced operation in April 2018, to coordinate major cross-bureau policies selected by the chief executive and the secretaries of departments of the Government of the Hong Kong SAR to help achieve policy objectives and to provide "first-stop and one-stop" consultation and coordination services for innovative development projects that would bring broader public benefits (PICO, 2019).

2.4. Fiscal incentives and tax administration

Fiscal incentives are commonly featured in SEZs and may take the forms of corporate tax reduction or exemption; duty-free importation of raw materials, capital goods, and intermediate inputs; no restrictions or taxes on repatriation of capital and profits; exemption from foreign exchange controls; and exemption from most local and indirect taxes (Akinci et al., 2008, pp. 54–55).

Nevertheless, the policy of the Hong Kong SAR tends to focus on longer-term arrangements and relies on its track records, credibility and competitiveness to attract businesses and investments, instead of ad hoc short-term fiscal benefits. This policy has indeed contributed to attracting long-term, sustainable and profitable investments, as opposed to simply short-term entries that do not stay long in the markets.

Furthermore, one should bear in mind that some of the fiscal incentives may not necessarily sit well with the disciplines on subsidies under the Agreement on Subsidies and Countervailing Measures (SCM Agreement) of the WTO.[16] The provision of WTO-inconsistent fiscal incentives in SEZs may give rise to risks of dispute settlement actions under the WTO as well as the imposition of countervailing duties on the relevant products by other WTO members.

Fiscal incentives in SEZs, once imposed, are often difficult to remove and are described as being "sticky". From the perspective of international investment law, investors may argue that withdrawal of fiscal incentives frustrates their legitimate expectation and gives rise to claims of violation of the fair and equitable treatment obligation and the like.[17] Whether such an argument would succeed depends on, inter alia, whether the cancellation and withdrawal of incentives are made in accordance with the laws related to SEZs in the host jurisdiction.

Research has revealed that successful zone programmes nowadays are moving increasingly toward the removal of fiscal incentives and toward the integration of

[16] The SCM Agreement regulates two types of subsidies, namely prohibited subsidies and actionable subsidies. Prohibited subsidies are non-agricultural subsidies that are contingent on export performance, and subsidies that are contingent on the use of domestic goods in place of imported goods. As such, two kinds of subsidies could be considered prohibited: subsidies in the form of cash payments provided by the government on the basis of the export performance of SEZ tenants as well as subsidies that are contingent on the SEZ tenants' use of domestic over imported goods (Creskoff et al., 2009 , pp. 31–33; Akinci et al., 2008, p. 55). Actionable subsidies, in contrast, are those that are granted by a WTO member that have "adverse effects" on international trade, because they cause injury to the domestic industry of another WTO member; nullify or impair WTO benefits; or cause "serious prejudice" to the interests of another WTO member (Akinci et al., 2008, p. 55).

[17] Withdrawals of free trade zone privileges have in the past given rise to a number of investor-State dispute actions, such as *Albacora S.A. v Republic of Ecuador*, PCA Case No 2016–11, and *Link-Trading Joint Stock Company v Department for Customs Control of the Republic of Moldova*.

zone tax regimes with those of the rest of the economy (Farole, 2011, pp. 178–179). Such integration should be orderly and gradual as well as predictable to minimize the risks of claims that may be brought by investors. One could also explore alternatives to fiscal incentives such as the enhancement of regulatory efficiency and greater emphasis on the business development service provided in the SEZ (Farole, 2011, pp. 178–179).

A simple tax regime and an efficient administration of the tax collection system in an SEZ would facilitate business activities and enhance the attractiveness of the SEZ as an investment location. Although tax rates offered in SEZs should be competitive in order to attract investment, SEZs should not be mistaken for tax heavens.

The Hong Kong SAR practises an independent taxation system separate from that of Mainland China and enacts its own laws on taxation. Under its tax regime, there are only three types of direct taxes, namely profits tax, salaries tax and property tax (Inland Revenue Ordinance (Cap. 112)). In the *Paying Taxes 2019* report prepared by the World Bank and PwC, the Hong Kong SAR was the top performer among the 190 economies in the overall ranking for ease of paying taxes. This high performance was attributed to the relative simplicity and stability of tax regulations as well as the digitalization of the entire tax work stream (World Bank and PwC, 2018, p. 15; 2019).

2.5. Efficient and liberal regulatory regime for business activities in SEZs

Given that SEZs play the dual role of attracting investments and experimenting with regulatory reforms, they should have an efficient and liberal regulatory regime and allow the broadest possible business activities (Gauthier, 2015, p. 13). The Hong Kong SAR follows the economic policies of free enterprise and free trade. There are no import tariffs save for excise duties levied on a limited number of commodities such as liquors and tobacco (Government of the Hong Kong Special Administrative Region, 2018a). Moreover, the Government of the Hong Kong SAR shall, under the Basic Law, formulate its own monetary and financial policies, safeguard the free operation of financial business and financial markets, and regulate and supervise them in accordance with law (Basic Law, art. 110).

As compared with the situation of Mainland China in which certain measures of foreign exchange control are in place and full capital account convertibility has yet been achieved, the Basic Law provides that no foreign exchange control policies shall be applied in the Hong Kong SAR and that the Hong Kong dollar shall be freely convertible (Basic Law, art. 112). In addition, the Government of the Hong Kong SAR shall safeguard the free flow of capital within, into and out of the special administrative region (Basic Law, art. 112). Indeed, this feature has allowed the

Hong Kong SAR to perform the role of a global offshore renminbi business hub (Hong Kong Monetary Authority, 2016) and contribute to the internationalization of the renminbi.

In the Hong Kong SAR,[18] there is neither general foreign investment legislation governing the admission of foreign investments nor a general screening mechanism for such admission (The Heritage Foundation, 2018, p. 215). Licensing requirements exist in some industries (CAITEC, 2014), such as banking (Banking Ordinance (Cap. 155)), insurance (Insurance Ordinance (Cap. 41)), broadcasting (Broadcasting Ordinance (Cap. 562)) and telecommunication (Telecommunications Ordinance (Cap. 106)). Furthermore, in most cases, foreign investors can maintain 100 per cent ownership of their investments in the Hong Kong SAR (The Heritage Foundation, 2018, p. 215).

Effective customs facilitation measures are also an important facet of the legal infrastructure of successful SEZs. Under the framework of the WTO, there is the Trade Facilitation Agreement (WTO, 2019b), which entered into force on 22 February 2017. The Agreement is concerned with the simplification of import and export processes. It contains provisions related to expeditious release and clearance of goods as well as simplification of customs formalities and documentation requirements (Trade and Industry Department, 2019b). The Hong Kong SAR has been the global forerunner in the expeditious movement and release of goods and was the first WTO member to formally accept the Trade Facilitation Agreement in December 2014 (WTO, 2019a).

With respect to the legal system under which businesses operate, a flexible yet predictable system of law is often considered to be more business friendly. As mentioned above, the Hong Kong SAR practises a common law-based legal system (Basic Law, arts. 8 and 18),[19] which differs from the civil law-based legal system applicable to the rest of China. This model of an SEZ adopting a common law-based system that is different from the one practised in other parts of the country concerned is also found in a number of SEZs, such as the Qatar Financial

[18] According to the report of the Heritage Foundation on its Index of Economic Freedom in 2019, the Hong Kong SAR ranked first among 180 economies in terms of economic freedom. The Hong Kong SAR has been ranked the world's freest economy for 25 consecutive years, since the Index was first published, in 1995.

[19] A common law system is often less prescriptive than a civil law system (providing for flexibility) and largely based on precedents, established by case law and follows the doctrine of judicial precedents (providing for predictability). However, it is by no means to say that a common law system is superior to that of civil law or other legal systems. Pejovic (2001) provides a useful comparison of common law and civil law systems and their respective advantages and limits.

Centre,[20] the Dubai International Financial Centre[21] and the Abu Dhabi Global Market in Dubai[22] as well as the Astana International Financial Centre in Kazakhstan.[23]

2.6. Linkages and integration with national and global initiatives

A very common pitfall in unsuccessful SEZ projects concerns the so-called "enclave syndrome": SEZs established as isolated economic enclaves that do not have sufficient linkages with the rest of the country (Norman, 2018; UNESCAP, 2017, p. 155). Such SEZs would be unlikely to have a catalytic impact in most economies due to their isolation from the wider economic strategies of the relevant countries (Farole, 2011, pp. 9 and 25).

In the Hong Kong SAR, an economic system that is different from Mainland China is practised under the policy of "One Country, Two Systems" (Basic Law, art. 5). Yet the Hong Kong SAR also enjoys close linkages with Mainland China, in particular in relation to economic development. One of the most significant is the Mainland and Hong Kong Closer Economic Partnership Arrangement (CEPA), which has very comprehensive coverage of trade in goods, trade in services, investment, and economic and technical cooperation (Trade and Industry Department, 2019a).

CEPA has been highly beneficial in strengthening the trade relationship in goods and services and fostering trade and investment between Mainland China and the Hong Kong SAR, as well as accelerating the economic integration and enhancing the long-term economic and trade development of both places (Trade and Industry Department, 2019a), thereby allowing the Hong Kong SAR to serve as a multilateral bridge or a springboard for inbound and outbound investments into or from Mainland China.

The Hong Kong SAR is also closely involved in various national initiatives such as the Belt and Road Initiative, as well as in the development of the Greater Bay Area (Government of the Hong Kong Special Administrative Region, 2018b, paras. 91–97). For the Belt and Road Initiative, a new model of trilateral cooperation featuring "Mainland China plus Hong Kong SAR plus a country along the Belt and Road" is being explored (OCMFA, 2017).

In today's interconnected world, new developments in technology and an enabling policy environment have allowed businesses to internationalize their operations across the globe in order to improve efficiency, lower costs and accelerate production

[20] See the website of the Qatar Financial Centre at http://www.qfc.qa/en/Pages/default.aspx.

[21] See the website of the Dubai International Financial Centre at https://www.difc.ae/.

[22] See the website of the Abu Dhabi Global Market of Dubai at https://www.adgm.com/.

[23] See the website of the Astana International Financial Centre of Kazakhstan at https://aifc.kz/.

(Fung, 2013, p. xix). As a result of the increasing connectivity and interdependence among different economies, it is important that SEZs are integrated not only with the rest of domestic economy but also with the global economy.

The Hong Kong SAR, acting under the general authorization of the Basic Law or the specific authorization of the Central People's Government of China, has been actively maintaining and developing relations with foreign States and regions, and has entered into a broad range of international agreements.[24] As of October 2019, the Hong Kong SAR has concluded six FTAs[25] and 21 investment promotion and protection agreements (IPPAs)[26] with foreign economies, and it is seeking further expansion of its network of trade and investment agreements to strengthen its economic connection with the rest of the world (Government of the Hong Kong Special Administrative Region, 2018b, paras. 82–85).

To craft a successful SEZ programme, policymakers should adopt an international mindset and pay close attention to the positioning of the SEZ in light of ongoing global initiatives. It is equally important to ensure that the policy design is compatible with international legal norms in relation to trade and investments, such as the principles of most-favoured-nation treatment and national treatment that are enshrined in the disciplines under the covered agreements of the WTO, such as the General Agreement on Tariffs and Trade 1994[27] and the General Agreement on Trade in Services, as well as under most international investment agreements.

3. Contemporary challenges and opportunities in the development of SEZs – Greater Bay Area and recent initiatives in the Hong Kong SAR

Designing a solid legal infrastructure of an SEZ is already a daunting task, yet SEZs themselves are also an evolving subject. Apart from their catalytic potential for international trade and investment, SEZs can serve as part of broader economic

[24] See e.g. arts. 96, 116, 133 and 151 of the Basic Law. For the list of bilateral international agreements of the Hong Kong SAR, please refer to the website of the Department of Justice of the Government of the Hong Kong SAR at https://www.doj.gov.hk/eng/laws/treaties.html.

[25] For the full list and the texts of the FTAs of the Hong Kong SAR, please refer to the website of the Trade and Industry Department of the Government of the Hong Kong SAR at https://www.tid.gov.hk/english/ita/fta/index.html.

[26] For the full list and the texts of the IPPAs of the Hong Kong SAR, please refer to the website of the Trade and Industry Department of the Government of the Hong Kong SAR at https://www.tid.gov.hk/english/ita/ippa/index.html.

[27] It should be noted that the principle of national treatment is also reflected in the disciplines of the Agreement on Trade-Related Investment Measures of the WTO, which govern the so-called "performance requirements".

reform strategies as well as laboratories for experimentation with innovative and forward-looking policies and regulatory practices (UNCTAD, 2019, p. 179).

There is currently a wide variety of SEZs, such as commercial free zones, export processing zones, single-unit free zones, wide-area SEZs (which operate similarly to cosmopolitan cities) and free trade ports.[28] Moreover, numerous new forms of SEZs continue to emerge (UNCTAD, 2018, p. 155).[29] For example, China Merchants Group, which is a Chinese State-owned corporation, has come up with the pioneering "Port-Park-City" (前港中區後城) model for SEZ development and sought to export such a model overseas on the basis of the very successful experience in Shekou of Shenzhen.[30]

To succeed in today's world, modern SEZs need to respond to contemporary challenges and opportunities arising from the changing global trade and investment environment (Cheng, 2019, pp. 56–66). In this regard, the Great Bay Area and some recent initiatives of the Hong Kong SAR may provide useful insights into how SEZ policymakers can respond to such challenges and opportunities.

3.1. Innovations in dispute resolution mechanisms

First, one must not overlook the fact that no matter how well an SEZ has been designed and operated, it is inevitable that for one reason or another, some of the investments in the SEZ may give rise to disputes between investors and between investors and the host government, as well as any other entities involved in the SEZ. On some occasions, even the establishment of an SEZ may give rise to disputes. A recent example is the high-profile legal dispute between a Djibouti port operator, which is a subsidiary of a global port operator owned by the United Arab Emirates,

[28] In China, President Xi Jinping mentioned that more powers will be granted to pilot free trade zones to conduct reform, and the establishment of free trade ports is to be explored (Xi, 2017). At the 40th year following the launch of China's economic reform in 1978, a plan was announced to explore the establishment of a free trade port with Chinese characteristics in Hainan, with reference to the experience of other well-established free trade ports in the world. Such a free trade port will move away from entrepôt trade, manufacturing and processing and focus on tourism, modern services industries and high-tech industries (Central Committee of the Communist Party of China and State Council of the People's Republic of China, 2018).

[29] On 16 October 2018, the State Council also published the overall plan for the development of the Hainan Pilot Free Trade Zone (State Council of the People's Republic of China, 2018).

[30] Under the "Port-Park-City" model, the "Park" element is concerned with the establishment of a free trade zone (Belt and Road Portal, 2019).

and the State of Djibouti, arising from the Djibouti International Free Trade Zone Project of the Djibouti Government and China Merchants Port Holdings.[31]

In light of the fact that different rules and regulatory approaches are adopted in SEZs as compared with the rest of the countries, a well-designed specialized dispute resolution mechanism for SEZs becomes even more important. Such specialized dispute resolution mechanism can, on one hand, ensure fair resolution of disputes and provide greater comfort for investors to make investments in the zones, and, on the other hand, prevent disputes in SEZs from being escalated to investor–State arbitration, which can result in substantial cost to the host jurisdictions (Dettoni, 2018).

The essential features of an effective specialized dispute resolution mechanism for SEZs are (i) clear and adequate scope of jurisdiction (Puig et al., 2017, pp. 689–690 and 700–703) and (ii) easy enforceability of judgments and arbitral awards delivered under such a mechanism outside the SEZs in the rest of the economy or in the other jurisdictions (Sharar et al., 2016, pp. 529–531 and 541).

The Hong Kong SAR has strived to fully capitalize on the unique arrangement under "One Country, Two Systems" to pursue the provision of effective, inclusive, efficient and affordable dispute resolution mechanisms for the benefit of all by way of various innovative initiatives.

On the international level, as the Hong Kong SAR is an inalienable part of China (Basic Law, art. 1), it is worth mentioning that the representatives of the Government of the Hong Kong SAR have, through the pioneering arrangement under the Basic Law, participated as members of the Chinese delegation in international organizations and conferences in appropriate fields limited to States (Basic Law, art. 152). In particular, the Judgments Project of the Hague Conference on Private International Law (HCCH), which has developed a new international convention (Judgments Convention) on the recognition and enforcement of foreign judgments in civil and commercial matters (HCCH, 2019), and Working Group III of the United Nations Commission on International Trade Law on the reform of investor–State dispute settlement (UNCITRAL, 2019), are two examples in which the Hong Kong SAR contributes to the international rule-making in dispute resolution under the aforesaid arrangement of the Basic Law.

[31] In the ruling by a tribunal of the London Court of International Arbitration, the State of Djibouti was held liable for being in breach of the Djibouti port operator's exclusivity rights under a concession agreement for a container terminal by pursuing the development of container port facilities with China Merchants Port Holdings (Jones et al., 2019). The parent company of that Djibouti port operator also brought a lawsuit in the High Court of the Hong Kong SAR against China Merchants Port for causing the Djibouti Government to revoke its exclusive right to run the port (South China Morning Post, 2019).

In the case of the Hong Kong SAR, whether before or after the resumption of the exercise of sovereignty by China on 1 July 1997, arbitral awards made within its jurisdiction can be enforced in all State parties to the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards.[32] Modelling on the regime under the New York Convention, the Hong Kong SAR has entered into two innovative arrangements, respectively with Mainland China and the Macao SAR, for reciprocal recognition and enforcement of arbitral awards.

Furthermore, in January 2019, taking reference from the Judgments Project of the HCCH, Mainland China and the Hong Kong SAR entered into a comprehensive arrangement on reciprocal recognition and enforcement of judgments in civil and commercial matters,[33] which will reduce the need for relitigation of the same disputes in both places and offer better protection of the disputing parties' interest.

In addition, in April 2019, Mainland China and the Hong Kong SAR entered into a ground-breaking arrangement concerning mutual assistance in court-ordered interim measures in aid of arbitral proceedings. This made the Hong Kong SAR the first and only jurisdiction outside Mainland China where, as a seat of arbitration, parties to arbitration proceedings administered by eligible arbitral institutions will be able to apply to the Mainland courts for interim measures.

To enhance the coordination and implementation of various initiatives on dispute avoidance and resolution, the Inclusive Dispute Avoidance and Resolution Office (IDAR Office) was established within the Department of Justice of the Hong Kong SAR to pursue and conclude cooperation or partnership arrangements with other jurisdictions and international organizations.[34] The IDAR Office strives to facilitate

[32] Prior to 1 July 1997, the United Kingdom had extended the application of the New York Convention to Hong Kong, with effect from 21 April 1977, by way of a notification to the Secretary-General of the United Nations (received on 21 January 1977). See https://treaties.un.org/doc/Publication/CN/1977/CN.27.1977-Eng.pdf. China is a Contracting Party to the New York Convention and ratified the Convention on 22 January 1987. On 6 June 1997, China made a notification to the Secretary-General of the United Nations that China would resume the exercise of sovereignty over Hong Kong on 1 July 1997, and the New York Convention thus applies to the Hong Kong SAR with effect from that date as well. See https://treaties.un.org/doc/Publication/CN/1997/CN.273.1997-Eng.pdf.

[33] This arrangement will supersede the previous Arrangement on Reciprocal Recognition and Enforcement of Judgments in Civil and Commercial Matters by the Courts of the Mainland and of the Hong Kong Special Administrative Region pursuant to the Choice of Court Agreements between Parties Concerned (also known as the Choice of Court Arrangement).

[34] For example, the Department of Justice of the Hong Kong SAR and the Ministry of Justice of Japan signed a Memorandum of Cooperation in January 2019 to strengthen their collaboration on issues relating to international arbitration and mediation. The Department of Justice of the Hong Kong SAR and the Ministry of Justice of Korea also signed a Memorandum of Cooperation in September 2019 to provide a framework for the Hong Kong SAR and Korea to strengthen communication, collaboration and co-operation on issues relating to dispute avoidance and resolution. On 5 May 2017, the High Court of the Hong Kong SAR and Abu Dhabi Global Market Courts signed a Memorandum of Guidance as to Enforcement.

access to justice and provide equal opportunities for people from all walks of life and for all sectors of the economy without boundary, advancing Goal 16 (Peace, Justice and Strong Institutions) of the United Nations 2030 Sustainable Development Goals in the Hong Kong SAR and beyond.

Innovation with respect to legal cooperation arrangements capitalizing on "One Country, Two Systems" in relation to dispute resolution will continue to enhance the role of the Hong Kong SAR as a legal hub and dispute resolution centre.

3.2. Creative use of modern technology

With respect to making greater use of modern technology in SEZs, the Government of the Hong Kong SAR has been very supportive of the development by non-governmental organizations of efficient and cost-effective online dispute resolution services and deal-making platforms, in order to enhance the use of LawTech in the Hong Kong SAR.[35] In particular, the non-governmental eBRAM Centre was established to develop an electronic business-related arbitration and mediation platform (eBRAM platform). The eBRAM platform is an internet-based online platform integrating state-of-the-art technologies such as neural machine learning on translation, artificial intelligence, the internet of things, blockchain and smart contracts, for facilitating the provision of a full spectrum of cross-border one-stop dispute resolution services ranging from negotiation, conciliation, mediation, to arbitration for enterprises worldwide (Department of Justice, 2019, pp. 3–4). The eBRAM Platform will also serve as a secure and user-friendly online platform to provide deal-making services.

3.3. Enhancing collaboration and partnership in the development of SEZs – the Greater Bay Area

In today's globalized world, collaboration and partnership are crucial to the development of SEZs. Goal 17 (Partnerships for the Goals) of the United Nations 2030 Sustainable Development Goals also places great emphasis on the revitalization of the global partnership for sustainable development.

[35] In the 2018 Policy Address, the Chief Executive of the Hong Kong SAR indicated support for funding the cost of non-governmental development of an e-arbitration and e-mediation platform so that the Hong Kong SAR will be able to provide efficient and cost-effective online dispute resolution services. On 27 February 2019, the Financial Secretary of the Hong Kong SAR announced that in the 2019-20 Budget HK$150 million will be provided for the development and initial operation of the online dispute resolution and deal making platform (Department of Justice, 2019).

Collaboration and partnership come in many forms. They may range from cooperation agreements between SEZs in different countries to the joint development of an SEZ by different governments. In this regard, the Greater Bay Area[36] sheds light on a new paradigm in the collaborative development of SEZs.

The Greater Bay Area consists of the Hong Kong SAR, the Macao Special Administrative Region (Macao SAR) and nine Pearl River Delta municipalities in Guangdong Province.[37] Similar to the situation in respect of collaboration among SEZs located in different jurisdictions, a unique challenge to the Great Bay Area is that it involves one country, two systems, three customs territories, three currencies and three legal jurisdictions. Given the differences in legal systems, social systems and regulatory policies practised in the Hong Kong SAR, the Macao SAR and the nine Pearl River Delta municipalities, innovative measures are necessary for fostering the flow of people, goods, capital and information.[38]

The Greater Bay Area, which is a key national strategy, aims at further deepening cooperation among Guangdong, the Hong Kong SAR and the Macao SAR, fully leveraging the composite advantages of these three places, facilitating in-depth

[36] On 1 July, 2017, witnessed by President Xi Jinping, the National Development and Reform Commission and the Governments of Guangdong, the Hong Kong SAR and the Macao SAR signed the Framework Agreement on Deepening Guangdong–Hong Kong–Macao Cooperation in the Development of the Greater Bay Area in Hong Kong (深化粵港澳合作推進大灣區建設框架協議). On 18 February, 2019, the Outline Development Plan for the Guangdong–Hong Kong–Macao Greater Bay Area (粵港澳大灣區發展規劃綱要) was promulgated and signified a new milestone in the development of the Greater Bay Area.

[37] The Greater Bay Area covers an area of 56,000 square kilometres with a combined population of approximately 70 million at the end of 2017. The nine Pearl River Delta municipalities are those of Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing in Guangdong Province (Outline Development Plan, p. 1).

[38] On 1 March 2019, eight policy measures were promulgated for taking forward the development of the Greater Bay Area to facilitate Hong Kong residents to develop, work and reside in the Mainland cities of the Greater Bay Area, as well as strengthen the convenient flow of people and goods within the Greater Bay Area. The policy measures include: (i) clarifying the method for calculating the 183 days that trigger payment of individual income tax on the Mainland: any stay of less than 24 hours on the Mainland will not count as a day of presence; (ii) providing tax relief by municipal governments to non-Mainland (including Hong Kong) high-end talents and talents in short supply by offsetting the tax differential between the two places; (iii) supporting the open recruitment of Hong Kong and Macao residents by public institutions in the Greater Bay Area; (iv) encouraging innovation and entrepreneurship in the nine Mainland cities of the Greater Bay Area by the youth of the Hong Kong SAR and the Macao SAR; (v) supporting higher education institutions and scientific research institutes from the Hong Kong SAR and the Macao SAR in participating in projects under Guangdong technology programmes; (vi) introducing pilot schemes of immigration facilitation reform in the Greater Bay Area; (vii) facilitating the entry and exit of vehicles from the Hong Kong SAR and the Macao SAR at Mainland ports; and (viii) expanding the scope of implementation of connection to the Speedy Customs Clearance mechanism between Customs administrations. Other major facilitation policies and measures for the Greater Bay Area can be found on the website of the Constitutional and Mainland Affairs Bureau of the Government of the Hong Kong SAR, at https://www.bayarea.gov.hk/en/facilitation/measures.html.

integration within the region and promoting coordinated regional economic development, with a view to developing an international bay area (Outline Development Plan, p. 1). One of the six principles of the Greater Bay Area is to adhere to "One Country, Two Systems" and act in accordance with the law.[39]

The Greater Bay Area is instructive for the legal infrastructure design of SEZs because, apart from the Hong Kong SAR and the Macao SAR, the Greater Bay Area also encompasses a number of SEZs of Mainland China, such as Shenzhen (including Qianhai Shenzhen–the Hong Kong Modern Service Industry Cooperation Zone) and Zhuhai (including the Hengqin Free Trade Zone). In particular, "early and pilot implementation" (先行先試) of reform and opening-up is part of the guiding ideology in the development of the Greater Bay Area (Outline Development Plan, p. 6). This provides a valuable platform for experimenting with the specialization and synergy creation of SEZs. For example, the Hong Kong SAR, one of the four core cities in the Greater Bay Area, is positioned as the centre for international legal and dispute resolution services. This positioning allows the Hong Kong SAR to leverage its experience and expertise in dispute resolution and the legal profession to handle disputes and address the demand for high-quality legal services in the Greater Bay Area.[40] As for the other three core cities in the Greater Bay Area, the Macao SAR is positioned as a tourism and leisure centre, while Guangzhou and Shenzhen are respectively positioned as an integrated gateway city and a national innovation city (Outline Development Plan, p. 12). This arrangement allows the cities to specialize on the basis of their respective strengths, to complement each other to create synergy and to avoid unnecessary competition among them. For example, the Hong Kong SAR can "export" its legal and professional talents and services to other places in the Greater Bay Area and provide a platform for resolution of disputes in the Greater Bay Area. In fact, the Department of Justice of the Hong Kong SAR and the legal departments of Guangdong and the Macao SAR have established, in September 2019, a joint conference mechanism to discuss work progress on

[39] The other five basic principles in the development of the Greater Bay Area are (i) to be driven by innovation and led by reform; (ii) to coordinate development and plan holistically; (iii) to pursue green development and ecological conservation; (iv) to open up and cooperate and achieve a win-win outcome; and (v) to share the benefits of development and improve people's livelihood (Outline Development Plan, pp. 6–8).

[40] Under the Outline Development Plan for the Guangdong–Hong Kong–Macao Greater Bay Area, an objective is to consolidate and enhance the Hong Kong SAR's status as an international financial, transportation and trade centre as well as an international aviation hub; strengthen its status as a global offshore renminbi business hub and its role as both an international asset management centre and a risk management centre; promote the development of high-end and high value added financial, commercial and trading, logistics and professional services, etc.; make great efforts to develop the innovation and technology industries; nurture emerging industries; establish itself as the centre for international legal and dispute resolution services in the Asia-Pacific region; and develop into an international metropolis with enhanced competitiveness (Outline Development Plan, pp. 11–12).

specific proposals, such as the establishment and implementation of a mediation platform in the Greater Bay Area, and research priorities on strengthening legal exchanges and collaboration, in accordance with the guiding directions set out in the Outline Development Plan for the Greater Bay Area.

4. Conclusions and policy implications – from SEZs to the new paradigm of special economic region

Despite the very long history and widespread use of SEZs in the world, the establishment of an SEZ does not necessarily guarantee success in boosting trade and investment. The performance of SEZs has so far been mixed (Zeng, 2015, p. 2), and many have not performed well for reasons such as poor site location, uncompetitive policies and lack of differentiation, poor zone development practices, cumbersome procedures and controls, and poorly designed administrative structure (Akinci et al., 2008, pp. 50–51). At the same time, there is no shortage of examples of SEZs that have proven to be highly successful in attracting foreign direct investment and supporting broader economic reform strategies of the host country.

This article highlights for policymakers that a well-designed legal infrastructure is essential to the successful development of an SEZ. In this regard, referring to the unprecedented and unique "One Country, Two Systems" policy and the experience of the Hong Kong SAR, it suggests that important features of a well-designed legal infrastructure of an SEZ are (i) key principles and polices that emphasize free trade and the protection of property rights; (ii) a solid institutional framework that can facilitate collaboration and coordination among the key actors of an SEZ and accommodate partnerships between public and private parties; (iii) good governance and strong rule of law supported by a robust legal and judicial system; (iv) policy incentives that aim to attract long-term, sustainable and profitable investments, and a simple and efficient tax regime; and (v) a liberal and efficient regulatory regime for business activities.

Furthermore, it underscores that policymakers should ensure an SEZ is linked with, and integrated into, national and global initiatives and should avoid the pitfall of turning an SEZ into an isolated economic enclave. Moreover, in light of the interconnectedness of today's world, it is of paramount importance for the policies and practices in an SEZ to align with international legal norms in relation to trade and investments as enshrined in the rules of the WTO, FTAs and international investment agreements.

This article also provides some thoughts on how policymakers can address and capitalize on the contemporary challenges and opportunities in relation to

development of modern SEZs, with reference to recent initiatives of the Hong Kong SAR in respect of innovations in dispute resolution mechanisms and creative use of modern technology. In particular, it draws the attention of policymakers to the Greater Bay Area, which provides a valuable and timely opportunity to experiment with innovative policies, on the basis of "early and pilot implementation", to facilitate the flow of people, goods, capital and information across places with different legal, economic and social systems as well as policy coordination among such places.

While the development of the Greater Bay Area is a national initiative of China, it is worth considering whether the Greater Bay Area model can be applied to collaboration efforts of SEZs in different countries for the establishment of a greater special economic region (SER). Much research will need to be conducted on the establishment of such greater SERs. Perhaps a new form of SEZ treaty or new best practice can be created to facilitate the implementation of such an arrangement. In this regard, the experience of the Hong Kong SAR – with respect to its legal infrastructure design, including its unique regime and status for entering into arrangements with foreign States and Mainland China – may shed light on how standalone SEZs can serve as the building blocks for the eventual establishment of a new paradigm of greater special economic region.

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Investment in agriculture and gender equality in developing countries

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Across developing countries, the agricultural sector is an essential source of economic growth, employment, poverty reduction and food security. Women play a vital role in agriculture, yet there is little research focusing on the impact of rising investment in the agricultural sector on the role of women in this sector and on gender equality. Many investors tend to be located in remote areas and have an impact on the life of the most vulnerable farmers, especially when few alternative employment opportunities exist. In this article, we present the role of women in agriculture and we explore the impact of large agricultural investment on gender equality in developing countries. Given the data limitations, we rely on both primary and secondary data, and provide examples of gender-sensitive practice carried out by the private sector to minimize the risk of leaving women behind. The article concludes with suggestions for corporate actions and government policies and maps out avenues for future research.

Keywords: gender equality, agriculture, developing countries, multinational companies, large-scale agricultural investment

1. Introduction

Across developing countries, the agricultural sector is an essential source of economic growth, employment, poverty reduction and food security. Because women play a vital role in agriculture, neglecting gender issues in agriculture can be costly, socially and economically. Strengthening the role of women in agriculture could boost agricultural productivity and income, and closing the gender gap by ensuring gender equality in access to productive resources would raise agricultural output in developing countries and help reduce hunger.

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Agriculture and women's empowerment are central to the new Sustainable Development Goals. To achieve these ambitious goals, the level of investment (public and private) will need to be raised. One source of investment in developing countries is foreign direct investment (FDI), and FDI in agriculture has increased over the past decades. Under the right conditions, transnational corporations (TNCs) can contribute by increasing agricultural production, and their activities' impact on women in a variety of ways.

The role of women in agriculture is widely documented, yet scant attention has been given to large-scale (foreign and local) investment and its impact on gender equality and women's empowerment in developing countries, nor to the means to enhance the potential benefits for women of such investment. Similarly, there has been little research on whether agricultural investors in developing countries integrate gender equality in their strategies and employment policies.

To fill this gap, this article aims to first explore ways through which investment in agriculture affects gender equality and women's empowerment in developing countries, and second to present preliminary guidelines and actions for governments and investors.

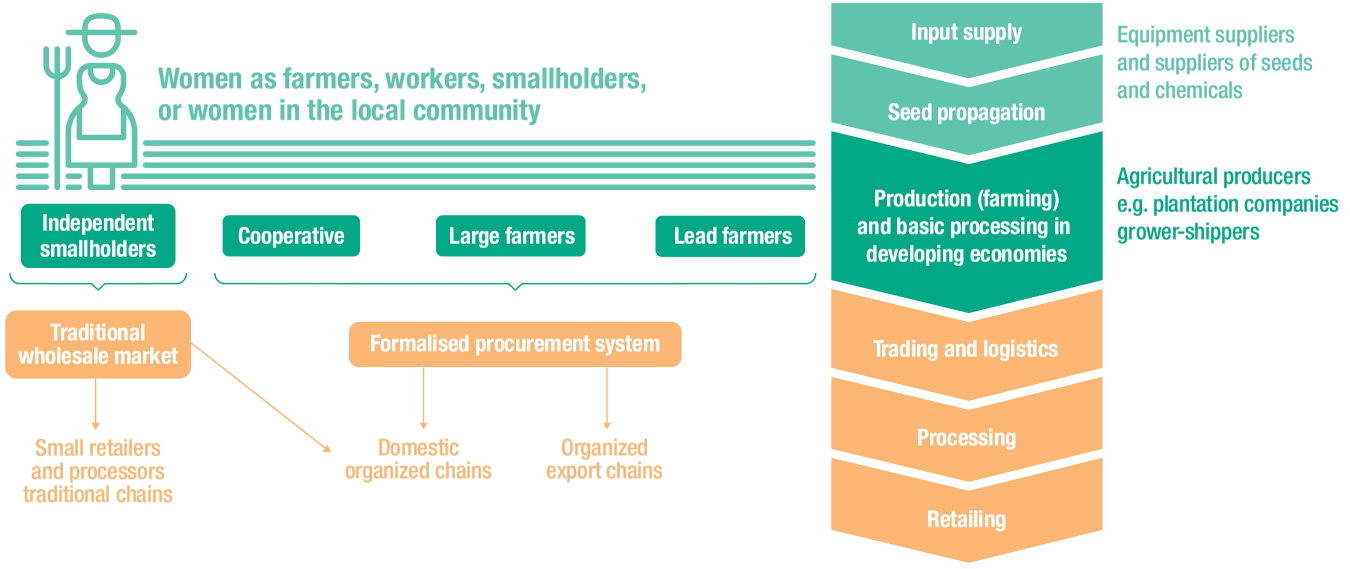
The focus of this article is on the food production and light processing segment of the agribusiness global value chains (see figure 1), where women's employment in developing-country agriculture is typically found (García, 2006). Women are employed as paid or unpaid workers on farms, and work as subsistence farmers or as entrepreneurs (e.g. as smallholders).

The analysis in this paper concentrates on the direct and indirect impact of large-scale (mostly foreign and domestic) investment on women involved in the sector in a variety of ways such as agricultural workers, farmers, smallholders and women in the local community.

> *"If women had the same access to productive resources as men, they could increase yields on their farms by 20–30 per cent. This could raise total agricultural output in developing countries by 2.5–4 per cent, which could, in turn, reduce the number of hungry people in the world by 12–17 per cent".*[1]

[1] (FAO, 2011a) The State of Food and Agriculture 2010–2011.

Figure 1. A typical agribusiness global value chain: position of women in the food-producing segments in developing countries



Source: Adapted from UNCTAD (2009:107) and FAO, IFAD & ILO (2011).

The article begins with a review of the role of women in agriculture in developing countries, before exploring recent investment trends in agriculture and the impact of large-scale investment in agriculture on gender equality. Selected corporate and government policy actions are put forward in the conclusions, and options for future research are mapped out.

2. The role of women in agriculture: opportunities and challenges

Employment of women in agriculture across developing countries presents a number of key common features.

- *The share of women employed in agriculture is high*. Globally, slightly more than one-quarter of women who have employment in the formal sector work in agriculture (27.6 per cent compared with 55.4 per cent in services; ILO, 2019). However, the regional distribution shows that, in developing countries – and especially least developed countries – women are predominantly employed in agriculture. In Sub-Saharan Africa, the share of women employed in agriculture is 55.1 per cent. This share reaches 58.5 per cent in Southern Asia.
- *Women's formal employment in agriculture is highest in certain sectors (such as export-oriented sectors or traditional sectors such as the flower, tea and aquaculture sector)*. Women represent half or more of employees in export-oriented, high-value agriculture in countries such as Chile, Ecuador, Guatemala, Kenya, India and South Africa. For instance, the female workforce represents between 60 and 80 per cent of the workforce in the flower industry of Colombia. In Senegal, women are found in modern horticulture segments such as French beans and tomatoes. Artichoke production and processing in Peru generates significant employment opportunities for women. In Brazil, 90 per cent of poultry workers are women (FAO/IFAD/ILO, 2010). In India, women comprise the majority of the labour force in cereal production (Slathia, 2015). Aquaculture is a highly female-dominated sector in India, Viet Nam, and Thailand (Kruijssen et al., 2018). In Central Asian countries, women are mainly responsible for activities such as livestock grazing, mixed cropping, horticulture, olive farming and household food production.
- *A significant share of agricultural employment is informal and/or unpaid, and the share of women in the informal sector, including subsistence agriculture, tends to be high.* In Africa, a large share of women active in the agricultural sector are informally employed (ILO, 2018). In Brazil, for example, the proportion of female agricultural workers in the informal labour market

remains high (69.7 per cent in 2007) despite a 21 per cent decline since 1992 (De Figueiredo & Branchi, 2009). Key challenges experienced by women employed in the informal sector include low or no pay, work instability and lack of benefits such as state protection.

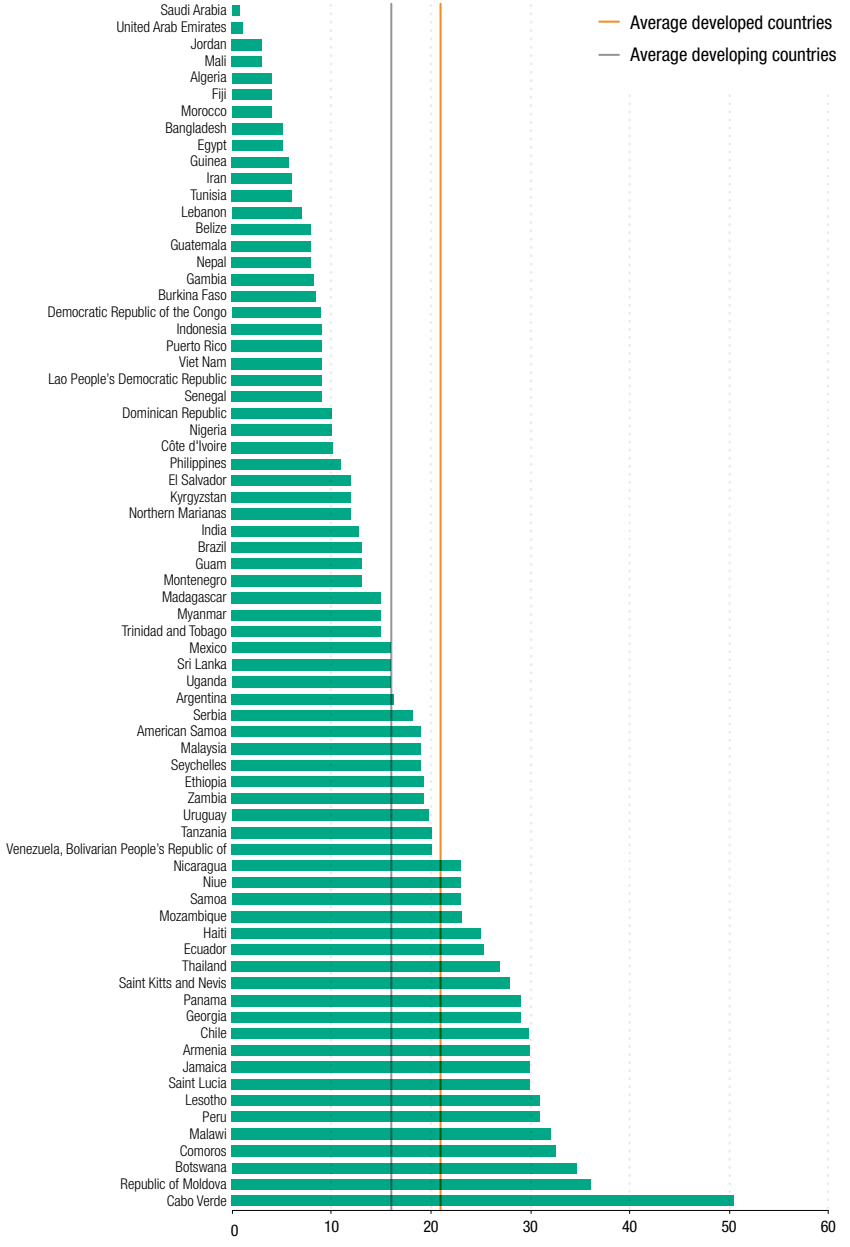
- *Wage employment in agriculture has a positive impact on women, but female workers tend to be paid less than male workers, and wages tend to be low, especially if the competitiveness of the sector is based on price efficiency* (which tends to be the case for global value chains in fruits, vegetables and fisheries, as well as traditional export commodities such as coffee, cotton and cocoa). In Africa, the rural agricultural wage gap between women and men is estimated to be between 15 and 60 per cent depending on the country and subsector (Shimeles et al., 2018). Similar results have been found in other studies (Oduol et al., 2017). Women's employment in agriculture is also linked to non-economic challenges such as unsafe working environments or the impact of repeated physical activities. Women may suffer from health problems associated with manual labour (Smalley, 2013). A study conducted by FAO in 11 agricultural investments in six developing countries found that women participating in out-grower schemes saw little improvement in their capacity to access, manage and make decisions over their own income (FAO, 2018b).
- *Women are often found in vulnerable employment.* Data on vulnerable employment in agriculture (own-account workers and unpaid contributing family workers) are not readily available. Estimates suggest that more than half of rural employment in Sub-Saharan Africa consists of self-employed farmers, many of whom are women. Women often work as contributing family workers and men as own-account workers (Adeniyi, 2010), which means women often do not have permanent contracts. In Uganda, the average ratio of women with casual contracts in coffee production in comparison to men is four to one (UNDP, 2013). Therefore, a key challenge for women is to shift from being "invisible workers" to being "agricultural workers".
- *Women are underrepresented in higher value-added tasks and activities, which limits their ability to capture benefits along the value chain.* Women are generally underrepresented in company management, in smallholder associations and in company boards. For instance, studies have shown that women constitute only 29 per cent of membership and 9 per cent of management in agricultural cooperatives in Kenya; in Ethiopia, only 2 per cent of women (as opposed to 13 per cent of men) are members of agricultural cooperatives, and men are five times more likely than women to hold a leadership position within a cooperative (Chan, 2010). In Ghana, only about 38 per cent of women involved in cocoa farming are members of an

association and hold leadership positions (Shimeles et al., 2018). Likewise, in Mozambique and Zimbabwe, although women account for a high share of all employees in aquaculture, their employment is primarily concentrated in packaging and/or processing tasks. Few women employees work as managers and/or technicians (FAO, 2016). Women's limited participation in decision-making means they tend to be unrepresented in group decisions that affect their working conditions.

Across developing countries, women face a number of constraints and challenges in agriculture. Some challenges are due to the type of employment in which they find themselves (e.g. low protection and little or no prospect for up-skilling), and others to the barriers women face in running their own farms. High entry barriers for women result from their limited access to land (for instance, in some countries tenure rules excludes women, which means women have no access to land title and no security of tenure) and non-land agricultural inputs (eg unequal access to crops, especially more lucrative cash crops) (Quisumbing et al., 2014). In the developing countries for which data are available, on average, 16 per cent of all landholders are women in comparison to 21 per cent in developed economies (see figure 2). Women are less likely to operate land and have access to rented land, and when they do, the farms they operate tend to be smaller than those operated by men and the land is often of poorer quality (Sraboni et al., 2014; Barrientos, 2019).

Women also have more restricted access to services, markets and market information (including information on export trading) and to bank credits, leading to lower land productivity (UNIDO, 2013). For instance, in Africa, women receive only 7 per cent of extension services and access less than 10 per cent of agricultural credit offered to small-scale farmers (ILO, 2009). In Ethiopia, women sell small amounts of haricot bean – up to 20 kg – per season while men sell between 100 to 160 kg (Aregu et al., 2010). In addition, limited access to fertilizers or new technologies for women farmers and the lack of gender balance among agricultural scientists means women's specific needs in agriculture are less likely to be heard (see figure 3). Additional constraints can arise from local cultural norms; for instance, women can face restrictions in their mobility and ability to engage in trading through a lack of available funds or there may be safety concerns in women travelling distances on their own. According to the World Bank Business and the Law Report (2018), 16 of the 187 countries analysed have legal restrictions on women travelling outside their home in the same way as men.

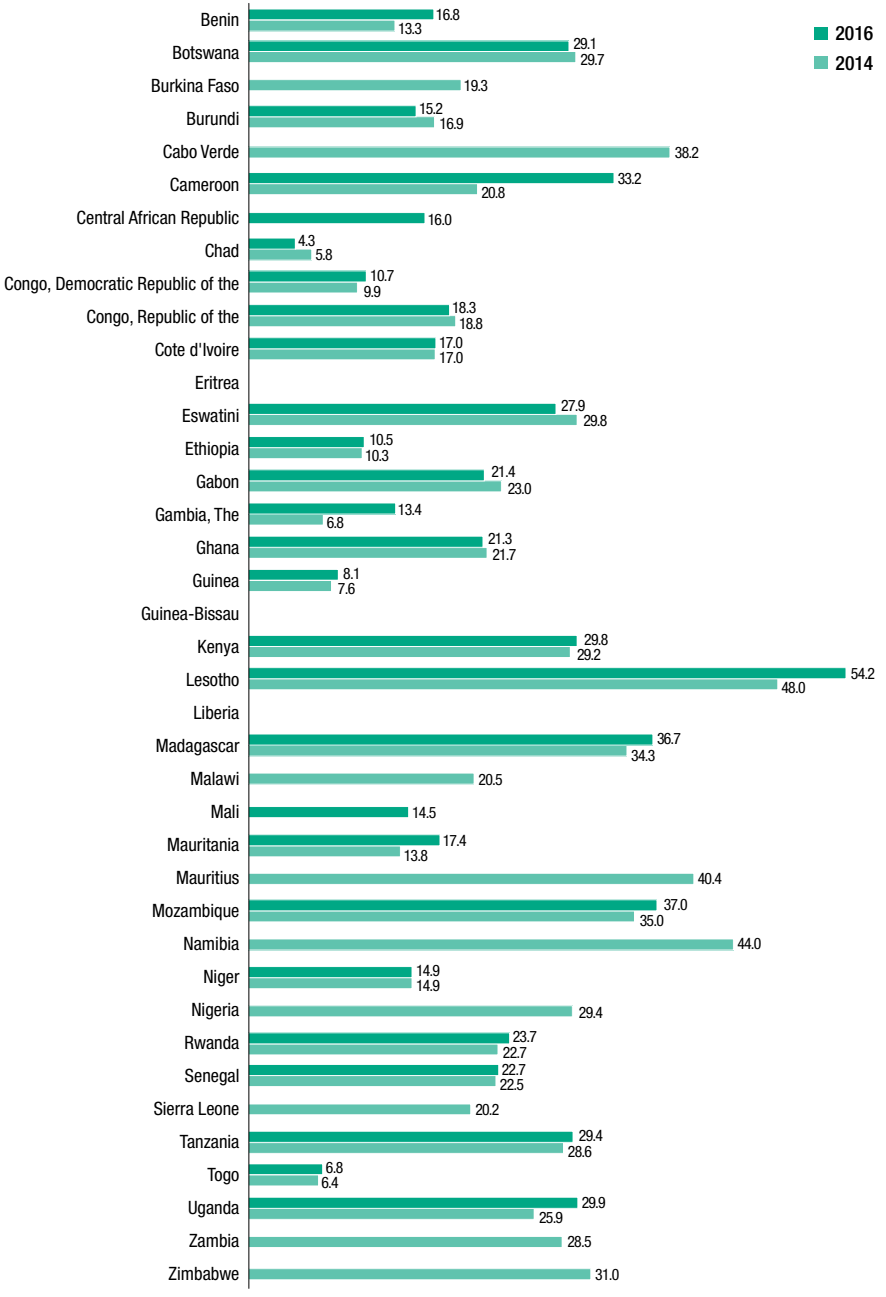
Figure 2. Unequal access to land: share of women agricultural landholders in selected developing countries (Per cent of total)



Source: Authors' calculations, based on data extracted from http://www.fao.org/gender-landrights-database/data-map/statistics/en/ on 20 April 2019.

Note: The graph includes data for 102 countries: 66 developing, 30 developed and 6 transition economies. The year for which the data are available varies by country. The UNCTAD classification of developing countries (as opposed to transition and developed) is used. For further information, please refer to the FAO Gender Land Rights Database.

Figure 3. Inequality in innovation: share of women agricultural researchers in Africa, selected countries, 2008–2011 (Per cent)



Source: Authors' calculations, based on data extracted from https://asti.cgiar.org/on 20 April 2019 from the Agricultural Science and Technology Indicators.

3. Investment in agriculture

In this section, the past and current trends of investment in agriculture are presented to better understand the role played by foreign firms in the food production and light processing segment of agricultural value chains.

- *Investment in agriculture in developing countries has increased sharply over the past decade.* Key factors driving this increase include rising commodity prices, the strategic concerns of food-importing countries and various commercial opportunities in agriculture. Traditionally, investment in agriculture is mainly conducted by agribusiness enterprises, domestic and foreign; state-owned enterprises; sovereign wealth funds; and private equity. Other investment funds also invest in the sector (although there is a high degree of uncertainty on scale, source of investment and geographic scope) (UNCTAD, 2009; Zhan et al., 2015). As South-South cooperation strengthens, different investment patterns emerge. New investors, including from China, have scaled up agricultural FDI in developing countries (Jiang et al., 2019).
- *Further increases in agricultural investments, and investments with more strategic plans with respect to social and environmental well-being, are needed in order to meet the SDGs.* UNCTAD estimates that annual global investment in food security and agriculture in developing countries currently stands at around $220 billion per year. However, total investment needs (UNCTAD, 2014: 143)[2] are about $480 billion per year, implying an annual gap of some $260 billion over and above the current level. The corporate sector contribution in the agricultural sector as a whole is already high at 75 per cent in developing countries and is likely to rise in the future (as is the case in developed countries).
- *Investors are more aware of responsible investment frameworks and voluntary sustainable standards.* Responsible investment frameworks can be defined as "voluntary guidelines and principles to promote responsible investment in agriculture among government actors, private sector investors, international organizations and civil society", and voluntary sustainable standards are "typically adopted by producer organizations and by companies that produce commodities for import and export" (Sexsmith, 2017). Most standards and guidelines identify gender equality as an important element and are aligned with international efforts and commitments to improve gender equality. Examples include the Food and Agriculture Business Principles (UN Global

[2] Investment needs in this area refer to the FAO's "zero hunger target" and primarily covers investment in relevant agriculture areas such as agriculture-specific infrastructure, natural resource development, research and food safety nets, which are all a part of the relevant SDGs.

Compact, 2013), UNCTAD/World Bank/FAO/IFAD Principles for Responsible Agricultural Investment (PRAI), and the OECD-FAO Guidance for Responsible Agricultural Supply Chains, among others.

- *Investment in basic agricultural infrastructure and institutions also needs to rise.* According to the FAO, levels of public and private investment in basic agricultural infrastructure (rural roads, irrigation schemes, storage and marketing chains) have declined and are often not in line with changing market demands. For this reason, "renewed but smarter investment in modern agriculture is seen as a vital component of global recovery to give more overall stability in food supply" (FAO, 2011a: 7). Global investment in land and water management will also need to increase. Gross investment requirements between 2007 and 2050 for irrigation development and management are estimated at almost $1 trillion. Land protection and development, soil conservation and flood control will require about $160 billion (FAO, 2011a: 13).

- *Foreign investment in agriculture is an important source of investment in some developing countries, especially least developed countries*. Worldwide, UNCTAD's data show that FDI inflows in agriculture, forestry and fishing have increased from $0.6 billion in 1990 to $1.4 billion in 2000 and $1.6 billion in 2005, before peaking in 2008 at $7.3 billion; it remained high in 2012 at $6.8 billion. In 2012, the share of agriculture in total inward FDI stock was 0.7 per cent in Africa and 1.6 per cent in Latin America and the Caribbean. However, this share varies greatly and can be significant for some countries; for instance, it stood at 14.2 per cent for Cambodia and 6.7 per cent for Viet Nam. FDI stocks in agriculture are also high in some cases; in 2012, those were $1.1 billion for Cambodia, $3.8 billion for Malaysia and $3.8 billion for Viet Nam (all of which are probably underestimates) (Zhan et al., 2015). A survey of investment promotion agencies showed that for Asia, agriculture is among the top three most promising sectors in terms of investment prospects (UNCTAD, 2014b). Agriculture is the second most targeted sector in terms of investment incentives offered by host economies.

FDI can have both positive and negative impacts on host developing countries, depending on the type of investment. In its *World Investment Report 2009*, UNCTAD shows that foreign investment in agriculture has both macro- and micro-economic impacts on host countries. These impacts cover overall agricultural production capacity, export propensity and access to global markets, technology transfer and acquisition, upgrading along the value chain, overall employment, local skills and upgrading potential. Social and environmental impacts pertain to potential changes in social and cultural mores, for instance in local communities and the effect of the investment on natural resources such as land use (Zaehringer et al., 2018), as well as environmental effects due to the use of chemicals or fertilizers, access and

use of water, etc. In the following section, we present the results of primary and secondary data analysis exploring the impact of investment and TNC activities in the agricultural sector of developing countries on women and gender equality.

4. Large-scale investment in agriculture: impact on gender equality

To assess the economic and social impacts of large-scale investment on gender equality in developing countries, we present data collected during a project led by UNCTAD and the World Bank on *The Practice of Responsible Investment Principles in Larger-Scale Agricultural Investment: Implications for Corporate Performance and Impact on Local Communities* (Mirza et al., 2014; Speller et al., 2017). The first report details the results of research examining 39 mature agribusiness investments in Africa and Southeast Asia. The objective of the research was to investigate the economic, social and environmental impact of large-scale investments in the host country.

As part of a follow-up study (Speller et al., 2017), a number of survey questions were added on the role of women in these large-scale investments – namely questions on the investors' employment opportunities and practice and their impact on women directly and indirectly, as well as questions on the potential impact on women in the community. Researchers visited eight operations in four countries – Cambodia, Ethiopia, Mozambique and Tanzania – conducting a total of 113 detailed, in-depth interviews with 349 stakeholders, primarily from communities in which the operations were based. This information is presented in this article, together with results from other studies, particularly on the role of foreign investors in developing countries. The distinction between economic and social impacts (UNCTAD, 2009) within the structure provided by a typical agricultural value chain (see figure 1) is used here as a basis for discussion.

Large-scale investments in agriculture have an economic impact on women stakeholders, notably through their direct employment on the farm, value chain participation and local farms' development, technology transfer and skills development, opportunities and challenges for decent employment creation and income generation, changes in land access, use and control of own financial resources.

- *The most frequently mentioned benefit for women of large-scale investment is employment generation.* Women represent up to 50 per cent of the workforce in the investments surveyed. The proportion of women for whom working for the investor is their first employment is much larger than for men (81 per cent versus 19 per cent; see figure 4). This is particularly true in

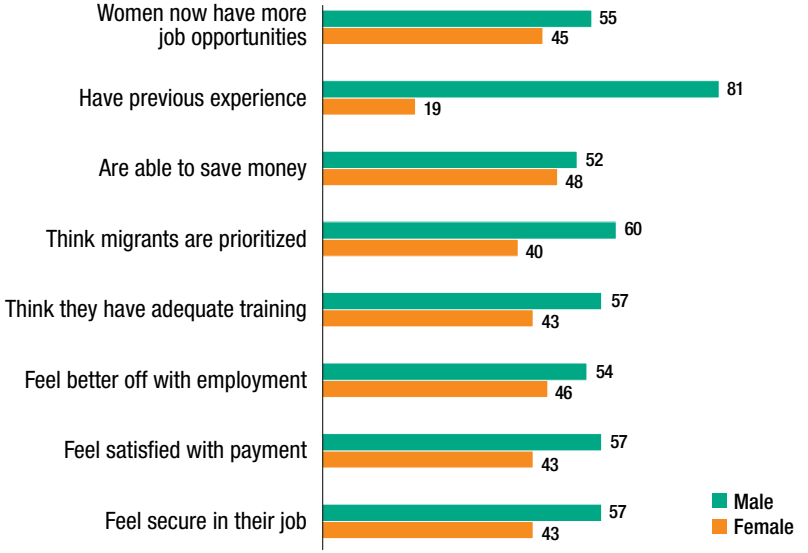
the case of investment in remote areas where the local community had little employment prospect prior to the arrival of the investor, because of limited education and lack of technical expertise. One interviewee mentioned, "The possibility of women getting employment, especially for those who are from the local community was very unlikely before the investment", and another, "The prospects for women have improved. In the past, it was more difficult for women in Tanzania to get formal employment. It still depends on the type of work and whether women are discriminated against in the company". Employment of women is often facilitated by the fact that some investors offer transportation services, accommodation and cooking facilities on the farm, although the quality of such provisions can vary and labour-related compliance and control deserve further research.

- *However, female employment tends to be seasonal or temporary, and the type of employment created for women is often confined to lower-paid and unskilled jobs, especially field workers.* Overall, fewer women (than men) feel they have job security and opportunities for training, and women tend to be less satisfied with their wage. On one maize plantation in Ethiopia, 70 per cent of daily workers were women; they performed lower skilled manual tasks such as seeding, watering, weeding and harvesting. Interviewees in other agricultural investments indicated that some jobs were perceived to be gendered. One mentioned, "The flower farm is considered as a women job". In some contexts, this can create divisions within the community by contravening gender norms: e.g. "It is easier for women to get a job on the farm, but many do not receive the support of their families and spouses".

- *Selected actions by the investor can facilitate women's employment and ease access for women to higher value-added tasks.* With regard to facilitating women's employment, interviewees' suggestions include adapting working hours (so that women can both work and carry out household and childcare responsibilities); sharing workloads (e.g. a mixed team of some women with children and some single women) to ensure a good job distribution among employees; providing training on discrimination against women and sexual harassment; and establishing gender networks to share experiences and to identify role models. Some investors have set up systems to encourage women in higher value-added activities. For instance, in one business venture in Tanzania, some skilled women hold senior positions. To overcome the gender gap in higher-paid and managerial positions, some investors are establishing preferential training and internal promotion programmes. Another investor in Ethiopia has provided incentives for women's employment by preferential incentives (e.g. lower entry requirements). Assessing the programme, one interviewee mentioned that "the company policy of affirmative action has so far failed to produce a large number of female supervisors and middle

managers". Reasons identified included women's lack of networks and access to information (e.g. men preparing collectively). In some investments, both male and female employees feel such initiatives may have an adverse impact on perceptions of women in the workplace.

Figure 4. Perceptions of employment and related conditions in large-scale agricultural investment, by gender (Per cent)



Source: UNCTAD-World Bank Survey of Responsible Agricultural Investment Database.

Note: A total of 39 employees answered these questions (23 male and 16 female). The total number of answers by sub-question varies.

- *Women smallholders can also benefit from the activities of the investor.* One investor in Tanzania mentioned that the number of women farmers it is dealing with is increasing, and so is their number and voice within the local farmers association (in this case women farmers accounted for less than one-fifth of all farmers in the association, but their number has increased rapidly). Because large investors benefit from accumulated knowledge and experience of operating in other markets, and often have established access to global markets, their business links with local smallholder farmers can be instrumental in upgrading the skills and capacity of local farmers, including women smallholders. Overall, benefits were found to be raised when the investor had developed dedicated schemes for outgrowers.
- *Only a very small percentage of outgrowers overall are women*. Benefits were found to be raised when the investor had developed dedicated schemes

for outgrowers, yet few are women (in the first UNCTAD/World Bank study, only 1.5 per cent of outgrowers were women). This can be explained by a number of factors. Land access remains a barrier for some women, as does the registration procedure and fee. Compared with men (who would grow crops for trade), women more often grow household food supplies. Thus, the promotion and design of inclusive models and policies by investors alone cannot redress gender inequality in outgrowing activity.

Improved access to markets for female farmers: On one of the rubber plantations visited, there was a market stall where women could sell the surplus food crops they grow. Because access to this stall had proved difficult, the company developed a number of stalls in central places around the plantation to facilitate access for growers and workers to buy and sell produce. The provision of business training to women linked to the plantation has also been identified as a useful way forward to support women.[3]

Large-scale investments also have a societal impact on women living in and around the investment. Women have often been empowered by the direct and indirect consequences of investments, including changes in intra-household decision-making and resource control, or more generally, access to investment-related infrastructure development and provision of social goods. Working for the investor is transforming the lives of women as well as those of their families and children. One interviewee mentioned, "For many women, this was their first job experience and it gave them a chance to know what it feels like. Working has minimized the level of domestic and farm-related work burden these women used to shoulder." This has a demonstration effect, as women can show their potential to the local community.

A related impact is women's rising contribution to household budgets, with positive spillovers in terms of their personal development, their spending in the local community and related benefits for their children's health, nutrition and education. Notably, almost half of women employed on farms mention they can now save (see figure 4). A number of investors facilitate access to health services on the farm. In the case of one investor in Ethiopia, mothers from the surrounding community can use the clinic for child delivery and, if needed, they can use the ambulance service of the farm for free.

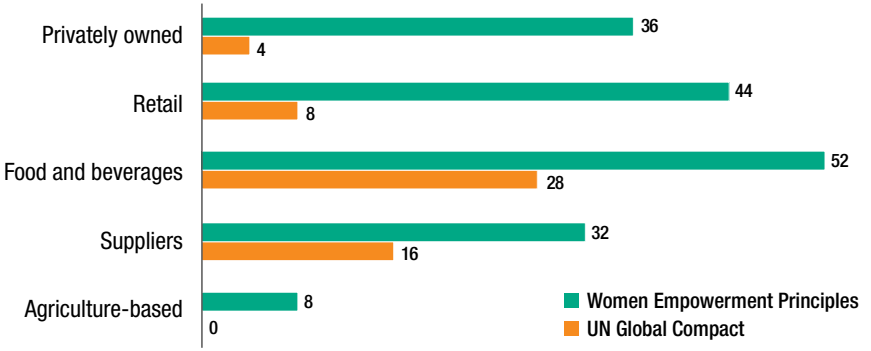
[3] UNCTAD (2014a: 15).

However, when wages remain low, positive impacts on the household and the community may not be maximized. For instance, one employee mentioned, "My standard of living is changing for the better, but money is low. Money is not enough, but I do my best to take care of the family". This points to the potential negative indirect impact an investment can have on women and their community and highlights the need for further research in this area.

Overall, the study shows that a number of firm-related and country-related factors influence the investor's developmental impact (e.g. on gender equality), including the local economic and socio-political environment in which the investor operates, and the financial and operational success, and strategic choices made by headquarters. The local sociocultural and legal environment matters, because complex sociocultural norms affect overall opportunities for employment for women and their ability to access key resources. Even when women are protected by law, social norms can impose restrictions on women's mobility, employment opportunities, ownership of immovable property, decision-making power and control over family income, limiting their ability to develop small businesses. With regard to firm-related factors, firm resources and commitment to achieve gender equality across its value chain activities can influence the potential impact of agricultural investment on women in developing countries. For instance, the financial success of the investment influences its developmental impact because it is closely linked to the investor's ability to generate employment, develop linkages with other parts of the value chain (e.g. outgrowers' schemes) or devise and implement community development programmes (Mirza et al., 2014).

- Investors in agriculture have a significant role to play in raising gender equality and women's economic empowerment, yet many investors perceive their impact on local communities as gender-neutral. More investors in agriculture need to develop and contribute to gender-focused programmes and initiatives. Figure 5 shows that compared with other top TNCs with activities along the agribusiness value chain, fewer TNCs in the agricultural production segment adhere to international initiatives for responsible investment.

Figure 5. The agribusiness value chain: share of top TNC signatories of UN Global Compact and Women Empowerment Principles (Per cent)



Source: Authors' calculations, based on data extracted from https://www.unglobalcompact.org/what-is-gc/participants on 24 April 2019.

Note: We used the list of top 25 TNCs for each segment of the agribusiness value chain developed in the World Investment Report 2009 (page 124), and listed signatories of the UN Global Compact and the UN Women Empowerment Principles. Some companies are signatories of both.

5. Corporate and government actions

In this section, we put forward selected policy suggestions and managerial recommendations for firms to adopt strategies and design approaches for responsible, inclusive and gender-equitable agriculture investment. Our suggestions focus on the local institutional and regulatory frameworks, corporate practice and multi-stakeholder partnerships.

Policy, institutional and regulatory frameworks. Policy intervention matters for raising the potential benefits and minimizing the risks of investment for women in agriculture, and an array of policy interventions can help (e.g. from national land tenure, agricultural development, trade regulation and investment policy, legislation and related institutions). Policy intervention can include – but is not limited to – the development of agricultural infrastructure; enabling women's employment in agriculture; supporting women's entrepreneurship in agriculture and identifying gender equity priorities, and including these in pre-investment negotiations with the investor.

Attracting foreign investment can contribute to the development of the agricultural sector of a country, but before the investment takes place, governments and investors could conduct gender impact assessments, establish a baseline, engage in consultations with stakeholders, or conduct gender-based benefit-

sharing arrangements. Doing so early in the process would raise awareness of the specific impact of investment on women. When investment impact assessment programmes are in place to support investors' social and environmental impact, policymakers can ensure that these contain information related to women, as well as clear monitoring mechanisms and gender indicators. Furthermore, refining existing incentives to attract foreign investment could be done by incorporating gender considerations in terms of employment generation, working conditions and equal pay for a comparable job, as well as gender-sensitive schemes along the supply chain. Hence, governments could promote investments that have demonstrated their positive economic and social impact on women.

In the post-investment phase, a number of policy interventions can take place. Monitoring schemes can be developed to assess investors' actions towards improving gender equality across all tasks and activities. Given that rural and small agricultural activities have a central position among local communities, paying attention to the location and the sectors in which large-scale investments take place and how an investment affects the livelihood of local communities and women within these communities, can help. For instance, it can be effective to build awareness programmes among investors and the local farming community about gender discrimination. Attention could be given to providing opportunities for women to diversify their livelihoods, i.e. investment planning that avoids community dependence on the investor as the sole agricultural employer.

Governments can invest in infrastructure to facilitate women's participation in agriculture and related industries. Engaging with women in the negotiation process would help in taking decisions upon locally appropriate gender-sensitive infrastructural investments. These may include childcare centres, health and education infrastructure, and the development of market areas oriented towards advancing women suppliers.

The results of the research presented in this paper demonstrate that employment opportunities represent the major direct benefit women received from large-scale investment. However, gender inequality remains in the participation rate in formal employment, and access to equal pay, higher-level positions or types of employment (e.g. workers or outgrowers). To address the persistence of such inequality, governments can enable formal employment of women in agriculture through employment and education laws and national programmes (e.g. national placement programmes, apprenticeship programmes), some of which should focus on providing training to build basic technical skills among rural women. To scale up women's participation, training can also be tailored to specific agricultural value chains since some subsectors are more gender inclusive.

Raising the impact of investment on gender equality could also be achieved by supporting women in the community, ensuring women are represented in local

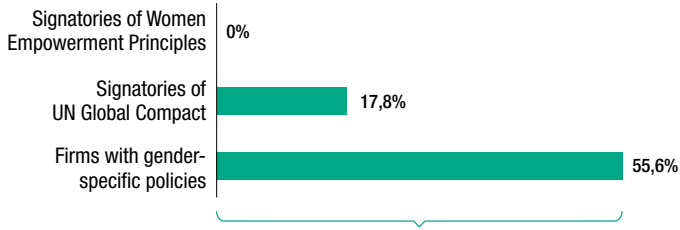
governance to enhance their role as decision-makers in rural settings, e.g. through women's networks, rural associations, and cooperatives.

This research has shown that few outgrowers to large-scale investments are women. Greater gender equality in agriculture can therefore also be achieved by supporting women's entrepreneurship. This can be done by creating and implementing policies and programmes focusing on women and removing discrimination against women in terms of access to resources. Governments can promote equal rights to land, property and inheritance for both men and women, promote women's independence in their civil status, and support women's rights to sign contracts, register a business, open a bank account and apply for a loan. Promoting women's entrepreneurship in agriculture also comes through developing financing schemes for women, including micro-financing, as well as developing training programmes on relevant financial skills (e.g. training in financial management and loan applications for female small farmers and entrepreneurs in the agricultural sector), and specific market-access programmes.

However, even when national laws protect women's rights to land and credit, discriminatory practices and a lack of awareness of women's rights often limit their access to both. To overcome such practices and lack of awareness, local actions can be implemented, including awareness campaigns and support for private sector gender-related initiatives (e.g. corporate social responsibility (CSR), fair trade, organic products, ethical labelling); and public procurement (e.g. school feeding programmes, catering for public administration), which offers opportunities for selling staples that are locally processed by women. Finally, supporting the development of women's cooperatives and associations can also be a means to support women's entrepreneurship, as this offers the opportunity for women to achieve greater bargaining power, to share resources, to increase market access, and to achieve greater productivity.

Corporate practice, corporate social responsibility and self-regulation. We surveyed major TNCs in agriculture and their corporate policies towards gender equality (see figure 6). A number of corporate actions can be adopted to increase gender equality in agriculture and to minimize the negative impact of investment on women in developing countries. This research uses existing gender-specific human resources and CSR policies and initiatives already adopted by TNCs as a useful base to develop recommendations for managers. Investors can adopt an explicit gender strategy, both in terms of their own corporate practice towards women's employment and externally regarding practices adopted by business partners along the value chain. This effort may involve adapting business models and plans to be more inclusive and gender-responsive across value chain activities. For instance, investors can promote equal employment opportunities and develop gender-sensitive practice that support women's participation (e.g. childcare support, flexible working hours or transportation arrangements).

Figure 6. Share of large TNCs in agriculture signatories of WEP, UN Global Compact and with gender-specific policies and initiatives



Exemples of Gender-specific Human Resources and CSR Policies and Initiatives

Internal practices

- Non-discrimination policies in recruitment and promotion
- Board gender diversity policy
- Gender leadership development programme
- Code of conduct to promote equal opportunities
- Equal pay policies
- Maternity policies
- Gender diversity committees

Practices with external partners along the value chain

- Gender-focused supplier diversity programmes
- Initiatives to promote gender equality and women's empowerment in the local community, including to women smallholders and farmers (e.g. fellow programmes for women scientists, capacity-building projects, access to credit and inputs, gender-focused training)
- Awareness programmes (e.g. women's health and sanitation, malnutrition)
- Education and literacy programmes for women

Source: Authors' own elaboration, based on a survey of the top 80 TNCs in agriculture.

Note: Methodology: A list of the largest 80 transnational agribusiness-based companies was compiled in January 2015 from the following company lists: (1) Ranker (lists the largest and most profitable agriculture businesses, corporations, agencies, vendors and firms in the world); (2) Statista 2013 (lists leading global agribusiness companies on the basis of seed sales); Grainorg (lists large commodity trading companies investing in farms); Fortune 2014 (lists companies in the food production category ranked by total revenues); Nation of Change 2013 (lists companies ranked by market share of the world's commercial seed market); and World Investment Report 2009 (lists top 25 TNCs in agriculture by foreign assets). Reports available online for the top 80 TNCs in agriculture were collected. We obtained company reports for 88 per cent of the sample and CSR reports for 56 per cent of the sample. The figure shows the percentage of TNCs in agriculture in the sample, as of 31 January 2015, that (a) were signatories of the women empowerment principles, (b) were signatories of the Global Compact principles and (c) had gender-specific programmes presented in either their company reports or their CSR report.

Within host developing economies, investors can also play an active role to improve gender equality in rural communities. They need to identify where and how they can contribute to close gender gaps in the communities where they operate. For instance, they could develop actions to facilitate rural women's access to financial resources and services and their access to local and regional markets. Also, investors can provide or facilitate access for women to financial literacy training on financial instruments such as mobile banking and support them filling out forms. Investors can also participate in training schemes available in the communities in which they operate. Another way forward includes developing partnerships and networks (for instance, with civil society organizations, trade promotion organizations, farmers' groups or women's cooperatives) with a view to raising women's long-term economic empowerment. Specific actions include the creation of gender-balanced committees and of market stalls for women to sell surplus food crops they grow.

Further along the value chain, TNCs can also adopt voluntary sustainability standards (VSSs) addressing gender equality. Some VSSs already exist among producer organizations and companies in agricultural global markets (Sexsmith, 2017; ITC, IISD and FIBL, 2017); for example, one of the aims of *Fairtrade* is to address gender inequality in producer communities and provide opportunities for women. To date, however, there is no clear evidence on the impact of VSSs on gender equality, which is partly a result of low female participation in the sector.

Raising gender equality through investment in agriculture through multi-stakeholder partnerships. A number of stakeholders have a role to play in improving gender equality in agriculture, including investors, governments, local farming communities, civil society, international donor agencies and producer organizations. Multi-stakeholder partnerships can focus on a number of issues aimed at promoting gender equality in agriculture, including raising awareness of small women producers, e.g. among consumers; enhancing working conditions and health for women on farms; facilitating access to finance for women; and developing new innovative financing mechanisms. For instance, multi-stakeholder partnerships can ease the process of information gathering through joint research on good practice and can disseminate results. Regular public-private dialogue can stimulate the exchange of new ideas and let the voices of stakeholders involved, including women farmers and employees, be heard.

6. Avenues for future research

In the context of the SDGs, many countries are establishing bold strategies to move gender equality towards. Although a lot has been done, women in the agricultural sector continue to face a myriad of challenges. Gender equality is a cross-cutting

issue that could be addressed in all national policies. Further research is needed to better understand how to better integrate a gender lens within national agricultural policies and investor practice.

More research is needed to explore the types and efficacy of investment incentives that incorporate gender considerations in the agricultural sector. For host developing countries, the data on women's employment in agriculture remain limited. More research using a mixed-methods approach could foster understanding about the division of labour, wage differentials and women's role as caregivers (for instance, data tend to focus on the head of the household only, who conventionally is a man). This could be complemented with existing national surveys.

Greater availability of data would facilitate the design of gender responsive evidence-based investment policies and more tailored education or skills-upgrading programmes to support women's participation in the agricultural sector at all levels. Focusing on land rights, key questions remain unanswered. For instance, is there a gender-specific impact if an investment creates land disputes (e.g. are enforcement and resolution procedures equitable for women?) What is the impact on the women in a community if an investment generates dispossession and resettlement?

Foreign investment is starting to diversify, as evidenced by recent foreign investment in agricultural research and development across Africa, motivated by declining yields, global warming, concerns about supply shortages and sectoral needs for a higher level of technological development (UNCTAD, 2014: 38). Since women are likely to be largely affected by these challenges, future research should explore these issues by integrating a gender perspective.

Our research has shown that the societal impact of large investment should also be better researched. Since large agricultural investments bring change for women in the communities around the investment, future research could explore whether there is a trade-off for women between engaging in subsistence agriculture and working for the investor; what the implications are of the dependence on the investor for income to meet family needs, and whether hidden costs are created for male and female employees when investors provide support (e.g. access to accommodation and transportation).

For investors, developing tailored measures to promote gender equality in a company and along its value chain, including within suppliers, is important. However, these initiatives are not always well known nor widely applied. Future research could focus on existing investors that have developed targeted gender practice, including impact assessments, consultations and benefit-sharing arrangements, to understand whether these have worked and how corporate practice can be further improved. More research is also needed to understand the role of headquarters in shaping activities in host countries and how this determines the potential impact of the investment on gender equality.

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Improving the analysis of global value chains: the UNCTAD-Eora Database

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The UNCTAD-Eora Global Value Chain (GVC) database offers global coverage (189 countries and a "Rest of World" region) and a timeseries from 1990 to 2018, reporting on key GVC indicators. This paper explains the methodology for compiling the UNCTAD-Eora GVC database, including nowcasting employed in the estimation of recent years; second, it provides a comparison of the results against other value-added trade databases, with a focus on the OECD Trade in Value Added (TiVA) dataset; and lastly discusses the relevance of GVC data for the analysis of globalisation patterns, particularly at the intersection between trade, investment and development.

Keywords: trade in value added; MRIO; global value chains; complex value chains; value added in export; input-output analysis

1. Introduction

A pivotal element in the analysis of international production are global value chains (GVCs), which are fragmented and geographically dispersed production processes where different stages are located across different countries. GVCs are coordinated by multinational enterprises (MNEs) investing in productive assets worldwide and trading inputs and outputs intra-firm, at arm's length or through their network of non-equity mode (NEM) partners. UNCTAD estimates that up to 80 per cent of global trade involves MNEs (*World Investment Report 2013*). In this respect, the analysis of GVCs is fully complementary to the analysis of FDI and international production.

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Recently, major analytical developments in the treatment of inter-country input-output tables have opened new avenues for the empirical research on global value chains. In particular, the availability of databases that break down trade according to the origin of its value added ("value added trade" or "value added in exports" data) enables the analysis of GVC patterns by countries and industries, at a level of granularity that was unimaginable as recent as ten years ago. The most important cross-regional value-added trade databases include the UNCTAD-Eora GVC database, the World Input-Output Database (WIOD) and the OECD's Trade in Value Added Database (TiVA). Major regional initiatives include the Asian Multi-Region Input-Output Database from the Asian Development Bank and the South-American Input-Output Table from the Economic Commission for Latin America and the Caribbean (ECLAC). Table 1 provides an account and a comparison of the different and ongoing initiatives to map GVCs (see also Tukker and Dietzenbacker, 2013).

The UNCTAD-Eora GVC database was initially launched in the context of the analysis conducted for the *World Investment Report 2013 (WIR13)*, with its main theme "Global Value Chains: Investment and Trade for Development" (UNCTAD, 2013). Compared with alternative databases, its distinctive feature is broad geographical coverage, including virtually all countries. Owing to this comprehensive coverage the database has become the preferred reference source of value-added trade data in analysis involving developing economies (AfDB, OECD, & UNDP 2014; UNECA, 2015; UNIDO, 2016; IMF, 2015a; IMF 2015b; IMF 2016a; IMF 2016b).

Given the importance of GVC analysis in the context of globalization and development and the high demand for value-added trade data, particularly for developing countries, UNCTAD-Eora has upgraded its GVC database. This has led not only to an update of the 2013 dataset to include GVC indicators up to 2015 but also a new improved version, featuring a "nowcast" methodology to project value-added trade data from 2016 to 2018. This step addresses one of the main weaknesses of available value-added trade databases (including the WIOD, TiVA and the previous version of the UNCTAD-Eora GVC database), namely the time lag of two to three years between the most recent data and the time of the analysis. *A further update of the UNCTAD-Eora GVC database, including GVC indicators for 2016 and 2017 based on actual data, is in preparation and will be published in conjunction with this paper.*

The main outcome of the UNCTAD-Eora database is a set of basic GVC indicators, including foreign value added (foreign value embedded in a country's exports), domestic value added (domestic value embedded in a country's exports) and domestic value added embedded in other countries' exports. Other important GVC indicators, such as GVC participation, can be easily computed from the three basic indicators (Koopman et al., 2014). UNCTAD-Eora GVC indicators are

Table 1. Efforts to map GVCs (status as of August 2019)

Project	Institution	Data sources	Countries	Industries	Years	Comments
UNCTAD-Eora GVC Database	UNCTAD/Eora	National Supply-Use and I-O tables, and I-O tables from Eurostat, IDE-JETRO and OECD	189	26-500 depending on the country	1990–2015 (nowcast for 2016, 2017 and 2018)	Meta database drawing together many sources and interpolating missing points to provide broad, consistent coverage
Trade in Value Added (TiVA) dataset	OECD	National I-O tables	64	34	2005–2015 (projections 2016)	Information on all OECD countries, and 27 non-member economies (including all G20 countries)
World Input-Output Database (WIOD): 2016 Release	Consortium of 11 institutions, EU funded	National Supply-Use tables	43	56	2000–2014	Based on official national account statistics; uses end-use classification to allocate flows across partners and countries
Other multi-region input-output databases						
EXIOBASE	EU-based consortium, exiobase.eu	National supply-use tables	44+5	200	1995–2013	Covers 44 countries plus five rest-of-world regions
ADB Multi-Region Input-Output Database (ADB MRIO)	Asian Development Bank	An extension of WIOD which includes 5 additional Asian economies (Bangladesh, Malaysia, Philippines, Thailand and Viet Nam)	45	35	2000, 2005–2008, 2011	The information for the 5 additional Asian countries are estimates methodically produced to assist research and analysis, not official statistics
Global Trade Analysis Project (GTAP)	Purdue University	Contributions from individual researchers and organizations	121 countries plus 20 regions	65	2004, 2007, 2011, 2014	Includes data on areas such as energy volumes, land use, carbon dioxide emissions and international migration.
South American Input-Output table	ECLAC and Institute of Applied Economic Research (IPEA) from Brazil	National I-O tables	10	40	2005	Based on official information from National Accounts

Source: UNCTAD.

publicly available at granular year-, country- and industry-level on the UNCTAD-Eora webpage.[1]

The intention is to establish the UNCTAD-Eora project as a continuing project for the update and improvement of GVC data and analysis, with annual updates envisaged.

In this context, this paper has two objectives: First, it presents the analytic and methodological construction of the UNCTAD-Eora database (sections 2 and 3). Second, it compares results with other available databases, particularly the OECD TiVA, for data validation purposes (section 4). The concluding section puts the UNCTAD-Eora database in the broad context of the analysis of the trade-investment-development nexus: it shows how GVC data can provide an important perspective on some relevant trends at the intersection between these three key areas in modern globalization.

2. The analytical background of the new UNCTAD-Eora database

In this section we briefly retrace the steps that lead to the establishment of the new UNCTAD-Eora database. The first step (section 2.1) – the construction of a multiregional input-output (MRIO) dataset – is the most technically complex and computationally intensive. We present it only qualitatively; for more detail the existing literature is referenced. Once an MRIO is available, some straightforward algebraic steps allow to fit the relevant information contained in the MRIO into the framework of value-added trade and derive the key GVC indicators (section 2.2). Finally, a nowcasting procedure is implemented to project value-added trade data from the last available year onward (section 2.3). Unlike section 2.1 and section 2.2 which are essentially summaries of existing material, the treatment of nowcasting in section 2.3 is new, hence its analytical elaboration here is more detailed.

2.1. The construction of the Eora MRIO dataset

This section provides an overview of how the Eora MRIO is constructed. For a more comprehensive explanation, the primary reference paper is Lenzen et al. (2012). Some more approachable summary papers are Lenzen et al. (2013); Moran and

[1] http://worldmrio.com/unctadgvc/. For references to the UNCTAD-Eora database, cite this method paper as follows:
Casella, B. et al. (2019). Improving the analysis of global value chains: the UNCTAD-Eora Database, *Transnational Corporations Journal 26(3)*. New York and Geneva: United Nations.

Geschke (2013); and Moran (2013). The documentation section of the Eora website (at http://worldmrio.com) also provides several papers and reports that present the main elements of I/O analysis.

The Eora dataset provides a multi-region input-output table at the global level to estimate value added in trade. The construction of the Eora MRIO table follows several steps.

a. The starting points are the national IO tables or supply/use tables (SUTs). National SUTs are recommended over input-output tables because they provide information on both products and industries. However, the national statistics bureaus in some countries still provide only input-output tables. A supply table provides information on products produced by each domestic industry and a "use" table indicates the use of products by industries or final users. As SUTs are only available for a limited number of countries, the remaining countries are hence represented by input-output (I/O) tables, which can be sourced from available data or compiled according to a range of assumptions. In order to avoid departures from the original raw data, EORA preserves the sectoral classification from each data provider. The complete list of raw data sources involved in preparing the IO table for each country in Eora is available at the Quality Report section of the Eora website and in the Supplementary Information of Lenzen et al. (2012).

b. National SUTs and I/O tables are linked through international trade statistics using import tables to obtain a multi-region input-output table. At this step, an estimation procedure is used to construct so-called "off-diagonal" trade blocks, estimating flows from each export sector in each origin country (rows) to each importing sector in each destination country (columns). Trade data is most often reported by product and by producer and consumer country. However, an off-diagonal trade block in an IO table requires knowing how goods from each exporting sector are absorbed into each importing sector. Put another way, the raw data is three-dimensional, but the IO table requires four dimensions. Thus, creating the trade blocks involves several assumptions and estimation steps. The challenges and procedures used to estimate trade are presented in full in Lenzen et al. (2012).

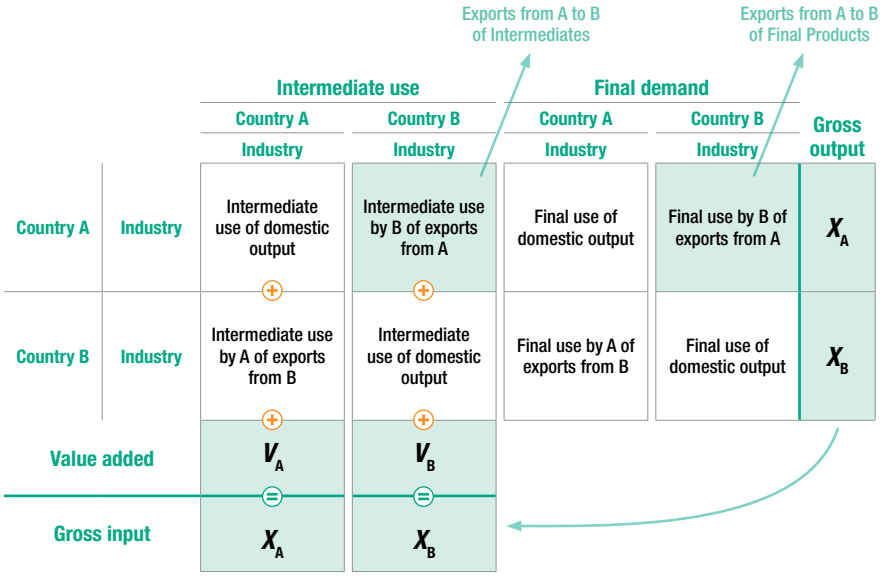
c. After obtaining a first estimate of an MRIO table, the resulting trade data are balanced through an industry-level balancing condition: the total output produced by each sector must equal the sum of the inputs used by that sector. This has been achieved via "constraints data": i) Input-output tables and main aggregates data from national statistics offices; ii) Input-output compendia from Eurostat, IDE-JETRO and OECD; iii) The UN National Accounts Main Aggregates Database and official country data; iv) The UN COMTRADE and UN Service Trade international trade databases. An optimization procedure (a variant of the

RAS algorithm that can handle multiple conflicting constraints; see Lenzen et al., 2014) is set up so that the solution should be some compromise table that respects the initial estimates and also satisfies constraints with as little deviation as possible. For the optimization exercise, a standard error is estimated for each data point based on the reliability of the data. In general, larger values are taken to be more reliable than smaller values, in relative terms. Data from national statistics agencies are assumed to be more reliable than other sources. The ordering of data sources listed above largely corresponds to the data reliability assumed in assigning standard errors.

d. The time series is constructed iteratively, by starting with an initial year estimate (year 2000), balancing it with all the starting year constraints, and taking the solution as the initial estimate for the following year, and so on. In each year, all available data for that year (GDP totals, trade data, new I/O tables, interpolated I/O table estimates, and so on) are overlaid onto the initial estimate of that year, and the table is rebalanced. The practice of using the previous-year solution as the initial estimate for the subsequent year has an effect to "smooth" timeseries data, though other constraints that introduce "jumps" will also be considered in the solution table for each year.

Figure 1 shows a simplified MRIO table, considering only one industry for two countries.

Figure 1. Structure of an MRIO Table



The rows in an MRIO table indicate the use of gross output from a particular sector in a country. The gross output X produced in country A (first row) can be used by country A itself as intermediate or as final consumption, or by country B, again as an intermediate input or final product. From here, we can retrieve a measure of gross exports from A to B, summing the intermediate and final output produced in country A and used in country B (the grey blocks in the example above).

The columns of an MRIO table provide information on the technology of production, as they indicate the amounts of intermediates needed for the production of the gross output whose use is then decomposed along the row. Hence, each column provides the domestic and foreign share of intermediates in the production of one unit of output. The first column thus shows how much domestic inputs contribute to the production of the gross output of country A (first cell, "Intermediate use of domestic output"), and how many inputs are sourced from abroad through imports (second cell, "Intermediate use by A of exports from B"). The difference between the gross output produced in each country and the sum of the (domestic and foreign) inputs necessary for production yields the value added generated in each country (V).

2.2. Deriving value-added trade from Eora MRIO

The derivation of value-added trade from the MRIO table follows the standard approach proposed by Koopman et al. (2010; 2014). Here we provide a concise description and we refer to Koopman's paper and other reviews such as the OECD's De Backer and Miroudot (2013) and the IMF's Aslam et al. (2017) for the details. The IMF paper in particular explicitly uses the Eora MRIO computational framework to derive value-added trade indicators. Some other important papers addressing issues in the computation of value-added trade include Hummels et al. (2001), Johnson and Noguera (2012), Stehrer et al. (2012), Timmer at al. (2012), Wang et al. (2013, 2017a, 2017b), Los et al. (2016), Johnson and Noguera (2016), Timmer et al. (2016), Antras and de Gortari (2017), and Los and Timmer (2018).

We first establish standard IO analysis identities for an MRIO table with N countries and H industries:

$$\begin{aligned} & x = T + y \\ \Leftrightarrow\ & x = Ax + y \\ \Leftrightarrow\ & (I - A)x = y \\ \Leftrightarrow\ & x = (I - A)^{-1}y = Ly \end{aligned} \qquad (1)$$

where x is the $(NH\ x\ 1)$[2] vector of gross outputs by countries and by industries, T is the corresponding vector of intermediate uses, y is final demand. From (1), we introduce the $(NH\ x\ NH)$ key matrices of the GVC construction: the technological coefficient matrix A and the Leontief inverse L (Leontief, 1970).

The fundamental relationships in (1) can be applied to the "*value-added trade*" framework. After introducing the $(NH\ x\ NH)$ diagonal matrices V and E, reporting respectively value-added share and exports by countries and industries, we define the matrix $(NH\ x\ NH)$ of embodied value-added flows F as follows:

$$\mathrm{F} = \begin{pmatrix} F^{11} & \cdots & F^{1N} \\ \vdots & \ddots & \vdots \\ F^{N1} & \cdots & F^{NN} \end{pmatrix} = \begin{pmatrix} V^1 & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & V^N \end{pmatrix} \begin{pmatrix} L^{11} & \cdots & L^{1N} \\ \vdots & \ddots & \vdots \\ L^{N1} & \cdots & L^{NN} \end{pmatrix} \begin{pmatrix} E^1 & 0 & 0 \\ 0 & \ddots & 0 \\ 0 & 0 & E^N \end{pmatrix} \quad (2)$$

where F^{rs} is a $(H\ x\ H)$ matrix showing inter-sector flows between country r and country s (domestic flows in the case that r and s are the same country). The matrix F is the key matrix of our analysis (figure 2). The matrix essentially describes how the value added contained in the exports of each country (and industry) is generated (by column) and distributed (by row) across countries. Henceforth, in order to facilitate the intuition, we will describe the elements of F (2) as if they were scalar (this is equivalent to considering an economy with only one product) rather than $(H\ x\ H)$ matrices as in the general case. Thus, the first column of the matrix describes the value added contained in the export of country 1. This is composed of two parts:

- the term F^{11} (in the matrix multiplication we have that $F^{11} = V^1 L^{11} E^1$) denotes the *Domestic Value Added* (DVA) content of exports of country 1;
- the generic term F^{r1} (in matrix notation $F^{r1} = V^r L^{r1} E^1$) denotes the *Foreign Value Added* (FVA) content of exports of country s generated by country r (with $r \neq 1$). Recall that the production of output by country s (part of which is exported) requires inputs from other countries. In producing these inputs, the other countries also generate value added. Hence, this term represents the share of value added that has been generated in country r (V^r) and that has been imported by country 1 (L^{r1}) in order to produce its exports (E^1).

The (column) sum of domestic and foreign value added, by construction, will yield the total exports of country 1. The other columns of the F matrix replicate the

[2] The notation $(NH\ x\ 1)$ refers to the dimensions of a matrix with NH (i.e. N times H) rows and 1 column (a column-vector). The same type of notation is used throughout the paper to provide the dimensions of any matrix when relevant.

exercise for the other countries. Therefore, in column 2 of the matrix we will find the term F^{22}, which denotes the DVA content of exports of country 2, as well as the generic term F^{r2}, which denotes the FVA content of exports of country 2 generated by country r, and so on. Hence, the DVA can be read on the diagonal of the matrix as the generic term F^{rr} for any country r in the dataset.

Finally, by reading the matrix along the row rather than along the column (and excluding the diagonal terms F^{rr}), we have an indication of how much of each country's domestic value added enters as an intermediate input in the value added exported by other countries. The latter terms are what Koopman et al. (2014) call "indirect value-added exports" (DVX). Clearly, by constructing what each country contributes to all the others in terms of indirect value-added exports has to be equal at the world level to what each country sources from all the others in terms of foreign value added, that is at the world level FVA = DVX. The latter gives a rough, though not perfect, proxy of the double counting embedded in the gross (official) trade figures.

Figure 2. The matrix of the value-added content of trade

		DVA	DVX					
		Country 1	Country 2	Country 3	...	Country K	...	Country N
	Country 1	F^{11}	F^{12}	F^{13}	...	F^{1K}	...	F^{1N}
FVA	Country 2	F^{21}	F^{22}	F^{23}	...	F^{2K}	...	F^{2N}
	Country 3	F^{31}	F^{32}	F^{33}	...	F^{3K}	...	F^{3N}
	...	...	...	...	...	...	...	...
	Country K	F^{K1}	F^{K2}	F^{K3}	...	F^{KK}	...	F^{KN}
	...	...	...	...	...	...	...	...
	Country N	F^{N1}	F^{N2}	F^{N3}	...	F^{NK}	...	F^{NN}

2.3. Nowcasting value added trade for more recent years

Compared to the original 2013 version, the current version of the UNCTAD-Eora database (as of August 2019) includes a nowcasting procedure to extend the time horizon covered by the GVC time-series to the most recent years. Specifically, the UNCTAD-Eora GVC results are based on reported data for the years from 1990 to 2015, and are nowcasted to estimate results for 2016, 2017 and 2018. The full MRIO elaboration is available only until 2015 because of the time lag (2-3 years) of the underlying macroeconomic data.

The nowcasting is based on estimates from the IMF's World Economic Outlook (WEO), December 2017 edition (IMF, 2017). The WEO provides estimates of the annual change of GDP, imports and exports, in each country. These estimates are provided as nowcasts for recent years (2016, 2017 and 2018 for the 2017 edition) and with 2+ year predictions for selected indicators.

The UNCTAD-Eora nowcasting of GVC indicators is performed in two stages. First, the value-added contribution from each origin country is adjusted according to their (nowcasted) change in GDP. Second, for each exporting country, resulting value-added contributions are then rescaled and normalized in order to sum the WEO nowcasted values for gross exports. In other words, the WEO GDP nowcasting determines the changes in the *distribution* of a country's export among its value-added contributors, while export nowcasting affects the change in the *level* of value-added trade. In this way, nowcasting essentially provides a simple and transparent way to project GVC indicators from actual year t to a following year $t+1$, by incorporating the macroeconomic estimates from the IMF's WEO into the standard GVC setting of section 2.2.

We may provide a formal elaboration of the procedure. The mathematical treatment presented below will be more detailed than for the standard GVC calculations illustrated in the previous section (noting that the basic computation of value added in trade is presented in a number of papers already, cited in the previous section). To this end, we also develop the formulas in the most general case of N countries and H industries.

Let F then be the final GVC matrix (2) at time t containing data from the latest observed period. For each country $r = 1, 2, ..., N$, let $(I + \partial G)_r$ and $(I + \partial E)_r$ be diagonal $(H \times H)$ matrices, reporting on the diagonal the sum between the unit and the (WEO-nowcasted) annual growth rate of GDP and export respectively, say ∂g_r and ∂e_r . In principle, of course, each industry would have its own growth rates, i.e. the elements in the diagonal of the matrices should be different. However, this is not possible in the nowcasting setting as the WEO estimates are provided only at the aggregate level.

First, we define the adjusted matrix $\hat{\hat{F}}$.

Step 1. Value-added adjustment:

$$\hat{\mathrm{F}} = \begin{pmatrix} \hat{F}^{11} & \cdots & \hat{F}^{1N} \\ \vdots & \ddots & \vdots \\ \hat{F}^{N1} & \cdots & \hat{F}^{NN} \end{pmatrix} = (I + \partial G) \times F \qquad (3)$$

where $(I + \partial G)$ is a $(NH \times NH)$ block diagonal matrix with matrices $(I + \partial G)_r$ $(r = 1, 2,..., N)$ on the diagonal, while F is the $(NH \times NH)$ block diagonal matrix

defined by (2). The generic element of the $(H \times H)$ matrices $\hat{F}^{rs}$ $(r, s = 1, 2, ..., N)$ in (3) is then given by $\hat{f}_{i,j}^{r,s} = \left[v_i^r \, l_{i,j}^{r,s} \, e_j^s \right] * (1 + \partial g_r)$ with $i, j = 1, 2, ..., H$. In this context, consistent with the matrix notation introduced in (2), v_i^r is the value-added share of country r in the production of product i; $l_{i,j}^{r,s}$ is the element of the Leontief inverse matrix corresponding to the countries' pair (r, s) and industries' pair (i, j), e_j^s is the export of product j by country s and ∂g_r the GDP growth of country r.[3] At time $t+1$, the value added extracted by country r at time t, represented by the generic elements $v_i^r \, l_{i,j}^{r,s} \, e_j^s$ $(s=1, 2, ..., N)$ of the matrix F in (3), is therefore adjusted to account for economic performance of country r between t and $t+1$, as reflected by the country's GDP growth, ∂g_r.

The $\hat{F}$ matrix in (3) potentially defines a new structure of the countries' export at time $t+1$; this is denoted by a $(NH \times NH)$ block diagonal matrix $\hat{E}$ where each component $\hat{E}^s$ $(s= 1, 2,..., N)$ is a $(H \times H)$ matrix reporting the exports of country s as implied by (3). Otherwise stated, the diagonal elements of $\hat{E}$ correspond to the sums of the NH columns of $\hat{F}$.[4] These elements are determined by the structure of the exports at time t, by the existing production technology at time t and by the economic growth between t and $t+1$.

In the second step of the nowcasting we incorporate in the GVC estimation the WEO information on the export's growth rates by country, ∂g_s $(s = 1, 2, ..., N)$. Let $\tilde{E}$ be the $(NH \times NH)$ export matrix, as resulting by the application of the WEO nowcast of export growth to export at time t, i.e. $\tilde{E} = E \times (I + \partial E)$ where E is the matrix of exports at time t and $(I + \partial E)$ is a diagonal block matrix with components $(I + \partial E)_s$ $(s = 1, 2, ..., N)$.

The export structure resulting from (3) does not coincide with the one implied by the WEO nowcasting, i.e. $\tilde{E} \neq \hat{E}$. Thus, we need to normalize and rescale (3) to make sure that the resulting export at time $t+1$ is consistent with nowcast provided by the WEO.

---

[3] More specifically, when $r = s$, the element $\hat{f}_{i,j}^{r,s}$ indicates the domestic value added extracted by country r, related to the intermediate use of domestic output i necessary to meet export levels of product j; if $s \neq r$, it indicates the foreign value added generated by country r, related to the provision of the intermediate input i necessary to meet export of product j from country s.

[4] Formally, for each exporting country s, the $(H \times 1)$ vector of exports implied by (3), say $\hat{e}_s$ (the vector of the diagonal element of the matrices $\hat{E}^s$, is defined by $\hat{e}_s = \left[i^T \times \hat{F}^s \right]^T$ where i is a unit vector $(1 \times NH)$ and $\hat{F}^s$ is a $(NH \times H)$ representing the value-added structure of export of country s.

Analytically, this is equivalent to calculate a new matrix $\tilde{F}$ as follows:

Step 2. Normalization and rescaling:

$$\tilde{F} = \begin{pmatrix} \tilde{F}^{11} & \cdots & \tilde{F}^{1N} \\ \vdots & \ddots & \vdots \\ \tilde{F}^{N1} & \cdots & \tilde{F}^{NN} \end{pmatrix} = \hat{F} \times \hat{E}^{-1} \times \tilde{E} = \hat{F} \times \hat{E}^{-1} \times E\,(I + \partial E) \tag{4}$$

The first product in (4) normalizes value-added exports resulting from (3), the second rescales them in order to sum aggregate exports implied by the WEO nowcasting. The generic element of the block matrices $\tilde{F}^{rs}$ $(r,s = 1, 2, ..., N)$ is then given by $\tilde{f}^{r,s}_{i,j} = \frac{\hat{f}^{r,s}_{i,j}}{\hat{e}^{s}_{j}} \times \tilde{e}^{s}_{j} = \frac{\hat{f}^{r,s}_{i,j}}{\sum_{\substack{i=1 \\ r=1}}^{H,N} \hat{f}^{r,s}_{i,j}} \times e^{s}_{j}(1+\partial e_s)$. It is easy to verify that the value-added shares implied by the matrix $\tilde{F}$ is the same as for $\hat{F}$, i.e. $\frac{\tilde{f}^{r,s}_{i,j}}{\tilde{e}^{s}_{j}} = \frac{\hat{f}^{r,s}_{i,j}}{\hat{e}^{s}_{j}}$ for any i, j, r, s. At the same time, for each exporting country s and each industry j, the sum of value added contributed by all other countries (domestic and foreign) equals the export implied by the WEO nowcasting:

$$\sum_{i,r} \tilde{f}^{r,s}_{i,j} = \tilde{e}^{s}_{j} \left(\sum_{i,r} \hat{f}^{r,s}_{i,j} / \hat{e}^{s}_{j}\right) = e^{s}_{j}(1+\partial e_s)\,(\hat{e}^{s}_{j} / \hat{e}^{s}_{j}) = e^{s}_{j}(1+\partial e_s)$$

This nowcasting approach is simplified compared to the full procedure used to compute value added in trade for years with observed data. In particular, the lack of timely information on the sectoral composition of the economy and the corresponding disaggregation between intermediate and final use, as provided by national I/O tables, does not allow constructing a sectoral detailed MRIO such as in figure 2. The most computationally intensive steps, illustrated in section 2.1, are not possible in the nowcasting setting. Instead, the inter-country, inter-sectoral structure of the economy is fully inherited from the last year, say t, for which full macroeconomic data are available. What nowcasting does is to adjust the GVC indicators at the national level at time t to account for the changes in the (relative) economic performance of countries and the expected trend in exports, assuming no change in the underlying economic structure. We also note that there is no explicit balancing step in the nowcasting procedure, since the WEO provides balanced forecasts (e.g. growth in exports from one country is 100 per cent absorbed by growth in imports from other countries).

Table 2 provides an example of the nowcasting approach using three countries with one industry.

Table 2. Numerical example illustrating the nowcasting method

	GVC indicators at time t (actual)			Intermediate step		GVC indicators at time t+1 (nowcasted)	
Value added (VA) originating in:	VA embodied in exports	VA added shares	Nowcasted growth (WEO input)*	Adjusted value added	Adjusted value added shares	VA embodied in exports	VA added shares
Country A	700	70%	9%	763	71%	750	71%
Country B	100	10%	3%	103	10%	101	10%
Country C	200	20%	1%	202	19%	199	19%
Exports from A	1 000	100%	5%	1 068	100%	1 050	100%

* Nowcasted growth (shaded column) refers to GDP growth for the first three rows and to export growth for the last row.

3. Limitations and areas for further development

There are two main sources of uncertainty in the estimation of value-added trade data and GVC indicators. The major one, discussed in section 3.1, is related to the original construction of an MRIO, requiring modelling assumptions and computational steps. This uncertainty is common to all MRIO approaches and it stems from the complexity of the estimation problem inherent to the construction of an MRIO, i.e. reconstructing the global network of bilateral trade flows across sectors and countries in the most comprehensive and granular way. A second set of uncertainties involves more specific data issues affecting the interpretation of value-added trade data and GVC indicators (section 3.2).

3.1. Common limitations related to the construction of an MRIO

The topic of MRIO construction and reliability has been extensively discussed in the MRIO literature (Wiedman et al., 2011, Tukker and Dietzenbacher, 2013, Dietzenbacher, 2013, Tukker et al., 2018). This section is a brief, non-technical overview only.

All MRIO databases are to some degree modelled. Some portions of the databases are overdetermined, with multiple, conflicting reports, while others are underdetermined and need assumptions or modelling to fill in portions of the dataset not covered by official sources. In particular the trade blocks of an MRIO are underdetermined. Trade statistics provide data as [good/service – country of origin – absorbing country] tuples, while the MRIO database structure reports data

as [good/sector of export – country of origin – absorbing good/sector – absorbing country]. This results in trade flows at the sector-to-sector level being inferred or estimated.

The modelling and interpolation approach ranges in complexity from simple linear interpolation to more complex proxy or statistical methods. In this context, there is no "correct" global MRIO table. Rather, there is variety of models that differ in how comprehensive and detailed they are and in how they treat conflicting and missing data. In view of this uncertainty, every single data point in the Eora MRIO is accompanied by an estimate of its standard deviation, reporting the extent to which it was contested, interpolated, estimated or adjusted away from its original value in order to assemble a balanced global I/O table. A large number of reliability and confidence reports are made available on the Eora website.

The several available MRIO databases are constructed by independent research teams. It should not be expected that they agree perfectly. They generally obey similar macroeconomic constraints at the national level (total GDP, total exports, imports, consumption, and value added created), though even on these basic macroeconomic totals the MRIOs do not perfectly match. There are multiple data providers for these macro statistics (the United Nations, the World Bank, national statistics agencies) and the values are not always identical across providers. The Eora website has a page that offers a comparison of the various MRIOs in terms of their reported values for these key macroeconomic totals (http://worldmrio.com/comparison/).

Even if the MRIOs were constructed using identical macroeconomic constraints, there remains considerable room for variation across the independent models at the sector level. The level of aggregation/disaggregation chosen is one major cause of variation. The OECD database opts to aggregate national IO tables to a relatively high degree (to 34 sectors). The WIOD database offers higher resolution (56 sectors). This means that the national IO tables have to be reclassified, aggregated or disaggregated, in order to adjust the source national tables to match the 56 sector classification. The Eora database preserves each country's national IO table in its native classification scheme. Eora's heterogenous classifications make inter-country comparison difficult and makes the MRIO slightly more complex to assemble and use, but, as major advantage, it minimally disturbs each original national IO table. The details of how the sector-level results are constructed vary substantially across the MRIOs. The effects of sectoral aggregation are well studied (Steen-Olsen et al. 2014, de Koning et al. 2015).

A significant body of work has investigated the reliability of MRIO databases using side-by-side comparison, sensitivity analysis, and using decomposition analysis to isolate sources of divergence (Lenzen et al., 2010; Wilting, 2012; Geschke et al., 2014; Moran and Wood, 2014; Wood et al., 2014; Inomata and Owen, 2014;

Owen et al., 2014; Owen et al., 2016; Steen-Olsen et al., 2016; Owen, 2017; Tukker et al., 2018; Rodrigues et al., 2018). Together, these studies indicate that the major MRIOs agree to within +/-10 per cent for most values for most larger and structurally central economies, and to within +/-30 per cent for smaller economies or economies with less comprehensive or reliable data.

3.2. Other specific issues affecting value-added trade data

In this section we discuss some issues that proved to be particularly relevant in the economic applications of GVC data and indicators, according to our experience with UNCTAD-Eora database and feedbacks received from UNCTAD-Eora users.

Re-exports / re-imports

Re-exports refers to goods imported and then re-exported with null or negligible transformation (e.g. goods that land, are warehoused and are then shipped out). The accounting of re-exports can be problematic. Different countries may account for re-exports differently. Additionally, the value of re-exports is sometimes estimated. The estimated value of re-exports can form a significant portion of trade, in particular for trade-intensive economies such as Belgium and the Netherlands. When re-exports form a large share of imports or exports, inconsistencies in how re-exports are reported in MRIOs or, whether they are excluded entirely, can drive large divergences in the calculation of value added in trade. Eora preserves re-exports. Other databases may handle re-exports differently. In the benchmark provided in the next section, we shall see that such differences in the treatment of re-exports is a major cause of divergence in results between GVC indicators as estimated by the UNCTAD Eora and the OECD TiVA databases, in particular for trade-exposed countries such as Belgium and the Netherlands.

Processing trade

Most MRIO databases and published Chinese IO tables treat export processing as structurally identical to domestic production. They do not differentiate the technical coefficients between production for exports and production for domestic use. However, in reality, production for exports often uses more foreign imports than does production intended for domestic consumption (Dietzenbacher et al. 2012). Processing exports account for 35-50 per cent of total Chinese merchandise exports (varying by year) so this homogeneity assumption affects a substantial share of the total economic activity in China. Mexico, and likely other countries, face a similar situation whereby export-led firms operate with a different mix of inputs than their peers selling to the domestic market. It is important to differentiate export processing. Chen et al. (2018) empirically studied the importance of distinguishing

export processing zones. They conclude, "[I]f China's processing trade is undistinguished… China's bilateral net trade in value added with some economies, such as Japan, Korea and Taiwan, would be significantly underestimated, while it would be significantly overestimated for some other economies, such as the United States". However, official public data on processing trade for China are currently not available, making undifferentiated treatment a necessary choice.

Re-imported domestic value added

In complex value chains it is possible that value is added in a domestic sector, the intermediary good is then exported, value is added in one or more foreign countries, and the final good is then imported back into the originating country. This is called re-imported or "feedback" value added.

Investigation of "re-imported DVA", e.g. by Koopman (2012), shows that the latter is relatively small at the world level (though it might be slightly more significant for some countries or industries than others). Koopman et al. (2012) estimate the domestic content of foreign exports that finally return home at 4 per cent of gross exports in 2004. The results computed by Stehrer (2012), using the WIOD database, indicate at the world level a range from a minimum share of 2.6 per cent in 1995 to a maximum of 3.3 per cent in 2008, with the figure for 2009 at 2.9 per cent. The OECD/WTO initiative, in turn, estimates that the re-imported DVA equals to just 0.6 per cent of world gross exports in 2009. The magnitude of these feedback effects was also investigated by Moran et al. (2017). The study concludes that re-imported value added usually comprises 2-6 per cent of value added in imports for most countries and sectors.

* * *

Following the discussion of the issues above, it is possible to identify three areas where future development would help improve the data accuracy and reliability of the database. This list is not intended as a fully-fledged research agenda for future work but rather as a partial list of issues that merit priority.

i. Improve results agreements across MRIO databases. Other fields have inter-comparison projects or model suite projects that help implementors identify errors and improve alignment across models.

ii. Improve sectoral detail that will offer high sector and product level resolution in the results.

iii. Provide more consistent treatment of re-exports and processing trade.

4. Comparison between UNCTAD-Eora and other GVC databases

While there are several studies providing comparison and cross-validation of the Eora MRIO against other MRIO databases (see section 3.1), less effort has been made to directly compare the key GVC indicators across different value-added databases. Our goal in this section is to contribute to covering this gap by investigating the consistency between the UNCTAD-Eora GVC estimates and results from other creditable GVC databases, particularly the OECD TiVA. In section 4.1 we present the results of a novel comparison between the UNCTAD-Eora GVC database (version 2018) and the latest OECD TiVA database (December 2018). In section 4.2, we briefly recall the findings from two previous studies that have performed similar cross-validation, IMF's paper by Aslam et al. (2017) and UNCTAD (2013b).

Overall, all these efforts confirm a general alignment of UNCTAD-Eora GVC results with the OECD TiVA at the countries' level. This is an important, and not at all obvious, achievement given that the coverage of the UNCTAD-Eora database is higher than that of the other databases (see table 1).

4.1. UNCTAD-Eora GVC Database and the OECD's TiVA (2018 versions)

We compare results from the new UNCTAD-Eora database and the OECD TiVA (2018 versions). To run the comparison, we selected one key GVC indicator, the foreign value-added share or FVA share, i.e. the share of foreign value added in total export. This, and the corresponding domestic value-added shares, is the most basic and fundamental GVC indicator. The comparison involves those years for which both datasets report actual values, a time horizon between 2005 and 2015. The reference year for most analysis is 2015, the most recent year of comparison. Country perimeter includes all 64 countries covered by the OECD TiVA, a subset of the 189 countries covered by UNCTAD-Eora.

Figure 3 shows the correlation between FVA share from UNCTAD-Eora and the OECD TiVA for 2015. High correlation (linear correlation coefficient Rho= 0.75) indicates an overall consistency between the results. A slope of the linear regression line close to 1 (0.85) suggests that values of FVA shares are generally similar between the two databases. The consistency between the results is substantially preserved over time, as confirmed by figure 4a plotting FVA share across countries and years. The correlation coefficient between the two sets of data is consistently above 0.7 in all years considered (figure 4b).

Figure 3. FVA shares of UNCTAD-Eora and the OECD TiVA, 2015

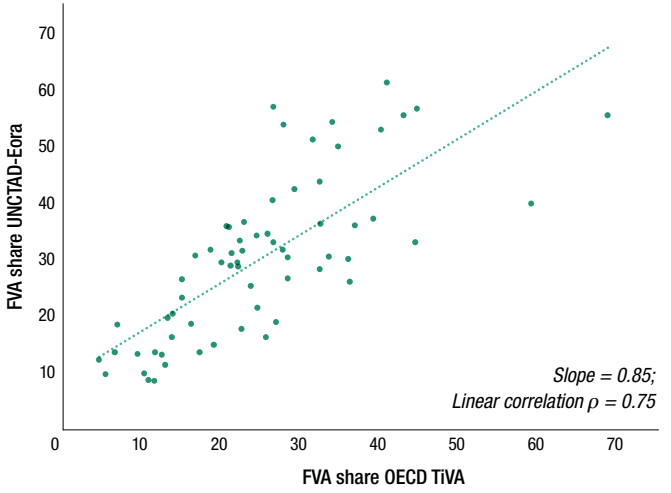


Figure 4a. FVA shares of UNCTAD-Eora and the OECD TiVA, 2005–2015

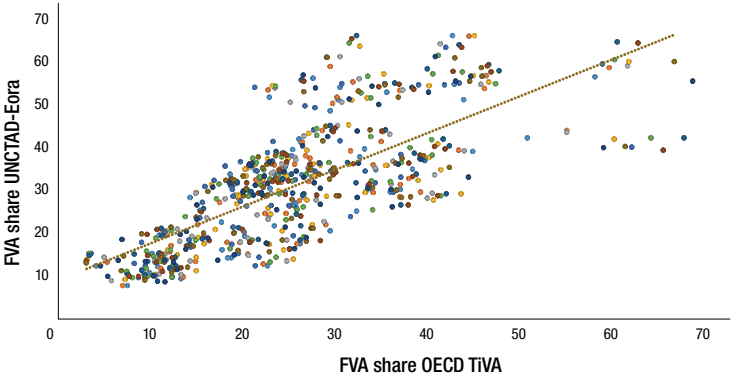


Figure 4.b. Linear correlation coefficient between UNCTAD-Eora and OECD TiVA across countries by year, 2005–2015

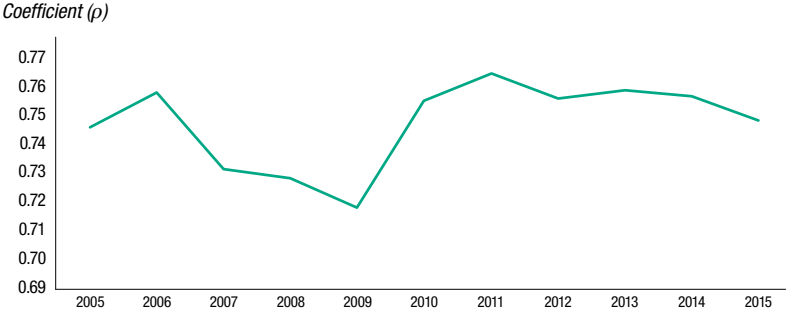
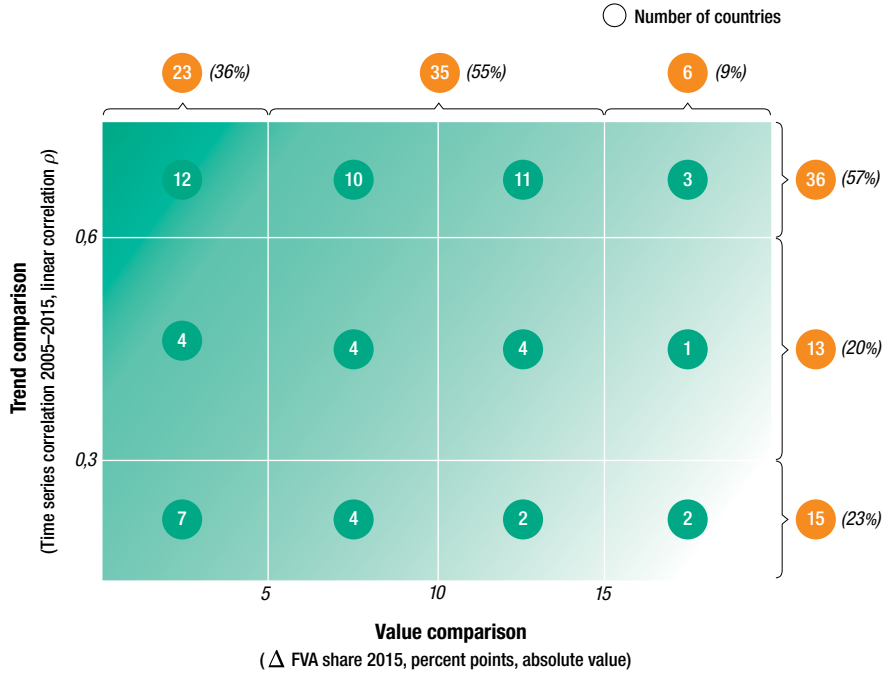


Figure 5 summarizes the results of the by-country comparison along the two critical dimensions: comparison of values (x-axis) and of trends (y-axis). Almost 60 per cent of the countries (36 out of 64) show highly consistent trends of FVA shares in the period of interest 2005–2015 (ρ>0.6) and more than a third (23 countries) display similar values (|Δ FVA share| < 5pp).

Figure 5. Summary of the comparison between UNCTAD-Eora and the OECD TiVA, 2005–2015

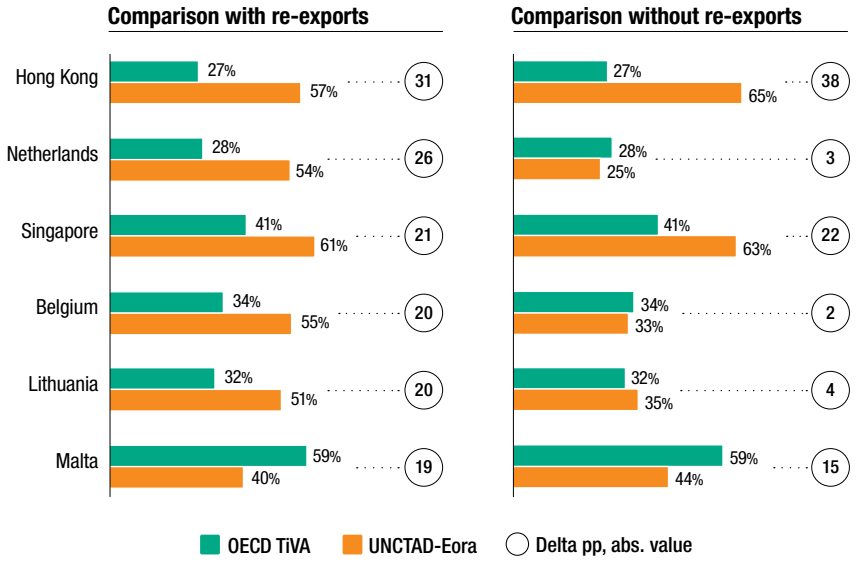


There are six countries (Hong Kong, the Netherlands, Singapore, Belgium, Lithuania and Malta) that present substantial divergence between the estimates (|Δ FVA share| > 15pp). These economies, particularly Hong Kong, Netherlands, Belgium and Singapore have a large amount of imports and exports relative to their total GDP, so the challenges discussed above relating to the macro constraints of total imports and total exports, and the sector-wise attribution of value added, become especially acute. Additionally, for these countries, the difference in the treatment of re-exports between UNCTAD-Eora and the OECD TiVA (see section 3.2) may heavily affect the final estimation as high level of re-exports would amplify UNCTAD-Eora FVA share relative to the OECD TiVA. Figure 6 tests this hypothesis by comparing the two databases, both in their original form (left-hand side) and

after removing the re-export component from UNCTAD-Eora estimate. In half of the cases (the Netherlands, Belgium and Lithuania), the values of UNCTAD-Eora and the OECD TiVA substantially realign after removing re-export from the UNCTAD-Eora estimate. Hong-Kong and Singapore are somehow surprising cases as we would expect the level of re-exports to be high and relevant. These cases warrant further consideration and analysis.

More generally removing re-export from the comparison further improves the overall consistency between the UNCTAD-Eora and the OECD TiVA. For exemple in figure 5, the share of countries with absolute delta less than 5 percent points would increase from current 36 per cent to 58 per cent after removing the re-export component.

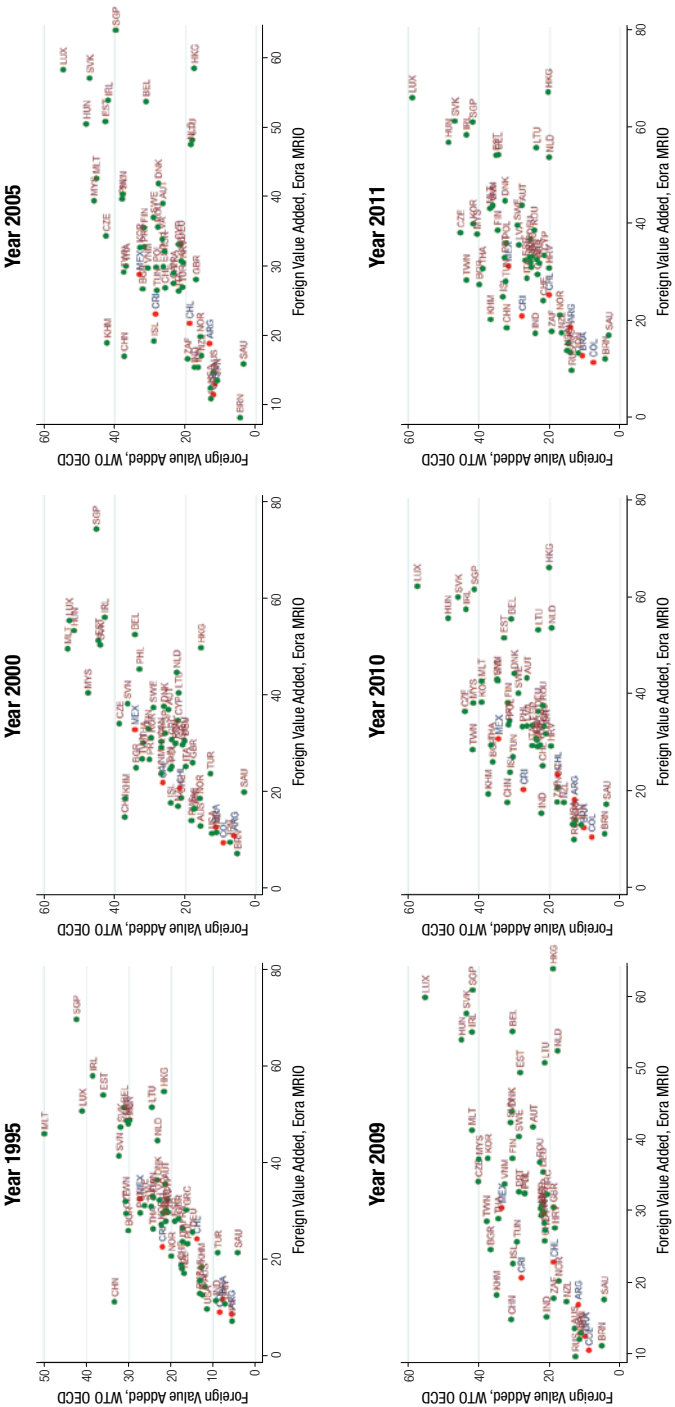
Figure 6. Comparison between FVA shares of UNCTAD-Eora and the OECD TiVA for selected (problematic) countries, with and without re-exports, 2015



4.2. Previous comparisons

The numerical comparison presented in the previous section is the most detailed cross-check of UNCTAD-Eora GVC indicators but not the only one. Here we briefly recall other two comparative analysis which generally confirm the consistency of UNCTAD-Eora with the other available GVC databases.

Figure 8. FVA shares of UNCTAD-Eora and the OECD TiVA, selected years (from Aslam et al, 2017)

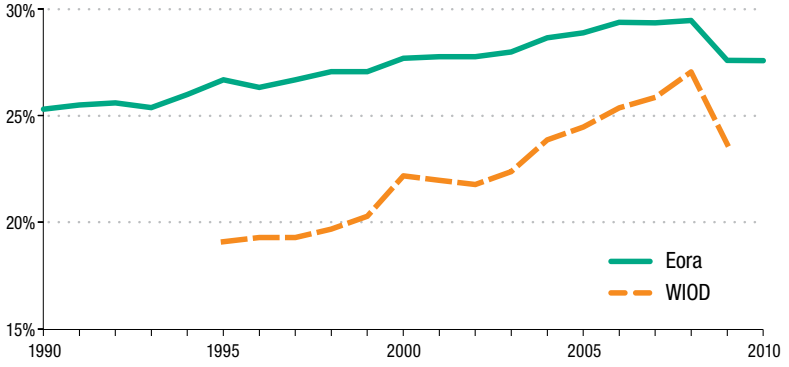


Aslam et al (2017) compare for different years the FVA shares of UNCTAD-Eora and the OECD TiVA, essentially the same exercise as figure 3 but replicated on several years. For illustrative purposes figure 8 reports some of their scatterplots, showing a substantial alignment between the two datasets similar to what we found. The authors conclude that *"Overall, the scatterplots reassure us that Eora and the OECD-WTO TiVA statistics are generally consistent with one another. Given this, we can feel somewhat more comfortable using Eora for countries for which the OECD-WTO data are not available. However, the researcher should be aware of possible problems, given the method by which the input-output table have been constructed for countries where no official supply-use tables are available. Some important country examples, such as China, Hong Kong etc. … depending on the year, have Eora data points that are not aligned with those of the OECD-WTO"* (page 19).

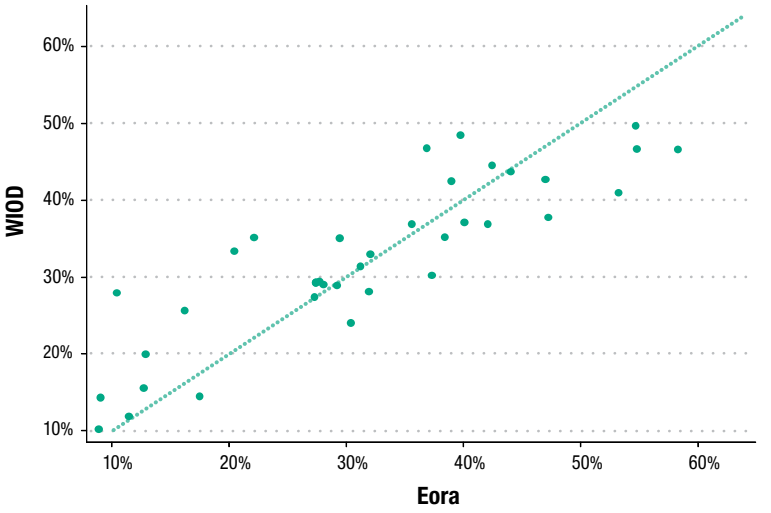
Comparison in UNCTAD (2013b), while quite limited in scope, is interesting because it uses the WIOD instead of OECD TiVA. The UNCTAD report shows that global average FVA shares estimated by UNCTAD-Eora and the WIOD are close, both in values and trends, and the difference is narrowing over time (figure 9a). Furthermore, the comparison of FVA shares at the country-level for 2009 reveals a strong correlation between data reported by UNCTAD-Eora and by the WIOD, close to 0.9, and a slope of the regression line at around 1 (figure 9b).

Figure 9. FVA shares of UNCTAD-Eora and WIOD (from UNCTAD, 2013b)

a. FVA share in exports, comparison between UNCTAD-Eora and WIOD



b. FVA share in exports by country, WIOD vs. UNCTAD-Eora, 2009



5. Concluding remarks: the importance of GVC data in the analysis of globalization

The analysis of GVCs has long occupied a central place in the analysis of trade and development. The concept gave development economists, in particular, an essential tool to examine the role of countries in the global production system and to identify opportunities for investment and growth in specific industries and value chain segments.

GVC analysis received a significant boost when data on value added in trade became available in the early part of this decade. The new data yielded many policy insights. For example, it was helpful in explaining the link between economies' openness to imports and export success; it showed the importance of services in GVCs; and it shed light on relative levels of GVC participation of, and integration between, countries and regions in the world.

The slowdown of trade growth relative to GDP growth after the global financial crisis again showed the utility of the new data as they helped to explain the factors behind the trend. At the time, GVC data could not provide all the answers, mainly because of the significant time lag inherent in most datasets. With the UNCTAD-Eora database now covering the full timespan since the financial crisis, the data show that GVCs reached an inflection point at about 2010-2012. Since then, foreign value added in exports has been stagnating after a lengthy period of continuous growth that started in 1990 (see UNCTAD, 2018, p. 22).

GVC data confirmed some important intuitions right away. A key insight was that GVCs have created an inextricable link between trade and investment. With the exchange of goods and services within the international production networks of MNEs comprising such a large part of global trade, it meant that the slowdown in global FDI flows – which today are still well below their peak level in 2007 – was a major factor behind the deceleration of global trade. The reverse is equally true; the current suite of policies designed to slow cross-border trade will have consequences for FDI. Trade and investment are two sides of the same coin – the very coin that ultimately pays for development.

The importance of GVC data as a barometer of trends in international production means the accuracy, universality and contemporaneity of the data are crucial. For these reasons, the efforts to renew and improve the UNCTAD-Eora dataset, as described in this paper, were undertaken.

The requests UNCTAD receives for GVC data are growing in number. This is in part owing to the realization among researchers that the dataset is reliable while the coverage has been expanded. The growing reliance on GVC data is also in large part the result of the current turbulence in the global policy environment for trade and investment. GVC analysis is critical to enable a serious assessment of the consequences of trade wars, including the shifting of supply chains, the effects on intra-firm trade and the potential relocation of production stages. It is also important for understanding other major global policy trends, such as the increasing reliance on regional economic cooperation, which is explained by the relatively greater importance of regional, over global, value chains.

GVC analysis is also relevant for understanding the impact of technology development on global trade and investment patterns. The digital economy and the new industrial revolution will cause important shifts in value chain-related sourcing patterns across geographies, industries and value chain segments. For policymakers, especially those in the 100+ countries that are actively pursuing industrial policies (cf. UNCTAD 2018), anticipating potential changes and identifying future opportunities for economic growth and development will be paramount.

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BOOK REVIEW

International Business

Peter J. Buckley, Peter Enderwick and Adam R. Cross
(Oxford University Press, 2018, ISBN 978-0-19-960209-4), 708 pages

International Business (IB) textbooks are not in short supply. Some of the IB textbooks found in university bookstores are well-established "classics" in two-digit editions. So, one may wonder why three prominent IB scholars – Peter Buckley, Peter Enderwick and Adam Cross – in collaboration with their university colleagues have ventured into this textbook project. The apparent answer is that some high ambitions, or "missions", have inspired the editing and writing of the book. As the editors/authors point out themselves in the Preface, this is the first IB textbook "to be explicitly theory driven" and parts of the book revolve around one theory, or conceptual framework: that of the *global factory*. The editors/authors put a great deal of effort into explaining how the global factory is different from the traditional view of the multinational enterprise (MNE). As senior scholars (like me) will know, back in the 1970s one of the editors/authors, Peter Buckley, was instrumental in developing this MNE view, also referred to as Internalization theory (Buckley and Casson, 1976). Whereas the internalization (or vertical integration) of value chain activities across borders is the hallmark of the traditional view of the MNE, the global factory is characterized by non-ownership coordination mechanism which, in turn, lets the global factory stand out as a more versatile and subtle institutional form in the international business landscape. As such, the resemblance between the global factory and the global value chain (GVC) (e.g., Gereffi et al., 2005; Strange and Humphrey, 2018) or the global production network (GPN) (e.g., Henderson et al., 2002) is remarkable. Since he envisaged the global factory more than ten years ago, Peter Buckley has promoted and refined the concept (occasionally in collaboration with other IB scholars, such as Pervez Ghauri and co-editor, Peter Enderwick) and this textbook featuring of the global factory seems only to be a natural extension and highlight of Peter Buckley's intellectual journey.

The global factory shares another feature with GVCs and GPNs, namely resilience – the ability to react smoothly and swiftly to changes in the global environment. This brings me to another ostensible ambition of the editors: the emphasis on implications to international management of an increasingly volatile global environment. A cocktail of climate change, geopolitical instability, migration pressure, disruptive technologies, risk related to cyber security, etc., increases the environmental volatility and brings resilience and flexibility in high demand among

business managers. More than any previous IB textbooks, Buckley, Enderwick and Cross's book captures this need for flexibility in international business. Recent – or rather, resurrected – anti-globalism only adds to this uncertainty and unpredictability in the conduct of business across borders. Whereas MNEs for quite some years have been subject to critical political scrutiny related to unethical behavior and (lack of) corporate social responsibility the rising concern about climate change is nowadays questioning the basic logic and sustainability of global specialization – the DNA of the global factory. Hence, the transportation of goods across countries and continents as well as businesspeople's intensive travelling activity that accompanies global specialization to this day will be subject to increasing criticism in the future. The book touches upon the implications to international business of the climate change and global warming agenda (as embodied, amongst others, in the United Nations' sustainable development goals), but presumably not to the extent it deserves.

In a fast-changing global environment, IB textbooks obsolesce at daunting speed and authors are almost doomed to start preparing the next edition as soon as they have completed the last sentence of the manuscript (which may be appreciated by the publisher but less so by the authors!). As an example, the geopolitical landscape may change dramatically over the next few years with "Brexit" and escalating trade wars on the horizon. Nevertheless, the Buckley et al. book is commendable for its theoretically updated text and the broad selection of topical cases. It also stands out positively from most other IB textbooks by its truly global perspective – nicely freed from the usual "Western" bias. The choice of cases is evidence of this "global", rather than "Western", perspective: of the 77 cases referring to individual or groups of countries, 46 involve non-Western countries and 14 of these are contextualized in emerging economies. I am pretty sure that the global perspective applied in the book was pursued deliberately and ambitiously by the editors. And yet, the global factory framework in some way is still entrenched in a Western MNE perspective. Emerging economy MNEs, in particular those that are State-owned, may be at odds with the lead firms described in the global factory. The global factory is first of all characterized by efficiency and flexibility as orchestrated by (Western) lead firms. The role of the State and the importance of close ties to the political elite in the home country is not highlighted (Alvstam et al., forthcoming). Since the editors have demonstrated expertise in internationalization of emerging economy firms (in particular Chinese ones), this expertise could be leveraged in a forthcoming edition of the book.

The book is arranged in three parts: The first part, Context and Rationale, explains the theoretical framework laid out in the book, including the global factory approach (but also international trade theory). Part two accounts for the external environment described by the institutional, political, societal and economic dimensions.

Hence, the structure almost follows the traditional PEST (political, economic, social, technological) analysis (and the more recent PESTEL [PEST + environmental and legal] analysis) but without explicitly focusing on technology and environmental factors. In an era of digitalization and where manufacturing firms across countries are enticed by the Industry 4.0 philosophy I would have liked a chapter that in a systematic way analyzed how the new technologies (e.g., robotization, additive manufacturing, internet of things) are likely to affect the location of production, economies of scale, and proximity to users, and thus bring about a reconfiguration of the global factory. Yet, the influence of new technology, not least the internet-based social networks, is touched upon in various chapters; e.g. in the chapter on societal dimensions and in a reshoring case in the chapter on foreign operation modes.

When it comes to the analysis of internationalization of services the usefulness of the global factory framework may be challenged (and the term itself, global *factory*, has become something of a misnomer). With the spread of the internet, a myriad of multinational, platform-based businesses have emerged (Airbnb, Spotify, Hotels.com, Uber, Facebook, eBay, etc.). Network externalities have spurred unprecedented and fast internationalization of these platform firms. Again, the book includes many references to this new breed of services MNEs, but I am curious to see how the global factory framework can accommodate platform firms as a new type of lead firm. I reckon that the knowledge component (including access to, and management of, big data) already emphasized in the global factory framework will be assigned even greater importance.

The book's third part, Managing the Global Factory, is the most extensive and takes up more than half of the pages. The ten chapters (plus a conclusion chapter) cover strategies in relation to the different value chain activities: marketing, production & logistics, innovation, finance, human resource management, and corporate social responsibility. Two chapters are about the formulation and implementation of strategies, respectively, and two more chapters cover topics directly related to IB, namely foreign operation modes and cross-cultural management. In other words, eight chapters cover topics that are not *per se* directly related to IB. The authors of these chapters were challenged by the question of how much basic stuff they should include. Can you expect the reader to know the basics about, say, marketing and just focus on the international aspects? Or, do you have to start "from scratch" so to say and run the risk of annoying the reader with trivialities? This is a delicate balance in any IB textbook, but in general I think the authors managed to find the right balance – both avoiding trivialities and sparing the reader unnecessary IB jargon. Despite the very different topics, I also found the chapters nicely interwoven inasmuch as they, one by one, relate the topic in question to the global factory framework.

Many authors contributed to the book (not least in Part III) with their expertise; all in all, ten authors in addition to the three editors (who also contributed as authors). Nine of these are from the Centre for International Business at the University of Leeds, or from the Lancaster University Management School. Given the international orientation of these two universities and the many IB competencies residing there, I prefer to see this geographical concentration as a strength rather than a weakness; and I can imagine that the geographical proximity of the contributors helped eased the task of coordinating the many chapters.

In conclusion, the IB textbook edited by Buckley, Enderwick and Cross sets a new standard in the field. The editors' high ambitions to (i) provide an overarching theoretical and conceptual foundation (the global factory); (ii) demonstrate the importance of resilience in a turbulent global environment; and (iii) apply a truly global perspective, are basically fulfilled. Notwithstanding the many outstanding qualities of the current textbook, a next edition may step up in terms of describing the effect of the environmental sustainability agenda and digital technologies on the global factory as well as highlighting the new breed of global factory lead firms: the digital platform firms and the ambidextrous market-political emerging economy firms. Hence, in an ever-changing global environment writing topical IB textbooks is indeed a Sisyphean, arduous and unthankful task!

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Guest Editor: Jennifer Poole (American University, Washington DC)

A long and well-established literature exists on the role of multinational enterprises (MNEs) in transferring technology around the globe, enhancing local productivity. Alongside the purely economic implications of foreign investment, transnational corporations are increasingly expected to maintain social and environmental responsibility and standards. The idea that cross-border investment spreads cultural norms and practice has received widespread attention among sociologists—for example, there is strong anecdotal evidence of multinationals spreading high-quality health standards and customer service. However, little econometric work exists largely due to data constraints. Importantly, we know very little about the impacts of foreign direct investment and multinational enterprises on gender policies and practice.

In this special issue, ***we focus on the role of multinational firms in promoting women's empowerment and gender equality across the world.*** The special issue will cover topics including (but not limited to) the following areas:

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