

Volume 29 • 2022 • Number 2

TRANSNATIONAL CORPORATIONS

INVESTMENT AND DEVELOPMENT



UNITED NATIONS

Volume 29 • 2022 • Number 2

TRANSNATIONAL CORPORATIONS

INVESTMENT AND DEVELOPMENT



UNITED NATIONS
Geneva, 2022

© 2022 United Nations
All rights reserved worldwide

Requests to reproduce excerpts or to photocopy should be addressed to the Copyright Clearance Center at copyright.com.

All other queries on rights and licences, including subsidiary rights, should be addressed to:
United Nations Publications
405 East 42nd Street
New York, New York 10017
United States of America
Email: publications@un.org
Website: <https://shop.un.org/>

The findings, interpretations and conclusions expressed herein are those of the author(s) and do not necessarily reflect the views of the United Nations or its officials or Member States.

The designations employed and the presentation of material on any map in this work do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

This publication has been edited externally.

United Nations publication issued by the
United Nations Conference on Trade and Development

UNCTAD/DIAE/IA/2022/3

UNITED NATIONS PUBLICATION

Sales no.: E.TNC.292 ISBN: 978-92-1-1130676 eISBN: 978-92-1-0019439

ISSN: 1014-9562 eISSN: 2076-099X

EDITORIAL BOARD

- Editors-in-Chief** James X. Zhan, *UNCTAD*
- Deputy Editors** Richard Bolwijn, *UNCTAD*
Amelia U. Santos-Paulino, *UNCTAD*
Heinz Tüselmann, *Manchester Metropolitan University, United Kingdom*
- Managing Editor** Kumi Endo, *UNCTAD*
- Board of Advisors** Olivier Bertrand, *Fundação Getulio Vargas – Brazilian School of Public and Business Administration, Brazil*
Peter Buckley, *University of Leeds, United Kingdom*
Jeremy Clegg, *Academy of International Business and University of Leeds, United Kingdom*
Lorraine Eden, *Texas A&M University, United States*
Xiaolan Fu, *University of Oxford, United Kingdom*
Gary Gereffi, *Duke University, United States*
Anabel González, *World Trade Organization, Switzerland*
Robert Koopman, *World Trade Organization, Switzerland*
Gabrielle Marceau, *University of Geneva and World Trade Organization, Switzerland*
Theodore Moran, *Georgetown University, United States*
Ram Mudambi, *Temple University, United States*
Pierre Sauvé, *World Bank Group, Switzerland*
Harsha V. Singh, *Former Deputy Director-General, WTO; Executive Director, Brookings India*
- Associate Editors** Tony Addison, *University of Copenhagen, Denmark*
Carlo Altomonte, *Bocconi University, Italy*
Pádraig Carmody, *Trinity College Dublin, Ireland*
Maria Alejandra Gonzalez-Perez, *Universidad EAFIT, Colombia*
Markus Krajewski, *Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
Jeffrey Owens, *Vienna University of Economics and Business, Austria*
Grazia Santangelo, *Copenhagen Business School, Denmark*
Rudolf Sinkovics, *University Glasgow, United Kingdom; LUT University, Finland*
Ana Teresa Tavares-Lehmann, *University of Porto, Portugal*
Tania Voon, *University of Melbourne, Australia*
Hinrich Voss, *HEC-Montréal, Canada*
Habib Zitouna, *University of Carthage, Tunisia*

**Editorial
Review Board**

Ilan Alon, *University of Agder, Norway*
Ulf Andersson, *Mälardalen University, Sweden*
Kazuhiro Asakawa, *Keio University, Japan*
Snehal Awate, *Indian School of Business, India*
Elitsa Banalieva, *Northeastern University, United States*
Helena Barnard, *University of Pretoria, South Africa*
Jonathan Beaverstock, *University of Bristol, United Kingdom*
Stephen Buzdugan, *Manchester Metropolitan University,
United Kingdom*
Bin Sheng, *Nankai University, China*
John Da Silva Luiz, *University of Sussex, United Kingdom*
John Dilyard, *St. Francis College, United States*
Stefano Elia, *Politecnico di Milano, Italy*
Maria Elo, *University of Southern Denmark, Denmark*
Peter Enderwick, *Auckland University of Technology, New Zealand*
Despoina Filiou, *The Open University, United Kingdom*
Susan Franck, *American University, United States*
David Freund, *Uppsala University and Mälardalen University,
Sweden*
Caroline Henckels, *Monash University, Australia*
Martin Hess, *University of Manchester, United Kingdom*
Jenny Hillemann, *Vrije University, Belgium*
Rory Horner, *University of Manchester, United Kingdom*
Kevin Ibeh, *Birkbeck, University of London, United Kingdom*
Vaneet Kaur, *Kent State University, United States*
Kathryn Lavelle, *Cape Western Reserve University, United States*
Andrew Mitchell, *University of Melbourne, Australia*
Sinead Monaghan, *Trinity College Dublin, Ireland*
Mike Morris, *University of Cape Town, South Africa*
Khalid Nadvi, *University of Manchester, United Kingdom*
Quyen Nguyen, *Henley Business School, United Kingdom*
Bent Petersen, *Copenhagen Business School, Denmark*
John Ravenhill, *University of Waterloo, Canada*
Stephan Schill, *University of Amsterdam, Netherlands*
Noemi Sinkovics, *University of Glasgow, United Kingdom*
Gabrielle Suder, *University of Melbourne, Australia*
Marjan Svetličič, *University of Ljubljana, Slovenia*
Xiaowen Tian, *Murdoch University, Australia*
Ari Van Assche, *University of Montreal, Canada*
Henry Yeung, *National University of Singapore, Singapore*
Stefan Zagelmeyer, *University of Manchester, United Kingdom*
Ivo Zander, *University of Stockholm, Sweden*

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 global reach, a strong development policy imprint and high potential for impact beyond the scholarly community. There are no fees or article processing charges associated with submitting to or publishing in *Transnational Corporations*. All articles of the online version of the journal are open access and free to read and download for everyone.

Aims and scope

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 cross-border investment, international production, multinational enterprises and other international investment actors affect sustainable development. The journal 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.

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. 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.

Transnational Corporations aims to provide a bridge between academia and the policymaking community. It publishes academically rigorous, research-underpinned and impactful contributions for evidence-based policy analysis and policymaking, including lessons learned from experiences in different societies and economies, in both developed- and developing-country contexts. It welcomes contributions from the academic community, policymakers, research institutes, international organizations and others.

In addition, *UNCTAD Insights* articles feature original research by UNCTAD staff, frequently conducted in collaboration with researchers from other organizations, universities and research institutions. The aim of the *UNCTAD Insights* articles is to

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).

advance and support research on investment and development, in line with UNCTAD's work programme, catalysing further work and helping to set a policy-relevant research agenda.

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 policymakers. UNCTAD's role as the focal point in the United Nations system for investment issues guarantees that its contents gain significant visibility and contributes to debates in global conferences and intergovernmental meetings, including the biennial *World Investment Forum* and the Investment and Enterprise Commission. The research published in *Transnational Corporations* feeds directly into UNCTAD 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 more than 160 countries and regional organizations. The journal thus provides a unique venue for authors' academic work to contribute to, and have an impact on, national and international policymaking.

For further information on the journal, including ethics statement and review policy, visit <https://unctad.org/Topic/Investment/Transnational-Corporations-Journal>.

CONTENTS

ARTICLES

Nigel Driffield, Holger Görg, Yama Temouri and Xiaocan Yuan 1
Multinational enterprises and the welfare state

**Belisa Ferreira Liotti, Joy Waruguru Ndubai, Ruth Wamuyu,
Ivan Lazarov and Jeffrey Owens** 25
The treatment of tax incentives under Pillar Two

Berna Dogan 47
Does FDI in agriculture promote food security in developing
countries? The role of land governance

RESEARCH NOTE

Vera Santomartino, Barbara Bratta and Paolo Acciari 75
Analysing MNEs structure and activities using country-by-
country reports. Evidence from the Italian dataset

UNCTAD INSIGHTS

Bruno Casella and Baptiste Souillard 99
A new framework to assess the fiscal impact of a global
minimum tax on FDI

Multinational enterprises and the welfare state*

Nigel Driffield,^a Holger Görg,^b Yama Temouri^c and Xiaocan Yuan^d

Abstract

This paper presents an empirical analysis on the extent to which a country's welfare spending influences foreign direct investment (FDI) decisions, particularly as they relate to relocations. We argue, and subsequently empirically test, that higher welfare spending by governments attracts foreign investment. Moreover, multinational enterprises (MNEs) located in high welfare spending countries have a lower likelihood of relocating to foreign markets compared with MNEs in countries with lower levels of welfare spending. Using data for MNEs in 27 OECD countries, our results show that MNE location decisions are positively related to welfare spending. These findings appear to be more pronounced for MNEs operating in high-tech rather than in low-tech manufacturing industries. Our results suggest that high welfare spending does deter FDI in the case of host developing economies, but that these effects are small. We suggest that this is a result of firms being more hesitant to invest in developing countries where they will be expected to contribute to welfare. This suggests that a degree of trust between firms and host country governments is required on institution building and the delivery of welfare. Our results suggest that the conventional wisdom of firms avoiding or relocating away from locations due to the associated additional costs of high welfare spending is questionable, but that firms need to be confident on the efficacy of this welfare expenditure.

Keywords: globalization, institutions, multinational enterprises, relocation, welfare state

JEL classification codes: F23, F68, H53, L23, P16

* Received: 17 May 2022 – Revised: 4 August 2022 – Accepted: 5 August 2022

We are grateful to the Editors and two anonymous referees for their helpful comments and suggestions. All remaining errors and shortcomings are ours.

^a Corresponding author. Warwick Business School, Warwick University, Coventry, United Kingdom (Nigel.Driffield@wbs.ac.uk).

^b Kiel Institute for the World Economy and University of Kiel, Kiel, Germany.

^c Khalifa University, Abu Dhabi, United Arab Emirates; Aston Business School, Aston University, Birmingham, United Kingdom.

^d Warwick Business School, Warwick University, Coventry, United Kingdom.

1. Introduction

Developed countries have experienced a rapid increase in international integration, as well as growing public sectors and expanding welfare states since the end of the Second World War. However, welfare support has declined in many developed countries since the global financial crisis (GFC) of 2008 following reductions in public spending. This *austerity* has partly been justified by the argument that high welfare spending is unsustainable in the context of globalization. More specifically, according to current conventional wisdom, large-scale public provision of social insurance and progressive systems of redistributive taxation are considered to be incompatible with globalization as they reduce the international competitiveness of countries. It is further argued that generous welfare state policies, as well as the taxation necessary to finance them, reduce international competitiveness as, among others, they contribute to additional costs to firms (Alesina and Perotti, 1997). Thus, a larger welfare state with higher tax rates is seen as detrimental to international competitiveness, and particularly a country's ability to attract and retain multinational enterprises (MNEs). Moreover, the risk that an MNE could leave or relocate increasingly mobile factors of production constrains national policy autonomy by reducing a governments' control over tax revenue (OECD, 1998; Sinn, 1997). We seek to challenge this orthodoxy by exploring the relationships between the most obvious facets of globalization, FDI decisions and welfare spending.

We argue that welfare state provisions impact the likelihood of a domestic MNE's relocation activity in a manner that runs counter to conventional wisdom. Thus, we challenge the conventional view and argue that welfare states and globalization are compatible as it enables firms to perform well in a stable environment which, in turn, helps to retain existing firms and attract new ones to high welfare locations.

We seek to challenge this common narrative, and aim to inform policymakers on the relationship between welfare spending and decisions relating to firm's location. We argue that common narrative that firms seek to avoid high welfare locations is misguided, but rather that welfare spending may attract firms, particularly in industries facing global shortages of talent. We compare the effects of welfare spending in influencing relocation away from a firm's country, as well as in terms of the importance of welfare spending in attracting inward investment in potential host countries. The increasing lack of welfare support in developed countries is similar to research that links international business and institutional voids (Cuervo-Cazurra, 2006; Habib and Zurawicki, 2002; Zhao et al., 2003). This literature (e.g. Khanna and Palepu, 2010) considers the extent to which voids are an additional cost to business, or if they compound business risk. Similarly, we argue that a lack of welfare provision also adds costs to business operations.

By changing the economic environment in which governments operate and exposing all economies to new but *common* pressures, globalization is seen as leading to a downward convergence to *similar* policy outcomes, e.g. a lower provision of redistributive and welfare state programmes and lower tax rates (Mishra, 1998 and 1999).¹ At its most extreme, this argument foresees a “race-to-the-bottom”, resulting in the de-facto disappearance of nation-states as independent sovereign entities (Ohmae, 1990).

The response to such issues within the international business literature is to employ the ideas developed by Hall and Soskice (2001), and their institutional analysis of varieties of capitalism (VOC). The VOC framework classifies countries as either liberal market economies (LMEs) or coordinated market economies (CMEs) according to various economic, social and institutional dimensions. While this framework places the firm at the centre of the analysis, in terms of the strategy being shaped by its institutional environment, Hall and Soskice (2001) also argue that the welfare state is more developed in CMEs than in LMEs. Therefore, one can argue that the nature of a country’s welfare state is likely to impact a firm’s location decisions. For example, Witt and Jackson (2016) link differences in countries’ comparative advantage across various sectors to the VOC framework, arguing that more liberal economies have higher levels of more radical innovation but also possibly lower levels of welfare spending.

We seek to develop this line of argument further and argue that welfare state provisions are another unique aspect of the institutional environment of countries which, in turn, contribute to their attractiveness to foreign MNEs. We also examine how welfare spending influences the location decisions of firms, with a particular focus on relocations away from the home country.

A unique set of firm-level data is used to define relocation events and link them with welfare spending in both a firms’ home and host countries. For reasons explored in more detail below, we provide empirical results for two distinct sub-samples before the GFC of 2008 and up to the period in which social expenditure expanded dramatically before the COVID-19 pandemic. In this way, we seek to extend the

¹ These premises are embedded even in those arguments that put forward more complex accounts of the relationship between globalization and the welfare state. The two foremost examples of this are: (i) the *compensation hypothesis* (Rodrik, 1997 and 1998), which explains the continued expansion of the welfare state as a response to the rising demands for social insurance resulting from exposure to the increasing external risk and economic dislocations caused by growing international openness; and (ii) the “varieties of capitalism” argument (Esping-Andersen, 1990), which stresses that the impact of globalization on welfare states are mediated through the national institutions and structure, such as the nature of the socio-political representation system (e.g. type of electoral representation), the nature of the welfare state (e.g. its degree of universalism) and the characteristics of the labour market (e.g. the degree of wage setting centralization). All point to the possible emergence of a small number of different *regime-specific* outcomes.

work of Cuervo-Cazzura and Dau (2009) who explore the link between institutional quality and firm performance, and the importance of welfare spending and an MNE's relocation decisions. To the best of our knowledge, this is the first paper to do this.

Our results show that a larger welfare state does not push MNEs to relocate activity away from the home country, and that overall, welfare spending serves to both attract and retain international investment. This result is stronger for high-tech MNEs than for low-tech MNEs. We also suggest that high welfare spending in developing countries in recent years has acted to deter FDI, although the effect is very small. This, we believe provides several insights into the relationship between international business and many current issues. For example, the United States is in the process of scaling back the provision of publicly funded healthcare, while similar debates on health and welfare spending were at the centre of the Brexit debate in the United Kingdom and the French presidential election of 2022. The common mantra is that countries need to have low taxation to remain competitive, and that this implies lower welfare spending.

The rest of this paper is organized as follows. In the next section, we provide an overview of the relevant theoretical framework and previous literature from which we develop several testable hypotheses. The subsequent section describes the data and research design. Section four presents the results followed by a discussion. The final section concludes and provides some takeaways for policymakers.

2. Literature review and hypotheses

2.1 Importance of welfare for international business

Welfare spending is as an important indicator within the VOC literature in the post-GFC period (Hall and Soskice, 2001; Jackson and Deeg, 2008). However, while the VOC literature provides a framework for examining this issue, it is narrowly concerned with classifying or grouping economies. The work of Hall and Soskice (2001) identifies the five key areas used for distinguishing between VOCs, namely: (i) industrial relations; (ii) corporate governance; (iii) financial markets; (iv) inter-firm relations; and (v) the management of employees and their contribution to the firm. It is our assertion that the existence – or otherwise – of a suitable welfare system is a crucial element of this aspect of employee management, and that insufficient attention has been paid to this, particularly in the context of the role of the state. Thus, we aim to move beyond merely characterizing or classifying countries by their levels of welfare support, and go on to explore how these variations lead to different firm responses.

Various strands of literature examining institutional quality adopt different approaches, which range from co-evolutionary concepts (e.g. Volberda and Lewin, 2003) to the importance of institutions in supporting firm development and local innovation systems (e.g. Dosi, 1999). For example, Rodrik (1998) argues that increasing globalization gives rise to a riskier environment, which is compensated by a welfare state. Similarly, De Grauwe and Polan (2003) find that social spending increases competitiveness via the contribution made by welfare to worker mobility and productivity. In general, these findings run counter to the conventional wisdom of larger welfare states acting as a barrier to competitiveness, as espoused by Alesina and Perotti (1997).

Witt and Lewin (2007) argue that a country's ability to attract and retain internationally mobile capital is not only an important aspect of globalization, but also a good indicator of its international competitiveness. Görg et al. (2009) argue that FDI flows are relatively liquid ex-ante, and characterized by significant immobility ex-post, which favours a long-lasting ownership stake in a host country. This would suggest a positive relationship between social expenditure and inward FDI. We build on this view and suggest that welfare spending, in addition to presenting reduced risk to the firm, illustrates the development of the economy and support for its citizens, and that this stability acts to attract and retain MNEs. This framework has its roots in the analysis of transition economics and institutional development, and MNE location choices in transition economies more generally (e.g. Henisz and Zelner, 2005; Meyer and Peng, 2005; Peng and Heath, 1996). In its original setting, this framework focuses on institutional quality and the attractiveness of locations (Agarwal and Ramaswami, 1992; Brouthers, 2013).

Welfare expenditure needs to be seen in the same context as other institutions and other business support mechanisms. There will always be “winners and losers” in any competitive process. Welfare spending encourages people to take risks or to be innovative; if these incentives prove unsuccessful, individuals relying on them have a safety net (Leonard and Van Audenrode, 1996). It also ensures that the intrinsic human capital belonging to such people is not lost to society. Along with limited liability, people are supported back into employment, or self-employment, and continue to contribute to the economy (Taylor-Gooby et al., 2004). Moreover, welfare spending reduces the potential risk to existing firms from the absence of any safety nets for their workers in case of old age, sickness or parenthood, which may increase social cohesion, worker productivity and contentment (Andreotti et al., 2012).

In addition, one could argue that welfare spending reduces the risks to a firm's investment. If workers are better supported when they fall ill or lose their jobs, their spending power is only likely to fall by a lesser extent. Equally, key workers are less likely to go on extended periods of absence, either through illness or because they

need to look after family members. Apart from reducing the risk associated with the absence of social safety nets, welfare spending also underpins labour market efficiency. Javorcik and Spatareanu (2005) show that location choice and the volume of FDI are positively related to labour market flexibility in the host country. Such labour market flexibility attracts firms, not with the prospect of lower wages, but with lower unit labour costs through higher productivity and a better allocation of resources.

An analysis of the Danish labour market (Bredgaard et al., 2005) is also instructive here. This analysis attributes the success of the Danish labour market in generating employment protection and flexibility as resulting from occupational mobility and long-standing policies designed to assist the unemployed to re-enter the labour market. This strategy of “flexicurity” in the labour market benefits firms, particularly MNEs wishing to benefit from the greater flexibility it affords and from the international division of labour; however, welfare spending is needed for it to function properly. In their search for locations MNEs will implicitly link welfare spending to the reduction of risk in securing flexible working patterns within their own business, and elsewhere in the supply chain. Also, welfare spending helps to cope with agency problems that apply to firms’ responses to changing environments before as well as after the investment.

Of course, high tax rates are needed to sustain welfare spending. This then implies that firms prefer locations with low levels of welfare spending and low tax rates (Görg et al., 2009). However, we argue that this is a partial view, and that a distinction needs to be made between tax and welfare.² It is important to see welfare as an important host country *institution*, as well as one that can determine a country’s ability to attract and retain foreign investors.

From an MNEs’ perspective, such interventions to promote institutional quality and reduced transactions costs can have an impact on firm performance. Indeed, international business literature shows a clear link between institutional characteristics and firm performance. An early contribution to this relationship was developed by Wan and Hoskisson (2003) who show how macro-environments at the country level can influence the performance outcomes of the diversification strategies of MNEs. Since then, more detailed and disaggregated firm-level data also shows how improved institutional quality (e.g. lower levels of corruption, lower risks of expropriation, and easier access to improved capital markets) reduces

² The relationship between tax rates and firm location is not addressed, although much of the recent evidence suggests that there is only, at most, a weak relationship between overall corporate tax rates and firm location. What is more important to the firm is the treatment of allowances for licensing and other deductions, which are agreed with tax authorities on a case-by-case basis (de Mooij and Ederveen, 2003; Devereux and Griffith, 1998; Gordon and Hines, 2002; OECD, 2008).

uncertainty and transactions costs. This improves firm-level investment decision-making through market efficiency which, in turn, affects a subsidiary's performance (Cuervo-Cazurra and Dau, 2009; Dau and Cuervo-Cazurra, 2014; Driffield et al., 2013, 2014 and 2016; Gaur, et al. 2007). As welfare spending is, in our view, yet another aspect of institutional quality, we expect a similar link between the welfare state and firm performance.

An expansive body of literature on welfare spending and social cohesion builds on the work undertaken by Hicks and Swank (1992), as well as the more recent work by Andreotti et al. (2012) on Europe, and Kaufman and Segura-Ubierno (2001) on Latin America. This literature, which has its roots in both sociology and political science, argues that welfare spending is required to maintain the rule of law and limit corruption. The argument is essentially that, in contexts where a safety net exists, crime is less likely to occur, corruption levels are likely lower, and bureaucratic quality has improved. Such safety nets not only improve the business environment, but also increase the likelihood of firms locating or retaining activities within a given country. This is a common finding in work that explores the link between FDI and corruption (e.g. Cuervo-Cazurra, 2006). As alluded to above, the importance of welfare in supporting business was highlighted in a survey of MNEs where a "stable social and political environment" was found to be an important factor in determining the attractiveness of an investment location. Hence, welfare spending plays an important role in signalling a government's commitment to social stability. This leads us to the following hypotheses:

Hypotheses 1: Higher welfare spending by a country is negatively related to the likelihood of relocation away from a country.

Hypothesis 2: Higher welfare spending by a country is positively associated with its ability to attract relocating firms.

Our final hypothesis concerns the type of activity in which firms are engaged in and the location of core technology. The two forces at play here suggest that welfare spending will impact the location decisions of high-tech and low-tech firms differently. Firms are increasingly engaged in a global war for talent (Beechler and Woodward, 2009). The extent to which leading firms experience significant skill shortages, particularly in senior scientific, technical and managerial positions, has been known for about 20 years, following the famous McKinsey report (Chambers et al., 1998). Many locations are looking to build on existing clusters and chasing the same high-tech industries, which they perceive as engines of growth and new technology. There is a well-developed literature in economic geography, dating back to Porter (1990), which links the siting of high-tech activity to that location's economic performance. We argue, therefore, that if welfare spending improves the performance of firms, it will disproportionately attract or retain high-tech firms.

We nuance the above argument by considering the respective attitudes of the two types of firms to risk. Viewing welfare as an important institution, we borrow from the analysis of Driffield et al. (2014) who highlight the risk aversion that firms attach to the location of their core technology and strategic assets, both in terms of capital and labour. Higher welfare spending reduces the risk of social unrest or instability, and is therefore positively associated with high-tech activity. As such, a country's high welfare spending reduces the risk associated with a location, as it signals a government commitment to social contentment and stability (Görg et al., 2009). As high-tech firms use state-of-the-art technology, which may require a workforce with a particular skill set, it may be costly for them to lose employees and to have to search again for similarly skilled individuals who may be difficult to find. Hence, firms become less likely to locate high-tech activity away from high-quality welfare support protecting workers.

The second aspect of this argument is based on the literature on institutional voids, and the extent to which firms find themselves taking on roles to fill certain voids. For example, high-value employees, typically expatriate workers, are provided with private healthcare, private education and private security, as part of what the human resources and practitioner-based location marketing literature refer to as the "war for talent" (Beechler and Woodward, 2009). This typically only occurs where firms perceive the need to protect strategic assets, and does not extend to more basic activities.

In contrast, low-tech firms are potentially less concerned about the protection offered to individual employees. They likewise are less to use sophisticated production techniques requiring special skill sets. They do not offer private welfare support to their employees and tend to locate in places where such labour is abundant. Hence, if workers were to leave the firm, they could easily rehire similarly skilled individuals. This leads to our third hypothesis:

Hypothesis 3: Welfare spending is more important in the location decisions of high-tech firms than low-tech firms.

3. Data and empirical model

The dataset is collected from ORBIS,³ which is a comprehensive and rich firm-level dataset provided by Bureau van Dijk.⁴ The latter collects financial, economic and other firm-level information from various sources, including official bodies, such as Companies House in the United Kingdom and similar commercial and official registries in other countries. We use financial data for every MNE included in the database. An MNE is defined as having an ownership of greater than 10 per cent in a foreign affiliate. The ORBIS database provides information on a MNE's characteristics, e.g. location, output, employment, labour intensity, productivity, and industry classification on an annual basis. This provides crucial information on whether they have reduced their operations at home, and concurrently set up new affiliates in host countries.

Data is considered for two distinct periods: the first of these is from 1997 to 2007 and ends at the onset of the GFC of 2008 as the data is somewhat volatile towards the latter end of the period. The second period is from 2013 to 2019 and covers the period between the recovery from the GFC and the onset of the dramatic expansion of welfare expenditure during the COVID-19 pandemic. All monetary values are deflated using GDP deflators to take account of inflation. The countries covered in the data are shown in table 1. As pointed out above, the conventional wisdom generally holds that economic globalization invariably leads to retrenchments of welfare state provision. Data providing a measure of total public social expenditure by country and as a percentage of GDP for the period 1997–2019 (Görg et al., 2009) is used to investigate the development of welfare state provision. These data from the OECD's Social Expenditure Database provides internationally comparable statistics on public and (mandatory and voluntary) private social expenditure. The social policy areas covered in the data relate to expenditure on: (i) old age; (ii) incapacity-related benefits; (iii) health; (iv) family; (v) unemployment; (vi) active labour market programmes; (vii) housing; and (viii) other social policy.⁵ As no data on social expenditure to GDP are available for developing host countries, we therefore use a very similar OECD measure, namely total government expenditure as a percentage to GDP. Table 2 contains the correlation matrix for the sample of manufacturing MNEs. Definitions of the variables used in the analysis are provided in the following sub-sections.

³ ORBIS reports firm accounts in either consolidated or unconsolidated form. We only include unconsolidated accounts as they represent the domestic activities of firms and exclude any information from affiliates at home or abroad. In contrast, consolidated accounts aggregate the activities of all firms belonging to a group worldwide, regardless of location and industrial affiliation.

⁴ For further details, including access issues, see www.bvdinfo.com.

⁵ Further information is available at www.oecd.org/social/expenditure.htm.

Table 1 shows the development of welfare state provision for the OECD countries in our sample. We show the level of expenditure in 1997 and compare it with the level in 2007, 2013 and 2019. In general, we find a wide variety of welfare expenditure. As one may expect, Scandinavian countries, e.g. Denmark Finland and Sweden, top the welfare expenditure list across our observation period, while Mexico, the Republic of Korea and developed countries, such as the United States, have the lowest levels between 1997 and 2007. It is also worth noting that Belgium, France and Italy reach similar levels as the Scandinavian countries during the second period. A mixed picture emerges in the change of expenditure over time. Sweden shows some evidence of reductions in total expenditures in the latter period, whereas Hungary and Ireland experience falls in 2019, compared to 2013 values. Nevertheless, a majority of countries on the list report increases, including Belgium, Italy, Norway and Spain which enjoyed the strongest growth. Hence, there is no strong evidence in these data to support suggestions that a “race-to-the-bottom” is occurring.

The remaining columns in the table show the distribution of MNEs in each country that have decided to either relocate or not over the two periods. In our sample, 13.1 per cent of all MNEs decided to relocate between 1997 and 2007, and the share is 9.1 per cent for the latter period but these mask significant heterogeneity across the various countries.

3.1 Dependent variable

A “relocation” in our empirical analysis is defined as a firm reducing their operations at home by more than 10 per cent of their size, as measured in the number of employees, while concurrently opening up a new foreign affiliate or acquiring an existing firm abroad. This definition is similar to Pennings and Sleuwaegen (2000). The establishment of a foreign affiliate is based on its date of incorporation. A firm owns a foreign affiliate if it holds at least 10 percent of voting shares. Our dependent variable is captured as a dummy variable equalling 1 if a firm reduces its operations at home by more than 10 per cent of their size (as measured in number of employees), and at the same time opens up a new foreign affiliate or acquires an existing firm abroad.⁶

⁶ Note that a firm may have more than one foreign affiliate and may therefore potentially engage in multiple relocations in different countries. Our definition implies that the relocation dummy will be 1 for the home country under these conditions, irrespective of how many new investments there are abroad. It does not matter whether the reduction in operations at home is accompanied by one or many new investments abroad.

Table 1. Distribution of MNEs and welfare expenditure, by OECD country, 1997–2007 and 2013–2019

	1997–2007				2013–2019 ^a			
	Welfare state expenditure as % of GDP in 1997	Welfare state expenditure as % of GDP in 2007	Number of firms relocating	Percentage of firms that relocate (%)	Welfare state expenditure as % of GDP in 2013	Welfare state expenditure as % of GDP in 2019	Number of firms relocating	Percentage of firms that relocate (%)
Austria	26.2	25.9	528	11.7	28.3	26.9	60	11.7
Australia	15.9	16.3	40	2.5	21.3	21.8 ^d	22	31.8
Belgium	25.2	25.4	801	16.2	29.2	28.9	147	10.9
Canada	17.0	16.2	477	2.3	17.0	18.0 ^c	..	..
Czechia	17.5	17.9	242	20.2	21.1	19.2	42	7.1
Denmark	26.9	26.0	321	10.3	32.6	28.3	20	5.0
Estonia	15.2	12.7	44	27.3	15.6	17.7	..	..
Finland	27.5	23.7	316	25.9	29.5	29.1	99	19.2
France	29.3	28.8	1 494	11.0	31.7	31.0	207	9.7
Germany	26.1	24.8	1 959	7.7	27.2	25.9	346	9.8
Greece	18.0	21.5	28	3.6	25.9	24.0	..	..
Hungary	21.2	22.9	31	3.2	22.2	18.1	7	14.3
Ireland	15.8	16.6	53	5.7	21.5	13.4	6	33.3
Italy	22.9	24.8	2 644	19.9	29.1	28.2	506	7.9
Japan	14.5	18.6	422	14.7	22.7	22.7 ^d	545	5.7
Korea, Republic of	3.6	7.6	54	18.5	9.5	12.3	..	..
Mexico	4.0	6.7	47	10.6	7.6	7.5	..	..
Netherlands ^b	21.8	21.1	–	–	24.1	16.1	7	28.6
Norway	21.6	20.0	220	16.4	23.2	25.3	44	18.2
Poland	21.8	19.4	72	5.6	20.5	21.3	11	18.2
Portugal	16.6	22.4	161	7.5	25.8	22.6	24	4.2
Slovenia	22.6	20.0	95	22.1	23.8	21.1	..	..
Slovakia	18.0	15.6	113	17.7	17.7	17.7	..	..
Spain	20.6	21.3	1 454	12.2	25.7	24.7	211	6.2
Sweden	30.2	27.0	744	20.4	27.4	25.5	47	10.6
Switzerland	18.0	17.7	1 017	10.7	26.1	27.4 ^c	..	..
United States	14.4	15.8	1 006	1.9	18.8	18.7	..	..
United Kingdom	18.3	20.1	523	18.0	23.3	20.6	125	11.2
Total	-	-	14 906	13.1	-	-	2 476	9.1

Source: Authors' compilation based on data from OECD social expenditure database (for welfare state expenditures); ORBIS and the Orbis crossborder investment database (for firms that are relocating).

Note: The sample from 2013 to 2019 may not contain the same companies covered in 1997–2007 given that the latter sample is generated using Orbis cross-border investment database. However, we do not believe that this can be a problem because results for the latter period remain largely the same and they present a robustness test for the earlier period.

– Nil.

- Not applicable.

.. Not available.

^a For welfare state expenditure, countries are included for a restricted period due to information availability. For the number of firms and percentage of relocation, several countries did not enter the regression sample because there is no complete data coverage for each year in the 2013–2017 period.

^b For the period 1997–2007, we did not observe any firms relocating from the Netherlands, which means that this country did not enter the regression sample for this period.

^c Latest available information in 2018.

^d Latest available information in 2017.

3.2 Independent variables

We include several independent variables in our empirical estimation model. One of the main variables of interest is “home welfare spending”, which is defined as the total public social expenditure by country as a percentage of GDP for every home country in our sample. Firm size is measured via the natural logarithm of a firm’s total turnover. Labour intensity is included as the ratio of the number of employees to turnover. We also include a measure of productivity, namely unit labour costs which is the ratio of a firm’s average wage over turnover level. Host welfare spending is included as the total public social expenditure by country, and as a percentage of GDP for every host country in our sample. Industry differences are captured by including NACE two-digit sector dummies. Eurostat classifies high-tech industries in accordance with the following 2-digit NACE industry codes: 24, 29, 30, 31, 32, 33, 34 and 35; and low-tech industries are classified by the following 2-digit NACE

Table 2a. Descriptive statistics for key variables, 1997–2007

Variable	All manufacturing industries				
	Mean	Standard deviation	Minimum	Maximum	Number of observations
Home welfare spending	24.691	3.986	5.140	30.400	47 945
Firm size	5.426	1.785	0.693	12.141	47 945
Labour intensity	0.004	0.006	0.000	0.130	47 945
Unit labour costs	0.043	0.046	0.000	0.638	47 945
Host welfare spending	21.393	5.491	3.707	30.400	47 945

Source: Authors' calculations.

Note: The detailed variable definitions are provided in section 3.2.

Table 2b. Descriptive statistics for key variables, 2013–2019

Variable	All manufacturing industries				
	Mean	Standard deviation	Minimum	Maximum	Number of observations
Home welfare spending	26.354	3.286	13.590	32.570	169 799
Firm size	12.369	1.815	2.794	15.197	169 799
Labour intensity	0.003	0.003	0.000	0.130	169 799
Unit labour costs	0.003	0.024	0.000	0.601	169 799
Host welfare spending	21.121	6.089	7.237	32.901	169 799

Source: Authors' calculations.

Note: The detailed variable definitions are provided in section 3.2.

industry codes: 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 36 and 37. Descriptive statistics are provided for our main variables in tables 2a and 2b.

3.3 Empirical model

We estimate the propensity to relocate for firm i , $Pr(D)_{it}$, is conditional on the levels of social expenditure in the home and the host country, as well as other control variables:

$$Pr(D)_{it} = \beta_1 Welfare_{st} + \beta_2 Welfare_{ht} + \beta_3 X_{it} + \varepsilon_{it} \quad (1)$$

where $Welfare_{st}$ is the share of social expenditure in GDP in firm i 's home country s at time t and $Welfare_{ht}$ is the equivalent in the host country. X_{it} is a vector of explanatory variables at the firm level, as explained above. The model also includes full sets of industry, year and country dummies.⁷

We estimate equation (1) using marginal effects Probit models for the manufacturing sector, as well as high-tech and low-tech manufacturing industries, separately. We begin by estimating the relocation activity to all destinations and distinguish between activities in developed and developing countries. All independent variables are lagged over one period to reduce simultaneity problems. Tables 3a and 3b provide correlation matrices. The individual correlations between the explanatory variables are low and after conducting variance inflation factor (VIF) measurements, they seem not to suggest any multicollinearity problems.

Table 3a. Correlation matrix for key variables, 1997–2007

Variable	All manufacturing industries				
	Home welfare spending	Firm size	Labour intensity	Unit labour costs	Host welfare spending
Home welfare spending	1	-	-	-	-
Firm size	0.0848	1	-	-	-
Labour intensity	0.0008	-0.0006	1	-	-
Unit labour costs	0.0249	-0.0951	0.0003	1	-
Host welfare spending	0.0259	0.0107	0.0026	-0.0025	1

Source: Authors' calculations.

Note: The detailed variable definitions are provided in section 3.2.

⁷ One may argue that our model should include more country-level controls (e.g. taxation or labour market regulations) to improve the accuracy of the estimation. Our assumption here is that such effects would be at least partially captured by a country's fixed effects.

Table 3b. Correlation matrix for key variables, 2013–2019

Variable	All manufacturing industries				
	Home welfare spending	Firm size	Labour intensity	Unit labour costs	Host welfare spending
Home welfare spending	1	-	-	-	-
Firm size	-0.2748	1	-	-	-
Labour intensity	0.0131	-0.2174	1	-	-
Unit labour costs	0.0316	-0.3287	0.3305	1	-
Host welfare spending	-0.0023	0.0045	-0.0001	-0.0014	1

Source: Authors' calculations.

4. Results

The relationship between welfare spending and location is presented in table 4. The table presents the regression results for the whole manufacturing sector during the periods of 1997–2007 and 2013–2019. The negative coefficient on *home welfare spending* indicates that MNEs are less likely to relocate when the home country's welfare state is well developed. While the coefficient is only statistically significant for the 1997–2007 period, it is also negative – although less precisely estimated – over this period. Overall, this result does not support the conventional wisdom that welfare state expenditure pushes MNEs to invest more abroad at the detriment of expanding at home. At the same time, the coefficient on *host welfare spending* is positive (and statistically significant in both cases), indicating that MNEs are more likely to relocate to host countries with generous welfare state provisions.

Taking these results together, we can confirm our first and second hypothesis, namely that welfare spending tends to support MNEs and that firms are both attracted and retained by welfare spending. This suggests that while one can interpret welfare spending as an institution, one could also extend it to the importance of welfare spending to labour markets voids which would otherwise deter FDI.

The subsequent estimates, reported in table 5, distinguish between technology levels and offer a test of hypothesis 3, which states that welfare spending may be more important for relocation decisions in high-tech industries. The results for the two periods are in line with this hypothesis when considering *home welfare spending*. While home welfare spending matters for relocations in both high- and low-tech manufacturing industries in the 1997–2007 period, the estimated coefficient size for the high-tech industries is almost twice that of the low-tech industries. In the 2013–2019 period, we find that home welfare spending only returns the expected negative coefficient for the high-tech industries.

Table 4. Relocation and social expenditure, baseline results

	All manufacturing industries	
	1997–2007	2013–2019
	Relocate	Relocate
Home welfare spending_{t-1}	-0.0179*** (0.0036)	-0.0001 (0.0001)
Firm size_{t-1}	-0.0133*** (0.0050)	0.0000 (0.0001)
Labour intensity_{t-1}	0.0001 (0.0003)	0.0089*** (0.0027)
Unit labour costs_{t-1}	-0.0116** (0.0053)	-0.0009 (0.0042)
Host welfare spending_{t-1}	0.0003** (0.0001)	0.0001*** (0.0000)
Home country	Yes	Yes
Industry (NACE Rev. 2 digit)	Yes	Yes
Year	Yes	Yes
Predicted probability	0.0315	0.0014
Pseudo R-squared	0.046	0.052
Log pseudolikelihood	-71 838.449	-1 738.325
Observations	47 945	169 799

Source: Authors' calculations.

Note: Average marginal effects from Probit Model estimation of equation (1) are reported. Explanatory variables are lagged one year. All specifications include a full set of country, industry and year dummies. Standard errors (clustered at the country level) in parentheses, *** p<0.01, ** p<0.05, * p<0.10.

In these high-tech manufacturing industries, the focus on the “war for talent” is particularly fierce (Beechler and Woodward, 2009). In such contexts, labour market voids created through the absence of welfare support deter high-tech firms and encourage their relocation. While the issue of skill shortages among high-tech firms has been known for some time, no one appears to have considered it in the context of welfare spending and FDI. The results further suggest that welfare expenditure reduces the likelihood of relocation away from a country. Hence, it seems that firms attach value to a home country’s welfare state.⁸

⁸ One may argue that, if the main point of hypothesis 3 is about the “war for talent”, then the main variable of interest should be public expenditures in education and R&D. While this appears reasonable, we should stress that the “war for talent” is only one aspect of hypothesis 3, the other important point being the avoidance of labour market risks for high-tech firms (see section 2.1).

Table 5. High-tech versus low-tech manufacturing

	High-tech manufacturing	Low-tech manufacturing	High-tech manufacturing	Low-tech manufacturing
	1997–2007	1997–2007	2013–2019	2013–2019
	Relocate	Relocate	Relocate	Relocate
Home welfare spending $_{t-1}$	-0.0214*** (0.0051)	-0.0128*** (0.0049)	-0.0004** (0.0002)	0.0003 (0.0003)
Firm size $_{t-1}$	-0.0126*** (0.0046)	-0.0127* (0.0075)	0.0000 (0.0001)	0.0000 (0.0001)
Labour intensity $_{t-1}$	-0.0004 (0.0007)	0.0002 (0.0002)	0.0071 (0.0060)	0.0093** (0.0039)
Unit labour costs $_{t-1}$	-0.0129*** (0.0050)	-0.0087 (0.0080)	0.0001 (0.0058)	0.0040 (0.0058)
Host welfare spending $_{t-1}$	0.0002 (0.0002)	0.0005** (0.0002)	0.0001** (0.0000)	0.0001*** (0.0000)
Home country	Yes	Yes	Yes	Yes
Industry (NACE Rev. 2 digit)	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Predicted probability	0.0294	0.0324	0.0013	0.0016
Pseudo R-squared	0.0641	0.0398	0.064	0.053
Log pseudolikelihood	-34 045.174	-37 364.158	-848.755	-875.217
Observations	23 265	24 638	89 615	78 580

Source: Authors' calculations.

Note: Average marginal effects from Probit Model estimation of equation (1) are reported. Explanatory variables are lagged one year. All specifications include a full set of country, industry and year dummies. Standard errors (clustered at the country level) in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The weaker results for the low-tech industries may be because production in these industries is generally quite labour intensive. Hence, labour costs may matter more in location and relocation decisions than a social and economic environment that may be characterized by welfare expenditure. Importantly, however, results for the low-tech industries also do not support the conventional wisdom that would postulate a statistically positive relationship between a home country's welfare expenditure and inward FDI.

Our results are less clear cut when considering *host welfare spending*. Here we find that in the early period, home welfare spending has the expected positive effect on attracting relocating MNEs in both the high-tech and low-tech industries, though the effect is stronger (and statistically significant) in the low-tech industries. In the latter period, there is no discernible difference in the size of the effect across the two manufacturing industries.

Investing firms are all from the 27 OECD countries and relocate to both developed OECD and non-OECD countries. In an extension to the analysis, in table 6 we distinguish these relocations to developed and developing economies. These two groups of countries may be considered different in terms of their level of development and institutional quality.

Our empirical results concerning the role of *home welfare spending* do not show any strong differences across country groups. However, this is different for *host welfare spending*. In low-tech sectors we find that the positive effect of host welfare spending on attracting MNEs only holds for relocations to developed countries and not to developing markets for both periods. This is somewhat similar for the high-tech industries, where a statistically significant and positive effect for relocations to developed economies was only found for the 2013–2019 period. Interestingly, however, we also find that relocations to developing countries are negatively affected by higher host welfare spending for this period. Taken together, these results may suggest that a certain level of institutional quality, i.e. of a type available in developed countries, is needed for firms to be attracted by high welfare spending. In the absence of such a level of institutional quality, higher welfare spending may be ineffective and potentially deter new firm locations, as suggested by our results for 2013–2019.

Table 6. Developed versus developing countries

	High-tech manufacturing		Low-tech manufacturing		High-tech manufacturing		Low-tech manufacturing	
	1997–2007	1997–2007	1997–2007	1997–2007	2013–2019	2013–2019	2013–2019	2013–2019
Home welfare spending _{<i>t-1</i>}	Relocate to developed countries	Relocate to developed countries	Relocate to developed countries	Relocate to developed countries	Relocate to developed countries	Relocate to developed countries	Relocate to developed countries	Relocate to developed countries
	-0.0227*** (0.0059)	-0.0165*** (0.0046)	-0.0120** (0.0052)	-0.0183** (0.0078)	-0.0004** (0.0002)	-0.0034* (0.0019)	0.0003 (0.0003)	0.0018 (0.0023)
Firm size _{<i>t-1</i>}		-0.0137** (0.0058)	-0.0089 (0.0077)	-0.0319*** (0.0059)	0.0000 (0.0001)	0.0005*** (0.0001)	0.0000 (0.0001)	0.0006** (0.0003)
Labour intensity _{<i>t-1</i>}		-0.0004 (0.0008)	0.0005 (0.0009)	0.0002 (0.0002)	-0.0003 (0.0015)	0.0075 (0.0070)	-0.1949 (0.4980)	0.0109** (0.0046)
Unit labour costs _{<i>t-1</i>}		-0.0144** (0.0062)	-0.0089* (0.0048)	-0.0048 (0.0081)	-0.0307*** (0.0066)	0.0003 (0.0067)	-0.1408 (0.1441)	0.0047 (0.0067)
Host welfare spending _{<i>t-1</i>}		0.0001 (0.0002)	-0.0001 (0.0002)	0.0004* (0.0003)	0.0002 (0.0002)	0.0001** (0.0000)	-0.0010*** (0.0001)	0.0001** (0.0001)
Home country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry (NACE Rev. 2 digit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Predicted probability	0.0339	0.0147	0.0343	0.0230	0.0015	0.0028	0.0017	0.0026
Pseudo R-squared	0.0636	0.1082	0.0361	0.1052	0.0630	0.2340	0.0540	0.0470
Log pseudo likelihood	-27 701.061	-58 017.816	-30 203.199	-66 573.851	-778.992	-42.16	-779.05	-79.724
Observations	17 205	5 885	19 164	5 161	73 097	2 863	64 102	4 718

Source: Authors' calculations.

Note: Average marginal effects from Probit Model estimation of equation (1) are reported. Explanatory variables are lagged one year. All specifications include a full set of country, industry and year dummies. Standard errors (clustered at the country level) in parentheses; ***, $p < 0.01$, **, $p < 0.05$, *, $p < 0.10$.

5. Conclusion and policy considerations

The majority of contributions to the debate on the effects of economic globalization do not question the fundamental premises of the conventional wisdom that economic integration has contributed to the retrenchment of public sectors. However, and for the first time, this paper challenges this view and offers evidence that does not support the conventional wisdom that the welfare state hinders firm competitiveness, or that social expenditure (financed through corporate taxation) deters inward FDI. Instead, we find that welfare expenditure may be attractive to inward investors and may also act to keep MNEs in the home country.

Taken together our findings offer several contributions to the dominant international business paradigms. Firstly, we contribute to the literature on the importance of institutions in international business, both in terms of explaining firm- and national-level competitiveness and show that welfare is an important institutional context. Secondly, this extends the literature on varieties of capitalism, offering a more detailed understanding of the standard distinctions applied by those seeking to operationalize Hall and Soskice (2001).

More generally, however, we believe our findings to be part of the wider debates which the international business community must engage in. Ghemawat (2016) sets out clearly how international business scholars need to address bigger questions within the various debates on globalization. For example, Europe and the United States have seen various populist and anti-globalization movements culminating in, for example, the recent Brexit vote in the United Kingdom. While many of the arguments are offered as negative consequences of globalization, they are in essence responses to perceived falling living standards among the middle classes in developed countries, and the lack of a perceived safety net. Similarly, other countries, such as Switzerland, have engaged in discussions on whether to set a basic income level guaranteed by the state. Our work highlights the role that international business research can play in contributing to these debates. It also helps policymakers understand how, with capital mobility threatening the incomes of relatively immobile labour, the state can underpin productivity, and both retain and attract internationally mobile capital.

Finally, we offer some interpretations for policymakers. The first fundamental finding is that welfare spending works to retain investments that a country has already won, and is not in any sense associated with relocation away from a “high-tax, high-spend” country. We argue that this is due to the importance of welfare spending encouraging labour mobility in industries where labour markets are tight, and where there are skill shortages.

We argue that welfare state provisions impact the likelihood of domestic MNE relocation activity in a way that runs counter to conventional wisdom. Thus, we

challenge the conventional view, and argue that welfare states and globalization are compatible as it enables firms to perform well in a stable environment, which in turn retains existing firms and attracts new ones to high welfare locations.

Further, we argue that welfare spending is an important indicator of how a state supports its workers when they are ill. While countries, such as the United States, continue to attract investment, firms recognize that the additional cost of employing people in countries with low public welfare, i.e. in contexts where people need health and dental insurance, not just for themselves but also their families. This has to be set against the higher taxes sometimes associated with high welfare locations, e.g. in places where taxes can be significant, especially in sectors with high proportions of skilled, internationally mobile workers. At the lower end of the income distribution scale, welfare spending may encourage labour mobility, with workers less concerned about “last-in first-out” re-deployment decisions if a welfare net exists.

Finally, our results suggest that the significance of unit labour costs in explaining relocation has declined over time, suggesting that add-on labour costs, such as national insurance or health provision, do not influence relocation decisions. However, we do have some tentative evidence that for the later period at least, relocations by firms in high-tech industries to developing economies may be deterred by welfare spending in host countries. While the estimated effect is small, it nevertheless suggests that host-country governments may need to persuade firms of the value of this spending, showing that it is associated with, among others, health care or better functioning labour markets, rather than merely reflecting a bloated government sector.

References

- Agarwal, Sanjeev, and Sridhar N. Ramaswami (1992). "Choice of foreign market entry mode: impact of ownership, location and internalization factors", *Journal of International Business Studies*, 23, pp. 1–27.
- Alesina, Alberto, and Roberto Perotti (1997). "The welfare state and competitiveness", *American Economic Review*, 87(5), pp. 921–939.
- Andersen, Torben M. (2002). "International integration, risk and the welfare state", *Scandinavian Journal of Economics*, 104(3), pp. 343–364.
- Andersen, Torben M., and Allan Sørensen (2011). "Globalisation squeezes the public sector – Is it so obvious?", *International Tax and Public Finance*, 18, pp. 369–382.
- Andreotti, Alberta, Enzo Mingione and Emanuele Polizzi (2012). "Local welfare systems: A challenge for social cohesion", *Urban Studies*, 49(9), pp. 1925–1940.
- Beechler, Schon, and Ian C. Woodward (2009). "The global war for talent", *Journal of International Management*, 15(3), pp. 273–285.
- Bredgaard, Thomas, Flemming Larsen and Per K. Madsen (2005). "The flexible Danish labour market - A review", CARMA Research Papers, No. 2005:01 (Aalborg: Centre for Labour Market Research).
- Brouthers, Keith D. (2013). "A retrospective on: Institutional, cultural and transaction cost influences on entry mode choice and performance", *Journal of International Business Studies*, 44, pp. 14–22.
- Chambers, Elizabeth G., Mark Foulon, Helen Handfield-Jones, Steven M. Hankin and Edward G. Michaels III (1998). "The war for talent", *The McKinsey Quarterly*, 3, pp. 44–57.
- Cuervo-Cazurra, Alvaro (2006). "Who cares about corruption?", *Journal of International Business Studies*, 37, pp. 807–822.
- Cuervo-Cazurra, Alvaro, and Luis A. Dau (2009). "Promarket reforms and firm profitability in developing countries", *Academy of Management Journal*, 52(6), pp. 1348–1368.
- Dau, Luis A., and Alvaro Cuervo-Cazurra (2014). "To formalize or not to formalize: Entrepreneurship and pro-market institutions", *Journal of Business Venturing*, 29(5), pp. 668–686.
- De Grauwe, Paul, and Magdalena Polan (2003). "Globalisation and social spending", CESifo Working Paper, No. 885 (Munich: CESifo).
- De Mooij, Ruud A., and Sjef Ederveen (2003). "Taxation and foreign direct investment: a synthesis of empirical research", *International Tax and Public Finance*, 10, pp. 673–693.
- Devereux, Michael P., and Rachel Griffith (1998). "Taxes and the location of production: Evidence from a panel of US multinationals", *Journal of Public Economics*, 68, pp. 335–367.
- Dosi, Giovanni (1999). "Some notes on national systems of innovation and production, and their implications for economic analysis", in Daniele Archibugi, Jeremy Howells and Jonathan Michie, eds., *Innovation Policy in a Global Economy* (Cambridge: Cambridge University Press), pp. 35–48.

- Driffield, Nigel L., Tomasz Mickiewicz and Yama Temouri (2013). "Institutional reforms, productivity and profitability: From rents to competition?", *Journal of Comparative Economics*, 41(2), pp. 583–600.
- _____ (2014). "Institutions and equity structure of foreign affiliates", *Corporate Governance: An International Review*, 22(3), pp. 216–229.
- _____ (2016). "Ownership control of foreign affiliates: A property rights theory perspective", *Journal of World Business*, 51(6), pp. 965–976.
- Esping-Andersen, Gösta (1990). *The Three Worlds of Welfare Capitalism* (Princeton: Princeton University Press).
- European Commission (2002). *European Economy – Public Finances in EMU*, No. 3. https://ec.europa.eu/economy_finance/publications/pages/publication1662_en.pdf.
- Gaur, Ajai S., Andrew Delios and Kulwant Singh (2007). "Institutional environments, staffing strategies and subsidiary performance", *Journal of Management*, 33(4), pp. 611–636.
- Ghemawat, Pankaj (2016). "Beyond Brexit: An initial analysis and questions for the AIB community", *AIB insights*, 16(3), pp. 3–6.
- Gordon, Roger H., and James R. Hines, Jr. (2002). "International taxation", *Handbook of Public Economics*, 4, pp. 1935–1995.
- Görg, Holger, Hassan Molana and Catia Montagna (2009). "Foreign direct investment, tax competition and social expenditure", *International Review of Economics and Finance*, 18(1), pp. 31–37.
- Habib, Mohsin, and Leon Zurawicki (2002). "Corruption and foreign direct investment", *Journal of International Business Studies*, 33, pp. 291–307.
- Hall, Peter A., and David Soskice (2001). "An introduction to varieties of capitalism", in Peter A. Hall and David Soskice, eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage* (Oxford: Oxford University Press), pp. 1–68.
- Henisz, Witold J., and Bennet A. Zelner (2005). "Legitimacy, interest group pressures, and change in emergent institutions: The case of foreign investors and host country governments", *Academy of Management Review*, 30(2), pp. 361–382.
- Hicks, Alexander M., and Duane H. Swank (1992). "Politics, institutions, and welfare spending in industrialized democracies, 1960–82", *American Political Science Review*, 86(3), pp. 658–674.
- Hoskisson, Robert E., Mike Wright, Igor Filatotchev and Mike W. Peng (2013). "Emerging multinationals from mid-Range economies: The Influence of Institutions and Factor Markets", *Journal of Management Studies*, 50(7), pp. 1295–1321.
- Jackson, Gregory, and Richard Deeg (2008). "Comparing capitalisms: understanding institutional diversity and its implications for international business", *Journal of International Business Studies*, 39, pp. 540–561.
- Javorcik, Beata Smarzynska, and Mariana Spatareanu (2005). "Do foreign Investors care about labor market regulations?", *Review of World Economics*, 141(3), pp. 375–403.

- Kaufman, Robert R., and Alex Segura-Ubiergo (2001). "Globalization, domestic politics, and social spending in Latin America: A time-series cross-section analysis, 1973–97", *World Politics*, 53(4), pp. 553–587.
- Khanna, Tarun, and Krishna G. Palepu (2010). *Winning in Emerging Markets: A Roadmap for Strategy and Execution* (Boston: Harvard Business Press).
- Kim, Hyejun, and Jaeyong Song (2016). "Filling institutional voids in emerging economies: The impact of capital market development and business groups on M&A deal abandonment", *Journal of International Business Studies*, 48, pp. 308–323.
- Leonard, Jonathan S., and Marc Van Audenrode (1996). "Worker's limited liability, turnover and employment contracts", *Annales d'économie et de statistique*, 41/42, pp. 41–77.
- Meyer, Klaus E., and Mike W. Peng (2005). "Probing theoretically into Central and Eastern Europe: Transactions, resources, and institutions", *Journal of International Business Studies*, 36, pp. 600–621.
- Mishra, Ramesh (1998). "Beyond the nation state: Social policy in an age of globalisation", *Social Policy & Administration*, 32(5), pp. 481–500.
- _____ (1999). *Globalisation and the Welfare State* (Cheltenham: Edward Elgar).
- OECD (Organisation for Economic Co-operation and Development) (1998). *Harmful tax competition: An Emerging Global Issue* (Paris: OECD).
- Ohmae, Kenichi (1990). *The Borderless World: Power and Strategy in the Interlinked Economy* (London: Collins).
- Peng, Mike W., and Peggy S. Heath (1996). "The growth of the firm in planned economies in transition: institutions, organizations, and strategic choice", *Academy of Management Review*, 21(2), pp. 492–528.
- Pennings, Enrico, and Leo Sleuwaegen (2000). "International relocation: firm and industry determinants", *Economics Letters*, 67(2), pp. 179–186.
- Porter, Michael E. (1990). "The competitive advantage of notions", *Harvard Business Review*, 68(2), pp. 73–93.
- Rodrik, Dani (1997). "Trade, social insurance, and the limits to globalization", NBER Working Paper No. 5905 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Rodrik, Dani (1998). "Why do more open economies have bigger governments?", *Journal of Political Economy*, 106(5), pp. 997–1032.
- Sinn, Hans-Werner (1997). "The selection principle and market failure in systems competition", *Journal of Public Economics*, 66, pp. 247–274.
- Taylor-Gooby, Peter, Trine Larsen and Johannes Kananen (2004). "Market means and welfare ends: The UK welfare state experiment", *Journal of Social Policy*, 33(4), pp. 573–592.
- Volberda, Henk W., and Arie Y. Lewin (2003). "Co-evolutionary dynamics within and between firms: From evolution to co-evolution", *Journal of Management Studies*, 40(8), pp. 2111–2136.

- Wan, William P., and Robert E. Hoskisson (2003). "Home country environments, corporate diversification strategies, and firm performance", *Academy of Management Studies*, 46(1), pp. 27–45.
- Witt, Michael A., and Arie Y. Lewin (2007). "Outward foreign direct investment as escape response to home country institutional constraints", *Journal of International Business Studies*, 38, pp. 579–594.
- Witt, Michael A., and Gregory Jackson (2016). "Varieties of capitalism and institutional comparative advantage: A test and reinterpretation", *Journal of International Business Studies*, 47, pp. 778–806.
- Zhao, John H., Seung H. Kim and Jianjun Du (2003). "The impact of corruption and Transparency on foreign direct investment: An empirical analysis", *Management International Review*, 43(1), pp. 41–62.

The treatment of tax incentives under Pillar Two*

Belisa Ferreira Liotti,^a Joy Waruguru Ndubai,^a Ruth Wamuyu,^a
Ivan Lazarov^b and Jeffrey Owens^a

Abstract

This paper analyses the potential impact of the minimum tax envisaged under the OECD Pillar Two on several common corporate tax incentives. It reaches the conclusion that while the impact is expected to be low to moderate for some common incentives, such as participation exemption regimes and accelerated depreciations, it might be significant for direct cuts from the tax bill, which include tax holidays, intellectual property (IP) box regimes and special economic zones (SEZs). Hence, the response by policymakers must be informed by the specific interaction between the corporate tax incentives under their respective systems and the upcoming international standards on the minimum level of taxation.

Keywords: BEPS, corporate tax law, FDI, international taxation, tax incentives, Pillar Two

JEL classification codes: F21, H25, K34

* Received: 8 July 2022 – Revised: 27 July 2022 – Accepted: 28 July 2022

The present paper was a further development of authors contribution to the UNCTAD *World Investment Report* (WIR). Among the issues addressed in the WIR, the ideas presented in this article were summarized in the report as an assessment of the impact of Pillar Two on the main categories of tax incentives typically adopted to attract FDI.

^a Institute for Austrian and International Tax Law, Vienna University of Economics and Business, Vienna, Austria.

^b Corresponding author. Institute for Austrian and International Tax Law, Vienna University of Economics and Business, Vienna, Austria (ivan.lazarov@wu.ac.at).

1. Introduction

On 20 December 2021, the OECD/G20 Inclusive Framework on Base Erosion and Profit-Shifting (Inclusive Framework on BEPS) released the Global Anti-Base Erosion (GloBE) Model Rules to ensure the 15 per cent global minimum tax agreed under Pillar Two of BEPS 2.0 is consistently adopted (OECD, 2021). The GloBE Model Rules are supplemented by a Commentary which provides tax authorities with guidance on the interpretation and implementation of the rules (OECD, 2022). The current expectation is that the GloBE Rules will begin to be implemented by 2023.

Unlike BEPS 1.0 which was predominantly focused on abusive tax structures leading to tax evasion and avoidance,¹ GloBE has a much broader scope, and is aimed at reducing tax competition between jurisdictions in all (including genuine) cases. To do so, GloBE introduces minimum taxation rules that are supposed to ensure that all corporate profits of large multinational enterprises (MNEs) are subject to a minimum level of taxation, no matter where they are allocated. As such, it is expected that GloBE will impact all forms of tax competition and, therefore, have a profound significance for the corporate tax incentives offered by countries. This paper aims at analysing how the minimum tax envisaged under GloBE will impact a number of common corporate tax incentives.

The minimum tax will be achieved through the implementation of two main rules:

- **Income inclusion rule (IIR):** a domestic rule that will require a taxpayer that is the ultimate parent entity (UPE) of a MNE group to pay a top-up tax on its proportionate share of the income of any low-taxed constituent entity in which it has a direct or indirect ownership interest. Thus, the idea is to tax the income of constituent entities that were subject to tax at an effective tax rate (ETR) below 15 per cent. The IIR will be applied in the jurisdiction of the UPE or an intermediary parent entity (IPE), with the implication being that any constituent entity in any other jurisdiction that has an ETR below 15 per cent will be identified and subject to a top-up tax in the UPE or IPE jurisdiction, irrespective of whether the jurisdiction of the relevant undertaxed constituent entity subscribes to the GloBE Rules or not.
- **Undertaxed payments rule (UTPR):** a domestic rule that will operate by denying deductions or requiring equivalent adjustments to certain low-taxed constituent entities to the extent the undertaxed income has not yet been captured by the IIR (order of priority). A classic example where the UTPR would kick in is when the UPE jurisdiction chooses not to apply the GloBE Rules.

¹ The BEPS 1.0 Actions are available at [/www.oecd.org/tax/beps/beps-actions/](http://www.oecd.org/tax/beps/beps-actions/).

The GloBE Rules are designed to ensure that large MNEs pay a minimum ETR of 15 per cent on the income arising in each jurisdiction in which they operate, through the application of a system of top-up taxes in other jurisdictions (an IIR and/or a UTPR). This top-up tax does not operate like a typical direct tax on income of corporations, but rather *“is closer in design to an international alternative minimum tax, that uses standardized base and tax calculation mechanics to identify pools of low-taxed income within an MNE Group and imposes a co-ordinated tax charge that brings the Group’s ETR on that income in each jurisdiction up to the Minimum Rate”* (OECD, 2022, para. 2 [emphasis added]) Therefore, the minimum tax is an alternative mechanism designed to act *in parallel* to existing corporate income tax (CIT) systems, which means that the GloBE Rules do not directly restrict countries from having certain measures that reduce the effective corporate tax liability in their territory.

This can be seen from the fact that neither the Model Rules nor the Commentary explicitly mention that countries are no longer allowed to adopt incentives, or have to change their CIT systems to impose a rate of at least 15 per cent. Instead, if implemented domestically, the GloBE Rules will act in parallel to CIT systems to ensure that MNE groups pay at least 15 per cent tax on excess profit in every jurisdiction in which their constituent entities operate. This means that jurisdictions are still “free” to adopt tax incentives and CIT rates below 15 per cent, but these measures risk being affected by the application of the GloBE Rules in other jurisdictions, as long as the reduced rate applies to excess profits. In the worst-case scenario, the operation of the GloBE Rules might lead to a situation where the revenue forgone due to tax incentives is recaptured in another jurisdiction until a minimum effective rate of 15 per cent is achieved, unless a jurisdiction introduces a domestic minimum top-up tax thereby ensuring that any under-taxation for the purposes of GloBE will be recaptured in the same jurisdiction.

2. General functioning of Pillar Two

2.1. Application of the GloBE Rules

Where an MNE group falls within the scope of the GloBE Model Rules, the UPE will have to calculate its top-up tax liability for each jurisdiction that has an ETR below 15 per cent.

To calculate the ETR, the UPE will first determine the amount of GloBE income or loss of each constituent entity on a jurisdictional consolidated basis. Once the financial accounting net income or loss of each constituent entity is determined, this amount will be adjusted for the permanent or temporary differences that arise between financial accounting results and taxable income results. The GloBE income or loss thus achieved can be referred to as “the GloBE tax base”.

As a next step, the amount of taxes that are attributable to the GloBE income or loss is determined by looking at the amounts paid as adjusted covered taxes.² These are the (qualifying) taxes that an MNE has paid in relation to its activities in a given jurisdiction.

Having established each constituent entity's GloBE tax base and adjusted Covered Taxes, the jurisdiction's ETR is calculated by dividing the sum of the adjusted covered taxes by the net GloBE income of that jurisdiction (i.e. the positive or negative amount resulting from the difference between the GloBE income of all constituent entities and the GloBE losses of all constituent entities in that jurisdiction):

$$\text{ETR} = \text{Adjusted covered taxes} / \text{Net GloBE income}$$

If the ETR is then below 15 per cent, the jurisdiction is a low-tax jurisdiction and a top-up tax percentage has to be calculated, being the difference between the minimum rate and the ETR calculated for that low-tax jurisdiction. For example, if the ETR is 11 per cent, the top-up tax would be 4 per cent. Any top-up tax to be paid abroad might be reduced or eliminated by any qualifying domestic minimum tax.

The top-up tax is levied only on the "excess profit" for a jurisdiction. The excess profit corresponds to the amount of GloBE income for the jurisdiction remaining after applying a "substance-based income exclusion", which is a formulaic carve-out based on payroll and tangible assets aimed to exclude a fixed return for substantive activities within a jurisdiction from the application of the GloBE Rules (OECD, 2022). Generally, the substance carve-out would amount to a fixed return (5 per cent) on payroll and tangible assets costs. This means that any tax incentive, leading to a rate below the minimum, will remain unaffected as long as it applies only to substance intensive activities covered entirely by the carve-out.

² According to Article 4.2 in OECD (2021), adjusted covered taxes include, inter alia, income-based taxes, such as taxes recorded in the financial accounts with respect to income or profits of a constituent entity, taxes on distributed and deemed distributed profits, taxes imposed in lieu of a generally applicable corporate income tax, and taxes levied on retained earnings and corporate equity. However, as mentioned in OECD (2022), the definition of covered taxes does not include excise taxes, "indirect taxes, payroll and property taxes, which are not based on a measure of income" (p. 85). Moreover, "[t]ax imposed on gross income or revenue without any deductions (i.e. a tax on turnover) would not be considered an income tax. The design and substantive character of such turnover taxes generally have more similarities to consumption or sales taxes. The definition of Covered Taxes therefore does not include a Tax on a gross amount unless such a Tax is in lieu of an income tax" (p. 92). A tax "in lieu" of income tax might be the withholding tax on gross interest and royalties income by non-residents. However, some turnover taxes such as a number of unilateral taxes on digital turnover imposed by countries seems to remain outside the scope of the definition of "covered taxes". It remains interesting to see how the newly introduced possibility for taxation of the digital economy under the United Nations model at source would affect this distinction. See Article 4.2, paras. 22–27 in OECD (2022).

2.2. Limitations on the GloBE scope

The GloBE Rules provide for certain exclusions from the top-up tax application according to the entities' sector and types of income, and require a minimum amount of revenue for a given MNE group to be in the scope of the rules. These limitations on the scope may also have an impact on potential incentives that can be retained by jurisdictions since some corporate taxpayers remain outside the scope of the rules. It remains unclear, however, if and to what extent high tax jurisdictions can unilaterally expand the scope of the GloBE Rules under their domestic law.

2.2.1. Small and medium-sized enterprises (SMEs)

The GloBE Rules apply to constituent entities of MNE groups that meet a €750 million threshold in the consolidated financial statements of the UPE in at least two of the four preceding fiscal years. This means that, in principle, the application of the top-up tax is limited to MNE groups with annual consolidated revenues of at least €750 million. Importantly, such threshold takes into account the consolidated financial statements of the MNE group, meaning that it is not each constituent entity that has to reach the €750 million threshold, but the whole group, even taking into consideration excluded entities (OECD, 2022).

In addition, a de minimis exclusion may also apply at election of the filing constituent entity to deem the top-up tax as zero if, for that jurisdiction, the average revenue was less than €10 million and the average of GloBE income or loss was less than €1 million in the current and the two preceding fiscal years.

2.2.2. Excluded entities

The GloBE provides for the exclusion of some entities from its rules, referred to as excluded entities. That is, excluded entities are those excluded from the definition of constituent entities and, therefore, are not subject to the GloBE Rules. These include: government entities, international organizations, non-profit organizations, pension funds and investment funds or a real estate investment vehicles that are UPEs of an MNE group.

Important to note that only investment funds and real estate investment vehicles that are UPEs of an MNE group are excluded entities for the purposes of the GloBE. Such exclusion is aimed at protecting their status as tax neutral investment vehicles. Where an investment fund or real estate investment vehicle is not the UPE, it can still be treated as a constituent entity, provided it otherwise meets the consolidation requirements of the Model Rules. However such entities are considered "investment entities" and subject to special rules for calculation of the GloBE ETR under Articles 7.4 to 7.6 in OECD (2022).

2.2.3. Excluded income

Furthermore, there is an exclusion from the GloBE Rules for income derived from international shipping. Thus, if the MNE group has this type of income, each constituent entity's portion of it will be excluded from the computation of its GloBE income or loss. This may result in a reduction in the denominator of the ETR formula, the GloBE tax base, making the ETR higher for that jurisdiction (and therefore reducing the risk of suffering the effects of the top-up tax).

3. Treatment of incentives

As mentioned above, the GloBE Rules do not directly and expressly prohibit jurisdictions to adopt tax incentives or reduced rates within the CIT system. However, based on how the GloBE Rules are intended to operate, their effects might be undermined and risk being impacted by the charging of the top-up tax by the UPE jurisdiction. If that happens, the jurisdiction granting the incentive would eventually give up taxing rights not in exchange for offering more favourable business environment but to the benefit of the tax revenue of the "topping-up" jurisdiction.

Notwithstanding this, the GloBE Rules and the Commentary explicitly determine that some untaxed (or undertaxed) income are not computed as part of the GloBE Income of a constituent entity, and that some types of tax benefits will not reduce the amount of adjusted covered taxes for GloBE purposes. This means that these income streams can be excluded from the denominator of the formula (the net GloBE income), and that these tax benefits will be included in the numerator (adjusted covered taxes), resulting in a higher ETR for the jurisdiction and therefore reducing the risk of application of the top-up tax by the UPE jurisdiction.

In essence, some tax benefits can be upheld by countries because they are not affected by the GloBE Rules, as they do not reduce the ETR for that location. Other types of incentives that have not been expressly mentioned in the Rules, however, do not share the same fate and may be undermined by the top-up tax.

The scope of this contribution is not to deplete the analysis of the impact of the GloBE Rules on each and every tax "incentive" adopted by jurisdictions around the world, but to conceptually understand which incentives will be affected to a lesser extent by the GloBE Rules because their impact on the ETR calculation is somehow neutralized as a result of the operation of these rules and the express mention of them in the Model and its Commentary. Some other incentives that are commonly adopted by countries to attract FDI are also analysed in order to establish whether these will have their effects minimized by the application of the top-up tax.

For this reason, the term “incentive” is used hereinafter in a broad sense, relating to the tax benefits granted by jurisdictions (especially to foreign investors) to attract FDI into their territories. The discussion on the meaning of the term “incentive” is not raised in this article (e.g. whether it means a more favourable tax treatment than the accounting treatment, or than what other countries normally adopt in their tax systems, or than other similar domestic situations, etc.). This is particularly due to the fact that each jurisdiction may define “taxable income” differently and deviations on its meaning would undermine a possible universal definition of the term “incentive”. Therefore, it is not the intention of this contribution to delve into dogmatic discussions about the use of the term “incentives”, as it could not be meaningfully defined in the abstract.

In addition, for the sake of simplicity, the present analysis focus only on CIT-related incentives, since the definition of covered taxes under the GloBE Rules includes basically taxes on corporate income. However, it is relevant to note that there is whole range of other tax incentives in the domestic tax systems of countries that are not affected by the GloBE Rules as they fall outside their scope.³

Thus, in light of the limitations set out above, when hereinafter we determine that an incentive is “impacted” by the GloBE Rules, we examine whether its effects would be affected by the top-up tax. This, naturally, presupposes the assumption that the circumstances fall within the scope of the GloBE Rules and that there is an excess profit beyond the standard return under the substance carve-out. Moreover, the analysis naturally presupposes that the application of the incentive leads to an ETR below 15 per cent: nothing in the rules, as they currently stand, suggests that an incentive that reduces the ETR from 25 to 20 per cent would be in any way affected.

3.1. Reduced rate

3.1.1. 0-rated and less than 15 per cent

Countries with zero or less than 15 per cent CIT rates are more likely to have an ETR below 15 per cent. While, a general reduced CIT rate may not be considered an “incentive” per se, unless within the context of competing jurisdictions, an analysis of the impact of the GloBE Rules is necessary for countries with (even general) reduced CIT rates. The GloBE Rules would limit the perceived financial benefits of reduced rates, as a top-up-tax would be chargeable by another jurisdiction in the instance that the ETR in the country offering the reduced CIT falls below 15 per cent.

³ UNCTAD (2022, chapter III, section C.2). provides further analysis on the variety of tax incentives adopted to attract FDI, also assessing the size of CIT-related incentives in comparison to others.

As described above, the GloBE is an alternative mechanism designed to act in parallel to existing CIT systems and it does not directly restrict countries from adopting zero or reduced rates for CIT purposes. Nevertheless, because the rules require a minimum ETR of 15 per cent on the income in each jurisdiction where an in-scope MNE group operates, the effect produced by systems adopting reduced or zero CIT rates is likely to be affected by the application of the top-up tax. The consequence of the parallel application of the GloBE and the domestic tax systems is that the amount of tax revenue foregone by countries operating a domestic tax system that leads to an ETR below 15 per cent will be collected in another country (the UPE jurisdiction). Therefore, countries will have to rethink how to structure their domestic tax systems.

Importantly, this does not only impact “CIT”, as the covered taxes definition under the GloBE Rules is broader. While countries with statutory CIT rates below 15 per cent are more likely to have an ETR below 15 per cent, countries with reduced CIT rates may still avoid the top-up tax if other taxes on corporate income, such as withholding taxes make up for the difference.

However, considering that with no CIT system or with zero or less than 15 per cent CIT rates are more likely to have an ETR below 15 per cent, three policy options may be adopted by these countries to minimize the impact that GloBE will have on their tax systems and avoid having the top-up tax levied in another country, while complying with the spirit and intentions of BEPS 2.0.

First, countries can adopt a CIT system or change the existing ones to impose or increase the (effective) rates to the minimum of 15 per cent. This would avoid the application of the foreign top-up tax under GloBE Rules. However, countries may face administrative and legislative challenges as this could entail an overhaul of the whole CIT system. Moreover, it could also affect the beneficial effects of the reduced rates for circumstances that do not fall within the scope of the GloBE Rules – e.g. SMEs or activities such as manufacturing that are largely covered by the substance carve-out, leading to a higher total tax liability.

Another option would be for source countries to retain the reduced rate in their current CIT systems, but to increase the rate only for in-scope companies. While this would ensure that the top-up tax is not collected at the UPE jurisdiction, it would require restructuring of the source country’s CIT systems. A downside of this approach is that it essentially splits the country’s corporate taxpayers on an arbitrary basis.

Lastly, countries could choose to retain the reduced rate in their current CIT systems, but to adopt a domestic minimum top-up tax as described under the GloBE Rules, to apply to all MNEs that operate in their territory and fall within the scope of the GloBE Rules. This is because, as explained above, the foreign top-up

tax is reduced by any qualified domestic minimum top-up tax (QDMTT) paid.

Under the GloBE Rules, jurisdictions are not required to adopt such Domestic minimum top-up tax, but if they do, such tax will, if implemented correctly, reduce the top-up tax by the UPE jurisdiction to nil (OECD, 2022). Thus, “[f]or example, a Parent Entity with an Ownership Interest in what would otherwise be a [Low-Taxed Constituent Entity] generally will not have any liability under the IIR if that Constituent Entity is subject to a Qualified Domestic Minimum Top-up Tax that imposes the same amount of tax that would otherwise arise under the IIR” (OECD, 2022, p. 212). A QDMTT is defined as “a minimum tax that is included in the domestic law of a jurisdiction and that: (a) determines the Excess Profits of the Constituent Entities located in the jurisdiction (domestic Excess Profits) in a manner that is equivalent to the GloBE Rules; (b) operates to increase domestic tax liability with respect to domestic Excess Profits to the Minimum Rate for the jurisdiction and Constituent Entities for a Fiscal Year; and (c) is implemented and administered in a way that is consistent with the outcomes provided for under the GloBE Rules and the Commentary, provided that such jurisdiction does not provide any benefits that are related to such rules” (OECD, 2021, p. 64).

Therefore, countries should adopt a domestic minimum tax that would operate similarly to the GloBE Rules, ensuring that if the MNEs located in their territory have an ETR below 15 per cent, they would be the countries charging the top-up tax, rather than the UPE jurisdiction. This would create a situation where the two tax systems function in parallel.

3.1.2. More than 15 per cent

Countries with CIT rates above 15 per cent are more likely to have an ETR above the 15 per cent minimum. However, this is not an absolute truth as calculations based on the GloBE Rules may lead to an ETR below the minimum. This is because the GloBE Rules have their own formulas and way of calculating the ETR, not necessarily following the same calculations under the CIT systems worldwide. In addition, even though countries may adopt statutory CIT rates above 15 per cent, the ETR calculation is not solely dependent on the CIT, meaning that any incentive adopted in relation to other taxes on corporate income treated as covered taxes under the GloBE Rules may also impact on the calculation and eventually bring the ETR below 15 per cent. Therefore, jurisdictions can never have absolute certainty that their ETR does not fall below the minimum under the GloBE Rules unless the ETR calculation is performed each and every time.

Thus, implementing a qualified domestic minimum top-up tax for all instances when an MNE falls within the scope of the GloBE Rules may be desirable to avoid, in the event the ETR for an MNE group in its territory is found to be below 15 per cent, the UPE jurisdiction charging the top-up tax (rather than the source jurisdiction). This

can be seen as a safety valve against having to constantly recalculate under the GloBE Rules the effects of domestic CIT reforms.

3.2. Deductions

3.2.1. Accelerated depreciation and immediate expensing

Since the GloBE Model Rules rely on financial accounts to arrive at the tax base, they do not consider the domestic tax treatment of depreciation. Tax rules for the deduction of depreciation differ from accounting rules and even more so between countries.⁴ This is because the timing rules⁵ for when to expense depreciation differ (Goddard and Rogers, 2006). Tax rules offer more favourable options for the depreciation of assets (as opposed to straight-line which spreads the cost evenly over the life of the asset), such as accelerating depreciation or immediately expensing the cost of the assets. Accelerated depreciation rules permit taxpayers to expense the cost of an asset much faster than traditional depreciation methods (Easson, 2001). Immediate expensing permits the deduction of the entire cost of the asset in the year it was purchased. Both incentives lower the taxable profits for the years where they are applied and will give rise to timing differences when compared to the financial accounts. To neutralize this outcome, typically, in the years where the actual taxes paid are lower than the taxes that would have accrued based on the financial accounting method, a deferred tax liability will be created, and this represents a company's higher tax liability in the future.

Accelerated depreciation and immediate expensing are common incentives adopted by countries and will, as a result, more frequently lead to temporary differences (caused by the timing issues) that could cause the ETR to fall below the minimum rate (OECD, 2022). This will result in a liability under the IIR and in "significant and frequent IIR tax paid and ultimately IIR tax credits" (OECD, 2020, para. 220). The GloBE tax liability arising from this temporary difference will then eliminate the intended-benefits of national tax rules (OECD, 2020). This is a significant risk to capital intensive businesses and could lead to over-taxation. This is because, the temporary differences arising from accelerated depreciation and immediate expensing are common around the globe and the Inclusive Framework recognizes that they are tied to substantive activities in a jurisdiction or are differences that are not prone to taxpayer manipulation (OECD, 2022, Article 4, para. 92). Accelerated depreciation and immediate expensing are therefore recognized as low-risk incentives.

⁴ This tension between accounting profits and taxing profits has been discussed extensively. See, for example: Brown (2020); Chandler and Edgley (1999); Freedman (1993 and 1995); and Whiting (2006).

⁵ For a discussion on this, see Schon (2004).

As a result, there is a need for the temporary differences that will be caused by the computation of the tax base using the GloBE Rules to be taken into account and adjusted for so that they do not distort the calculation of the ETR. To do this, accelerated depreciation and immediate expensing of the tangible property of the constituent entity will be included in the computation of the ETR as deferred taxes. A deferred tax liability is “the amount of income tax payable in future periods in respect of taxable temporary differences” or “tax that is payable in the future”.⁶

To arrive at the deferred tax amount, entities will rely upon the rules applicable in the constituent entity’s tax jurisdiction (OECD, 2020). This is obviously a departure from the policy approach of the GloBE Model Rules which refrain from relying on national rules. The deferred tax adjustment amount for a constituent entity for a fiscal year will equal the deferred tax expense accrued in its financial accounts if the applicable tax rate is below 15 per cent. This amount will be added to the adjusted covered taxes of a constituent entity, which will ultimately, once computed, increase the ETR (OECD, 2022, Article 4, para. 69).

MNEs are directed to the section addressing the computation of adjusted covered taxes where they are required to apply the deferred tax rules contained in Article 4.4. This provision sets out the method for calculating the total deferred tax adjustment amount, it builds on traditional deferred tax accounting principles but includes key adjustments “to protect the integrity of the GloBE Rules” (OECD, 2022, p. 100). It should also be noted that, regarding the application of the UTPR, the denial of a deduction under this Article includes the denial of an allowance for depreciation or amortization (OECD, 2022).

3.2.2. Loss carry-forward

A tax loss occurs where the allowable expenses exceed the taxable income. Tax losses may generally be carried forward to future years as long as the national tax rules permit or until the loss has been completely offset against future tax liability returning the company to a payable position. This is a common form of tax relief for companies that experience losses. A loss carry forward is an asset in the financial statement since it will assist in reducing future tax liabilities. A deferred tax asset will then be created and will be offset against net income arising in the following financial years. The deferred tax asset account may either be reduced each year or may increase if the losses persist.

⁶ Association of Chartered Certified Accountants, “Deferred tax”, www.accaglobal.com/in/en/student/exam-support-resources/fundamentals-exams-study-resources/f7/technical-articles/deferred-tax.html (accessed 6 July 2022).

The GloBE Model Rules permit adjustments for the carry forward of losses. Losses are defined as the excess of expenses over income included in the GloBE tax base of the jurisdiction for a year. Losses include qualified pre-regime losses or losses incurred prior to the MNE group falling within the scope of the GloBE Rules (OECD, 2020). The carrying forward of losses will reduce the GloBE tax base in the year they are deducted, as a result, the adjustment of the GloBE tax base has been permitted for losses and other carry-forwards (such as excess tax payments paid in prior periods into a subsequent period) in order to smooth-out any potential volatility arising from the mix of taxes imposed under local law or resulting from timing differences (OECD, 2020). This follows the same rationale as the treatment of depreciation and, as a result, a deferred tax accounting approach is also available to companies.

The mechanism to address temporary differences using deferred tax (Article 4.4, highlighted in the section on depreciation) may be applied to the carry forward of losses or the entity may opt for the GloBE loss election (OECD, 2021 and 2022). A constituent entity can make a GloBE loss election for a jurisdiction resulting in the creation of a GloBE loss deferred tax asset in that fiscal year when the loss election is made (OECD, 2021). The GloBE loss deferred tax asset is equal to the net GloBE loss multiplied by the minimum rate. The balance of the GloBE loss deferred tax asset is carried forward to subsequent fiscal years, reduced by the amount of GloBE loss deferred tax asset used in a fiscal year. It must be used in any year where there is net GloBE income.

3.2.3. Refundable tax credits

The negative corporate tax liability (losses) need not be carried forward. Although more rarely, countries might opt to directly refund the negative tax liability by means of a refundable tax credit. For instance, if a constituent entity has a loss of 1,000 in a given year and the CIT rate is 10 per cent, a jurisdiction might opt to directly refund the 100 of negative tax liability rather than have the loss being carried-forward. The result achieved is essentially the same as if the losses are carried forward (provided that the future holds sufficient profits) but the refundable tax credits provide a manifest cash-flow advantage which could be especially beneficial in stimulating new businesses.

In some instances, refundable tax credits can also be used as a direct incentive where a government commits to cut the tax bill with respect to certain activities (e.g. R&D) and to the extent there is no sufficient tax due to refund the amount of unused credit. While it is in this latter sense that the GloBE envisages refundable tax credits (OECD, 2020), the logic of the rules also holds when it comes to refunding negative corporate tax. The refunding of negative corporate tax is important to

explicitly consider as it might be a powerful economic stimulus in times of crisis.⁷ The Model Rules differentiate between qualified and non-qualified refundable tax credits. The differentiating criterion between the two is whether the credit is refundable within four years of the moment when the conditions for it are met. Qualified credits are treated as income for the purposes of the GloBE computation of the base (OECD, 2021). Hence, qualified credits are treated similarly to governmental grants. On the other hand, non-qualified refundable tax credits are treated at the level of the tax expenses under Article 4 of the Model Rules, leading to a reduction in the tax expenses (OECD, 2022). In any event, both the qualified and the non-qualified will have an impact on the ETR calculation.

That being said, their effect would not necessarily lead to a top-up tax. It will ultimately depend on the exact constellation of activities (presumably not all eligible for a tax credit incentive) of the MNE, as well as its net GloBE tax result. It must be noted that for the refundable tax credit to apply it would be often the case that there might be a negative tax result. Moreover, even if due to differences in calculating the base or because the credit applies for a specific activity (e.g. R&D), the GloBE net result is positive, one could expect that refundable tax credits would not be entirely re-collected as taxes since the tax due is a percentage of the overall income with a net effect of reduced overall taxation also below 15 per cent.⁸

3.2.4. Deductions for qualified expenses

Deductions for qualified expenses refer to the allowable expenses that businesses are permitted to deduct for tax purposes:

The financial accounts of the [constituent] entity are used to determine the entity's profit (or loss) before tax. Profit (or loss) before tax is the preferred profit measure under the GloBE rules for several reasons. First, it takes into account the actual costs of doing business, including all operating and non-operating expenses. Second, it is the most comparable financial accounting measure to taxable income, but, critically, it is computed without regard to special local tax exclusions, deductions and tax accounting conventions that would undermine the policy objectives of the GloBE rules. Therefore, using profit (or loss) before tax as a measure of profit for computing the GloBE tax base should limit the risk of the GloBE tax base diverging significantly from the tax base of the MNE Group under local corporate income tax rules, where such a divergence would be inconsistent with the policy objectives of the GloBE rules (OECD, 2020, para. 159).

⁷ Wolfgang Schön has been a prominent proponent of this idea: See "Tax law under heavy weather", Max Planck Institute for Tax Law and Public Finance, September 2020, www.tax.mpg.de/en/news.

⁸ See in this sense also UNCTAD (2022, p. 147).

To address the treatment of deductible qualified expenses, the Inclusive Framework recognizes that it is “implicit in the decision to use financial accounts as the starting point for determining the GloBE tax base that certain permanent differences will arise between that local tax base and the GloBE tax base” (OECD, 2020, para. 177). These permanent differences are expected and “it would not be possible or desirable, from either a policy or a design perspective, to develop a comprehensive set of adjustments that will bring the GloBE tax base fully into line with the tax base calculation rules of all Inclusive Framework members” (OECD, 2020, para. 177).⁹ However, some adjustments are still possible and appropriate and to determine whether they will be acceptable an evaluation of the materiality and commonality of a permanent difference will be required. Ultimately, an adjustment should only be made to “exclude material items that are commonly excluded from the tax base of Inclusive Framework jurisdictions” (OECD, 2020, para. 178). But these allowable adjustments should be kept to a minimum to reduce complexity, these adjustments include net tax expenses, excluded dividends and excluded equity gains or losses amongst others.

3.3. Exemptions

3.3.1. Tax holidays and other specific exemptions (location/sector/entity)

In order to attract investments to their territory, it is a common practice for countries to resort to tax incentives, such as tax holiday schemes and other specific exemption regimes. In general terms, tax holiday is a government incentive programme offering a temporary reduction or elimination of taxes. Specific exemption regimes include, for example, those that fully or partially exempt from the tax base income arising from certain sectors of the economy, types of entities or locations.

While the GloBE Rules do not explicitly prohibit countries from adopting these exemptions, CIT-related incentives directed at businesses are likely to be affected. This is because, the GloBE Rules will have an impact on income-based taxes and, therefore, certain exemptions and tax holiday schemes aimed at temporarily “eliminating” income taxes will largely be affected by the charging of the top-up tax in the UPE jurisdiction.

Naturally, if such measures target out of scope companies, or they do not lead to a reduction of the ETR below 15 per cent, they will remain unaffected provided that the UPE jurisdiction is not applying lower thresholds under its domestic implementation of the GloBE Rules.

⁹ Whereas temporary differences are eventually reversed, permanent differences will never be eliminated. Some examples of permanent differences are penalties and fines which are recorded for accounting purposes but cannot be deducted for tax reporting purposes.

3.3.2. Participation exemption regimes

In many jurisdictions, dividends are excluded, in whole or in part, from the taxable income of a corporate shareholder, through a mechanism often referred to as participation exemption. These regimes are reliefs usually granted under domestic law in recognition of the fact that the dividend is paid out of profits that have already been subject to tax at the level of the distributing company. Taxing these dividends under the GloBE would thus give rise to the risk of over taxation (OECD, 2020, para. 181).

The rules allow certain types of dividends to be excluded from the GloBE Income (the denominator of the ETR fraction), which means that the untaxed dividends will not be computed in the ETR calculation. However, there are some limitations for this exclusion. An exception is found for dividends received from short-term portfolio shareholding, i.e. below 10 per cent and held for less than one year. In any event, domestic participation exemption regimes will impose similar conditions for their application.

3.3.3. Exemptions for excluded equity and asymmetric foreign currency gains or losses

The rules provide for other adjustments in the GloBE tax base computation to address permanent differences between the treatment of some items under financial and tax accounting standards, which may have an impact on exemptions adopted worldwide.

Many jurisdictions fully or partially exempt from the tax base gains and losses arising from the disposition of ownership interests. Usually, these gains or losses are included in the financial accounting income of the seller but excluded from its taxable income. If this difference is not adjusted in the GloBE income or loss computation, “gains on sales of Ownership Interests will result in a lower GloBE ETR for the seller (and potential tax liability under the GloBE Rules). Losses, on the other hand, will result in a higher GloBE ETR for the seller (and potentially shield other income from GloBE tax liability)” (OECD, 2022, p. 54). The rules exclude gains and losses from dispositions of ownership interests from the seller’s GloBE income or loss computation, as long as these are not from the disposition of a portfolio shareholding (below 10 per cent shareholding). Thus, exemptions granted to dispositions of ownership interests, other than a portfolio shareholding, may not be affected by the application of the rules.

However, exemptions granted for foreign currency exchange gains or losses (FXGL) that arise due to differences between the functional currency for accounting purposes and the one used for local tax purposes, may be at risk, since the GloBE Rules do not make any adjustments for FXGL when the tax and the accounting functional currencies are the same (OECD 2022, para. 67). Thus, if FXGL are exempt

under domestic tax rules in this situation, there will be a permanent difference that will affect the ETR of the jurisdiction, where such exemptions are likely to be impacted by the GloBE application. Nevertheless, if the functional currencies used for accounting and tax differ, different types of adjustments are made by the GloBE Rules to avoid distortions that could arise.¹⁰

3.4. Other income taxes-related incentives

3.4.1. Imputation regimes

These regimes are intended to protect resident shareholders from economic double taxation, as they allow either the company or the shareholder to claim a full or partial credit or refund of the CIT previously paid by another company when its profit is subsequently distributed as dividends.

According to the Blueprint, CIT paid under an imputation system seeking to prevent economic double taxation at the resident shareholder level should be treated as a covered tax. Thus, only to the extent that such shareholder is subject to tax (OECD, 2020, para. 138).

In this context, the GloBE Rules differentiate between qualified imputation tax and disqualified refundable imputation tax regimes. qualified imputation tax regimes relate to those regimes that allow a refund of taxes to be paid in respect of distributions made to a resident shareholder that is generally subject to tax, or which is an excluded entity. Under these regimes, the tax refunded will not be treated as a reduction in covered taxes (the numerator of the ETR fraction), resulting in a higher ETR for the jurisdiction and thus reduce the risk of application of the top-up tax. Thus, qualified imputation tax regimes may not be affected by the GloBE Rules and can be upheld by countries.

Disqualified refundable imputation tax regimes, on the other hand, relate to regimes that allow a refund of taxes previously paid by the company when the income is subsequently distributed as dividends even where the shareholder is not subject to tax on the dividend. In such a case, disqualified refundable imputation taxes that are paid or accrued and included as an expense in the financial accounting net income or loss do not qualify as a covered tax and must be added back in the GloBE tax base. This will represent an increase to GloBE income, ultimately reducing the ETR (OECD, 2022).

¹⁰For the potential scenarios, see Article 3.2, paras. 68–74 in OECD (2022).

3.4.2. Withholding tax incentives

Withholding tax (WHT) is a tax that source countries levy on various forms of income paid to residents or foreigners including dividends, interest, professional fees, management services and more. The foreign companies subject to WHT may or may not have a permanent establishment in the source country. Some countries provide for favourable WHT treatment to foreign investors by eliminating WHT on outbound passive payments, such as on dividends (or liquidation payments), interest and/or royalties. The GloBE Rules include all types of passive inbound income in the computation of the tax base: dividends, interest and royalties, except for participation exemption regimes as discussed above.

The WHT paid in the source state would be included in the computation of the covered taxes for the purposes of calculating the ETR – see Article 4.2.1. (c) of the Model Rules.¹¹ The effect of this will be that the inclusion of the passive income will increase the tax base, whilst the availability of WHT incentives will fail to increase the covered taxes. This will result in a lower ETR and means that WHT incentives could reduce the ETR of a constituent entity to below the minimum rate, and lead to either the resident jurisdiction of the recipient or the UPE charging a top-up tax. This will be particularly concerning where the passive income enjoys both a WHT incentive and low or no CIT in the jurisdiction where the outbound payment is received.

Therefore, source jurisdictions might wish to levy a WHT for the difference in each and every case where, due to the WHT incentive and the level of taxation in the residence state of the item of income, the overall taxation of such item is below 15 per cent. For example, a source jurisdiction might wish to levy at least 5 per cent WHT on royalties if the recipient entity is at a profit and enjoys an IP box regime where IP income is taxed at a 10 per cent rate. If in such a scenario the source jurisdiction refrains from levying WHT, the difference up to 15 per cent might be anyway taxed under the GloBE Rules, only in another jurisdiction. The above comes to say that source countries could revisit their beneficial WHT regimes and make them conditional upon a minimum tax of 15 per cent in the country of residence for the specific item of income.

Moreover, WHT benefits might be maintained with equal efficiency if a source country applies the WHT refund mechanism and ascertains for its application that the overall GloBE ETR in the country of residence of the recipient for the relevant period is above 15 per cent (rather than the simplified per-item of income approach) or that there is no GloBE excess profit (because the MNE is in a loss position in

¹¹ See also OECD (2022, Article 4, para. 31): “This test [...] would generally include *withholding taxes on interest, rents and royalties, and other taxes on other categories of gross payments* such as insurance premiums, provided such taxes are imposed in substitution for a generally applicable income tax” [emphasis added].

the given jurisdiction of residence or due to the substance-carve out). Hence, a certain flexibility as regards reduced WHT rates is in order. While such flexibility is possible under domestic law, double tax treaties might introduce restrictions to countries' possibility to levy variable WHT depending on the tax treatment of the corresponding income in the residence state.

3.4.3. Subject to Tax Rule (STTR)

The STTR is a standalone rule, designed to complement the IIR and UTPR, which will be included in tax treaties. It applies to payments between the residents of two contracting states that are connected persons and specifically targets intragroup payments that shift profits from source jurisdictions to low or no tax locations. In particular, the STTR "is based on the rationale that a source jurisdiction that has ceded taxing rights in the context of an income tax treaty should be able to apply a top up tax to the agreed minimum rate where, as a result of BEPS structures relating to intragroup payments, the income that benefits from treaty protection is not taxed or is taxed at below the minimum rate in the other contracting jurisdictions" (OECD, 2020, para. 567). The STTR addresses this by allowing the source state to impose additional taxation on certain covered payments up to a nominal rate of 9 per cent. This rule will not apply to payments made to or by individuals (OECD, 2020).

The STTR is essentially a rule that makes a double-tax-treaty benefit (e.g. reduced WHT rate) conditional upon taxation of the corresponding income in the country of residence. For example, while the OECD Model convention precludes the source country from levying WHT on royalty payments, by including an STTR, this surrender of taxing rights would be conditional upon effective taxation in the state of residence of up to 9 per cent. Covered payments include: (i) interest; (ii) royalties; (iii) other payments for mobile factors, such as capital, assets or risks owned or assumed by the person entitled to the payment, such as franchise fees or other payment for intangibles in combination with services; (iv) insurance premium; (v) guarantees, brokerage or financing fees; (vi) rent or any other payment for the use of or the right to use moveable property; and (vii) payments in consideration for the supply of intermediary services.

The STTR is intended to assist source states to protect their tax bases, and, to ensure it is focused on BEPS structures, a materiality threshold will be applied based on either the size of the MNE group, the value of the covered payment or the ratio of the covered payments to total expenditure (OECD, 2020).

3.4.4. IP box regimes

The IP box regime tax incentive relates to favourable tax treatment of income derived from intellectual property rights (e.g. patents). Such IP box regimes would be compatible with BEPS Action 5, provided that they are substance-based: i.e. the R&D activities that lead to income from IP rights must be performed in the jurisdiction that grants the incentive (e.g. “non-harmful IP box regime”).

However, the GloBE Rules do not differentiate between IP box regimes depending on whether they are BEPS Action 5 compatible or not. This in essence means that if an IP box regime results in an overall ETR below 15 per cent as computed under the GloBE Rules in the given jurisdiction, the effect of the incentive would be impacted also for non-harmful regimes. The effect would depend on the exact activities that an MNE is performing in the given jurisdiction – e.g. the effects would be “diluted” if there are substantial other business activities that generate income not entitled to the beneficial IP rate. In the latter case, even if the IP incentive applies with a rate below 15 per cent, the total ETR of the MNE in that jurisdiction might be above 15 per cent.

A further rule that might have an impact on the effects of GloBE to BEPS Action 5 compatible IP box regimes is the substance-based income exclusion. Non-harmful IP box regimes presuppose actual R&D activity to take place in the jurisdiction offering them. The substance-based GloBE carve-out excludes from the net GloBE profit a standard 5 per cent return on eligible payroll costs and tangible assets, such as property, plant and equipment. If the substance based income exclusion, exceeds the net GloBE income, there would be no excess profit subject to a top-up tax. Thus, a BEPS Action 5 compatible IP box regime might be further shielded from the GloBE Rules if the R&D behind it is heavily dependent on cost intensive staff and tangible assets.

What the above means is that in principle GloBE Rules can have an impact on IP box regimes. However, the intensity of this impact would be dependent upon a number of factors, such as tax rates, exact constellation of activities performed by the MNE in the jurisdiction at hand, as well as the related staff and tangible assets costs related to the R&D activity. Hence, the GloBE Rules are not expected to entirely cancel out but rather to reduce the impact of IP box tax incentives. Unlike WHT, however, it is the jurisdiction that offers the incentive that would eventually collect the top-up tax if such is due assuming it applies a domestic top-up tax. In this sense, it appears sensible that IP box regimes are retained in parallel to the GloBE Rules, as long as a country maintains a qualified domestic top-up tax regime.

3.4.5. Distribution based corporate income tax systems

The Inclusive Framework recognizes that some members have income tax regimes that impose corporate income tax when the income is distributed to the shareholders of a company rather than when it is earned. Although the tax rates applicable to these distribution-based regimes maybe equal to or above the GloBE minimum tax rate, “absent a distribution [...] the income is not subject to the distribution tax in the year it is earned and included in the financial accounts” (OECD, 2020, para. 226). As a result, under the GloBE Rules, the covered tax expense for the year that the income was earned would fall below the minimum tax rate. The GloBE Rules do not permit an indefinite deferral but introduces a deemed distribution tax, which enables an entity to “increase its covered taxes for the year up to the minimum tax liability for purposes of the GloBE ETR computation in the jurisdiction, but requires the corporation to recapture the increase to the extent an equal amount of distribution tax is not paid within a reasonable period of time, e.g. 2–4 years” (OECD, 2020, para. 228).

4. Concluding remarks

This paper demonstrates that while the GloBE Rules do not explicitly prohibit countries from maintaining a system of tax incentives, they might have an impact on the lower tax benefits arising from the use of incentives and lead to the need for countries to rethink their incentives policy. Moreover, it seems largely irrelevant whether a jurisdiction is part of the Inclusive Framework or has endorsed Pillar Two to be affected by its rules. This is because the rules are designed in such a way that, as long as the capital-exporting countries implement them, any under-taxation (below 15 per cent ETR on consolidated jurisdictional basis) would eventually be recaptured, the only remaining question being *where*. If the IIR or the UTPR apply, this would be at the level of another jurisdiction, leaving the country offering the incentive in a situation where it foregoes tax revenue to the benefit of another country. If the qualified domestic top-up tax applies, this would be the same jurisdiction offering the incentive.

In practical terms, the GloBE Rules have a very different impact on different incentives. There is the “green” zone where, although providing a tax benefit, the rules pursue a higher goal recognized by the OECD and the international community, such as prevention of double taxation (participation exemption), dealing with timing differences (accelerated depreciations), or determining ability-to-pay by recognizing certain expenses in deviation from the financial accounts. Such domestic rules would remain largely unaffected by the GloBE Rules.

At the other end of the spectrum is the “red” zone where the corporate tax reduction is generalized and serves no purpose other than to provide a favourable tax regime.

The reduction might be intrinsic for the system (e.g. because no CIT exists at all), time-related (tax holidays), geographically located (SEZs), etc. To the extent such systems apply to all entities of an MNE in a given jurisdiction and lead to an ETR below 15 per cent, they would always be affected by the Pillar Two Rules for in-scope situations and excess profits with the resulting tax policy dilemma for the jurisdictions that offer them.

Finally, there is the “yellow” zone in between, where only certain items of income are affected. These would include mostly passive income, such as interest or income from royalties and IP box regimes. The yellow zone is interesting because one can hardly determine a priori what would be the effect of Pillar Two in the abstract since this effect would depend on the specific circumstances of each taxpayer, the constellation of its activities, as well as its substance and the profit-margins it operates at. Moreover, since these types of income are mainly “passive” and therefore the taxing rights between residence and source countries are mostly shared, any under-taxation can be compensated not only at the level of the residence state but also by the source state.

References

- Brown, Rhoda (2020). "Accounting profits, tax profits and unitary taxation (revisited)", *British Tax Review*, 1, pp. 63–81.
- Chandler, Roy, and Carla Edgley (1999). "Certainly reasonable or reasonable certainty?", *British Tax Review*, 4, pp. 309–314.
- Easson, Alex (2001). "Tax incentives for foreign direct investment part II: Design considerations", *Bulletin for International Taxation*, 55(8), pp. 365–375.
- Freedman, Judith (1993). "Ordinary principles of commercial accounting – Clear guidance or a mystery tour?", *British Tax Review*, 6, pp. 468–478.
- _____ (1995). "Defining taxable profit in a changing accounting environment", *British Tax Review*, 5, pp. 434–444.
- Goddard, Robert, and Helen Rogers (2006). "Tax law and accounting principles", *Edinburgh Law Review*, 10(2), pp. 298–306.
- Schön, Wolfgang (2004). "International accounting standards – A starting point for a common European tax base?", *European Taxation Bulletin*, 44(10), pp. 426–440.
- Whiting, John (2006). "Tax and accounting", *British Tax Review*, 3, pp. 267–281.
- OECD (Organisation for Economic Co-operation and Development) (2020). *Tax Challenges Arising from Digitalisation – Report on Pillar Two Blueprint: Inclusive Framework on BEPS*, OECD/G20 Base Erosion and Profit Shifting Project (Paris: OECD Publishing).
- _____ (2021). *Tax Challenges Arising from the Digitalisation of the Economy – Global Anti-Base Erosion Model Rules (Pillar Two): Inclusive Framework on BEPS* (Paris: OECD).
- _____ (2022). *Tax Challenges Arising from the Digitalization of the Economy – Commentary to the Global Anti-Base Erosion Model Rules (Pillar Two)* (Paris: OECD).
- UNCTAD (United Nations Conference on Trade and Development) (2022). *World Investment Report 2022: International Tax Reforms and Sustainable Investment* (New York and Geneva: United Nations).

Does FDI in agriculture promote food security in developing countries? The role of land governance*

Berna Dogan^a

Abstract

As climate change, population growth, rising incomes and rapid urbanization increase the demand for food, the world is facing further pressure to enhance food security for all. Investment in agriculture and food systems is not only necessary but also critical. Foreign direct investment (FDI) is an important source to close the funding gap that developing countries face to increase food production and agricultural productivity. Yet, it poses serious challenges on domestic populations. The goal of this study is to investigate the effect of FDI in agriculture on food security in the host country. The empirical analysis employs a land access index by the International Fund for Agricultural Development (IFAD) to control for differences in land governance. Using data from 56 developing countries over a 16-year period, the empirical analysis finds evidence that FDI in agriculture has an inverse effect on food security in the host country. FDI has a more favourable impact where the land governance system is better. The findings call for an imperative role to governments for tenure reforms by formalization of customary rights to enhance tenure security for a more equitable access to land. It is also essential that good monitoring and impact assessment systems are developed to ensure transparency of the processes associated with agricultural investments.

Keywords: developing countries, FDI, food security, land governance, tenure security

JEL classification codes: F21, F63, Q15

* Received: 13 May 2022 – Revised: 25 July 2022 – Accepted: 26 July 2022

I am grateful to Leonce Ndikumana for his invaluable support and guidance throughout this project. I would like to thank Jim Boyce, James Heintz and Julie Caswell for their insightful comments on earlier drafts. I also wish to acknowledge the comments and suggestions of the two anonymous referees which profoundly improved this study. All the remaining errors are mine. The views presented here do not represent those of UNCTAD or its Member States.

^a Investment Research Branch, Division on Investment and Enterprise, United Nations Conference on Trade and Development, Geneva, Switzerland (Berna.Dogan@unctad.org).

1. Introduction

Food insecurity remains a major long-term concern and is expected to increase even more under the impacts of economic slowdown and downturns following the COVID-19 pandemic, ongoing conflicts and climate extremes. While the global prevalence of undernourishment (PoU) fell from 1,011 million people in 1990–1992 to 927 million in 2000–2002 and to 821.6 million in 2014–2016, this declining trend reversed in 2015 (FAOSTAT). In 2020, both the share of the undernourished in total population and the number of the undernourished increased following a stagnant period from 2014 to 2019. The prevalence of undernourishment climbed to about 9.9 per cent in 2020, from 8.4 per cent the previous year (FAO et al., 2022).

Foreign direct investment (FDI) in agriculture has gained increasing scope and scale in the context of reducing hunger and promoting food security for all. In 2014, UNCTAD estimated that the investment in agriculture and food security required between 2015 and 2030 is \$480 billion, and that the investment gap is \$260 billion (UNCTAD, 2014). FDI is essential to closing the funding gap to increase food production and agricultural productivity. The developmental benefits of foreign investor involvement in investment in agriculture can be realized through four channels: (i) job creation; (ii) providing access to markets and technology for local producers; (iii) local and national tax revenues; and (iv) supporting social infrastructure, often through community development funds using land compensation (Deiningier et al., 2011; UNCTAD, 2009). The actual impacts and implications vary across countries, by agricultural produce, and influenced by factors, such as the type of foreign involvement, the institutional environment, and the host country's level of development (UNCTAD, 2009).

The potential benefits of foreign investment in agriculture are counterweighted by the concerns raised due to the examples of the past decades. Firstly, the scale of investment projects involves large areas of land and affects a large number of people. Secondly, the sectoral breakdown of FDI reveals that investment flows to agriculture do not follow a steady pattern. Third, and more importantly, most land deals lack transparency and are either underreported or not reported at all, which makes monitoring a challenge. Consequently, it is hard to reach the desired socioeconomic outcomes such as job creation, empowering rural communities, and reducing poverty and food insecurity in the host country.

One of the critical factors of concern relating to land investment in many developing countries is that land governance is only vaguely defined in legislation. Land governance is the process of decision-making on access to, and use of, land and natural resources, and how conflicting interests are reconciled. According to the Rights and Resources Initiative (RRI), about 65 per cent of the global land reserves are held by indigenous people and communities under customary tenure regimes, with only one-tenth being formally recognized (RRI, 2015). In the least developed countries (LDCs), particularly in Africa, land tenure systems are shaped by historical

conditions and social relations rather than a formal legal framework. Most farmland investments in developing countries in recent years exploit this gap in the legal system. Foreign investors predominantly target “unutilized” or “underutilized” land which are in practice under the use of local communities (Cotula, 2013; Conigliani et al., 2018). This obscurity in land governance makes rural populations vulnerable to the adverse effects of agricultural investments (World Bank, 2014).

While agricultural investment can promote food security in the home country by increased availability of food, their implications for food security in the host country remain ambiguous. This study sets out to explore this relation and will make a novel contribution to the recent land acquisition debate on the differences in land governance across developing countries. Recent literature on large-scale land acquisitions emphasizes the role of institutions. Some studies identify tenure insecurity as one of the main drivers of land deals (Arezki et al., 2013; Giovanetti and Ticci, 2016; Lay and Nolte, 2018); others still find that investors prefer to invest in countries with better regulated land tenure as it provides more guarantees for their investment and helps when potential disagreements or conflicts occur (Mazzocchi et al., 2018; Tagini, 2009). However, the discussion is mostly based on findings from individual case studies. Lack of data on land governance and land deals make it a challenge to turn the case studies into empirical analysis.

The goal of this study is to investigate the implications of FDI in agriculture for food security in the host country. Empirical research on the relationship between sectoral allocation of FDI and food security is quite limited. This study aims to contribute to this literature. Using FAO data, this study seeks to answer two main questions: Does FDI in agriculture promote food security in developing countries? And how does the land governance system affect the ultimate relation?

Empirical findings shed some light on the socioeconomic outcomes of farmland acquisitions in developing countries, and especially the impact these acquisitions have on food security in host countries. By this, the study can support evidence-based policymaking on alleviating the increasing pressure on agricultural land as growing populations require more food production, and as environmental degradation and climate change escalate the competition for limited natural resources in developing countries.

This study is organized as follows. Following the introduction, the second section of the paper provides a brief overview of the trends FDI in agriculture followed since 1995. The third section reviews the literature on FDI and food security, and the fourth section examines the relation empirically, and presents a detailed discussion of the econometric results. Concluding remarks and policy implications are contained in the final, fifth section.

2. Trends in FDI in agriculture

Agricultural investments in developing countries have risen dramatically in recent decades. FDI in agriculture was not previously unknown but it has evolved significantly over time, with variations across regions, in target commodities, scale and how it has impacted smallholder farming. All these variations affect the socioeconomic outcomes of investments (Deiningier et al., 2011).

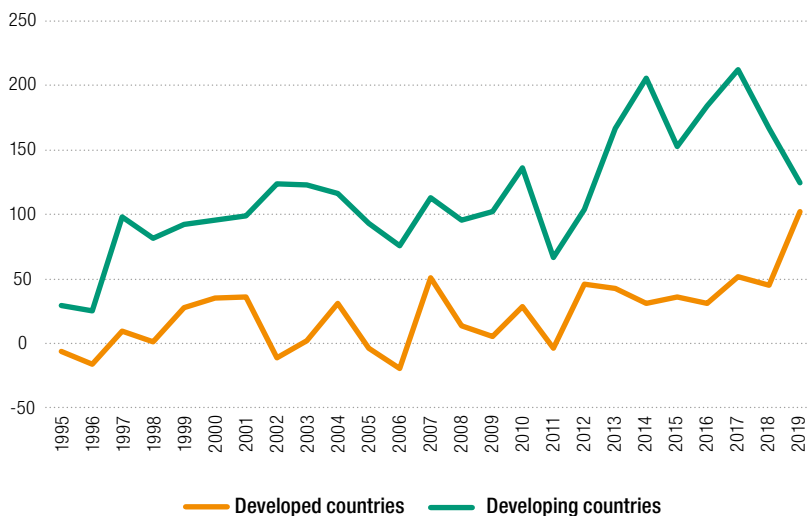
In general, FDI in agriculture comprises a significantly small share of total FDI, as compared to other economic sectors. However, such investments have grown globally since the mid-1990s and, after 2007, FDI inflows to developing country agriculture rose significantly. This development is explained by several factors. To begin with, the global food price surge of 2007–2008 highlighted the vulnerability of food-dependent countries and spurred them to find new secure food sources. With this motivation, countries with a growing population and sufficient funds started investing overseas to avoid food supply shocks in their home country (Deiningier et al., 2011). The drivers of this new wave of investment are mainly emerging countries with rapidly growing populations, a shortage of fertile land, but with abundant capital. Major investors from China, the Gulf States, and the Republic of Korea have invested in food crops and livestock production in developing countries. Target countries are in the Global South with abundant cultivable land and low agricultural productivity. In addition, following the global financial crisis of 2008, investors rediscovered farmland as a worthwhile alternative investment tool with stable returns.

Figure 1 shows the FDI trend in agriculture since 1995.¹ These investments represented 2.8 per cent of global FDI inflows between 2010 and 2019, 0.7 percentage points higher than the previous decade.² The pace of investments slowed before the 2008 global financial crisis and was followed by a sharp decline which lasted until 2011. The pace picked up momentum again until its subsequent decline in 2021. UNCTAD (2022) shows a continuing decline in the numbers of international private investment projects in the food and agriculture sector, which have not recovered from the COVID-19 pandemic. Despite an overall increase, FDI inflows in agriculture fluctuates remarkably and reacts strongly to global economic shocks. These sudden changes in FDI inflows make developing countries more vulnerable to global business cycles than their developed-country counterparts.

Regional distribution of FDI in agriculture has been profoundly uneven, even though it has overall increased (figure 2). The East Asia and the Pacific region has received

¹ The main information source for FDI in agriculture is the FAO's Foreign Investment Database which reports FDI flows in agriculture using the International Standard Industrial Classification of all Economic Activities (ISIC) Rev.4 category on "agriculture, forestry and fishing". The term "agriculture" is used to cover this broad category.

² Author's own calculations based on data from the FAO's Foreign Investment Database (accessed 4 May 2022).

Figure 1. FDI in agriculture, 1995–2019 (Millions of dollars)

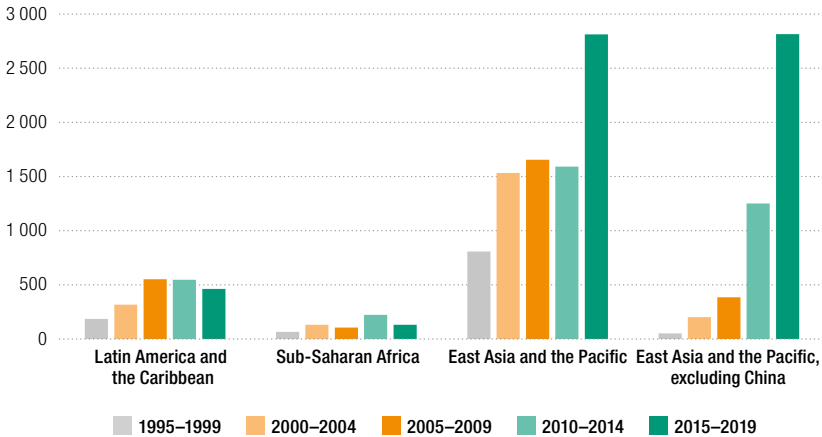
Source: Author's calculations based on data from the FAO's Foreign Investment Database.

the most FDI in the agriculture sector since 1995. FDI to the region has increased, led by high economic growth, strong institutional capacities, large potentials in agricultural industries and government incentives. Until recently, China was the main FDI destination in the region, but South-East Asian countries have managed to attract increasingly larger shares of FDI. Indonesia has been a prime target of farmland investments: from 2015 to 2019, it was the world's largest recipient of FDI inflows to agriculture, with average inflows of \$3.1 billion per year.³ China accounted for the largest portion of investment in agriculture since 1995, rising as high as 85 per cent of total FDI in the sector in 2008, before falling to 20 per cent before the COVID-19 pandemic.⁴ Indonesia and Malaysia have been targeted for palm oil production in large estates, while in Thailand and Viet Nam foreign investments mostly targeted rice production by smallholders (Deiningier et al., 2011).

FDI inflows to the Latin America and the Caribbean region have risen significantly since the early 2000s. This increase was mainly due to growing interest in crop production of biofuels and livestock ranching. Brazil has long been a particularly attractive destination for farmland investments in the region. Since 2000, foreign investors bought over 6 million hectares of land in Brazil for agricultural production, timber extraction, carbon trading, industry, renewable energy production, conservation, and

³ Indonesia is followed by Norway with \$940 million per year on average, and by Oman with \$816 million per year on average from 2015 to 2019 (FAO, 2022).

⁴ Author's own calculations based on data from the FAO's Foreign Investment Database (accessed 4 May 2022).

Figure 2. FDI in agriculture, by region, 1995–2019 (Millions of dollars)

Source: Author's calculations based on data from the FAO's Foreign Investment Database.

tourism (ILC, 2022). These deals resulted in heated debates on displacement and harassment of indigenous and traditional communities, and the deforestation of the Amazon Forest.

Sub-Saharan African countries attract the smallest share of global FDI inflows to agriculture. However, the value of FDI flows to agriculture to these countries more than doubled in the period between 2010 and 2019, compared to between 2005 and 2009. This is due to a change of approach in how African governments deal with development and the rural sector. Political commitment to reduce poverty and hunger and increasing production and productivity in the agricultural industries were contained in the Maputo Declaration on Agriculture and Food Security in 2003, and the Comprehensive African Agricultural Development Programme (CAADP) Compact in 2007. Government incentives to attract investments to the rural sector have encouraged transnational companies to consider investing in the region. According to the Land Matrix database, as of July 2022, 9.5 million hectares of land was acquired in sub-Saharan Africa for agricultural production (ILC, 2022). Mozambique, Ethiopia and Ghana, in that order, were the top recipient countries of farmland investments in the region.

3. Literature review

The analysis of the relation between FDI and food security began in the 1980s. Prior to this, food security was considered a part of social welfare, and only became a parameter in empirical analysis after Sen's introduction of the concept of *entitlements* (Sen, 1981), but still largely from a sociological perspective. Since the late 1980s, several cross-national studies focused on the impact of international

investment and trade on micro-level measures of welfare, such as nutrition, infant mortality, literacy rate, and life expectancy (Firebaugh and Beck, 1994; Shen and Williamson, 1997; Wimberley, 1991). These studies were particularly important as they applied earlier sociological research on basic needs to the broader question of economic development.

Several cross-national studies testing the effect of FDI on food consumption found a direct and negative relation (London and Smith, 1988; London and Williams, 1990; Wimberley, 1991). They argue that FDI is detrimental to food supply. This is criticized by studies claiming that they misinterpreted the negative sign on FDI. These studies argue that foreign investment does not decrease food supply, but rather that it is not as beneficial as domestic investment (Firebaugh and Beck, 1994; Firebaugh, 1996). Several studies found that foreign capital penetration does not have a robust significant effect on food consumption (Brady et al., 2007; Jenkins and Scanlan, 2001).

The surge of large-scale land acquisitions in developing countries resulted in increased interest on a wide range of topics, among others, the drivers and outcomes of foreign investment in land. The literature almost unanimously agrees that the issue of property rights and land tenure security are crucial in the context of large-scale acquisitions. Several studies suggest that the lack of formal recognition of customary land tenure rights can increase the risk of "land grabbing" by reducing the potential of large-scale land deals to contribute to inclusive growth (Cotula, 2013; Cotula et al., 2019; De Schutter, 2011). Other studies argue that some populations are disproportionately affected under tenure insecurity (Behrman et al., 2012; German et al., 2013). Schoneveld et al. (2011) show that vulnerable groups, such as women and migrant farmers, are particularly affected because of their comparatively insecure access to vital livelihood resources.

Empirical work investigating the direct link between agricultural FDI and food security is quite limited, mainly due to the lack of disaggregated sectoral data. However, a small number of studies show both a positive relation (Ben Slimane et al., 2015; Dhahri and Omri, 2020; Santangelo, 2018; Wardhani and Haryanto, 2020) and a negative relation (Abdul-Hanan et al., 2022; Djokoto, 2012; Kinda et al., 2022; Mihalache-O'keef and Li, 2011). Ben Slimane et al. (2015) explain the positive impact of FDI in the primary sector on food security through increased agricultural production and employment creation, thereby increasing per capita income; while Mihalache-O'keef and Li (2011) found that FDI in the primary sector has a negative effect on food security due to increasing unemployment, changing use of agricultural land, and negative environmental and demographic changes.

Country or regional case studies provide further findings on this. Schoneveld et al. (2011) show that agricultural investment projects directly impact food security and the income earning potential of communities following their loss of access to vital resources, especially forests and land. Kinda et al. (2022) investigate the impacts of investments for biofuel and food crop production. Their analysis indicates that land acquisition for mixed production of biofuel and food crops, and land for other

uses contribute to food insecurity in sub-Saharan Africa as it decreased cereal production and increased malnutrition. They also found that land acquisition for biofuel has no significant effect on food security. Mechiche-Alami et al. (2021) argue that even when the main objective is agricultural production, most large-scale agricultural investments are not likely to improve food security, but rather serve the financial interests of transnational companies.

Santangelo (2018), using project-level information, argues that an investor's country of origin has an impact on the host country's food security, when engaging in FDI in developing country agriculture. She shows that while FDI in land by investors from developed countries positively influenced food security in the host country, investments by investors from developing countries hampered it. The main reason for this is that developed country investors are pressured by home institutions to respect human rights and engage in responsible farmland investments. Investors from developing countries, on the other hand, are pressured to promote national interests and government policy objectives at the expense of the interests of the host country, e.g. through the decrease of its cropland. Abdallah et al. (2022) distinguish between investments in land by domestic and foreign entities and show that both domestic and foreign investments lead to worse food security outcomes, but that the effect is larger for domestic investments.

This study aims to contribute to this growing empirical literature on the implications of foreign direct investment in developing country agriculture on food security in the host country. Considering the evidence from the literature, the following hypotheses will be tested:

H_1 : FDI in developing country agriculture does not always enhance food security in the host country.

H_2 : Better governance of land tenure is positively associated with food security.

4. Empirical analysis

4.1. Model specification

Hypotheses are tested on an unbalanced panel of 56 developing countries over the period 2005–2020. The selection of countries is determined by data availability. Econometric analysis is based on the following reduced-form model:

$$Y_{it} = \alpha + \beta_1 FDI_agri_{it-1} + \Gamma X_{it} + \lambda_i + \eta_t + \varepsilon_{it}$$

where Y_{it} stands for the food security indicators of country i in year t . The coefficient of interest is β_1 , showing the impact of FDI in agriculture sector on food security indicators. There may, in principle, be a dynamic impact from undernourishment to FDI through a healthier workforce as healthy and productive labour attract more FDI. This reverse causality is disentangled using a lagged independent variable

(FDI_agri_{it-1}) in a first difference model (Allison, 2009). X is the vector of control variables affecting the dependent variable. λ_i and η_t are country and time fixed effects, respectively; and ε is the error term. Several variations of the model are estimated using different indicators to measure food security. The model is estimated using the fixed effects method to account for omitted time-invariant factors. The only exception is the estimation where a binary variable for resource-rich countries is controlled for. For these estimations, the random effects method is used.

4.2. Data and variables

The variable of interest of the analysis is FDI in agriculture. The main source of information is FAO's Foreign Investment Database which reports FDI flows in agriculture following ISIC Rev.4 category on "agriculture, forestry and fishing". FAO follows UNCTAD's definition of FDI and records the value of cross-border direct investment transactions received by the reporting economy over the course of a year. The data represents transactions affecting the investment in enterprises of a specific industry resident in the reporting economy. Therefore, this variable does not focus solely on large-scale land deals. FDI is measured as a share of total FDI flows. In the FAO database it is reported on a net basis. Hence, FDI flows with a negative sign indicate that at least one of the components of FDI is negative and not offset by positive amounts of the remaining components. These are instances of reverse investment or disinvestment.

Food security is measured by two indicators to capture two FAO dimensions of food security, namely: (i) the prevalence of undernourishment, to measure access to food; and (ii) dietary energy consumption, to measure the availability of food.⁵ Prevalence of undernourishment expresses the share of population that continuously consumes an amount of calories that is insufficient to cover their energy requirement for an active and healthy life. Dietary energy consumption is proxied by dietary energy supply. Ideally, data on food consumption should come from nationally representative household surveys. However, only very few countries conduct such surveys on an annual basis. Thus, FAO's dietary energy consumption values are estimated from the daily per capita dietary energy supply reported in the individual country food balance sheets compiled by FAO (see FAO et al., 2022). It shows the amount of food available for consumption, expressed in kilocalories per person per day (kcal/person/day). At the country level, it is calculated as the food remaining for human use after all non-food consumption, e.g. food exports, animal feed, industrial use, seed and wastage, is removed.

⁵ The most widely accepted definition of food security is that "[it] exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (FAO et al., 2022, p. 202). This definition encompasses the four dimensions of food security, namely: (i) availability; (ii) access; (iii) stability; and (iv) utilization.

Both indicators are based on the notion of an average individual in the reference population. The data for each measure is taken from FAO.

Based on previous literature, several other determinants of food security are controlled for, and include: (i) economic development; (ii) agricultural production; (iii) export dependency; (iv) population structure; and (v) democracy. This study adds land governance as a new control variable. Unless otherwise indicated, most data are collected from the World Development Indicators (World Bank, 2022a). Table A1 shows the definition and source of each variable used in the analysis.

An effective and transparent land governance system is required to protect local livelihoods from the potential negative impacts of FDI in agriculture, and on land in general. To measure the effectiveness of land governance policies, IFAD's access-to-land index is used. This index assesses the extent to which the institutional, legal and market framework provides secure land tenure and equitable access, and is based on five components, namely: (i) the extent to which law guarantees secure tenure for land rights of the poor; (ii) the extent to which the law guarantees secure land rights for women and other vulnerable groups; (iii) the extent to which land is titled and registered; (iv) the functioning of land markets; and (v) the extent to which government policies contribute to the sustainable management of common property resources at the community level. It takes values between 1 and 6 with higher values indicating better land governance.

Economic development is measured by GDP per capita. Income per capita measures households' ability to afford food and non-food elements which improve the quality of nutrition (e.g. hygiene, education, information, etc.). It is used in logarithmic form because of its skewed distribution (Mihalache-O'keef and Li, 2011).

Agricultural production and export dependency have direct effects on food security in terms of food availability. Agricultural production is measured by a crop production index which takes the 2014–2016 average as the base year. Export dependency is measured by food exports as a share of total merchandise exports. The World Bank defines food exports as consisting of food and live animals, beverages and tobacco, and animal and vegetable oils and fats (World Bank, 2022a). Food exports may limit its availability as it diverts land from crop production for domestic consumption to export agriculture, and as a result undermine food security in the exporting country. However, revenue from food exports may improve the ability to import food that cannot be produced in the country concerned. Including food exports and crop production as control variables together with FDI may also lead to the problem of multicollinearity. This issue is explored with a correlation matrix (table A2). The correlation between FDI and food exports is 0.19, and FDI and crop production is -0.20, indicating no problem of multicollinearity.

Population structure is measured by age dependency and population density. Age dependency has implications for both the supply of and demand for food, and therefore affects food security. It is measured as the ratio of dependents (those who are younger than the age of 15 and older than 65) to the working-age population.

Population density, measured as population divided by land area in square kilometers, affects food security through food demand, agricultural production, and wages. The immediate effect of high population density is increased demand for food and pressure on land. Increasing population density may also have a negative impact on food security through declining agricultural wages if the majority of the population is employed in agriculture. However, higher population density may also be related to the development of markets and institutions, and to lower transaction costs, and lead to increased agricultural production (McMillan et al., 2011). Boserup (1965) suggest that increasing population density leads to more input use per unit of land and increased agricultural production, as a result of farmers shifting from long fallow to short fallow and multiple cropping per year. Ricker-Gilbert et al. (2014) suggest that this relation depends on the extent to which rural agricultural markets are integrated with local non-farm markets and urban markets.

Based on Sen's observation (Sen, 1981) that democracy creates political incentives for rulers to provide basic needs, democratic governments are expected to be more responsive to food security concerns than autocratic regimes. The political stability and absence of violence/terrorism indicator is used to control for democracy. It measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. Estimates give the country's score on the aggregate indicator, in units of a standard normal distribution. This indicator takes values between (about) -2.5 to 2.5, with higher values indicating higher levels of democracy (World Bank 2022b).

There has been a significant increase over the past decade in FDI flows to resource-rich countries. A broad range of literature investigates the economic and social outcomes of resource abundance. Some studies find that resource-rich economies have worse well-being indicators, such as life expectancy, child mortality and educational attainment (Bonilla Mejia 2020; Gylfason, 2001; Perez and Claveria, 2020); some, however, argue that there is no robust effect (Stijns, 2006). Several studies suggest that the human development effect of resource abundance depends on institutions, and resource abundance need not be a curse, and could contribute to economic and human development if the process is well managed and good governance structures are in place (Kolstad, 2009; Osaghae, 2015; Zallé, 2019). A binary variable is used to control for resource abundance. This variable takes the value 1 for countries that are rich in natural resources, and 0 otherwise. The categorization is based on UNCTAD's classification for oil-rich and mineral-rich countries.

4.3. Regression sample

The regression sample consists of 56 developing countries over the period 2005–2020. Summary statistics of the variables are provided in table 1. The average prevalence of undernourishment is 10.6 per cent of total population, and daily dietary energy consumption per capita is 2,810 kcal. Table 2 presents

a disaggregated sample by region, which shows that sub-Saharan Africa has the highest levels of food insecurity as the region has the lowest mean for daily dietary energy consumption per capita, with 2,496 kcal, and the highest prevalence of undernourishment with 21.7 per cent.

The share of FDI in agriculture in total FDI is considerably low in all regions. This is not surprising, as agriculture usually attracts a small portion of total FDI compared to other sectors. In the sample, the East Asia and the Pacific has the highest level of FDI in agriculture, while the mean values are almost even for Latin America and the Caribbean and sub-Saharan Africa.

IFAD's access-to-land index is not provided for every country and only covers the period up to 2018. Its average value is 3.98, with indiscernible variation across regions. The average access-to-land index value is highest in the Latin America and the Caribbean region, reflecting a more equitable access to land, and is followed by sub-Saharan Africa.

Table 1. Summary statistics, full sample

	Observations	Mean	Standard deviation	Minimum	Maximum
Prevalence of undernourishment (%)	795	10.58	8.65	2.50	43.20
Dietary energy consumption (kcal/per capita)	831	2 811	373.47	1 837	3 755
FDI in agriculture (% of total FDI)	670	3.71	6.95	-14.02	62.86
Access to land (1 to 6)	619	3.98	0.60	1.30	5.63
GDP per capita (2015, in constant \$)	896	4 382	3 642	346	16 038
Crop production index (2014–2016=100)	840	93.40	16.32	39.27	169.14
Food exports (% of total merchandise exports)	842	27.88	21.16	0.15	93.61
Age dependency (% of working-age population)	896	60.54	16.99	36.49	111.94
Population density (people km ² of land area)	896	117.80	178.67	5.61	1 265
Political stability (approximately -2.5 to 2.5)	848	-0.41	-0.71	-2.80	1.06
Resource-rich countries (1: yes)	896	224	25.0%	0	1

Source: Author's estimations.

Note: The mean and standard deviation for the resource-rich countries dummy indicate their respective number and share.

Table 2. Summary statistics, by region

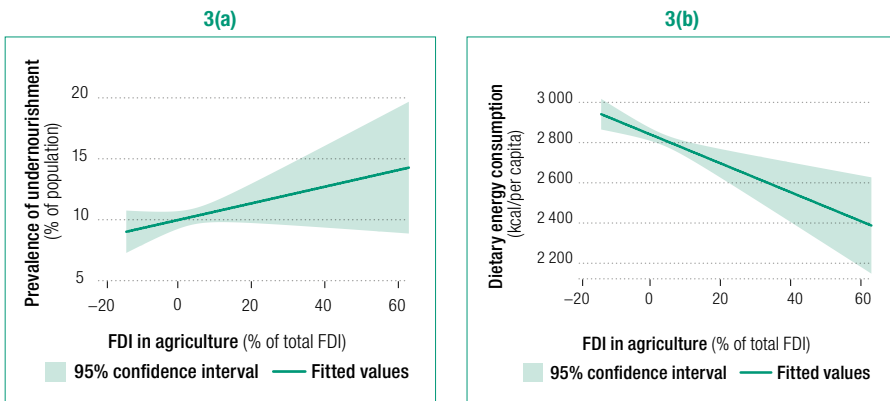
Variables	East Asia and the Pacific					Latin America and the Caribbean					Sub-Saharan Africa				
	Obs.	Mean (std. dev)	Min	Max		Obs.	Mean (std. dev)	Min	Max		Obs.	Mean (std. dev)	Min	Max	
Prevalence of undernourishment (%)	150	9.29 (5.26)	2.50	27.80		255	9.55 (6.14)	2.50	26.80		135	21.74 (10.49)	4.70	43.20	
Dietary energy consumption (kcal/percapita)	160	2 741 (218.25)	2 200	3 336		272	2 770 (289.78)	2 133	3 314		127	2 497 (377.53)	1 837	3 261	
FDI in agriculture (% total FDI)	143	4.12 (7.41)	-1.73	59.81		203	3.96 (7.76)	-9.72	62.86		138	3.99 (6.01)	-8.21	38.11	
Access to land (1 to 6)	122	3.86 (0.61)	2.00	5.25		196	3.97 (0.48)	2.90	5.20		151	3.92 (0.49)	2.60	4.90	
GDP per capita (2015, in constant \$)	160	3 828 (2 752)	542	11 414		272	7 101 (4 085)	1 573	16 037		192	1 783 (2 280)	384	10 643	
Crop production index (2014–2016=100)	150	95.11 (18.00)	39.27	165.23		255	93.32 (13.92)	52.87	126.93		180	95.51 (18.31)	48.93	133.89	
Food exports (% of total merchandise exports)	150	17.54 (16.54)	0.61	67.67		266	37.96 (22.43)	2.87	93.61		185	36.95 (19.43)	5.79	87.09	
Age dependency (% of working-age population)	160	50.84 (8.96)	36.49	78.46		272	57.18 (8.52)	43.38	86.64		192	82.17 (18.22)	41.29	111.94	
Population density (people per km ² of land area)	160	136.16 (95.15)	26.92	367.51		272	60.28 (69.21)	8.52	313.04		192	148.61 (180.5)	10.75	623.52	
Political stability (-2.5 to 2.5)	144	-0.32 (0.62)	-1.78	0.92		272	-0.22 (0.58)	-2.05	1.06		192	-0.30 (0.76)	-2.26	1.02	
Resource-rich countries (1: yes)	..	..	0	1		80	29.4%	0	1		128	66.7%	0	1

Source: Author's estimations.

Note: The mean for resource-rich dummy denotes the share of these countries in each region.

The correlation between variables is explored using a correlation matrix (table A2). The significance level of correlation coefficients is also provided. The correlation matrix shows that most correlation coefficients are significant at 5 per cent level. Both food security measures are correlated with the FDI variable. Due to the nature of the indicators, they move in opposite directions against FDI; as the share of FDI in agriculture in total FDI increases, prevalence of undernourishment goes up while per capita dietary energy consumption goes down (figure 3).

Figure 3. Food security versus FDI in agriculture



Source: Author's estimations.

4.4. Results and discussion

The association between FDI in agriculture and food security is explored by two different measures of food security on a fixed effects model. This helps to address the different dimensions of food security as defined by FAO, namely the availability of food within the country, and its utilization by domestic population. These factors allow to address food security as both a supply- and demand-side phenomenon. Moreover, using these two measures as dependent variables allows to check the robustness of regression results.

The model is first estimated without the access-to-land index to explore the effect of FDI in agriculture on food security, without controlling for the level of land governance. It also has the advantage of having a longer time analysis as the access-to-land index data is available until 2018 which limits the time dimension of the panel data. Tables 3 and 4 present the estimation results. Diagnostic statistics are provided in each column. The validity of using fixed effects over random effects is tested using the Hausman test. A p -value that is smaller than 0.05 indicates that the results of fixed effects are preferred over a random effects estimation. Estimations using a

resource-rich country dummy are not provided for the p -value for the Hausman test as these regressions are run using the random effects technique.

Tables 3 and 4 present the results of the estimations with prevalence of undernourishment and dietary energy consumption as dependent variables, respectively. Initial results yield significant and negative coefficients on prevalence of undernourishment, and significant and positive ones on dietary energy consumption, indicating a positive effect of FDI in agriculture on food security (columns 1-3 of tables 3 and 4). However, the direction of the relation is negated by what is observed in the descriptive analysis (figure 3). The relation changes when an interaction variable between FDI and access to land is included in the estimation, supporting the hypothesis of this study that better land governance matters for the ultimate effect of FDI on food security (columns 5 and 6). The full model (column 6 in each table) shows that on average a 1 percentage point increase in FDI in agriculture is associated with a 13-percentage-point increase in prevalence of undernourishment, and a 7.5 kcal decrease in per capita food available for dietary consumption. This outcome supports the first hypothesis of this study.

The estimate on land governance is of particular interest in this study. Figure 4 plots the relation between land governance and food security measures. Both figures 4(a) and 4(b) show a linear and positive relation, as can be seen from the prevalence of undernourishment's downward sloping line and the dietary energy consumption's upward sloping line. This indicates that better governance of land tenure systems is associated with lower food insecurity. Note that the access-to-land index enters the equation twice: first, as a stand-alone independent variable and second, as an interaction term with FDI. The results of the estimations show no significant effect of land governance on food security. With or without FDI as a right-hand side variable, this outcome does not change. This is contrary to expectations. To investigate this result further, the access-to-land index is interacted with FDI. This interaction term is significant and negative in estimations using both food security measures. This new finding indicates that FDI has a more favourable effect where there is better land governance. Additionally, to explore the stand-alone effect of land governance, the model is estimated with FDI and the access-to-land index separately. The results of these estimations yield insignificant coefficients for the access-to-land index. To further analyse the role of land governance in similar socioeconomic, historical and cultural settings, the full model is estimated for the three geographic regions in the second part of the analysis.

Table 3. Effect of FDI in agriculture on prevalence of undernourishment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FDI in agriculture (lag_1)	-0.0489*** (-3.37)	-0.0489*** (-3.37)	-0.0383** (-2.45)	-	0.170** (2.29)	0.187** (2.52)	-	0.175** (2.25)	-
GDP per capita (ln)	-6.276*** (-7.63)	-6.080*** (-4.46)	-5.361*** (-3.39)	-7.899*** (-5.71)	-8.068*** (-7.57)	-5.605*** (-3.60)	-5.357*** (-3.41)	-5.129*** (-7.06)	-6.000*** (-10.17)
Crop production	-0.0401*** (-5.02)	-0.0389*** (-4.87)	-0.0451*** (-4.18)	-0.0573*** (-5.26)	-0.0524*** (-5.01)	-0.0487*** (-4.56)	-0.0463*** (-4.31)	-0.0546*** (-5.05)	-0.0581*** (-8.11)
Food exports	0.00732 (0.6)	0.000816 (0.06)	-0.00357 (-0.27)	0.00697 (0.57)	0.00209 (0.16)	0.000755 (0.06)	-0.00308 (-0.23)	0.0149 (1.16)	0.0369*** (4.07)
Age dependency	0.128*** (3.71)	0.0613 (1.45)	-0.0442 (-0.75)	-0.0676 (-1.53)	0.0715 (1.64)	-0.0647 (-1.10)	-0.0414 (-0.71)	0.0558 (1.40)	0.0573** (2.28)
Population density	0.0501*** (4.76)	0.0417*** (3.93)	0.0581*** (4.83)	0.0646*** (6.31)	0.0614*** (5.29)	0.0567*** (4.82)	0.0584*** (4.89)	0.0602* (1.80)	0.00623** (2.09)
Political stability	-1.356*** (-4.50)	-1.494*** (-4.84)	-2.267*** (-6.10)	-2.135*** (-5.90)	-1.914*** (-5.53)	-2.223*** (-6.12)	-2.241*** (-6.07)	-1.667*** (-4.77)	-1.051*** (-3.77)
Land governance	-	-	0.13 (0.39)	0.409 (1.38)	-	-	0.216 (0.64)	-	-
FDIxLand	-	-	-	-	-0.0536*** (-2.88)	-0.0579*** (-3.10)	-0.0122*** (-3.08)	-0.0556*** (-2.84)	-
Resource rich	-	-	-	-	-	-	-	5.726*** (3.74)	5.561*** (4.06)
Constant	50.99*** (7.51)	55.11*** (5.45)	53.65*** (4.58)	74.42*** (7.22)	67.74*** (7.60)	57.70*** (5.12)	53.20*** (4.57)	51.56*** (7.05)	57.95*** (10.57)
Observations	550	550	439	542	439	439	439	439	723
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
year dummy	no	yes	yes	yes	no	yes	yes	yes	yes
R ² within	0.3707	0.4012	0.4778	0.4392	0.4630	0.4908	0.4826	0.4466	0.3626
R ² between	0.3197	0.3036	0.1210	0.1522	0.2611	0.1227	0.1209	0.6762	0.7168
R ² overall	0.3295	0.3192	0.1109	0.1593	0.2412	0.1128	0.1111	0.6906	0.7072
Hausman (p_value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	..	..

Source: Author's estimations.

Note: t-statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 4. Effect of FDI in agriculture on dietary energy consumption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FDI in agriculture (lag_1)	1.324** (2.45)	1.372** (2.54)	0.725 (1.41)	-	-9.498*** (-2.61)	-10.05*** (-2.75)	-	-9.390** (-2.47)	-
GDP per capita (ln)	390.2*** (13.81)	355.7*** (7.58)	386.2*** (8.02)	495.4*** (12.52)	506.4*** (14.97)	388.4*** (8.38)	388.0*** (8.10)	305.0*** (9.08)	298.5*** (10.23)
Crop production	1.864*** (7.13)	1.912*** (7.23)	1.257*** (4.02)	1.426*** (4.83)	1.514*** (4.84)	1.399*** (4.49)	1.292*** (4.14)	1.735*** (5.51)	2.583*** (10.68)
Food exports	-0.507 (-1.18)	-0.626 (-1.39)	-0.0373 (-0.09)	-0.0303 (-0.09)	0.066 (0.16)	-0.114 (-0.27)	-0.0541 (-0.13)	-0.344 (-0.81)	-1.155*** (-3.62)
Age dependency	-5.160*** (-4.49)	-4.343*** (-3.10)	0.746 (0.43)	-1.31 (-1.07)	-3.126** (-2.31)	1.915 (1.09)	0.779 (0.45)	2.214 (1.47)	-2.528*** (-2.75)
Population density	-1.335*** (-3.84)	-1.307*** (-3.71)	-2.057*** (-5.82)	-2.601*** (-9.03)	-2.038*** (-5.85)	-1.988*** (-5.76)	-2.019*** (-5.80)	-0.512*** (-2.79)	-0.630*** (-3.69)
Political stability	-25.22** (-2.35)	-20.38* (-1.83)	8.934 (0.76)	3.41 (0.32)	-6.466 (-0.57)	9.823 (0.85)	7.414 (0.64)	8.423 (0.73)	-9.689 (-0.97)
Land governance	-	-	-6.048 (-0.61)	1.884 (0.23)	-	-	-	-	-
FDI/Land	-	-	-	-	2.507*** (2.88)	2.597*** (2.97)	0.215* (1.76)	2.477*** (2.72)	-
Resource rich	-	-	-	-	-	-	-	-177.8* (-1.76)	-155.1* (-1.67)
Constant	-104.8 (-0.46)	117.4 (0.33)	-239.1 (-0.67)	-965.5*** (-3.25)	-1 002*** (-3.60)	-448.7 (-1.28)	-287.5 (-0.83)	81.14 (0.27)	394 (1.59)
Observations	535	535	425	528	425	425	425	425	708
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
year dummy	no	yes	yes	yes	no	yes	yes	yes	yes
R ² within	0.5991	0.6118	0.7070	0.6869	0.6856	0.7143	0.7077	0.6958	0.5863
R ² between	0.3940	0.3803	0.2160	0.2313	0.3063	0.2180	0.2216	0.3971	0.4709
R ² overall	0.3872	0.3765	0.2213	0.2528	0.3056	0.2327	0.2266	0.4136	0.4803
Hausman (p value)	0.0006	0.0086	0.0001	0.000	0.000	0.0001	0.0002	..	..

Source: Author's estimations.

Note: t-statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

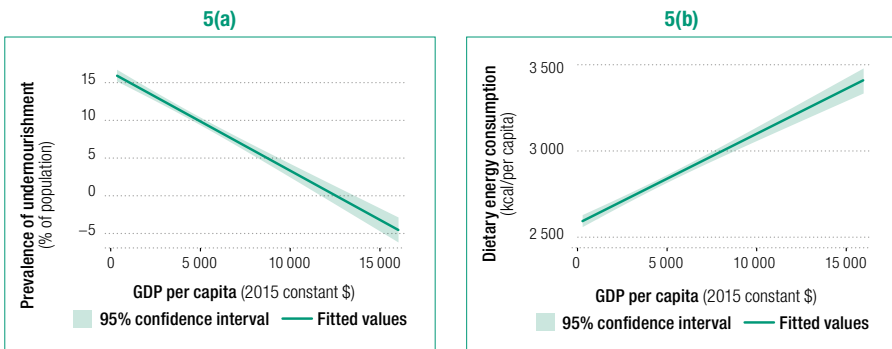
Figure 4. Food security versus access to land index



Source: Author's estimations.

Among the control variables, per capita income has a significant effect on both food security measures. This effect is robust across estimations. Both estimates indicate a positive association between GDP per capita and food security. The magnitude of the effect is also the largest of all control variables suggesting that GDP per capita is a strong determinant of food security. This is supported by findings in the literature. Income per capita is the main determinant of households' ability to afford food and non-food elements that improve the quality of nutrition (e.g. hygiene, education, information, etc.). In the full model, a 1 per cent increase in GDP per capita is associated with a 5.6 per cent decrease in prevalence of undernourishment, and a 3.98 kcal increase in dietary energy consumption. Figure 5 displays this positive relation between GDP per capita and the food security measures used in the analysis.

Figure 5. Food security versus GDP per capita



Source: Author's estimations.

Coefficients on crop production and population density have significant coefficients in the full sample regressions and are robust across estimations. The estimates indicate that crop production is positively associated with food security. This could be explained by two reasons: (i) production of food crops could increase the availability of food in the host country; and (ii) that the production of biofuel crops and cash crops, e.g. coffee, soy, maize, rice, may increase incomes, resulting in better nutritional status.

Population density has positive and significant coefficients in cases where prevalence of undernourishment is the dependent variable, and negative coefficients where dietary energy consumption is the dependent variable, signaling that it is negatively associated with food security. This is in line with views in the literature that point out the immediate effect. Increasing population density may worsen food security by increasing demand for food. It may further undermine food security through lower agricultural wages if most of the workforce is employed in this sector.

Resource-rich countries are found to have a worse food security status, with a 5.7 per cent more undernourished population compared to non-resource-rich countries, and 177 kcal less available for dietary consumption (column 8). This confirms earlier findings in the literature that resource-rich countries tend to have worse human development outcomes (Bonilla Mejia 2020; Gylfason, 2001; Perez and Claveria, 2020). However, whether this negative impact is due to a lack of strong institutions, or any other structural problem, is beyond the scope of this study.

In the second part of the analysis, the full model is estimated separately for three geographic regions. The goal of this exercise is to explore the impact of similarities in social, historical and cultural structures that are empirically related to contemporary food and land governance systems. Dividing the sample by region reveals that FDI in agriculture has significant and robust coefficients only in East Asia and the Pacific where, on average, a 1 percentage point increase in share of FDI in agriculture in total is associated with an around 7 percentage point increase in the prevalence of undernourishment, and a 3 kcal increase in dietary energy consumption (columns 1 and 7 in table 5). In Sub-Saharan Africa, FDI in agriculture is found to increase dietary energy consumption but has no significant effect on prevalence of undernourishment. In Latin America and the Caribbean, no significant effect is found. These findings suggest that FDI in agriculture promotes food security in East Asia and the Pacific, while the results are either not significant or not robust for Latin America and the Caribbean and sub-Saharan Africa.

In conclusion, the empirical analysis provides evidence that FDI in agriculture does not always enhance food security in the host country, which supports the first hypothesis of this study. Even though no significant link is found between land governance and food security, evidence shows that land governance systems matter when considering the ultimate effect of FDI in agriculture. This outcome leads to conclude that the second hypothesis of the study is partially supported. Regional breakdown of the sample establishes a strong and positive relation in

Table 5. Effect of FDI in agriculture on food security, by region

	Prevalence of undernourishment					Dietary energy consumption						
	East Asia and the Pacific		Latin America and the Caribbean		Sub-Saharan Africa	East Asia and the Pacific		Latin America and the Caribbean		Sub-Saharan Africa		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FDI in agriculture (lag_1)	-0.0790*** (-3.03)	-0.0670** (-2.46)	-0.00038 (-0.02)	-0.00667 (-0.25)	0.0276 (0.78)	0.0261 (0.72)	3.156*** (4.10)	2.738*** (3.39)	-0.87 (-1.36)	-0.616 (-0.81)	2.283** (2.16)	1.934* (1.81)
GDP per capita (ln)	-6.132*** (-4.65)	-5.392*** (-3.25)	-8.781*** (-3.37)	-14.66*** (-3.82)	-6.515*** (-3.07)	-5.889** (-2.02)	405.8*** (10.43)	486.1*** (9.49)	510.1*** (6.80)	613.4*** (5.65)	236.7*** (4.31)	334.7*** (4.09)
Crop production	-0.0429*** (-2.78)	-0.0622*** (-2.82)	0.0231 (1.22)	0.0242 (1.05)	-0.110*** (-7.61)	-0.117*** (-6.34)	2.514*** (5.52)	1.854*** (2.84)	0.279 (0.51)	0.635 (0.97)	2.654*** (7.04)	1.927*** (3.88)
Food exports	0.0174 (0.29)	0.0276 (0.42)	0.0145 (0.75)	0.00772 (0.36)	-0.048 (-1.65)	-0.0462 (-1.50)	1.626 (0.92)	0.85 (0.44)	-0.361 (-0.65)	-0.168 (-0.28)	-1.017 (-1.44)	-0.773 (-1.07)
Age dependency	0.317*** (3.95)	0.288*** (3.02)	-0.00726 (-0.07)	-0.144 (-1.02)	-0.367*** (-3.56)	-0.329*** (-2.82)	-1.116 (-0.47)	-2.081 (-0.74)	3.075 (0.99)	5.189 (1.29)	-3.264 (-1.23)	-3.689 (-1.30)
Population density	0.0448 (1.60)	0.0423 (1.19)	-0.0699 (-0.89)	-0.154 (-1.40)	0.0350* (1.86)	0.0281 (1.13)	-0.410 (-0.50)	-1.535 (-1.46)	4.811** (2.12)	6.761** (2.17)	-0.697 (-1.61)	-1.065* (-1.84)
Political stability	-2.128*** (-2.83)	-2.074** (-2.47)	-2.841*** (-3.78)	-2.681** (-2.54)	-2.268*** (-3.45)	-1.992*** (-2.82)	-6.507 (-0.29)	12.47 (0.50)	49.65** (2.30)	42.24 (1.42)	-5.576 (-0.23)	-20.73 (-0.83)
Land governance	..	-0.897 (-1.62)	..	-0.758 (-1.00)	..	0.30 (0.28)	..	2.468 (-0.15)	..	-15.07 (-0.70)	..	-49.61* (-1.85)
Constant	39.18*** (3.62)	39.91*** (3.21)	87.78*** (3.36)	155.1*** (3.81)	100.5*** (5.51)	94.46*** (4.53)	-693.7** (-2.17)	-862.7** (-2.34)	-2 177.8 (-2.90)	-3 279.8*** (-2.86)	975.2* (1.98)	615.9 (1.07)
Observations	120	103	193	154	95	85	120	103	193	154	80	71

Source: Author's estimations.

Note: t-statistics in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01.

East Asia and the Pacific, but not in other regions.

Empirical results should be interpreted carefully. While the two indicators used to capture two different dimensions of food security (in its official definition), and supply- and demand-related issues, these indicators react reasonably fast to external changes. Availability of food for per capita consumption in a country is directly linked to its ability to produce, export, and import food in a given year. Prevalence of undernourishment is calculated as a crude number of people whose consumption remains below this level in the same year. Other dimensions of food security may reflect longer term factors that affect food security. Health-related indicators, such as stunting among children and anemia among women, capture longer term consequences of food insecurity. One may or may not be undernourished today but may suffer growth retardations and other related problems due to past experiences of undernourishment. Production-related indicators, such as export dependency of essential food groups, variability of food supply, share of arable land equipped for irrigation, reflect a country's productive capacity and the stability of the food security status of the country over the long term. Therefore, empirical analysis concludes that FDI in agriculture improves food security in the short-run but that the results cannot be generalized for long-term food security.

5. Conclusion and policy implications

As population growth, rising incomes and urbanization increase the demand for food, investment in agriculture and food systems is not only essential but also critical to enhance food security and food safety for all. Foreign direct investment in developing country agriculture can play an important role in closing the investment gap. However, the recent wave of agricultural investments in developing countries pose significant challenges. This is a matter of concern because of the potential direct impacts on local populations, which are mainly due to legal gaps in the governance of land tenure systems. In most developing countries, tenure systems, which define how people and communities access natural resources (e.g. land, water, fisheries and forests), are based on unwritten customs and practices rather than written policies and laws.

This study argues that FDI in agriculture does not always enhance food security in the host country. Because the recent wave of farmland investments is characterized by resource-seeking, and their main motivation is to promote food security in the investor country. Even when intended for crop production, foreign investors do not always produce for the domestic market. The ultimate effect depends on other factors, such as the type of investment, structure of agriculture sector in the host country, and the institutions involved. Existing land governance systems are particularly important as they determine the direct impact of investment projects on local populations and have an indirect impact on domestic food security.

To this end, the effect of FDI in agriculture on food security in the host country is examined empirically. Using data from 56 developing countries, empirical analysis shows that FDI in agriculture has a significant and negative effect on food security in the host country. The land governance index used to explore the role of land governance, is only significant when it interacts with FDI, which indicates that FDI has a more favourable effect where land governance is better.

The critical thing about customary land and resource tenure systems is that they make no distinction between legal property rights and de facto use rights. Most recent farmland investments in developing countries exploit this gap in the legal system. Foreign investors target predominantly “unutilized” or “underutilized” land, which is nonetheless used by local communities. These common lands are critical sources of livelihoods for indigenous people and rural populations for agriculture or raising livestock. The resilience of small communities and related agro-systems is deeply connected to this land. It is also a central factor in economic growth. Therefore, no statutory recognition of the customary land tenure in some developing countries make rural populations vulnerable to poverty and food insecurity. Transferring the property rights of these lands to foreign investors, temporarily or permanently, endangers the survival of rural communities by depriving them of land and other critical resources for food security, resulting from the production of food for direct consumption and providing income-generating activities.

Growing interest in farmland investment requires vigilance. Measures need to be taken to promote responsible and sustainable investment in developing country agriculture. When considering an investment in agriculture, one of the main principles to observe is not to jeopardize food security and the overall livelihoods of local populations directly affected by these investments. It is therefore important that investors are aware of local conditions and respect existing local rights to land and resources use. Tenure reforms by formalization of customary rights are essential to enhance tenure security for a more equitable and transparent access to land. Governments need to support sound systems for monitoring and assessing the impact of agricultural investments and processes associated with them. In order to address concerns about the consequences on local livelihoods, governments should formulate integrated policy frameworks to ensure transparency in international investments, to prevent marginalization of rural populations, and to enhance environmental sustainability.

References

- Abdul-Hannan, Abdallah, Michael Ayamga and Joseph Awuni (2022). "Impact of land grabbing on food security: Evidence from Ghana", *Environment, Development and Sustainability*, <https://doi.org/10.1007/s10668-022-02294-7>.
- Allison, Paul (2009). *Fixed Effects Regression Models* (London: Sage).
- Arezki Rabah, Klaus Deininger, and Harris Selod (2013). "What drives the global 'land rush'?", *The World Bank Economic Review*, 29(2), pp. 1–27.
- Behrman, Julia, Ruth Meinzen-Dick and Agnes Quisumbing (2012). "The gender implications of large-scale land deals", *Journal of Peasant Studies*, 39, pp. 49–79.
- Ben Slimane, Mehdi., Marilyne Huchet-Bourdon and Habib Zitouna (2015). "The role of sectoral FDI in promoting agricultural production and improving food security", *International Economics*, 145, pp. 50–65.
- Bonilla Mejia, Leonardo (2020). "Mining and human capital accumulation: Evidence from the Colombian gold rush", *Journal of Development Economics*, 145, art. 102471.
- Boserup, Ester (1965). *The Condition of Agricultural Growth: The Economics of Agrarian Change under Population Pressure* (Chicago: Aldine).
- Brady, David, Yunus Kaya and Jason Beckfield (2007). "Reassessing the effect of economic growth on well-being in less-developed countries, 1980–2003", *Studies in Comparative International Development*, 42(1–2), pp. 1–35.
- Conigliani, Caterina, Nadia Cuffaro and Giovanna D'Agostino (2018). "Large-scale land investments and forests in Africa", *Land Use Policy*, 75, pp. 651–660.
- Cotula, Lorenzo (2011). *Land deals in Africa: What is in the contracts?* (London: International Institute for Environment and Development).
- _____ (2013). *The Great African Land Grab?: Agricultural Investments and the Global Food System* (London: Zed Books).
- De Schutter, Olivier (2011). "How not to think of land-grabbing: Three critiques of large-scale investments in farmland", *Journal of Peasant Studies*, 38, pp. 249–279.
- Deininger, Klaus, Derek Byerlee, Jonathan Lindsay, Andrew Norton, Harris Selod and Mercedes Stickler (2011). *Rising Global Interest in Farmland. Can It Yield Sustainable and Equitable Benefits?* (Washington, D.C.: World Bank).
- Dell'Angelo, Jampel, Paolo D'Odorico, Maria Cristina Rulli and Philippe Marchand (2017). "The tragedy of the grabbed commons: Coercion and dispossession in the global land rush", *World Development*, 92, pp. 1–12.
- Dhahri, Sabrina, and Anis Omri (2020). "Are international capital flows really matter for achieving SDGs 1 and 2: Ending poverty and hunger?", *Review of World Economics*, 156, pp. 731–767.
- Djokoto, Justice (2012). "Effect of foreign direct investment inflows into agriculture for food security in Ghana", *Journal of Economics and Sustainable Development*, 3(2), pp. 81–92.
- FAO (Food and Agriculture Organization of United Nations) (2022). "Foreign direct investment to agriculture 2010–2019", *FAOSTAT Analytical Brief*, No. 34 (Rome: FAO).

- FAO (Food and Agriculture Organization of United Nations), International Fund for Agricultural Development, United Nations Children's Fund, United Nations World Food Programme and World Health Organization (2022). *The State of Food Insecurity and Nutrition in the World 2022: Repurposing Food and Agricultural Policies to Make Healthy Diets More Affordable* (Rome: FAO).
- Firebaugh, Glenn (1996). "Does foreign capital harm poor nations? New estimates based on Dixon and Boswell's measures of capital penetration", *American Journal of Sociology*, 102(2), pp.563–575.
- Firebaugh, Glenn, and Frank Beck (1994). "Does economic growth benefit the masses? Growth, dependence, and welfare in the third world", *American Sociological Review*, 59(5), pp. 631–653.
- German, Laura, George Schoneveld and Esther Mwangi (2013). "Contemporary processes of large-scale land acquisition in Sub-Saharan Africa: Legal deficiency or elite capture of the rule of law?", *World Development*, 48, pp. 1–18.
- Giovannetti, Giorgia, and Elisa Ticci (2016). "Determinants of biofuel-oriented land acquisitions in Sub-Saharan Africa", *Renewable and Sustainable Energy Review*, 54, pp. 678–687.
- Gylfason, Thorvaldur (2001). "Natural resources, education, and economic development", *European Economic Review*, 45(4–6), pp. 847–859.
- ILC (International Land Coalition) (2022). The Land Matrix. www.landmatrix.org (accessed 8 July 2022).
- Jenkins, J. Craig, and Stephen Scanlan (2001). "Food security in less developed countries, 1970 to 1990", *American Sociological Review*, 66(5), pp.718–744.
- Kinda, Somlanare, Nazindigouba Kere, Thierry Yogo and Musonda Simpasa (2022). "Do land rushes really improve food security in sub-Saharan Africa?", *Food Policy*, <https://doi.org/10.1016/j.foodpol.2022.102285>.
- Kolstad, Ivar (2009). "The resource curse: Which institutions matter?", *Applied Economics Letters*, 16(4), pp. 439–442.
- Lambin, Eric, and Patrick Meyfroidt (2011). "Global land use change, economic globalization, and the looming land scarcity", *Proceedings of the National Academy of Sciences. Inaugural Article*, 108(9), pp. 3456–3472.
- Lay, Jann, and Kerstin Nolte (2018). "Determinants of foreign land acquisitions in low- and middle-income countries", *Journal of Economic Geography*, 18(1), pp. 59–86.
- London, Bruce, and David Smith (1988). "Urban bias, dependence, and economic stagnation in noncore nations", *American Sociological Review*, 53(3), pp. 454–463.
- London, Bruce, and Bruce Williams (1990). "National politics, international dependency, and basic needs provision: A cross-national analysis", *Social Forces*, 69(2), pp. 565–584.
- Mazzocchi, Chiara, Michel Salvan, Luigi Orsi and Guido Sali (2018). "The determinants of large-scale land acquisitions (LSLAs) in sub-Saharan Africa (SSA): A case study", *Agriculture*, 8(12), art. 194.

- McMillan, Margaret, William Masters and Harounan Kazianga (2011). "Rural demography, public services, and land rights in Africa: A village-level analysis in Burkina Faso", NBER Working Paper Series, No. 17718 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Mechiche-Alami, Altaaf, Jihad Yagoubi and Kimberly Nicholas (2021). "Agricultural land acquisitions unlikely to address the food security needs of African countries", *World Development*, 141, art. 105384.
- Mihalache-O'keef, Andrea, and Quan Li (2011). "Modernization vs. dependency revisited: Effects of foreign direct investment on food security in less developed countries", *International Studies Quarterly*, 55(1), pp. 71–93.
- Nolte, Kerstin, Wytse Chamberlain and Marcus Giger (2016). *International Land Deals for Agriculture. Fresh Insights from the Land Matrix: Analytical Report II* (Rome: International Land Coalition).
- Osaghae, Eghosa (2015). "Resource curse or resource blessing: The case of the Niger Delta 'oil republic' in Nigeria", *Commonwealth and Comparative Politics*, 53(2), pp. 109–129.
- Perez, Claudia, and Oscar Claveria (2020). "Natural resources and human development: Evidence from mineral-dependent African countries using exploratory graphical analysis", *Resources Policy*, 65, art. 101535.
- Ricker-Gilbert, Jacob, Charles Jumbe and Jordan Chamberlin (2014). "How does population density influence agricultural intensification and productivity? Evidence from Malawi", *Food Policy*, 48, pp. 114–128.
- RRI (Rights and Resources Initiative) (2015). *Who Owns the World's Land? A Global Baseline of Formally Recognized Indigenous and Community Land Rights* (Washington, D.C.: RRI).
- Santangelo, Grazia (2018). "The impact of FDI in land in agriculture in developing countries on host country food security", *Journal of World Business*, 53, pp. 75–84.
- Schoneveld, German, Laura German and Eric Nutakor (2011). "Land-based investments for rural development? A grounded analysis of the local impacts of biofuel feedstock plantations in Ghana", *Ecology and Society*, 16(4), art. 10.
- Sen, Amartya (1981). "Ingredients of famine analysis: availability and entitlements", *Quarterly Journal of Economics*, 96(3), pp. 433–464.
- Shen, Ce, and John Williamson (1997). "Child mortality, women's status, economic dependency, and state strength: A cross-national study of less developed countries", *Social Forces*, 76(2), pp. 667–700.
- Steinweg, Tim, Barbara Kuepper and Gabriel Thoumi (2017). *Farmland Investments in Brazilian Cerrado: Financial, Environmental and Social Risks* (Washington, D.C.: Chain Reaction Research).
- Stijns, Jean-Philippe (2006). "Natural resource abundance and human capital accumulation", *World Development*, 34(6), pp. 1060–1083.
- Swan, Samuel, Seird Hadley and Bernardette Cichon (2010). "Crisis behind closed doors: Global food crisis and local hunger", *Journal of Agrarian Change*, 10(1), pp. 107–118.
- Tagini, Phillip (2009). "The effect of land policy on foreign direct investments in the Solomon

- Islands", *Journal of South Pacific Law*, 5(3), www.paclii.org/journals/fJSPL/vol05/5.shtml.
- UNCTAD (United Nations Conference on Trade and Development) (2009). *World Investment Report 2009: Transnational Corporations, Agricultural Production and Development* (New York and Geneva: United Nations).
- _____ (2014). *World Investment Report 2014: Investing in the SDGs* (New York and Geneva: United Nations).
- _____ (2022). *World Investment Report 2022: International Tax Reforms and Sustainable Investment* (New York and Geneva: United Nations).
- Wardhani, Fajar, and Tri Haryanto (2020). "Foreign direct investment in agriculture and food security in developing countries", *Contemporary Economics*, 14(4), pp. 513–523.
- Wily, Liz Alden (2011). *The Tragedy of Public Lands: The Fate of the Commons Under Global Commercial Pressure* (Rome: International Land Coalition).
- Wimberley, Dale (1991). "Transnational corporate investment and food consumption in the third world: A cross-national analysis", *Rural Sociology*, 56(3), pp. 406–431.
- World Bank (2014). "The practice of responsible investment principles in larger-scale agricultural investments: Implications for corporate performance and impact on local communities", *World Bank Report*, No. 86175-GLB. (Washington, D.C.: World Bank).
- _____ (2022a). World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators> (accessed 8 May 2022).
- _____ (2022b). World Governance Indicators. <https://databank.worldbank.org/source/world-governance-indicators> (accessed 8 May 2022).
- Zallé, Oumarou (2019). "Natural resources and economic growth in Africa: The role of institutional quality and human capital", *Resources Policy*, 62, pp. 616–624.

Appendix

Table A1. Description of the variables

Variable	Nature of variable	Definition and source of data
Prevalence of undernourishment	Dependent	Percentage of the population whose habitual food consumption is insufficient to provide the dietary energy levels that are required to maintain a normal active and healthy life (World Development Indicators).
Dietary energy consumption	Dependent	Food available for human consumption, after deduction of all non-food consumption (exports, animal feed, industrial use, seed and wastage), expressed in kilocalories per person per day (FAOSTAT).
FDI in agriculture	Independent	Share of net FDI flows into the agriculture sector (agriculture, forestry and fishing) in total FDI (FAO Foreign Investment Database).
Land governance	Independent	Access to land index takes values between 1 and 6 with higher values indicating more equitable access to land (IFAD).
GDP per capita	Control	Gross domestic product (in constant 2015 United States dollars) divided by midyear population (World Development Indicators).
Crop production	Control	Agricultural production for each year relative to the base period 2014–2016 (World Development Indicators).
Food exports	Control	Share of food exports in total merchandise exports (World Development Indicators).
Age dependency	Control	Ratio of dependents – people younger than 15 or older than 64 – to the working-age population – those ages 15–64 (World Development Indicators).
Population density	Control	Midyear population divided by land area in km ² (World Development Indicators).
Political stability	Control	Country scores that measure perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism; ranges from approximately -2.5 to 2.5 (World Governance Indicators).
Resource rich	Control	1=if country has oil or mineral resources, 0=otherwise (UNCTAD).

Source: Author's compilation.

Table A2. Correlation matrix and tests of significance

	undemou	dec	FDI_agri	land_acce	ln_gdppc	crop_pro	food_X	age_dep	pop_dens	pol_stab	resour_rich
undemou	1										
dec	-0.8617*	1									
FDI_agri	0.0598	-0.1406*	1								
land_acce	-0.3442*	0.4774*	-0.0533	1							
ln_gdppc	-0.7414*	0.6390*	-0.1139*	0.4657*	1						
crop_pro	-0.0588	0.1256*	-0.2029*	0.1163*	0.0785*	1					
food_X	0.2517*	-0.3287*	0.1954*	-0.1429*	-0.0392	0.1622*	1				
age_dep	0.7863*	-0.6584*	0.1176*	-0.3679*	-0.7084*	-0.0925*	0.2362*	1			
pop_dens	0.0935*	-0.1420*	-0.1004*	-0.0209	-0.1497*	0.1222*	-0.0997*	-0.1051*	1		
pol_stab	-0.2704*	0.1795*	0.1062*	0.2202*	0.3755*	0.0717*	0.1943*	-0.2945*	-0.0681*	1	
resour_rich	0.4260*	-0.2771*	-0.0632	-0.0739	-0.2598*	-0.0187	-0.0962*	0.4423*	-0.1615*	0.0074	1

Source: Author's calculations.

Note: * denotes correlation significance at the 5 per cent level.

Analysing MNEs structure and activities using country-by-country reports. Evidence from the Italian dataset*

Vera Santomartino,^a Barbara Bratta^a and Paolo Acciari^b

Abstract

This paper is based on microdata originating in the first collection of country-by-country reporting (CbCR) – a new reporting tool to be filed by multinational enterprises (MNEs). It analyses the differences between CbCR and other widely used data sources of MNEs and presents the case of MNE activities in Italy. The CbCR dataset is used to understand the global distribution of MNE activities. Results show that foreign activities are mostly concentrated in high-income countries for all economic indicators. In low-income countries, MNEs activity appears to be concentrated in labour-intensive industries. Middle-income countries have a relatively higher importance in terms of tangible assets and employment opportunities than they do in terms of revenues and profits. Investment hubs have a relatively higher share in global MNEs profits than they do in global MNEs tangible assets and employment. The CbCR data can be useful for policymakers to obtain an indication on how a country is positioned in the global value chain (GVC) and its attractiveness for foreign companies.

Keywords: BEPS, corporate taxation, country-by-country reporting, GVC, multinational firms, offshoring

JEL classification codes: F23, H25, H26, M16

* Received: 25 May 2022 – Revised: 5 August 2022 – Accepted: 8 August 2022.

The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the official position of the institution.

^a Department of Finance, Ministry of Economy and Finance, Rome, Italy.

^b Corresponding author. Department of Finance, Ministry of Economy and Finance, Rome, Italy (paolo.acciari@mef.gov.it).

1. Introduction

This work takes advantage of a new source of data, namely country-by-country reporting (CbCR). The availability of high quality and comprehensive data on the global activities of multinational enterprises (MNEs) – hitherto a major challenge for tax administrations – has been addressed by the international community in the context of the OECD/G20 Base Erosion and Profit Shifting (BEPS) Project, mainly under Action 11 (OECD, 2015a) and Action 13 (OECD, 2015b).

Under BEPS Action 13 “Transfer Pricing Documentation and Country-by-Country Reporting”, a new reporting tool has been developed for MNEs with global revenues above €750 million. This tool provides that MNEs have to file CbCR, which include information on a set of variables, such as revenues, profits, taxes, employees and tangible assets, broken down on a country-by-country basis. Tax authorities typically receive CbCRs from MNEs whose ultimate parent entity is resident for tax purposes in the country concerned; these CbCRs are then exchanged with the tax authorities of the foreign jurisdictions in which MNEs report their foreign activities.¹ This exchange of CbCRs gives each tax authority access to data on the global activities of domestic and foreign MNEs in all jurisdictions.

This new tool is mainly intended to be used by tax authorities to conduct high-level assessments on transfer pricing and BEPS-related risks. However, countries have agreed that CbCRs may also be used by tax authorities to carry out economic and statistical analysis on MNEs and BEPS (OECD, 2015b, para. 25).² This analysis of CbCRs enables policymakers to analyse, in aggregate terms, the business structures of MNEs from a global perspective.

CbCRs began to be collected by tax authorities in 2018, but on information for fiscal year 2016. In September 2019, Italy’s Department of Finance of the Ministry of Economy and Finance received data from the Italian Tax Revenue Agency and began to build a dataset for their own statistical purposes.

Statistical tables of Italian CbCRs have been published in the OECD’s corporate tax statistics database.³ Under BEPS Action 11 “Measuring and monitoring BEPS”, OECD member states agreed to regularly publish anonymized and aggregated CbCR statistics to support the economic analysis of BEPS. To this end and in accordance with their confidentiality standards, each jurisdiction compiles the CbCR filings of MNEs that have their ultimate parent entity (UPE) in the country into a single anonymized and aggregated dataset, and then shares it with the OECD for public release. The first release took place on 8 July 2020 and is based on the

¹ Section 3 explains key CbCR concepts, including the definition of ultimate parent entity (UPE).

² This provision is also included in the relevant legal instruments governing the exchange of CbCRs between jurisdictions.

³ https://stats.oecd.org/Index.aspx?DataSetCode=CBCR_TABLEI.

data for fiscal year 2016 received by 26 reporting jurisdictions, including Italy. The second release, based on 2017 data, was on 29 July 2021. CbCR was not yet mandatory in few important countries, such as the United States, with respect to 2016 data, however, voluntary CbCR filing was available.

The main conceptual difference between the OECD data and the dataset used in the present analysis is that the former data provide a comprehensive perspective on the global activities of all MNEs, but only in the form of aggregated and anonymized data, as sent out by national tax authorities.⁴ The present analysis is based on a smaller subset of MNEs, and only covers the operations of national and foreign MNEs with a presence in Italy. In addition, the dataset used in this analysis presents a higher level of granularity than the OECD dataset, thanks to CbCR microdata, i.e. MNE-level data on a jurisdiction-by-jurisdiction basis. This presents advantages when conducting economic and statistical analysis, especially of BEPS.⁵

The present analysis aims to obtain insights on the global distribution of domestic and foreign MNE activities from CbCR data collected for the first time and presents the case of Italian MNEs for fiscal year 2016.⁶ Wherever possible, the global distribution of Italian MNEs is compared to the global distribution of foreign MNEs to identify potential similarities in the scale and location of operations. A snapshot of the activities of foreign MNEs in Italy is also provided. Analysis of the distribution of the financial variables reported in the CbCR enable policymakers to obtain a snapshot of a country's positioning in global value chains (GVCs) and its attractiveness for foreign companies; for example, this could be done by investigating the extent to which foreign MNEs choose to locate assets or employees in a specific economy.⁷

Section 2 contains an overview of existing data sources on the global activities of Italian MNEs and illustrates the innovative features of CbCRs and their shortcomings. Section 3 explains the methodology for building the dataset from raw CbCR data. Section 4 analyses the outward reach of Italian MNEs and compares it with that of foreign MNEs to identify patterns. Section 5 examines the geographical distribution of domestic and foreign MNE activities, as well as the contribution of foreign MNEs to domestic activities. Section 6 focuses on the sectoral distribution of MNE activities. Section 7 concludes.

⁴ Several countries were unable to provide the OECD with aggregated and anonymized data for fiscal year 2016, so the OECD data do not yet encompass all MNEs worldwide.

⁵ An analysis of BEPS originating from CbCR data for 2017 is available in Bratta et al. (2021).

⁶ While our study was the first to describe the CbCR data, other studies used aggregated data (Casella and Souillard, 2022) or microdata from Germany (Fuest et al., 2021). Further, our analysis is connected with the strand of literature focusing on the FDI location determinants. See Nielsen et al. (2017) for a recent review of the literature.

⁷ While there is plenty of literature analysing the importance of GVCs (among others, Antràs and Chor, 2021; and UNCTAD, 2021), some studies have pointed out the need for improved data on MNE activities (Johnson, 2017).

2. Country-by-country reports – a new perspective

This section provides a brief overview of the most frequently used data sources on MNEs activities. However, it does not attempt to exhaustively evaluate the pros and cons of each data source, but rather provide an overview of the innovative features of CbCR data.

Existing data sources on MNEs take both macro- and micro-level perspectives as they provide information on the aggregate activities of Italian MNEs and the activities of individual firms. At macro-level, national statistics and Eurostat statistics provide inward and outward foreign affiliates statistics (FATS) (Eurostat 2012). The latter presents information on the in-country activities of foreign-owned enterprises (inward FATS), and on the activities abroad of domestically-owned enterprises (outward FATS). FATS statistics are based on census surveys. As to inward FATS, data include information on variables, such as: (i) number of enterprises; (ii) number of employees; (iii) turnover; (iv) production value; (v) value added; (vi) gross operating surplus; (vii) purchase of goods and services; (viii) personnel costs; (ix) gross investment in tangible goods; and (x) research and development (R&D) expenditure. As to outward FATS, these include information on: (i) number of enterprises; (ii) number of employees; (iii) turnover; (iv) personnel costs; (v) gross investment in tangible goods; and (vi) value added. For each reporting country, variables are available by controlling country (inward FATS) and by partner country (outward FATS), although data are not available for several countries. FATS statistics also provides data on the key indicators of foreign affiliates of MNEs, but only with respect to the national economy.

The Orbis-BvD database is the most frequently used source for microdata. This database contains firm-level financial account information on companies worldwide, as well as details on balance sheet and income statements, both at a consolidated and unconsolidated level, as well as data on the number of employees and ownership structure. Although this database is one the largest source of data, one of its main disadvantages is that its geographic coverage is limited and has a limited amount of data on MNEs from the United States and several investment hubs.⁸

⁸ We define “investment hubs” as economies with a share of inward FDI stock as a percentage of GDP greater than 150 per cent (in line with OECD, 2020): namely, Anguilla, Aruba, the Bahamas, British Virgin Islands, Cayman Islands, the Congo, Cyprus, Hong Kong (China), Ireland, Liberia, Luxembourg, Malta, Mozambique, the Netherlands, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Seychelles, Singapore and Switzerland. A conceptually similar source to Orbis for data on MNEs from the United States is the United States Bureau of Economic Analysis (BEA). For a deeper analysis of the representativeness of the Orbis dataset, see Bajgar et al. (2020) For a comprehensive comparative analysis between CbCR and Orbis data, see Bratta et al. (2021).

Another relevant source of microdata are national tax returns, which contain information on the tax liabilities of Italian enterprises and foreign enterprises with a taxable presence in Italy. Although tax returns enable an analysis of the contribution of domestic and foreign-controlled enterprises to national revenues, one of the main limitations of this data for the analysis of MNEs is that they provide no information on their economic activities and tax liabilities in foreign countries.

The CbCR data contain innovative features, which enable governments and researchers to obtain a more refined and comprehensive perspective on the global activities of MNEs overcoming some of the limitations of existing data sources.

CbCRs comprise a comprehensive set of variables with an extensive geographic coverage, including countries for which coverage in existing data sources is generally poor. These features are described in more detail below:

- *Combination in one single source of financial and tax information:* CbCRs were developed under a tax policy perspective within the BEPS framework. The main approach in detecting BEPS behaviours is the misalignment between the location where economic activities take place, as reflected by indicators, such as revenues, employees or tangible assets, and the location where profits are taxed, as reflected by the amount of profits and taxes reported in each country.⁹ The CbCR therefore combines economic and financial variables with tax variables, i.e. the taxes accrued and paid in each country, as opposed to existing data sources on MNEs which were not developed for tax analysis purposes, and which therefore do not include such information.
- *New variables not usually observed in other datasets:* Besides tax information, CbCRs include data on profits reported in each country, and on total revenues split between related- and unrelated-party revenues. These variables are not usually present in other datasets, or at least not with the same geographical coverage as CbCRs.
- *More extensive geographic coverage:* MNEs are required to report their activities in every jurisdiction in the world where they have operations, including countries for which coverage in other datasets is generally minimal. For example, the Orbis database has a good coverage of European enterprises but a low coverage for those in United States, as well as in some investment hubs and developing economies.¹⁰
- *Comprehensive MNE perspective on its global activities:* in the CbCR, MNEs provide information on their global activities, which highlight the linkage

⁹ Previous analyses on the measurement of BEPS were mainly based on financial accounts data (OECD, 2015a) or FDI data (Acciari et al., 2015).

¹⁰ See footnote 8 on investment hubs.

between the entities and the MNE group. In other datasets, such as Orbis, multiple steps are needed before it is possible to identify the MNE group and its country of operation. The statistics developed by the National Institute of Statistics in Italy are aimed at analysing key indicators of national enterprises belonging to MNE groups; however, the data are only available for the national economy.

- *Domestic and foreign operations of MNEs are included in one single dataset:* In the CbCR, MNEs provide information on their foreign operations and their operations in the country of tax residence. This presents an advantage over the FATS statistics where national operations of foreign MNEs are not covered.
- *Data consistency and comparability across countries:* CbCR data are intended to be easily and directly comparable across countries as it was developed under an international standard.

Although CbCR data only refers to the largest MNEs, i.e. those with global revenues above €750 million, FATS statistics also include smaller MNEs, as they are based on census surveys for which the response rate is 72 per cent (for 2017 data). Although other sources estimate the values of non-respondents, the companies concerned may not be willing to disclose information on their international activities, which would eventually incur a low fine. CbCR filing, instead, represents a fiscal obligation for MNEs. Furthermore, in FATS statistics, section K “Financial and Insurance Activities” of the NACE classification does not include certain indicators, such as turnovers, value added and investments, whereas CbCR data also includes the number of MNEs active in these industries, and which account for a significant share of CbCR indicators, as will be discussed in more detail later. The CbCR and FATS datasets are not directly comparable as the variables are defined differently.

Several caveats need to be mentioned with respect to CbCR data. Some of these relate to the structural design of the report and the way information is exchanged between tax authorities. Other caveats are expected to be transitory and addressed in the future, as both MNEs and tax authorities gain increased familiarity with the new tool in a learning-by-doing process.

As to the “structural” limitations, CbCRs only contain information on larger MNEs with global revenues of €750 million or more. Furthermore, as each tax authority has access to information on domestic and foreign MNEs with operations in their respective jurisdictions; smaller MNEs, or MNEs with a smaller scale of operations (e.g. those only present in Asian economies), are not represented in the dataset available to the Italian tax administration. Insights into the under-representation of foreign MNEs included in the dataset can be drawn by comparing it with the OECD dataset. For each foreign reporting country, we compared the number of CbCRs included in the present dataset with the total number of CbCRs in the OECD

dataset. For France, the coverage of the present dataset in terms of the number of CbCRs is high (76 per cent). For Luxembourg and Austria, the share is above 50 per cent. For other European Union countries in the list, the data coverage of the national dataset ranges between 20 and 50 per cent. For non-European Union countries, such as Canada, Japan and the United States, the coverage is below 20 per cent.

Another caveat is that the CbCR is a new tool, so MNEs and tax administrations are still engaged in a learning-by-doing process. As a result, CbCR data presents several limitations that can affect the quality of the data, which calls for extreme caution in the interpretation of results, at least for fiscal year 2016. A thorough analysis of the limitations of CbCR data is given in the disclaimer of accompanying the release of CbCR statistics (OECD, 2021a), as well as in the relevant section of OECD (2021b). One of the main limitations is the treatment of intra-company dividends in profits or losses before tax. In the absence of specific guidance on this (OECD, 2015b), jurisdictions have taken different approaches, with some requiring MNEs to include them, others excluding them, and others still not issuing any guidance. This has created inconsistencies across CbCRs, hampering the interpretation of the reported profit (loss) data, particularly in the country of the UPE, and the comparability of CbCR data across countries. As for Italian MNEs, analysis on this issue showed that a majority of Italian UPEs included dividends in their profits (losses).¹¹

Another limitation is that data may be underestimated in some jurisdictions due to a limited submission of CbCRs. For MNEs with their UPE in the United States, CbCR filing was voluntary in 2016, data for that year might therefore under-represent the magnitude of the global activities of MNEs from the United States. This might also occur for other countries for which a low number or no CbCRs were available. This implies that the positioning of some countries in the global allocation of MNE activities might be misrepresented in this dataset. The present analysis therefore describes the data from available CbCRs.¹²

CbCR raw data also presented several recurring filing errors. The following section explains the approach undertaken to address the issue and build the dataset.

¹¹“Note on country-specific analysis: Italy” (n.d.), www.oecd.org/tax/tax-policy/italy-cbcr-2016-country-specific-analysis.pdf.

¹²Furthermore, for some of the available CbCRs compiled by foreign MNEs, the country of the UPE was not indicated, therefore it was not possible to analyse it.

3. Creation of the dataset

To understand the dataset, it is useful to provide an overview of what a CbCR report looks like, of the information contained therein and key CbCR concepts, together with an explanation of how they have been used in the construction of the dataset.¹³

CbCRs are composed of three tables. In table 1, MNEs report the allocation by tax jurisdiction of the following variables: (i) total revenue; (ii) unrelated-party revenues; (iii) related-party revenues; (iv) profit (loss) before income tax; (v) income tax paid; (vi) income tax accrued; (vii) stated capital; (viii) accumulated earnings; (ix) number of employees; and (x) and tangible assets (other than cash and cash equivalents).

Information is reported by MNE subgroup, representing the combination of entities of the MNE group operating in one tax jurisdiction. If an MNE operates in one jurisdiction with more than one entity, data are provided by aggregating values on all the entities in the jurisdiction; it is, therefore, not possible to distinguish how each entity contributes to the total values reported in that jurisdiction.

Table 1 in the CbCRs also provides the following relevant information for the statistical analysis of data:

- *Currency* in which each variable is expressed.
- *Tax identification number (TIN) of the reporting entity*. The TIN is essential to spot potential duplications, and to match CbCR data with other sources (e.g. Italian tax returns and Orbis database).
- *Role of the reporting entity*. This specifies the role of the reporting entity. Possible values are: (i) CBC701 (UPE); (ii) CBC702 (surrogate parent entity - SPE); and (iii) CBC703 (local filing in the framework of an international exchange, intra-European Union exchanges only). The UPE is the entity within the group that directly or indirectly owns a sufficient interest in one or more other entities of the MNE that it is required to prepare consolidated financial statements. The SPE is an entity of the MNE group which has been appointed to act as a substitute for the UPE when filing the CbCR in that entity's jurisdiction of tax residence, on behalf of the MNE group. Entities act as SPEs in case the country of their UPE has not implemented the CbCR filing. Local filing is an alternative residual reporting mechanism and allowed in specific circumstances when neither UPE nor the SPE files the CbCR. The

¹³The fiscal year 2016 figures are based on the voluntary filing of CbCR by a few countries, including the United States. CbCR filing became mandatory as of 2017, including for the United States. This might lead to non-negligible differences of the results based on these two reporting periods. However, voluntary filing in the UPE jurisdiction was quite attractive for MNEs as a mean to avoid the compliance burden of providing "local filing" in many different jurisdictions. The authors only had privileged access to 2016 data for this analysis. This is a limitation of the study, but this work might be updated in the future. CbCR template and key definitions are available in OECD (2015b).

role of the reporting entity has been used in the statistical analysis to identify the “nationality” of the MNE group: MNE groups with their UPE in Italy are considered Italian MNEs, and MNE groups with their UPE in foreign countries are considered foreign MNEs. The role of the reporting entity has also been used to address duplication issues.

- *Time stamp* (date and time of compilation). This information has been used to address duplications issues, namely when multiple identical CbCRs were submitted, we keep the most recent one.

Table 2 of the CbCR reports information on the main business activities (e.g. R&D, production and sale) for all the MNE group’s entities by tax jurisdiction. Table 3 contains additional information reported as free text.

When examining CbCR data, it became evident that several filing errors, such as multiple identical submissions or amounts reported using the wrong unit or the wrong currency (see below for more detailed explanation) were present in the tables. This required a series of preliminary steps to clean the dataset into one which could be functional for statistical analysis; a conservative approach was taken to avoid arbitrarily modifying the dataset, while guaranteeing its consistency. These cleaning steps identify recurring and macroscopic reporting errors and apply solid approaches to make the dataset consistent and reliable, without altering the integrity of the information provided by MNEs.

A first set of cleaning actions concerned duplications. Raw CbCR data presented duplications in the form of multiple identical reports for the same MNE group, but mainly from different reporting entities with different reporting roles. The main cleaning approach consisted of keeping the report sent by the UPE and discarding the others. In a few instances, multiple identical reports were sent by different UPEs located in different countries; in such cases other criteria were used, e.g. searching for the entity to identify the correct country of the UPE, or keeping the report sent by the UPE located in the country with the highest amount of revenues and employees.

Further cleaning steps were needed to correct irregularities relating to currency and units. As to currency corrections, the CbCR is supposed to be filed using one single currency for all variables in all jurisdictions; there were, however, instances in which country-specific currencies were used for the same variables, or that different variables were reported using different currencies. Data were converted to Euros using the relevant exchange rate in 2016. As for unit corrections, although amounts should be provided in full units, in some instances data were provided in thousands or millions. In some cases, MNEs explicitly reported in table 3 of the CbCR to have used different units when compiling tables 1 and 2; these discrepancies were found by means of a manual check of the free text reported in table 3. Furthermore, an automatic check for anomalous low or anomalous high values was carried out. Suspect data was compared with Orbis data for the same reporting entity and the

relevant correction was applied where needed.

Unit corrections for employees were needed in addition to unit corrections for amounts. Errors relating to numbers of employees mainly derive from the fact that in the CbCR filings MNEs multiplied the correct employee number by 1,000 or by 1,000,000, as they had done for other variables such as revenues or profits; in fact, CbCRs are mainly filed using financial accounts data, generally expressed in thousands or millions, which needed to be multiplied to express them in full units for CbCR purposes. These errors were identified by spotting anomalous high values and comparing them with Orbis database.

Following this cleaning process, we obtained a dataset of 1,251 MNEs and 43,694 subgroups headquartered in 37 jurisdictions and operating in 233 jurisdictions.

4. Global presence of Italian MNEs

The dataset revealed that among 1,251 MNEs identified, 138 were Italian MNEs and 1,113 were foreign MNEs.

By the number of MNEs, the United States ranks first, with 152 MNEs, followed by Italy and France, with 137 and 138 MNEs, respectively (table 1). Taken together, the top 10 countries accounted for 67 per cent of the total number of MNEs.¹⁴

Table 1. Top 10 countries of ultimate parent entity, by number of MNEs with at least one entity in Italy, 2016

Country of ultimate parent entity	Number of MNEs
United States	152
Italy	138
France	137
United Kingdom	93
Netherlands	72
Luxembourg	63
Spain	62
Switzerland	44
Austria	37
Sweden	36
Sum of top 10	834
World	1 251

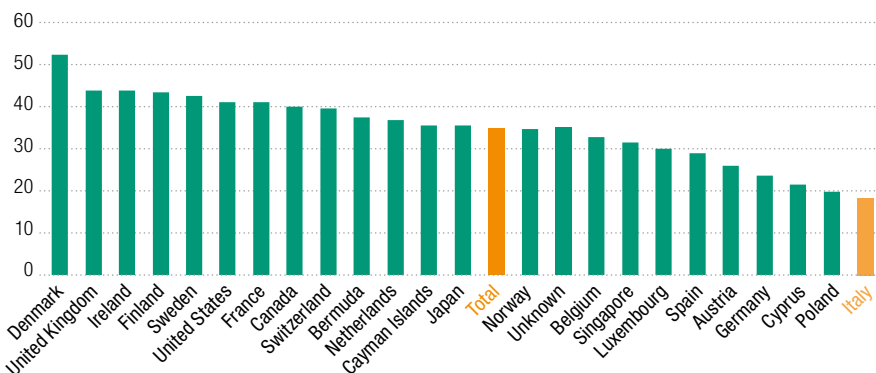
Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

¹⁴Non-obvious figures referred to some countries, such as the absence of China among Asian MNEs, or the low number of German MNEs, should be interpreted with caution as they may be explained by inconsistencies in the filing of the CbCR, as 2016 was the first year of collection. Nevertheless, the low figure for Germany might be linked to the fact that a low proportion of businesses are incorporated and that MNEs can, at times, be unincorporated (European Commission, 2012).

Within the CbCR the number of subgroups by country indicates the number of MNEs with at least one entity located in the country.¹⁵

The average number of subgroups by MNE provides a picture of their average geographical reach. On average, Italian MNEs are present in 18.3 countries (figure 1), which is significantly below the average for all the MNEs included in the dataset (34.9), and below the average of MNEs based in the United Kingdom (43.9), the United States (41.1), France (41.1) and Spain (30.1).

Figure 1. Average number of MNE subgroups, by country of ultimate parent entity, 2016



Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

Note: An MNE subgroup indicates the combination of MNE group entities operating in one tax jurisdiction.

In terms of geographical distribution, countries were ranked by the number of Italian MNEs with a presence in those countries, which enabled us to obtain a list of the top 10 destination countries. The same was done for MNEs with different nationalities, which enabled us to obtain the respective top 10 lists. We then compared these lists with the top 10 list computed for Italian MNEs to analyse the similarity in global reach, by the nationality of the MNE. Table 2 reports the matching share of destinations in the top 10 list of foreign MNEs with their UPE in selected OECD countries (France, Spain, the United Kingdom and the United States) with the top 10 list of Italian MNEs. For instance, French MNEs have the highest degree of similarity with Italian MNEs, as 88 per cent of destination economies in the top 10 list of French MNEs are also present in the top 10 list of Italian MNEs. In terms of similarity with investment destinations of Italian MNEs, French MNEs are followed by MNEs based in the United Kingdom, the United States and Spain.

¹⁵An MNE subgroup indicates the combination of entities of the MNE group operating in one tax jurisdiction.

Table 2. Comparison of top 10 destinations of Italian and Foreign MNEs, 2016
(Percentage)

Country of ultimate parent entity	Matching share of destinations with Italian MNEs
France	88
United Kingdom	75
United States	75
Spain	63

Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

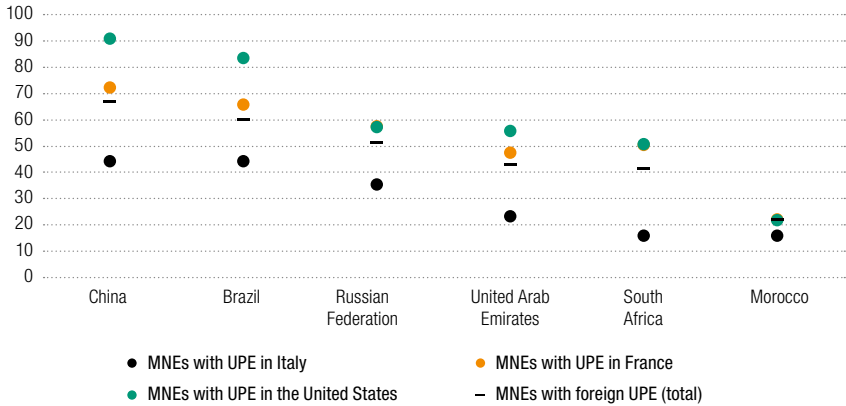
When focusing on the presence of MNEs by region and main countries, this similarity appears to be confirmed. We analysed, for each geographical region and for MNEs with their UPE in Italy and in other selected OECD countries, those host economies where at least 25 per cent of such MNEs were present. The host economies where Italian MNEs are more likely to be present are also those where American, British, French and Spanish MNEs are more likely to be located, for example, China, Hong Kong (China), India and Singapore.

However, the main difference between Italian and foreign MNEs appears to be the magnitude of their global reach, as highlighted by two peculiarities. In the first place, for each region, the number of host economies where at least 25 per cent of MNEs were present is lower when considering Italian MNEs compared to foreign MNEs. China, Hong Kong (China), India and Singapore are the only four jurisdictions in Asia where 25 per cent or more Italian MNEs were located, whereas American, British and French MNEs, as well as all foreign MNEs, were also present in additional countries in the area, such as Indonesia, Malaysia and Thailand.

Another distinctive feature of Italian MNEs is that the share of Italian MNEs present in locations considered to be "essential places to be" is lower than the share of foreign MNEs that were operational in those same locations. For example, when considering the presence of Italian and foreign MNEs in China, the share is equal to 44 per cent for Italian MNEs, 72 per cent for French MNEs, 91 per cent for United States MNEs, and an average of 67 per cent for all foreign MNEs (figure 2).

The different reasons for the low global reach of Italian MNEs compared to foreign MNEs are beyond the scope of this paper, and could be explained by certain characteristics of Italian MNEs affecting their global competitiveness, e.g. their relatively low levels of productivity and innovation, and ownership structures with a high proportion of family-owned and managed businesses (Accetturo et al., 2013). Several studies provide evidence of low productivity and low innovation, as well as the prevalence of family-owned and managed businesses.

Figure 2. Share of MNEs from selected OECD countries present in selected foreign jurisdictions, by country of UPE, 2016 (Percentage)



Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

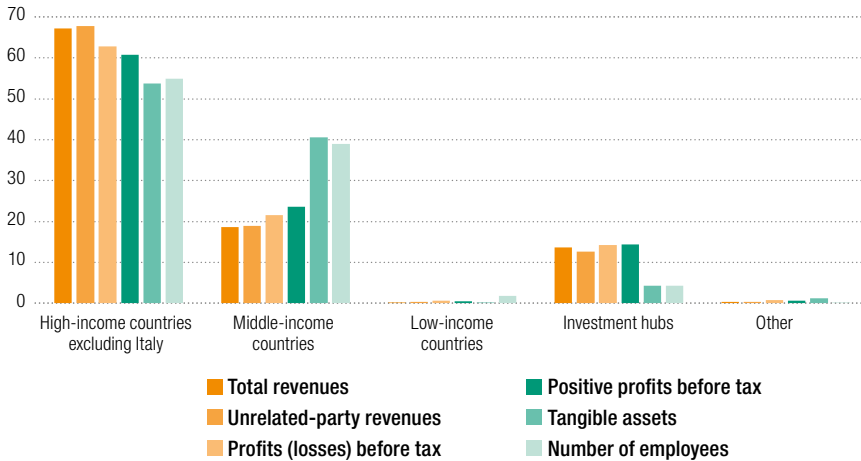
5. Geographical distribution of activities

A majority of Italian MNEs' activities are reported in Italy. For example, Italian MNEs reported 56 per cent of their revenues from unrelated-party transactions in Italy, and 44 per cent in other countries (table 3). When comparing the domestic and foreign contribution to global activities of Italian MNEs with that of foreign MNEs it appears that, on average, the share of activities carried out domestically is more significant for Italian MNEs (table 3) compared to foreign MNEs (table 4).

The geographic distribution of the operations of Italian MNEs can also be analysed with respect to the distribution of activities across country groups, as classified by income levels.¹⁶ Figure 3 presents the distribution of the foreign activities of Italian MNEs by country groups. High-income countries (excluding Italy) account for the highest share of all indicators, namely for the greatest share of revenues (nearly 70 per cent for both total revenues and unrelated-party revenues) and profits (about 60 per cent) reported in foreign countries; however, they also account for a relatively lower, but still significant share of tangible assets and employees (54 and 55 per cent, respectively). Middle-income countries have a relatively higher importance in terms of tangible assets and employees (41 and 39 per cent, respectively) than they

¹⁶Investment hubs (see footnote 8) are located across the spectrum of income groups based on the World Bank classification. In line with OECD (2020), when an economy is included in the investment hub category, it is excluded from the income group, to which it would otherwise belong.

Figure 3. Italian MNEs: share of foreign activities, by group of host economy and indicator, 2016 (Percentage)



Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

Note: Country groups reflect the World Bank classification by income level. "Investment hubs" refer to economies with a share of inward FDI stock as a percentage of GDP greater than 150 per cent (see footnote 8). "Other" reflects economies for which classification by income level is not available, as well as unknown jurisdictions.

do in terms of revenues (19 per cent for both total revenues and unrelated-party revenues) and profits (21 per cent). Investment hubs, as can be seen from figure 3, have a relatively higher share of revenues (14 per cent for total revenues and 13 per cent for unrelated-party revenues) and profits (14 per cent), as compared to tangible assets and employees (4 per cent for both variables). This feature is likely linked to tax planning considerations that deserve specific analysis,¹⁷ but which is out of the scope of this paper. In low-income countries, MNEs activity appears to be more focused on labour-intensive industries but less inclined to choose low-income countries to invest in tangible assets; this may, in turn, explain the low contribution to profits through their low value-added activities. As a matter of fact, low-income countries represent 2 per cent of total employees, but almost 0 per cent of tangible assets and less than 1 per cent of profits.

The analysis of the contribution of domestic and foreign MNEs to their total activities reported in Italy shows that foreign MNEs represent only 30 per cent of positive profits and 35 per cent of tangible assets. In terms of employees, foreign MNEs report 603,000 employees in Italy, whereas Italian MNEs report about 803,000

¹⁷See Bratta et al. (2021) for this kind of analysis based on CbCR microdata.

Table 3. Italian MNEs: distribution of activities, by domestic or foreign economy and indicator, 2016 (in millions of euros, number and percentage)

Italian MNEs activities	Total revenues		Related-party revenues		Unrelated-party revenues		Profits (losses) before tax		Positive profits before tax		Tangible assets		Number of employees	
	Values	Share (%)	Values	Share (%)	Values	Share (%)	Values	Share (%)	Values	Share (%)	Values	Share (%)	Number	Share (%)
Domestic	449 112	56	109 377	57	340 326	55	19 024	36	43 648	52	203 128	55	802 791	50
Foreign	359 772	44	82 696	43	277 462	45	33 153	64	40 555	48	164 655	45	801 089	50
World	808 884	100	192 073	100	617 788	100	52 177	100	84 203	100	367 783	100	1 603 880	100

Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy

Table 4. Foreign MNEs: distribution of activities, by domestic or foreign economy and indicator, 2016 (in millions of euros, number and percentage)

Foreign MNEs activities	Total revenues		Related-party revenues		Unrelated-party revenues		Profits (losses) before tax		Positive profits before tax		Tangible assets		Number of employees	
	Values	Share (%)	Values	Share (%)	Values	Share (%)	Values	Share (%)	Values	Share (%)	Values	Share (%)	Number	Share (%)
Domestic	11 509 200	60	1 737 277	40	9 775 499	65	411 092	40	514 454	38	1 842 748	37	17 788 897	40
Foreign	7 826 066	40	2 648 581	60	5 177 281	35	606 058	60	829 096	62	3 178 083	63	26 525 894	60
World	19 335 266	100	4 385 859	100	14 952 780	100	1 017 150	100	1 343 550	100	5 020 832	100	44 041 791	100

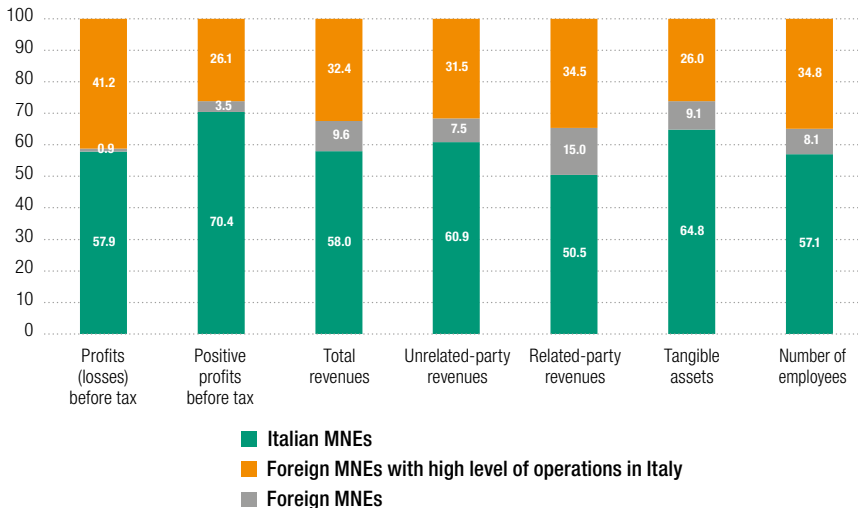
Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

Note: Activities of MNEs for which the country of the ultimate parent entity (UPE) is unknown are excluded. Domestic activities refer to activities reported in the country of the UPE (e.g. for French MNEs, domestic activities are those reported in France).

employees in Italy. Analysing the incidence of related-party revenues on total revenues, it appears that the share of related-party revenues was more important for foreign MNEs (33 per cent) than for Italian MNEs (24 per cent). This might be an indication that foreign MNEs choose to locate in Italy to greater extent for production purposes compared to domestic market-seeking purposes.

Within foreign MNEs it is, however, possible to identify a subset of foreign MNEs with a high level of operations in Italy. These were identified by analysing foreign MNEs for which Italy represented an important segment of their worldwide activities, as measured by the share of unrelated-party revenues, tangible assets or employees, and whether it is equal or greater than the importance of Italy for the Italian MNE at the 20th percentile. This subset is composed of 26 MNEs active in different sectors, but with a prevalence of MNEs active in the chemical, telecommunications and energy sectors. These MNEs account for 9.6 per cent of total revenues, reflecting a share of 15 per cent of related-party revenues and 7.5 per cent of unrelated-party revenues (figure 4). They also account for a significant share of tangible assets (9.1 per cent) and employees (8.1 per cent). In contrast, their contribution is modest in terms of profits reported in Italy (0.9 and 3.5 per cent, respectively, for total profits and positive profits before tax), and their incidence of profits on revenues is lower than the other foreign MNEs present in Italy. High levels of MNE operations in Italy may reflect three realities: (i) foreign investment funds that have acquired Italian companies; (ii) foreign MNEs for which Italy is an important market, or in terms of production plants; and (iii) MNEs that have experienced restructurings resulting in a different location of the UPE but who have maintained a high level of operations in Italy.

Figure 4. Contribution of foreign MNEs with high level of operations in Italy to total MNE activities in Italy, by indicator, 2016 (Percentage)



Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

Note: Foreign MNEs with a "high level of operations in Italy" were defined as foreign MNEs for which Italy represented an important segment of their worldwide activities, as measured by the share of unrelated-party revenues, tangible assets or employees in Italy being equal to or greater than the share of Italy for the Italian MNE at the 20th percentile.

6. Global activities of Italian MNEs by sector

MNEs are not required to indicate their activity code in the CbCR; however, CbCR data can be matched with other data sources to complement this data. For the purposes of the present analysis, the database of Italian tax returns and the Orbis-BvD database were used to identify the relevant activity code of the UPE, and thus assign it to the MNE group whose information is reported in the CbCR. For several UPEs, the activity code was "activities of holding companies" or "activities of head offices"; it is not unusual that an UPE is a company with shares in other companies in the MNE group that undertake real activities. In other words, the UPE operates in certain sectors through companies it has control over, but whose information is nonetheless reported in the CbCR. For these UPEs, a further analysis of available public financial accounts was conducted to identify, where possible, the real sector of activity.

The analysis presented in this section is based on the MNEs' main activity, as identified through the above-mentioned process. However, it is worthwhile noting that the CbCR dataset is focused on the largest MNEs, which can be active in

multiple and differentiated sectors. Due to the large scale of operations of these MNEs, the magnitude of secondary business activities is not necessarily negligible in terms of the variables reported in the CbCR.

Figure 5 represents the number of MNEs for each sector and shows the relative contribution of each group of sectors to the total value of revenues, profits, tangible assets and employees of Italian MNEs included in the dataset. Industrial activities represent the major contribution in terms of number of MNEs (70),¹⁸ followed by services (50) and wholesale and retail trade (18), while no MNEs are found in agriculture, forestry and fishing.

The services sector accounts for the highest contribution to the global activities of Italian MNEs in the dataset (figure 6), with over 50 per cent of the services sector MNEs were in financial, insurance and real estate activities. The only exception is tangible assets, where the transportation and storage industry also plays a significant role. Another interesting aspect is the high share of profits in information and communication.

The contribution of the services sector to total revenues appears to be higher in the present dataset than other existing datasets.¹⁹ This may be explained by different sample characteristics, especially by the CbCR sample being limited to the larger MNEs with global revenues of at least €750 million.

7. Conclusions and policy implications

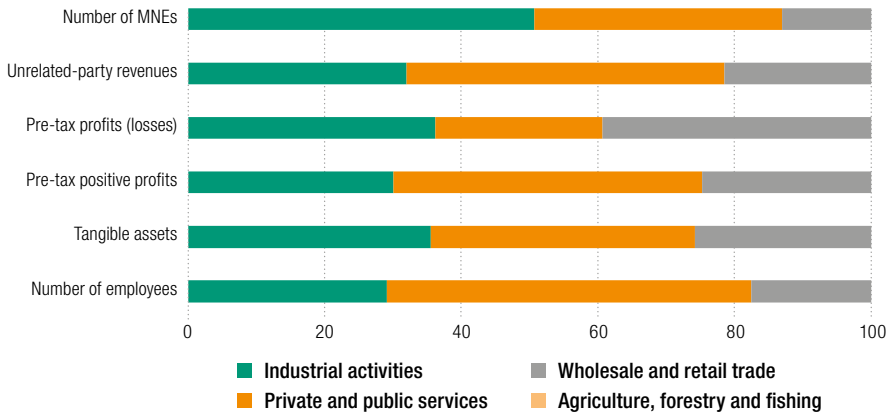
Overall, the descriptive analysis of the global activities of Italian MNEs, as reflected in the 2016 CbCR data suggests that the geographical allocation of Italian MNEs is quite similar to that of foreign MNEs in terms of top countries of presence. The host economies where Italian MNEs are more likely to be present are also those where American, British, French and Spanish MNEs are also more likely to be located. This seems to suggest that large MNEs may follow similar choices when deciding the locations of their foreign affiliates, and that country characteristics, such as geographical location, labour availability, level of infrastructures, tax systems, may explain this homogeneous behaviour. Further analysis is needed to confirm this initial insight.

Despite this similarity, the global reach of Italian MNEs is relatively smaller when compared to that of foreign MNEs, both in terms of the number of jurisdictions

¹⁸Industrial activities include manufacturing and other industrial activities, and in accordance with the following sections of the NACE Rev. 2 Classification of economic activities: B. mining and quarrying; D. electricity, gas, steam and air conditioning supply; E. water supply; sewerage, waste management and remediation activities; and F. construction.

¹⁹For example, OECD's Activities of Multinational Enterprises (AMNE) dataset and the data compiled by the Italian Trade Agency and Polytechnic University of Milan (see Italian Trade Agency, 2017).

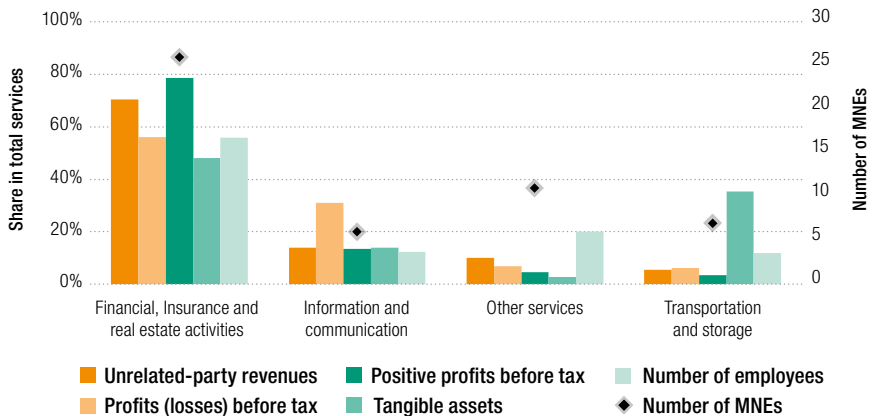
Figure 5. Global activities of Italian MNEs, by sector and indicator, 2016 (Percentage)



Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

Note: Share in total sectors. Industrial activities include manufacturing and other industrial activities, and in accordance with the following sections of the NACE Rev. 2 classification of economic activities: B. mining and quarrying; D. electricity, gas, steam and air conditioning supply; E. water supply, sewerage, waste management and remediation activities; F. construction.

Figure 6. Global activities of Italian MNEs in services, by industry and indicator, 2016 (Percentage share in total (left axis) and number of MNEs (right axis))



Source: Authors' calculations based on the 2016 CbCR micro-level data made available to the Department of Finance, Ministry of Economy and Finance, Italy.

where Italian MNEs are present, but also in terms of the share of national MNEs located in the “places to be”, i.e. in those destinations where MNEs from various other countries are present. Additionally, domestic activities represent a greater share of Italian MNEs’ activities than they do for foreign MNEs. This may indicate that Italian MNEs present structural weaknesses, which potentially limit their global reach. This issue could contribute to the deliberations of policymakers when formulating measures to increase the global competitiveness of Italian MNEs.

The distribution of activities across country groups, grouped by income-level, shows that the foreign activities of MNEs are mostly concentrated in high-income countries. Middle-income countries have a relatively higher importance in terms of tangible assets and employees than they do in terms of revenues and profits; the opposite holds true for investment hubs, as they account for a higher share of profits and revenues than they do in terms of tangible assets and employees. This may provide an initial insight on possible tax planning strategies – an issue that is out of the scope of the present analysis and will be explored in other research.²⁰ As to low-income countries, their contribution to foreign activities appears to be limited to the employment dimension and seem to be less attractive for the location of tangible assets, which may explain the low contribution to profits through their low value-added activities.

The analysis on the presence and operations of foreign MNEs in Italy suggests that the contribution of Italian MNEs to total activities reported in Italy by all MNEs is predominant. This implies that foreign MNEs locate in Italy mainly for production purposes, and that a subset of foreign MNEs have a high level of operations in Italy but a lower level of reported profits.

The sectoral analysis shows that, although industrial activities are the most populated category in terms of the number of Italian MNEs, the highest contribution to the global activities of Italian MNEs comes from the services sector.

In conclusion, by utilizing this novel and rich dataset, our study provides additional information on some of the big questions surrounding the behaviour of MNEs – questions which are often left unanswered due to the lack of data. Similar exercises performed by other national administrations could help researchers obtain clearer information on the global activities of MNEs and enable policymakers to have better insights on the positioning of a country in the global allocation of the economic activities of MNEs.

²⁰ See Bratta et al. (2021) for this kind of analysis based on CbCR microdata.

Future research using CbCR data may support policymakers in their efforts to assess the role played by their respective countries in GVCs, as well as the strengths and weaknesses of the national context, in terms of its attractiveness for foreign companies. Policymakers also have to consider introducing tax policies to enhance investments (UNCTAD, 2022).

Currently, however, not all countries benefit from the analysis of CbCR data. Developing economies continue to face significant challenges in meeting CbCR requirements, and only a small number of them are currently able to receive the CbCRs of other countries. Accordingly, capacity building and technical assistance efforts are needed to promote implementation of CbCRs (OECD, 2021c).

References

- Acciari, Paolo, Francesca Tomarelli, Laura Benedetti and Laura Limosani (2015). "Measurement of base erosion and profit shifting phenomena through the analysis of FDI stocks", Department of the Treasury Working Paper, No. 3 (Rome: Ministry of Economy and Finance).
- Antràs, Pol, and Davin Chor (2021). "Global value chains", NBER Working Paper, No. 28549 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Bratta, Barbara, Vera Santomartino and Paolo Acciari (2021). "Assessing profit shifting using country-by-country reports: A non-linear response to tax rate differentials", Department of Finance Working Paper, No. 11 (Rome: Ministry of Economy and Finance).
- Bajgar, Matej, Giuseppe Berlingieri, Sara Calligaris, Chiara Criscuolo and Timmis Jonathan (2020). "Coverage and representativeness of Orbis data", OECD Science, Technology and Industry Working Papers, No. 2020/06 (Paris: OECD Publishing).
- Casella, Bruno, and Baptiste Souillard (2022). "A new framework to assess the fiscal impact of a global minimum tax on FDI", *Transnational Corporations Journal*, 29(2), pp.99–137.
- European Commission (2012). *Taxation Trends in the European Union* (Luxembourg: European Union).
- Eurostat (2012). *Foreign Affiliates Statistics (FATS) Recommendations Manual* (Luxembourg: European Union).
- Fuest, Clemens, Felix Hugger and Florian Neumeier (2021). "Corporate profit shifting and the role of tax havens: Evidence from German country-by-country reporting data", CESifo Working Paper, No. 8838 (Munich: CESifo).
- Italian Trade Agency (2017). *L'Italia Nell'economia Internazionale*.
www.ice.it/it/repository/archivio_rapporti/Rapporto_Ice_2016%20-2017_web.pdf.
- Johnson, Robert C. (2017). "Measuring global value chains", NBER Working Paper, No. 24027 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Nielsen, Bo B., Christian Geisler Asmussen and Cecilie Dohlmann Weatherall (2017). "The location choice of foreign direct investments: Empirical evidence and methodological challenges", *Journal of World Business* 52(1), pp. 62–82.
- OECD (Organisation for Economic Co-operation and Development) (2013). *Action Plan on Base Erosion and Profit Shifting* (Paris: OECD Publishing).
- _____ (2015a). *Measuring and Monitoring BEPS, Action 11– 2015 Final Report*, OECD/G20 Base Erosion and Profit Shifting Project (Paris: OECD Publishing).
- _____ (2015b). *Transfer Pricing Documentation and Country-by-Country Reporting, Action 13–2015 Final Report* (Paris: OECD Publishing).
- _____ (2020). *Tax Challenges Arising from Digitalisation – Economic Impact Assessment: Inclusive Framework on BEPS, OECD/G20 Base Erosion and Profit Shifting Project* (Paris: OECD Publishing).

_____ (2021a). “Important disclaimer regarding the limitations of the country-by-country report statistics”. www.oecd.org/tax/tax-policy/anonymised-and-aggregated-cbcr-statistics-disclaimer.pdf.

_____ (2021b). *Corporate Tax Statistics*, 3rd ed. (Paris: OECD Publishing).

_____ (2021c). *Developing Countries and the OECD/G20 Inclusive Framework on BEPS: OECD Report for the G20 Finance Ministers and Central Bank Governors, October, Italy* (Paris: OECD).

UNCTAD (United Nations for Trade and Development) (2021). *Trade and Development Report 2021: From Recovery to Resilience: The Development Dimension* (New York and Geneva: United Nations).

_____ (2022). *World Investment Report 2022: International Tax Reform and Sustainable Development* (New York and Geneva: United Nations).

A new framework to assess the fiscal impact of a global minimum tax on FDI*

Bruno Casella^a and Baptiste Souillard^b

Abstract

The OECD agreement in principle on a global minimum corporate income tax – Pillar Two of the Base Erosion and Profit Shifting project – is a major step in international tax regulation and coordination. Yet, its consequences for foreign direct investment (FDI) have received limited attention thus far. In the present paper, the authors detail the analytical framework developed to underpin the findings of the *World Investment Report 2022: International Tax Reforms and Sustainable Investment*. The paper introduces the notion of FDI-level effective tax rate (ETR). Unlike standard ETRs, FDI-level ETRs embed the profit shifting schemes of multinational enterprises (MNEs). They capture not only the taxes paid on income reported in the host country of the foreign investment but also those levied on income shifted to offshore financial centres (OFCs). The effect of Pillar Two on these two components of the tax base determines the increase in the overall tax rate faced by MNEs, which ultimately affects the investment decisions of MNEs. After empirically calibrating ETRs, profit shifting and FDI-level ETRs of more than 200 countries, the authors quantify the effect of Pillar Two on FDI-level ETRs. The results show that after the reform FDI-level ETRs are likely to increase by 2 to 3 percentage points in non-OFCs, which corresponds to an increase in the corporate income tax liability for MNEs between 14 and 20 per cent.

Keywords: effective tax rate, multinational enterprises, foreign direct investments, profit shifting, minimum tax, Pillar Two

JEL classification codes: F23, F42, H25, H26, H32

* Received: 15 March 2022 – Revised: 22 May 2022 – Accepted: 8 June 2022

The views expressed in this article are solely those of the authors and do not necessarily represent the views of the United Nations and its Member States. The authors are grateful to Gregory Auclair, Richard Bolwijn, Michael Devereux, Javier Garcia-Bernardo, Petr Janský, Michael Keen and Hayley Pallan for input and comments during the preparation of the paper. The authors are responsible for any remaining errors.

^a Investment Research Branch, Division on Investment and Enterprise, United Nations Conference on Trade and Development, Geneva, Switzerland.

^b Corresponding author. European Center for Advanced Research in Economics and Statistics, Solvay Brussels School of Economics and Management, Université Libre de Bruxelles, Brussels, Belgium (baptiste.souillard@gmail.com).

1. Introduction

Pursued by the G20/OECD Inclusive Framework on Base Erosion and Profit Shifting (BEPS) to curb tax-motivated income shifting, the global reform of the taxation of large multinational enterprises (MNEs) has to date been endorsed by 141 jurisdictions. The agreement – in principle thus far – includes a minimum tax of 15 per cent for the largest MNEs (Pillar Two). Growing attention has been given to the consequences of a minimum tax, but ongoing discussions have generally focused on corporate income tax (CIT) revenues. Less is known about the effect of a minimum tax on the overall tax rate paid by MNEs on the income derived from foreign direct investment (FDI), which ultimately drives investment decisions.

The OECD's economic impact assessment (EIA) examines the effect of Pillar Two on the cost of investment for MNEs (Hanappi and Cabral, 2020; OECD, 2020). Yet, because the investment is conducted in the parent country, the analysis provides scant indication on the cost of FDI. Devereux et al. (2020) investigate the impact of Pillar Two on investment incentives and international tax avoidance. The authors develop a stylized three-country model to highlight the mechanisms at play; however, the framework remains theoretical and is not calibrated to actual data.

A new metric, the FDI-level effective tax rate (ETR), is presented to complement the standard definition of ETR and clarify the effect of Pillar Two on the CIT paid by MNEs on the income generated by their FDI. Standard (average) ETRs, defined as corporate income taxes paid by foreign affiliates divided by their pre-tax profits, reveal the taxes paid by foreign affiliates in a country on the profits reported in that country. They cannot reflect the taxes paid on the profits generated in the host country if some profits are shifted overseas for tax saving purposes.

However, compelling evidence indicates that MNEs artificially move profits across borders and internalize these profit shifting opportunities in their decision-making. Buettner et al. (2018) show that anti-profit shifting measures, e.g. thin capitalization rules, reinforce the sensitivity of FDI to tax rates (see also Grubert, 2003; Dharmapala, 2008). This finding suggests that profit shifting wanes tax rate differentials across countries and that standard ETRs need to be adjusted for profit shifting to understand FDI strategies. FDI-level ETRs combine information on both ETRs and profit shifting patterns. As such, they enrich standard ETRs and provide further insights into the investment decisions made by MNEs.

FDI-level ETRs are defined in a simple and transparent way. They depend on the ETR where production takes place and profits are made, i.e. in the host country, and on ETRs in place in offshore financial centres (OFCs), where some profits are shifted and recorded. The weights associated to these ETRs are determined by bilateral profit shifting shares, i.e. by the share of profits shifted from the host jurisdiction to each OFC.

A global minimum tax exerts two effects on FDI-level ETRs. First, it increases ETRs in host countries that have tax rates below the threshold (ETR channel). Second, it modifies the profit shifting practices of MNEs. The taxes paid on profits shifted to OFCs increase, with some of these profits “repatriated” to the host country where they were generated (profit shifting channel). The two effects can, to some extent, be isolated and quantified.

FDI-level ETRs are empirically calibrated to cover 208 distinct jurisdictions. We leverage a wide range of data to extend the scope of the analysis and check its robustness. In particular, we construct alternative matrices of bilateral profit shifting shares that include not only developed economies but also most developing economies. Obtaining an exhaustive sample of developed and developing economies is challenging but crucial from a policy perspective to better grasp the impact of a minimum tax rate worldwide.

The main results of this paper can be summarized as follows:

- (i) The average gap between standard ETRs and FDI-level ETRs lies between 2 and 3 percentage points (pp). This means that profit shifting schemes enable MNEs to lower the tax rate paid on the income generated by their FDI by almost 15 per cent.
- (ii) In our baseline (conservative) scenario, the implementation of a minimum tax rate of 15 per cent raises FDI-level ETRs faced by MNEs by 2 pp globally – a 14 per cent increase in their CIT liability relative to the pre-Pillar Two level. Under more aggressive assumptions, the impact of the reform on FDI-level ETRs could be up to 3 pp, or 20 per cent.
- (iii) Looking through the lens of the FDI-level ETR at the objectives of the tax reform – countering profit shifting and limiting tax competition – it appears that Pillar Two acts mainly through the profit shifting channel. This is especially true for developing countries, which display relatively high ETRs and strong exposure to international tax planning.

The paper is structured as follows. In section 2, we present existing metrics of CIT rates, a key input to our analysis. Section 3 introduces a new indicator – the FDI-level ETR – and explains the extent to which it improves on existing metrics. Section 4 presents the impact of Pillar Two on FDI-level ETRs and section 5 discusses its repercussions on tax differentials. Section 6 calibrates the new framework to the data. Section 7 presents the results along with several sensitivity tests. The paper concludes with a summary of the findings in section 8.

2. Existing metrics of corporate income tax rates

2.1. Statutory tax rates (STRs) and effective tax rates (ETRs)

There are two broad classes of corporate income tax rates: STRs, which are established by law and ETRs indicating the tax rate at which profits are actually taxed. The choice of using one or the other tax rate depends on the research question (Bradbury et al., 2018). ETRs are best suited for studying the taxes paid on FDI for two related reasons. First, unlike STRs, they absorb credits, deductions, exemptions, and any other tax break that a government may have granted to lighten CIT on FDI. Second, ETRs more accurately reflect the very low taxation in OFCs and play a key role in the profit shifting practices of MNEs. While the average difference between STRs and ETRs is equal to 6 pp among non-OFCs, this gap rises to 11 pp in OFCs following access to greater availability of fiscal incentives and preferential tax treatment.¹

2.2. Forward-looking ETRs and backward-looking ETRs

ETRs can be either forward- or backward-looking. Both seek to measure corporate tax liabilities but differ conceptually and analytically. Forward-looking ETRs are model-based, consider a hypothetical investment project, and include all taxes due over the investment's lifetime (Devereux and Griffith, 2002 and 2003). They are particularly suited for simulating alternative tax regimes. Backward-looking ETRs do not require predicting future scenarios (e.g. the evolution of interest and inflation rates). They reveal the taxes paid in a given year on the income reported in that particular year. They are computed directly from the data and calculated as the CIT paid over pre-tax profits. Recent improvements in the availability and reliability of data on MNE activities – notably through the country-by-country reporting initiative (BEPS Action 13) – have encouraged the use of backward-looking ETRs in the analysis of international corporate taxation (e.g. Garcia-Bernardo and Janský, 2022).

Previous analyses on the investment impact of Pillar Two have used both types of ETRs. The OECD's EIA employs forward-looking ETRs, whereas Devereux et al. (2020) make use of backward-looking ETRs. The latter approach lends itself more naturally to the study of the effect of Pillar Two on the taxes paid on FDI because backward-looking ETRs are more directly comparable with the GloBE ratio – the main trigger of the Pillar Two top-up tax (chapter III section A.2 in UNCTAD, 2022).

¹ Data from 2017. ETRs are retrieved from country-by-country reporting data, and STRs come from the Tax Foundation. See section 6 and figure 3 for more details.

Another key advantage of backward-looking ETRs resides in data availability. Backward-looking ETRs can be constructed for a large sample of countries (section 6.1), while forward-looking ETRs are only available for a limited subset of countries, mostly developed economies. For example, the Centre for Business Taxation of Oxford University provides updated and comparable forward-looking ETRs for a group of 43 countries, including only developed and emerging economies.²

3. A new metric: the FDI-level ETR

An extensive body of research shows that MNEs engage in large-scale tax avoidance and profit shifting. They move profits generated in high- to low-tax countries, and especially toward OFCs (Beer et al., 2020; Dharmapala, 2014; Riedel, 2018). Hence, the ETR an MNE ultimately pays on the income generated in some country is smaller than the ETR reported in this country. We introduce a more comprehensive notion of ETR which encompasses the entire income generated by FDI – including shifted income, the FDI-level ETR. The FDI dimension implies a shift in the analytical focus from the foreign affiliate’s country of operations (host country) to the underlying value-creating FDI project itself.

Consider a generic FDI project i operated by a foreign affiliate of an MNE in a host country c . The standard ETR reported by the foreign affiliate in c is:

$$ETR_{ic} = \frac{\text{CIT paid in host country } c \text{ on the FDI income generated by } i}{\text{FDI income generated by } i \text{ and reported in host country } c}$$

The FDI-level ETR for the investment i in host country c is instead defined as:

$$ETR_{ic}^{FDI} = \frac{\text{CIT on the FDI income generated by } i \text{ in host country } c}{\text{FDI income generated by } i \text{ in host country } c}$$

Without profit shifting, FDI income generated in c is fully reported in c , and the two rates are equivalent. However, in the presence of profit shifting, a share of the income generated in c is shifted offshore and subject to lower taxation, so that $ETR_{ic}^{FDI} < ETR_{ic}$.

Three key assumptions are made at this stage. First, we assume that ETRs are homogeneous within countries, i.e. $ETR_{ic} = ETR_c$ for all i (assumption 1). This

² See also the OECD series (https://stats.oecd.org/Index.aspx?Data SetCode=CTS_ETR), Bazel et al. (2017) and Spengel et al. (2021). All three exclude the majority of developing economies – a severe limitation for global analysis.

assumption has historically been used in prior impact assessments (Devereux et al., 2020; Hanappi and Cabral, 2020; OECD, 2020). It remains the best approximation given the limited availability of disaggregated data. However, assumption 1 has implications for the impact assessment of Pillar Two. In our analysis, disregarding the within-country variance of ETRs leads to an understatement of the impact of the minimum tax on FDI (Auclair and Casella, 2022). Second, we assume that backward-looking ETRs are reliable proxies for GloBE ETRs, i.e. for the ratios triggering the activation of the top-up within the GloBE Pillar Two framework (assumption 2). This is an acceptable simplification at the aggregate level. Yet, it is worth noticing that specific treatments of categories of incentives in the GloBE Rules may produce a divergence between standard ETRs and GloBE ETRs for individual firms (chapter III.C in UNCTAD, 2022). Assumptions 1 and 2 make the top-up equal to the difference, if positive, between the 15 per cent minimum and the host country's average ETR. Finally, we assume that profits can only be shifted from non-OFCs to OFCs (assumption 3). This assumption is grounded on the profit shifting literature. Dowd et al. (2017) and Garcia-Bernardo and Janský (2022) show that most profits moved across borders for tax saving purposes are concentrated in OFCs, where ETRs are close to zero. Casella (2019), Damgaard et al. (2019) and UNCTAD (2015) also point out that 30 to 40 per cent of FDI transit through a limited number of very large investment hubs, hinting at the disproportionate role played by a limited set of OFCs in the tax optimization practices of MNEs.

Let ETR_h be the effective tax rate in the generic OFC h and γ_{ch} be the share of profits generated by foreign affiliates in c and shifted to h . The FDI-level ETR in host country c can be written as a linear combination between the ETR in c and ETRs in OFCs, where the weights are given by bilateral profit shifting shares:³

$$ETR_c^{FDI} = \left(1 - \sum_{h, h \neq c} \gamma_{ch} \right) ETR_c + \sum_{h, h \neq c} \gamma_{ch} ETR_h$$

³ Profit shifting costs are considered negligible throughout this paper. It is in theory possible to establish micro-foundations and incorporate profit shifting costs à la Hines and Rice (1994). In such models, (non-deductible) costs incurred by firms when shifting profits from host country c to OFC h take the form: $(\gamma_{ch}^2) \pi_c / (2k)$, where π_c represents the profits generated in c . Hence, the share of profits shifted from c to h is equal to $k(t_c - t_h)$ (under reasonable assumptions) and profit shifting costs would enter equation (1). The additional term would be equal to $\sum_{h \neq c} \gamma_{ch}^2 / (2k)$. In the present paper, the calibration is more flexible and profit shifting shares will also depend on tax rate differentials (section 6 and annex). Further note that the additional term in (1) would be of small magnitude. Therefore, explicitly incorporating profit shifting costs à la Hines and Rice (1994) would only marginally change our findings.

An alternative expression for the FDI-level ETR in c is:

$$ETR_c^{FDI} = ETR_c - \sum_{h, h \neq c} \gamma_{ch}(ETR_c - ETR_h) \quad (1)$$

The first term in (1) refers to the ETR in host country c . The second term represents profit shifting gains, i.e. the taxes “saved” by MNEs on the income generated by their FDI in host country c due to profit shifting. The difference between ETRs and FDI-level ETRs widens as profit shifting shares and ETR differentials between host countries and OFCs increase. The empirical calibration of ETRs and profit shifting is described in section 6.

4. An impact framework based on FDI-level ETRs

Taking ETRs and profit shifting as given, we now turn to the analysis of the impact of the global minimum tax on FDI. In doing so, we focus on FDI-level ETRs as the most comprehensive and realistic measure of the total tax liability faced by MNEs on their FDI income. As a starting point, we examine the impact of Pillar Two on FDI-level ETRs in the absence of profit shifting (section 4.1). Next, we re-incorporate profit shifting into the picture to highlight the (more indirect) impact of the reform through profit shifting (section 4.2). FDI-level ETRs increase not only because ETRs in host countries rise, but also because ETRs in OFCs increase and profit shifting activities of MNEs decline. Together, these two effects constitute the overall impact of the reform on the FDI-level ETR faced by large MNEs. We apply our framework to two distinct scenarios. We provide both a conservative estimate and an upper bound for the impact of Pillar Two on FDI-level ETRs, based on the profit shifting response adopted by MNEs to Pillar Two (section 4.3). To complete the formalization of the impact, we add the effect of a carve-out – a key feature of Pillar Two which excludes a share of profits tied to real activity from the top-up tax (section 4.4).

4.1. ETR channel

Consider the implementation of a minimum tax rate t^* applied to the foreign affiliates of large MNEs on a jurisdictional basis. We abstract, for the moment, from profit shifting and the carve-out. Assuming $\gamma_{ch} = 0$ for all h in (1), the FDI-level ETR is just equal to the ETR. The FDI-level ETR after Pillar Two is then given by:

$$ETR_c'^{FDI} = ETR_c' = \max(ETR_c, t^*) \quad (2)$$

Throughout the paper, the prime symbol ' denotes the underlying metrics post-Pillar Two. Changes in FDI-level ETRs of the foreign affiliates of large MNEs in c are then:

$$\Delta ETR_{lrg,c}^{FDI} = \Delta ETR_{lrg,c} = ETR'_c - ETR_c = \begin{cases} t^* - ETR_c & \text{if } ETR_c < t^* \\ 0 & \text{if } ETR_c \geq t^* \end{cases} \quad (3)$$

In other words, ETRs faced by large MNEs increase in countries where the average ETR is below the minimum. We refer to this effect as the ETR channel.

4.2. Incorporating profit shifting

From (1), taking the full difference in FDI-level ETRs between post- and pre-Pillar Two yields the expression:

$$\Delta ETR_{lrg,c}^{FDI} = ETR'_c - ETR_c + \sum_{h,h \neq c} \gamma_{ch}(ETR_c - ETR_h) - \sum_{h,h \neq c} \gamma'_{ch}(ETR'_c - ETR'_h) \quad (4)$$

where γ'_{ch} denotes bilateral profit shifting shares of foreign affiliates of large MNEs after the reform, ETR'_c is defined by (2), and:

$$ETR'_h = \max(ETR_h, t^*)$$

The first term in (4) reflects the ETR channel. With profit shifting, a supplementary term – a profit shifting channel – enters the equation. It captures the variation in the FDI-level ETR in c caused by the rise in taxes levied on profits reported in OFCs and by the reduction of profit shifting from c to OFCs.

An alternative expression for (4) is:

$$\Delta ETR_{lrg,c}^{FDI} = \left(1 - \sum_{h,h \neq c} \gamma_{ch}\right) (ETR'_c - ETR_c) + \sum_{h,h \neq c} (\gamma_{ch} - \gamma'_{ch}) (ETR'_c - ETR_h) + \sum_{h,h \neq c} \gamma'_{ch} (ETR'_h - ETR_h) \quad (5)$$

Equation (5) represents the impact of Pillar Two on FDI-level ETRs as a sum of three components. The first component is the increase in CIT paid on non-shifted profits. The second component is the increase in taxes paid on profits that were previously shifted but are no longer shifted after Pillar Two. Finally, the third component is the

increase in taxes paid on profits that are still shifted after Pillar Two and subject to higher taxation in OFCs.

Equation (5) shows that the degree to which the reform raises FDI-level ETRs not only depends on initial ETRs but also hinges on assumptions on the evolution of profit shifting shares pre- and post-Pillar Two. This aspect is analyzed in the next section.

4.3. Profit shifting response to Pillar Two

Two intertwined dynamics contribute to the impact of Pillar Two on FDI-level ETRs through the profit shifting channel. On the one hand, profits remaining in OFCs are taxed at a higher rate. On the other hand, some profits that were shifted toward OFCs prior to Pillar Two are expected not to be shifted anymore. The remaining share of profits shifted to OFCs after Pillar Two rests on empirical and modelling considerations. In the evaluation made by Hanappi and Cabral (2020) and OECD (2020), profit shifting is fixed and constant, i.e. the second component in (5) is equal to 0. This assumption minimizes the profit shifting channel. This scenario can be useful to set a theoretical lower bound but is unlikely to occur in practice. Its occurrence would indeed imply that Pillar Two would be ineffective in tackling profit shifting, an outcome that is hardly realistic, nor desirable.

In this paper, we argue that profit shifting will decline after the reform. We consider two scenarios to assess the impact of Pillar Two on FDI-level ETRs: one that is likely to provide a conservative estimate of the increase in FDI-level ETRs (“baseline scenario”) and another one that provides an upper bound (“upper bound scenario”).

In the same manner as Devereux et al. (2020), the first scenario enables profit shifting to partially decrease, i.e. $\gamma_{ch} \geq \gamma'_{ch} \geq 0$. The reduction is proportional (linear) to the reduction of the difference in ETRs between host countries and OFCs. More precisely, in (5), we assume that the difference $\gamma'_{ch} - \gamma_{ch}$ between the bilateral profit shifting share before and after Pillar Two is a linear combination of the difference between the ETR in the host country before and after Pillar Two and the difference between the ETR in the OFC both before and after Pillar Two:

$$\gamma'_{ch} - \gamma_{ch} = \beta_1(ETR'_c - ETR_c) + \beta_2(ETR'_h - ETR_h) \quad (6)$$

where β_1 and β_2 are estimated empirically (section 6.3), with expected signs $\beta_1 \geq 0$, $\beta_2 \leq 0$. The interpretation is straightforward. As a global minimum tax tends to raise ETRs in host countries and OFCs, or more precisely, the two ETR differences in (6) are either positive or zero, the change in profit shifting is driven by the increase in taxes in the host country relative to the increase in taxes in OFCs.

The upper bound scenario assumes that profit shifting of foreign affiliates of large MNEs disappears after the introduction of the reform (full reversal of profit shifting), i.e. $\gamma_{ch} \geq 0$ and $\gamma'_{ch} = 0$ for all h . This assumption maximizes the impact of the reform on FDI-level ETRs by setting to 0 the only negative term in (4), yielding the expression:

$$\Delta ETR_{Irg,c}^{FDI} = \left(1 - \sum_{h, h \neq c} \gamma_{ch} \right) (ETR'_c - ETR_c) + \sum_{h, h \neq c} \gamma_{ch} (ETR'_c - ETR_h)$$

The actual effect of the minimum tax on profit shifting is very likely to lie between the baseline and the upper bound, as confirmed by the recent literature supporting the significant non-linearity of profit shifting (Dowd et al., 2017; Garcia-Bernardo and Janský, 2022). In this respect, our baseline estimate is a conservative one.

4.4. Substance-based carve-out

A key feature of Pillar Two is the application of a substance-based carve-out tied to indicators of real activity. The carve-out reduces the tax base to which the Pillar Two top-up tax rate applies. This is intended to preserve the possibility for countries to compete for real and productive investment. It also leaves room for countries to engage in tax competition through their domestic tax system (chapter III section D in UNCTAD, 2022; Devereux et al., 2021). Here we focus on the formal expression of the impact of Pillar Two on FDI-level ETRs in the presence of a carve-out. The empirical calibration of the carve-out instead is presented in section 6.5.

We adjust (4) and (5) to account for the carve-out. More concretely, we re-formulate the definition of the variables after Pillar Two (ETR'_c , ETR'_h and γ'_{ch}) taking into account the carve-out.

Starting with ETR'_c and applying the definition of the carve-out, its expression becomes:

$$\begin{aligned} ETR_c^{CO} &= \frac{1}{\pi_{Irg,c}^*} \left((\pi_{Irg,c}^* - CO_c) ETR'_c + CO_c ETR_c \right) \\ &= (1 - CO_c^{SHARE}) ETR'_c + CO_c^{SHARE} ETR_c \end{aligned} \quad (7)$$

where $\pi_{Irg,c}^*$ denotes the profits reported by foreign affiliates of large MNEs in host country c , CO_c the reported profits excluded from the top-up tax thanks to the carve-out, and CO_c^{SHARE} their corresponding share.

We then argue that the two other variables post-Pillar Two, namely ETR'_h and γ'_{ch} are unaffected by the carve-out. First, the carve-out on shifted profits is 0, or close to 0, as their underlying economic substance is by nature negligible. Therefore,

$ETR'_h{}^{CO} = ETR'_h$. Second, we claim that the carve-out has no repercussion also on profit shifting patterns ($\gamma'_{ch}{}^{CO} = \gamma'_{ch}$). Generally speaking, this occurs if changes in profit shifting are neither accompanied by any change in real activities, nor in the carve-out available in each country – a reasonable and likely simplification.⁴

From the discussion above, it follows that the only term that changes in (5) after introducing a carve-out is ETR'_c . Re-arranging (5) and combining (5) with (7) gives a simple expression for the impact of Pillar Two on FDI-level ETRs in the presence of a carve-out:

$$\Delta ETR_{Irg,c}^{FDI,CO} = \Delta ETR_{Irg,c}^{FDI} - CO_c^{SHARE} (ETR'_c - ETR_c) \quad (8)$$

Equation (8) shows that the carve-out mitigates the increase in FDI-level ETRs through the ETR channel: the higher the ETR channel and carve-out share, the greater the role played by the carve-out.

Finally, the minimum tax concerns merely large MNEs, i.e. MNEs with annual revenues above €750 million. Denoting by ω_c the (host-country-specific) coefficient indicating the share of activities conducted by foreign affiliates of large MNEs in activities carried out by all foreign affiliates, changes in FDI-level ETRs at the host country level – i.e. including all foreign affiliates – are given by:

$$\Delta ETR_c^{FDI,CO} = \omega_c \Delta ETR_{Irg,c}^{FDI,CO} \quad (9)$$

An analogous transformation applies to (5) to obtain the country-level estimate for the impact of the reform in the absence of a carve-out. Unless stated otherwise, our results will be displayed at the country-wide level (i.e. in line with (9)) to facilitate the policy interpretation of the analytical findings.

⁴ More descriptively, consider the case in which the pre-Pillar Two ETR in host country c is above the minimum. The carve-out applies neither to reported profits in the host country as there is no top-up, nor to profits shifted to OFCs as the substance requirement is not satisfied. The carve-out does not affect the change in ETR differentials between the host country and OFCs and, thus, has no influence on the profit shifting response to Pillar Two. Consider now the case where the pre-Pillar Two ETR in host country c is below the threshold. Without any carve-out, post-Pillar Two ETRs in host country c and OFCs are aligned and equal to the minimum. There is no incentive to shift profits anymore and γ'_{ch} is set equal to 0. The introduction of the carve-out does not affect these dynamics. If anything, it further weakens the rationale for profit shifting as the post-Pillar Two ETR in host country c , at some level below 15 per cent in virtue of the carve-out, would be lower than the ETR applied to shifted profits. Note that the considerations supporting the equality $\gamma'_{ch}{}^{CO} = \gamma'_{ch}$ hold irrespective of the scenario (baseline or upper bound).

5. Implications of Pillar Two for tax rate differentials

By setting a floor to the race to the bottom in CIT and mechanically compressing standard ETRs into a smaller range, the introduction of a minimum tax rate mitigates tax rate differentials between countries. Without profit shifting considerations, the reduction in tax rate differentials caused by the Pillar Two minimum (at 15 per cent) is particularly significant. Based on ETRs calculated from country-by-country reporting (CbCR) data (section 6), a third of developing countries – and about half of developed ones – will see their standard ETRs re-aligned (upward) to the minimum, reducing the gap between those countries and others that have ETRs above 15 per cent.

In the same vein, a frequently used argument is that the reduction of tax rate differentials would also improve efficiency in the capital allocation by making tax-related factors less relevant for the location choices made by MNEs (Englisch and Becker, 2019; OECD, 2020). The idea is that tax differentials distort the location of productive activities from an economically efficient allocation (Barrios et al., 2012; Davies et al., 2021).

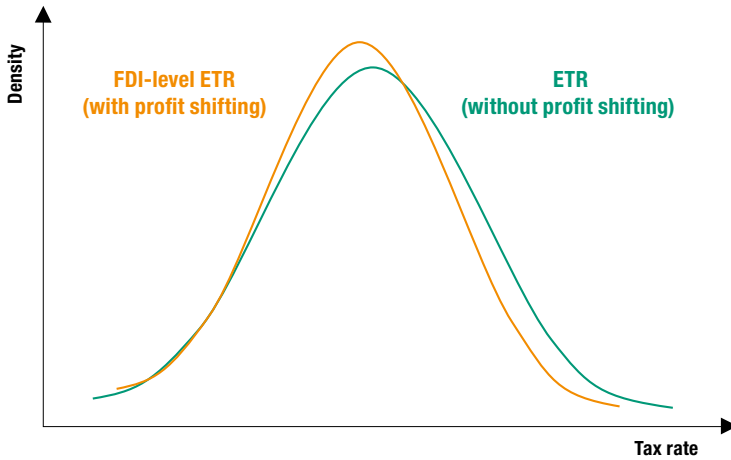
The typical discussion on the implications of Pillar Two for tax rate differentials, however, revolves around the standard notion of ETRs. Yet, standard ETRs do not account for profit shifting dynamics. Introducing profit shifting mitigates the role played by taxation in the location decisions of MNEs. Buettner et al. (2018) argue that the implementation of anti-profit shifting measures increases the sensitivity of FDI to tax rates (see also Dharmapala, 2008; Grubert, 2003).

In this respect, the FDI-level ETR, i.e. the new metric introduced in this paper, provides a more solid basis for an assessment of the impact of Pillar Two on tax rate differentials, addressing also the effects of profit shifting.

First, it confirms that profit shifting practices employed by MNEs reduce tax rate differentials. This occurs because the fiscal benefits provided by OFCs partially offset differences in tax rates across host countries (figure 1).

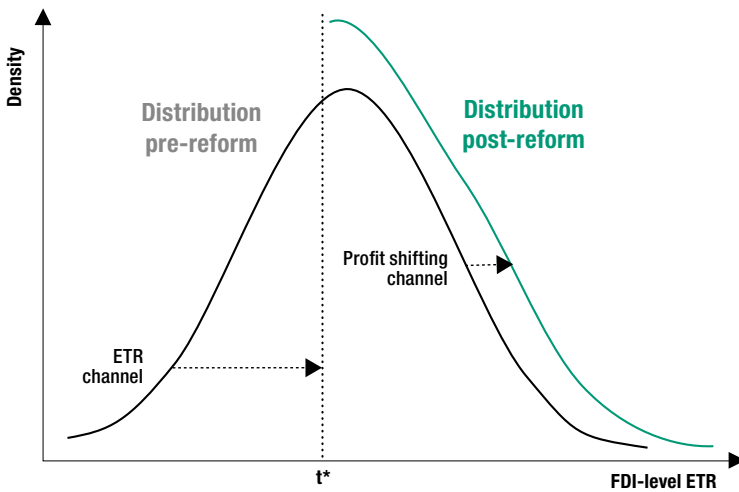
Second, it nuances the expected impact of Pillar Two on tax rate differentials (figure 2). As expected, ETRs on FDI in low-tax countries increase to 15 per cent, thereby compressing tax rate differentials in the left tail of the tax rate distribution. However, and perhaps less intuitively, the reduction of profit shifting caused by Pillar Two operates in the opposite direction. Countries with relatively high ETRs will see their FDI-level ETRs increase to a larger extent due to the decline of profit shifting, thus

Figure 1. Distribution of standard ETRs and FDI-level ETRs pre-Pillar Two



Source: Authors' elaboration.
 Note: Distributions plotted for illustrative purposes.

Figure 2. Effect of a minimum tax rate t^* on the distribution of FDI-level ETRs



Source: Authors' elaboration.
 Note: Distributions plotted for illustrative purposes.

generating higher tax rate differentials in the right tail of the distribution.⁵ The net effect will still be a reduction in FDI-level ETR differentials,⁶ but will be smaller than expected based solely on the changes in host countries' ETRs. More accurately, the stronger the reduction in profit shifting by large MNEs following Pillar Two, the smaller the decrease in the tax rate differentials produced by the reform.

Hence, interestingly, profit shifting adds to the direct impact of Pillar Two on the level of FDI-level ETRs (equation (5)) but partially mitigates its impact on their differentials at the same time. It is worth emphasizing that since it is the FDI-level ETR and not the ETR that drives the investment decisions of MNEs, the effects of Pillar Two on tax-related competitive dynamics and economic efficiency should be assessed against changes in the former, and seen through this lens, they may be lower than expected.

6. Data and empirical calibration

6.1. Sample of countries

The analysis covers 208 economies, including 53 developed economies and 155 developing ones. This extensive coverage is a distinctive feature of this study and is crucial for a better understanding of the impact of Pillar Two worldwide.

Of these 208 economies, 39 are classified as OFCs following the classification established by Tørsløv et al. (2021).⁷ OFCs are generally defined as jurisdictions where corporate income tax rates are low and where financial secrecy provides additional opportunities for tax avoidance. Following Tørsløv et al. (2021), we separate Belgium, Cyprus, Ireland, Luxembourg, Malta, the Netherlands and Switzerland from the rest. The remaining 32 OFCs are pooled together and form a composite OFC. The list is highly consistent with other classifications (e.g. Dyreng and Lindsey, 2009; Hines and Rice, 1994), and is also substantially aligned with

⁵ This statement holds under the hypothesis that high-tax countries are more exposed to outward profit shifting. Evidence of this can be found in section 6.

⁶ This statement holds under reasonable assumptions. For example, profit shifting must not be too large. In an extreme configuration in which all profits are initially shifted to OFCs and profit shifting significantly declines after the reform, FDI-level ETR differentials might increase overall. Nevertheless, this case remains purely theoretical and is unlikely to occur in practice.

⁷ The list includes: Andorra, Anguilla, Antigua and Barbuda, Aruba, the Bahamas, Bahrain, Barbados, Belgium, Belize, Bermuda, British Virgin Islands, Cayman Islands, Curacao, Cyprus, Grenada, Guernsey, Gibraltar, Hong Kong (China), Ireland, Isle of Man, Jersey, Lebanon, Liechtenstein, Luxembourg, Macao (China), Malta, Marshall Islands, Mauritius, Monaco, the Netherlands, Panama, Puerto Rico, Seychelles, Singapore, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Switzerland and Turks and Caicos. Bonaire and Sint Maarten, included in Tørsløv et al. (2021), are excluded here due to data shortcomings.

the one used in previous UNCTAD studies (Bolwijn et al., 2018; Casella, 2019; UNCTAD, 2015).⁸

6.2. Pre-Pillar Two effective tax rates: ETR_c and ETR_h

Baseline ETRs

As previously mentioned in section 2, our preferred metrics of corporate income tax rates are backward-looking ETRs. However, the construction of an empirically consistent measure of backward-looking ETRs is challenging. Until the introduction of CbCR, the United States Bureau of Economic Analysis (BEA) data on outward activities of MNEs headquartered in the United States was the main source for calculating backward-looking ETRs of foreign affiliates. The dataset reports income taxes paid by, and net income accrued to, foreign affiliates of MNEs in nearly 70 countries, including several developing economies. The ratio between the two variables provides in principle a consistent ETR measure after some corrections for double counting of equity income (Blouin and Robinson, 2020).⁹ Tørsløv et al. (2021) use national accounts, which are also available for many countries but include all firms operating within a country, i.e. both domestic firms and MNEs. Data from the BEA and Tørsløv et al. (2021) pool together profit- and loss-making firms, leading to an overestimation of the ETRs that firms have to contend with. Firm-level data have also been used to derive ETRs (e.g. Markle and Shackelford, 2012), but their application in developing economies – notably in Africa and in Latin America and the Caribbean – is severely limited by poor data availability.

In this context, the publication of CbCR data as part of BEPS Action 13 has been an important breakthrough. Large MNEs, i.e. those with annual revenues over €750 million, are required to prepare reports and give details about their activities in the countries where they operate. The information is then aggregated at the level of the headquarter-host country pair and made publicly available by the OECD. At the time of this analysis (December 2021), data were available for only 2016 and 2017. It is important to note that the reporting was not yet mandatory in 2016, but the 2017 data used in this report capture all the large MNEs from 38 countries that had signed the multilateral agreement for the automatic exchange of country-by-country reports.

⁸ Notwithstanding the overall alignment between these different lists, our main motivation for using Tørsløv et al. (2021) is because of analytical consistency, as one matrix of bilateral profit shifting shares builds on Tørsløv et al. (2021) (section 6.3 and annex).

⁹ Blouin and Robinson (2020) pointed out that one of the shortcomings of the BEA data is that foreign income is double counted due to equity income. Equity income must then be subtracted not to double count foreign income.

CbCR is thus very recent and as CbCR practice consolidates, it is expected to improve. Yet, experts (e.g. Garcia-Bernardo et al., 2021) concur that CbCR data are already both richer and more empirically consistent than alternative sources. These data cover the largest investors worldwide (almost 40 countries, corresponding to 90 per cent of outward FDI stock globally) and almost all recipient countries (about 200, compared with nearly 50 in Tørsløv et al. (2021) and 70 in the BEA dataset). In addition, loss- and profit-making companies are separated, and national companies can be excluded to focus the calculation on foreign affiliates. Furthermore, in the context of the analysis of Pillar Two, the CbCR perimeter is exactly aligned with the scope of the tax reform and only targets foreign affiliates of large MNEs. Finally, in the version used in this report, excluding stateless entities, CbCR data are less prone than the BEA data to double counting, although some residual double counting is possible for intracompany dividends.¹⁰

The baseline CbCR-based ETRs in this paper are provided by Garcia-Bernardo and Janský (2022) and cover 193 distinct jurisdictions. Missing values are imputed using the Tax Foundation data on STRs, after regressing CbCR-based ETRs on STRs (figure 3).

Alternative ETRs

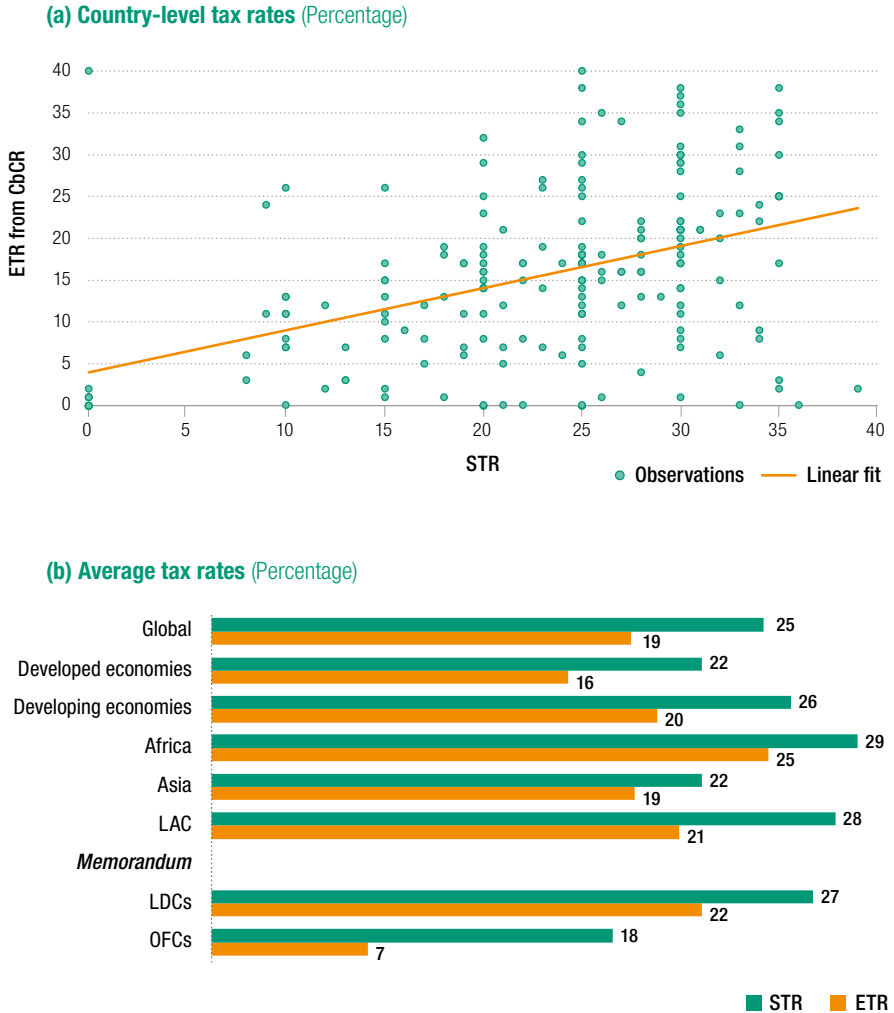
For validation purposes, CbCR-based ETRs are triangulated with data from both national accounts and BEA. ETRs from national accounts are computed with the replication files of Tørsløv et al. (2021). As conceived, they encompass all firms operating in a country, i.e. domestic firms and MNEs. BEA-based ETRs are calculated using the BEA's data on the United States direct investment abroad. The three series of backward-looking ETRs are globally aligned, particularly CbCR and BEA data as expected (figure 4).

6.3. Pre-Pillar Two profit shifting shares: γ_{ch}

To calibrate pre-Pillar Two FDI-level ETRs (equation (1)), the share of profits shifted to each OFC needs to be computed for more than 200 host countries. In other words, we need to estimate a host country-OFC matrix of bilateral profit shifting shares. Quantifying profit shifting is another challenging task because it is not directly observed. Three main approaches have been adopted in the recent literature to gauge its magnitude, namely: (i) the misalignment approach; (ii) the approach taken by Tørsløv et al. (2021); and (iii) the tax semi-elasticity approach.

¹⁰In CbCR data, intra-company dividends are excluded from revenues but might still be double counted in profits, especially for the United States but more generally for developed economies. See discussions in Clausing (2020), Garcia-Bernardo et al. (2021) and Garcia-Bernardo and Janský (2022).

Figure 3. STRs and CbCR-based ETRs



Source: Authors' calculations.

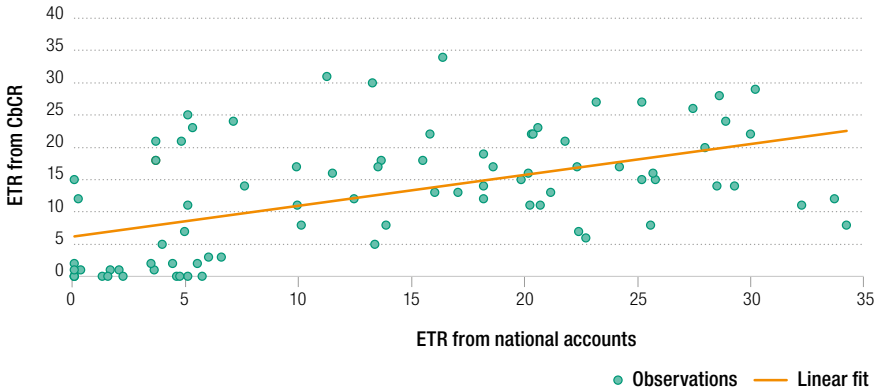
Note: Data from 2017. STR: Statutory tax rate from the Tax Foundation. ETR: effective tax rate from Garcia-Bernardo and Janský (2022).

Subfigure (a): ETRs on the y-axis and STRs on the x-axis. Correlation coefficient equals to 0.443. $ETR_c^{CbCR} = 3.957 + 0.504 * STR_c$, $R^2 = 0.196$.

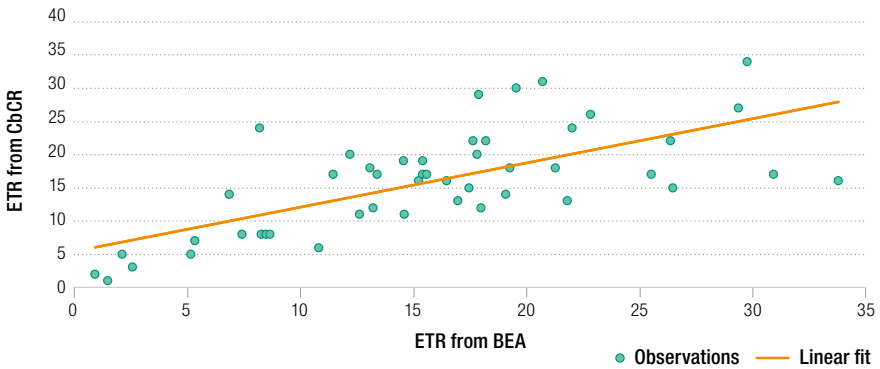
Subfigure (b): Simple average across countries. LAC: Latin America and the Caribbean. LDCs: least developed countries. OFCs: offshore financial centers. OFCs are included only in the "OFCs" category.

Figure 4. ETRs across data sources

(a) CbCR data and national account data (Percentage)



(b) CbCR data and BEA data (Percentage)



Source: Authors' calculations.

Note: Data from 2017. ETR: Effective tax rate. BEA: Bureau of Economic Analysis.

Subfigure (a): ETRs from Garcia-Bernardo and Janský (2022) on the y-axis and ETRs based on Tørslov et al. (2021) on the x-axis. ETRs before imputation of missing values. Correlation coefficient equals to 0.525. $ETR_c^{CbCR} = 6.249 + 0.479 \cdot ETR_c^{NA}$, $R^2 = 0.276$.

Subfigure (b): ETRs from Garcia-Bernardo and Janský (2022) on the y-axis and ETRs computed with BEA data on the x-axis. ETRs before imputation of missing values. Correlation coefficient equals to 0.682. $ETR_c^{CbCR} = 5.498 + 0.665 \cdot ETR_c^{BEA}$, $R^2 = 0.465$.

Baseline bilateral profit shifting shares

The baseline matrix of bilateral profit shifting shares is built with CbCR data and the misalignment method. Thanks to the extensive coverage of CbCR, profit shifting shares can be computed for many countries directly. The priority assigned to the misalignment method follows quite naturally from the choice of CbCR data as our main source of information on the activities and taxation of large MNEs.

The misalignment method leverages CbCR information on the location of profits and economic activities of (large) MNEs to derive profit shifting patterns (Garcia-Bernardo and Janský, 2022). Profit shifting creates a disconnect between the location of profits and the location of activities, as reported in CbCR data. The profit misalignment method re-aligns both distributions. It re-allocates the worldwide profits reported by MNEs to each jurisdiction in accordance with the scale of MNEs' activities in that jurisdiction.

Following Garcia-Bernardo and Janský (2022), we select three indicators of economic activity: L_c , the numbers of workers employed by MNEs in country c ; W_c , the wages paid by MNEs in country c ; and R_c , unrelated-party revenues of MNEs in country c . Let π_{Irg} be the worldwide profits generated by MNEs and $\pi_{Irg,c}$ be the profits generated by MNEs in country c . We also define π_{Irg}^* and $\pi_{Irg,c}^*$, the profits reported by MNEs worldwide and in country c , respectively. Notice that $\pi_{Irg} = \pi_{Irg}^*$ but, because of profit shifting, the equality does not necessarily hold at the country level. For any country c (including OFCs), defining s_c the share of profits generated by MNEs in c in total profits:

$$\begin{aligned}\pi_{Irg,c} &= s_c \pi_{Irg} \\ &= s_c \sum_k \pi_{Irg,k}^* \\ &= \left(\phi_L \frac{L_c}{\sum_k L_k} + \phi_W \frac{W_c}{\sum_k W_k} + (1 - \phi_L - \phi_W) \frac{R_c}{\sum_k R_k} \right) \sum_k \pi_{Irg,k}^*\end{aligned}$$

Following Garcia-Bernardo and Janský (2022), we set $\phi_L = \phi_W = 0.25$. Employees L_c and unrelated-party revenues R_c are observed in CbCR data. For their part, wages W_c are obtained after multiplying the number of employees L_c (from CbCR) with the average annual salary in country c in 2017 from the International Labour Organization.¹¹ Outward profit shifting from host country c is defined as the

¹¹Missing salaries are predicted by a linear regression model with GDP and population as regressors: $\ln(salary_c) = \alpha_0 + \alpha_1 \ln(GDP_c) + \alpha_2 \ln(population_c) + \xi_c$. $R^2 = 0.931$. GDP and population data are retrieved from the World Bank's Development Indicators (accessed 13 December 2021).

difference between profits generated in c and profits reported in c :

$$PS_{Irg,c}^O = \pi_{Irg,c} - \pi_{Irg,c}^*$$

where, symmetrically, negative values indicate inward profit shifting.

Let us assume that the profit shifting behaviour of MNEs is independent from their origin. For instance, the share of profits shifted from France to Ireland in the profits generated in France is the same for French, German or Italian MNEs operating in France. The share γ_c of the profits generated by foreign affiliates of MNEs in c that are shifted to OFCs is given by:

$$\gamma_c = \sum_{h, h \neq c} \gamma_{ch} = \max\left(\frac{PS_{Irg,c}^O}{\pi_{Irg,c}}, 0\right)$$

We estimate that some \$1,036 billion profits are shifted from non-OFCs toward OFCs, of which three quarters (\$759 billion) originate from developed economies. Moreover, among these profits recorded in OFCs, about 25 per cent (\$257 billion) are transferred by foreign affiliates, with the majority being instead shifted by domestic MNEs. Foreign affiliates operating in developing economies are estimated to artificially report about \$108 billion in OFCs, corresponding to 42 per cent of all profits shifted by foreign affiliates worldwide. Yet, developing economies are relatively more exposed to international tax planning than developed economies, with the former transferring 18 per cent of their profits to OFCs, compared to 16 per cent for developed economies (figure 5). Profit shifting is most pronounced in the least developed economies, with one quarter of their profits being moved to OFCs.¹²

To complete the calibration of the bilateral profit shifting matrix, we allocate country-level outward profit shifting shares γ_c to OFCs based on their relative size as the destination of shifted profits. Denote μ_h the share of profits shifted to OFC h in total shifted profits:

$$\gamma_{ch} = \gamma_c \mu_h = \frac{PS_{Irg,h}^N}{\sum_h PS_{Irg,h}^N}$$

with $PS_{Irg,h}^N = -PS_{Irg,h}^O$.

¹²These figures coincide with the conclusions reached by the Tax Justice Network et al. (2021) and Garcia-Bernardo and Janský (2022). Note that most of parent countries in CbCR data are developed economies. Therefore, it is not possible to infer profits shifted by MNEs headquartered in developing economies. This shortcoming, however, should not be a major problem as we expect most of large MNEs to be headquartered in developed countries.

Alternative bilateral profit shifting shares

We construct two supplementary matrices. One is based on Tørsløv et al. (2021) and the other relies on the tax semi-elasticity of reported profits estimated by Heckemeyer and Overesch (2017). Tørsløv et al. (2021) exploit the gap between the (reported) profitability of local and foreign firms in OFCs to assess inward profit shifting in OFCs. They then assign profit shifting in OFCs to non-OFCs using excessive flows in high-risk services (Hebous and Johannesen, 2021). Heckemeyer and Overesch (2017) find that, all other things being equal, profits reported in a given country decrease by 0.8 per cent if the tax rate in that particular country increases by 1 pp. The tax semi-elasticity of reported profits and tax rate differentials between host countries and OFCs together deliver a set of profit shifting shares (Devereux et al., 2020; Hanappi and Cabral, 2020; OECD, 2020). See the annex for technical details and a discussion of the two methods.

6.4. Bilateral profit shifting shares post-Pillar Two: γ'_{ch}

We adopt two scenarios to model bilateral profit shifting shares after Pillar Two (section 4.3). The upper bound scenario is straightforward. As profit shifting vanishes after the reform, we set $\gamma'_{ch} = 0$ for all $h \neq c$. The baseline scenario assumes that the reform partially reduces profit shifting and thus requires a careful empirical calibration of the linear coefficients β_1 and β_2 in (6).

Laffitte et al. (2021) incorporate corporate income taxation and profit shifting in a quantitative trade model and derive a gravity equation for bilateral profit shifting flows. Drawing on their contribution, we regress bilateral profit shifting shares on the ETR of the FDI host country, the ETR of the OFC, and a vector of gravity-type determinants. The latter embeds four bilateral variables all sourced from CEPII, namely: (i) bilateral distance (in km and logarithm); (ii) a contiguity dummy; (iii) a common language dummy; and (iv) a colonial history dummy. Gravity controls allow us to neutralize, to the extent possible, variations in bilateral profit shifting shares not attributable to ETRs in host countries and OFCs:¹³

$$\gamma_{ch} = \beta_0 + \beta_1 ETR_c + \beta_2 ETR_h + \beta_3 gravity_{ch} + \epsilon_{ch} \quad (9)$$

We expect profit shifting to intensify as the ETR in host country c increases ($\beta_1 \geq 0$) and the ETR in OFC h decreases ($\beta_2 \leq 0$), in line with workhorse models of profit

¹³Three comments are in order. First, ETR_c and ETR_h are introduced separately (instead of $ETR_c - ETR_h$ directly) for reasons of flexibility. Second, we abstract from the possible non-linear effect of tax rates on bilateral profit shifting shares. Third, for the sake of simplicity, we also ignore the existence of interactions between OFCs and then proceed as if profit shifting between c and h is unrelated to the characteristics of other OFCs.

shifting (Hines and Rice, 1994). Notice that for any given host country-OFC pair, taking the difference of equation (10) between the period before and after Pillar Two yields equation (6), which is then used to formally define our baseline scenario of partial (linear) reduction in profit shifting. In this respect, our empirical strategy is fully consistent with our initial modeling assumptions.¹⁴

Results in table 1 confirm our hypotheses. Non-OFCs with high ETRs are more exposed to profit shifting, and OFCs with low ETRs tend to attract more profits. $\widehat{\beta}_1$ and $\widehat{\beta}_2$ have expected signs and are statistically significant at the 1 per cent level. Evidence also validates that distance matters for profit shifting. Altogether, ETRs and gravity factors explain around 30 per cent of the variance in bilateral profit shifting shares.

Table 1. Determinants of bilateral profit shifting shares

Dependent variable	γ_{ch}
ETR_c	0.032*** (0.007)
ETR_h	-0.097*** (0.012)
$\ln(\text{distance}_{ch})$	-0.004*** (0.001)
contiguity_{ch}	0.001 (0.006)
$\text{common language}_{ch}$	-0.002 (0.002)
colony_{ch}	-0.012 (0.020)
Observations	1 192
R^2	0.338

Source: Authors' estimations.

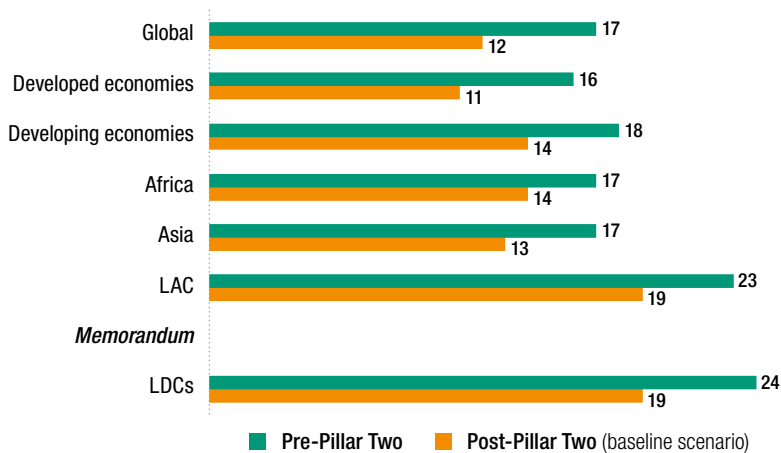
Note: Standard errors, in parentheses, are heteroskedasticity-robust. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. ETR: effective tax rate. Profit shifting shares γ_{ch} are calibrated with the profit misalignment method. ETRs are based on CbCRs (Garcia-Bernardo and Janský, 2022) and the list of offshore financial centres follows in Tørsløv et al. (2021).

Armed with $\widehat{\beta}_1$ and $\widehat{\beta}_2$, profit shifting shares post-Pillar Two are calculated using (6). For example, assume that the ETR in c increases by 2 pp and that the ETR in OFC h rises by 10 pp. According to (6) and our point estimates $\widehat{\beta}_1 = 0.032$ and $\widehat{\beta}_2 = -0.097$, the bilateral profit shifting share post-Pillar Two diminishes by 0.91 per cent.

¹⁴ Importantly, regression results for (10) are also used to broaden the scope of the analysis and incorporate countries absent from CbCRs through imputations.

Figure 5 reports each group's profit shifting shares before and after Pillar Two, as estimated with the profit misalignment method. At the global level, we find that 17 per cent of FDI income generated in non-OFCs is artificially recorded in OFCs before Pillar Two. As Pillar Two is rolled out and narrows ETR differentials between non-OFCs and OFCs, MNEs adapt and reduce their profit shifting activities. The orange bars represent profit shifting shares after Pillar Two and are based on the regression results in table 1. Assuming a linear decline in profit shifting, we estimate a global profit shifting share of 12 per cent after Pillar Two, i.e. a 30 per cent decrease in the average profit shifting share.

Figure 5. Pre- and post-Pillar Two profit shifting shares (Percentage)



Source: Authors' calculations.

Note: Green bars represent pre-Pillar Two profit shifting shares. They also represent post-Pillar Two profit shifting shares, assuming no profit shifting response, as in Hanappi and Cabral (2020) and OECD (2020). Orange bars represent post-Pillar Two profit shifting shares, assuming partial reduction of profit shifting (baseline scenario). FDI-weighted averages. LAC: Latin America and the Caribbean. LDCs: least developed countries. Offshore financial centres are excluded since we assume no profit shifting out of offshore financial centers (assumption 3).

6.5. Additional parameters: carve-out shares (CO_c^{SHARE}) and relative contribution of large MNEs (ω_c)

Two sets of parameters are missing to complete the calibration exercise and calculate the impact of Pillar Two on FDI-level ETRs (equation (9)): the carve-out shares CO_c^{SHARE} and the relative contribution of large MNEs ω_c . Technically, the profits which can be spared from the application of the minimum tax rate (i.e.

carve-out) represent 5 per cent of tangible assets and payroll.¹⁵ We make use of the OECD CbCR and the OECD Activity of Multinational Enterprises (AMNE) databases to approximate the share of profits excluded from Pillar Two. The carve-out share is based on the OECD AMNE database for the payroll calculation (using partner countries). The payroll component of the carve-out is calculated as 0.05 times personnel costs divided by gross operating surplus. The tangible asset calculation is based on the OECD CbCR data (by partner jurisdiction). The tangible carve-out is calculated as 0.05 times tangible assets divided by profit (loss) before income tax. The estimated total carve-out share is simply the sum of the two components. When aggregating, only partner countries with positive profits or gross operating surplus are used. We also drop the cases where the carve-out share is greater than one. Taking a simple average across countries gives a carve-out share of 40 per cent, with a median value at 31 per cent. We use this average for all host countries for convenience, i.e. $CO_c^{SHARE} = CO^{SHARE} = 0.4$ for all c .

Finally, Pillar Two only targets large MNEs. Therefore, calculating changes in FDI-level ETRs for all foreign affiliates requires knowing ω_c , i.e. the share of activities conducted by foreign affiliates of large MNEs among those carried out by foreign affiliates of all MNEs. The calibration of this parameter involves merging two complementary databases, namely: the BEA's data on the United States direct investment abroad and the United States' CbCRs.¹⁶ The BEA's dataset provides details on the activities of MNEs headquartered in the United States overseas, while the United States' CbCRs exclusively cover those of large MNEs headquartered in the United States. The implicit assumption of using data on MNEs headquartered in the United States is that the relative size of foreign affiliates of large MNEs in a particular jurisdiction does not depend on the location of their headquarter. Denote $S_{IrgUS,c}$ the sales made by large MNEs headquartered in the United States in host country c and $S_{US,c}$ those of all MNEs headquartered in the United States in the same country c . ω_c is calculated as follows:

$$\omega_c = \frac{S_{IrgUS,c}}{S_{US,c}}$$

The ratio covers 82 host countries and includes the largest FDI recipients. Missing values are replaced with regional averages.

¹⁵A statement released by the OECD in October 2021 declares that "the GloBE rules will provide for a formulaic substance carve-out that will exclude an amount of income that is 5% of the carrying value of tangible assets and payroll. In a transition period of 10 years, the amount of income excluded will be 8% of the carrying value of tangible assets and 10% of payroll, declining annually by 0.2 percentage points for the first five years, and by 0.4 percentage points for tangible assets and by 0.8 percentage points for payroll for the last five years" (OECD, 2021, p. 4).

¹⁶The latter are available on the website of the Internal Revenue Service.

7. Results

We start by showing the gap between standard ETRs and FDI-level ETRs before Pillar Two (section 7.1). Then, we turn to the impact assessment of Pillar Two on FDI-level ETRs (sections 7.2, 7.3 and 7.4). We assume that all countries covered by the analysis implement Pillar Two and treat the scenario with partial reduction of profit shifting and substance-based carve-out as our reference. Moreover, we compare our estimates with those presented in the OECD's EIA (section 7.5). Lastly, we examine the effect of the reform on the dispersion of tax rates (section 7.6).

7.1. Initial ETRs and FDI-level ETRs

Table 2 displays ETRs and FDI-level ETRs before Pillar Two. Tax rates are weighted by FDI within each category. This correction provides a more faithful picture of taxes paid on FDI since foreign investments are not uniformly distributed across countries. The average ETR faced by foreign affiliates of MNEs in non-OFCs stands at 17 per cent, but ETRs differ markedly across groups. Developed economies exhibit lower ETRs (15 per cent), as compared to developing countries (23 per cent). At the other end of the spectrum, the average ETR in OFCs is the lowest and is equal to 5 per cent.

The difference between ETRs and FDI-level ETRs lies between 2 and 3 pp. Profit shifting activities are thus sizable. They reduce the tax rate paid on FDI income by more than 13 per cent. The gap is somewhat larger for developing economies (15 per cent) than for developed economies (13 per cent). It is most striking for the least developed countries (21 per cent) as they are relatively more affected by profit shifting (section 6.3).

Interestingly, Table 2 indicates that incorporating profit shifting dynamics is critical in assessing the impact of Pillar Two. The share of FDI subject to taxes below 15 per cent is indeed significantly higher once profit shifting is accounted for. For example, developing economies with an average ETR below 15 per cent represent 6 per cent of total FDI inward stock. If we were to look at corporate income taxes through the lens of FDI-level ETRs, the share of FDI taxed at less than 15 per cent reaches 26 per cent. From this perspective, the Pillar Two threshold of 15 per cent is more ambitious than it might appear at first sight. Given the high concentration of tax rates in the range between 15 and 21 per cent (21 per cent being the threshold originally discussed during the BEPS negotiations), even a slight shift in the minimum tax has a considerable impact on the positioning of countries relative to the Pillar Two threshold (see also UNCTAD, 2022).

Table 2. ETRs and FDI-level ETRs pre-Pillar Two

Group	ETR (percentage)	FDI-level ETR (percentage)	Gap (pp. percentage in brackets)
Global	17.3	15.0	2.3 (13.4)
Developed economies	15.0	13.1	1.9 (12.5)
Developing economies	23.0	19.6	3.4 (14.8)
Africa	25.6	22.2	3.4 (13.3)
Asia	22.3	19.6	2.7 (12.2)
LAC	23.4	18.6	4.8 (20.5)
Memorandum			
LDCs	25.4	20.1	5.3 (20.8)
OFCs	5.4	5.4	–

Source: Authors' estimations.

Note: FDI-weighted averages. ETR: effective tax rate. LAC: Latin America and the Caribbean. LDCs: least developed countries. OFCs: offshore financial centres. OFCs are included only in the "OFCs" category.

Table 3. Impact of Pillar Two on FDI-level ETRs (without carve-out)

Group	Linear decline of profit shifting, baseline (pp. percentage in brackets)	Elimination of profit shifting, upper bound (pp. percentage in brackets)
Global	2.4 (16.3)	3.0 (19.9)
Developed economies	2.7 (20.3)	3.0 (22.8)
Developing economies	1.9 (9.7)	3.0 (15.4)
Africa	2.1 (9.3)	3.4 (15.4)
Asia	1.6 (8.3)	2.4 (12.3)
LAC	2.3 (12.4)	4.2 (22.5)
Memorandum		
LDCs	3.0 (14.8)	5.4 (26.6)
OFCs	7.3 (133.5)	7.3 (133.5)

Source: Authors' calculations.

Note: FDI-weighted averages. Results for ΔETR^{FDI} expressed in percentage points (in percentage in brackets). ETR: effective tax rate. LAC: Latin America and the Caribbean. LDCs: least developed countries. OFCs: offshore financial centres. OFCs are included only in the "OFCs" category. No carve-out.

7.2. Impact of Pillar Two on FDI-level ETRs

Results without substance-based carve-out

The effect of Pillar Two on FDI-level ETRs without substance-based carve-out is outlined in table 3. Pillar Two is expected to increase the average FDI-level ETR faced by MNEs by 2 to 3 pp. Assuming that part of these profits is still transferred to OFCs after the reform (baseline scenario), the impact of Pillar Two on FDI-level ETRs in developing countries (1.9 pp) is two thirds that of developed economies (2.7 pp). In the alternative scenario (upper bound), the impact of the FDI-level ETRs reform is more homogenous (3.0 pp for developed economies and 3.1 pp for developing economies). Among developing economies, the subset composed of the least developed countries (LDCs) shows the largest rise in FDI-level ETRs, with 3.0 pp in the conservative scenario and 5.4 pp in the most aggressive scenario.

The different cross-regional impact patterns in the two scenarios stem from the exposure of countries to the profit shifting and ETR channels (section 4 and table 4). Countries that have lower ETRs and that are less prone to profit shifting tend to display a limited gap between the baseline and the upper bound, as the difference between scenarios entirely depends on the profit shifting behaviour of MNEs. This is fully exemplified by OFCs, which have very low ETRs and no outward profit shifting. To a lesser extent, this is also the case for developed economies. In contrast, developing countries, especially in Africa and in Latin America and the Caribbean, have relatively high ETRs and significant exposure to profit shifting, which explains the sizable difference between the baseline and the upper bound.

Globally, two thirds of the 3 pp increase in FDI-level ETRs can be attributed to the profit shifting channel (table 4). Yet, the effects vary greatly between developed and developing economies. In developed economies, the contribution to the overall impact is evenly shared between the two channels. However, the profit shifting channel is more prominent in developing economies, including LDCs, owing to the combination of higher pre-Pillar Two ETRs and greater exposure to profit shifting. The weight of the ETR channel is less than 10 per cent in developing economies, compared to almost 50 per cent in developed economies. Among developing economies, LDCs are somewhat distinct, with a stronger weight of the ETR channel. Conversely, in OFCs, the ETR channel drives the total effect of Pillar Two on FDI-level ETRs – an increase of 7 pp, corresponding to a growth rate of 133 per cent relative to the very low pre-Pillar Two level of 5 per cent.

Table 4 . Contribution of the ETR and profit shifting channels to the impact of Pillar Two on FDI-level ETRs (upper bound, without carve-out)

Group	ETR channel	Profit shifting channel	Weight of the profit shifting channel
	(pp)	(pp)	(percentage)
Global	1.1	1.9	64.5
Developed economies	1.4	1.6	53.4
Developing economies	0.3	2.7	90.8
Africa	0.7	2.8	80.8
Asia	0.1	2.3	94.4
LAC	0.2	4.0	96.2
Memorandum			
LDCs	1.1	4.2	78.8
OFCs	7.3	–	–

Source: Authors' calculations.

Note: FDI-weighted averages. Results for ΔETR^{FDI} expressed in percentage points (in percentage in brackets). ETR: effective tax rate. LAC: Latin America and the Caribbean. LDCs: least developed countries. OFCs: offshore financial centres. OFCs are included only in the "OFCs" category. Upper bound scenario: elimination of profit shifting. No carve-out.

Table 5. Impact of Pillar Two on FDI-level ETRs (with carve-out)

Group	Linear decline of profit shifting, baseline	Elimination of profit shifting, upper bound
	(pp, percentage in brackets)	(pp, percentage in brackets)
Global	2.0 (13.5)	2.6 (17.1)
Developed economies	2.1 (16.1)	2.4 (18.3)
Developing economies	1.8 (9.2)	3.0 (15.1)
Africa	1.8 (8.1)	3.1 (14.2)
Asia	1.5 (7.9)	2.4 (12.0)
LAC	2.2 (12.1)	4.1 (22.1)
Memorandum		
LDCs	2.5 (12.5)	4.9 (24.1)
OFCs	4.4 (80.1)	4.4 (80.1)

Source: Authors' calculations.

Note: FDI-weighted averages. Results for $\Delta ETR^{FDI,CO}$ expressed in percentage points (in percentage in brackets). ETR: effective tax rate. LAC: Latin America and the Caribbean. LDCs: least developed countries. OFCs: offshore financial centres. OFCs are included only in the "OFCs" category. With carve-out.

Results with substance-based carve-out

Table 5 presents the results obtained with substance-based carve-out. As discussed in section 4.4, we consider that 40 per cent of profits reported in host countries are no longer subject to the minimum tax. The simulations reveal that substance-based carve-outs only mitigate the effect of Pillar Two on FDI-level ETRs to a certain extent and for host countries with a relatively low ETR before Pillar Two. This is because the substance-based carve-out leaves the profit shifting channel intact and acts merely through the ETR channel, as shown in (8). The case of developing countries perfectly illustrates this point. Substance-based carve-outs play a very minor role for these jurisdictions as barely 10 per cent of the impact of Pillar Two on FDI-level ETRs passes through the ETR channel (table 4). They reduce the impact of FDI-level ETRs to a larger extent for developed countries, where the ETR channel is more influential.

7.3. Summary of the findings

Combining results across different scenarios and assumptions on the carve-out (tables 3 and 5), the increase in FDI-level ETRs generated by Pillar Two is estimated to be between 2 and 3 pp globally. This implies growth relative to pre-Pillar Two levels of between 14 per cent (baseline scenario with carve-out, table 5, column 1) and 20 per cent (upper bound scenario without carve-out, table 3, column 2). In our preferred scenario (baseline scenario with carve-out), the increase is more pronounced for FDI in developed economies (16 per cent) than in developing economies (9 per cent). Note that the impact of Pillar Two on FDI-level ETRs for large MNEs alone (with annual revenues above €750 million) could be up to 17 per cent in the baseline scenario. It should also be noted that the baseline estimate reflects the average increase faced by FDI (an FDI-weighted average); this is smaller than the simple average change in FDI-level ETRs across countries, also estimated at 17 per cent.

7.4. Sensitivity analysis

To gauge the robustness of our findings, we replicate the simulations with alternative profit shifting matrices. The results for non-OFCs are laid out in table 6, in a setting with profit shifting elimination and no substance-based carve-out. This configuration is ideal for running sensitivity tests as it provides the highest impact. Therefore, if the results are aligned under such assumptions, the results obtained in different cases should be even closer. The first series of sensitivity checks lends credence to our estimates. Generally, the impact of Pillar Two on FDI-level ETRs is stable across profit shifting matrices. Table 6 suggests that our findings are not significantly driven by our modeling assumptions on profit shifting. This is important

as no consensus has been reached on the magnitude of profit shifting (Riedel, 2018), so focusing on one single calibration method might be problematic and potentially misleading.

Table 6. Impact of Pillar Two on FDI-level ETRs – robustness checks

Profit shifting matrix	Increase in FDI-level ETRs
	Global average, upper bound (pp, percentage in brackets)
Profit misalignment method (baseline)	3.0 (19.9)
Tørsløv et al. (2021) method	3.6 (25.0)
Semi-elasticity method	2.3 (14.8)

Source: Authors' calculations.

Note: ETRs used: from CbCR. FDI-weighted averages. Results for ΔETR^{FDI} expressed in percentage points (in percentage in brackets). Offshore financial centres excluded. Upper bound scenario: elimination of profit shifting. No carve-out.

Table 7 explores the sensitivity of the findings, with other sets of ETRs this time. The table further validates our findings. The average impact of Pillar Two on FDI-level ETRs hardly varies across ETR data sources. Note that, in line with our expectations, the impact is lowest when national account data are used. ETRs in OFCs are systematically larger when they are constructed with such data. The upward bias dampens the profit shifting channel and consequently the overall impact of Pillar Two on FDI-level ETRs.

Table 7. Impact of Pillar Two on FDI-level ETRs – robustness checks (ETRs)

Source of ETRs	Increase in FDI-level ETRs
	Global average, upper bound (pp, percentage in brackets)
CbCR (baseline)	3.0 (19.9)
National accounts	2.4 (14.9)
Bureau of Economic Analysis (BEA)	2.5 (15.8)

Source: Authors' calculations.

Note: Profit shifting calibration technique: profit misalignment. FDI-weighted averages. Results for ΔETR^{FDI} expressed in percentage points (in percentage in brackets). Offshore financial centres excluded. Upper bound scenario: elimination of profit shifting. No carve-out.

7.5. Comparison with the OECD Economic Impact Assessment

The OECD's EIA is to the best of our knowledge the main alternative estimate of the impact of Pillar Two on the taxes faced by MNEs (Hanappi and Cabral, 2020; OECD, 2020). Under the OECD's EIA, the effective average tax rate of MNEs would increase by 0.5 pp and the effective marginal tax rate of MNEs would rise by 1.9 pp (GDP-weighted average among non-OFC economies).

The approach followed by the OECD differs from ours in two respects. From a methodological perspective, the OECD's EIA uses forward-looking ETRs. We exploit backward-looking ETRs in our study for reasons explained in section 2. From a conceptual point of view, it is worth pointing out three main differences in the underlying assumptions:

- (i) First, profit shifting remains constant in the OECD's EIA. The potential increase in investment costs resulting from a decline of international tax planning is therefore not incorporated. Our simulations allow for a reduction of profit shifting activities of large MNEs, which is one of the key objectives of Pillar Two.
- (ii) Second, the OECD's EIA investigates the effect of Pillar Two on the taxes paid on the income of an investment carried out in the home country. The approach prioritizes a group-level perspective and informs on the investment impact of Pillar Two for the MNE group. In a sense, the present analysis is complementary as it addresses the effect of the tax reform on the foreign investments of an MNE.
- (iii) Third, and related to (ii), the substance-based carve-out plays a role only through profit shifting in the OECD's EIA. This is because the tax increases only stem from the rise in taxes paid on shifted profits. In this paper, we argue that shifted profits, by their very nature, have no or negligible economic substance. The substance-based carve-out on shifted profits is thus assumed to be negligible.

These three conceptual differences are perhaps best visualized through equations. Combining equations (4) and (8) gives a comprehensive expression for changes in the FDI-level ETRs incurred by the foreign affiliates of large MNEs in the presence of a carve-out:

$$\begin{aligned} \Delta ETR_{lrg,c}^{FDI,CO} &= (1 - CO_c^{SHARE}) (ETR'_c - ETR_c) \\ &+ \sum_{h,h \neq c} \gamma_{ch} (ETR_c - ETR_h) - \sum_{h,h \neq c} \gamma'_{ch} (ETR'_c - ETR'_h) \end{aligned} \quad (11)$$

Assumption (i) implies $\gamma'_{ch} = \gamma_{ch}$. The expression above becomes:

$$\begin{aligned} \Delta ETR'_{Irg,c}{}^{FDI,CO} &= (1 - CO_c^{SHARE}) (ETR'_c - ETR_c) \\ &+ \sum_{h,h \neq c} \gamma_{ch} (ETR'_h - ETR_h) - \sum_{h,h \neq c} \gamma_{ch} (ETR'_c - ETR_c) \end{aligned} \quad (11.i)$$

Assumption (i) maximizes the negative term in (11) and (11.i) \leq (11). Furthermore, the application of assumption (ii) to our framework implies that $ETR'_c = ETR_c$, i.e. rules out the ETR channel. Expression (11.i) then becomes:

$$\Delta ETR'_{Irg,c}{}^{FDI,CO} = \sum_{h,h \neq c} \gamma_{ch} (ETR'_h - ETR_h) \quad (11.ii)$$

Lastly, a substance-based carve-out applied to shifted profits, i.e. assumption (iii), further mitigates the impact of Pillar Two on FDI-level ETRs:

$$\Delta ETR'_{Irg,c}{}^{FDI,CO} = \sum_{h,h \neq c} (1 - CO_h^{SHARE}) \gamma_{ch} (ETR'_h - ETR_h) \quad (11.iii)$$

Table 8 provides a quantification of the impact of the sequential application of assumptions (i), (ii) and (iii) to our framework. We use the baseline scenario with carve-out as a starting point (+2 pp) and provide estimates at the country-wide level (in line with (9)). To facilitate the comparison with the OECD's EIA, we first remove the countries not covered in the OECD analysis. The results show that sample selection is not determinant (+2.1 pp). Next, we assume that the profit shifting behaviour of the foreign affiliates of large MNEs is the same before and after Pillar Two (11.i). This hypothesis alone reduces the estimated impact of Pillar Two on FDI-level ETRs by 0.2 pp (+1.9 pp). The third iteration assumes that the impact of Pillar Two through the ETR channel is null. The impact of Pillar Two on FDI-level ETRs lowers by 0.6 pp in this case (+1.3 pp). Finally, we apply a carve-out of 40 per cent to shifted profits. The global impact of Pillar Two decreases by 0.5 pp (+0.8 pp). Overall, the expected increase in FDI-level ETRs at the global level goes from a baseline (conservative) estimate of +2.1 pp to +0.8 pp after incorporating the OECD's EIA assumptions (i), (ii) and (iii) into our framework. The final simulated impact at +0.8 pp is only slightly higher than the impact estimated by the OECD. Although the two approaches are very different and hardly comparable, it suggests that the difference between our estimate and the OECD's stems from underlying assumptions rather than fundamental differences in methodology.

Table 8. Simulation of the impact of Pillar Two on FDI-level ETRs under assumptions made in the OECD economic impact assessment (Percentage point)

Assumption	Increase in FDI-level ETRs
	Global average
Baseline (11)	2.0
Baseline (11) with reduced sample	2.1
— + constant profit shifting (11.i)	1.9
— + no ETR channel (11.ii)	1.3
— + 40 per cent carve-out on shifted profits (11.iii)	0.8

Source: Authors' calculations.

Note: FDI-weighted averages. Results for $\Delta ETR^{FDI,00}$ expressed in percentage points. Offshore financial centres excluded. PS: profit shifting. ETR: effective tax rate. With carve-out.

7.6. Tax rate differentials

Before concluding, we examine the evolution of tax differentials for large MNEs, assuming profit shifting elimination and no carve-out for ease of exposition (table 9). Without profit shifting considerations, the reduction in (standard) ETR differentials across countries generated by Pillar Two is particularly sizable. The post-Pillar Two distribution of the average ETR is “truncated” at the minimum tax rate (section 5), resulting in a 30 per cent decrease in the standard deviation of ETRs. In contrast, differentials in FDI-level ETRs decrease to a lesser degree because of the profit shifting channel extensively discussed in section 5. The decline is more moderate at 15 per cent, i.e. it represents half of the reduction observed for standard ETRs. The baseline scenario with partial reduction of profit shifting shows a stronger decrease in FDI-level ETRs differentials but is still smaller than for standard ETRs.

Table 9. Standard deviation of ETRs and FDI-level ETRs across host countries (Percentage)

Tax rate	Standard deviation pre-Pillar Two	Standard deviation post-Pillar Two	Change in standard deviation post-Pillar Two
ETR	11.8	8.3	29.7
FDI-level ETR	9.6	8.3	14.7

Source: Authors' calculations.

Note: Assuming elimination of profit shifting, no carve-out, and including only large MNEs. All countries included.

8. Conclusion

This paper assesses the effect of BEPS Pillar Two on the taxes paid by MNEs on FDI income. To this end, we introduce a new metric that refines and complements standard measures on ETRs. Standard ETRs provide insights into the taxes paid by firms in a country on the income reported in this country. The new indicator, FDI-level ETR, reflects the taxes paid by firms on the income generated in that country. It thus captures the tax avoidance schemes of MNEs and sheds more light into MNEs' investment decisions.

Pillar Two triggers two effects on FDI-level ETRs. First, ETRs in host countries will increase if they are lower than 15 per cent (ETR channel). Second, the tax rate that applies to profits artificially reported in OFCs will increase, and profit shifting is likely to decrease (profit shifting channel). Both channels can be quantified within our framework.

Next, we bring the model to the data. We collect and exploit rich data to construct ETRs, profit shifting matrices, and FDI-level ETRs for 208 countries. We expand the profit shifting literature by building more extensive matrices. While existing studies either calibrate bilateral profit shifting for a subset of advanced countries or calibrate profit shifting shares at the country level, we estimate bilateral profit shifting for almost all countries. This not only enriches our understanding of profit shifting patterns but also allows us to predict the effect of Pillar Two on FDI-level ETRs for various types of countries.

The findings are three-fold. First, profit shifting activities allow MNEs to reduce the taxes paid on FDI income in non-OFCs by about 15 per cent. Second, among non-OFC countries, on average a global minimum tax of 15 per cent raises FDI-level ETRs faced by MNEs by 14 per cent in our benchmark (and conservative) exercise. The increase in FDI-level ETRs reaches 20 per cent under more aggressive assumptions. Third, the effect induced by Pillar Two on FDI-level ETRs mostly passes through the profit shifting channel. The latter is more pronounced in developing countries, where ETRs are higher and outward profit shifting is fiercer in the first place.

The policy implications of these findings are important. They include strategic investment policy considerations as the competitive positions of individual countries for FDI attraction are altered, and tax competition is reshaped fundamentally. They also extend the practical implications for the use and effectiveness of common investment promotion tools, such as fiscal incentives, special economic zones, and other preferential schemes. Discussion of these implications is beyond the scope of this paper and is covered in UNCTAD (2022).

References

- Auclair, Gregory, and Bruno Casella (2022). "The elephant in the room? The role of tax incentives in the measurement of the fiscal impact of the BEPS minimum tax rate", unpublished manuscript.
- Barrios, Salvador, Harry Huizinga, Luc Laeven and Gaëtan Nicodème (2012). "International taxation and multinational firm location decisions", *Journal of Public Economics*, 96(11–12), pp. 946–958.
- Bazel, Philip, Jack Mintz and Austin Thompson (2018). "Tax competitiveness report: The calm before the storm", SPP Research Paper, vol. 11:7, February (Calgary: School of Public Policy Publications, University of Calgary).
- Beer, Sebastian, Ruud de Mooij and Li Liu (2020). "International corporate tax avoidance: A review of the channels, magnitudes, and blind spots", *Journal of Economic Surveys*, 34(3), pp. 660–688.
- Blouin, Jennifer, and Leslie A. Robinson (2020). "Double counting accounting: How much profit of multinational enterprises is really in tax havens?", SSRN Working Papers, 1 September. <https://dx.doi.org/10.2139/ssrn.3491451>.
- Bolwijn, Richard, Bruno Casella and Davide Rigo (2018). "An FDI-driven approach to measuring the scale and economic impact of BEPS", *Transnational Corporations*, 25(2), pp. 107–144.
- Bradbury, David, Tibor Hanappi and Anne Moore (2018). "Estimating the fiscal effects of base erosion and profit shifting: Data availability and analytical issues", *Transnational Corporations*, 25(2), pp. 91–106.
- Buettner, Thiess, Michael Overesch and Georg Wamser (2018). "Anti profit-shifting rules and foreign direct investment", *International Tax and Public Finance*, 25, pp. 553–580.
- Casella, Bruno (2019). "Looking through conduit FDI in search of ultimate investors – A probabilistic approach", *Transnational Corporations*, 26(1), pp. 109–146.
- Clausing, Kimberly A. (2020): "How big is profit shifting?", SSRN Working Papers, 17 May. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3503091.
- Damgaard, Jannick, Thomas Elkjaer and Niels Johannesen (2019). "What is real and what is not in the global FDI network?", IMF Working Papers, No. 19/274 (Washington, D.C.: International Monetary Fund).
- Davies, Ronald B., Iulia Siedschlag and Zuzzana Studnicka (2021). "The impact of taxes on the extensive and intensive margins of FDI", *International Tax and Public Finance*, 28, pp. 434–464.
- Devereux, Michael P., François Bares, Sarah Clifford, Judith Freedman, Irem Güçeri, Martin McCarthy, Martin Simmler and John Vella (2020). *The OECD Global Anti-Base Erosion Proposal* (Oxford: Oxford University Centre for Business Taxation).
- Devereux, Michael P., and Rachel Griffith (2002). "The impact of corporate taxation on the location of capital: A review", *Swedish Economic Policy Review*, 9(1), pp. 79–106.

- _____ (2003). "Evaluating tax policy for location decisions", *International Tax and Public Finance*, 10(2), pp. 107–126.
- Devereux, Michael P., Martin Simmler, John Vella and Heydon Wardell-Burrus (2021). "What is the substance-based carve-out under Pillar 2? And how will it affect tax competition?", *EconPol Policy Brief*, 5(39). European Network for Economic and Fiscal Policy Research. www.econpol.eu.
- Dharmapala, Dhammika (2008). "What problems and opportunities are created by tax havens?", *Oxford Review of Economic Policy*, 24(4), pp. 661–679.
- _____ (2014). "What do we know about base erosion and profit shifting? A review of the empirical literature", *Fiscal Studies*, 35(4), pp. 421–448.
- Dowd, Tim, Paul Landefeld and Anne Moore (2017). "Profit shifting of US multinationals", *Journal of Public Economics*, 148, pp. 1–13.
- Dyreng, Scott D., and Bradley P. Lindsey (2009). "Using financial accounting data to examine the effect of foreign operations located in tax havens and other countries on US multinational firms' tax rates", *Journal of Accounting Research*, 47(5), pp. 1283–1316.
- Englich, Joachim, and Johannes Becker (2019). "International effective minimum taxation – The GLOBE proposal", *World Tax Journal*, 11(4), pp. 623–680.
- Garcia-Bernardo, Javier, and Petr Janský (2022). "Profit shifting of multinational corporations worldwide", 20 January, arXiv, Cornell University. <https://arxiv.org/pdf/2201.08444.pdf>.
- Garcia-Bernardo, Javier, Petr Janský and Thomas Tørslov (2021). "Multinational corporations and tax havens: Evidence from country-by-country reporting", *International Tax and Public Finance*, 28(8), pp. 1519–1561.
- Grubert, Harry (2003). "Intangible income, intercompany transactions, income shifting, and the choice of location", *National Tax Journal*, 56(1), pp. 221–242.
- Hanappi, Tibor, and Ana Cinta González Cabral (2020). "The impact of the Pillar One and Pillar Two proposals on MNE's investment costs: An analysis using forward-looking effective tax rates", OECD Taxation Working Papers, No. 50 (Paris: OECD Publishing).
- Hevous, Shafik, and Niels Johannesen (2021). "At your service! The role of tax havens in international trade with services", *European Economic Review*, 135, <https://doi.org/10.1016/J.EUROECOREV.2021.103737>.
- Heckemeyer, Jost H., and Michael Overesch (2017). "Multinationals' profit response to tax differentials: Effect size and shifting channels", *Canadian Journal of Economics*, 50(4), pp. 965–994.
- Hines, James R., and Eric M. Rice (1994). "Fiscal paradise: Foreign tax havens and American business", *Quarterly Journal of Economics*, 109(1), pp. 149–182.
- Laffitte, Sébastien, Julien Martin, Mathieu Parenti, Baptiste Souillard and Farid Toubal (2021). "Taxation of multinationals: Design and quantification", *Focus*, No. 64, June (Paris: Conseil d'Analyse Économique).
- Markle, Kevin S., and Douglas. A. Shackelford (2012). "Cross-country comparisons of corporate income taxes", *National Tax Journal*, 65(3), pp. 493–527.
- OECD (Organisation for Economic Co-operation and Development) (2020). *Tax Challenges*

- Arising from Digitalisation – Report on Pillar II Blueprint: Inclusive Framework on BEPS*, OECD/G20 Base Erosion and Profit Shifting Project (Paris: OECD Publishing).
- _____ (2021). “Statement on a two-pillar solution to address the tax challenges arising from the digitalisation of the economy”, OECD/G20 Base Erosion and Profit Shifting Project, 8 October. www.oecd.org/tax/beps/statement-on-a-two-pillar-solution-to-address-the-tax-challenges-arising-from-the-digitalisation-of-the-economy-october-2021.pdf.
- Ridel, Nadine (2018). “Quantifying international tax avoidance: A review of the academic literature,” *Review of Economics*, 69(2), pp. 169–181.
- Spengel, Christoph, Frank Schmidt, Jost Henrich Heckemeyer, Katharina Nicolay, Alexandra Bartholmeß, Christopher Ludwig, Daniela Steinbrenner, Peter Buchmann, Theresa Bührlé, Verena Dutt, Leonie Fischer, Julia Spix and Barbara Stage (2021). *Effective Tax Levels Using the Devereux/Griffith Methodology – Update 2020* (Mannheim: European Union Commission).
- Tax Justice Network, Public Services International and Global Alliance for Tax Justice (2021). *The State of Tax Justice 2021*. https://taxjustice.net/wp-content/uploads/2021/11/State_of_Tax_Justice_Report_2021_ENGLISH.pdf.
- Tørslov, Thomas R., Ludvig S. Wier and Gabriel Zucman (2021). “The missing profits of nations”, NBER Working Papers, No. 24701 (Cambridge, Massachusetts: National Bureau of Economic Research).
- UNCTAD (United Nations Conference on Trade and Development) (2015). *World Investment Report 2015: Reforming International Investment Governance* (New York and Geneva: United Nations).
- _____ (2022). *World Investment Report 2022: International Tax Reforms and Sustainable Investment* (New York and Geneva: United Nations).

Annex

Profit shifting matrix based on Tørsløv et al. (2021)

To the best of our knowledge, the only available source of profit shifting data at the bilateral level is Tørsløv et al. (2021). The material provided by the authors contains not only bilateral profit shifting flows for around 45 non-OFCs but also the data exploited to construct these flows. All figures and tables from Tørsløv et al. (2021) can thus be reproduced with the files uploaded on www.missingprofits.world. We build on this work and extract the data for 2017.

To calibrate γ_{ch} , we proceed as follows. Due to data limitations, we assume that the share of profits generated in c and shifted to h is the same irrespective of the size and nationality of MNEs. Denote $PS_{all,ch}^O$ outward profit shifting of foreign affiliates from c to h , PS_{ch}^O outward profit shifting of MNEs from c to h , $\pi_{all,c}$ profits generated by foreign affiliates in c , and π_c profits generated by MNEs in c . Formally:

$$\gamma_{ch} = \frac{PS_{all,ch}^O}{\pi_{all,c}} = \frac{PS_{ch}^O}{\pi_c}$$

Furthermore:

$$\pi_c = \pi_c^* + \sum_{h \neq c} PS_{ch}^O$$

where π_c^* represents the profits reported by MNEs in c . Denote ψ_c the share of profits reported by MNEs in c (π_c^*) among all profits reported by enterprises operating in c (Π_c^*).

Hence:

$$\gamma_{ch} = \frac{PS_{ch}^O}{\psi_c \Pi_c^* + \sum_{h \neq c} PS_{ch}^O}$$

The database compiled by Tørsløv et al. (2021) includes information on the profits shifted from c to h (PS_{ch}^O) and on the total profits disclosed in country c (Π_c^*). For ψ_c , we leverage data from the OECD's AMNE database. The latter reports the sales made by all active firms in c and those made exclusively by MNEs in c . If the share of sales mirrors the share of profit, combining data from Tørsløv et al. (2021) and OECD AMNE enables us to pin down γ_{ch} for a set of countries present in both data sources. A caveat is that the two databases are mostly composed of OECD economies. To insert more developing economies and thereby extend the scope of our analysis, we predict missing bilateral profit shifting shares using equation (10).

Profit shifting matrix based on Heckemeyer and Overesch (2017)

The tax semi-elasticity approach hinges on the meta-study of Heckemeyer and Overesch (2017) and is used in Devereux et al. (2020) and Hanappi and Cabral (2020), among others.

Heckemeyer and Overesch (2017) find that the tax semi-elasticity of (pre-tax) reported profits is equal to 0.8. In other words, reported profits in country c decrease by 0.8 per cent if the tax rate in c increases by 1 pp. Country-level profit shifting shares γ_c are thus calibrated as follows:

$$\gamma_c = \max \left(0.8 \times \left(ETR_c - \overline{ETR}_h \right), 0 \right)$$

where \overline{ETR}_h is the average ETR in OFCs. Country-level profit shifting shares are then transformed into bilateral profit shifting shares using data on FDI from non-OFC countries in OFCs:

$$\gamma_{ch} = \gamma_c \frac{FDI_{ch}}{\sum_{h, h \neq c} FDI_{ch}}$$

FDI data come from the International Monetary Fund (IMF) Coordinated Direct Investment Survey (CDIS) database (accessed 31 December 2021), which incorporates 127 countries. Ratios $\frac{FDI_{ch}}{\sum_{h, h \neq c} FDI_{ch}}$ for non-OFCs missing from the IMF CDIS database are replaced with global averages. It is worth noting that this calibration procedure does not require an econometric model.

GUIDELINES FOR CONTRIBUTORS

Editorial policies

Transnational Corporations publishes high-quality policy-oriented research. Work submitted to the journal should adhere to generally accepted academic standards in terms of originality, significance and rigour, as well as to the criteria for high-quality research and analysis set out in United Nations publication policies, and specifically [UNCTAD's Publication Policy](#).

The journal is committed to inclusivity and encourages submissions from a diverse range of authors from all countries and backgrounds. It welcomes contributions from the academic community, policymakers, research institutes, international organizations and others.

In line with [the journal's aims and scope](#), submissions are sought from a variety of disciplines. However, submissions should be accessible across disciplines (idiosyncratic research relevant for a single discipline should be avoided) and of interest for the non-academic readership of the journal in the policy and practitioner communities.

To ensure high-quality, impactful publications that are both academically rigorous and policy relevant, authors should ensure appropriate policy framing of the paper, demonstrate policy relevance and draw clear policy conclusions.

In line with our [publication ethics statement](#), allegations of research misconduct and suspected plagiarism, including duplicate or redundant publications, false citations, falsification of data or omission of data sources, will be investigated and appropriate action will be taken.

No fees for authors and open access

There are no fees or article processing charges associated with submitting to or publishing in *Transnational Corporations*. In accordance with United Nations policies for public access to publications, all articles of the online version of the journal are open access and free to read and download for everyone.

Understandings

When submitting papers to the journal, authors are expected to have read and observed the [Ethics Policy](#) of *Transnational Corporations* and the documents referenced in it.

Authors are also encouraged to read and observe the [COPE ethical guidelines](#).

In addition to the explicit **declarations** listed below, submission of manuscripts to the journal is on the understanding that authors adhere to the following:

- **Authorship:** All authors who have made substantial contributions to the paper are included in the author list (others involved should be listed in the acknowledgements). The authorship criteria should be based on the [ICMJE Guidelines](#). Any change to the author list after submission of the manuscript should be approved by all authors, including any who have been removed from the list.
- **Corresponding author:** The corresponding author is the author responsible for communicating with the journal for publication. The corresponding author is responsible for ensuring that all appropriate co-authors and no inappropriate co-authors are included on the manuscript. The corresponding author ensures that all the authors mentioned in the manuscript have agreed to authorship and the order of authors, have read and approved the manuscript, and have given consent for submission and subsequent publication of the manuscript.
- **Originality:** Authors should ensure that they have written entirely original works. If the work or parts of other publications, or words of others, have been used, this must be appropriately cited or quoted.
- **Copyright and permissions:** Authors are responsible for obtaining permission to use any material in their manuscript that has been created by a third-party copyright holder. The United Nations will hold the copyrights for all published articles. By submitting their manuscript, authors agree to the transfer of copyrights upon publication. Authors are free to reuse their manuscripts that have been published in *Transnational Corporations*, with due acknowledgement.
- **Data access and retention:** For the purpose of reproducibility of results, authors may be asked to provide the research data in connection with a manuscript for editorial review. Authors should be prepared to provide access to such data and retain it for a reasonable time after publication.
- **Standards of research ethics and laws:** Authors should ensure that their submitted articles do not include research which has been conducted in

violation of applicable standards of research ethics or applicable laws. This includes laws and regulations relating to data protection and processing of personal data, as well as possible ethical approval if the research involves human participants.

Submission guidelines

Authors are requested to submit their manuscript by email to tncj@unctad.org. Papers for publication must be in English.

The submission should be accompanied by the following **declarations**:

- **Duplicate submissions and redundant publications:** A statement must be included that the manuscript (or parts thereof) has not been published or submitted for publication elsewhere, and that the manuscript will not be submitted elsewhere until the editorial process is completed or the manuscript is withdrawn by the authors.
- **Disclosure and conflicts of interest:** Authors must disclose all personal, financial and non-financial relationships, funding support or other interests that could inappropriately influence or bias their work. If there is no conflict of interest, it should be stated explicitly.
- **Acknowledgement of funding sources:** Grants and other funding sources for the research reported in the manuscript should be duly acknowledged.

Original research papers, reviews and perspective papers should not normally exceed 10,000 words. Point-counterpoint papers should not exceed 7,000 words. Research notes should not exceed 5,000 words. All papers should include an abstract not exceeding 150 words. Book reviews should be about 1,500 words. The word count includes the abstract, text, footnotes, references, tables, figures and appendices.

Manuscripts should be double-spaced (including references) with wide margins and prepared in Microsoft Word. Pages should be numbered consecutively. Footnotes should be placed at the bottom of the page they refer to. An alphabetical list of references should appear at the end of the manuscript. Appendices, tables and figures should be on separate pages and placed at the end of the manuscript.

The first page of the manuscript should contain the (i) title of the manuscript; (ii) full name(s) of author(s), institutional affiliation(s) and country name(s); (iii) mailing address, email address, telephone number of the author (or corresponding author, if more than one).

The main text should not include any information that may identify the authors. It should be presented in the following order: (i) title; (ii) abstract (describing aims, methods, scope of analysis, results and conclusions); (iii) key words (between 4 and 8); (iv) JEL classification codes; (v) main text; and (vi) list of references.

Style guide

Spelling is guided by the United Nations Editorial Manual. A number of words ending in *-ise* and *-isation* in British English should be spelled *-ize* and *-ization*.

Quotations should be accompanied by the page number(s) from the original source (e.g. “Cantwell, 1991, p. 19” and “UNTAD, 2019, pp. 104–105”). Quoted words, sentences and paragraphs are enclosed within double quotation marks. Single quotation marks are used to enclose quotations within quotations.

Footnotes should be numbered consecutively throughout the text with Arabic-numeral superscripts. Important substantive comments should be integrated in the text itself rather than placed in footnotes. For citations from newspaper and magazine articles and Internet-based materials (e.g. blog posts, webpages and online databases), authors are encouraged to list them in footnotes, rather than in the references section.

Examples:

- ¹ India, Ministry of New and Renewable Energy, “India achieves 100 GW milestone of installed renewable energy capacity”, 12 August 2021, <https://pib.gov.in>.
- ² European Commission, “What category do I fit into?”, EU Immigration Portal, <https://ec.europa.eu/immigration> (accessed 13 December 2021).
- ³ Based on UNCTAD, “International investment agreements navigator”, Investment Policy Hub, <https://investmentpolicy.unctad.org/international-investment-agreements> (accessed 15 April 2018).
- ⁴ *The Financial Times*, “Gig workers should get pension rights now, says regulator”, 19 May 2021.
- ⁵ Bloomberg News, “Tracking tax runaways”, Bloomberg Special Reports: Corporate Tax Inversions, 1 March 2017, www.bloomberg.com/graphics/tax-inversion-tracker.

Figures must be accompanied by heads, subheads, units, labels and full sources. Footnotes to figures should be preceded by lowercase letters and should appear after the figure sources. Figures should be numbered consecutively. The position of figures in the text should be indicated as follows:

Put figure 1 here

Tables should have heads, subheads, column heads and full sources. Table heads should indicate the year(s) of the data, if applicable. The unavailability of data should

be indicated by two dots (..). If data are zero or negligible, this should be indicated by a dash (-). Footnotes to tables should be preceded by lowercase letters and should appear after the table sources. Tables should be numbered consecutively. The position of tables in the text should be indicated as follows:

Put table 1 here

Abbreviations should be avoided whenever possible, except for FDI (foreign direct investment), MNEs (multinational enterprises) and TNCs (transnational corporations).

Citations in the text should appear as: “UNCTAD (2019) reported that ...” or “(Cantwell et al., 2010; Dunning, 2000)”. The family name of the first co-author, followed by “et al.”, can be used when the source was co-authored by three people or more.

References should be completed fully following the examples below. The first name of authors must be spelled out. Names of organizations should be spelled out in parenthesis when abbreviations are used in citations. Names of journals should not be abbreviated. DOI numbers are required only for the sources which have been published online but without issue or page numbers. Authors should ensure that there is a strict correspondence between names and years appearing in the manuscript (including figures, tables and appendices).

Examples:

Cantwell, John (1991). “A survey of theories of international production”, in Christos N. Pitelis and Roger Sugden, eds., *The Nature of the Transnational Firm* (London: Routledge), pp. 16–63.

Cantwell, John, John H. Dunning and Sarianna M. Lundan (2010). “An evolutionary approach to understanding international business activity: The co-evolution of MNEs and the institutional environment”, *Journal of International Business Studies*, 41, pp. 567–586.

Dunning, John H. (2000). “The eclectic paradigm as an envelope for economic and business theories of MNE activity”, *International Business Review*, 9(1), pp. 163–190.

UNCTAD (United Nations Conference on Trade and Development) (2009). *Investment Policy Monitor*, No. 1, 4 December. unctad.org/system/files/official-document/webdiaeia200911_en.pdf.

_____ (2019). *World Investment Report 2019: The Special Economic Zones* (New York and Geneva: United Nations).

All manuscripts accepted for publication will be edited to ensure conformity with United Nations practice.

UNCTAD products and services in the area of Investment and Enterprise

World Investment Report

<https://worldinvestmentreport.unctad.org>

World Investment Forum

<https://worldinvestmentforum.unctad.org>

Investment information and research

<https://unctad.org/topic/investment>

Investment Policy Hub

<https://investmentpolicy.unctad.org/>

Investment Policy Reviews

<https://unctad.org/topic/investment/investment-policy-reviews>

International Investment Agreements

<https://unctad.org/topic/investment/international-investment-agreements>

Investment Facilitation and Promotion

<https://unctad.org/topic/investment/investment-facilitation-and-promotion>

Business Facilitation

<https://businessfacilitation.org>

Institutional Investor Partnerships for Sustainable Development

<https://sdginvestors.net>

Investment Guides

www.theiguides.org

Sustainable Stock Exchanges Initiative

<https://sseinitiative.org>

Family Business for Sustainable Development

<https://fbsd.unctad.org>

Intellectual property for development

<https://unctad.org/Topic/Science-Technology-and-Innovation/Intellectual-Property>

Entrepreneurship Policy Framework and Implementation Guidance

<https://unctad.org/topic/enterprise-development/entrepreneurship-policy-hub>

Empretec and Business Linkages

<https://empretec.unctad.org>

International Standards of Accounting and Reporting

<https://isar.unctad.org>

The World Investment Network

