FDI Qualities Indicators

Measuring the sustainable development impacts of investment

OECD

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Preface

In today's increasingly interconnected world, governments must consider how to address the challenges of bringing about socio-economic progress and environmental sustainability. Foreign Direct Investment (FDI) offers a range of technological and financial resources that can raise productivity, create jobs, boost exports, spread knowledge, trigger innovation, improve living standards and, more generally, advance progress towards the 2030 Agenda and climate change objectives. Yet, realising this potential is not a given: among countries receiving FDI, some have benefited more than others and, within countries, some segments of the population have been left behind. Outcomes depend on private sector incentives as well as home and host country policies.

This report presents a new set of indicators that measure the sustainable development impacts of FDI in host countries. The new metrics focus on five clusters derived from the 17 Sustainable Development Goals (SDGs): productivity and innovation; employment and job quality; skills; gender equality; and, the carbon footprint. This study is an important element of the OECD Action Plan on the SDGs. It complements the OECD's longstanding interest and expertise in shaping the policy environment to improve the social impact of private investment, including through the OECD Policy Framework for Investment and the OECD Guidelines for Multinational Enterprises.

The new indicators suggest that there are no striking trade-offs between economic, social and environmental impacts of FDI. However, positive economic and environmental contributions are more prevalent than social and inclusiveness outcomes. Further analysis on the country and policy contexts is necessary to have a complete picture, but this first FDI Qualities assessment sheds new light on the relationship between FDI and sustainable development, encourages dialogue, and allows policymakers to identify policy priorities and possible trade-offs. Considering country-specific contexts, policymakers can use FDI Qualities Indicators to assess how FDI supports national policy objectives, where challenges lie, and what areas require policy action.

It is our hope that this report will help maximise the positive impacts of FDI in OECD member and partner countries, and paves the way for policy formulation and coordination that promotes equitable and sustainable economic development across the world.

Angel Gurría

OECD Secretary-General

Foreword

This report develops new indicators on the impacts of foreign direct investment (FDI) on sustainable development in host countries. Taking into account the country-specific context, policymakers can use FDI Qualities Indicators to assess how FDI supports national policy objectives, where challenges lie, and in which areas intervention is needed. The report includes indicators on five sustainability clusters: productivity and innovation, employment and job quality, skills, gender equality, and carbon footprint.

This report is part of OECD's efforts to enhance socio-economic impacts of private investment, in line with the Sustainable Development Goals (SDGs), and following a request of OECD Ministers related to the update of the OECD Policy Framework for Investment. The project was mandated by the OECD Investment Committee and a dedicated FDI Qualities Network was established to engage in policy discussions and provide technical feedback. The Network comprised government officials from investment, development and other related policy communities in OECD and developing countries, representatives from the private sector and civil society, and experts from the OECD, other international organisations and academia. The project builds on initial work jointly conducted with the World Bank Group.

The project was co-ordinated by Martin Wermelinger, OECD Investment Division. The report was prepared by a team comprising Fares Al-Hussami, Iris Mantovani, Letizia Montinari and Martin Wermelinger, under the general guidance of Ana Novik, Head of the OECD Investment Division, and Stephen Thomsen, Head of Investment Policy Reviews. Pamela Duffin, Arianna Ingle, Angele N'Zinga, and Edward Smiley provided editorial and organisational support.

The report benefited from valuable comments of Members of the Investment Committee, participants in the FDI Qualities Network and various international investment policy workshops (organised by the APEC, World Bank Group and Australia; Deutsches Institut für Entwicklungspolitik and Graduate Institute; European Commission; OECD; Switzerland; and TUAC Working Group on MNEs and RBC). The report further benefited from comments from Laura Alfaro, Harvard Business School, Simon Evenett, University of St. Gallen, Alexandros Ragoussis, the World Bank Group, Karl Sauvant, Columbia Center on Sustainable Investment, Adnan Seric, UNIDO, Christian Volpe, the Inter-American Development Bank, as well as OECD colleagues from the Centre for Entrepreneurship, SMEs, Regions and Cities; Development Centre; Directorate for Employment, Labour and Social Affairs; Directorate for Financial and Enterprise Affairs; Development Co-operation Directorate; and Environment Directorate.

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Acronyms and abbreviations

APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
DIE	German Development Institute
EC	European Commission
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GVC	Global Value Chain
HQ	Headquarters
HR	Human Resources
IEA	International Energy Agency
ILO	International Labour Organization
IPR	Investment Policy Review
M&A	Merger and Acquisition
MNE	Multinational Enterprise
OECD	Organisation for Economic Co-operation and Development
PFI	Policy Framework for Investment
PIAAC	Programme for the International Assessment of Adult Competencies
R&D	Research and Development
RBC	Responsible Business Conduct
SDC	Swiss Development Co-operation
SECO	Swiss State Secretariat for Economic Affairs
SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprise
TUAC	Trade Union Advisory Committee
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
USD	United States Dollars
WB	World Bank
WBES	World Bank Enterprise Surveys
WTO	World Trade Organization

Overview and policy directions

Foreign direct investment (FDI) can play a crucial role in making progress toward the Sustainable Development Goals (SDGs). From the viewpoint of the host country, it can enhance growth and innovation, create quality jobs and develop human capital, and raise living standards and environmental sustainability, for instance. By linking domestic firms to multinational enterprises (MNEs), it serves as a conduit for domestic firms to access international markets and integrate in global value chains (GVCs).

However, realising these positive contributions to sustainable development is not a given. Maximising benefits and minimising potential risks associated with FDI may not be a primary concern for profit-seeking investors and may not receive sufficient attention by policymakers seeking to attract investment. While, in principal, FDI has the potential to advance sustainable development, private sector incentives and both home and host country policies require careful consideration as they play a critical role in realising this potential.

How FDI relates to sustainable development in different country and policy contexts is still unclear. The OECD launched the FDI Qualities initiative in 2018 in an effort to fill this information gap. The initiative is an important element of the OECD Action Plan on the SDGs (OECD, 2016) and provides new evidence for discussion at the OECD and other international policy fora.[1] The objective of the initiative is to equip policy makers with an actionable tool to mobilise FDI that maximises inclusive and sustainable growth and supports progress towards the SDGs. It focuses on how foreign (as opposed to domestic) investors can contribute to sustainable development, beyond the financing they bring, by spreading knowledge.

FDI impacts depend crucially on host country policies. The FDI Qualities initiative is about measuring the contribution of foreign investment to sustainable development and identifying policies to maximise the positive impacts and to avoid or minimise potential negative impacts. The initiative includes four pillars: Indicators; Policy Toolkit; Policy Dialogue and Implementation. The first FDI Qualities report develops the pillar on Indicators.

The FDI Qualities Indicators

FDI Qualities Indicators describe how foreign investment relates to specific aspects of sustainable development in host countries. They are structured around three Ps of the 2030 Agenda (i.e. prosperity, people and planet) which broadly capture economic, social and environmental sustainability. An in-depth assessment of all 17 SDGs, and their corresponding targets, is used to identify the full spectrum of FDI Qualities – that is, areas where FDI may contribute to achieving the SDGs. This assessment further considers the extent to which FDI's potential for advancing the SDGs is reflected in the OECD Policy Framework for Investment, including related frameworks and guidelines, such as the OECD Guidelines on Multinational Enterprises and the OECD Policy Guidance for Investment in Clean Energy Infrastructure.

The FDI Qualities Indicators currently focus on five clusters derived from the 3Ps; namely, productivity and innovation, employment and job quality, skills, gender equality, and carbon footprint (Table 1). These clusters have been selected through a participatory process including various stakeholders in the FDI Qualities Policy Network.[2] For each of the five clusters, a number of different outcomes were identified and used to produce indicators that relate them to FDI or activity of foreign MNEs, allowing for comparisons both within and across clusters so as to identify potential sustainability trade-offs.

Table 1. FDI Qualities by sustainability cluster and outcomes

Cluster	Objective	Outcomes	Country coverage
1. Productivity & innovation	Provide information on the extent to which foreign MNEs and their linkages with domestic firms, including SMEs, enable productivity growth and enhance innovation capacity through knowledge and technology transfer.	Labour productivity Labour productivity growth Product innovation Process innovation R&D expenditures Use of foreign technologies	OECD, non-OECD OECD, non-OECD non-OECD, limited OECD non-OECD, limited OECD OECD, non-OECD non-OECD, limited OECD
2. Employment & job quality	Explore how FDI relates to employment and job quality in host countries, and to what extent the relationship is positive or negative. Job quality is essential to ensure that employees can work productively.	Job creation per unit of FDI Employment growth Wages Job security (temporary work) Worker safety (injuries)	OECD, non-OECD OECD, non-OECD OECD, non-OECD non-OECD, limited OECD OECD, non-OECD
3. Skills	Investigate to what extent foreign MNEs invest in human capital and skills, directly through in-house worker and manager trainings, and indirectly through knowledge transfers to domestic firms.	Skill intensity On-the-job training Technical skill shortage/surplus	OECD, non-OECD OECD, non-OECD OECD
4. Gender equality	Examine how FDI is associated with gender equality in host economies. Effective participation of women in the workforce and equal opportunities at all work levels are not only desirable from a social perspective but can unlock economic opportunities.	Gender employment gap Gender wage gap Female top managers (female empowerment) Women entrepreneurship	OECD, non-OECD OECD, non-OECD non-OECD, limited OECD
5. Carbon footprint	Study the extent to which FDI relates to carbon footprint, and how FDI is contributing to the low-carbon energy transition. The transition towards low-carbon energy/ electricity production is at the essence of the Paris Agreement and efforts to fight global warming under the SDGs.	CO_2 emissions Energy efficiency Renewable energy	OECD, limited non-OECD OECD, non-OECD OECD, non-OECD

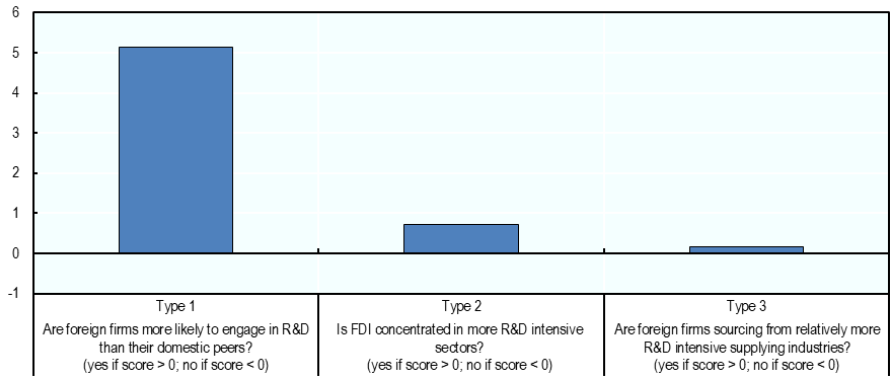
Note: The country coverage (OECD and non-OECD) broadly indicates whether FDI Qualities Indicators are available for OECD and/or non-OECD countries for a specific outcome. For each outcome, the exact country coverage will vary depending on data availability. Annex B provides an overview of all data sources used to construct the indicators.

Taking into account the country context, policymakers can use FDI Qualities Indicators to assess how FDI supports national policy objectives, where challenges lie, and in what areas policy action may be needed. Indicators also allow for cross-country comparisons and benchmarking against regional peers or income groups, which can help to identify good practices and make evidence-based policy decisions. An important value added of the FDI Qualities Indicators is that they reveal cross-country differences in how FDI relates to sustainable development. Existing studies touch upon some of the outcomes covered in this report, but generally only examine one dimension of sustainability, offering only a partial view of FDI's contribution to sustainable development, without revealing important cross-country and cross-cluster differences.

FDI affects socio-economic and environmental outcomes through various channels, both directly through the activities of foreign firms, and through spillovers that arise from market interactions. The indicators covered in this report cannot disentangle direct FDI impacts and spillovers, but provide some direction on what mechanisms are at play for a given outcome. With this purpose in mind, three broad types of indicators are developed, using both firm-level and industry-level data sources (Figure 1).

Figure 1. The FDI Qualities Indicators: Three different perspectives

An example: FDI and R&D activity in Thailand



Note: The figure shows scores for the three types of FDI qualities indicators (see Annex B for a description). Type 2 and Type 3 indicators compare outcomes in FDI-intensive sectors relative to national average.
Source: OECD based on World Bank Enterprise Surveys.

FDI supports productivity and innovation gains in OECD countries

The first cluster of country-level indicators measure how FDI relates to productivity and innovation, and may thereby support or weaken progress towards SDGs 8 and 9. Broadly speaking, FDI is associated with higher labour productivity and innovation than the national average in OECD countries, and relatively lower productivity and innovation in developing countries. In other words, foreign activity is more prevalent in sectors that are capital- and R&D-intensive in advanced economies, while it is more prevalent in labour-intensive and less innovative manufacturing industries in developing countries.

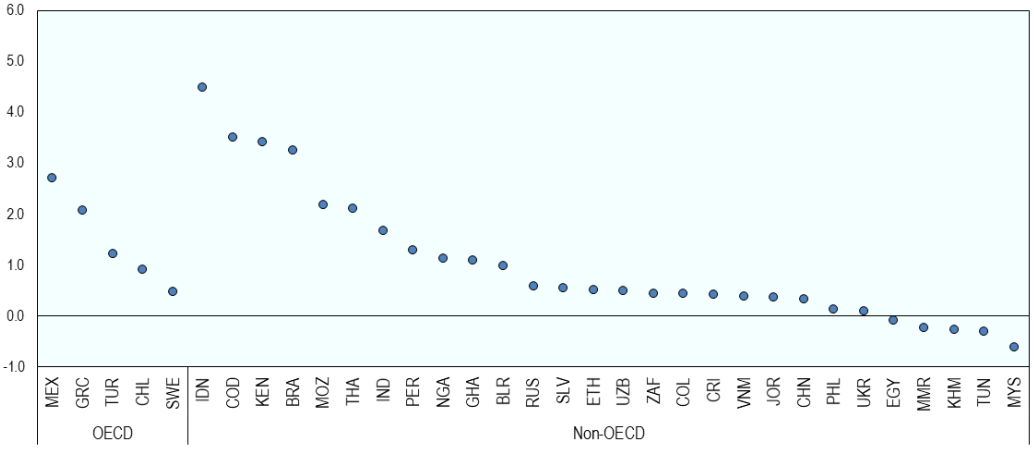
The results also suggest that FDI-attracting sectors often experience higher growth in labour productivity and R&D intensity than other sectors, although the findings are more mixed across income groups. The observed productivity and innovation advantage in FDI-dominated sectors may be a result of foreign firms outperforming domestic firms (Figure 2). This may be expected, as affiliates of foreign multinationals have access to advanced technologies and managerial knowhow from their global branches, which allows them to produce more efficiently and invest more in innovation than domestic firms. Foreign firms also tend to be larger and more capital-intensive than their domestic counterparts, further explaining their performance premium.

The indicators also shed light on the potential for productivity and innovation spillovers of FDI through linkages with domestic firms. Domestic firms require sufficient absorptive capacities to benefit from FDI presence and the associated knowledge and technology transfers that occur through supply chain linkages. Absorptive capacities are typically measured in terms of performance gaps between foreign and domestic firms. The results show considerable variation across countries, with performance gaps that are substantial in

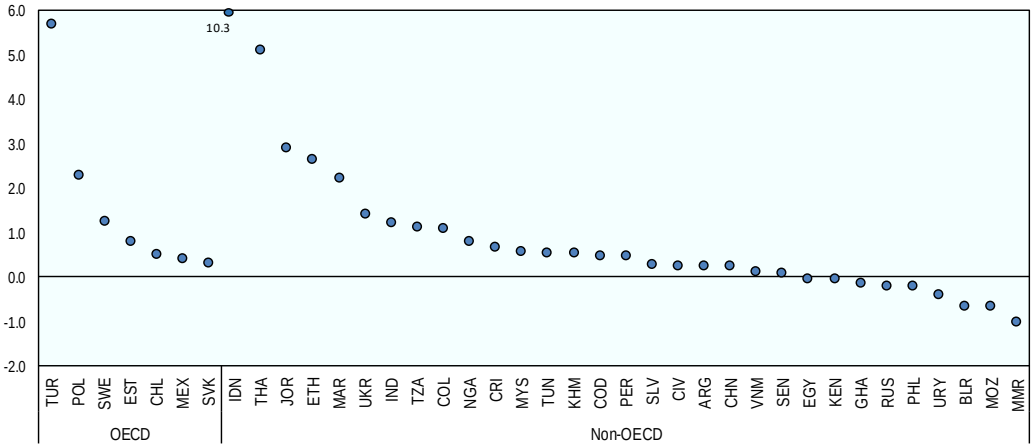
some countries and negligible in others (Figure 2). Differences in absorptive capacities have important implications for policy makers. Countries with greater absorptive capacities may aim to facilitate linkages and technology transfer, while countries with lower capacities could focus on the development of a stronger supplier base in the first place.

Figure 2. Productivity and innovation outcomes of foreign and domestic manufacturers

A. Are foreign firms more productive than their domestic peers?
(yes if score > 0; no if score < 0)



B. Are foreign firms more likely to engage in R&D than their domestic peers?

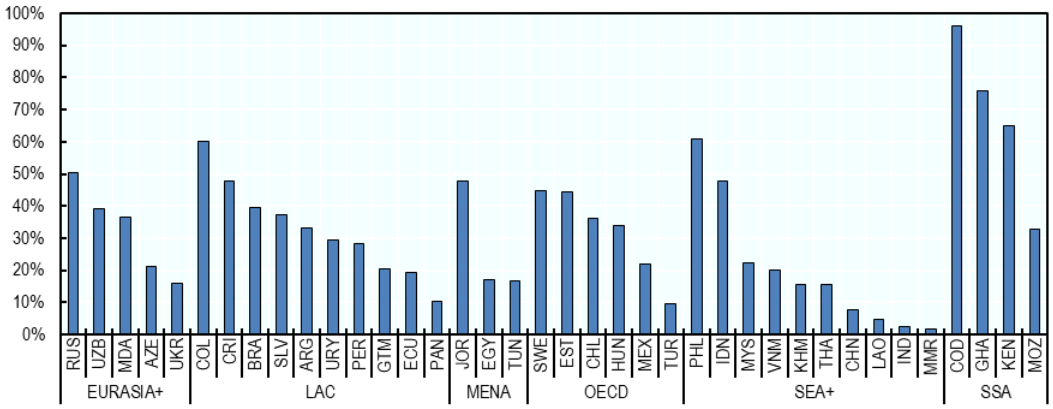


Note This figure shows a Type 1 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Another way to evaluate the potential for FDI spillovers is to measure the extent of local sourcing of foreign firms, which may be a policy objective in itself as it creates a market for domestic firms. Domestic linkages are also likely to facilitate knowledge and technology transfers from the foreign affiliate to its domestic supplier. The analysis reveals that foreign investors purchase a large share of domestically sold intermediate inputs, both in OECD and non-OECD countries, although the extent of these linkages varies considerably by country (Figure 3).

Figure 3. Domestic supply chain linkages of foreign affiliates

Foreign manufacturers' purchases in domestically sold inputs (%)



Note: The linkage indicators are further explained in Annex C.
Source: OECD based on the OECD Analytical AMNE database (Panel A); OECD Input-Output Tables and World Bank Enterprise Surveys (Panel B).

Overall, the indicators reveal considerable variation in FDI's contribution to productivity and innovation. This heterogeneity has different implications for countries at different stages of development. For example, in countries at early stages of the industrialisation process, a policy objective may be to expand investments in lower value added sectors where producers benefit from a comparative advantage. The objective may be to move up the value chain within those sectors into more complex activities. Conversely, more advanced emerging economies may aim to attract FDI in higher value added sectoral value chains to advance the industrialisation process. A more detailed analysis of a country's development stage and policy context is necessary to further interpret the results and derive policy recommendations.

FDI creates jobs and enhances wages but not necessarily other working conditions

The second cluster examines how FDI relates to labour market outcomes of host countries. According to SDG 8, both the quantity and quality of jobs created matter to ensure that all citizens can work productively and receive fair compensation. The cluster includes indicators that identify how FDI is associated with job creation and employment growth, wages and non-wage working conditions (i.e. job security and occupational safety at work).

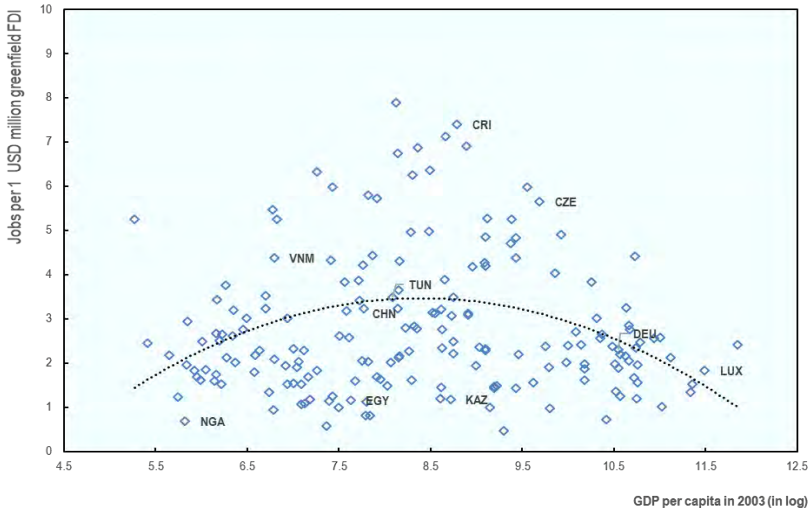
Governments devote ample resources to attract FDI with the hope that it will create new employment prospects. The indicators confirm that greenfield FDI projects generate jobs, but unevenly across countries. The extent of job creation varies with level of development and economic structure. FDI projects in mining or biotechnology (capital-intensive) generate fewer jobs per dollar invested than those in garment manufacturing or healthcare (labour-intensive), for instance. Consequently, greenfield FDI in Costa Rica or in the Czech Republic create around 6 jobs per million dollar invested, three times as many as in Kazakhstan or Luxembourg (Figure 4). The indicators do not provide a complete picture of FDI effects on job creation, as they do not capture whether foreign takeovers of domestic firms create or destroy jobs across countries.

The behaviour of foreign affiliates with respect to labour demand is typically similar to that of domestic businesses. In few countries, foreign firms are more responsive to short-term

business fluctuations in terms of employment adjustments, particularly in cases of expansion. Over longer time spans, and when taking into account the possibility of spillover effects on domestic firms, greenfield FDI relates positively to employment growth; but this does not apply to all countries. In the OECD, the positive FDI-employment growth relationship is stronger in countries where medium-tech industrialisation processes are, or have been, stronger and more sustained.

Figure 4. The FDI-jobs relationship is conditional on economic development

Estimated number of jobs created per one million USD of (announced) greenfield FDI projects



Note: The trend line is generated using a polynomial regression. Greenfield FDI: capital expenditure. Number of jobs and capital expenditure are partly based on estimates between January 2003 and December 2017. See Annex C for a description of the data.
Source: OECD based on Financial Times' fDi Markets database.

The OECD 2018 Jobs Strategy and other international frameworks explain that while creating more jobs is crucial, their quality equally matters for inclusiveness. The indicators confirm a well-documented result: an average foreign affiliate pays higher wages than an average domestic business. Beyond this common finding, a more relevant result in the context of this report is that vast variations exist in the foreign wage premium across countries, partly because the indicators reflect the plethora of factors behind the premium, such as firms' higher productivity, larger size, more skilled workforce, or greater product market power. The results also challenge the presumption that foreign companies always pay higher salaries. There is less evidence of a foreign wage premium at the bottom of the wage distribution.

If foreign businesses can enhance living standards, excessive wage dispersion with domestic firms may nevertheless hamper inclusive growth by raising overall wage inequality. In addition, the results confirm, to some extent, that positive, productivity-driven, spillovers of FDI on the wages of domestic firms may be more limited in countries with wider wage dispersions between the two groups of firms. Conversely, local souring by foreign firms amplifies wage spillovers.

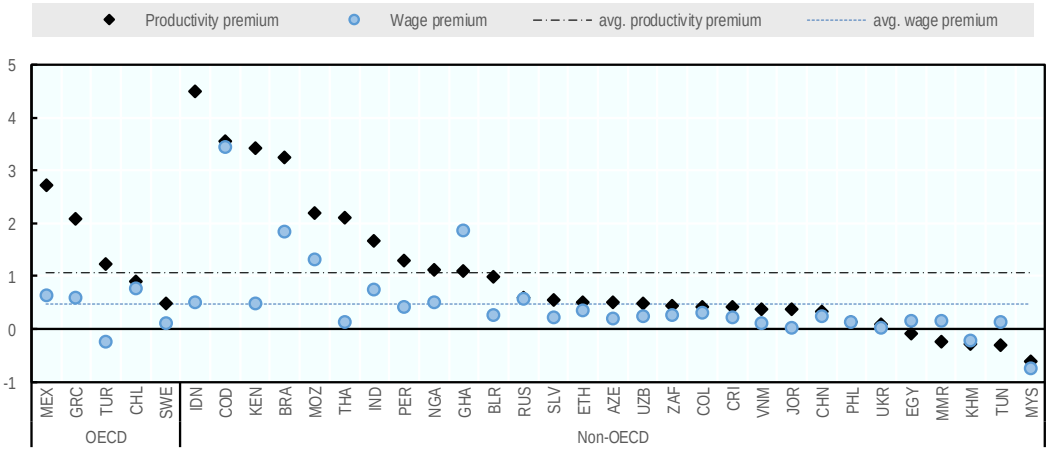
The indicators also show that MNE activity is concentrated in sectors that typically pay lower wages in developing countries while the opposite result holds in most of the OECD. As for jobs, the level of industrialisation appears to be another crucial factor driving the

FDI-wage relationship: more advanced countries tend to attract FDI in highly paid services, while less advanced countries attract FDI in labour-intensive, low-skill, and low-wage industries. The dichotomy between developed and developing countries may reflect differences in the size of the informal sector, which, if accounted for, would provide more precise indicators of FDI concentration in higher or lower wage industries.

The indicators on wages provide a consistent picture relative to those on productivity: generally, the higher is the foreign productivity premium, the larger is the wage premium (Figure 5). This supports the notion of productivity as an engine for enhancing living standards, but only to a certain extent. Across countries, foreign firms are twice as productive as domestic firms, but they pay only 50% higher wages. This implies that the foreign firm performance premium does not fully translate into wage benefits for workers. MNEs are typically active in highly-concentrated markets – which in turn can generate rents. Such productivity-related rents, and the extent to which they are shared between owners and workers, can be due to policy pitfalls, such as barriers to competition.

Figure 5. Foreign firms' wage and productivity premia in OECD and emerging countries

Are foreign firms paying higher wages and are more productive than their domestic peers?
(yes if score > 0; no if score < 0)



Note: See Chapters 2, 3 and Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Job quality is not limited to wages, it includes other aspects of working conditions. The behaviour of MNEs has at times raised public concerns over their impact on working conditions due to, for instance, the greater bargaining power they enjoy over unions and governments, or their lower core labour standards. The indicators seek to provide a broader picture of job quality by examining the relationship between foreign firms, temporary work and occupational safety, and provide some evidence that FDI is associated with lower job security. The observed relationship could reflect MNEs concentration in sectors with more exposure to global trade fluctuations, or in areas under special regulatory regimes with more flexible labour rules, such as special economic zones. An implication is that more analysis on FDI effects on non-wage working conditions is necessary.

Positive labour market effects of foreign firms operations are often linked to their performance, an aspect that does not justify developing specific policies for them. Even so, investment and labour market policies can play a crucial role in cushioning or amplifying FDI effects on labour market outcomes, including distributional effects. For instance, FDI

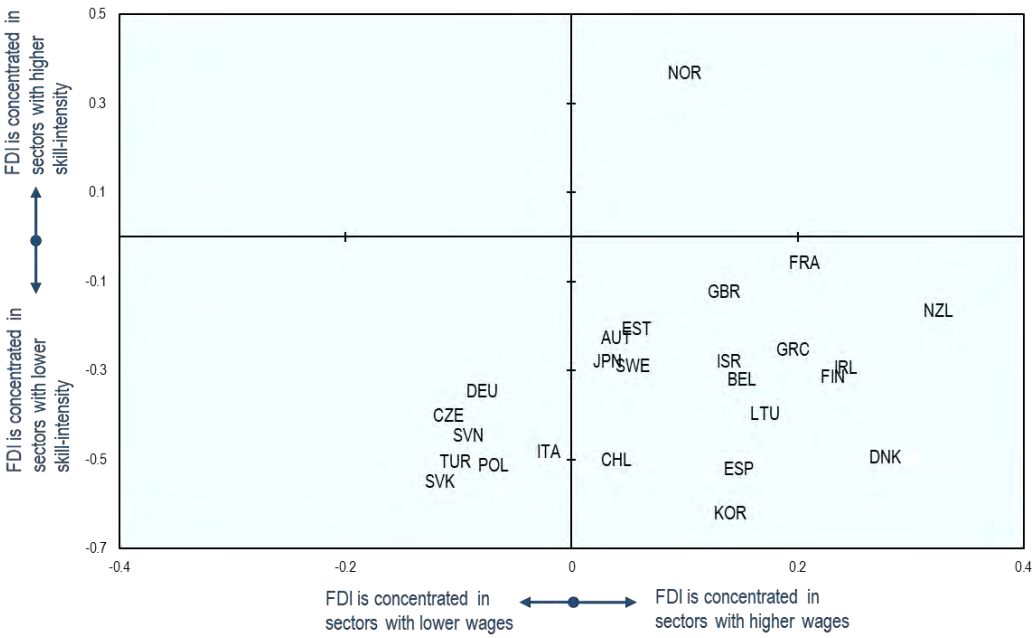
impacts on host country wages may be magnified by policies that promote labour mobility. Future work on FDI Qualities aims to provide a comprehensive policy framework for countries to maximise positive impacts of FDI on their labour market while mitigating potential adverse effects, in line with the OECD 2018 Jobs Strategy and the Guidelines for Multinational Enterprises.

FDI prevails in sectors with lower shares of skills and trained workers

Skills upgrading is fundamental for sustainable development (SDG 4). Skills are an important production factor that enables innovation and facilitates knowledge transfer. FDI can support skills development both by offering training opportunities to employees or suppliers and by affecting the demand for technical and managerial skills in the host country. The following cluster of indicators examines the relationship between FDI and skills-related outcomes.

The indicators overwhelmingly show that, in OECD countries, FDI is concentrated in sectors that employ fewer skilled workers (i.e. managers, technicians and experts), relative to the national average (Figure 6, vertical axis). This includes manufacturing, construction and transport services, which tend to have higher shares of unskilled and semi-skilled blue collar jobs. OECD countries with strong industrial bases, like Germany, Turkey and the Czech Republic, host FDI with the weakest skill-intensity levels, which is also associated with lower average wages in these sectors (Figure 6, horizontal axis). Across countries, the more FDI is concentrated in skill-intensive sectors, the more countries also benefit from FDI in high-wage sectors.

Figure 6. FDI association with wages and skill-intensity in the OECD



Note: See Chapters 3 and 4 and Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database, OECD National Accounts and OECD Survey of Adult Skills (PIAAC).

A closer look at manufacturing firms offers a more nuanced picture. Foreign firms are not inherently different from domestic firms in employing skilled workers, rather it is a country's comparative advantage that determines the skill intensity of the FDI it attracts. Countries with large and relatively cheap labour forces tend to attract considerable FDI in labour-intensive and low-skilled manufacturing activities (e.g. garments, food processing), while countries with large heavy manufacturing industries like Mexico and Brazil attract FDI in more capital-, skill- and technology-intensive manufacturing activities (e.g. chemicals, machinery and equipment).

Attracting FDI in low-skilled activities is not necessarily a negative outcome if foreign firms can expand and upgrade workers' skills in these sectors, for instance by offering training or supplier development opportunities. Foreign firms may also induce domestic companies to invest more in training by increasing competitive pressures. Nonetheless, the indicators show that foreign firms do not necessarily provide more on-the-job training to their workers, and that in the majority of OECD countries, FDI is concentrated in sectors with lower shares of trained workers.

Lastly, foreign firms can also affect imbalances of technical skills (i.e. programming, installation), whether shortages or surpluses. Shortages of skills exist when the supply of qualified workers is insufficient in the labour market, potentially slowing down productivity, innovation and technology absorption. Surpluses of skills are observed when skills are underutilised. Surpluses are often associated with unemployment and, in the long term, may reduce aggregate income and productivity. In general FDI is concentrated in sectors with higher skill surpluses. However, by expanding activity where skills are abundant (and investing little where skills are scarce) FDI may contribute to attenuating skill imbalances.

Further analysis is needed to confirm the robustness of these results but they invite for more thinking with regard to the role of policy in linking investment to skills and human capital development.

FDI does not always improve gender equality

Gender disparities and discrimination persist in the labour markets of both OECD and developing countries, where women tend to work in lower-value added service jobs, and are paid less than men, on average. Women are also under-represented in the business sector and are less likely to reach high-pay senior positions.

Through their activities, foreign firms can enhance gender equality in host countries. By increasing the demand for female labour foreign firms can put upward pressure on women's wages and contribute to reducing the gender employment and wage gaps. Foreign firms can also support gender balancing in senior management through, for instance, corporate policies that help reconcile work-life balance, or activities aimed at developing leadership and managerial skills of women. Foreign firms can further support women entrepreneurship in host countries, by creating new business opportunities for female-owned businesses, or by helping improve their performance. The following cluster of country-level indicators measure how FDI relates to gender equality, and may thereby support or weaken progress towards SDGs 5.

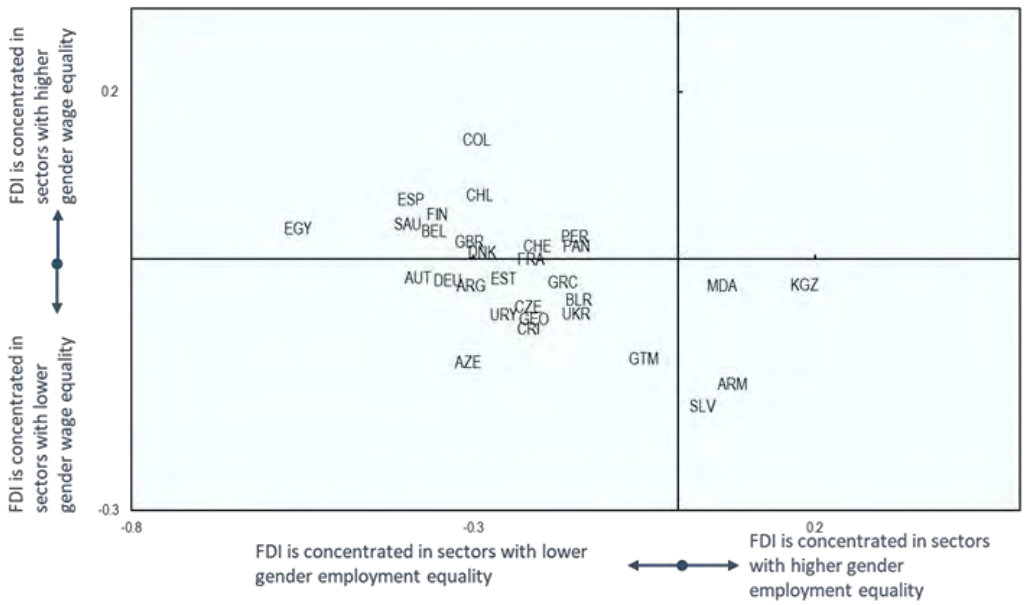
In terms of employment equality, FDI tends to be concentrated in sectors with lower shares of women employees, including the typically male-dominated construction, finance and transport sectors. A closer look at manufacturing firms, however, suggests that, particularly in developing countries, FDI is positively related to women's employment, as a result of

large-scale activities in the typically female-dominated and labour-intensive garment and food industries. While intensive female employment in these industries has been an important avenue for women to enter the labour force, it may exacerbate the gender gap if it perpetuates gender-specific labour roles, with women participating only in low-skill low-wage jobs. This may warrant policy action to support training and skills upgrading opportunities targeting women.

The second and related set of findings describes the link between FDI and the gender wage gap. FDI is concentrated in sectors with higher pay gaps between men and women, notably manufacturing, finance, and business activities. Large differences are nevertheless observed across countries, especially in the OECD. Existing studies also report mixed evidence, suggesting that country-specific and sector-specific factors might play an important role.

Combining the indicators for wage equality and employment equality suggests that there is an inverse relationship between the wage and employment dimensions (Figure 7). This is likely because the distribution of FDI across industries plays a large role in its association with gender outcomes, rather than inherent differences across domestic and foreign employers. Sectors with relatively higher female employment tend to be lower-skilled and lower-wage, while sectors with high-skilled and better paid jobs tend to be male-dominated. Thus, countries with large female-dominated industries, which attract substantial foreign investment, tend to exhibit a higher wage gap; whereas countries that attract high-skilled or capital-intensive investment exhibit less of a wage gap but a larger employment gap, as very few women are employed in these higher-paid jobs. In both cases upgrading women's skills and facilitating their access to higher-paid activities can serve to reduce gender disparities.

Figure 7. Contribution of FDI to gender equality in wages and employment



Note: See chapter 4 and Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database, ILO and UN National Accounts

Another set of indicators considers FDI's association with women empowerment in the workplace, measured as the extent to which they are represented in the workforce in senior management positions, and with women entrepreneurship. The analysis does not indicate any significant difference across foreign and domestic firms in terms of empowering women to assume top managerial roles and female ownership, again suggesting that foreign and domestic firms are not inherently different in terms of their contribution to gender outcomes. At the same time, manufacturing FDI appears to prevail in sectors with greater women participation in top managerial roles and with larger shares of business owned by women. The sectors explaining these associations are once again the female-dominated food and garment industries. This suggests that to some extent FDI in low-skilled, labour-intensive and female dominated activities also supports women's empowerment and entrepreneurship.

FDI supports decarbonisation and efficiency improvements of the energy sector

Environmental risks are perceived as the gravest global threats in the next decade, especially extreme weather events, climate change policy failures, and the accelerated pace of biodiversity loss. A global economy reliant on fossil fuels and the resulting rising greenhouse gas (GHG) emissions, now 50% higher than their 1990 level, are creating drastic changes to the climate. The annual average financial losses from tsunamis, tropical cyclones, flooding and wildfires related to rising global temperatures amount to hundreds of billions of dollars.

Against this backdrop, global energy demand is expanding well above the rate of deployment of clean energy resources, which are only slowing down the growth of fossil fuel use and CO2 emissions and not reversing them. Energy efficiency and renewable energy are seen as the twin pillars of sustainable energy policy. Improvements in energy efficiency have been the biggest contributor to reduced energy use since 2000 and the main factor behind the flattening of global energy-related GHG emission trends since 2014. But continuing improvements in energy efficiency are not enough. A substantial increase in the production and uptake of renewable energy across the world is imperative to curb rising CO2 emissions in meeting energy demands.

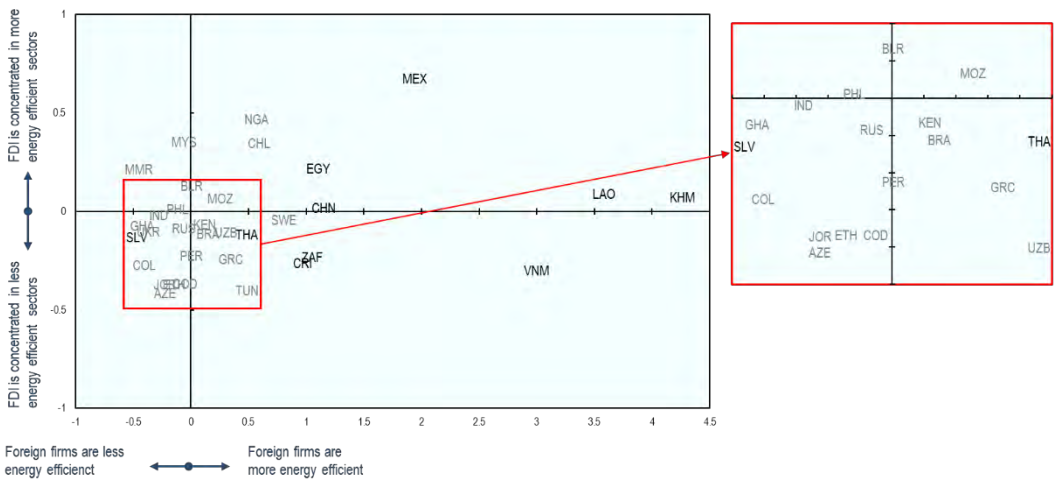
The last cluster examines how FDI relates to climate change mitigation (SDG13) and access to sustainable energy (SDG7), focusing on FDI's carbon footprint and its contribution to renewable energy infrastructure. The mechanisms through which FDI is expected to affect carbon footprint include increasing the scale of economic activity; affecting the structure of economic activity; inducing the adoption of new energy-saving technologies; and influencing the uptake of clean energy sources.

Across the board, FDI prevails in industries that are cleaner in terms of CO2 emissions, and more efficient in terms of energy use. The few exceptions include countries where fossil fuels constitute a large share of both GDP and inward FDI. This may be explained by the fact that in resource-rich countries, fossil fuels offer lucrative investment opportunities in extraction and energy transformation; and these heavily capital- and energy-intensive activities tend to attract large multinationals with the requisite capacity for such investments. Thus, for countries that rely heavily on fossil fuels as a source of income, FDI might exacerbate this dependence, and consequently their carbon footprint.

A closer look at manufacturing firms provides further evidence that foreign firms are more energy efficient than their domestic counterparts (Figure 8, horizontal axis). Countries like China, Mexico and Egypt, host foreign firms that are more energy efficient than their

domestic counterparts on average, and also operate in manufacturing sectors with higher average energy efficiency (such as electronics). In these countries FDI is associated with improvements in energy efficiency, which is amplified if energy-saving technologies are diffused to domestic firms. Conversely, in countries that host foreign firms that are relatively less energy-efficient and also operate in manufacturing industries that are more energy-intensive, like mining-related manufacturing activities, existing FDI is associated with a deterioration of energy efficiency. In countries like Viet Nam and Thailand, where foreign firms are relatively more energy efficient than domestic peers but operate in manufacturing sectors that are more energy-intensive (such as garment manufacturing), these firms may be bringing energy efficiency improvements to these sectors if domestic firms are able to absorb their energy-saving processes.

Figure 8. FDI and improvements in energy efficiency



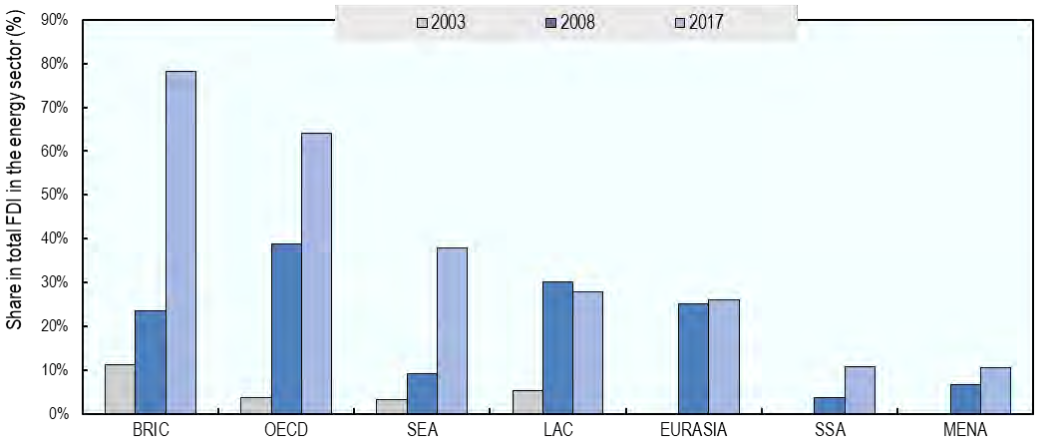
Note: Only surveys starting in 2009 are considered, and countries for which there are at least 20 foreign firms. Indonesia (10.9, -0.3) is omitted to aid visibility. Black labels indicate statistical significance.
Source: OECD based on World Bank Enterprise Surveys

While increasing energy efficiency is essential for mitigating climate change in the long run, the forces driving up energy demand are outpacing progress on energy efficiency, resulting in accelerating global energy use. Thus, a critical avenue to curb greenhouse gas emissions in the immediate term and meet growing energy demands is to increase production and use of renewable energy, and foreign investors can play an important role in this respect. The stock of foreign investments in renewable energy relative to fossil fuels, accumulated over 2003-2017, was substantial, particularly for OECD and BRIC economies. A closer look at FDI flows reveals that the contribution of FDI to renewables relative to fossil fuels is growing rapidly, not only in OECD countries but increasingly also in developing regions like Southeast Asia and Sub-Saharan Africa (Figure 8).

Comparing FDI in renewables to the extent of emissions of the energy sector across 88 countries shows that for a majority of countries FDI is still concentrated in fossil fuels and the energy sector is still significantly polluting in terms of CO2 emissions. In these countries policy can play an important role in creating greater incentives for investments that help transition to low-carbon energy infrastructure, reforming fossil fuel support measures or correcting regulations that weaken the business case for investment and innovation in low-carbon infrastructure.

Figure 9. FDI in renewables is a significant share of energy investments across regions

Greenfield FDI flows: 2003, 2008 and 2017



Note: The energy sector includes renewables (wind, solar, geothermal, tide/wave/ocean, small hydroelectric, and biomass) and fossil fuels (coal, oil and natural gas) and related extraction activities.
Source: OECD based on Financial Times' fDi Markets database.

Using FDI Qualities Indicators for evidence-based policy analysis

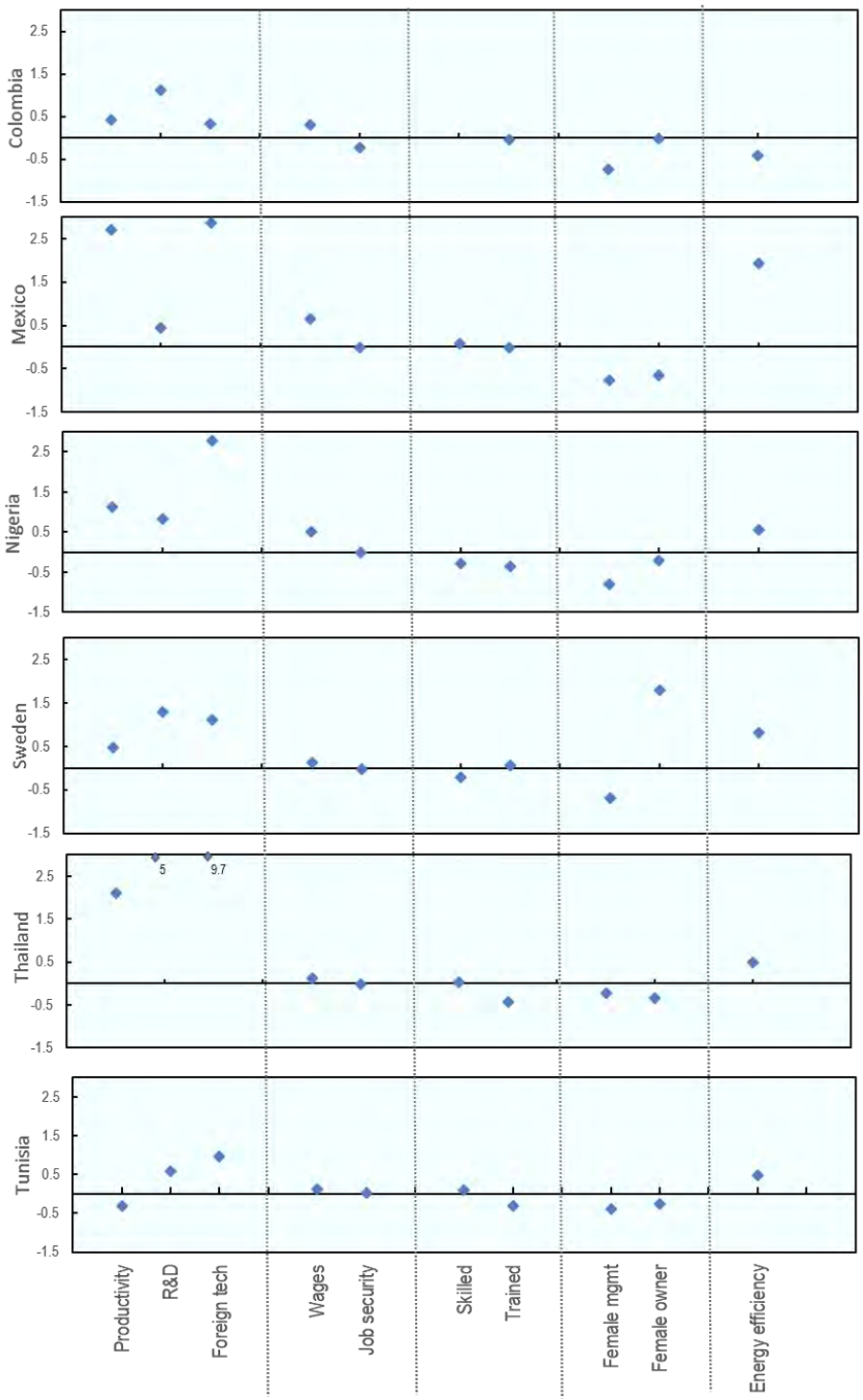
The five clusters of FDI Qualities Indicators provide an overview of general trends and complexities of the relationship between FDI and different aspects of sustainable development. The indicators provide evidence of both positive and negative FDI qualities, and of significant variation across countries. Broadly speaking, the analysis points more systematically to positive FDI impacts on economic and environmental sustainability dimensions areas than social dimensions (Figure 10). However, the indicators are insufficient for explaining all the observed differences across countries, and FDI's contribution to advancing the SDGs is not always clear-cut. Framework conditions and country contexts are crucial determinants of the socio-economic and environmental impacts of FDI and policy can amplify or mitigate these impacts.

While further analysis on country and policy contexts is required, a country-level FDI Qualities assessment sheds some light on the relationship between FDI and specific outcomes, triggering dialogue and facilitating the identification of policy priorities and possible trade-offs. FDI Qualities Indicators already serve as a practical tool in ongoing country reviews, including the OECD Investment Policy Reviews (Egypt, Indonesia and Thailand) and a new series of country-level assessments on FDI Qualities and Impacts.

Subject to funds, the second pillar of work on FDI Qualities will involve the development of a policy toolkit on how to maximise the sustainable development impacts of FDI, starting with the five clusters of FDI Qualities indicators. Once the policy framework components are developed, policy guidance on how to foster a specific SDG-related objective through private investment will be further strengthened and more structured.

Figure 10. FDI Qualities across countries and clusters: An example of six countries

Do foreign firms have higher outcomes than their domestic peers?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 1 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Notes

[1] OECD work on FDI qualities was initiated jointly with the World Bank Group (Lejarraga and Ragoussis, 2018).

[2] The FDI Qualities Policy Network is a multi-stakeholder group that engages in policy dialogue and technical discussions on specific project activities, and includes policymakers, private sector, civil society, and experts from the OECD, other international organisations and academia.

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Chapter 1. FDI Qualities: A new OECD initiative

This chapter motivates and contextualises the new OECD initiative on FDI Qualities. It defines key objectives of the initiative around four pillars: Indicators; Policy Toolkit; Policy Dialogue and Implementation. This first FDI Qualities report focuses on Indicators, which describe how foreign investment relates to specific aspects of sustainable development in host countries. The framework for conceptualising FDI qualities is based on a mapping of FDI impacts to the Sustainable Development Goals (SDGs) and their targets. This chapter explains how the indicators help shed some light on FDI's contribution to sustainable development, and shows how FDI Qualities Indicators can be used for country-specific and cross-country assessments.

1.1. Motivation and background

Investment – foreign or domestic – plays a role in making progress toward the Sustainable Development Goals (SDGs). It creates jobs, develops skills, triggers innovation, and improves living standards. Under certain circumstances, it can also support more inclusive redistribution of wealth and resources, increase female labour participation and empowerment, and green economies. Foreign direct investment (FDI), specifically, can further serve as a conduit for domestic enterprises to access international markets and global value chains (GVCs), through linkages with multinational enterprises (MNEs).

Realising these positive economic, social and environmental outcomes from FDI is not a given, however. Maximising socio-economic and environmental benefits and minimising potential risks associated with FDI may not be a primary concern for profit-seeking investors and may not receive sufficient attention by policymakers seeking to attract investment. While, in principle, FDI has the potential to advance sustainable development, private sector incentives and both home and host country policies need to be carefully considered as they play a critical role for enabling this potential.

The 2015 Addis Ababa Action Agenda calls on the private sector to adopt principles for responsible business and investment and engage as partners in the development process (UNGA, 2015). It also calls on the private sector to invest in areas critical to sustainable development and to help shift economies to more sustainable consumption and production patterns. At the same time, it commits governments to strengthening regulatory frameworks and developing policies to better align private sector incentives with public goals, and to encourage the private sector to adopt sustainable practices and foster long-term investment.

The notion of *FDI qualities* has come to the forefront of international policy discussions. The World Bank has been calling for a framework that differentiates across types of FDI and their various socio-economic impacts (Echandi et al., 2015). UNCTAD launched its Investment Policy Framework for Sustainable Development in 2015 (UNCTAD, 2015). UNIDO initiated a platform for organisations, policymakers, and academia to engage in public-private dialogue on issues related to FDI's contribution to inclusive and sustainable development. Scholars of the International Institute for Sustainable Development (IISD) and the International Centre for Trade and Sustainable Development (ICTSD) developed an indicative list on the sustainability characteristics of FDI (Sauvant and Mann, 2017). In academic circles, a new strand of research examines how different types of investment have different repercussions on the domestic economy (Alfaro, 2017; Alfaro and Charlton, 2013; Farole and Winkler, 2014). A recent publication by experts from various fields studies how investment could be governed in the context of challenges related to sustainable development (Aisbett, 2018).

The OECD has longstanding interest and expertise in shaping the policy environment to enhance the societal impacts of private investment (OECD, 2002). This expertise now spans a wide range of policy areas, in the form of legal instruments, research initiatives, advisory services and stakeholder networks. It is reflected in the updated OECD Policy Framework for Investment (OECD, 2015a) that serves as the basis for country-level Investment Policy Reviews. The OECD responsible business conduct (RBC) standards provide minimum requirements for investors to operate in a way that does not hamper inclusive and sustainable development (OECD, 2011 and 2018d), and many governments encourage and enable private sector efforts to adhere to these standards through dedicated interventions.[1] The OECD further engages in partnerships with businesses and other

initiatives to help the private sector improve their social and environmental impacts and develop standards for measuring and reporting these impacts.[2]

How FDI relates to sustainable development in different country and policy contexts and which policy mix supports FDI-induced sustainable development gains are still very much unclear. Following a request of OECD Ministers, and in an effort to address this gap, the OECD launched the FDI Qualities initiative (OECD, 2018a and 2018b). This project is an important element of the OECD Action Plan on the SDGs (OECD, 2016) and provides practical inputs for policy discussion in high-level OECD and other international policy fora (Table 1.1).[3]

1.2. Objectives: Four pillars of work

The objective of the FDI Qualities initiative is to equip policymakers with an actionable tool to mobilise FDI that maximises inclusive and sustainable growth and supports progress towards the SDGs. FDI's contribution to sustainable development s can be considered from two distinct perspectives: FDI as a source of finance for development (as postulated in the Addis Ababa Action Agenda), and FDI as economic activity that generates socio-economic and environmental impacts. While the financing aspect is essential and is extensively elaborated in the OECD Global Outlook on Financing for Development (OECD, 2018d), the FDI Qualities initiative focuses on how the activities of foreign MNEs can contribute to the SDGs beyond the additional financing they bring, for example, when they train workers or enhance the capabilities of local suppliers.

The work focuses on foreign, as opposed to domestic, investment. While there is nothing special about FDI and policies should not discriminate between domestic and foreign investment (OECD, 2015a), many governments strive to attract FDI as a means of spurring industrialisation and growth, particularly where domestic resources or capabilities are lacking. Evidence suggests that firms that engage in international trade and investment are often more productive and innovative than those that do not, and through their supply chains in host economies can diffuse knowledge and technology to domestic firms (Echandi et al., 2015; and Tusha et al., 2017). Absorption of this knowledge can in turn result in economic, social and environmental benefits (or costs), depending on the host country macroeconomic and policy context. FDI impacts are, in other words, not always positive, and will vary in magnitude across countries and aspects of sustainable development.

Importantly, the FDI Qualities initiative does not seek any normative or prescriptive conclusions on good (i.e. sustainable) FDI or on bad (i.e. unsustainable) FDI, it is about assessing the contribution of foreign investment to sustainable development and identifying policies to maximise positive impacts and minimise potential negative impacts. The initiative includes four pillars of work: Indicators; Policy Toolkit; Policy Dialogue and Implementation.

Pillar 1: The Indicators

This first FDI Qualities report develops the pillar on Indicators, which describe how foreign investment relates to various aspects of sustainable development in host countries. Taking into account the country-specific context, policymakers can use FDI Qualities Indicators to assess how FDI supports national policy objectives, where challenges lie, and in which areas intervention is needed. The Indicators also allow cross-country comparisons and benchmarking against regional or income groups, which can help to identify good practices and make evidence-based policy decisions. An important value added of the Indicators is that they reveal cross-country differences in how FDI relates to sustainable development. Existing studies touch upon some of the outcomes covered in this report, but generally only examine one dimension

of sustainability, offering only a partial view of FDI's contribution to sustainable development, without revealing important cross-country and cross-cluster differences.

The FDI Qualities Indicators currently focus on five clusters discussed at length in the remainder of this report; namely, productivity and innovation, employment and job quality, skills, gender equality, and carbon footprint. These clusters were selected through a participatory process involving various stakeholders in the FDI Qualities Network (Pillar 3) and are based on the mapping of FDI Qualities to the SDGs (Section 1.3). The current set of indicators is limited in scope due to restricted access to data in other areas and limited resources for this project. The set of indicators could be expanded to other dimensions of sustainable development (e.g. income inequality, infrastructure, automation, agricultural innovation, clean water, human rights, or resource use) in the next phase of the project based on further discussions with stakeholders and data collection.

FDI affects not only recipient countries, but also source countries, by altering their capital stock, balance of payments, employment, wages, exports, imports, technological development, and integration in global value chains (Sauvant et al., 2014; Thomsen, 2006). While once the preserve of a small number of wealthy and highly developed countries, today almost every country is both home and host to MNEs (Bano and Tabbada, 2015), suggesting that the sustainable development impacts of outward FDI are relevant on a global scale. The current indicators focus on receiving countries (inward FDI), only. A future iteration of the work could also develop indicators on outward FDI.

Pillar 2: The Policy Toolkit

The second pillar of work will be the development of a policy toolkit for maximising the sustainable development benefits of FDI in the five clusters and corresponding policy spaces selected for the indicators. Developing a policy toolkit that is validated by government and non-government stakeholders is an ambitious endeavour, requiring a realistic timeframe and comprehensive discussions on methodology, expected output, and how it can be used. The policy toolkit will be the main focus of a second phase of the FDI Qualities initiative, for which consultations and multi-stakeholder policy dialogue will start at the Roundtable on Investment and Sustainable Development in October 2019, with the ambition of a flagship contribution to the OECD 2021 Ministerial Council Meeting.

Set in different contexts and at different stages of development, countries will have different priorities, resources and options available to leverage FDI to advance sustainable development. The FDI Qualities Policy Toolkit will not be prescriptive. Adequate policy choices to maximise FDI's contribution to sustainable development depend on host country conditions (e.g. market access, skills base, labour costs, taxation, industrial structure), as well as the type of FDI (e.g. greenfield vs. M&A), and motive for investment (e.g. efficiency-seeking vs. market-seeking).

The FDI Qualities Policy Toolkit will build on the FDI Qualities Indicators and the OECD Policy Framework for Investment (PFI). The PFI guides policymakers in asking relevant questions to create an investment climate that reconciles investment and sustainable development objectives. The FDI Qualities Policy Toolkit will support better policy implementation by providing directions to advance specific policy objectives; namely in the area of FDI as a driver of productivity and innovation, an enabler of decent work (job quality, skills, gender inclusion), and a catalyst of climate change mitigation.[4] Subject to funds, the approach to develop the policy toolkit could consist of various complementary activities (Box 1.1).

Box 1.1. Potential activities to develop the FDI Qualities Policy Toolkit

The following complementary activities are envisaged to develop the FDI Qualities Policy Toolkit:

- Develop a draft policy toolkit that identifies and maps institutions and policies that influence FDI's ability to improve sustainability objectives related to each cluster identified in the first phase, based on a review of relevant literature. Research and policy instruments by the OECD and other international organisations would be consulted and reflected in the toolkit.
- Develop and administer a concise survey of relevant government bodies in OECD and developing countries, to provide a broad picture of the institutional linkages underlying the interplay of investment promotion and other policies that affect sustainable development.
- Pilot the draft toolkit in 1-2 countries through detailed exploratory assessments.
- Hold multi-stakeholder discussions on the survey, country assessments and policy toolkit, including national and regional governments, for instance in the context of the OECD Policy Network on FDI Qualities and the Roundtable on Investment and Sustainable Development.
- Review and finalise the policy toolkit based on the survey findings, country assessments, and stakeholder discussions. The policy toolkit will seek to identify specific institutions and policies that achieved or failed to achieve stated objectives given national/regional contexts.

Pillar 3: Policy dialogue

The third pillar is about policy dialogue, peer learning, and stakeholder engagement. The OECD has established a dedicated multi-stakeholder Policy Network to support and provide guidance to the FDI Qualities initiative, through policy dialogue and technical discussions on project activities. The Network includes government officials from investment, development and other related policy communities (from OECD and developing countries); representatives from the private sector and civil society; and experts from the OECD, other international organisations and academia.[5]

The Policy Network has met three times since the beginning of the project, with the objective of validating the methodology behind the indicators and discussing preliminary results. This format proved very useful to engage different stakeholders groups, receive constructive feedback, and generate support and ownership for the broader FDI Qualities initiative. Government stakeholders shared their experiences with respect to promoting FDI Qualities through specific policy programmes. Businesses conveyed their stance on how their investments advance the FDI Qualities agenda and what policy constraints they face in doing so. Civil society expressed their views on the limitations of FDI and how the agenda could be enhanced to reflect the concerns of their interest groups. Experts from international organisations, think tanks and academia contributed their research experience related to FDI Qualities and provided specific feedback on the work.

Besides the Network meetings, numerous presentations were delivered and workshops held to further embed the FDI Qualities initiative in international discussions on investment policy and promotion as well as in the financing for development and SDG agenda (Table 1.1).[6] This endeavour is expected to continue and be further strengthened in the next phases of the FDI Qualities initiative. The high-level Roundtable on Investment and Sustainable Development in October 2019 serves this purpose and aims to spur multi-stakeholder dialogue on concrete and context-specific policies and tools along four key sustainable development dimensions: increasing productivity and innovation, improving labour market outcomes, enhancing gender

inclusion, and greening economies. These discussions will be the starting point of the next phase of the FDI Qualities initiative, on developing an FDI Qualities Policy Toolkit to advance specific SDGs through private investment.

Pillar 4: Implementation

The last pillar is on implementing the FDI Qualities initiative within country-level or regional projects, alongside existing instruments, such as the PFI and the Guidelines for Multinational Enterprises. Once the FDI Qualities Policy Toolkit is developed, guidance on how to address specific sustainable development concerns through private investment will be strengthened and more structured.[7]

The FDI Qualities Indicators already serve as a practical tool in a number of existing country reviews, in order to identify policy priorities and trade-offs. The Indicators are being included with dedicated chapters in ongoing OECD Investment Policy Reviews of Indonesia, Egypt, Georgia, Myanmar, Thailand, and Uruguay as well as in a regional review on six countries of the European Union's Eastern Partnership (Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, and Ukraine). Moreover, the Indicators are being used in a new series of country-level investment assessments, tentatively titled FDI Qualities and Impacts Assessment. A pilot assessment has been carried out for Ireland (OECD, 2019, forthcoming) and is planned for Chile. Sectoral, regional and time dimensions of FDI Qualities are analysed in greater detail in the country-level work than is done in this report (see Section 1.5).

Table 1.1. FDI Qualities for evidence-based policy dialogue: Activities to date and next steps

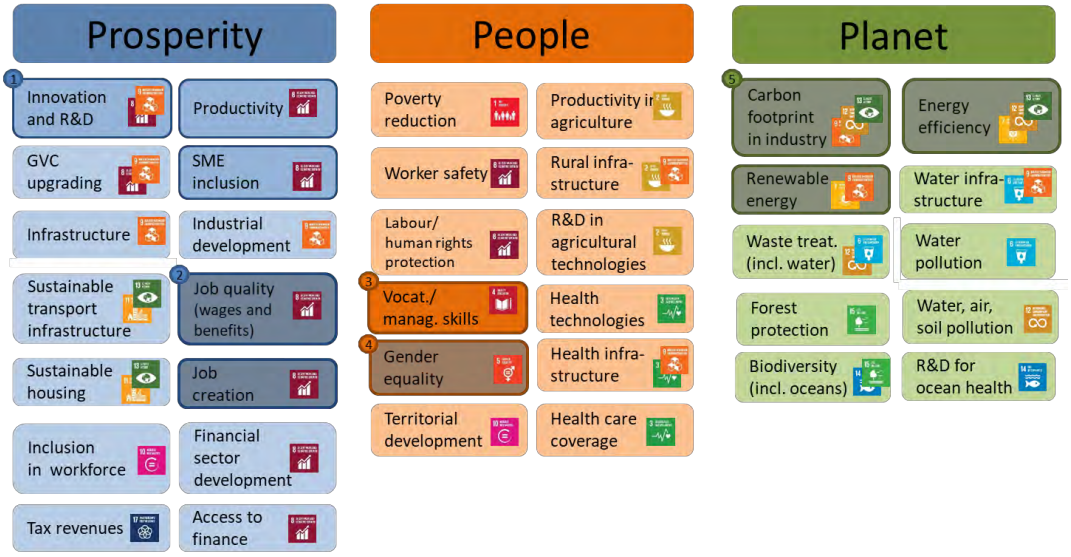
Date	Forum	Activities
Mar 2018	OECD Investment Committee	Presented proposal of FDI Qualities project and secured mandate to establish Policy Network
Jun 2018	1st Policy Network Meeting on FDI Qualities	Presented focus and methodology based on first progress report
Jul 2018	OECD Brownbag Lunch Seminar	Engaged in technical discussion on methodology and preliminary results with OECD colleagues
Oct 2018	2nd Policy Network Meeting on FDI Qualities	Reported on progress since first meeting and presented clusters on productivity-innovation and gender inclusion
Mar 2019	Workshop on investment trends and qualities in the Mediterranean region (Tunis)	Presented FDI Qualities Indicators and engaged in policy discussion
	3rd Policy Network Meeting on FDI Qualities	Presented progress report 3 with clusters on skills and carbon footprint
	OECD Council on the 2030 Agenda	Presented FDI Qualities Indicators and highlighted the role of private investment for SDG implementation
Jun 2019	EC conference on smart specialisation in Central and Eastern Europe (Bratislava)	Presented FDI Qualities Indicators and engaged in policy discussion
	TUAC Working Group on MNEs and RBC	Presented FDI Qualities Indicators, focusing on job quality and skills
	APEC-WB-Australia Workshop on Investment Promotion and Policy (Kuala Lumpur)	Held interactive session on FDI Qualities and engaged in policy discussion
	DIE side event to the WTO Structured Discussions on Investment Facilitation	Presented FDI Qualities work and discussed opportunities for investment facilitation with WTO Members
Aug 2019	MBA programme at Athabasca University (Canada)	Presented indicators and consulted mid-level business executives on role of business for SDG implementation
Sep 2019	Joint consultation with SECO and SDC (Switzerland)	Presented indicators and engaged in discussion on how to align policy objectives related to FDI Qualities
Oct 2019	*2nd Roundtable on Investment and Sustainable Development*	*Launch of FDI Qualities Indicators and discussion on how to develop the policy component*
Nov 2019	*OECD-ASEAN workshop on investment policy*	*Interactive session on FDI Qualities and engaged in policy discussion*
2020-2021	*TBC*	*Intermediate outputs and discussions, subject to resources*
2021 (TBC)	*OECD Ministerial Council Meeting*	*FDI Qualities deliverable with policy component*

1.3. Mapping FDI Qualities to the SDGs

A natural starting point for identifying priority areas in which FDI can contribute to economic, social and environmental development are the SDGs. A detailed assessment of all 17 SDGs and their respective targets was undertaken to derive a taxonomy of the full spectrum of FDI Qualities, or areas where FDI may contribute to sustainable development through financing and the activities of foreign MNEs (Annex A). This assessment further considered the extent to which FDI's potential for advancing the SDGs is reflected in the OECD Policy Framework of Investment, the OECD Guidelines on Multinational Enterprises and the OECD Policy Guidance for Investment in Clean Energy Infrastructure. It was informed by other related exercises (Sauvant and Mann, 2017).[8]

The resulting FDI Qualities can be grouped under three of the 5Ps of the 2030 Agenda, prosperity, people and planet (Figure 1.1), which broadly translate to economic, social and environmental sustainability.[9]

Figure 1.1. Mapping of FDI Qualities based on the SDGs



Note: See Annex A for a detailed mapping of FDI Qualities against the 17 SDGs. As FDI can simultaneously contribute to progress in several SDGs, FDI Qualities often relate to more than one SDG (and vice versa).
Source: OECD based on SDGs, OECD Policy Framework for Investment and Sauvant and Mann (2017).

Five clusters of FDI Qualities

The five clusters of FDI Qualities Indicators considered in this report are the following:

- ***Productivity and innovation (Chapter 2):*** To what extent do foreign firms and their linkages with domestic firms enable productivity growth and enhance innovation capacity through knowledge and technology transfer?
- ***Employment and job quality (Chapter 3):*** How does FDI relate to employment and job quality in host countries, including wages, job stability and safety at work?
- ***Human capital and skills (Chapter 4):*** To what extent do foreign firms help develop human capital and skills, directly through in-house training, and indirectly through knowledge transfers to domestic firms?

- ***Gender equality (Chapter 5):*** How is foreign investment associated with gender equality in host economies, including female participation in the workforce and access to managerial and shareholder positions?
- ***Carbon Footprint (Chapter 6):*** What is FDI's carbon footprint, and to what extent does FDI contribute to reducing CO2 emissions through investment in energy-saving and renewable energy technologies?

For each of the five clusters, different outcomes are considered and used to produce a set of indicators, described at length in dedicated chapters. While information on the country and policy context is needed for a more complete picture, the compendium of FDI Qualities Indicators shed some light on the relationship between FDI and development outcomes, allowing to identify policy priorities and possible trade-offs. Table 1.2 lists all outcomes included in this report and groups them by cluster.

The indicators are constructed from various firm- and industry-level data sources, requiring careful interpretation when comparing indicators within and across countries (Annex C provides an overview). Depending on data availability, indicators cover the entire economy or only the manufacturing sector.

Table 1.2. FDI Qualities by sustainability cluster and outcomes

Cluster	Outcomes	Country coverage
1. Productivity & innovation	Labour productivity	OECD and non-OECD
	Labour productivity growth	OECD and non-OECD
	Product innovation	non-OECD (and limited OECD)
	Process innovation	non-OECD (and limited OECD)
	R&D expenditures	OECD and non-OECD
	Use of foreign technologies	non-OECD (and limited OECD)
2. Employment & job quality	Employment expansion	OECD and non-OECD
	Job creation per unit of FDI	OECD and non-OECD
	Wage levels	OECD and non-OECD
	Job security (temporary employment)	non-OECD (and limited OECD)
	Worker safety (injuries)	OECD and non-OECD
3. Skills	Skill intensity	OECD and non-OECD
	On-the-job training	OECD and non-OECD
	Technical skill shortages/surpluses	OECD
4. Gender equality	Gender employment equality	OECD and non-OECD
	Gender wage equality	OECD and non-OECD
	Female top managers (female empowerment)	non-OECD (and limited OECD)
	Women entrepreneurship	non-OECD (and limited OECD)
5. Carbon footprint	Carbon emissions	OECD and non-OECD
	Energy efficiency	OECD and non-OECD
	Renewable energy vs. fossil fuels	OECD and non-OECD

Note: The exact country coverage for each outcome varies depending on data availability.

1.4. Measuring FDI Qualities

FDI affects socio-economic and environmental outcomes through various channels, both directly through the activities of foreign firms, and through spillovers that arise from market interactions (Box 1.2 for definitions of foreign firms, FDI impacts and spillovers used in this report). The indicators covered in this report cannot disentangle direct FDI impacts and spillovers, but provide some direction on what mechanisms are at play for a given outcome.

Box 1.2. Defining FDI and its impacts

What are foreign firms?

Firms are defined as foreign when foreign investors own ***at least 10% of their equity stocks***. This is in line with the *OECD Benchmark Definition of Foreign Direct Investment*, according to which "lasting interest" in an affiliate that is resident in an economy other than that of the direct investor is evidenced when the direct investor owns at least 10% of the voting power of the direct investment enterprise. Transactions between direct investors and such direct investment enterprises are thus included in OECD FDI statistics.

What is FDI?

In this report, the term 'FDI' is used interchangeably to refer to investment flows and stocks, according to the benchmark definition of FDI (above), and to refer to the activities of foreign affiliates of MNEs, measured as their sales. As information on sector-level FDI is scarce, greenfield investment is used as a proxy for FDI. Greenfield FDI is chosen over mergers & acquisitions (M&A) because it increases the investment base, while M&A reflects changes in ownership; however both are likely to affect sustainable development (see Annex C for more details)

What are direct impacts of FDI?

Direct impacts relate to the economic activities of foreign firms and how they affect the structure of the economy. For the purpose of this report, this includes also externalities that are the direct result of foreign firms' operations (which are often considered spillovers in the literature). For instance, by creating jobs and paying salaries foreign firms affect labour market outcomes, and through their use of energy and emissions they affect environmental outcomes. By affecting the scale of economic activity within sectors they also affect sustainability outcomes. For instance if substantial FDI goes to highly polluting sectors relative to domestic investment, FDI may cause environmental degradation. However, if foreign firms employ cleaner production processes or superior energy-saving technologies than domestic peers they may positively affect environmental outcomes even if they operate in industries that are relatively more polluting.

What are FDI spillovers?

FDI spillovers arise from the supply chain relationships of foreign firms (e.g. technology transfer), their market interactions (e.g. competition, imitation, agglomeration and market effects) and labour mobility. The basic premise underlying the existence of FDI spillovers is that foreign firms are technologically superior and (intended or unintended) benefits might spill over to local firms. Moreover by influencing supply and demand for goods, services, and workers, FDI affects their relative prices. If foreign firms offer higher wages, they put pressure on domestic firms to raise wages in order to compete for workers. Such effects can be specific to certain segments of the workforce, industries, or geographic locations. FDI spillovers are not always positive, if for instance, FDI crowds out local business or causes environmental degradation. Foreign MNEs can generate negative spillovers also through unsustainable or irresponsible practices of their supply chains.

Source: Cadestin et al. (2018); OECD (2018c)

Three indicator types

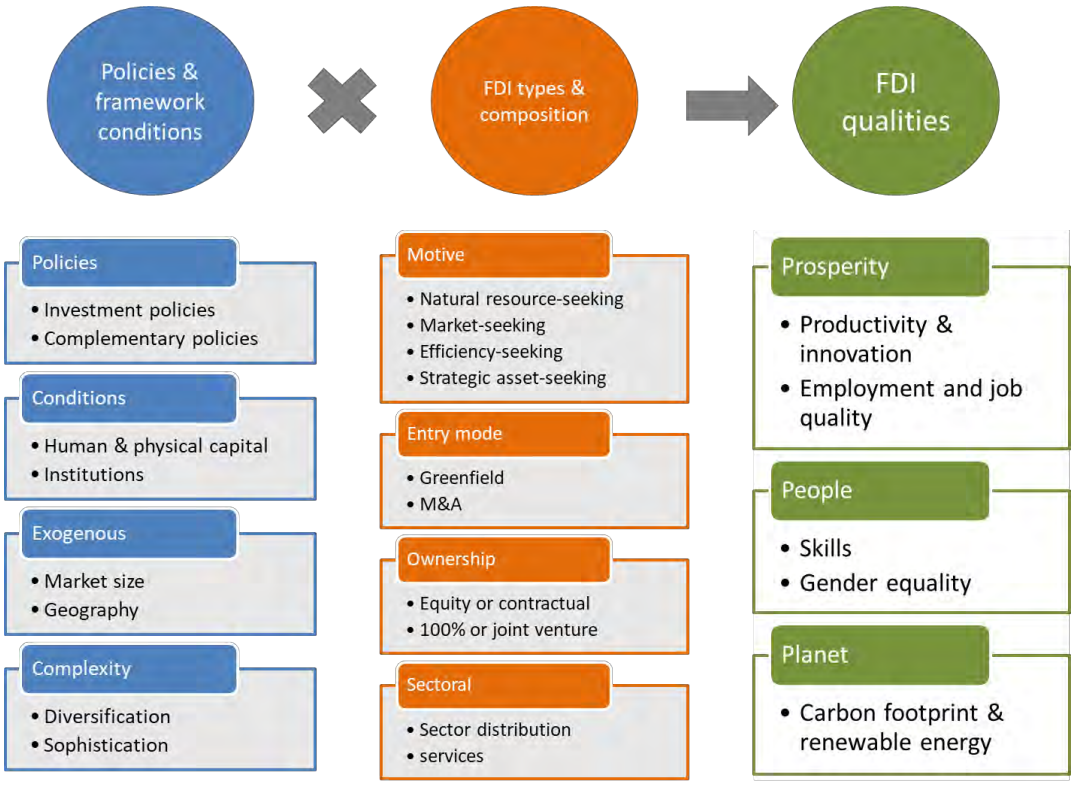
Three complementary types of indicators are developed to shed light on the relationship between FDI and development outcomes. All three types are produced for each sustainability outcome, contingent on data availability and relevance to the outcome. The three types of indicators are as follows (see Annex B for technical details):

- ***Type 1 indicators measure how foreign firms perform relative to domestic firms*:** Type 1 indicators examine the extent to which foreign firms perform differently from domestic firms, on average, thereby shedding some light on their direct contributions to socio-economic and environmental outcomes. This indicator type further illustrates the gap in capacities between foreign and domestic firms and thus further provides insights on the potential for spillovers from foreign to domestic firms. The relationship between the gap in capacities and the potential for positive spillovers is considered to be U-shaped: if the gap is very small, there is little potential for domestic firms to benefit from interactions with foreign firms, but if the gap is too big, they may not have the capacity to benefit.
- ***Type 2 indicators assess industry-level outcomes and their association with FDI:*** FDI can lead to changes in the structure of economic activity, and influence sustainable development if development outcomes vary significantly by industry, or if the activities of foreign firms influence industry-level outcomes. Type 2 indicators examine the association between FDI and industry-level outcomes. The indicator does not disentangle whether FDI affects sectoral composition or whether it affects industry-level outcomes, but it provides useful insights into whether FDI goes to sectors with higher or lower sustainable development outcomes and can thus help identify where policy action is needed.[10]
- ***Type 3 indicators assess industry-level outcomes and their association with local sourcing of foreign firms:*** Domestic sourcing, or vertical linkages of foreign firms with domestic suppliers in host economies, are an important channel through which FDI can benefit host economies. Type 3 indicators exploit information on vertical linkages with foreign firms and examines the association between domestic input sourcing of foreign firms and outcomes in supplying industries. It provides useful insights on whether development outcomes are better or worse in supplying industries that have more vertical linkages with foreign firms.

Policy guidance requires in-depth country-level analysis

The indicators covered in this report hide important country specificities with respect to overall framework conditions, institutions and policy context, economic structure, national resource endowments and, importantly, types of FDI (e.g. the entry mode and motives of FDI). FDI Qualities or the sustainability outcomes of FDI depend largely on the interaction of types of FDI with policies and conditions in host and sending countries (Figure 1.2).

Figure 1.2. FDI Qualities enabled through FDI types, policies and country conditions



Note: Bullet points under each category are indicative and not comprehensive.

Empirical research has found that different types of FDI may have different impacts in the economy, but there is a lot of heterogeneity in these results, which suggests that the policy environment plays an important role (Dunning, 2004; Lejarraga and Ragoussis, 2018). For example, adherence and implementation of RBC standards in FDI sending countries are particularly relevant to enable positive impacts of any FDI type in host economies. This does not mean that policies should favour some types of investment over others (i.e., 'cherry-picking'), rather policies should seek to maximise the potential benefits of different types of FDI and minimise or avoid related costs on the economy, society and environment.

It is important to stress that FDI Qualities Indicators need to be interpreted with caution. The indicators provide a snapshot of how FDI relates to sustainable development but do not allow for a causal interpretation or reveal the factors driving the relationship. A set of indicators may mask trade-offs if FDI has conflicting effects on different aspects of sustainable development; so, the indicators should be compared across clusters of sustainability. Moreover, any given indicator value could be viewed as desirable or not depending on the country's stage of development and policy objectives.

In order to provide country-specific policy guidance and advice, further analysis on the national context, policy framework and FDI characteristics is necessary. The discussion of FDI Qualities Indicators developed in this report points to possible and likely factors at play in selected country cases, but does not fully elaborate on these assessments.

1.5. Country-level assessments: Two illustrative examples

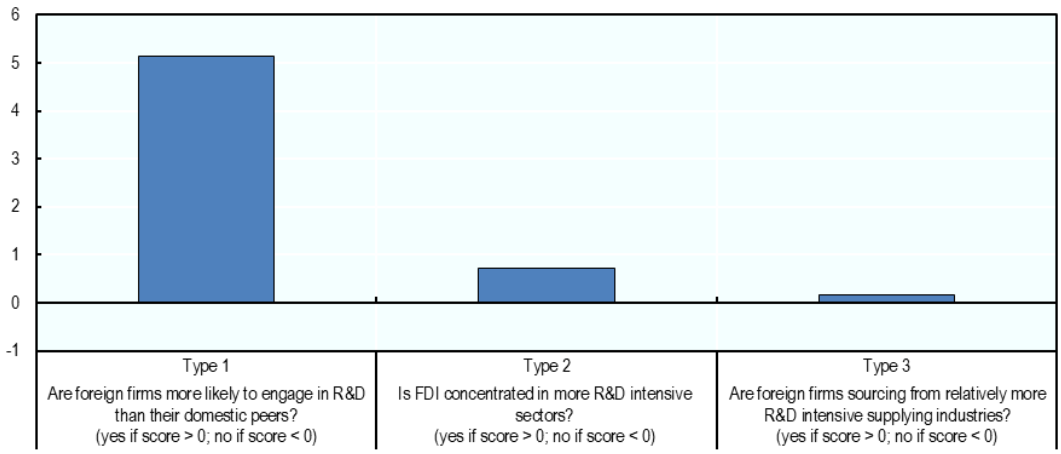
FDI Qualities Indicators have been incorporated into OECD Investment Policy Reviews, and in a new series of country-level assessments on FDI Qualities and Impacts. This section explains how indicators can be used for country-level analysis and clarifies their potential interpretations. The discussion uses the cases of Thailand and Ireland as illustrative examples that are not intended to provide an exhaustive FDI Qualities assessment of these countries, but to show how the indicators can help identify policy priorities and trade-offs.

FDI Qualities from three complementary perspectives

Thailand's current development ambitions are to move existing industries (such as automobile and electronics) from labour-intensive, routine assembly activities towards more sophisticated, automated and R&D-intensive activities. FDI can play an important role in driving this shift, and this potential can be examined through the lens of FDI Qualities Indicators.

The three indicator types on FDI and R&D activity in manufacturing are presented for the case of Thailand (Figure 1.3). The Type 1 indicator shows that foreign manufacturers in Thailand are, on average, five times more likely to invest in R&D than domestic peers. Their presence is in Thailand is therefore likely to contribute to innovation and industrial upgrading. The Type 2 indicator shows that FDI is more prevalent in industries that are more R&D-intensive in Thailand. This further supports evidence of a positive contribution of FDI to R&D activity in manufacturing. The Type 3 indicator goes one step further and measures the relationship between R&D activity and local sourcing of foreign firms. The indicator, which is close to zero, suggests that local sourcing is unrelated to R&D activity. In other words, R&D spillovers to supplying industries are likely to be limited.

Figure 1.3. Example: FDI and R&D in Thai manufacturing: Three perspectives

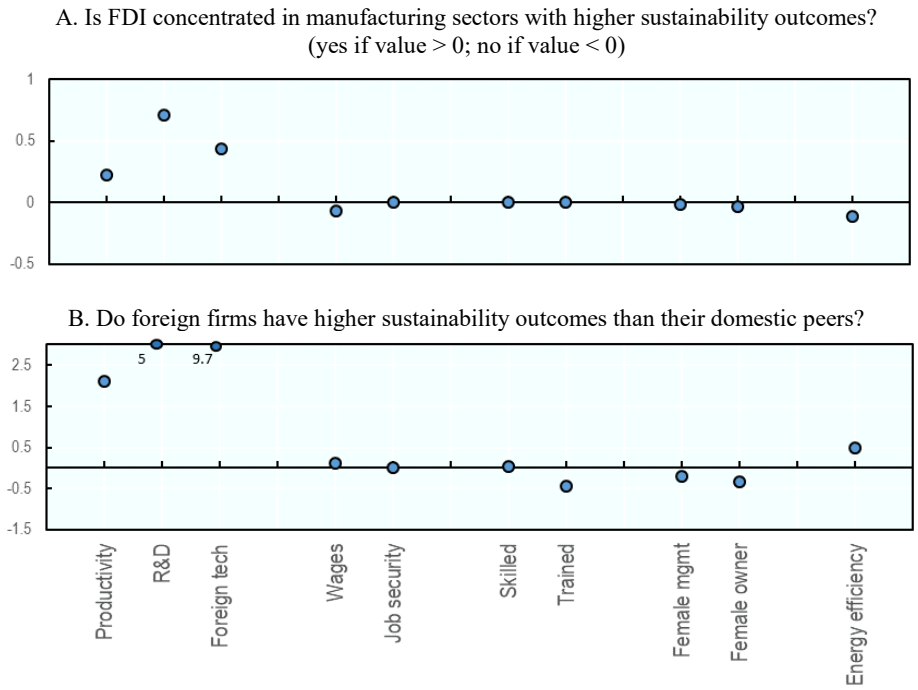


Note: The figure shows values for the three types of FDI qualities indicators (see Annex B for a description).
Source: OECD based on World Bank Enterprise Surveys

FDI Qualities across clusters and outcomes

The indicators allow comparisons within and across clusters of outcomes for a given country of interest. These comparisons can help policymakers identify where potential trade-offs exist and where action may be needed in relation to policy priorities.

Figure 1.4. Example: FDI Qualities in Thailand



Note: This figure shows Type 1 (Panel B) and Type 2 (Panel A) indicators. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

The Thai example (Figure 1.4) shows that FDI tends to be positively associated with economic outcomes (e.g. productivity, R&D, use of foreign technologies), while the relationship is unclear or negative for social and environmental outcomes (e.g. skills and training, wages, female empowerment, energy efficiency). This holds both for Type 2 indicators that measure whether FDI is concentrated in sectors with higher or lower sustainability outcomes (Panel A) and for Type 1 indicators that compare outcomes of foreign and domestic firms (Panel B). For example, FDI is concentrated in industries with higher average productivity levels, and foreign firms are also, on average, more productive than domestic firms. Conversely, there is significant difference in wages offered by foreign and domestic firms, and no indication of concentration of FDI in better or worse paying industries. These mixed findings have important implications and may help identify areas where interventions are needed to enhance FDI's contribution to social and environmental objectives.

FDI Qualities relative to reference countries

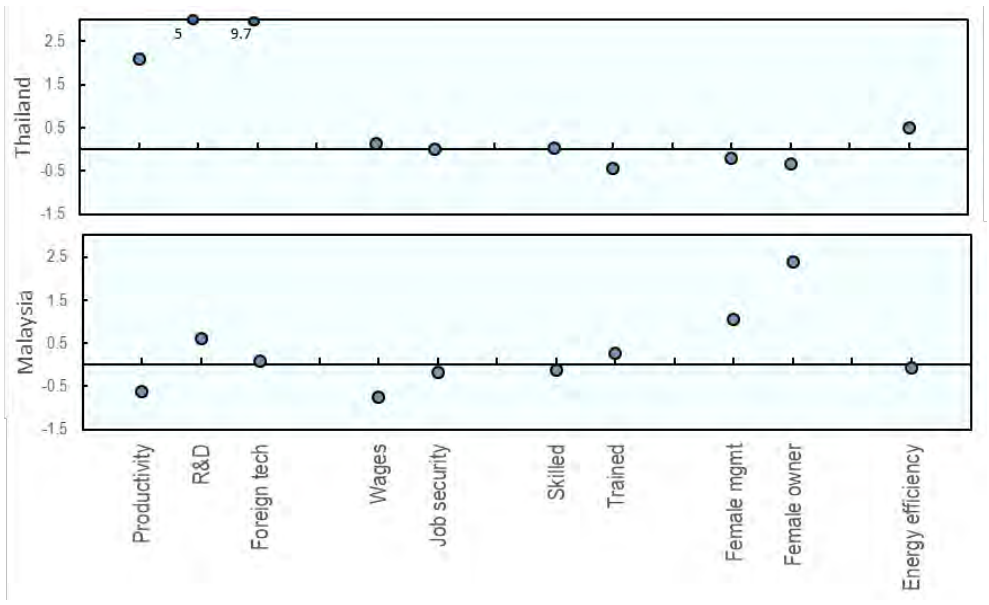
Given their broad geographic coverage, the indicators further allow for cross-country comparisons and benchmarking against reference groups. Taking into account country idiosyncrasies, this can allow constructive dialogue and peer learning among countries on what policies do or do not work to advance specific objectives.

Three examples of benchmarking against reference countries are provided for the case of Thailand. The first example compares Thailand to Malaysia across FDI Qualities (Figure 1.5). Concretely, it compares performance of foreign and domestic firms across sustainability outcomes for the two countries (as in Figure 1.4, Panel B). The indicators suggest that although Thailand and Malaysia are from the same geographic region and economic community and have comparable levels of economic development, they vary considerably with respect to FDI Qualities. Thailand seems to attract from foreign firms with the potential to contribute to productivity and innovation (as discussed above), while in Malaysia this is not the case. On the other hand, foreign firms in Malaysia are more likely to have female top managers and shareholders than domestic firms, which is not the case in Thailand. This difference could be driven by particular sectors, policies and economic realities, which are not disentangled, but the snapshot could generate a useful exchange.

The second example compares Thailand to a reference group of countries at a similar stage of development (acknowledging that they each face different economic realities) – specifically, upper middle-income countries (Figure 1.6). Unlike the previous example this benchmarking exercise does not provide information on whether foreign firms perform better or worse than domestic firms, or are concentrated in industries with better or worse average outcomes. It provides information on how Thailand performs relative to its reference group of upper middle-income countries in terms of FDI Qualities. This gives policymakers a quick picture of how their country fares relative to others across any outcome of interest. Combined with the above assessment, it may encourage informed policy dialogue among peers that can help identify good policy practices. The findings from this exercise are consistent with previous findings. Thailand tends to outperform peers in areas related to productivity and innovation, but less so when it comes to social and environmental outcomes.

Figure 1.5. Example: Comparing Thailand and Malaysia

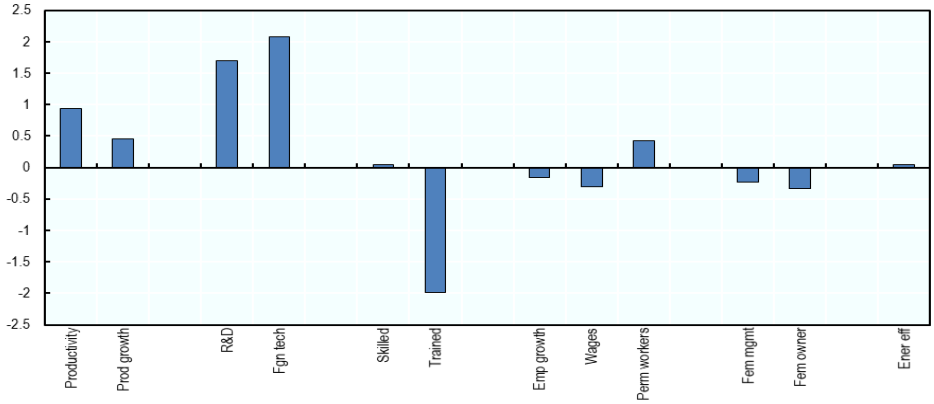
Do foreign firms have higher sustainability outcomes than their domestic peers?
(yes if value > 0; no if value < 0)



Note: This figure shows Type 1 indicators; see Annex B for a description.
Source: OECD based on World Bank Enterprise Surveys.

Figure 1.6. Example: Comparing Thailand and upper middle-income countries

Do foreign firms perform relatively better in Thailand compared to upper middle-income countries?
(yes if value > 0; no if value < 0)

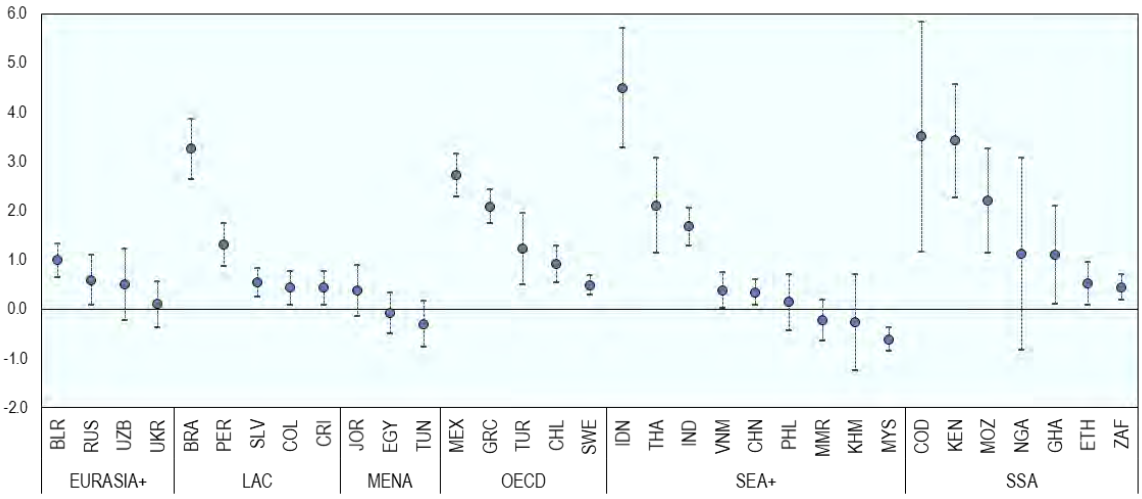


Note: This figure shows rescaled Type 1 indicators. The exercise could be repeated for Type 2 and Type 3 indicators, omitted in the interest of space.
Source: OECD based on World Bank Enterprise Surveys.

The last example considers one FDI outcome (labour productivity) and benchmarks Thailand against a host of countries from different regions (Figure 1.7). In line with findings of existing studies (see Chapter 2), it shows that for a majority of the selected OECD and developing countries, including Thailand, foreign firms are significantly more productive than domestic peers.

Figure 1.7. Example: Cross-country comparison of productivity premium

Are foreign firms more productive than their domestic peers?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 1 indicator. See Annexes B and C for a description of the methodology and data. Labour productivity: value added per employee
Source: OECD based on World Bank Enterprise Surveys.

The three examples of cross-country benchmarking highlight that FDI Qualities are very much country- and context-specific and are likely to be influenced by different policy settings and priorities. The structural and policy drivers of these differences require further analysis but the present tools provide a useful starting point for identifying of cross-country differences and initiating policy dialogue. Policymakers may use this analysis to identify relevant reference countries to further study what policies drive outcomes in those countries.

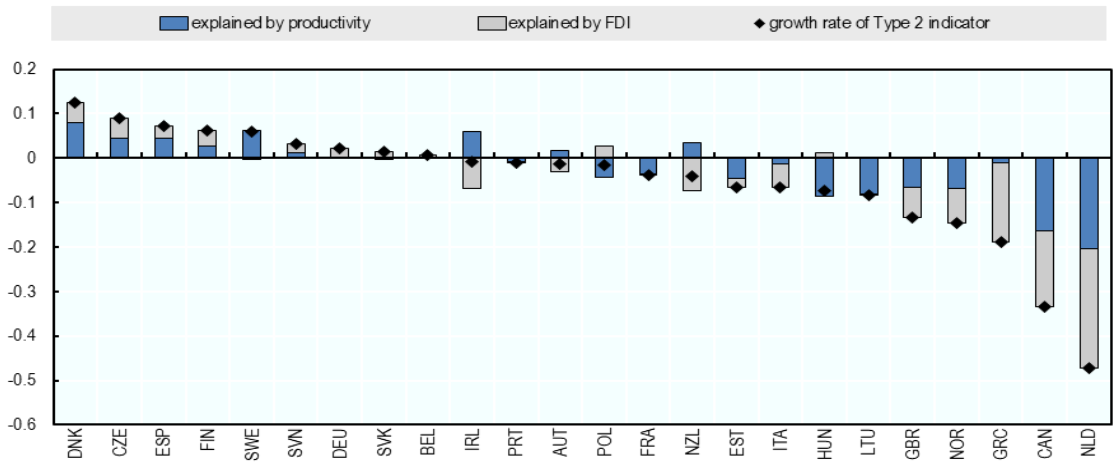
FDI Qualities over time

Examining the evolution of FDI Qualities over time allows policymakers to assess how FDI's contribution to development objectives changes in response to policy interventions. By decomposing the change in an indicator over time into the components used to construct the indicator it is possible to determine which factors are driving the change. In other words, the decomposition indicates whether an improvement or deterioration in the indicator is the result of a shift in the industries that attract FDI, or a change in industry-level performance in sectors that receive the bulk of FDI. This analysis sheds further light on how policy interventions impact FDI Qualities over time. While the time dimension is explored for some indicators included in this report, it is not the focus of this report and figures more prominently in ongoing country-level assessments on FDI Qualities.

The illustrative example considers the evolution of the indicator on industry-level FDI and labour productivity (Type 2) for selected OECD countries for which data is available (Figure 1.8). Some OECD countries have seen a positive change in the indicator (e.g. Denmark, Czech Republic and Spain), while others have seen a negative change (e.g. Netherlands, Canada, Greece). Independent of sign, a shift in the sectoral composition of FDI often explains more than 50% of the change in the indicator (grey bars). These findings provide evidence that FDI directly affects aggregate productivity by shifting the structure of economic activity, and that this aggregate impact is not always positive although industry-level impacts might be.

Figure 1.8. Example: FDI and productivity-innovation outcomes over time

Is FDI increasingly concentrated in sectors with higher labour productivity?
(yes if value > 0; no if value < 0)



Note: This figure measures the growth rate of a Type 2 indicator over 2009-15 (years vary slightly by country). See Annexes B and C for a description of the methodology and data. Labour productivity: value added per hour worked.
Source: OECD based on Financial Times' fDi Markets database and OECD National Accounts

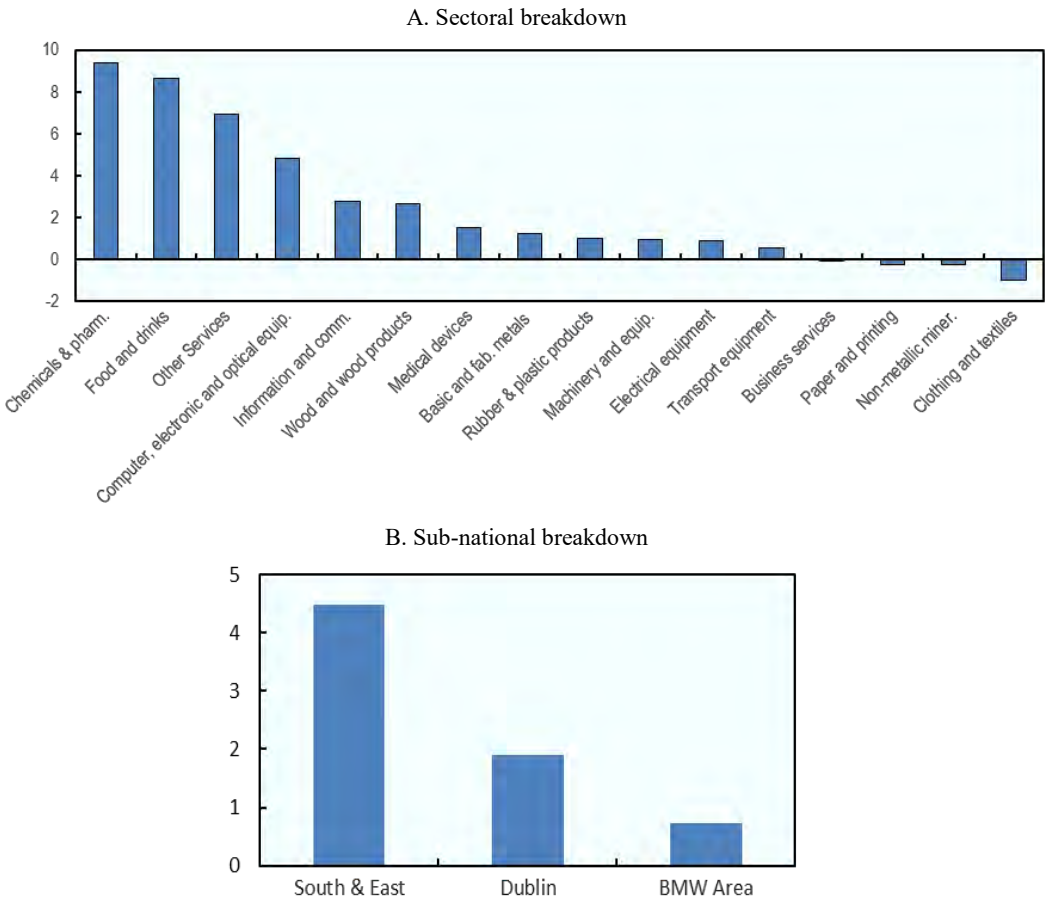
The analysis also shows the extent to which changes in industry-level productivity of sectors that receive the bulk of FDI are responsible for changes in the indicator (blue bars). For example, Denmark and Sweden exhibit productivity rises in sectors that attract significant FDI, and to a lesser extent a shift in the sectoral distribution of FDI. On the other hand, Hungary and Lithuania have seen a decline in the FDI-productivity relationship, explained almost exclusively by negative productivity growth in FDI-intensive sectors.

FDI Qualities across sectors and sub-national regions

It is also useful to study FDI Qualities at the sectoral and sub-national levels. The sectoral breakdown of FDI Qualities helps to better understand what sectors drive national sustainability outcomes. The regional analysis provides information on the extent to which the impacts of FDI vary within a given country. This analysis can inform policymakers where policy action is most needed, as a result of industry-level and territorial differences and policy priorities.

Figure 1.9. Example: FDI and labour productivity across sectors and regions in Ireland

Are foreign firms more productive than their domestic peers? (yes if value > 0; no if value < 0)



Note: This figure shows Type 1 indicators. See Annexes B and C for a description of the methodology and data. Labour productivity: value added per employee; BMW: Border, Midland and Western region.
Source: OECD elaboration based on ongoing work on FDI Qualities and Impacts for IDA Ireland

The illustrative example considers differences in firm-level productivity (Type 1) within sectors and across regions, for the case of Ireland (Figure 1.9). Foreign firms are on average more productive than domestic peers in most sectors except business services, paper and printing, non-metallic minerals, and garments and textiles (Panel A). The magnitude of the productivity premium varies considerably across sectors, and is most pronounced for chemicals and food products. The analysis suggests that foreign firms contribute to productivity in most sectors in Ireland. Policymakers can use these results to look further into the policy and non-policy drivers of productivity differentials in particular sectors.

The regional breakdown also suggests significant regional differences in productivity gaps between foreign and domestic firms in Ireland (Panel B). The gap is considerably higher in the South-East region (excluding Dublin) where foreign firms are almost five times more productive than their Irish peers, compared to Dublin and the Border, Midland and Western region (BMW). Better understanding regional differences can help policymakers leverage unique characteristics and potential of regions (location, geography, natural resources, infrastructure, etc.) to reduce regional disparities.

Notes

[1] E.g., laws to promote RBC due diligence (France, Australia, US, UK); integration of RBC in trade and investment policies (EU); industry-level RBC initiatives and the new model BIT (Netherlands).

[2] These initiatives include high-level mandates where a the group of major international businesses has pledged to tackle inequality and promote diversity in their workplaces and supply chains as part of a G7 initiative led by French President Emmanuel Macron and overseen by the OECD's Business for Inclusive Growth Initiative (https://www.oecd.org/inclusive-growth/businessforinclusive growth/ or https://www.diplomatie.gouv.fr/IMG/pdf/g7_financing_for_sustainable_development_declaration_cle0973b7.pdf). It also includes work related to crafting the narrative for UN's Roadmap for Financing the 2030 Agenda for Sustainable Development (https://www.un.org/sustainable development/wp-content/uploads/2019/07/UN-SG-Roadmap-Financing-the-SDGs-July-2019.pdf and OECD, 2018d) as well as work on the OECD Blended Finance Principles (http://www.oecd.org/development/financing-sustainable-development/blended-finance-principles/) and the OECD Social Impact Investment Initiative (https://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/social-impact-investment-initiative.htm). See Mealy (2018) for an overview.

[3] OECD work on FDI qualities was initiated jointly with the World Bank Group (Lejarraga and Ragoussis, 2018).

[4] Adaptations of the PFI in the area of investment in clean energy and agriculture already exist and provide useful examples of how the FDI Qualities Policy Toolkit could be developed.

[5] The OECD Secretariat received the mandate to setup the Network on FDI Qualities from the OECD Investment Committee (IC), to which a summary is presented after each Network meeting. Delegates from the OECD Development Assistance Committee (DAC) also engage in the Network, bringing the role of donors and donor co-operation to the discussion table.

[6] Prior to the official project start in March 2018, initial brainstorming and analysis on FDI Qualities Indicators was conducted jointly with the World Bank Group (Lejarraga and Ragoussis, 2018). Preliminary indicators were presented at the OECD Global Forum on International Investment (March 2017); the High-level Conference on Fostering Investment for Competitiveness in South East Europe (April 2017); the WTO-FIFD Workshop on Investment Facilitation for Development (July 2017); and the MENA-OECD Working Group on Investment and Trade (September 2017).

[7] Beyond implementing the FDI Qualities work for policy advice at the country or regional level, strengthened coordination with the donor community regarding financing policy implementation is envisaged, which has also been recommended by Ministers as part of the 2015 update of the Policy Framework for Investment and the related Recommendation, which recognised the IC and DAC collaboration.

[8] Sauvant and Mann (2017) studied a number of instruments affecting the sustainability characteristics of FDI, including international investment agreements; non-binding inter-governmental instruments; criteria of investment promotion agencies; international standards; and voluntary codes of international business associations, private institutional investors, individual companies and NGOs. The paper did not map these characteristics to the SDGs.

[9] FDI qualities also relate closely to RBC principles. Business conduct, if irresponsible or unsustainable, can detract from sustainable development, and policies in support of RBC are a necessary first step for achieving the SDGs. The OECD is currently developing a methodology to assess RBC in global value chains, for example, by measuring the extent to which domestic value added in exports is generated by child labour (ILO, OECD, IOM and UNICEF, 2019).

[10] The indicators provide correlations rather than estimates of causal effects of FDI on sustainability outcomes and require careful interpretation (see Annex B for an overview of limitations).

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Chapter 2. How does FDI relate to productivity and innovation?

This chapter presents indicators on how FDI relates to productivity and innovation in host countries. It explains why productivity and innovation matter for sustainable development and examines the channels through which FDI may influence both outcomes and enablers of productivity and innovation. The indicators provide some insights into which channels are likely to be at play, identify varying outcomes across OECD and selected non-OECD countries, and provide early guidance for policy priorities.

2.1. Summary

This chapter presents a set of country-level indicators that measure how FDI is associated with productivity and innovation in host countries, and may thereby contribute to or inhibit progress towards the Sustainable Development Goals (SDGs). A better understanding of the nature of the relationship between FDI and productivity and innovation can help policymakers identify where policy action is needed to align FDI attraction efforts with policy objectives.

The indicators suggest that FDI is associated with higher productivity and innovation in OECD countries, as foreign firm activity is concentrated in sectors with higher labour productivity and R&D intensity. In contrast, in many developing countries, foreign manufacturers operate in sectors with relatively lower labour productivity and innovation capacity; notably, in a number of Southeast Asian and Sub-Saharan African countries.

The results also reveal that FDI-intensive sectors often experience higher growth in productivity and R&D intensity compared to other sectors. This can be partly due to foreign firms' performance premium over domestic firms. Foreign firms are, on average, more productive and innovative than their domestic peers in both OECD and developing countries. This may be expected as affiliates of foreign firms are often larger and bring more advanced technologies and managerial knowhow from their headquarter operations, which allows them to be more productive than domestic firms.

The indicators also show that the productivity and innovation gains of FDI can vary greatly in magnitude and do not always materialise. These differences have important implications: Foreign firms support overall productivity and innovation outcomes, but excessive premia over domestic peers could impede forging linkages and knowledge spillovers between foreign and domestic firms. Excessive performance gaps may also lead to crowding out effects – where some domestic firms can no longer compete in the market.

Domestic supply chain linkages of foreign firms are often a policy objective in itself as they generate a market for selling for domestically operating firms, but domestic linkages are also likely to involve knowledge and technology transfers from the foreign affiliate to its domestic supplier. The analysis reveals significant domestic linkages of foreign firms across OECD and developing countries, although the extent of these linkages varies once again considerably by country.

2.2. Conceptual framework

Productivity and innovation figure prominently in the Sustainable Development Goals or SDGs, particularly in SDG 8 (economic growth) and SDG 9 (industry and innovation). These goals encompass boosting overall competitiveness, reducing regional disparities, and raising productivity and innovation capacity of the typically more constrained small and medium-sized enterprises (SMEs). Enhanced productivity and innovation are closely tied to better paid and more stable jobs (Chapter 3), greater human capital and skills (Chapter 4), and more environmentally sustainable production (Chapter 6). Productivity and innovation may thus support progress across a broader set of development objectives, some of which are examined in this report, although causality is likely go in both directions.

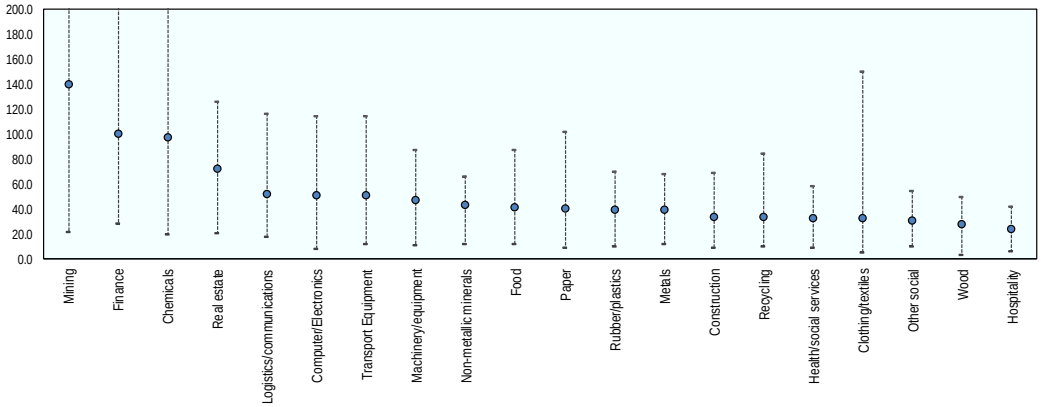
Recent OECD work on 'The Future of Productivity' shows that productivity growth has decelerated globally but the main source of the productivity slowdown is not so much a decline in innovation, but rather a drop in the pace at which innovations spread throughout the economy. Productivity growth of the globally most productive and innovative firms

remained robust in recent years but the gap between these highly productive and innovative firms and the rest has widened (OECD, 2015).

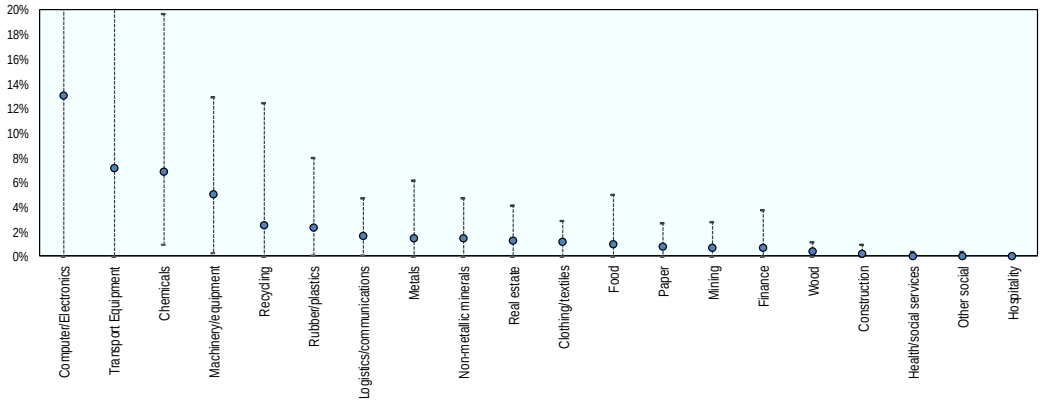
Productivity levels reflect a country's stage of economic development, and resulting competitive edge and economic structure. As an economy develops, its structure typically shifts from agriculture, to light manufacturing, to heavier manufacturing, and eventually to high-tech manufacturing and services, reflecting increasing levels of productivity and innovation capacity (OECD, 2014a). For simplicity, this chapter considers labour productivity, or value added per unit of labour, as a proxy for productivity (Box 2.1). Labour productivity varies considerably across sectors as well as for different activities within sectors, as a result of varying levels of labour intensity. For instance, mining and finance in some countries display similar levels of labour productivity as garments and hospitality in other countries, possibly due to different areas of specialisation within the industry and different firm-level efficiency characteristics (Figure 2.1, Panel A). Industry-level productivity growth can arise from higher firm-level efficiency, or a shift to higher-value added activities within existing or new value chains. Firm-level efficiency improvements can be driven by new knowledge and technology, better inputs, a more capable workforce, or competition from more productive new entrants in the market.

Figure 2.1. Labour productivity and R&D intensity across sectors

A. Average labour productivity (value added per hour worked) in OECD countries, by sector



B. Average R&D intensity (expenditures on R&D per unit of value added) in OECD countries, by sector



Note: Most recent year used for each country (2015, 2016, or 2017). Spread indicates minimum and maximum productivity levels (Panel A) and R&D intensity (Panel B) across OECD countries.
Source: OECD based on OECD National Accounts.

R&D intensity, defined as R&D expenditure per unit of value added, varies significantly across sectors (Figure 2.1, Panel B). R&D can apply to any sector, but R&D expenditures tend to be higher in some manufacturing industries, such as computer equipment and electronics or transport equipment. Just like for productivity, R&D intensity also varies within industries. In fact in some countries R&D intensity in the food industry (where it is typically low) is higher than average R&D intensity in machinery (which is typically high). Cross-country differences in R&D intensity are likely to reflect their relative positioning in the value chains (Belderbos et al., 2016).

Box 2.1. Defining productivity and innovation

For the purpose of this report, **productivity** is defined as value added per unit of labour, where labour is measured as total hours worked or number of employees depending on data availability. It is important to stress that labour productivity is an incomplete gauge of efficiency. Labour productivity can rise due to increased capital spending (e.g. giving workers more machines), but does not mean all factors of production are being used more efficiently (e.g. using better machines). Total factor productivity or measures of return on capital (e.g. incremental capital-output ratios) would better capture efficiency improvements for capital-intensive industries like mining.

According to the OECD's Oslo Manual, **innovation** is defined as the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organisational method in business practices, workplace organisation, or external relations (OECD, 2005). Patented intellectual property is sometimes used as an indicator for innovation output, although not all innovations are protected with patents. A broad set of tangible and intangible assets with embedded knowledge – ranging from human and organisational capital, existing technologies to R&D – need to be accumulated and combined to yield innovation outputs (Cirera and Maloney, 2017). This report focuses on two measures of innovation: process innovation and R&D intensity, or R&D per unit of value added.

FDI can raise productivity and boost innovation capacity

This chapter focuses on the impact of FDI and foreign firm activity on productivity and innovation in host economies. FDI may affect productivity and innovation directly through the activities of foreign firms and via knowledge spillovers on domestic firms in host economies:

- **FDI can directly affect productivity and innovation:** Foreign firms' direct impact relates to their own activities and how they contribute to aggregate and sectoral productivity and innovation (Cadestin et al., 2018). FDI directly relates to improved productivity and innovation at the industry or aggregate level if foreign firm activity is concentrated in sectors that are typically more productive and innovative.[1] The opposite holds if FDI is concentrated in low-value added, less innovative, sectors. Thus, FDI can shift the sectoral composition towards more or less productive or innovative activities. Additionally, foreign firms often enjoy a productivity and innovation premium over their domestic peers in host economies that may be related to their larger size, higher quality inputs and processes, better technologies and human capital (Box 2.2). A second direct productivity and innovation impact may therefore take place within sectors where (more productive and innovative) foreign firms are operating.
- **Foreign firms may affect productivity and innovation via positive or negative spillovers on domestic firms:** Spillovers occur either through supply chain

linkages and partnerships or via competition and imitation effects and knowledge transfers resulting from labour mobility. In order to tap into upstream and downstream linkages with foreign firms, domestic firms often need to meet certain preconditions, such as product quality, supply and storage capacity, knowhow, access to technology, including digital technologies, and access to finance. Positive FDI spillovers are more likely to occur when domestic firm capabilities are closer to the foreign firm frontier. That is, domestic firms' absorptive capacity (e.g. productivity, innovation capacity, technology) determines whether foreign firms are able to engage in supply chains linkages and partnerships with domestic firms (Box 2.2). At the same time, FDI can crowd out local enterprises, for instance by increasing foreign imports or competing for local skills. Accordingly, FDI spillovers can be uneven across domestic firms, and potentially exacerbate existing disparities.

Box 2.2. Evidence on FDI impacts and spillovers

Positive FDI spillovers may exist but are not a given

The literature on FDI impacts on productivity and innovation is vast. Approaches used to estimate FDI spillovers diverge along different literature strands, and their conclusions tend to be incomplete and are often contradictory (Alfaro, 2017; Tusha et al., 2017). The mainstream approach to estimate FDI spillovers uses an industry-level measure of FDI presence and assesses FDI's effect on a given performance indicator at the firm level, often labour productivity or R&D expenditures. Although findings from empirical research adopting this approach have been diverging and inconclusive, several patterns arise. Evidence for positive intra-industry spillovers are rarely found, which is often attributed to the fact that foreign firms are protective of their technology advantage and try to limit knowledge spillovers to domestic competitors. Using this approach, no horizontal spillovers across the manufacturing sector are found in Indonesia (Blalock and Gertler, 2008), while there is evidence that domestic firms may even experience productivity decreases, as fierce competition with more superior foreign firms drives them out of the market (Aitken and Harrison, 1994). The picture is more positive when considering vertical spillovers, especially to upstream domestic suppliers, which are attributed to an effort of foreign firms to raise the productivity and innovation capacity of their suppliers and improve the quality of their inputs through knowledge transfers (Javorcik, 2004; Blalock and Gertler, 2008).

Domestic firms' absorptive capacities play a role

Other research has refined these findings by allowing firm heterogeneity to play a role in the realisation of benefits from FDI spillovers. Several studies suggest that the transfer of technology is more effective when local firms possess previously accumulated knowledge and innovative capacities. This set of knowledge and skills is identified by the literature as absorptive capacity. Specifically, absorptive capacity is the ability to utilise available information or knowledge that is transferred from other firms (Cohen and Levinthal, 1990). It involves the capacity to acquire, assimilate and exploit the value of the information and knowledge (Todorova and Durisin, 2007). Absorptive capacity is determined by firm-specific factors and is a function of the technology gap between domestic and foreign firms.

A number of studies show that FDI is more likely to generate positive productivity spillovers when the technology gap between foreign and domestic firms is not too large and domestic firms have enough absorptive capacity (Abraham et al., 2010; Farole and Winkler, 2014; Girma et al., 2008; Halpern and Murakozy, 2007). The technology gap between foreign and domestic companies is often measured by the gap between their respective productivity levels. Several studies show that relatively high productivity is needed for domestic firms to reap FDI related spillovers (Keller and Yeaple, 2009).

The literature identifies a number of characteristics that seem to affect the absorptive capacity of domestic firms. Several studies highlight positive FDI spillovers in companies that invest in human capital and in research and development as opposed to companies that do not (OECD-UNIDO, 2019; Meyer and Sinani, 2005; Ben Hamida and Gugler, 2009; Girma et al., 2008). An additional determinant of absorptive capacity identified by the literature is company size (Knell and Rojec, 2007). Bigger firms tend to have higher level of absorptive capacity (Ornaghi, 2006, Tusha et al. 2017) and are also more innovative (Veugelers and Cassiman, 2004).

Another key factor which affects the ability of domestic firms to reap the benefits of foreign spillovers is their geographical distance from foreign affiliates. Domestic firms which are located near foreign firms are more likely to benefit from knowledge spillovers than other firms (Lembcke and Wildnerova, 2019, forthcoming; Görg and Greenaway, 2004; Girma and Wakelin, 2002; Halpern and Murakozy, 2007). Geographical proximity is required to facilitate knowledge spillovers, especially as far as tacit knowledge is concerned (Jacobs, 1993). Relatedly, Crescenzi et al. (2018) find that foreign top-innovation MNEs have a significantly smaller impact on local innovation than other MNEs and that knowledge flows to geographically closely located domestic firms are higher when regions host smaller and non-frontier innovator MNEs. This is explained by lower technology gaps between non-frontier MNEs and domestic firms and thus improved absorptive capacities of domestic firms, enabling them to benefit from the presence of foreign firms.

Supply chain linkages are associated with positive spillovers

Research on vertical linkages with foreign firms has often produced contradictory and incomplete findings, in part as a result of too aggregated data. Gorodnichenko et al. (2015) show that using a mainstream approach of industry-level data to measure FDI presence underestimates FDI spillovers (partly because these effects are dependent on geographic proximity, which is not captured by Input-Output tables). A strand of literature tries to account for this by controlling for vertical linkages at the firm level. Using survey data on foreign affiliates in five transition economies, Gentile-Ludecke and Giroud (2012) find that linkages are indeed important for knowledge transfer. Potter et al. (2003) make the same finding with survey data from the UK. Both studies use self-reported measures of spillovers, rather than an objective measure of supplier productivity. Thus, it could be that the observed variation is not so much a result of actual variation in performance, as a reflection of variation in the subjective perceptions of foreign affiliates and suppliers. Studies that make use of data from an UNIDO Investor Survey in sub-Saharan African countries find a positive association between linkages and labour productivity (Sanfilippo and Seric, 2016), as well as suppliers' product and process innovation (Görg and Seric, 2016). Using data from surveys of enterprises in Thailand and Azerbaijan reveal that linkages are associated with above average firm productivity. Firms that enjoy some form of trade, partnership or FDI linkage experience an average productivity premium of a factor of at least eight relative to firms that do not (OECD-UNIDO, 2019).

2.3. The indicators

This chapter develops a set of country-level indicators on how FDI is associated with productivity and innovation. The indicators cannot fully disentangle direct impacts from the activities of foreign firms from FDI spillovers, but they provide some direction as to what mechanisms could be at play. In particular, the following questions are examined:

(1) Is FDI observed in sectors that are more or less productive and innovative? Has this changed over time?

(2) Is FDI concentrated in sectors that have experienced productivity and innovation improvements or declines over time?

(3) Are foreign firms more or less productive and innovative than domestic firms?

(4) Does FDI generate productivity and innovation spillovers to domestic firms?

The indicators focus on several measures that serve as proxies for productivity and innovation capacity at the national level. These measures include: labour productivity, process innovation, and R&D intensity (Box 2.1).[2]

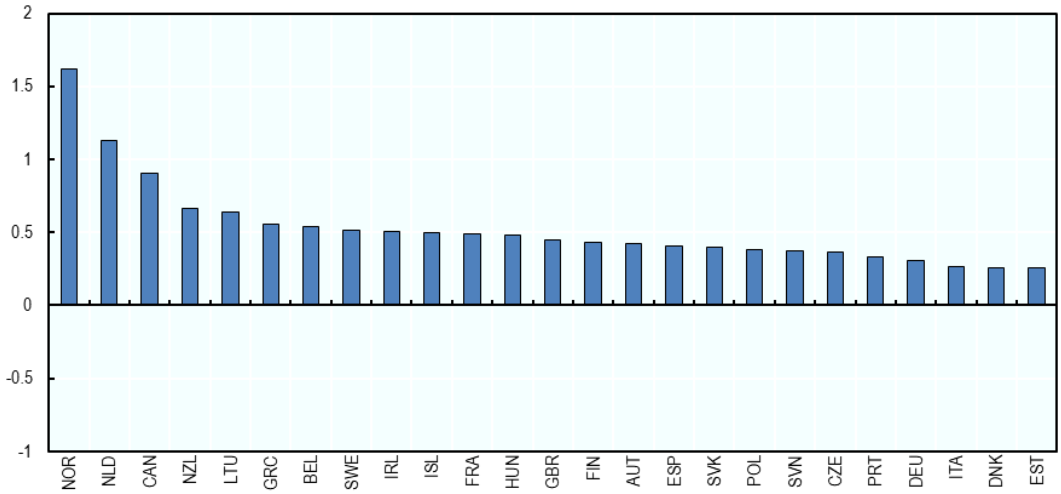
FDI is concentrated in productive and R&D-intensive sectors in the OECD

A first indicator examines whether, in OECD countries, FDI is found in sectors with higher or lower average labour productivity, relative to the overall economy.[3] Across OECD countries, inward FDI is concentrated in sectors with relatively higher labour productivity levels, as shown by the positive sign of the indicator (Figure 2.2, Panel A). These sectors include mining, chemicals, finance, real estate, telecommunications, and logistics. The extent of FDI concentration in highly productive sectors varies across OECD countries, as revealed by the magnitude of the indicator. Generally it tends to be higher in countries with a larger natural resources sector, where highly profitable and capital-intensive mining and extraction activities attract significant foreign investment. This is the case of Norway, the Netherlands and Canada, where the magnitude of the indicator is highest, and labour is at least twice as productive in natural resources compared to any other sectors in these countries. The indicator value is lower in countries with smaller mining sectors such as in Denmark and Italy. In these countries, the positive correlation between FDI and labour productivity is driven primarily by FDI in real estate, logistics and communication, as well as relatively more productive manufacturing activities such as computer equipment and electronics and machinery.

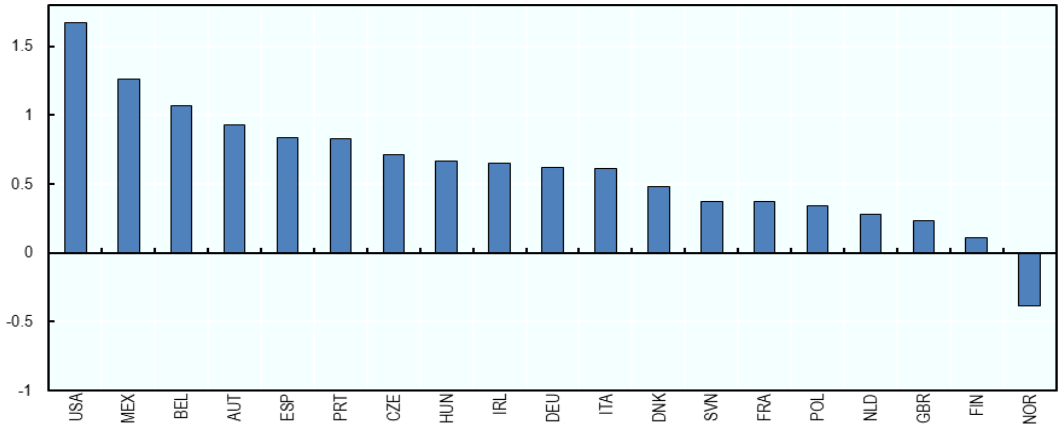
A similar indicator combines industry-level FDI and expenditures on R&D per unit of value added, and examines whether sectors that receive larger FDI shares exhibit higher or lower R&D intensity. FDI is associated with industries that have relatively higher R&D intensity in almost all OECD countries (Figure 2.2, Panel B). In the United States, where the relationship is most pronounced, high-tech and R&D-intensive manufacturing sectors (including computer equipment and electronics, chemicals, transport equipment, recycling and machinery), logistics and communications account for more than 50% of greenfield FDI. In each of these sectors, R&D intensity levels are at least twice as high in the US as the OECD average. In other countries, the distribution of FDI is less skewed towards R&D-intensive sectors (e.g. Netherlands, United Kingdom, and Finland). Norway is the only exception in which the relationship between FDI and R&D-intensity is negative; this is, again, a result of the exceptionally high share of greenfield FDI stocks in mining (almost 60%), one of the least R&D-intensive sectors (particularly when measured in relative to value added generated by the sector). Taking out mining would reveal a different picture as Norway attracts significant FDI in logistics and communications, which are relatively R&D-intensive. Nonetheless, manufacturing industries that are more R&D-intensive attract relatively little FDI in Norway.

Figure 2.2. FDI and productivity-innovation outcomes in selected OECD countries

A. Is FDI concentrated in sectors with higher labour productivity?
(yes if value > 0; no if value < 0)



B. Is FDI concentrated in more R&D intensive sectors?



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. Labour productivity: value added per hour worked. R&D intensity: business expenditure on R&D as % of value added.
Source: OECD based on fDiMarkets and OECD National Accounts.

…but this is not the case in many developing countries

Another set of indicators expands the analysis to developing countries, focusing on the activities of foreign manufacturing firms. The outcomes considered are labour productivity (value added per employee), process innovation (share of firms that report process innovation) and R&D investment (share of firms that report R&D investments).[4] Sales of foreign-owned firms are used to measure foreign firm activity (or FDI exposure).

Foreign manufacturers do not always operate in sectors with higher average labour productivity (Figure 2.3, Panel A). For many countries, the association between foreign manufacturing activity and labour productivity is negative, particularly in Latin America, Southeast Asia and Sub-Saharan Africa, as well as in China, India, Tunisia and Turkey.

Significant cross-country differences are also observed when looking at measures of innovation capacity (Figure 2.3, Panel B and C). Only a few countries (e.g. Belarus, El Salvador, Peru, Estonia and Indonesia) attract FDI in manufacturing industries in which process innovation is more common, and the relationship is clearly negative in a number of Southeast Asian and Sub-Saharan African countries as well as in Uzbekistan, Tunisia, Poland and Mexico. In terms of R&D investment in manufacturing, the strong positive correlation still holds in most OECD countries for which data are available, as well as a number of non-OECD countries, including Belarus, Uzbekistan, Uruguay, Colombia, Egypt, Thailand, Nigeria and Ivory Coast. For many Southeast Asian and Sub-Saharan African countries, instead, the relationship is negative.

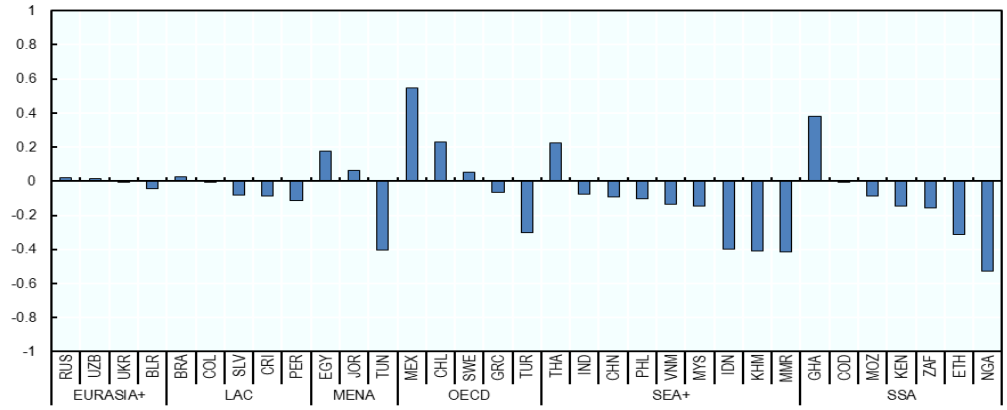
The negative indicators observed in developing countries reflect the large contribution of foreign firm activity to labour-intensive industries, such as food processing and garments, where innovation activity is expected to be lower than in capital-intensive manufacturing.[5] An illustrative example is Cambodia, where the bulk of manufacturing FDI is in garment production. Foreign investment has, in other words, contributed to expanding this industry with limited innovation potential, as a result of comparatively low labour costs and generous investment incentives. As wages rise FDI in the industry will weaken and the government will have to find a new approach that supports diversification into other activities with more innovation potential (OECD, 2018c).

Comparing the indicators for R&D intensity with those for labour productivity shows that foreign investment in R&D-intensive manufacturing often pays off in terms of labour productivity. For example, in Mexico, Thailand, Chile and Egypt, FDI is concentrated in R&D-intensive manufacturing sectors (transport equipment, electronics and chemicals), which are also those with higher average labour productivity. By contrast, countries that attract FDI in sectors that are less likely to generate R&D activities (e.g. typically food and garments) also exhibit lower labour productivity in those sectors. This is the case for Ethiopia, Indonesia and Myanmar, for example.

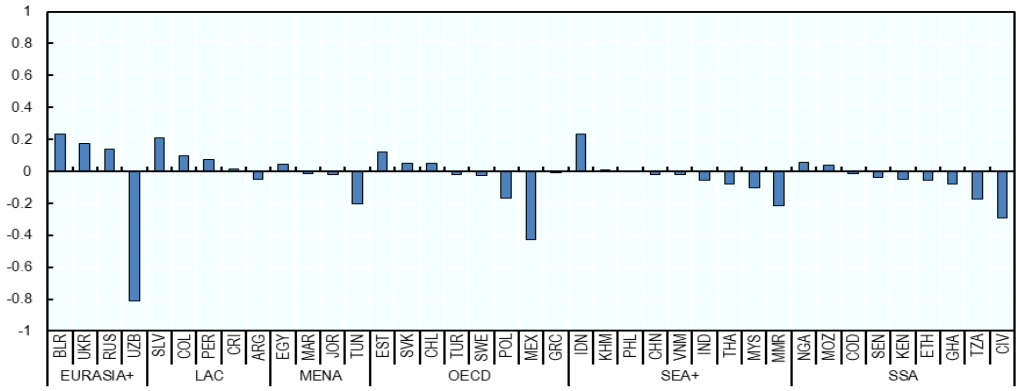
The indicators provide a snapshot of how FDI relates to productivity-innovation outcomes at a given point in time. A positive association may be the policy objective, if FDI is expected to enhance aggregate productivity and innovation capacity. But FDI can also boost competitiveness and support upgrading in lower-value added sectors, both directly through the activities of foreign firms or through spillovers. The sign of the indicator may thus not always reflect whether FDI meets policy priorities, which would require more granular analysis of FDI's contribution to productivity and innovation objectives.

Figure 2.3. FDI and productivity-innovation outcomes in manufacturing

A. Is FDI concentrated in sectors with higher labour productivity?
(yes if value > 0; no if value < 0)



B. Is FDI concentrated in sectors where process innovation is more likely?
(yes if value > 0; no if value < 0)



C. Is FDI concentrated in more R&D intensive sectors?
(yes if value > 0; no if value < 0)

Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. Labour productivity: value added per employee. Process innovation: share of firms reporting process innovation; R&D intensity: share of firms that invest in R&D.
Source: OECD based on World Bank Enterprise Surveys.

Shifts in FDI composition affect productivity and innovation

The above analysis relates the composition of FDI to productivity and innovation. A positive indicator reflects FDI in more productive and innovative sectors (e.g. transport equipment, chemicals, finance, communications), and negative value indicates FDI in lower-value added sectors (e.g. food, garments, healthcare, hospitality services). Introducing a time dimension and decomposing the evolution of the indicator into its various components sheds further light onto whether observed changes are explained by changes in overall productivity or by changes in the structure of FDI.

Two additional indicators (available for OECD countries only) underline that the structure of FDI explains an important part of the association of FDI to productivity and innovation (Figure 2.4). Some OECD countries have seen a positive shift in the relationship (e.g. Denmark, Czech Republic and Spain in the case of productivity; and Hungary and Poland in the case of R&D intensity), while others have seen a negative shift (e.g. Netherlands, Canada, Greece for productivity; and Japan, Latvia, and Korea for R&D intensity). Independent of the direction of change, a shift in FDI's sectoral composition often explains more than 50% of the change (grey bars).

These findings provide further evidence that FDI affects aggregate productivity and innovation capacity, particularly greenfield FDI projects that may otherwise not materialise.[6] The findings also highlight that these direct effects on aggregate outcomes are not always positive. Negative effects at the aggregate level may nevertheless still involve positive impacts at the sectoral level as discussed below.

…but so does productivity growth in FDI-intensive sectors

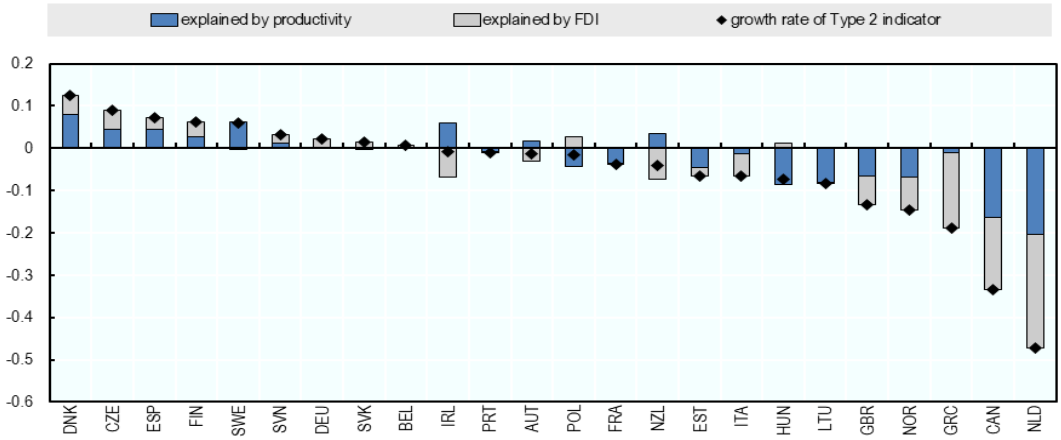
The indicators also show the extent to which the relationship has changed over time as a result of productivity and R&D intensity dynamics within sectors that have received the bulk of FDI (Figure 2.4, blue bars). For example, Denmark and Sweden have benefited particularly from enhanced productivity within FDI dominated sectors and less so due to a shift in the sectoral distribution of FDI (Panel A). On the other hand, Hungary and Lithuania have seen a decline in the positive FDI-productivity relationship and this decline is explained almost exclusively by negative productivity growth in FDI-intensive sectors.

In the area of R&D intensity, the within sector effect is particularly pronounced in Hungary and Poland (Panel B). Both countries have experienced an increasing positive relationship between FDI and R&D intensity over the past decade through strong R&D upscaling in FDI dominated sectors. At the same time, Hungary and Poland have seen a shift in the FDI composition towards sectors that are less R&D intensive, which is counter-balancing the positive within sector effect and thus lowering the overall value of the indicators.

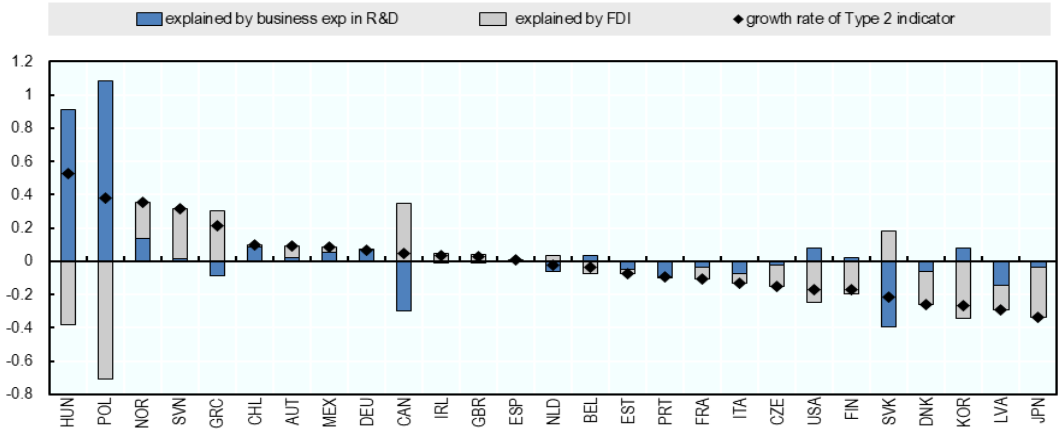
In Slovakia and Canada, the opposite has happened during the same period: FDI dominated sectors have become less R&D intensive but this negative trend has been counter-balanced with shifts towards generally more R&D intensive sectors. In Slovakia, this phenomenon may be explained with anecdotal evidence that foreign firms, for example in automobile manufacturing, are typically not engaging in R&D activities in Slovakia, nor are they sourcing these services locally. As a result, existing local R&D capacities may be reduced in these sectors (Vlčková, 2019). At the same time, Slovakia attracts investment in R&D-intensive IT services, which could explain the positive across sector effect.

Figure 2.4. FDI and productivity-innovation outcomes over time

A. Is FDI increasingly concentrated in sectors with higher labour productivity?
(yes if value > 0; no if value < 0)



B. Is FDI increasingly concentrated in more R&D-intensive sectors?
(yes if value > 0; no if value < 0)



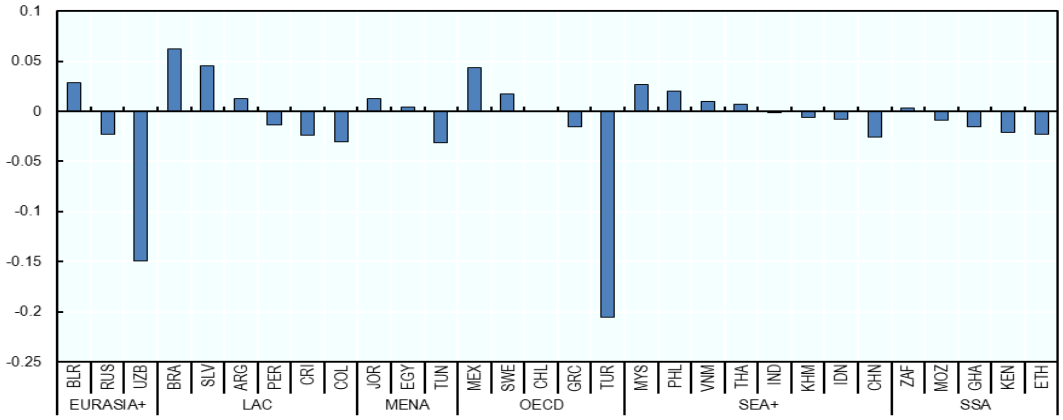
Note: This figure measures the growth rate of a Type 2 indicator over 2009-15 (years vary slightly by country). See Annexes B and C for a description of the methodology and data. Labour productivity: value added per hour worked. R&D intensity: business expenditure on R&D as % of value added.
Source: OECD based on Financial Times' fDi Markets database and OECD National Accounts.

A related indicator measures the extent to which FDI is more prevalent in manufacturing sectors with relatively higher labour productivity growth, for selected OECD and non-OECD countries. It shows that the relationship between FDI and productivity growth in is positive just under half of the 28 countries considered, and negative in the other half, with no systematic division across regions (Figure 2.5). In Turkey, the stark negative value is a result of substantial FDI in the garment sector (75% of manufacturing FDI), which experienced low productivity growth over the period of observation (2010-13).

Overall, the analysis over time suggests that, in FDI-intensive sectors, growth in productivity and R&D intensity differs from those sectors that receive less FDI. While no causal relationship can be identified, it is likely that FDI affects changes in productivity and R&D outcomes at the sector level. This analysis does not show whether the role of FDI is direct or rather related to spillovers on domestic firms.

Figure 2.5. FDI and productivity growth in manufacturing

Is FDI concentrated in sectors with higher growth in labour productivity?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. Labour productivity: value added per employee; labour productivity growth: compound annual growth of labour productivity over 3 years.
Source: OECD based on World Bank Enterprise Surveys.

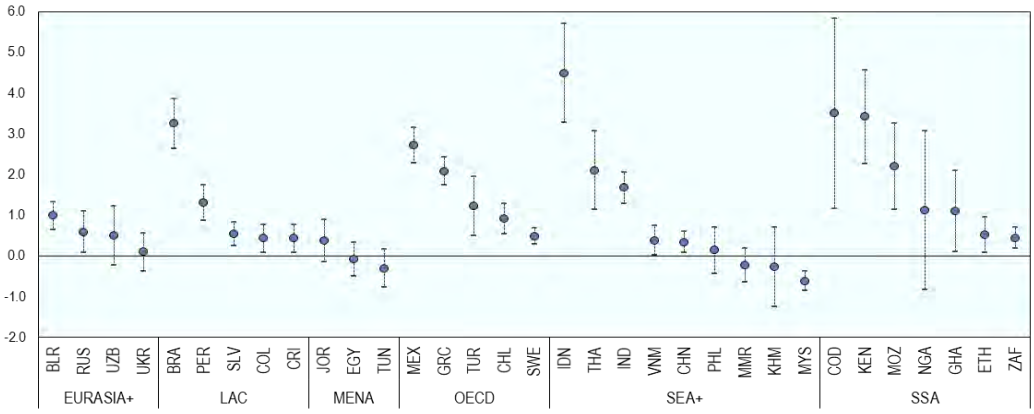
Foreign manufacturers are more productive than domestic peers

There is ample evidence that firms that invest abroad are more productive and are able to incur the fixed costs associated with outward investment activities, such as setting up distribution networks overseas. Numerous studies also show that it is not only the MNEs as international corporate groups but also their affiliates abroad that are generally more productive in their operations than domestic firms in host economies (Tusha et al., 2017). Affiliates of foreign firms bring more advanced technologies and managerial knowhow from their headquarters operations, which allows them to produce more productively than domestic firms (OECD-UNIDO, 2019).

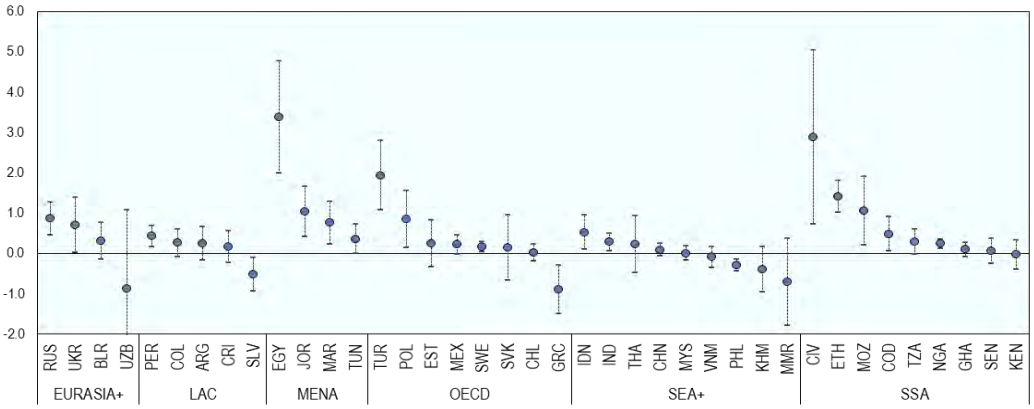
A set of indicators compares productivity and innovation outcomes of foreign firms with those of domestic firms in manufacturing. The indicators show the extent to which foreign firms have a performance premium or gap relative to domestic firms, and whether these differences are statistically significant. With some exceptions, foreign firms are on average more productive and innovative than their domestic peers (Figure 2.6). This is particularly the case for labour productivity (Panel A) as well as R&D intensity (Panel C) but somewhat less for process innovation (Panel B). Foreign firms have a statistically significant labour productivity premium over domestic firms in all Latin American and OECD countries as well as in many Southeast Asian and Sub-Saharan African countries selected for the analysis.

Figure 2.6. Productivity and innovation outcomes of foreign and domestic manufacturers

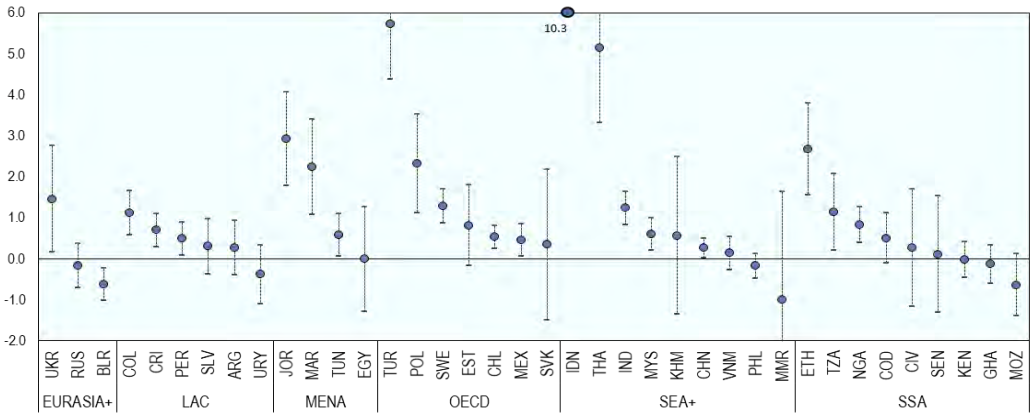
A. Are foreign firms more productive than their domestic peers?
(yes if value > 0; no if value < 0)



B. Are foreign firms more likely to engage in process innovation than their domestic peers?
(yes if value > 0; no if value < 0)



C. Are foreign firms more likely to engage in R&D than their domestic peers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Labour productivity: value added per employee. Process innovation: share of firms reporting process innovation. R&D intensity: share of firms that invest in R&D.
Source: OECD based on World Bank Enterprise Surveys.

For example in the Democratic Republic of Congo (DRC), the significant productivity premium of foreign firm is driven by FDI in mining-related manufacturing (such as metals and non-metallic minerals). These activities dominate the manufacturing sector in DRC and depend extensively on foreign investment. More than 80% of all manufacturing investments are conducted by affiliates of foreign companies as a result of FDI reforms and investment facilitation efforts over recent years.[7] In Indonesia, foreign manufacturers are also considerably more productive than domestic firms. Key sectors of manufacturing investments by foreign firms include chemicals and food processing. The output of affiliates of foreign firms in these sectors is many times higher than that of domestic firms.

In the area of R&D intensity, the significant performance premium holds for most OECD as well as for a number of Latin American, MENA, Southeast Asian and Sub-Saharan African countries (Figure 2.6, Panel C). Foreign firms are 3-4 times more likely to engage in R&D in Jordan, Morocco, Poland and Ethiopia and more than 5 times as likely in Turkey, Indonesia and Thailand. A performance premium in process innovation prevails mostly in MENA and a few Sub-Saharan African countries (Figure, 2.6, Panel B).

A performance premium of foreign firms is not confirmed for all countries. In the area of labour productivity, exceptions include for example Myanmar and Malaysia (Figure 2.6, Panel A). A more detailed analysis is required to understand the policy and non-policy factors for these outliers. Foreign firms may underperform domestic firms if they are located in sectors and value chain activities that are typically associated with lower outcomes. Some research illustrates that cases in which affiliates of foreign firms are less productive than domestically owned firms exist when significant advantages, market protection and rents are given to domestic firms, often state-owned firms (Lejarraga and Ragoussis, 2018). Thus, foreign firms may find it difficult to access and operate in a saturated market dominated by protected state-owned firms, or they are constrained in accessing the market due to regulatory and non-regulatory restrictions (OECD, 2018a).

In a few developing countries foreign firms are less likely to engage in process innovation and R&D (Figure 2.6, Panel B and C). Foreign MNEs may invest in those tasks that generate the least value added and that have no longer a competitive edge in home markets, due to rising labour and other costs. They are unlikely to establish in developing markets in order to engage in R&D and innovation activities and potentially even less so than are domestic firms. Domestic firms may not be globally connected and are therefore more likely to engage in innovation in order to grow domestically and then potentially on international markets.

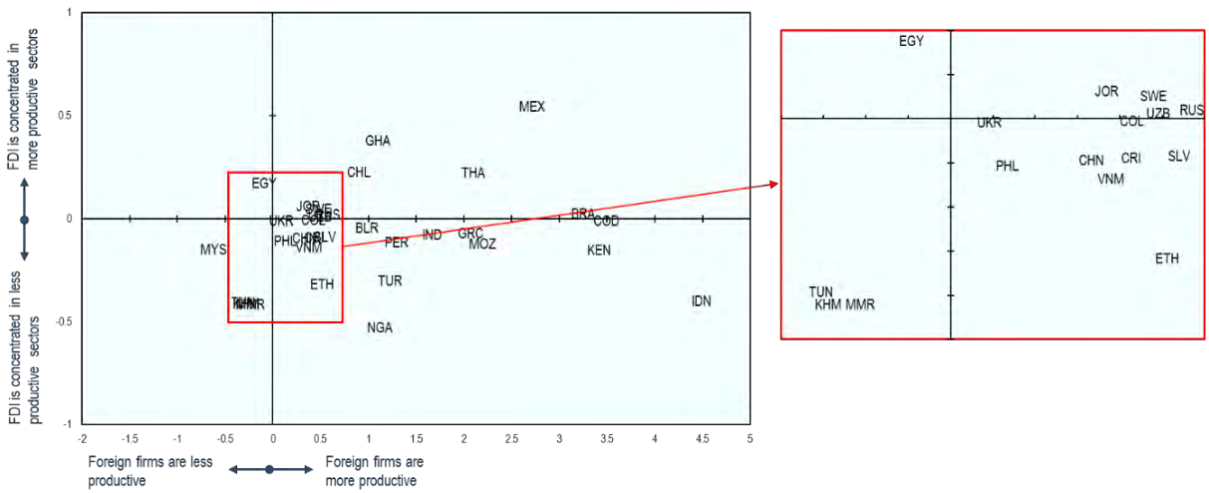
Direct effects of FDI on productivity are ambiguous

The indicators discussed in this chapter explore FDI's direct contribution to productivity from two perspectives: the composition of FDI relative to the economy and the performance of foreign firms relative to domestic peers. Studying where countries are positioned along these two dimensions can provide further insights on the direct impact of FDI.

In more than half of the countries where foreign manufacturers are more productive, on average, than domestic peers, they operate in relatively less productive sectors (Figure 2.7). The direct impact is thus ambiguous. This is the case for all countries positioned in the bottom-right quadrant in Figure 2.7, such as in Ethiopia, Indonesia, Nigeria, Peru and Turkey. In these countries, FDI goes prevalently to low-tech, low-productivity sectors, but foreign firms may still contribute to within sector productivity gains as a result of their technological advantage.

In a number of countries, the indicators suggest a clearly positive FDI-productivity relationship; this is the case for Chile, Mexico and Thailand (and all those positioned in the top-right quadrant in Figure 2.7). They receive FDI in relatively higher productivity industries (such as in the automobile, electronics and chemicals industries) and foreign firms have a productivity premium over domestic firms, on average. The same positive relationship holds for Ghana, although FDI is concentrated in the basic metals sector which is one of the most productive manufacturing sectors in Ghana but could be one of the lower value added sectors in more advanced countries. This illustrates that similar indicator results could be driven by different sectors depending on the country context.

Figure 2.7. FDI and labour productivity in manufacturing: Two direct relationships



Note: This figure compares a Type 1 indicator (horizontal axis; indicator from Figure 2.6) with a Type 2 indicator (vertical axis; indicator from Figure 2.3). See Annexes B and C for a description of the methodology and data. Labour productivity: value added per employee.
Source: OECD based on World Bank Enterprise Surveys.

Absorptive capacities of domestic firms favour FDI spillovers

The last set of analysis examines the potential for spillovers effects of FDI on productivity and innovation in host economies. The identification of spillovers is often not possible as it requires large firm-level datasets that are typically not available across a broad set of countries. These datasets would further require information on supply chain and other linkages of domestic firms with foreign affiliates as well as information to disentangle how domestic firms, even without explicit FDI linkages, are affected by the presence of foreign affiliates (Box 2.1). While spillovers are not directly measured in this chapter, a few indicators shed some light on the potential for productivity and innovation spillovers across countries.

Existing studies show that domestic firms require so-called absorptive capacities that enable them to benefit from a foreign presence – either via supply chain linkages or other forms of knowledge and technology transfers (e.g. OECD-UNIDO, 2019; Farole and Winkler, 2014). Absorptive capacities are often measured in terms of performance gaps between foreign and domestic firms.

The above indicators comparing average performance of foreign and domestic firms identify a number of countries where performance gaps are relatively small and statistically

insignificant (Figure 2.6). For labour productivity, this is the case for the Russian Federation, Uzbekistan and Ukraine, Jordan, Egypt, and the Philippines. For R&D intensity, it is the case for El Salvador, Argentina and Viet Nam, as well as in the Democratic Republic of Congo, Ivory Coast, Senegal, Kenya and Ghana. In the area of process innovation, low and insignificant performance gaps exist in the majority of countries across regions.

The analysis of performance gaps does not allow concluding in which countries spillovers are most likely and further analysis would be required. Moreover, some countries report large confidence intervals, often spreading above and below the zero line, suggesting significant performance differences within the group of domestic and/or foreign firms. Some domestic firms are thus likely to be at the technology and productivity frontier, competing with foreign firms in a given country, while other domestic firms lag behind and are unlikely to compete and benefit from linkages and spillovers.

Foreign affiliates have extensive domestic supply chain linkages

Another indicator for OECD countries reveals the extent of domestic supply chain linkages of foreign firms. It combines data on domestic sourcing of foreign affiliates (domestic backward linkages) from the OECD AMNE database with information from OECD Input-Output tables (Cadestin et al., 2018). It measures the share of local sourcing of foreign affiliates as a percentage of total sourcing and splits this share into sourcing from domestic firms and from other foreign affiliates in host economies. Domestic supply chain linkages may be a policy objective in itself as they generate a market for selling for domestically operating firms, but domestic linkages are also likely to involve knowledge and technology transfers from the foreign affiliate to its domestic supplier. As such, the indicator provides an alternative proxy on the potential for productivity-innovation spillovers.

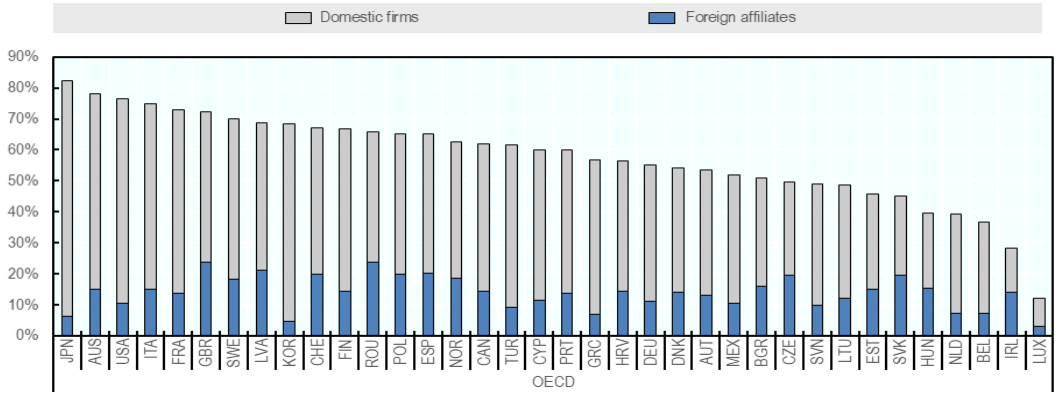
Higher shares of domestic linkages, as measured by the indicator, may not be the ultimate objective however. These shares depend considerably on the local market size for inputs and the structure of the economy. A potentially more important policy objective could be the growth in the absolute value of domestic linkages. GVC integration typically reduces the share of domestic linkages while disproportionately increasing the pace of domestically produced value added growth due to efficiency gains, for example. The indicator in shares therefore requires careful interpretation.

Across OECD countries, the indicator reveals significant domestic linkages of foreign firms (Figure 2.8, Panel A). The share of domestic sourcing ranges from 10% in Luxembourg to above 80% in Japan. Smaller economies like Luxembourg, Ireland, Belgium and Hungary have lower shares due to their smaller domestic market for inputs, while larger economies have higher shares (e.g. Japan and the United States). In Australia, foreign firms are extensively sourcing natural resources which results in a very high share of domestic sourcing (80%).

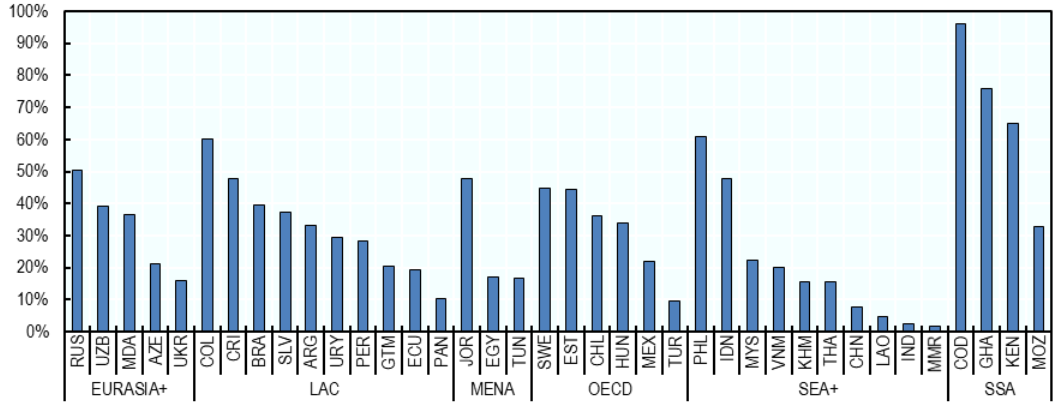
For manufacturing only, an alternative indicator available for a larger set of countries measures foreign manufactures' shares of domestically purchased and produced inputs: the higher the share, the more important the role of FDI supply chain linkages in the local market for intermediates. In line with the previous indicator, this indicator confirms the importance of FDI for the local intermediates market. Natural resource abundant economies, such as Colombia, the Democratic Republic of Congo, Ghana, Indonesia or the Russian Federation report particularly high shares (above 50%), while other countries such as Mexico, Hungary or Thailand have lower but still significant domestic linkages of foreign affiliates in manufacturing.

Figure 2.8. Domestic supply chain linkages of foreign affiliates

A. Local sourcing of foreign affiliates (in % of total sourcing), by supplier ownership



B. Foreign manufacturers' share of domestically purchased inputs



Note: The linkage indicators are further explained in Annex B.
Source: OECD based on the OECD Analytical AMNE database (Panel A); OECD Input-Output Tables and World Bank Enterprise Surveys (Panel B).

In a few countries, the role of foreign firms for the local market of intermediates is found to be very small or almost non-existent. These countries include Myanmar and Lao PDR where foreign manufacturers operate in low-cost assembly activities that are often located in special economic zones (OECD-UNIDO, 2019; OECD 2017a; and OECD 2014b). The local availability of quality inputs in these countries remains very low. The share is also low in China and India where the small share of foreign firms in local purchase of intermediates may also be due to their large local markets. However, in other large markets like Brazil and Indonesia the role of foreign firms in local sourcing is important and thus market size alone cannot explain the results.

Productivity spillovers vary across countries

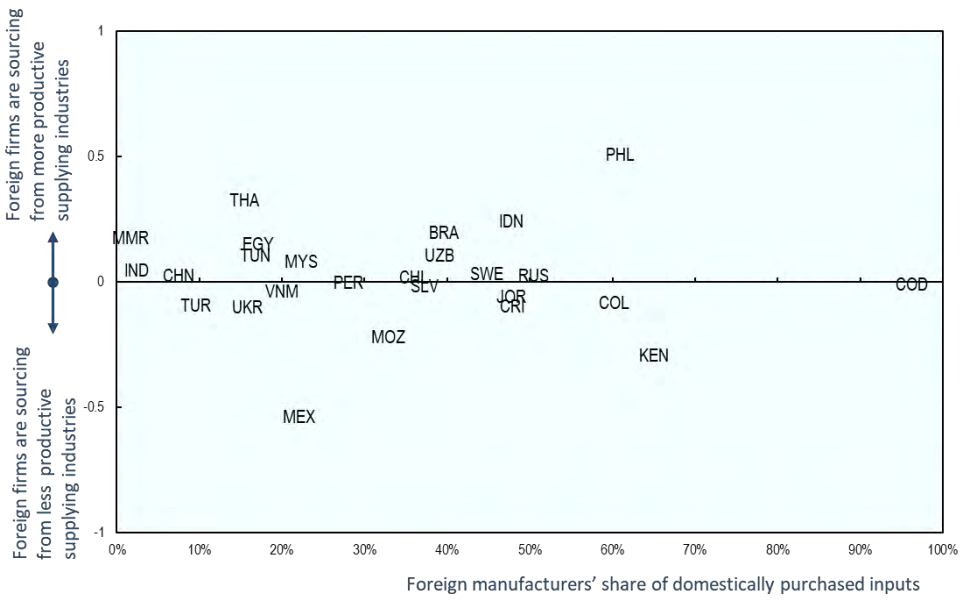
An alternative indicator examines whether higher or lower productivity industries benefit relatively more from backward linkages of foreign manufacturers. It studies the distribution of FDI linkages across manufacturing sectors and labour productivity outcomes in these sectors. While this indicator cannot identify to what extent linkages have led to productivity improvements at the firm level, the indicator does show to what extent linkages can be associated with productivity due to the expansion of the market for either lower or higher productivity industries.

The indicator shows that foreign manufacturers are sourcing more from relatively higher productivity sectors in some countries (e.g. Thailand, Brazil, Indonesia and the Philippines) and from relatively lower productivity sectors in the other countries (e.g. Mexico, Mozambique and Kenya) (Figure 2.9, vertical axis). In many countries, no relationship between the distribution of FDI linkages and productivity can be identified (e.g. China, Viet Nam, Peru, Sweden and the Russian Federation).

This indicator is compared with the linkage indicator discussed above (horizontal axis in Figure 2.9). This comparison provides some perspective on the potential impact of linkages on aggregate productivity. If the share of foreign manufactures' purchases of total purchases of local inputs is relatively high (e.g. in the Philippines and Kenya), the aggregate productivity impact in manufacturing is likely to be higher (i.e. a positive productivity impact in the Philippines and a negative productivity impact in Kenya). If the share of the linkage indicator on the horizontal axis is low (such as in Myanmar and India), the impact on aggregate manufacturing productivity is likely to be insignificant.

It is important to emphasise that it might also be a positive outcome to have significant linkages in lower productivity sectors. This might be the case for a country like Mozambique that is at an early stage of industrialisation and may still benefit from expanding lower value added sectors such as food, clothing and basic metals. Suppliers in these countries may still aim to expand into higher value added activities within those sectors and linkages with foreign firms can support that process. On the other hand, Mexico is already more advanced and could aim to benefit from foreign firms' sourcing from higher value added and higher productivity sectors (such as in electronics and the automobile sector). In this case, the upgrading objective would go beyond just moving up within existing sectoral value chains to expand increasingly into higher productivity and higher technology sectors all together.

Figure 2.9. FDI linkages and productivity in supplying industries



Note: This figure compares the linkage indicator (horizontal axis; indicator from Figure 2.8) with a Type 3 indicator (vertical axis). See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Notes

[1] Some industries are more productive and innovative than others. Within manufacturing, automobile and electronics tend to be more productive industries compared to food and garments for example. Modern services such as e-commerce, finance or engineering are generally more productive and innovative than manufacturing altogether. However, as illustrated in Figure 2.1, industry-level productivity varies considerably across countries.

[2] Other outcomes related to productivity and innovation (e.g. capital intensity, patents, product innovation) were considered, but are not covered in the interest of space. It is important to stress that these indicators do not reflect causal effects but an association between FDI and productivity.

[3] While this indicator focuses on greenfield FDI, cross-border M&A may also have an impact on management and production processes of firms and therefore affect productivity.

[4] Process innovation and R&D activity are binary variables based on survey responses on whether firms have improved production processes (including manufacturing, logistics, distribution, accounting, etc.) or invested in R&D (in-house or outsourced) in the last three years. Firms do not constantly improve processes or invest in R&D, particularly if they benefit from a competitive advantage in a market. Therefore, the innovation indicators require careful interpretation as they only capture innovation activity for a small period of firms' life cycle.

[5] It's worth mentioning that new technologies and digitalisation can improve production processes and business models in any value chain and thereby increase innovation potential (OECD, 2017b). However, the investors in many developing countries may still employ traditional business processes that have lower innovation potential.

[6] While not necessarily generating new activities, a change in ownership resulting from cross-border M&A may equally affect firm productivity and innovation capacity. Indicators based on M&A data are available upon request.

[7] See online report of DRC's National Agency for the promotion of investments here.

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Chapter 3. How does FDI relate to employment and job quality?

This chapter presents indicators on how FDI relates to labour market outcomes in host countries. It explains why more inclusive labour market outcomes matter for sustainable development and examines the channels through which FDI may influence such outcomes. More specifically, the chapter includes country-specific indicators that identify how FDI is associated with job creation and employment growth, wages and non-wage working conditions (i.e. job security and occupational safety). The indicators provide insights into which channels are likely to be at play and identify varying results across OECD and developing countries.

3.1. Summary

This chapter examines how foreign direct investment (FDI) in host countries relates to employment growth and job quality.[1] The Sustainable Development Goals (SDG 8) indicate that both the quantity and quality of jobs generated are highly relevant to ensure that all citizens can work productively and receive fair compensation. Based on a review of the literature, the chapter develops country-specific indicators to identify how FDI is associated with three aspects of labour market outcomes: job creation and employment growth; wages; and non-wage working conditions (i.e. job security and occupational safety at work).

Governments devote large resources to attract foreign investment in the hope that it will create jobs. The first set of indicators confirms that FDI generates jobs, but this depends largely on the stage of development and economic structure of receiving countries. FDI in mining or in biotechnology (capital-intensive) do not generate as many jobs as those to manufacture electronic products or in healthcare (labour-intensive). For instance, greenfield FDI in Costa Rica or in the Czech Republic create around 6 jobs per million dollar invested, three times as many as in Saudi Arabia or in Luxembourg. The indicators do not provide a complete picture of FDI effects on job creation. They do not report whether foreign takeovers of domestic firms create or destroy jobs across countries and do not consider how foreign divestment—the sale of a foreign-owned firm to a domestic investor—affects employment at the firm.[2]

The behaviour of foreign affiliates with respect to labour demand fluctuations is similar to that of domestic businesses, although the indicators do shed light on some differences across countries. Over longer time spans, and when taking into account the possibility of spillover effects on domestic firms, greenfield FDI relates positively to employment growth; but this does not apply to all countries. In the OECD area, the positive FDI-employment growth relationship is stronger in countries where medium-tech industrialisation processes are, or have been, stronger and more sustained.

The OECD 2018 Jobs Strategy and other international frameworks explain that while job creation is crucial, job quality matters equally for inclusiveness. The second set of indicators confirms a well-documented result: an average foreign affiliate pays higher wages than an average domestic business. Beyond this common finding, a more relevant result in the context of this report is that vast variations exist in the foreign wage premium across countries, partly because the indicators reflect the plethora of factors behind the premium, such as firms' higher productivity, larger size, more skilled workforce, or greater product market power. The results also challenge the presumption that foreign companies always pay higher salaries. The foreign wage premium does not necessarily exist when comparing foreign and domestic firms at the bottom of the wage distribution.

If foreign companies can enhance living standards, excessive wage dispersion with domestic firms may nevertheless hamper inclusive growth by raising overall wage inequality. In addition, such wage gaps can be an impediment to forging supply chain linkages between foreign and domestic firms. Results support the evidence that positive, productivity-driven, spillover of FDI on the wages of domestic firms may be more limited in countries with important wage dispersions between the two groups of firms.

At the industry-level, the results show that foreign firm activity is concentrated in sectors that typically pay lower wages in developing countries unlike in most of the OECD area. As for jobs, the level of industrialisation appears to be another crucial factor of the FDI-wage relationship: in countries with a large services sector, FDI is concentrated in higher-

wage activities while in those countries with a stronger industrial base, it is concentrated in sectors with lower wages. The dichotomy between developed and developing countries may reflect differences in the size of the informal sector, which, if accounted for, would provide more precise indicators of FDI concentration in higher or lower wage industries.

Overall, the indicators on wages provide consistent pictures with those on productivity: the foreign productivity and wage premia are positively correlated. This confirms the role of productivity as an engine to enhance living standards, but only to a certain extent. Across countries, foreign firms are twice as productive as domestic firms, but they pay only 50% higher wages. This means that the foreign firm performance premium does not fully translate into wage benefits for workers. Multinationals are typically active in highly-concentrated markets -- which in turn can generate rents. Recent OECD work has shown that such rents, and how they are shared between owners and workers, can be due to policy pitfalls, such as barriers to competition.

The behaviour of MNEs has sometimes raised public concerns about their impact on non-wage working conditions due to, for instance, reduced unions' power or lower core labour standards in the host country (2008b). The third set of indicators partly confirms that foreign firms may not enhance job security. This could reflect FDI concentration in sectors with more exposure to global trade fluctuations or in legal regimes with less stringent labour legislation such as special economic zones. Adverse impacts of job insecurity include poorer health for vulnerable populations such as migrants, women and youth. While the indicators in this report are not able to capture such impacts, they show that greenfield FDI tends to be concentrated in activities with higher risks of occupational injury, including in the OECD, and more when FDI is prevalent in manufacturing or in infrastructure.

Both investment and labour market policies can play an important role in cushioning or amplifying how FDI affects labour market outcomes. For instance, FDI positive effects on host countries' wages may be improved by pro-labour mobility policies. Future work on FDI Qualities aims to provide a comprehensive policy framework for countries to maximise positive impacts of FDI on their labour market while mitigating potential adverse effects. The work should also ensure a strong alignment with other OECD policy tools, at the forefront of them the 2018 Jobs Strategy and the OECD Guidelines for Multinational Enterprises, in particular Chapter V on Employment and Industrial Relations.

3.2. Conceptual framework

Several international frameworks – particularly ILO's decent work indicators – aim to measure the quality of jobs and the wider working environment.[3] The OECD developed a framework for measuring and assessing job quality in 2015 to guide its new *2018 Jobs Strategy*. The objective was to revise the 2006 Strategy, which had largely focused its recommendations and indicators on the quantity of jobs, with less attention paid to job quality. The OECD framework measures three aspects of job quality: earning quality, labour market security, and the quality of the working environment (Box 3.1). Applying this framework to OECD countries, the analysis has shown that job quality matters crucially for inclusive growth as it varies strongly across different socio-economic groups. The worst off are youth and low-skilled workers, as they tend to have lower earnings quality and considerably higher job insecurity (Cazes et al., 2015).

Box 3.1. The OECD Framework for Measuring and Assessing Job Quality

The OECD has developed in 2015 a framework to measure and assess the quality of jobs that considers three objective and measurable dimensions. Together, they provide a comprehensive assessment of job quality:

1. **Earnings quality** captures the extent to which earnings contribute to workers' well-being in terms of average earnings and their distribution across the workforce.
2. **Labour market security** captures those aspects of economic security related to the risks of job loss and its economic cost for workers. It is defined as the risks of unemployment and benefits received in case of unemployment.
3. **The quality of the working environment** captures non-economic aspects of jobs including the nature and content of the work performed, working-time arrangements and workplace relationships.

Source: Cazes, S., A. Hijzen and A. Saint-Martin (2015), Measuring and assessing job quality: The OECD job quality framework, *OECD Social, Employment and Migration Working Papers*, No. 174

FDI can have widespread effects on labour market outcomes

Globalisation has been increasingly permeating the world of work in both developed and developing countries. Record cross-border investment flows over the last decades, together with trade and technological change, have gradually contributed to the fragmentation of global production networks with a growing international division of labour, as production and services facilities are spread around the globe.

FDI can have widespread effects on both home and host country labour markets. The establishment or relocation of a foreign greenfield investment and a change in the nationality of a firm's ownership cause changes in the demand for labour, thereby affecting employment, wages and the labour force composition (e.g. the gender balance or skill intensity). FDI can have effects on wider labour market outcomes, such as on non-wage working conditions, including, but not limited to, job security due to the use of non-regular employment (e.g. incidence of temporary jobs), occupational health and safety at work, human and core labour rights.

The following points describe how FDI relates to labour market outcomes in host countries[4]:

- **FDI can affect employment growth or contraction through changes in labour demand.** FDI affects a host country's employment growth rate by increasing or decreasing the demand for labour. The direction and magnitude of the relationship depend on the type of foreign investment. Greenfield FDI projects have a positive *direct* effect on the demand for labour, leading to new jobs creation, while a foreign takeover of a domestic firm (M&A) could either have a positive or negative *direct* effect. The employment impact of FDI may also vary across different industries. One reason is that greenfield FDI tends to be overrepresented in manufacturing, relative to M&As (Davies et al., 2015). Irrespective of the entry mode, FDI may increase the relative demand for skilled labour due to foreign firms' higher productivity and technology advantages. Whether there will be net employment growth will also depend on the effects of FDI on domestic firms in the same labour market. For instance, foreign firms could introduce labour-saving

techniques that are then adopted by domestic firms (imitation effects), leading to a transitory decline in labour demand, at least of low-skilled workers.

- **FDI can affect wages and their distribution across firms and workers.** In a competitive labour market, there is no reason why comparable foreign and domestic firms should pay different wages to their workers. In such a context, *average* wage differences between the two groups arise because of other firm- and industry-specific features (Hijzen et al., 2013). These include firms' size, productivity level, workforce skill intensity, product market power, and working conditions, such as job insecurity. Foreign firms may still find pay higher wages to workers with similar skills and tasks, for example, to reduce turnover and lower the risk of technology transfer to competing firms through labour mobility. Beyond these *direct* effects, FDI may affect domestic firms' wages by raising the cost of labour or because of technology spillovers. Such effects may also occur in upstream or downstream firms having supply chain relationships with foreign affiliates. Spillovers can take the form of skill-biased technological transfer, thus increasing skilled wages while potentially reducing the ability of domestic firms to hire or retain skilled workers. As a result, FDI can lead to wage dispersions between foreign and domestic firms and raise overall wage inequality.
- **FDI can have an impact on non-wage working conditions.** Foreign and domestic firms may have differentiated impacts on job stability, occupational health and safety at work and employees' collective bargaining power. As for wages, this difference could reflect specific firm-level and industry-specific characteristics. For instance, FDI effects on job stability could result from foreign and domestic firms' distinct management practices, survival rates, worker turnover rates, or propensities in the use of non-regular forms of employment (e.g. temporary contracts), the latter providing less protection to workers.[5] FDI effects on non-wage working conditions might also be contingent on whether foreign firms export their home country labour practices or respond instead to local labour conditions. Adopting international standards on responsible business conduct, such as the OECD *Guidelines for Multinational Enterprises*, should positively affect FDI impact on non-wage working conditions.[6]

There is an empirical consensus that FDI has broadly positive impacts on host countries' labour markets outcomes (Box 3.2), but not all segments of the population benefit (equally) from these positive effects. The impact on job creation is likely to be positive, but mostly in developing countries and often confined to skilled labour. Positive effects are also observed for wages. Forces behind the so-called foreign wage-premium include labour force reallocations in favour of higher-skilled jobs or movements of workers from domestic to foreign firms. Incumbent employees (in case of an acquisition) or low-skilled workers might not witness a wage increase, at least in the short-term (Hijzen et al., 2013). Higher FDI might also lead to wage dispersions, potentially raising wage inequality, without necessarily providing better non-wage working conditions.

An accurate interpretation of how FDI relates to the labour market outcome should not look in isolation at the three above-mentioned labour market outcomes. For instance, workers with similar skills can still earn different wages, as employers may be compensating those working in less desirable conditions through higher pay (OECD, 2017). Foreign firms' market rents, and how these are shared with workers, can also differ with those of domestic firms. Therefore, for any assessment of the FDI relationship with labour market outcomes, the quality of the working environment should be measured alongside the wage dimension.

Box 3.2. FDI effects on labour market outcomes: A review of the empirical literature

FDI effects on labour market outcomes involve multiple but interrelated transmission channels. Effects will differ with the mode of entry of FDI, i.e. whether it is a new greenfield investment or take-over of an existing domestic business. Outcomes can result from *direct effects*, i.e. resulting from foreign firms' direct operations: hiring new workers or firing incumbents (in case of an acquisition), offering higher or lower wages, and offering better or worse non-wage working conditions (e.g. job security, health and safety, etc.). *Indirect effects* on the wider labour market can occur through vertical spillovers due to linkages between foreign and local companies (through the participation of local firms in the supply chain or through worker mobility) or involve horizontal spillovers on domestic firms operating in the same industries and in the same geographical location.

The direction and magnitude of the combined *direct* and *indirect* effects on labour market outcomes will depend on investing, target (in case of an acquisition) and competing firms' specificities (e.g. size, productivity, responsible business conduct (RBC) practices, etc.). Industry characteristics (skill-intensity, capital-intensity, etc.) and national aspects (ease of labour mobility or employment protection legislation) also matter.

FDI effects on employment growth are multifaceted

Hale and Xu (2016) survey the work on FDI and labour market outcomes. They conclude that foreign ownership or takeover lead to employment growth in developing countries, while the impact is mixed in developed economies. For developing countries, one explanation is that foreign ownership/acquisition boosts productivity, which also increases firms' market share and size. For instance, a study of 19 Sub-Saharan countries showed that foreign firms are 11.5% to 16.6% larger than their domestic peers (Coniglio et al., 2015). In a study of China, relatively high employment growth of firms with foreign ownership is associated with their high survival rates (Karlsson et al. 2009). In developed countries, several studies report an employment decline following a foreign takeover of a domestic company. Some evidence suggests that this effect is short-term, due to the introduction of labour-saving techniques, but the progressive integration of foreign firms into the local economy creates a positive effect on employment in the long-run (Jude et al., 2016). In contrast, a divestment by a foreign firm is followed by a drop in employment (Borga et al., 2019; Javorcik and Poelhekke, 2017).

The effect of FDI on employment may differ by investors' entry mode. It can also vary by workforce type (e.g. skilled vs. unskilled). For instance, greenfield FDI is more likely to create direct positive employment effects than mergers and acquisitions (M&A) (Williams, 2003). Irrespective of investors' entry mode, several studies report that FDI increases the demand for skilled labour, thereby leading to employment growth only (or mostly) of skilled workers (Bandick and Karpaty, 2011; Hijzen et al., 2013). Evidence of FDI spillover effects on domestic firms' employment is inconclusive. Studies of China and South Korea suggest a positive indirect effect, presumably caused by learning or demonstration effects, which can be stronger in goods than in services industries (Karlsson et al., 2009; Lee and Park, 2018). This effect is found to be negative if domestic firms are far from where FDI occurs within the country (Lembcke and Wildnerova, forthcoming).

FDI effects on wages are broadly positive but may not benefit all workers

There is an empirical consensus that FDI increases wages in host countries, both through *direct effects* and *spillovers* to domestic firms (Hale and Xu, 2016). The magnitude varies and tend to be lower in developed nations. The so-called foreign wage premium still exists after accounting for foreign investors' "cherry picking" behaviour, i.e. acquiring domestic firms that are already highly productive (Almeida, 2007). Positive *spillovers effects* are more likely to happen in developing countries (Hale and Xu, 2016). They take the form of skill-biased technological transfer (horizontal spillovers) or productivity-driven wage effects in case of linkages between local and foreign firms, either through participation in supply chains or through worker mobility (vertical spillovers).

Domestic firms may increase their wages when there are more foreign firms in the same labour makret, even in episodes of negative productivity spillover effects of FDI. Upon entry, foreign firms may compete for talents with domestic firms, driving up wages (Lu et al., 2017).

Forces behind the foreign wage-premium include higher firm-level productivity and the use of better technology. Relatedly, labour force reallocations in favour of higher-skilled jobs also play a key role. Therefore, FDI does not lift the wages of all. The "premium" is smaller in studies that account for labour force changes (towards higher-skilled jobs) or for employees' features. One study of Sweden, which compares foreign and domestic firms with "identical" employees, concludes that wages are lower in foreign acquired firms compared to similar non-acquired firms (Heyman et al., 2007). Another study shows that the largest wage gains come from workers moving from domestic to foreign firms, rather than from increased wages of incumbents (Hijzen et al., 2013). Evidence does not support the argument that foreign firms pay higher wages to compensate for increased job insecurity or more difficult working conditions (Hijzen et al., 2013; OECD, 2017).

FDI in host countries might benefit wide segments of the population while raising income inequality. This effect might result from higher wage dispersion both within foreign firms (within-firm inequality) and between foreign and domestic firms (between-firm inequality). Empirical research confirms that a foreign takeover leads to higher within-firm wage dispersion. It is also likely that FDI leads to higher between-firm wage disparity as wider evidence shows that this channel of inequality has been increasing due to the growing gap between high and low productivity firms (Berlingieri et al., 2017; OECD, forthcoming). At the aggregate level, higher FDI may lead to rising wage inequality, and even more so in developing countries (Hale and Xu, 2016). The relationship is not necessarily linear. In some studies it is conditional on host countries' level of development, i.e. their skills base and domestic firms' absorptive capacity (Wu and Hsu, 2012; Lin et al., 2013).

There is a dearth of evidence relating FDI to non-wage working conditions

Non-wage working conditions relate to the nature of the tasks and the physical and social conditions under which these tasks are carried out. These factors include the features of the firm, the scheduling of working time, the prospects that the job provides to workers and the intrinsic rewards associated with the job (OECD, 2017). The empirical literature on FDI effects on such aspects, when they may have one, seem to be driven by the specific characteristics of firms that become or are foreign-owned (OECD, 2008a). In addition, it is not clear whether potential effects are the result of home country labour practices or a response by MNEs to local conditions (Almond and Ferner, 2006).

FDI effects on job security may result from differences in foreign and domestic firms' rates of mortality or because of workers' turnover. The empirical literature surveying these aspects does not provide a clear-cut response (Bernard and Sjöholm, 2003; Bernard and Jensen, 2007; Hijzen et al., 2013; Javorcik, 2014). FDI effects on job security could also arise due to different propensities in the use of non-regular forms of employment (e.g. temporary contracts), the latter providing less protection to workers. Empirical research from a host country perspective on this question is quasi-inexistent. The topic has received more attention when observed from a home country (or parent company) viewpoint, reflecting developed nations' concerns about the adverse impacts of offshoring and outward FDI on their labour markets (Görg and Görlich, 2015).

There is a dearth of evidence relating FDI to occupational health and safety. The only study matching worker data with industry-specific information for five developing countries concludes that FDI contributed to a better working environment (Jayasuriya, 2008). Focussing on health aspects, Herzer and Nunnenkamp (2012) find a negative effect of FDI on population health. Other studies suggest a positive correlation between fewer fatal job accidents rates, or population's health, and FDI (Alsan et al., 2006; Flanagan, 2006). More broadly, inward FDI and core labour standards are positively correlated (Kucera, 2002). MNEs may shy away from investing in countries with low labour standards because of reputational risks and to fulfil international standards on responsible business conduct, sometime adopted in home country regulations. This however does not say whether, once they are operating, foreign firms would help improve working conditions.

3.3. The indicators

In light of the multifaceted impacts of FDI on labour market outcomes, providing policymakers a set of internationally comparable indicators is of crucial importance for at least two reasons. Firstly, FDI is likely to affect labour market outcomes differently across countries. Secondly, FDI may create trade-offs within host countries, by affecting some labour market outcomes positively and others negatively, or by affecting some segments of the population negatively. Potential trade-offs may justify policy actions to maximise FDI benefits with respect to priority objectives while minimising adverse effects.

The indicators proposed for examining the relationship between FDI and host countries' labour market outcomes are based on the conceptual framework described above. The indicators cannot fully disentangle direct and indirect FDI effects on labour market outcomes, but provide some direction as to what mechanisms could be at play. In particular, the indicators examine how FDI relates to the following outcomes:

(1) How many jobs does greenfield FDI create? Do foreign firms have higher employment growth rates than domestic businesses? At the industry-level, is FDI concentrated in sectors with stronger employment expansion?

(2) Do foreign firms pay higher average wages than their domestic peers? At the industry-level, is FDI concentrated in low or high-wage sectors?

(3) Do foreign firms offer better non-wage working conditions than domestic firms? At the industry-level, is FDI concentrated in sectors with better working conditions?

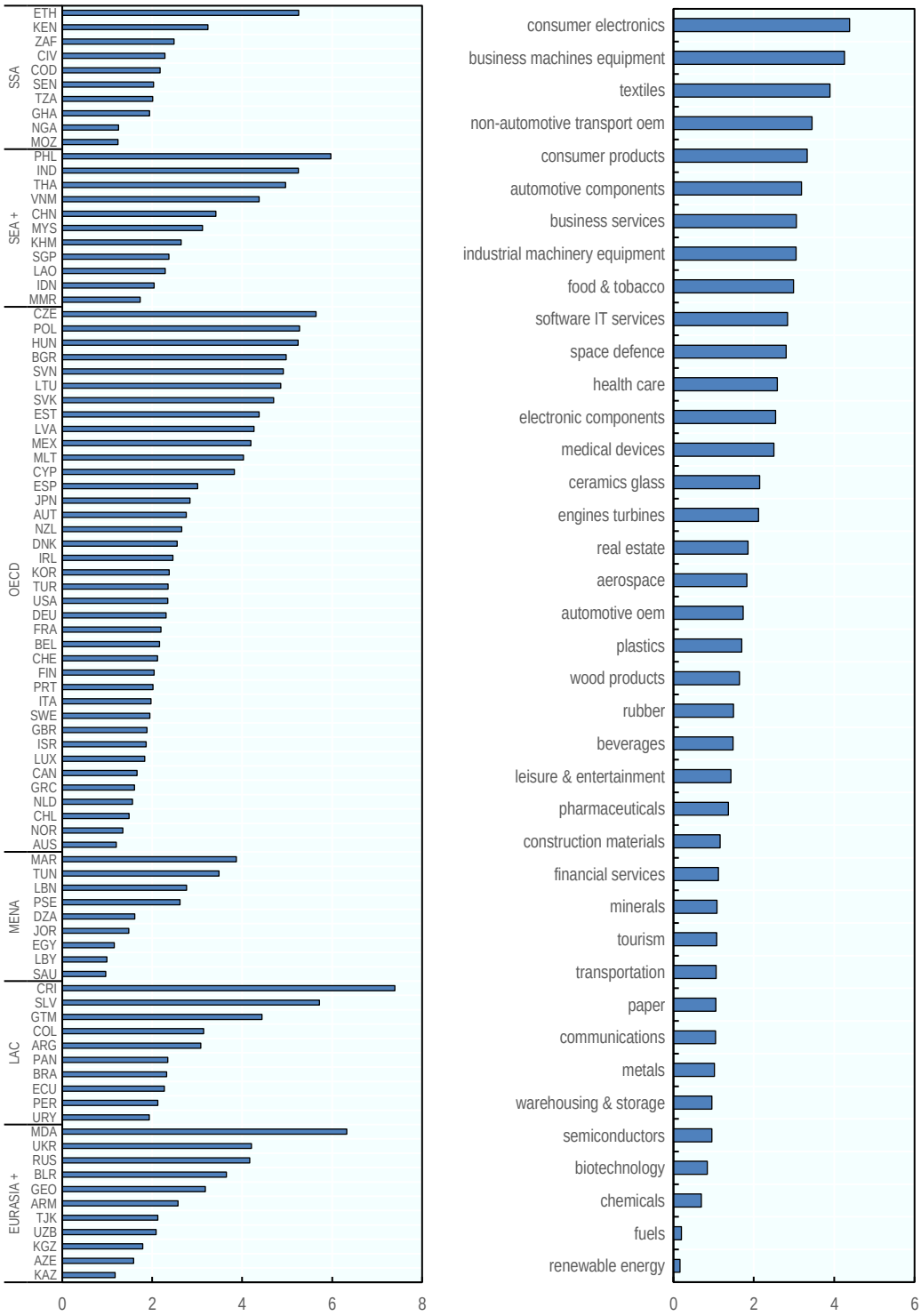
FDI effects on job creation vary with stages of development

The first set of indicators examines the relationship between foreign ownership, job creation and employment fluctuations. One indicator provides the number of created jobs per unit of greenfield FDI. According to project-level data on announced cross border greenfield investments, every million USD of capital expenditure (CAPEX) creates nearly three jobs. This relationship varies considerably across countries and economic activities (Figure 3.1). Projects to manufacture electronic or textile products generate the most jobs per dollar of CAPEX. Effects on job creation in labour-intensive services such as business services, IT and healthcare are equally important. Greenfield FDI in extractive industries and activities relying on raw materials produce fewer jobs per dollar invested, reflecting their higher capital-intensity (e.g. chemicals, fuels, renewable energy, and metals).

Job creation through foreign takeover of domestic firms are not reflected in Figure 3.1 while these can be sizeable, particularly in higher-income countries. Nonetheless, this first indicator provides evidence that FDI effects on job creation can strongly differ across countries and sectors. Such differentiated impacts on the labour market may not vary from those of domestic investment. Nonetheless, FDI could exacerbate investment-related labour market outcomes, as it tends to be more concentrated in specific geographical areas and sectors.[7] Thus, an initial understanding of countries' structural features is crucial before interpreting indicators comparing foreign and domestic investment effects on employment growth and wider labour market outcomes.

Figure 3.1. Greenfield FDI and job creation across countries and sectors

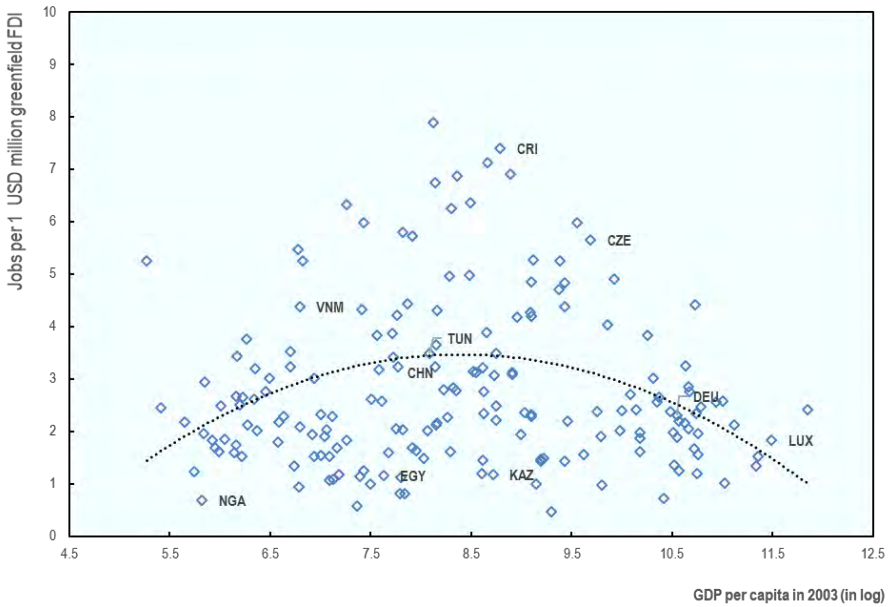
Estimated number of jobs created per one million USD of (announced) greenfield FDI, by country and sector



Note: Greenfield FDI: capital expenditure (capex). Number of jobs and capex are partly based on estimates between January 2003 and December 2017. See Annex C for a description of the data.
Source: OECD based on Financial Times' fDi Markets database.

Figure 3.2 shows how FDI effects on job creation depend critically on the host country's stage of development and natural resource endowments. Combining information on job creation and GDP per capita suggests that there is an inverted U-shape relationship between greenfield FDI-job elasticity and the level of economic development. Resource-rich economies with relatively limited comparative advantages in manufacturing or in services tend to attract FDI with relatively small effects on labour demand and wider labour market outcomes (e.g. Kazakhstan, Saudi Arabia and Nigeria). Lower and upper middle-income countries with strong industrialisation in the last decades attract FDI with the largest effects on their labour market. This is the case of Southeast Asian and Central European countries, the Czech Republic, Poland and Mexico in the OECD area, Morocco and Tunisia in MENA and Costa Rica and Salvador in LAC. Greenfield FDI effects on jobs become lower the more countries attract projects in capital-intensive high-tech industries and skills-intensive services. Not accounting for M&As reduces the wider validity of an inverse u-shaped relationship between FDI and job creation.

Figure 3.2. The relationship between greenfield FDI-job elasticity and stages of development



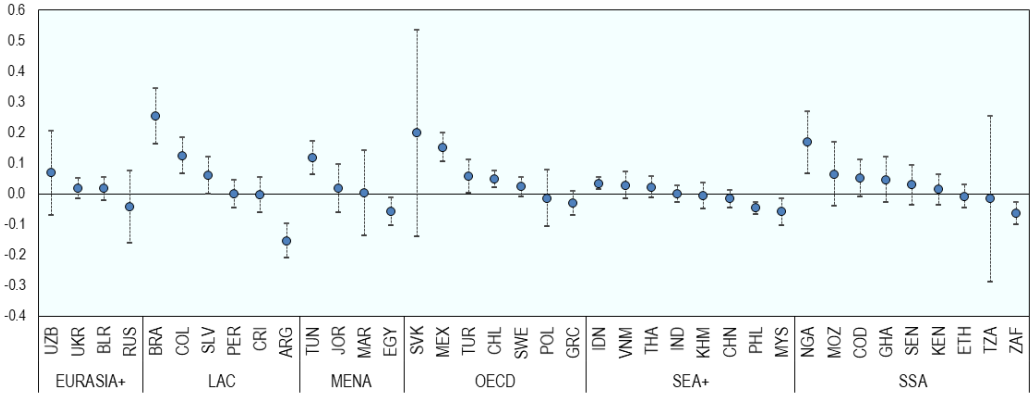
Note: Greenfield FDI is defined as capital expenditure (capex). Number of jobs and capex are partly based on estimates between January 2003 and December 2017. See Annex C for a description of the data.
Source: OECD based on Financial Times' fDi Markets database and the World Development Indicators (WDI).

Foreign and domestic investors respond similarly to economic to fluctuations

Having considered the contribution of foreign investment to job creation in isolation, the ensuing question is whether it differs from that of domestic investment. The next measures relating FDI to employment address this question. One indicator compares the average annual expansion (or contraction) in full-time employment of foreign and domestic firms, over their last three years of activity (Figure 3.3). In other words, it measures whether foreign ownership is associated with relatively higher (or lower) employment growth in the host country. In most countries there is no significant difference in employment growth in foreign relative to domestic firms. Nevertheless, in a quarter of the 38 countries for which the indicator is available, foreign ownership is associated with significantly stronger employment growth, while in five countries it is related to weaker employment growth.

Figure 3.3. Foreign and domestic manufacturers' employment growth rates

Do foreign firms have higher employment growth rates than their domestic peers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Employment growth rate: compound annual growth of full-time employment over 3 years.
Source: OECD based on World Bank Enterprise Surveys.

The relationship between foreign ownership and employment growth outcomes does not vary substantially across regions or income levels. Mexico, Nigeria and Tunisia exhibit the widest positive gap in employment expansion between foreign and domestic businesses. In the case of Tunisia (survey undertaken between 2011 and 2013), this gap may imply that post-2011 political instability affected foreign manufacturers' activities less than their Tunisian peers. It is plausible that export-oriented manufacturing FDI in the country was more sheltered than, for instance, the typically domestic tourism industry from negative domestic demand shocks. Latin America exhibits the widest variation across countries, with foreign firms expanding significantly more in Brazil and Colombia, and significantly less than domestic firms in Argentina.

Several aspects can explain the similar employment dynamics in foreign and domestic firms. As the indicator does not control for the business cycle, changes in employment may be driven by macroeconomic fluctuations specific to the time of the survey that affect foreign and domestic investors in similar ways (Lejárraga and Ragoussis, 2018). Therefore, it is not surprising if foreign and domestic companies' employment growth rates have the same direction. In addition, the indicator does not capture employment changes at the due to the entry or exit of new firms (i.e. extensive margin). If foreign firms have higher survival rates, the indicator may then underestimate the employment growth effects of FDI.[8]

By comparing employment growth rates of foreign and domestic firms in the last three years, the indicator also assesses how the two groups of firms adjust labour demand in response to transitory changes. A significant difference could imply that foreign businesses carry out faster or larger adjustments when facing business cycles fluctuations. This is plausible as MNEs have the option of relocating output across subsidiaries, an operation that may reduce their hiring and firing costs. In addition, MNEs may be able to bargain from a privileged position with governments and unions, allowing them to bypass some labour regulations (Navaretti et al. 2003).[9] This difference might be more important if fluctuations affect an industry in which foreign firms are more active. Labour adjustments by foreign firms appear nonetheless to be asymmetric: they tend to be more elastic in cases

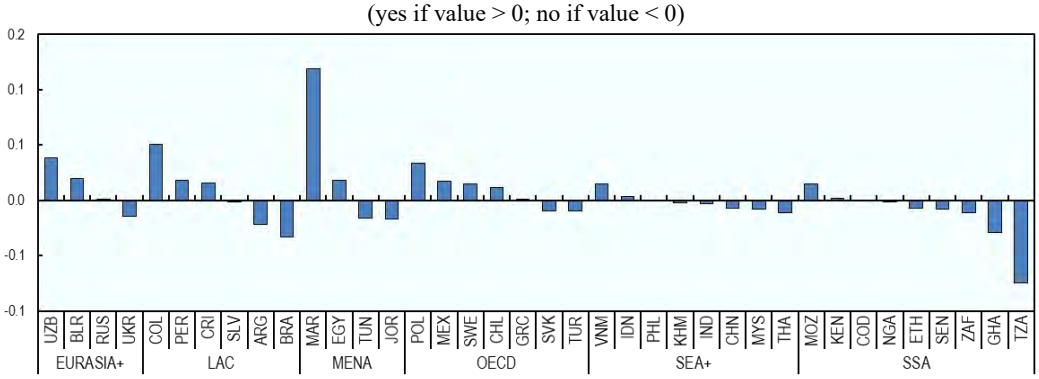
of expansions than of contractions. It is possible that, when facing downward pressures, foreign firms find it harder to reduce their workforce because of their higher skill-intensity.

FDI is concentrated in sectors with higher employment growth rates

Another indicator measures whether FDI is observed in manufacturing activities with higher employment growth over a three-year period, relative to the wider economy (Figure 3.4). In comparison with the previous firm-level measure, this indicator captures, to some degree, both *direct* and *spillover* contributions of FDI on labour demand in the same industry (but not in upstream or downstream sectors). The results reveal some disparities across countries, irrespective of their development level, with respect to both the direction and magnitude of the relationship. FDI is present in sectors with stronger employment expansion (or weaker contraction) in half of the countries and with lower employment expansion (or higher contraction) in the other half.

Figure 3.4. FDI and employment growth in selected OECD and developing countries

Is manufacturing FDI concentrated in activities with higher employment growth?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. Employment growth rate: compound annual growth of full-time employment over 3 years.
Source: OECD based on World Bank Enterprise Surveys.

In the Southeast Asian (SEA) and Sub-Saharan African (SSA) regions lower employment growth is often associated with FDI industry-specific concentration. Some evidence suggests that the introduction of labour-saving techniques by foreign firms might lead to a transitory decline in labour demand within a specific industry, at least of low-skilled workers (Jude et al., 2016). In contrast, FDI associated with employment expansions might be the outcome of large, highly productive foreign firms expanding their activities.

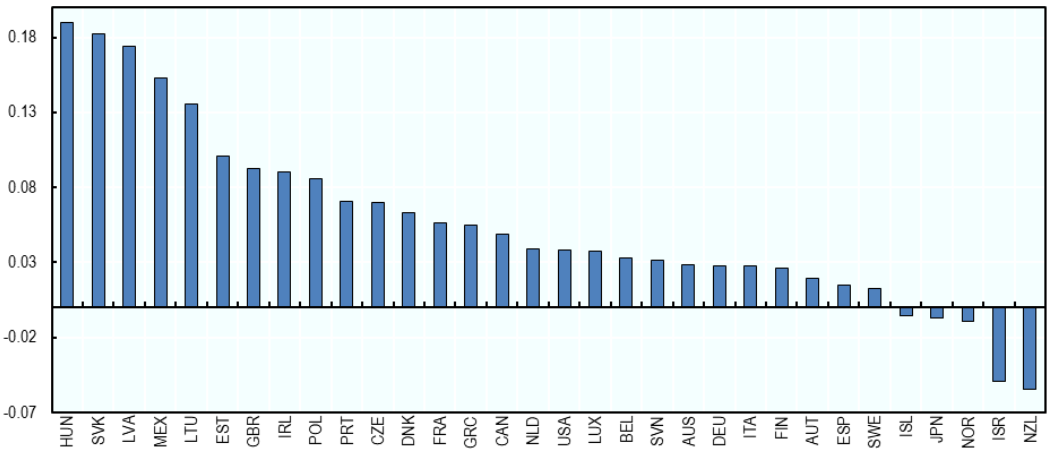
This indicator has some limitations, however, as it only reports changes in employment over the last three years while FDI sectoral concentration remains constant. As for the previous indicator, changes may result from macroeconomic or industry-related movements specific to the time of the survey rather than to FDI concentration. In addition, the indicator does not capture the potential effects on labour demand of recent investments by existing foreign firms as FDI concentration across sectors is contemporaneous to the employment level reported during the year of the survey.

A more robust indicator relates greenfield FDI to employment growth in a large number of OECD countries between 2009 and 2016. Available statistics for the OECD area make it possible to examine this association over a longer and comparable period than with the previous indicator. In addition, the data cover services activities. The results indicate that,

in OECD countries, sectors with higher concentration of greenfield FDI in 2009, relative to the overall economy, witnessed stronger employment growth over time (Figure 3.5). This is particularly the case for Slovakia, Lithuania and Hungary. Only Iceland, Israel, Japan, New Zealand and Norway report a negative association. In these countries, FDI may have been concentrated in more capital-intensive sectors (e.g. utilities, finance, etc.), potentially limiting the expected impact of FDI on labour demand.

Figure 3.5. FDI and employment growth in OECD countries between 2009 and 2016

Is employment growth occurring more in sectors with a higher concentration of greenfield FDI?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. FDI sectoral distribution is kept constant at year 2009 (or earliest available year). The indicator is based on data for 27 sectors of which 13 are manufacturing sectors. Only countries with at least 10 sectors are included. Data for Canada refers to 2013, for New Zealand to 2015.
Source: OECD based on Financial Times' fDi Markets database, OECD National Accounts and ILO statistics.

OECD economies with strong industrialisation processes in the last decades, such as Mexico and Poland, hosted large foreign investments in labour-intensive, medium-tech industries, such as the manufacturing of automotive components. In higher-income OECD countries, business activities appear to be an important driver of the positive association between FDI and employment growth (e.g. in Denmark, Ireland, Netherlands, Finland, and Switzerland). In Denmark, transport and communication and chemicals play a key role; in the Netherlands, the results are driven by mining, machinery and equipment, transport and communication; in Switzerland important drivers are mining, chemicals, transport and finance.

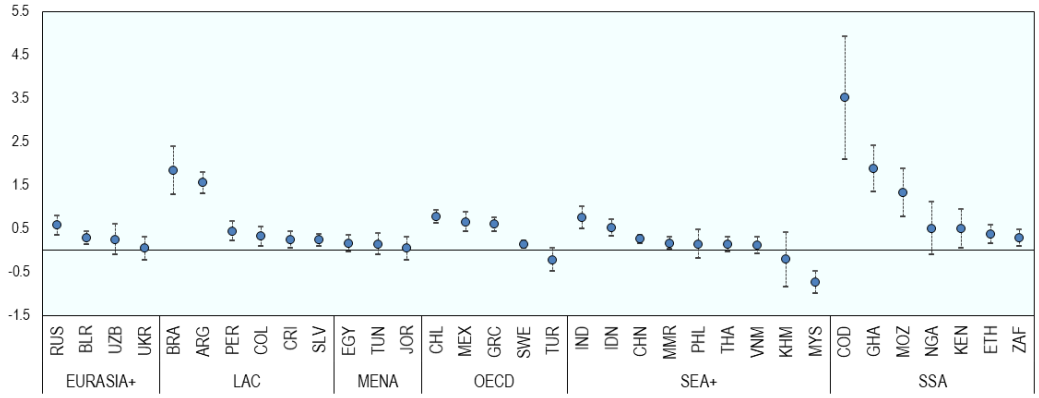
Foreign ownership is associated with higher average wages …

The previous set of indicators examined one aspect of how FDI relates to changes in labour demand, i.e. through employment expansions or contractions. Such changes also have effects on another dimension of labour market outcomes, namely workers' wages. The objective of the second set of metrics is to study how foreign ownership status relates to firm- and industry-level wages. Beyond job creation, governments aim at attracting FDI with better labour market outcomes. According to the OECD framework for assessing and measuring job quality, a key aspect of job quality is earnings and how it affects the wider wage distribution.

One indicator compares foreign and domestic manufacturers' average wages in 34 countries (OECD and developing countries). The results confirm what previous studies have shown using a similar methodology, i.e. foreign ownership is associated with a wage premium (Lejárraga and Ragoussis, 2018). The foreign wage premium is, on average, positive and significantly different from zero in most, but not all, countries (Figure 3.6). In MENA economies, Ukraine, Turkey and Nigeria there is no significant difference between the two groups of firms. Malaysia is the only case in the sample of countries where foreign manufacturers offer significantly lower average wages than their domestic peers do. This is consistent with indicators from the "productivity cluster" showing that there is no foreign productivity premium in Malaysia (see Chapter 2).

Figure 3.6. Foreign and domestic firms' wages in OECD and developing countries

Do manufacturing foreign firms offer higher average wages than their domestic peers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Wages: Total annual labour cost (includes wages, salaries, bonus, etc.); Workforce: sum of full-time permanent and temporary employees.
Source: OECD based on World Bank Enterprise Surveys.

The magnitude of the foreign wage premium strongly differs across countries, including when they are from the same region. In Latin America, the premium is considerably higher in Brazil and Argentina than in the rest of the region. The largest wage premiums are observed in SSA countries, such as in the Democratic Republic of Congo where the average foreign firm pays wages that are multiple times higher than the average domestic firm. While the existence of a foreign wage premium could enhance living standards, excessive wage dispersions also push upward between-firm wage disparity, thereby contributing to overall wage inequality (OECD, forthcoming).

The colossal wage dispersions between the two groups of firms mirrors the important productivity gaps observed in these countries (see Chapter 2). More broadly, the larger the (indicators on) productivity gap between foreign and domestic firms the higher is the foreign wage premium. The firm-level indicator does not disentangle the different drivers of the premium, however. As the indicator compares *average* wages, and not *individual* workers' wages, it is likely that most of the premium reflects foreign firms' intrinsic features, i.e. that they are larger, more productive and have higher shares of skilled workers (Hale and Xu, 2016). The premium could also reflect different product market power among the two groups of firms, which in turn can generate productivity-related rents. Such

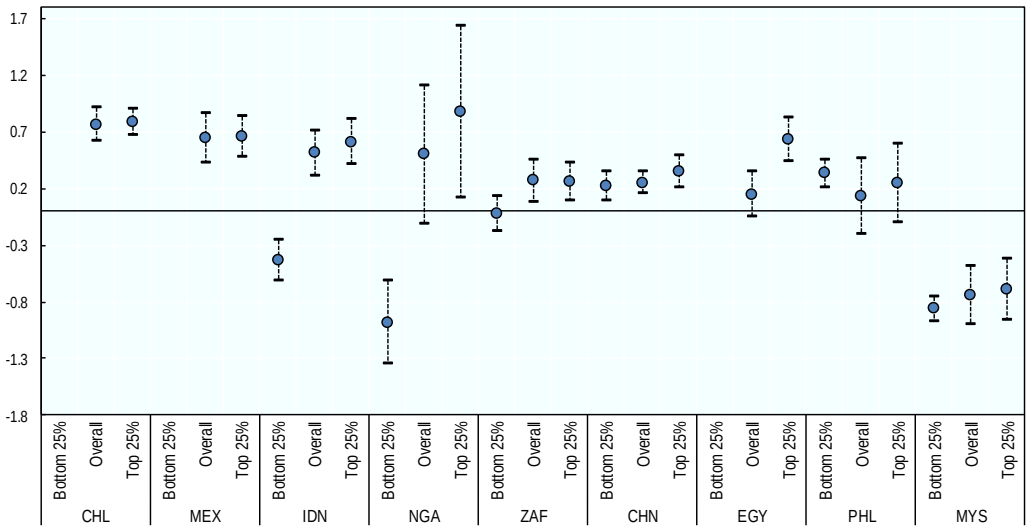
rents, and how they are shared with workers, can be rooted in product innovation but also in barriers to competition or in the wider policy environment (OECD, forthcoming).

… But not necessarily towards the bottom of the wage distribution

Wage differences could also arise because foreign firms need to compensate workers for potentially more difficult working conditions or to limit turnover (and technology spillovers to competitors). Also, while most foreign companies may be providing better wages, there may be few others that offer relatively poorer working conditions than their domestic peers. The indicator in Figure 3.6 is reproduced for the top (bottom) 25% foreign and domestic firms with the highest (lowest) wages (Figure 3.7). The result, available for a limited group of countries, suggest that the foreign wage premium tends to be higher at the top of the wage distribution and lower, if not inexistent, towards the bottom. In Nigeria and Indonesia, the so-called foreign wage premium is even negative for firms at the bottom of the wage distribution, in stark contrast with the top 25% foreign firms.

Figure 3.7. Top and bottom foreign and domestic firms' wages in selected countries

Do manufacturing foreign firms offer higher average wages than their domestic peers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Wages: Total annual labour cost (wages, salaries, bonus, etc.); Workforce: sum of full-time permanent and temporary employees. Overall: average wage of all firms; bottom/top 25%: average wages of firms below the 25 percentile/above the 75 percentile.
Source: OECD based on World Bank Enterprise Surveys.

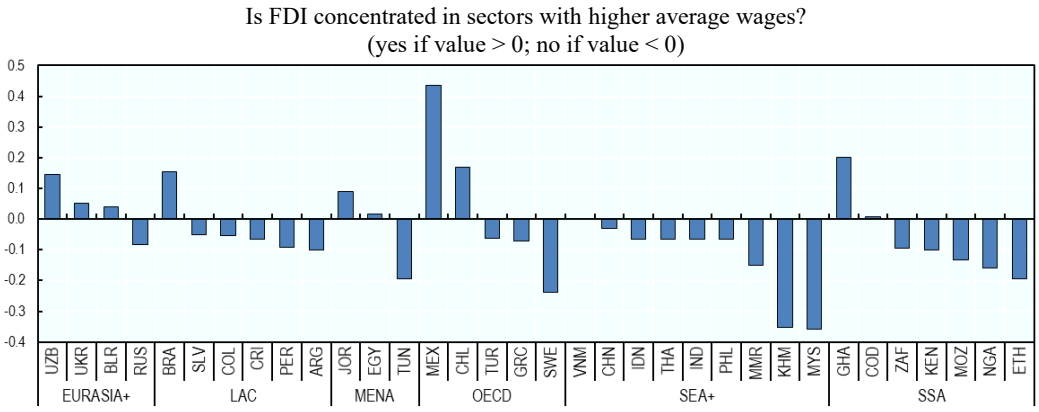
The above indicator informs policymakers about the wage outcomes associated with firms' ownership status in host countries, including along the wage distribution. Nonetheless, it does not tell whether foreign firms help maintaining adequate standards of living by offering decent wages. The indicator also falls short from evaluating how industry-specific characteristics shape the FDI-wage relationship. Firstly, as foreign firms are often more concentrated than domestic businesses in specific sectors of an economy, the (non-) existence of a wage premium may reflect industry-specific wage differences. Secondly, the indicator does not capture potential competition or imitation spillover effects of foreign ownership on wages of domestic firms operating within the same industry (or supply chain) or a specific geographical location (with localised labour market effects of FDI).

FDI in developing countries is often concentrated in low-wage industries

The following indicator assesses whether FDI is concentrated in lower or higher-wage industries, relative to the overall economy. It overcomes one limitation of the previous, firm-level, indicator by aggregating both *direct* and *spillover* wage outcomes of foreign ownership. Beyond the (non-) presence of a (direct) foreign wage-premium, FDI may also affect domestic firms' wages by raising the cost of labour or because of technology spillovers. As the indicator measures the correlation between FDI concentration and wage levels, and not purely effects of FDI on wages (i.e. causality), the results may nonetheless reflect FDI attraction to sectors with more competitive labour costs.

The results show that FDI is more concentrated in industries with lower average wages in a majority of developing countries (Figure 3.8). This is particularly the case in Southeast Asia, China and India. In contrast, manufacturing FDI dominates industries with higher average wages in Brazil, Chile, Ghana, Jordan, Mexico, Ukraine and Uzbekistan. The fact that the data only cover manufacturing activities may explain the negative (or no) association between FDI concentration and wages in countries with large primary or service sectors, such as mining in the Democratic Republic of Congo and Malaysia. Nonetheless, a negative association at the aggregate level does not rule out the possibility of positive FDI-related wage spillovers at the industry-level. These could result from skill-biased technological transfer that would increase the wages of skilled workers within the industry, and potentially spread to rest of the economy.

Figure 3.8. Manufacturing FDI and wages in selected OECD and developing countries



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. Wages: Total annual labour cost (wages, salaries, bonus, etc.); Workforce: sum of full-time permanent and temporary employees.
Source: OECD based on World Bank Enterprise Surveys and OECD Statistics.

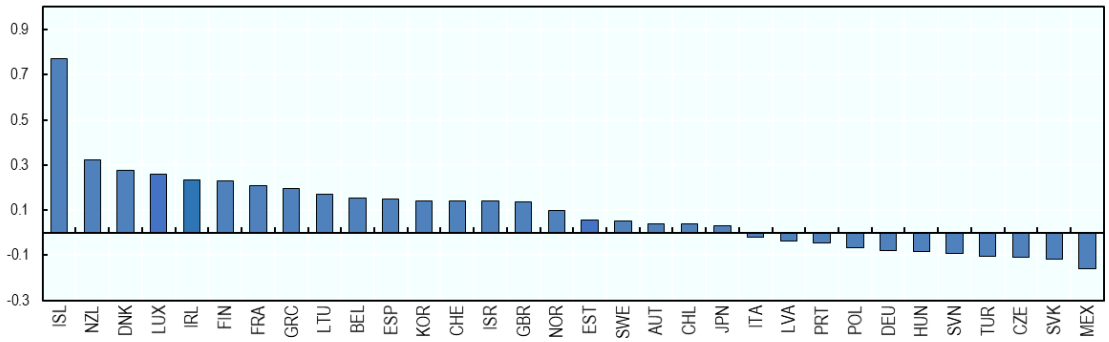
FDI association with wages can be significantly different in developing and developed countries. Potential dichotomy between the two could partly reflect variations in the size of the informal sector, which, if accounted for, would provide more precise indicators of FDI concentration in countries with high informality. To explore potential differences related to the stage of development, a second indicator examines the FDI-wage relationship in a large group of countries in OECD area. The indicator is identical in its construction to the previous indicator but it relies on other statistical sources. Beyond different country coverage, the data used to construct the second measure cover a larger number of economic activities, including services; in contrast with the previous metric, which only includes

manufacturing. In addition, this indicator is based on greenfield FDI data while the first measure does not distinguish greenfield investments from M&As.

According to the second measure, FDI is concentrated in sectors with higher average wages in the majority of OECD countries, in contrast with the previous result (Figure 3.9). The level of industrialisation appears to be a crucial determinant of the sign and magnitude of the relationship: countries with a dominant services sector (and limited industrialisation) also concentrate FDI in higher-wage activities (e.g. Iceland, New Zealand, Denmark, and Luxembourg). OECD countries with strong industrial bases such as Germany, Turkey and Czech Republic host more FDI in sectors with lower average wages, but also with weaker skill-intensity (see chapter 4). This is also the case of Mexico, for which there is a stark difference between the two indicators. The inclusion of services in the second measure partly explains this difference. Overall, FDI in Mexico is skewed towards manufacturing, a sector with lower average wages than in services. Within manufacturing, FDI in the country is located in relatively high paying sub-sectors, however.[10]

Figure 3.9. FDI and wages in OECD countries

Is greenfield FDI concentrated in sectors with higher average wages?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. Wages: industry-level average nominal monthly wages.
Source: OECD based on Financial Times' fDi Markets database, OECD and ILO Statistics.

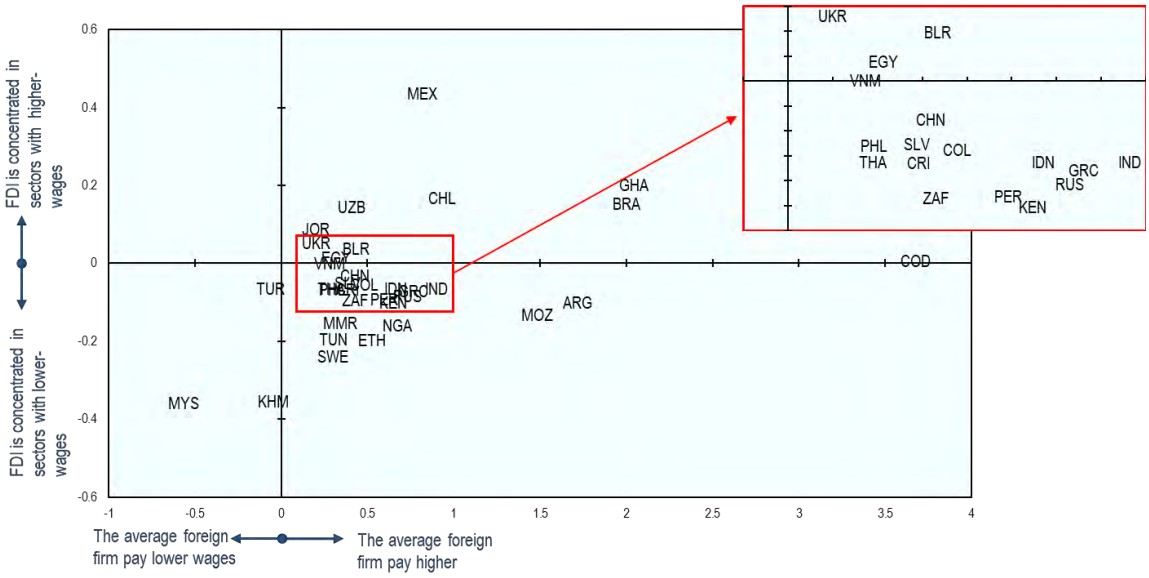
Using different measures of foreign ownership, as for the two above indicators, would further augment the understanding of the channels through which FDI affects wages, but is not done in this chapter. Different FDI entry modes, i.e. either through a new greenfield project or a foreign takeover, can lead to distinct labour market outcomes. Labour market outcomes are more sensitive to greenfield FDI than M&A, as changes in labour demand (and thus employment) are expected both to be positive and stronger (Williams, 2003). Relatedly, greenfield FDI tends to be overrepresented in labour-intensive manufacturing activities while M&As tend to prevail more in capital-intensive services sector.[11] Thus, besides firm-level features such as productivity or size, wider effects of FDI on employment and wages also depend on investor' entry mode and FDI sectoral composition.

The aggregate FDI-wage relationship strongly varies across countries

The indicators above explored the relationship between FDI and wages using multiple units of analysis. They capture two levels of relationship: foreign businesses' wage premium, at the firm-level, and the sectoral composition of FDI and its wider association with wages, at the industry-level. Figure 3.10 summarises where countries stand along these two

relationships and provides insights on how FDI relates to wages at the aggregate level. If foreign manufacturers pay higher average wages than their domestic peers, a country is positioned in the two quadrants on the right; the case for the majority of countries. If FDI is concentrated in higher-wage industries, then a country appears in the two quadrants above, which is the case for only few countries.

Figure 3.10. Manufacturing FDI and wages: Firm level vs. industry level indicators



Note: This figure compares a Type 1 indicator (horizontal axis; indicator from Figure 3.6) with a Type 2 indicator (vertical axis; indicator from Figure 3.8). See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Figure 3.10 shows that countries with larger foreign wage premiums also tend to host more FDI in high-wage industries, relative to the rest of the manufacturing sector. This is particularly the case of Brazil, Chile, Ghana, and Mexico (top-right quadrant). In these countries, and a few others, the indicators suggest a positive FDI-wage relationship at the aggregate level, as they also suggest a positive FDI-productivity relationship (Figure 2.7 of Chapter 2). In contrast, Cambodia and Malaysia display negative FDI-wage and FDI-productivity relationships (bottom-left quadrant). In the majority of the countries, foreign manufacturers have on average a wage premium over domestic peers while at the same time being located in relatively lower-wage industries (bottom-right quadrant). Foreign firms may be boosting wages in these industries in case they are more productive or technologically more advanced.

These results highlight the central role of labour productivity in shaping the FDI-wage relationship and they are simple, although crude, robustness checks whether the indicators in different "FDI qualities clusters" provide consistent messages. At the same time, they show that a better decoding of the aggregate FDI-wage relationship, and how it relates to wage inequality, is necessary for more robust comparisons across countries. For instance, FDI concentration in lower-wage industries could contribute to a narrowing of the wage gap with higher-wage industries. At the same time, foreign firms' may increase intra-industry wage disparity.

Wider evidence indicates that differences in pay between firms contribute significantly to overall wage inequality, even more so than differences across sectors (Berlingieri et al. 2017; OECD, forthcoming). Excessive wage gap between foreign and domestic businesses may increase overall wage inequality and therefore hamper inclusive growth. Less excessive disparities ensure a more effective diffusion of knowledge from top to bottom industries and firms and can support wider structural transformation (OECD, 2015). Reducing productivity and wage disparities across industries and between firms while at the same time supporting aggregate growth is therefore a challenging but crucial policy objective. Gaining a better understanding of foreign ownership effects on wage inequality is particularly relevant in a context where some MNEs are viewed as "superstar" or "winner-takes-most" firms with large (productivity-related) product market rents.[12]

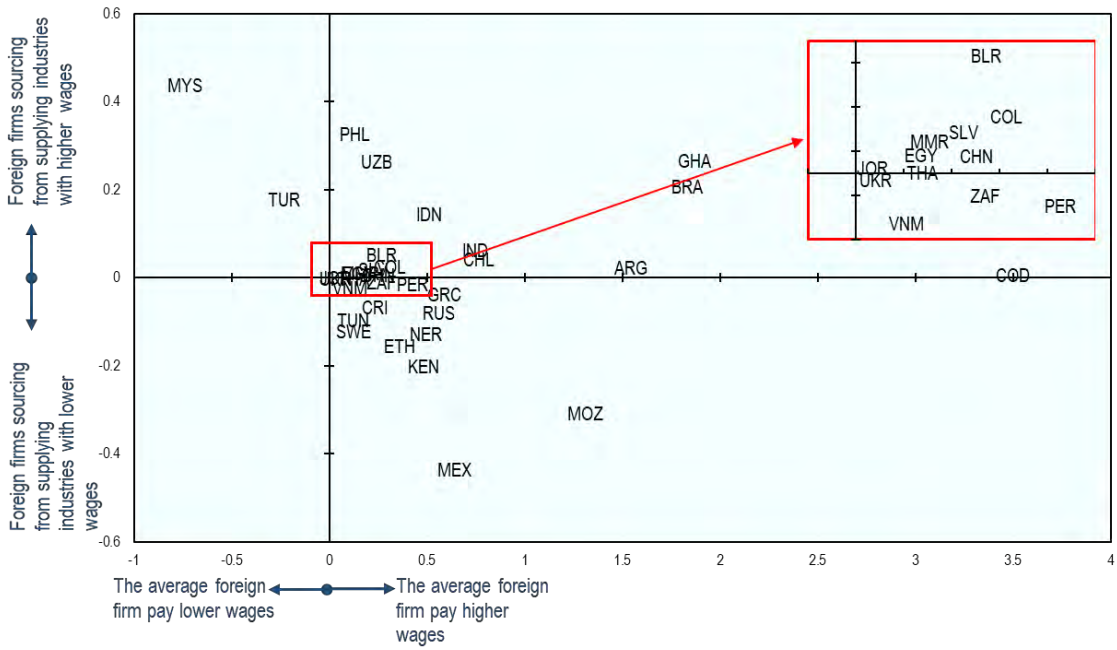
Other industry-specific factors can be driving countries' positioning in Figure 3.10. Foreign firms' entry and operations often cause intra-industry labour force reallocations in favour of more skilled workers, leading wages to surge. Foreign firms may also be boosting wages within an industry because, upon entry, they compete for talent with domestic firms in the same labour market (Lu et al., 2017). Some empirical evidence suggests that labour mobility of higher-skilled workers moving from a domestic to a newly acquired foreign firm is behind most of the wage increase - the wage premium quasi vanishes if workers have the same characteristics (Hijzen et al, 2013). These wage effects may nonetheless reduce the ability of domestic firms within the same industry to hire or retain skilled workers and grow. National and local policies in favour of labour mobility play a role in diffusing FDI effects on wages to the wider economy.

Local souring by foreign firms may amplify wage spillovers

Positive wage spillovers are likely to be more important in the presence of strong linkages between local firms and foreign affiliates, such as through the participation of local firms in the supply chain or through worker mobility (OECD, 2008). The data at hand do not allow developing a cross-country measure of FDI linkages effects on wages of supplying firms. Instead, an alternative indicator examines whether stronger supply chain linkages with foreign manufacturers are observed in higher-wage industries (Figure 3.11, vertical axis). In the majority of the countries, there is no identifiable relationship. The exceptions are Brazil, Ghana, Uzbekistan and Southeast Asia: industries with stronger supply chain linkages also report higher average wages. The opposite result holds for Mexico, Mozambique and Kenya, for example.

The extent of FDI linkages concentration in lower or higher wage industries is, to some degree, related to the size of the foreign wage premium (Figure 3.11). In countries with larger wage dispersion between foreign and domestic firms, FDI linkages are more concentrated in low-wage industries and vice-versa. This relationship provides additional insights on the expected spillover effects of FDI on domestic firms' wages. In industrialised countries such as Mexico, the wide productivity and wage gaps observed between foreign and domestic manufacturers may be impediments to forging supply chain linkages between the two groups of firms. This relates to the absorptive capacity of domestic suppliers, as examined in Chapter 2. In that context, positive, productivity-driven, wage spillover effects of FDI may be relatively limited.

Figure 3.11. FDI linkages and the wage premium in selected OECD and developing countries



Note: This figure compares the Type 1 indicator from Figure 3.6 (horizontal axis) to a Type 3 indicator (vertical axis). See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys; Financial Times' fDi Markets database and OECD Input-Output tables.

Foreign firms may not enhance job security but their role is likely to be limited

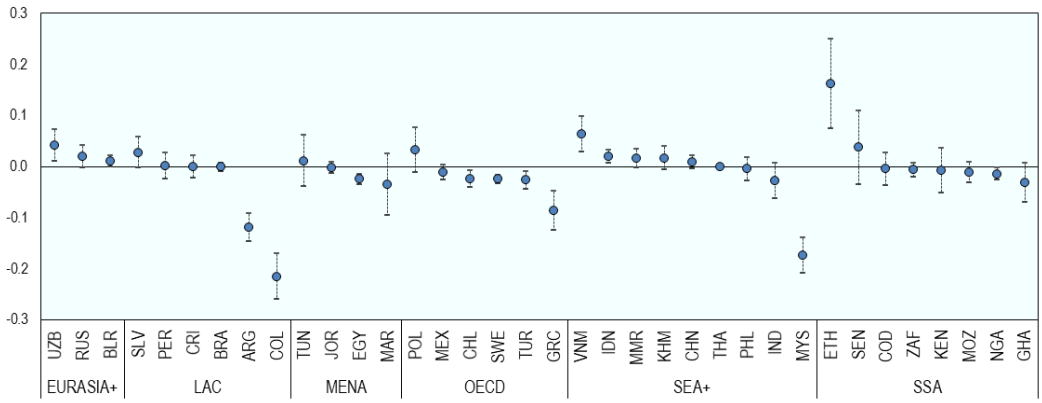
The third set of indicators relates FDI to non-wage working conditions to see in which countries foreign firms offer better conditions than their domestic peers and whether this outcome is driven by sector-specific considerations. The rising importance of MNEs has raised public concerns about their potential social impact in the host countries on non-wage working conditions such as job security, health and safety at work and union rights (2008b). Policymakers sometimes fear that foreign investments are "footloose" and more likely than domestic businesses to downsize in response to negative shocks. If that is the case, it is then equally relevant to examine whether foreign firms compensate their workers by offering higher wages.

FDI effects on job security could arise because of distinct propensities in the use of non-regular forms of employment, such as the incidence of temporary work.[13] MNEs are likely to have more options along which to adjust their operations than domestic firms – they could respond to changes in business cycles, wages, and so on in different countries by adjusting production in different affiliates. This might make them more interested in flexible work arrangements than single unit firms or purely domestic firms. Temporary work contracts often include a different set of legal obligations; in particular, certain aspects of employment protection legislation do not apply to them, and their use is more widespread among migrants, women and youth (OECD, 2018). They are also associated with poorer health conditions, including mental illnesses (Virtanen et al., 2005). Recent findings show that such effects do exist but are limited and specific to *perceived* job insecurity rather than the nature of the work contract – permanent versus temporary (Caroli and Godart, 2016).

One indicator relates FDI to labour market security in host countries by comparing the extent and length of temporary employment between foreign and domestic businesses.[14] The results show that foreign firms tend to rely relatively more on temporary workers in 22 countries out of 35 (Figure 3.12), but the difference in the average shares of permanent workers between the two groups of firms is only significant in a few cases. Argentina, Colombia and Malaysia host the foreign manufacturers with the highest prevalence of temporary workers compared to domestic businesses. This is also the case for most OECD countries in the sample (i.e. Chile, Greece, Sweden and Turkey), albeit differences between the two groups of firms are smaller. Comparisons between developed and developing countries may be blurred by the reliance on informal workers in the case of the latter, which substitute for formal temporary contracts.

Figure 3.12. Job security among foreign and domestic firms

Do foreign manufacturers have higher shares of permanent workers than domestic businesses?
(yes if value > 0; no if value < 0)



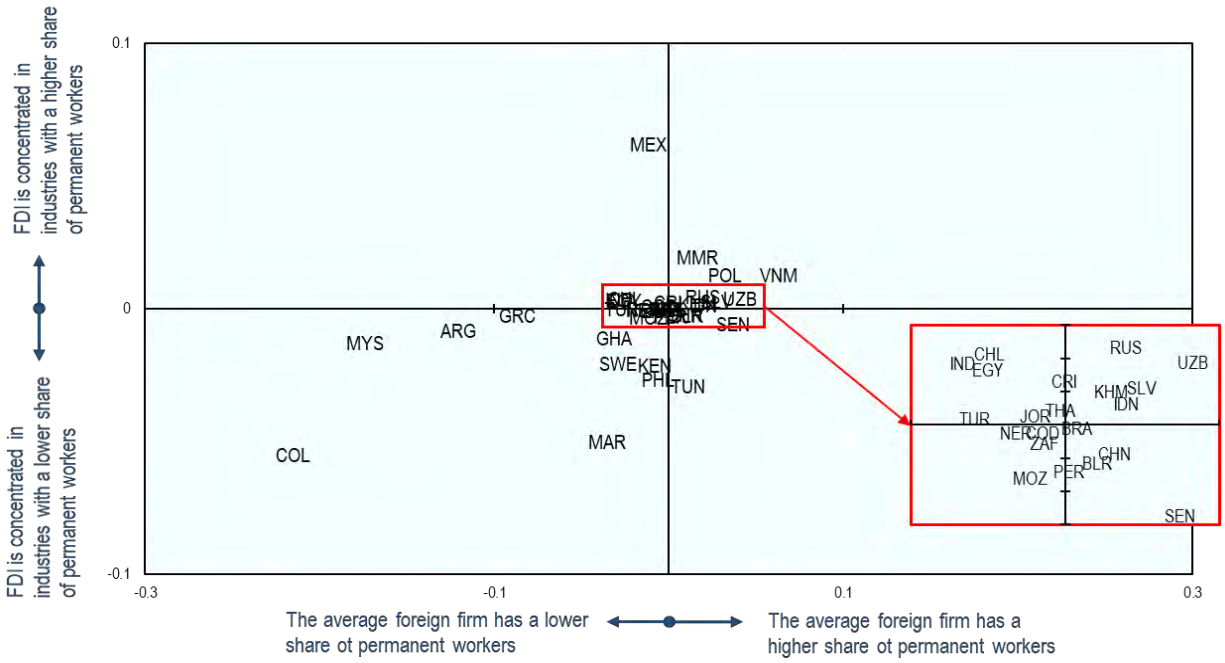
Note: The figure shows a type 1 indicator and the respective 95% confidence interval. Permanent employment: contracts that are longer than 12 months. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Despite the dearth of studies examining the link between firms' ownership status and the use of temporary work, there are some reasons why foreign affiliates might rely more on non-regular forms of employment. These may not be the same for developed and developing nations. In the case of the latter, the prevalence of FDI in special economic zones could be one of the causes behind foreign firms' wider reliance on temporary workers. Zones often have more flexible labour rules that may encourage precarious employment arrangements and limit unions' bargaining power (UNCTAD, 2019). Zone investors are also often subject to production or export compliance criteria that may push them to adjust frequently to business fluctuations by relying more on temporary contracts.

A wider use by foreign firms of non-regular forms of work could also be due to FDI prevalence in industries that are more sensitive to global fluctuations or to international and domestic legislation. In Colombia, for instance, most jobs created by greenfield FDI projects are in the food and tobacco industry. The export-oriented nature of this sector, and the relatively low profit margins, may push foreign multinationals to favour temporary contracts in order to adapt quickly to ever-changing global trends. Figure 3.13 tends to support this hypothesis: most countries with higher shares of temporary workers in foreign firms relative to domestic businesses also concentrate FDI in sectors with a higher

incidence of temporary contracts (lower-left quadrant). Besides Colombia, this is also true for Argentina and Morocco, among others.

Figure 3.13. FDI and job stability across selected OECD and developing countries

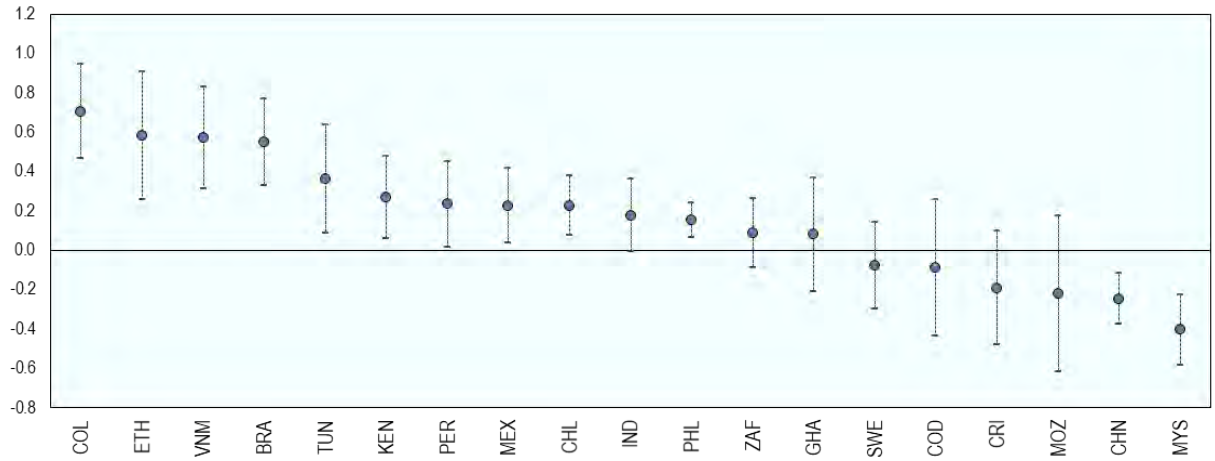


Note: This figure compares a Type 1 indicator (horizontal axis; indicator from Figure 3.11) with a Type 2 indicator (vertical axis). Permanent employment: work contract that is longer than 12 months. See Annexes B and C for a description of the methodology and data.
Source: OECD calculations based on World Bank Enterprise Surveys.

In some countries, foreign firms are more prone than their domestic peers to offer longer temporary contracts (Figure 3.14), even if they make more use of temporary contracts. Such trade-off exists, for instance, in Colombia, Egypt or Tunisia. In these countries, foreign firms offer longer temporary contracts than domestic ones, while also relying more on temporary workers. In Morocco, foreign affiliates and domestic firms offer temporary contracts of the same duration, but the former rely less on temporary workers. In only few countries, such as Viet Nam, does FDI relate positively to job stability across various indicators: foreign firms have higher shares of permanent workers, offer longer temporary contracts than their domestic peers and are concentrated in sectors with higher job stability.

Figure 3.14. The length of temporary contracts among foreign and domestic firms

Do foreign manufacturers offer longer temporary contracts than their domestic peers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. The length of temporary employment comprises contracts between 1 and 12 months.
Source: OECD based on World Bank Enterprise Surveys.

FDI is concentrated in sectors with lower occupational safety at work

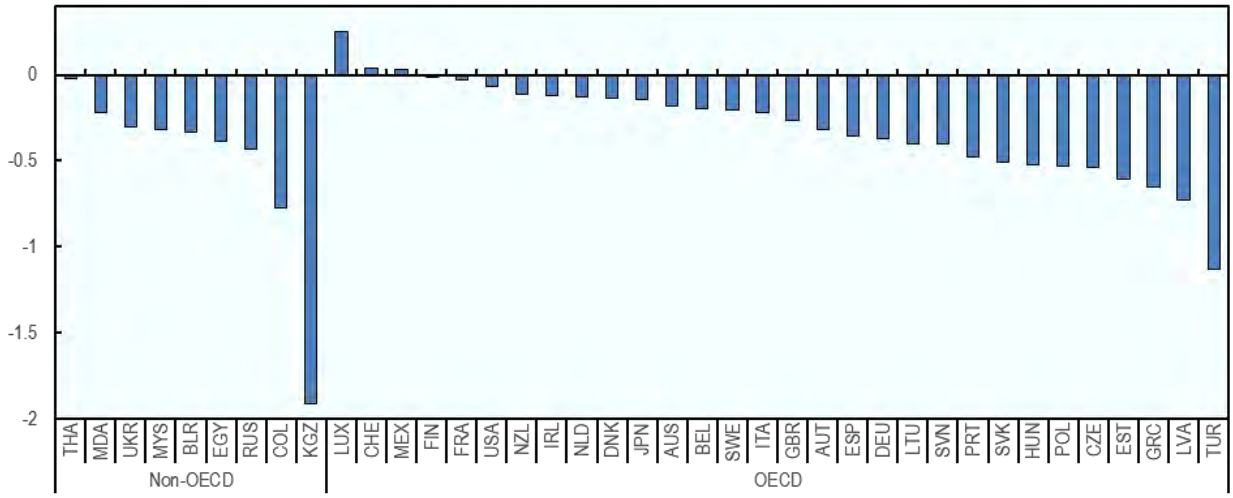
Safety at work is a crucial measure to examine non-working conditions and labour market outcomes more broadly. SDG8 includes a metric measuring the "frequency rates of fatal and non-fatal occupational injuries" (SDG indicator 8.8.1). The metric monitors target 8.8: "Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment".

Foreign and domestic firms may have differentiated impacts on occupational health and safety at work. The few studies that exist suggest that such differences might be due to firm- or industry-specific features and countries' regulations and not necessarily to the ownership status (Box 3.1). One indicator relates the SDG metric to the sectoral concentration of greenfield FDI, relative to the overall economy to see in which countries FDI is more concentrated in sectors with higher incidence of occupational injuries. Following the recommendations of the OECD guidelines on measuring the quality of the working environment (OECD, 2017), this measures relates FDI to outcome measures of non-wage working conditions rather than to procedures.

The results suggest that greenfield FDI tends to be concentrated in sectors with a higher incidence of non-fatal occupational injuries for a large group of OECD countries (Figure 3.15). The strongest correlation between FDI concentration and occupational injuries occurs in countries with labour-intensive manufacturing activities such as Hungary, Poland, the Czech Republic, and Turkey. In contrast, FDI projects in Luxembourg, Switzerland and Finland are mostly located in industries with lower work-related injuries. There are some exceptions such as Mexico and Latvia, however. Among a smaller group of developing countries, for which data are relatively limited, FDI is systematically concentrated in sectors with a risk of occupational non-fatal injuries, particularly in Colombia and Kyrgyzstan.

Figure 3.15. FDI and occupational health in OECD and selected developing countries

Is greenfield FDI concentrated in sectors with lower incidence rates of non-fatal injuries?
(yes if value > 0; no if value < 0)



Note: This figure shows a Type 2 indicator. See Annexes B and C for a description of the methodology and data. The incidence rate is the average number of new cases of non-fatal occupational injury per 100,000 workers in the reference group between 2012 and 2017. The indicator excludes countries with data in less than five sectors.
Source: OECD based on ILO, OECD, UN Statistics and Financial Times' fDi Markets database.

Some industries are more prone to face higher risks of occupational injuries than others, such as the construction sector. In Colombia, for instance, cross-border investment projects in the construction sector represent 10% of greenfield FDI, which is a relatively high sectoral concentration of FDI, relative to the overall economy. It is also possible that industries with higher exposure to work-related injuries also have larger shares of temporary workers. These workers have higher risks of developing an occupational injury than workers with a higher job security, even in cases where both work in the same sector (Virtanen et al., 2005).

A deeper investigation of the relationship between MNEs activity and occupational safety is required in light of the results above and because of the severe limitations of the indicator. It is not possible to establish any causality between FDI and occupational safety with the above indicator. Furthermore, the indicator suffers from drawbacks in terms of industry representativeness as some countries report occupational injuries in a more limited set of activities (and therefore have observations in few sectors only). Nonetheless, the indicator provides an initial signal to countries whether FDI starkly relates to a lack of safety at work and that policymakers may further examine to clarify the underlying causes.

Notes

[1] While crucial, how FDI relates to human rights and child labour is beyond the scope of this report.

[2] Divestment can have impacts on the performance of the affected affiliates. Borga et al. (2019) find a negative relationship between foreign divestment and employment of the divested affiliates across 41 OECD and G20 countries, relative to firms that have not been divested by foreign investors.

[3] A comprehensive list of frameworks measuring job quality is compiled in the OECD Guidelines on Measuring the Quality of the Working Environment (OECD, 2017).

[4] FDI could also affect home country labour market outcomes. While relevant, this chapter does not discuss this aspect as it goes beyond the scope of this report.

[5] Evidence shows that management practices are more advanced in foreign firms than in domestic firms (Bloom et al., 2016). Good management can be a critical component of a good job, in turn leading to higher work engagement and job satisfaction, better health and higher productivity. Limited data availability did not allow to develop indicators relating FDI to management practices.

[6] FDI can also affect non-wage working conditions by altering workers' representation and incentives to strike. MNEs bargaining power may differ from that of domestic firms due to their organisational structure, while at the same time being possibly more prone to strikes. There is some evidence, albeit weak, that a foreign takeover reduces union bargaining power (OECD, 2008b), possibly reflecting union fears that wage demands (or negative shocks) may lead to the relocation of production to other countries. Overall, collective bargaining is associated with lower wage inequality and the quality of the working environment tends to be higher in firms with a recognised form of employee workplace representation (OECD, 2018). Limited data availability did not allow to develop indicators relating FDI to workers' incentives to strike or to collective bargaining.

[7] Lejarraga and Ragoussis (2018) show that foreign firms activity tends to be geographically less widespread than domestic activity.

[8] See Karlsson et al. (2009). Overall, studies are inconclusive on whether foreign and domestic firms have different survival rates. Bernard and Jensen (2007) find that foreign firms have higher survival rates because of firm-specific characteristics and not due to their ownership status. In contrast, Görg and Strobl (2002) discuss the footloose nature of FDI and show that foreign firms are more likely to shut down operations, conditional on a set of firm and industry features.

[9] Focussing on 11 European countries, Navaretti et al. (2003) find that employment adjustment in foreign firms is faster than in domestic businesses, after controlling for sector and size effects.

[10] The argument for Mexico also holds for Greece and Sweden. The World Bank Enterprise Survey only covers manufacturing, which could explain the negative association between FDI concentration and wages (Figure 3.6). This association is positive once services FDI is included (Figure 3.7).

[11] Davies et al. (2015) rank sectors by the number of FDI projects. They find that the top three sectors in both greenfield and M&A are service sectors, specifically software & IT, financial, and business services. Textiles is the fourth top sector for greenfield but is not among the top 10 in M&A. In contrast, pharmaceuticals and real estate rank much higher for M&A than for greenfield.

[12] A number of public policies may help containing the dispersion of productivity-related wage premia between firms without hurting aggregate productivity growth (OECD, forthcoming). These include reducing market entry barriers and strengthening (the enforcement of) competition policy to contain rents in "superstar" firms that are unrelated to innovation. Such rents could also be contained

by levelling the playing field in terms of tax policies, as multinational firms often are better able to reduce their tax burden through tax optimisation measures than domestic businesses.

[13] FDI effects on job security can reflect different survival rates between foreign and domestic firms.

[14] According to the OECD definition, temporary employment comprises work under a fixed- term contract, in contrast to permanent work where there is no end-date.

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Chapter 4. How does FDI relate to skills?

This chapter examines how FDI relates to three skill outcomes in host countries, notably skill intensity, skill development, and imbalances - surpluses or shortages - of technical skills. Based on a review of the literature, the first part of the chapter develops a conceptual framework that identifies the channels through which FDI can affect these skill outcomes. The second part presents indicators relating FDI to these three skill outcomes for selected OECD and developing countries.

4.1. Summary

The development and upgrading of skills is fundamental for sustainable development (SDG 4). Skills are an important production factor; they enable innovation; and they facilitate the transfer and absorption of technology. FDI can importantly foster skills development: Foreign firms tend to hire more skilled labour than their domestic peers, in part, due to their greater technology intensity. It follows that foreign firms can increase the demand for skilled labour relative to that of unskilled labour, ultimately leading to an increase in skill intensity in the host country. At the same time, foreign firms may decide to keep more complex tasks associated with higher skill levels at home, while offshoring low-skill routine tasks, thereby reducing skill intensity in the host country.

A set of indicators relates greenfield FDI to skill intensity (measured as the share of managers, professionals and technicians in total occupations). In contrast with conventional wisdom, the results show that greenfield FDI tends to be concentrated in sectors with lower shares of skilled workers, namely manufacturing, construction, mining and transport services.

A closer look at the manufacturing sector shows a more nuanced picture: in many OECD and developing countries, foreign activity (as measured by foreign firms' sales) tends to be concentrated in sectors with lower shares of skilled workers. These sectors are often low-technology intensive manufacturing sectors, notably food and garments. Countries with large garment sectors such as China and Indonesia belong to this group. In other countries, however, the opposite result is observed: foreign activity is largely found in sectors with higher shares of skilled workers. These sectors are generally medium and high-technology manufacturing sectors such as chemicals and machinery. This cluster includes for example Brazil and Mexico, both with important chemical sectors. The results also indicate that foreign and domestic firms do not have significantly different shares of skilled workers.

Through their activities, foreign investors can also affect the supply of skills in host countries. They can do so by providing training to their employees or to those of domestic companies as part of support activities. The results show that in OECD countries, greenfield FDI tends to be concentrated in sectors with lower shares of trained workers. These sectors also tend to be less skill-intensive. However, more detailed data for the manufacturing sector show that in most OECD and developing countries, foreign activity is prevalent in manufacturing industries with higher shares of trained workers. These manufacturing industries are high-technology intensive sectors such as chemicals and machinery, where training needs tend to be higher due to more rapid technological change. The results also show that in most countries foreign firms do not have different shares of trained workers relative to domestic firms.

The last set of indicators shows how FDI is associated with imbalances, shortages or surpluses, of technical skills (e.g. programming, installation) in OECD countries. Through their impact on the demand and supply of skills, foreign firms may reduce or expand skill imbalances in the labour market. Skill imbalances involve both shortages, when the supply of qualified workers is insufficient in the labour market, and surpluses, when skills are underutilised. Skill shortages may slow down productivity, innovation and technology absorption. Surpluses are often associated with unemployment and, in the long term, may reduce aggregate income and productivity.

The indicators show that in the majority of countries FDI is concentrated in sectors with higher imbalances of technical skills. In particular, in countries characterised by a surplus of technical skills in the labour market, FDI is found more in sectors with relatively higher surpluses. As such, FDI may contribute to reducing the surplus of technical skills by

expanding economic activity in those sectors (i.e. by creating occupations that use extensively technical skills).

In countries with a shortage of skills, the results vary across countries. In the majority of countries with a scarcity of technical skills, FDI is concentrated in sectors with lower imbalances (lower shortages or higher surpluses) of technical skills. Thus, FDI may not exacerbate skills shortages at the economy-wide level in these countries and may actually contribute to a balancing effect, which has strong policy implications and may be further studied for specific countries.

Overall, the results indicate large cross-country variation in the way FDI relates to skill intensity, skill development and imbalances of technical skills. While some of the results diverge from current evidence possibly due to differences in the data and approach used, the findings are broadly in line with the indicators on FDI and productivity and FDI and wages shown in Chapter 2 and Chapter 3 of this report. For example, the analysis shows that countries with a large manufacturing sector (e.g. Germany, Italy) tend to receive FDI in manufacturing industries with lower shares of skills, lower average wages and lower productivity levels relative to countries with more services-oriented economies. This finding omits showing that these countries have world class and high-tech manufacturing sectors that are more skill intensive than in many other countries. The large cross-country heterogeneity observed also suggests that more specific country analysis is needed to understand determinants of FDI impacts on skill outcomes and to provide policy guidance.

4.2. Conceptual framework

SDG 4 states that countries should "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." SDG 4 reflects a growing consensus that basic education should encompass not only primary education, but also higher levels of educational attainment, including secondary education and technical and vocational education and training. Despite remarkable progress in school enrolment, many children and adolescents remain outside of the formal education system worldwide. Disparities in education persist along the lines of income, gender, urban versus rural areas, and many other dimensions. Achieving SDG 4 can help succeed in other dimensions of sustainable development.

Skills are a key determinant of sustainable economic growth

Education is key to developing skills. Skills, in turn, are vital for a productive and flexible workforce. Many studies show that countries with better endowments of skills (i.e. human capital) are more productive and grow faster (Barro, 1991; Mankiw *et al*., 1992; Barro and Sala-i-Martin, 1995; Brunetti *et al.*, 1998, Hanushek and Kimko, 2002). Furthermore, a skilled workforce can raise a country's innovation capacity, and the new technologies, products and processes that result from innovation can support growth (Lucas, 1998; Romer, 1990; Aghion and Howitt, 1998). Skills also facilitate the transfer of knowledge and information needed to understand and apply technologies created by others, which further encourages growth (Benhabib and Spiegel, 1994; Cohen and Levinthal, 1990).

Recent studies show that skills are an important determinant of countries' comparative advantage in global value chains (GVCs) and affect the opportunities and challenges created by GVCs (OECD, 2017a). Skills are essential to adapt to fast-changing market conditions and to upgrade and move up the value chain (OECD, 2012). They are also an important factor in attracting FDI and influence the ability of countries to benefit from FDI (Gupta and Govindarajan, 2000; Zahra and George, 2002).

Skills also enable people to build better lives and equip businesses and communities to face social and environmental changes. Increasing evidence shows that developing skills can advance progress towards other sustainable development goals such as good health, gender equality, poverty eradication, decent work. For example, there is evidence that enhancing girls' education reduces gender inequality (Unterhalter et al., 2014), and adult education – particular women's education – reduces child mortality and has a positive impact on health (Chou et al., 2010; Gakidou et al., 2010; Grossman and Kaestner, 1997; Grossman, 2006).

Foreign firms affect the demand and supply of skills in host countries

Through their activities, foreign firms can affect the demand and supply of skills in host country labour markets. Consequently, they may influence skill outcomes such as skill intensity, skill development and skill imbalances, i.e. surpluses and shortages of skills. Based on a review of the literature (Box 4.1), a number of channels are identified.

- **FDI may raise the relative demand for skills**: Foreign firms tend to be more skill-intensive than domestic firms, possibly due to firm-specific assets, and to bring new technologies to host countries, which often favour skilled over unskilled labour (i.e. skill-biased technical change). It follows that the presence of foreign firms may lead to an increase in the demand for skilled labour relative to the demand for unskilled labour. If, as a result, skilled employment increases more than unskilled employment, skill intensity in the host country will also grow. At the same time, foreign firms may transfer more complex tasks associated with higher skill levels to home or regional headquarters, thereby reducing skills intensity in the host country. While an increase in skill intensity will have positive implications for long-term growth, it could widen wage inequality between skilled and unskilled workers in the short term, as the higher relative demand for skills puts upward pressure on the wages of skilled workers.[1]
- **Foreign firms may increase the supply of skills:** Foreign firms may contribute to skill development by training local employees, or offering support to domestic partners, for instance to ensure the quality and reliability of their suppliers. They may also induce local firms to invest in human capital in response to rising competitive pressure from their presence in the market (competition effects) or to imitate more profitable foreign firms' practices (imitation effects).
- **Foreign firms may impact skill imbalances:** The activities of foreign firms may have an impact on skill shortages or surpluses in host countries, known as skill imbalances. Both shortages and surpluses of skills stem from inefficiencies in the labour market. Skill shortages occur when there is insufficient supply of qualified workers (Shah and Burke, 2005), and may lower productivity and slow down the adoption of new technologies (OECD, 2017b). Skill surpluses exist when people work in jobs that do not require the level or type of skills that they possess, or when their skills are underutilised. Surpluses of skills are often associated with unemployment and may cause income and productivity losses for an economy in the long term (Mavromaras et al., 2013). Foreign firms have the potential to affect skill imbalances through their impact on both the supply and the demand of skilled labour. Especially if they bring skilled-biased technology, foreign investors may help to decrease skill surpluses by raising the relative demand for skilled labour in the host country. At the same time, foreign firms may contribute to reduce skill shortages by expanding the supply of skills in the host country, i.e. by training their employees and by encouraging domestic companies to do the same.

Box 4.1. A review of studies on FDI and skills

Economic theory suggests that FDI may increase the relative demand for skilled labour

Economic theory predicts that globalisation – trade and FDI openness, and technological progress – affect the relative costs and demand of skilled and unskilled labour.

In particular, the Stolper-Samuelson theorem of factor-proportions suggests that trade-induced sectoral specialisation and comparative advantage might increase the returns of the factors used more intensively in the production process. It follows that in advanced economies with a comparative advantage in skill-intensive activities, trade may increase the relative demand for skilled workers. On the contrary, in developing countries where low-skilled labour may be abundant, trade is expected to increase the demand for unskilled labour. A similar effect has been suggested for inward FDI: foreign investment is expected to increase the returns of the factor used more intensively in the host country.

In addition, the theory suggests that MNEs possess firm-specific assets (e.g. technological assets) that give them an advantage relative to domestic firms (Vernon 1966, Dunning 1993). These assets explain why MNEs are found to be more productive, hire more skilled workers, and pay higher wages relative to indigenous firms (Girma et al., 1999; Lipsey and Sjoholm, 2004; Feliciano and Lipsey, 2006; Almeida, 2007).

FDI is also an important conveyor of knowledge and technology in host countries (Kneller 2005). The transfer of technology to acquired firms abroad or the technology embedded in new greenfield FDI projects might lead to an increase in the demand for skilled labour, especially if the technological change favours skilled workers (Baldwin, 2016; Javorcik, 2004, 2015; Gorg and Strobl, 2001).

Empirical literature points to a positive effect of FDI on the demand for skilled labour

Overall, the empirical literature finds a positive effect of FDI on the demand for skilled labour, relative to the demand for unskilled labour. Feenstra and Hanson (1995) find that inward FDI increased the relative demand for skilled labour in the Mexican manufacturing sector during 1975-1998. Bandick and Hansson (2009) and Bandick and Karpaty (2011) find that in the 1990s the employment of skilled labour increased more than that of less-skilled labour, especially in acquired non-MNEs relative to domestic Swedish MNEs. Eliasson et al. (2017) find that foreign acquisitions did not lead to reductions in high-skilled activities in domestic Swedish firms between 1999 and 2011. Peluffo (2015) analyses the impact of FDI on employment of skilled workers in Uruguay from 1997 to 2005, and finds that FDI has led to an increase in the demand for skilled labour.

The effect of FDI on the demand for skilled labour has mainly been studied to shed light on the wage difference between skilled and unskilled workers. The evidence on the effect of FDI on skill wage inequality is mixed. Several studies find that FDI has led to an increase in the skill wage gap in favour of skilled workers (Feenstra and Hanson, 1997; Taylor and Driffield, 2005; Cruz et al., 2018). Other studies suggest that the effect of FDI on skill wage-inequality is not linear: the effect might change depending on the nationality of the foreign investor (Girma and Görg, 2007), development stage of a country (Figini and Gorg, 1999; Freeman et al., 2001), and level of aggregation of the data used in the analysis (Heyman et al., 2007).

Several studies point to a 'skill-biased technical change' effect to explain the positive impact of FDI on the relative demand for skilled labour and on skill wage inequality. In particular, FDI – especially from more advanced economies – tends to bring technologies that are complementary to skills (e.g. ICT technology). A number of studies, mainly for developed countries, provides evidence for the 'skill-biased technical change' effect. For example, Berman et al. (1994) find a positive correlation between within industry skill upgrading and investment in ICT and R&D in the US manufacturing sector from 1979 and 1989. Autor et al. (1998) quantify that the diffusion of ICT technology explains as much as 30–50% of the growth in the relative demand for skilled labour. Furthermore, Machin

and Van Reenen (1998) find a positive correlation between R&D expenditure and the relative demand for skilled workers in seven OECD countries.

Recent studies on the effect of inward FDI on the employment composition in host countries have shifted the focus of the analysis from 'skills' to 'job tasks'. This strand of literature argues that other factors than skill intensity determine whether a job can be offshored or not (Leamer and Storper, 2001; Autor et al., 2002; and Levy and Murmane, 2004). In particular, routine tasks can be more easily offshored, thus explaining why foreign affiliates may be less skill-intensive than their parent company. Limited empirical evidence, however, exists on the effect of inward FDI on the demand for job tasks in host countries. Hakkala et al. (2014) find that foreign multinational firms in Sweden, regardless of nationality, have a higher share of employees doing non-routine tasks. They also find that acquisitions of Swedish local firms by multinationals increased the demand for non-routine and interactive tasks.

Foreign MNEs may raise the supply of skills in host countries

Limited theoretical and empirical evidence exists on the impact of foreign MNEs on the supply of skills in host countries. Existing evidence – mainly based on case studies – shows that foreign MNEs have the potential to affect the supply of skills both directly – through the provision of training to their employees – and indirectly – by encouraging domestic companies to invest in human capital. Regarding the evidence on the direct impact, two studies by UNCTAD (2000, 2016) find that foreign MNEs tend to invest more in training than their local counterparts. UNCTAD (2000) cite Intel and Matsushita in Malaysia as examples of MNEs that have established training facilities to ensure that their needs for specialised skills are met. On the indirect impact, a number of studies suggest that foreign MNEs may provide personnel training to domestic suppliers as a form of assistance to ensure efficiency and quality (Crespo and Fontoura, 2007; Paus and Gallagher, 2008; Tong 2018). In addition, other studies show that FDI-related demonstration effects may spur local firms to more efficient use of resources, including by training workers (Blomström and Kokko, 2003).

4.3. The indicators

The remainder of this chapter presents a set of indicators that relate foreign investment to selected skill outcomes, notably skill intensity, skill development, and imbalances (shortages and surpluses) of technical skills in a group of OECD and developing countries.

The indicators provide policy makers with an indication of how FDI correlates to the above skill outcomes in their country and highlight potential trade-offs. While more country-specific analysis is needed to identify FDI impacts, the analysis provides an indication of whether FDI is positively or negatively correlated to skill outcomes and suggests possible interpretations. Specifically, the analysis seeks to answer to following questions:

(1) Does FDI goes to sectors with higher or lower skill intensity? Do foreign firms hire more or less skilled workers relative to their domestic peers?

(2) Is FDI concentrated in sectors with higher or lower shares of trained employees? Do foreign firms have higher shares of trained workers with respect to domestic firms?

(3) How is FDI related to imbalances (shortages and surplus) of technical skills (e.g. programming, installation)?

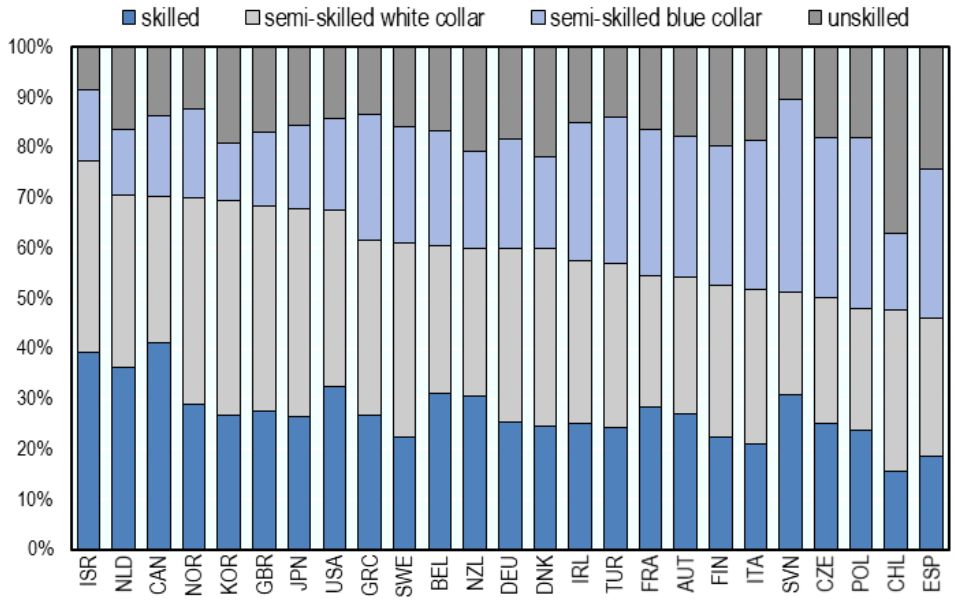
The distribution of occupations vary greatly across OECD countries

The shares of skilled (managers, professionals, and technicians), semi-skilled white collar (clerical support workers, service and sales workers) and blue collar (skilled agricultural,

forestry and fishery workers, craft and related trades workers, plant and machine operators, and assemblers) and unskilled jobs vary considerably across OECD countries (Figure 4.1). The share of unskilled occupations in total occupations ranges from 37% in Chile to 9% in Israel. The range of variation is even higher for semi-skilled blue collar occupations (from 40% in Slovak Republic to 12% in Korea), semi-skilled white collar occupations (from 43% in Korea to 18% in Lithuania), and skilled occupations (from 16% in Chile to 41% in Canada). In addition, skilled and semi-skilled white collar occupations tend to be concentrated in services sectors such as finance, education, health, public administration, hospitality and business activities, whereas unskilled and semi blue collar occupations are observed primarily in construction, mining, agriculture, and manufacturing.

Figure 4.1. Distribution of occupations by skill type across OECD countries

Shares of occupations by skill type in total occupations



Note: Countries are sorted by the shares of skilled and semi-skilled white collar. Skilled jobs include managers, professional, technicians and associate professionals. Semi-skilled white collar jobs comprise clerical support workers and service and sales workers. Semi-skilled blue collar occupations refer to skilled agricultural, forestry and fishery workers, craft and related trade workers, and plant and machine operators and assemblers. Finally, unskilled jobs include elementary occupations.
Source: OECD Survey of Adult Skills (PIAAC).

In OECD countries FDI is concentrated in low-skill sectors

Evidence points to a positive effect of FDI on the demand for skilled labour. Foreign firms tend to be technologically more advanced than their domestic counterparts and bring new technology to the host country, requiring skilled labour. Other studies, however, suggest that FDI may also have a negative effect on skill intensity. This occurs if foreign firms keep more complex tasks associated with higher skill levels at home, while offshoring low-skill routine tasks, thereby reducing skills intensity in the host country (Box 4.1).

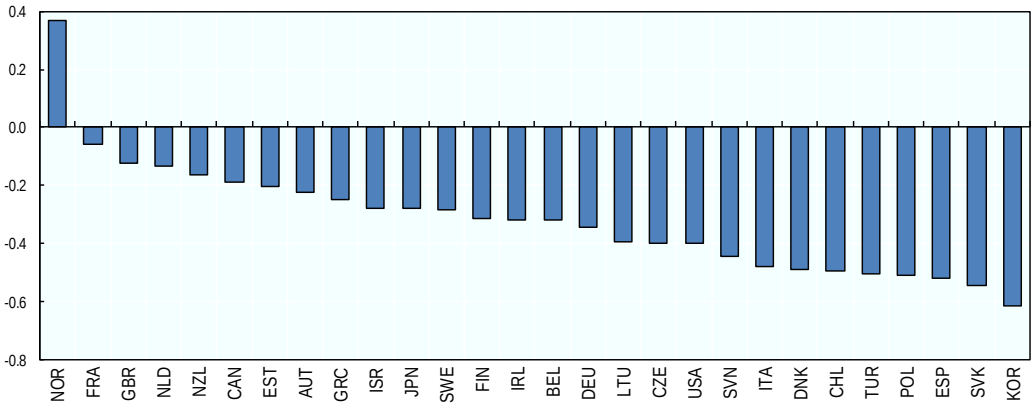
A first indicator relates greenfield FDI to skill intensity in a group of OECD countries. Skill intensity is calculated using data on workers' occupations from the Programme for the International Assessment of Adult Competencies (PIAAC). In particular, skill intensity is

defined as the share of skilled occupations (managers, professional and technicians) in total occupations. The indicator examines whether FDI is positively or negatively associated to skill intensity in a given country. The results show that, across all but one OECD countries, FDI is observed more in sectors with lower shares of skilled jobs (Figure 4.2).

The negative relationship between FDI and skill intensity is explained primarily by negative associations found in manufacturing, mining, construction, and transport services. These sectors are characterised by larger shares of semi-skilled, particularly blue collar, and unskilled workers. This explains why countries with more industry-oriented economies and important production centres, such as Eastern European countries (Slovakia, Poland, Czech Republic, Lithuania), Korea, Turkey, Germany, and Italy tend to have lower indicator values, in contrast to services-oriented economies (United Kingdom, Netherlands, Ireland). The exceptionally positive association observed in Norway is driven by mining, a capital-intensive sector that receives a large amount of greenfield FDI. In Norway, the mining sector is even more capital-intensive than in other countries. These findings are consistent with the analysis on productivity (Chapter 2) and wages (Chapter 3). These chapters show that OECD countries with strong industrial bases concentrate greenfield FDI in sectors with lower productivity and wage levels relative to countries with more services-oriented economies. Nevertheless, FDI is found in sectors that are relatively more productive and have higher wages.

Figure 4.2. FDI and skill intensity in the OECD

Is greenfield FDI concentrated in sectors with higher skill intensity?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. Skill intensity: number of skilled occupations over total number of occupations. Skilled occupations include managers, professional, technicians and associate professionals.
Source: OECD based on Financial Times' fDi Markets database, OECD National Accounts and OECD Survey of Adult Skills (PIAAC).

The literature often finds that FDI has a positive impact on the demand for skills in host countries. One reason for this discrepancy may be the definition of FDI, which considers greenfield investment projects only, often dominated by construction and manufacturing activities that require substantial employment of low-skilled workers. Using M&A deals that reflect consolidations and changes in ownership rather than new operations may produce different results (see Annex 3). The proxy used to measure skilled workers may also affect the results. This measure considers managers, professionals, and technicians, only, while other studies may apply broader definitions (e.g. including semi-skilled

occupations). In other words activities that employ numerous semi-skilled white and blue collar workers (like some manufacturing industries) would appear more skill-intensive under a broader definition of skills. Lastly, empirical studies use econometric techniques to isolate the impact of FDI on skill intensity, controlling for other country- and sector-specific factors, while the indicators presented in this section examine the association between FDI and skills as a result different economic endowments and country contexts.

… and in sectors with less on-the-job training

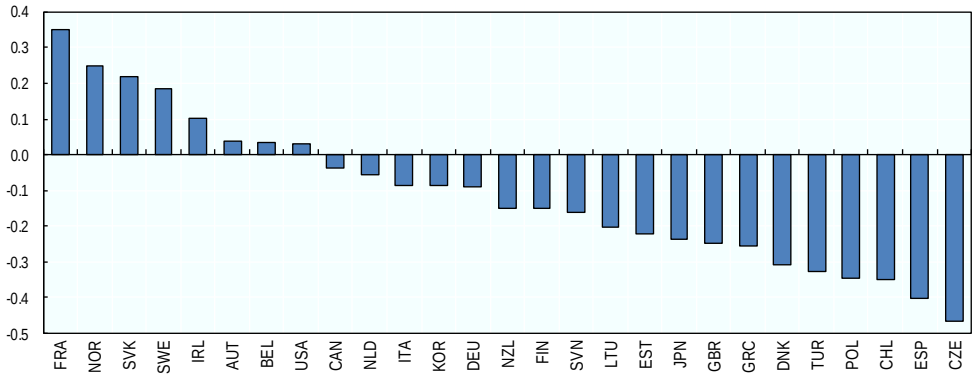
Limited evidence exists on the link between FDI and the incidence of on-the-job training. Some countries offer incentives to foreign investors for local staff training or supplier development, and studies have indeed shown that foreign firms tend to provide more in-house training than domestic firms, as well as training to domestic suppliers as a form of support activity (Box 4.1).

A next indicator examines the link between FDI and on-the-job training by combining greenfield FDI data with sector-level information on the share of workers that received training in the last 12 months from the OECD Survey of Adult Skills (PIAAC). In most countries, FDI is more prevalent in sectors with lower incidence of on-the-job training (Figure 4.3). Countries where FDI is concentrated in sectors with lower shares of trained workers, also tend to receive FDI in less-skill intensive sectors; and vice versa. In fact, a positive relationship between the two indicators seems to exists, as can be observed by plotting together the two indicators (Figure 4.4).

In most countries, FDI tends to be concentrated in sectors with lower shares of both skilled workers and trained workers (lower left quadrant). Albeit with cross-country variation, these sectors include manufacturing, construction and transport services. Countries with industry-oriented economies and important production centres such as Germany, Italy, Turkey and Poland belong to this cluster. In some countries, however, FDI is concentrated in sectors with relatively higher shares of trained workers but lower skill intensity (upper left quadrant). This group comprises countries that receive substantial greenfield FDI in high-tech industries (e.g. chemicals, pharmaceuticals and ICT) such as France and Ireland. Training needs in those industries might be higher to keep up with rapid technological change, while skill intensity is relatively lower compared to other sectors (e.g. finance, business activities). Finally, Norway is the only country where FDI is concentrated in sectors with relatively higher skill intensity and larger shares of trained workers. The positive relationship for Norway is driven by the mining sector, a technology-driven capital intensive sector. In fact, Norway, invests considerably in capital- and skill-intensive new mining technologies that require continuous updating of worker skills.

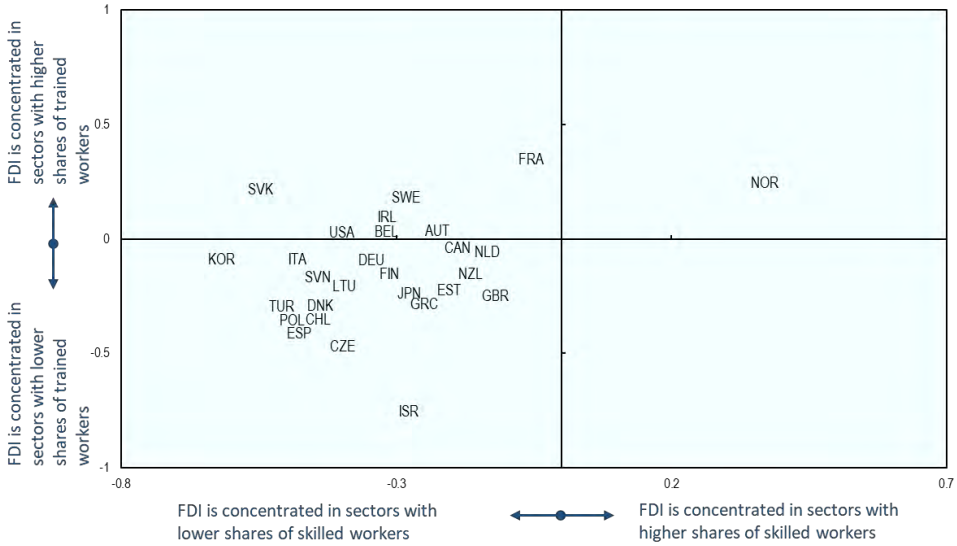
Figure 4.3. FDI and on-the-job training in the OECD area

Is greenfield FDI concentrated in sectors with higher shares of trained workers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 2 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database, OECD National Accounts and OECD Survey of Adult Skills (PIAAC).

Figure 4.4. FDI, skill intensity and on-the-job training



Note: This figure compares the Type 2 indicators for skills intensity and on-the-job training. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database, OECD National Accounts and OECD Survey of Adult Skills (PIAAC).

Manufacturing FDI is found more in industries with lower shares of skilled workers…

Using data from the World Bank Enterprise Surveys, an indicator is developed to study the relationship between foreign activity and skill intensity in the manufacturing sector. The indicator uses information for 16 manufacturing sectors and is constructed for a group of developing and OECD countries. Data on sales of foreign-owned firms are used to measure foreign firm activity.

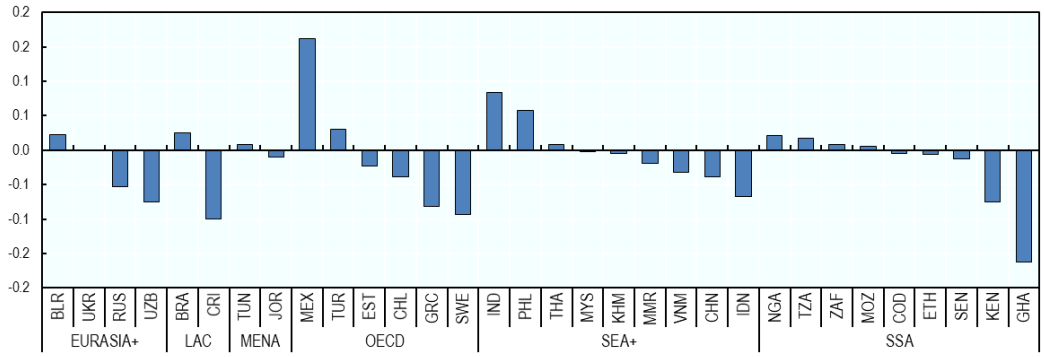
The indicator shows that foreign manufacturers are often located in manufacturing sectors with lower shares of skilled workers (as well as with lower productivity and wage levels) (Figure 4.5). Even if with large variation across countries, these sectors include several low-technology industries such as food, textile and garments. For instance, in Uzbekistan, Costa Rica, and Sweden the negative relationship between FDI and skill intensity is explained by negative associations found in the food sector, while in China and Indonesia an important role if played by textile and garments.

In other countries, foreign activity is concentrated in manufacturing sectors with relatively higher shares of skilled workers. Sectors explaining the positive association in those countries comprise medium and high technology-intensive sectors notably chemicals, machinery and equipment, and electrical machinery. For instance, the chemical sector plays an important role in Brazil and Mexico, electrical machinery explains the findings for the Philippines.

Generally, the findings are in line with those for productivity and wages: countries where FDI is concentrated in manufacturing sectors with lower shares of skilled workers also tend to report FDI concentration in lower productivity and lower wage sectors; and vice versa. For instance, in Russia, Costa Rica, Sweden, China and several other countries FDI tends to be concentrated in relatively less productive, less skill-intensive and lower wage sectors.

Figure 4.5. FDI and skill intensity in manufacturing

Is manufacturing FDI concentrated in sectors with higher shares of skilled workers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. Share of skilled workers: number of skilled production workers over total production workers.
Source: OECD based on World Bank Enterprise Surveys.

… but with higher shares of trained workers

A complementary indicator examines the association between foreign activity and the incidence of on-the-job training in the manufacturing sector in selected OECD and developing countries. The indicator shows whether foreign activity is concentrated in manufacturing sub-sectors with higher or lower shares of workers that have been trained on the job. Data on sales of foreign-owned firms are used to measure foreign firm activity.

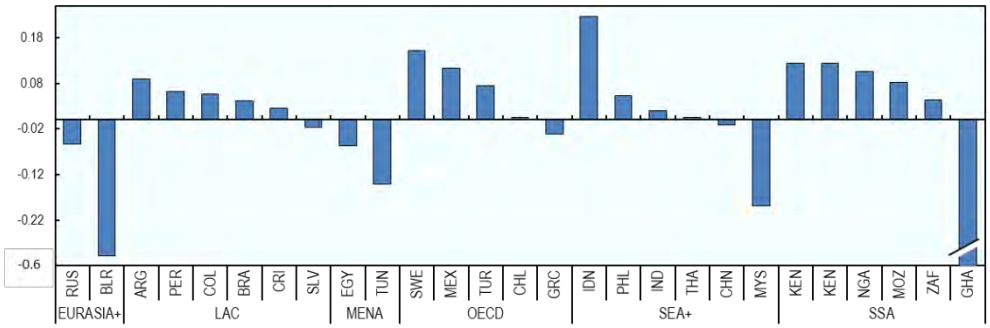
In most countries, foreign activity is skewed towards sectors with higher shares of trained workers (Figure 4.6). The positive relationship is mainly driven by strong FDI concentration in high-tech sectors like chemicals, machinery and electrical equipment. These sectors are characterised by rapid technological change, which explains the need to

train workers to replace skills that became obsolete. For example, in Mexico foreign activity is concentrated in chemicals. However, several exceptions exist. For instance, in Indonesia, the country with the highest indicator value, the positive association is explained by garments, a low-tech sector.

In some countries, FDI is found more in sectors with lower shares of trained workers. In these countries, low technology intensive sectors, notably food and garments, play an important role. For instance the food sector explains the results in Russia and Egypt, whereas the garment sector explains the results for Tunisia.

Figure 4.6. FDI and on-the-job training in manufacturing

Is FDI concentrated in sectors with higher shares of trained workers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. Share of trained workers: number of workers who received on-the-job training in the last year over the total number of workers.
Source: OECD based on the World Bank Enterprise Surveys.

Foreign and domestic firms do not have different shares of skills

Existing studies have found a skill premium in favour of foreign firms. Due to specific technology advantages, foreign firms tend to employ higher shares of skilled workers relative to domestic firms (Box 4.1). An indicator compares the share of skilled workers in affiliates of foreign firms with that of domestic firms in the same group of developing and OECD countries. Foreign and domestic outcomes are averaged across 16 manufacturing sub-sectors. The indicators shows the extent to which foreign firms have a skill premium or gap relative to domestic firms and whether these differences are statistically significant.

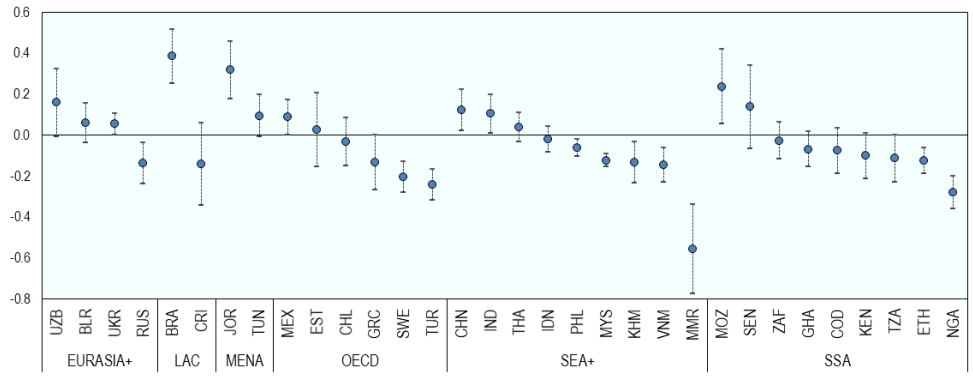
The results do not allow to draw conclusions on the existence of a foreign skill-premium. In particular, for most countries the indicator value is not significant, indicating no meaningful difference between domestic and foreign firms (Figure 4.7). For some countries including Russia, Sweden, Turkey and several others from Southeast Asia and Sub-Saharan Africa, the indicator shows that foreign manufactures employ lower shares of skills than domestic firms. Conversely, a skill premium in favour of foreign investors is found in Brazil, Jordan, China, India and Mozambique.

In addition, the observed differences are rather small. The highest skill premium in favour of foreign firms is observed in Brazil where the share of skilled workers is 40% higher than the same share in domestic firms. A large number of foreign firms in Brazil are located in chemicals, a sector that employs on average larger shares of skills. Conversely, Myanmar has the largest gap: foreign firms are mainly located in the garment sector, where fewer skilled workers tend to be employed.

Several factors may explain why the results do not point to systematic differences between foreign and domestic firms in the share of skilled workers. If they exist, such differences between the two groups could be related to other factors, such as the scale, industry and type of activity. Moreover, policy and non-policy factors might also be at play.

Figure 4.7. Share of skilled workers of foreign and domestic firms in manufacturing

Do foreign manufacturing firms employ higher shares of skilled workers?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Share of skilled workers: number of skilled production workers over total production workers
Source: OECD based on World Bank Enterprise Surveys.

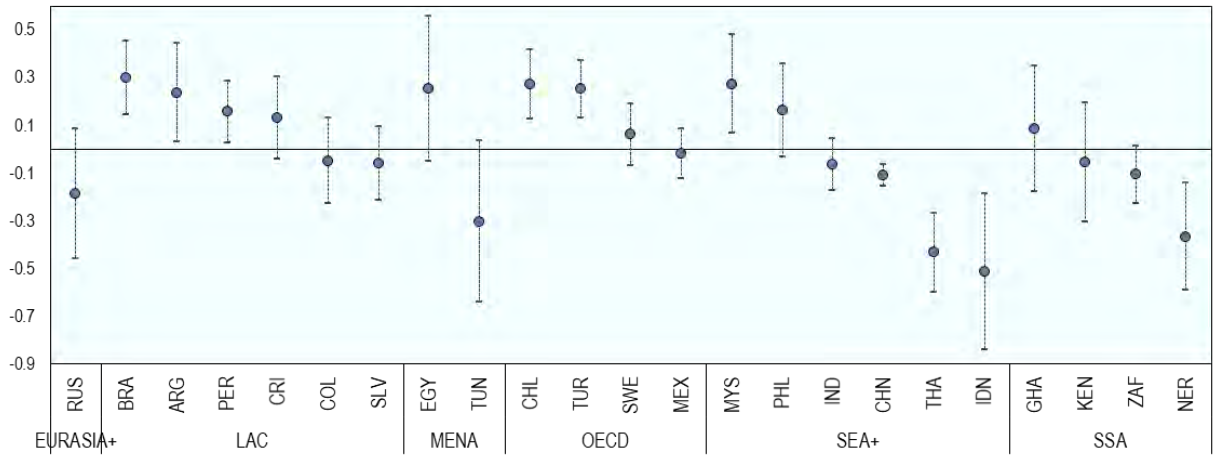
… and do not have different shares of trained workers

Limited evidence exists on training practices by foreign firms. A few case-studies report examples of foreign firms who have established training facilities to ensure that their needs for specialised skills are met (Box 4.1). Using the World Bank Enterprise Surveys, an indicator similar to that presented in the previous section compares the average share of trained workers in affiliates of foreign firms with the same share in domestic companies. The indicator is constructed for a group of developing and OECD countries and covers the manufacturing sector. The indicator shows the extent to which foreign firms have a premium or a gap in relation to the share of trained workers relative to domestic firms and whether these differences are statistically significant.

The results show that there is no systematic difference in the share of trained workers between foreign and domestic firms: in many instances the indicator is not statistically significant (Figure 4.8). In some countries from Latin America and the OECD area, however, foreign firms have a premium relative to domestic firms. In these countries, foreign activity is often concentrated in medium high-tech manufacturing sectors. Conversely, a gap is observed in some countries from Southeast Asia and Sub-Saharan Africa. In these countries, foreign activity is prevalent in low-tech sectors. China provides an illustrative example since a large share of foreign activity is found in garments.

Figure 4.8. Share of trained workers of foreign and domestic firms in manufacturing

Do foreign manufacturing firms have higher shares of trained workers?
(yes if > 0; no if score



Note: The figure shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Share of trained workers: number of workers who received on-the-job training in the last year over the total number of workers.
Source: OECD based on World Bank Enterprise Surveys.

In the OECD, technical skills imbalances vary greatly across sectors

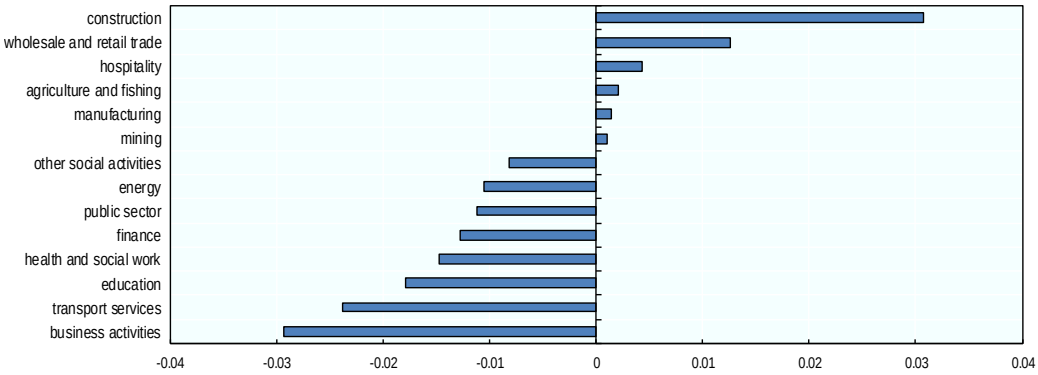
The demand for skills is undergoing significant change as a result of technological progress, globalisation and other 'mega-trends'. Rapid shifts in computer technology, the transition towards the digital economy, and the penetration of new technologies (e.g. advanced robotics) have changed the way jobs and tasks are carried out in the labour market. As a result of those trends, technical skills (programming, installation, technology design, and so on) have become gradually more important than traditional and less technology-intensive skills (OECD 2017).

In OECD countries, on average, sectors such as construction, wholesale and retail trade, hospitality, agriculture and fishing, manufacturing, and mining, are characterised by surpluses of technical skills. This means that in those sectors workers are unable to find an occupation commensurate to their level of skills. On the contrary, business activities, transport services, education, health, and finance feature shortages of technical skills. Skill shortages imply that employers are unable to find workers with an adequate skills levels under current labour market conditions (Figure 4.9).

Both shortages and surpluses of technical skills may bring about economic and social costs. In particular, skill shortages may decrease productivity, innovation and slow down technology absorption. Skill surpluses are associated with unemployment, and in the long run may decrease aggregate income and productivity (Mavromaras et al., 2013; OECD 2017b; Shah and Burke, 2005).

Figure 4.9. Technical skills imbalances across sectors in the OECD area, 2015

Average technical skills shortages (<0) and surpluses (>0) across sectors



Note: The technical skill imbalances index has been rescaled to make it consistent with other indicators presented in this chapter. The original indicators varies between -1 (skill surpluses) and 1 (skill shortages).
Source: OECD Skills for Jobs Indicators.

In many OECD countries, FDI is associated with higher imbalances of technical skills

The literature suggests that FDI could play an active role in helping countries to reduce imbalances, whether shortages and surpluses, of technical skills. FDI may affect imbalances of technical skills by changing the occupational composition within an industry. For example, by creating jobs that intensively use technical skills FDI may help absorb the excess supply. This is more likely to occur if foreign firms bring new technologies that are complementary to this type of skills. FDI may also help countries with shortages to increase the supply of workers with technical skills, by training their staff or those of partner domestic firms.

An indicator combines greenfield FDI data with an index capturing imbalances of technical skills from the OECD Skills for Jobs Database.[2] The indicator provides an overview of how the sectoral distribution of FDI affect overall skill imbalances in a country.

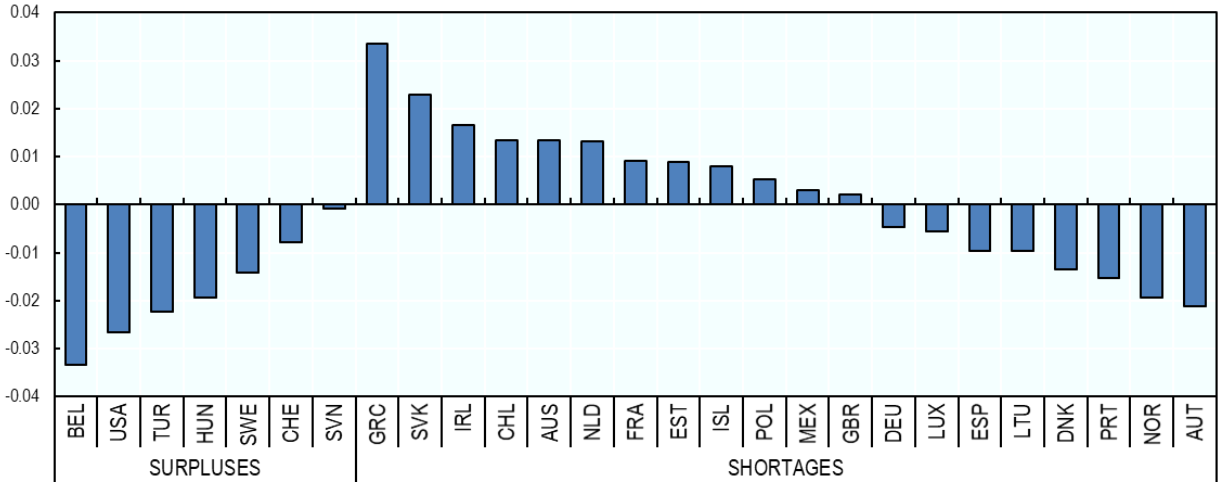
The results show that in most countries, FDI is related to higher imbalances of technical skills (Figure 4.10). In particular, in countries where technical skills are in surplus (i.e. workers with technical skills are unable to find a job corresponding to their qualifications) FDI tends to be found in sectors with relatively higher surpluses of occupations that use more technical skills. For example, in Belgium workers with technical skills are in surplus in the labour market. At the same time, a large number of greenfield FDI projects are directed to sectors with relatively higher surpluses of jobs requiring technical skills (manufacturing and mining). This explains why FDI is negatively correlated to technical skill imbalances in Belgium.

In countries with a shortage of technical skills (i.e. workers with technical skills are on demand in the local labour market and companies are unable to fill corresponding job vacancies), the results are more mixed. In the majority of these countries, FDI is concentrated in sectors with lower imbalances of technical skills; that is with lower shortages or with surpluses. For instance, Greece is characterised by a shortage of technical skills, implying that workers with technical skills are in demand in the local labour market,

but FDI is concentrated in sectors with a surplus of technical skill (manufacturing), which explains the positive indicator value for Greece.

Figure 4.10. FDI and technical skill imbalances in OECD countries

Is FDI concentrated in sectors with lower imbalances of skills?
(yes if value > 0; no if value < 0)



Note: The figure shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. The technical skill imbalances index measures surpluses and shortages of technical skills. Technical skills are programming, installation, technology design, and so on. Surpluses indicate that technical skills are in excess in the labour market relative to the demand. Shortages exist when technical skills are hard-to-find in the current labour market.
Source: OECD based on Financial Times' fDi Markets database, OECD National Accounts and OECD Skills for Jobs indicators.

Notes

[1] Due to data limitations, this chapter does not examine the relation between FDI, skills and wage inequality; FDI and average wages are analysed in Chapter 3.

[2] The OECD Skills for Jobs indicators use the occupational skills classification database, O*NET, to translate occupations in shortage or surplus into a measure of skills in shortage or surplus. In particular, a shortage in a certain occupation that use certain skills (e.g. technical skills) more intensively will point to a shortage in those skills when aggregating information at the country and industry level. See OECD (2017b) for details about the methodology employed and the assumptions made to compute the indicators.

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Chapter 5. How does FDI relate to gender equality?

This chapter examines how FDI relates to four dimensions of gender equality, notably gender employment equality, gender wage equality, women in top management positions, and women's entrepreneurship. The first part of the chapter describes the channels through which FDI can affect the above gender outcomes in host countries, through a review of the literature. The second part presents a set of indicators relating FDI to the above gender equality dimensions for the OECD and selected developing regions.

5.1. Summary

This chapter examines how FDI relates to gender equality (SDG 5). Gender disparities and discrimination persist in the labour markets of both OECD and developing countries, where women tend to work in lower-value added services jobs, and are paid on average 20% less than men (ILO, 2016). Women are also under-represented in the business sector and less likely to reach senior management positions.

Foreign investors can affect gender equality in host countries by influencing the relative demand for female and male workers. By increasing the demand for female labour, particularly in female-dominated sectors, foreign firms can put upward pressure on female wages and contribute to reducing the gender employment and wage gaps.

The indicators presented in this chapter suggest that FDI is concentrated in sectors with lower female participation in all OECD and many developing countries; notably, construction, finance and transport. Within manufacturing, however, FDI is positively related to women's employment, and foreign firms tend to hire more female workers than their domestic peers, on average. This association is largely driven by low-skill labour-intensive sectors, such as garments and food, where female workers tend to be concentrated in many countries. The results support existing evidence showing that in countries at an early stage of industrialisation, foreign firms' activities tend to increase women's employment in labour-intensive industries. As an economy develops, a reverse pattern is observed in favour of male employees. While working in labour-intensive, low-value added sectors has allowed more women to participate in the labour force, it has also increased the risk of locking them in low-paid, low-skilled positions, perpetuating gender segregation in the labour market.

The second set of indicators examine the link between FDI and the gender wage gap. The results show that in many OECD and developing countries, FDI is concentrated in sectors with relatively higher gaps between the pay of men and women; notably manufacturing, finance, trade and business activities. The results also show large variation across countries, especially in the OECD. Overall, the findings are in line with existing evidence, and suggest that country-specific factors (e.g. policies) are relevant to explain the link between FDI and gender wage equality.

Foreign investors may also affect career progression opportunities of women in host countries. Employment practices, including promotion, largely depend on corporate culture, which in turn is influenced by home country norms and values. Foreign firms from more gender-equal countries are likely to have more women in top management positions. Domestic firms may also adopt similar practices to imitate successful foreign firms or to attract and retain female talent. The indicators suggest that women are equally likely to reach senior management positions in foreign and domestic firms. At the same time, FDI tends to go to sectors where firms are more likely to have female top-managers, and may therefore create greater opportunities for career advancements for women.

In a similar vein, firms from more gender-equal countries may be more likely to have women owners and may encourage women entrepreneurship through their selection of business partners and suppliers. However, foreign firms may also harm female-owned businesses by increasing competition in domestic markets. The indicators suggest that there is no significant difference in women entrepreneurship across foreign and domestic firms, but, again, FDI is concentrated is sectors with relatively higher incidence of female entrepreneurship.

5.2. Conceptual framework

SDG 5 states that by 2030 every country should "achieve gender equality and empower all women and girls."[1] Gender equality and women empowerment are not only fundamental rights, but also a necessary foundation for sustainable economic growth and inclusive development. Worldwide, gender inequality and discrimination persist in the labour market, education, health-care, domestic work, and economic and political representation. In many countries, women are still deprived of rights granting access to key assets such as property, land, and financial resources. Gender equality and women's empowerment is integral to all dimensions of inclusive and sustainable development and can support progress towards all SDGs.

Gender equality is key to spur economic growth and equity

Increasing evidence shows that gender equality is not only morally important but also key for spurring growth and equity. Some of the benefits of gender equality stem from a more efficient use of resources, notably the female population in the labour market. Recent estimates suggest that the potential growth dividend from closing gender gaps and boosting labour forces could be substantial. For example, reducing the gender gap in labour force participation by 25% by 2025 could boost per capita GDP growth by 24% in Mexico, 23% in Turkey, 19% in South Korea, and 10% in the United States (OECD, 2017). A study finds that increasing female employment has reduced household earning inequality in OECD countries (OECD, 2011). A similar effect has been observed for Latin America and the Caribbean, where growing female participation in the labour market has led to a 30% reduction in extreme poverty over a 10-year period (World Bank, 2012a).

Improving women's access to education also has substantial positive effects on growth. A recent study finds that increased educational attainment explains about 50% of economic growth in OECD members over the past 50 years, of which more than half is due to women having gained access to higher levels of education and to greater equality in the number of years of schooling (OECD, 2012).

Gender equality is central for achieving other sustainable development goals, such as poverty eradication, good health, decent work, and many others. For example, women's education is negatively related to child mortality (Chou et al. 2010, Gakidou et al., 2010). Evidence from a range of countries as varied as Bangladesh, Brazil, Canada, Ethiopia, and the United Kingdom shows that women tend to allocate a greater share of household income to education, health and nutrition than men (WEF, 2018).

Worldwide, female participation in the labour market remains low, at less than 50% in 2017, compared to 75% for men (ILO, 2018a). Gender disparities also persist with respect to wages. Globally, women earn, on average, 20% less than men (ILO, 2016). Women are also more likely to be in low-productive, insecure and informal jobs (ILO, 2018b).

Women are also less likely to reach the top levels of management, in the private and public sectors. In OECD countries, only about one-third of managers are women (OECD, 2019). In developing countries, few women reach high-status and well-paid positions, as legislators, senior officials and managers (ILO, 2016), and are under-represented as entrepreneurs. Businesses owned by women tend to be trapped in low-productivity, low-value added activities, and are more likely to operate in the informal economy (OECD, 2012; UNCTAD 2014).

Gender disparities go beyond the labour market and affect other aspects of women's lives. According to the OECD Social Institutions and Gender Index (SIGI) discriminatory social norms in matters related to land, property, inheritance, civil rights and many other areas persist in both OECD and non-OECD countries (OECD, 2019b).

FDI can enhance gender equality through multiple channels

This chapter focuses on the link between FDI and four dimensions of gender equality in the labour market: gender employment equality (measured as the relative share of female workers), gender wage equality (measured as women's relative to men's wage), women in top management positions (measured as the share of firms with female top managers), and women entrepreneurship (measured as the share of women-owned firms). The main channels through which FDI can affect the above aspects of gender equality in host countries are identified based on the literature (Box 5.1):

- **Gender employment equality**: Foreign investors can create new job opportunities in host countries, both by hiring local workers and by developing supply-chain linkages with local firms (e.g. through local sourcing).[2] If FDI creates more jobs for women than for men, it can enhance gender employment equality in the local labour market. This positive effect is more likely to occur in female-dominated sectors. Conversely, foreign firms can reduce gender employment equality in a host country, if they create more jobs for men than for women, for instance by investing in male-dominated sectors.
- **Gender wage equality**: Foreign firms can affect the demand for female and male labour differently in a host country, and thereby influence their relative wages. If FDI increases the demand for female relative to male labour, wages of women may increase relative to those of men. This can result in greater wage equality, insofar as men don't relocate to the resulting better paid jobs. Once again, this outcome is more likely to materialise in female-dominated sectors. Besides labour market effects, other channels might be at play. For instance, more stringent international and national standards, including RBC principles, may induce foreign firms to pay men and women equally, and possibly to encourage their suppliers to do so.
- **Women in top management positions**: Foreign firms' employment practices, including promotion, are affected by corporate culture. While corporate culture depends on a variety of factors (type of industry, modality of investment, degree of autonomy of the subsidiary), home country norms and values play an important role. For instance, foreign firms from more gender-equal countries may have more gender-inclusive employment practices than domestic firms. Gender-inclusive employment practices include HR policies that reconcile work-life balance, do not penalise maternity and guarantee career continuity. Other actions include training to foster women's leadership skills, scholarship programmes, career sponsorship and so on. Thus, foreign firms with more gender-inclusive employment practices are more likely to have women in top management positions. In addition, foreign firms may support women's career progression opportunities in their domestic peers, for instance, if domestic firms adopt more gender-inclusive employment practices to imitate successful foreign firms (i.e. demonstration effects) or to attract and keep female talent (i.e. competition effects).
- **Women entrepreneurship:** Foreign investors from more gender-inclusive home countries are more likely to have women owners. In addition, foreign firms may

create new business opportunities for women entrepreneurs in host countries by outsourcing and subcontracting supply-chain activities. For example, they could source inputs from local suppliers owned by women. Foreign firms could also help female-owned businesses to become more productive through positive technology spillovers and support activities (e.g. training). This positive effect is more likely to occur in less capital-intensive sectors where female-owned businesses tend to face lower barriers to entry. However, as female-owned businesses generally face more constraints than their male peers (e.g. more difficulty accessing to credit), they tend to be more vulnerable to competition resulting from the presence of foreign firms.

Box 5.1. Literature on FDI and gender equality in the labour market

The effect of FDI on gender employment equality varies with a country's level of development

A large strand of the literature has looked at the effect of FDI openness on gender employment equality in host countries. Many studies use as a theoretical framework the well-established Heckscher-Ohlin (H-O) model which provides a useful setup to study how globalisation – trade and FDI openness – may affect differently the demand and prices of female and male labour in host countries. The HO model predicts that when countries open to trade and FDI, the demand and wages of unskilled workers should increase in less skilled labour abundant economies, but decrease in skilled labour abundant economies (Aguayo-Téllez, 2012). As in developing countries women tend to be concentrated in low skill jobs, the model suggests that the employment gap between men and women (as well as the wage gap) should decrease in developing countries but increase in developed countries.

The empirical literature has only partly confirmed the predictions of the HO model on the effect of FDI on female employment. However, existing studies have mostly focused on the effect of FDI on the demand and price of female labour in the manufacturing sector, while most female workers are concentrated in services and – especially in developing countries – in agriculture (UNCTAD, 2014).

Consistently with the H-O model, some studies conclude that the impact of FDI on female employment depend on the level of industrialisation of a country. In countries at an early stage of industrialisation, foreign MNE activities tend to increase women's employment in labour-intensive industries. Female workers are mainly created in light manufacturing and labour intensive industries such as garments and electronics. As an economy develops, a reverse pattern is observed in favour of male employees. This trend has been found in studies for Hong Kong (China) and Chinese Taipei, Singapore, Korea, and Mexico (Berik et al., 2004). However, differently from what the H-O model predicts for some developed countries, a recent study by Kodama et al. (2018) for Japan finds evidence of an increase in the female labour share a few years after the ownership change. The study also finds that foreign affiliates in Japan have higher proportions of females among workers, managers, directors and board members relative to domestic firms of comparable size in the same industry.

More recent studies have focused on the implications of global value chains (GVCs) for female employment. Overall, these studies show that new job opportunities for women have been created through supply chain agreements with MNEs, notably subcontracting and outsourcing. However, a number of case studies show that these jobs are often sensitive to the economic cycle and more likely associated with precarious work conditions for women (Arndt, Jones and Tarp, 2006, Cockburn et al. 2009).

The literature on FDI and gender wage equality has produced mixed results

The H-O model provides a useful theoretical setup also for studies that look at the impact of FDI on gender wage equality. The H-O model suggests that, as long as female workers are concentrated in less-skilled occupations, FDI should increase wages for female employees in developing countries, but decrease wages in developed countries. Consequently, FDI should lead to a decrease in the gender wage gap in developing countries and to an increase in developed countries (Aguayo-Téllez 2012).

The empirical evidence shows that the effect of FDI on gender wage equality is not systematic, suggesting that a number of factors are at play. Gender in fact tends to be highly correlated with skills, industry, type of occupation (Anker, 1998). Moreover, results appear to be – to some degree – country and period specific.

Seguino (2000) finds that in Chinese Taipei simultaneous inward and outward FDI flows led to a lower bargaining position of women in female-dominated manufacturing sectors, resulting in a wider wage gap between men and women. Conversely, in Korea women became better off because what prevailed was outward FDI from male-dominated industries. Using province-level data for China in 1995 and 2002, Braunstein and Brenner (2007) find that FDI had a sizable and statistically significant positive effect on both female and male wages in both years, but, while in 1995 women experienced larger gains from FDI than men, in 2002 those gender-based advantages reversed in favour of men.

Shu et al. (2007) find no evidence of variation in gender income gap among Chinese cities in 1990 and 2000. However, the study also finds that women are more likely to be employed in export oriented manufacturing industries that offer lower wages and are less likely to work in high-paying foreign firms and joint ventures. Using a sample of 12 countries, Oostendorp (2009) finds that growth in FDI has narrowed the gender wage gap only in rich countries, suggesting that a certain level of development is needed before FDI can have a significant impact on gender. These findings contradicts the predictions of the H-O model.

Case study evidence shows that few women reach management positions even in MNEs

A few studies have looked at the link between FDI and high-raking female employees. A general finding of the literature on gender is that women tend to have less opportunities for skill development and career advancements than men, a problem known as ‘glass-ceiling’ or ‘vertical segregation’ (Albrecht et al. 2003; Adams and Funk, 2009). Other studies suggest that the nature of the performed tasks often limits the possibility for women to develop general skills that are important to move across occupations (Nicita and Razzaz, 2003; UNCTAD, 2014).

A business study by McKinsey and Company (2012) shows that women in MNEs are not immune to the glass-ceiling problem. In particular, few women reach management positions even in multinational corporations. However, recent evidence shows that MNEs are increasingly setting up systems to increase diversity – including gender diversity – in the workplace. For example, UNCTAD (2014) discusses the case of Lenovo, HSBC and Accenture. These MNEs have introduced programmes that offer benefits to employees if they successfully refer female candidates for a job posting internally.

The link between FDI and women entrepreneurship remains under-explored

The link between FDI and women entrepreneurship remains under-explored from both a theoretical and an empirical point of view. The only study directly concerned with the impact of FDI on women’s entrepreneurship is based on a small sample of countries for a single year. Using a cross-section of 36 developed and developing countries for 2006, Misra *et al* (2014) study the effect of FDI on women entrepreneurship in host countries. The results indicate that FDI and women's entrepreneurship have an inverted U-shaped relationship: FDI has a positive effect on women’s entrepreneurship up to an optimal level after which the effect becomes negative.

5.3. The indicators

This chapter presents a set of indicators to assess the relationship between FDI and gender equality that follows the discussion above. The indicators cannot isolate the effects of FDI on gender equality, but can provide some direction on what mechanisms are at play. Specifically, the indicators investigate the following questions:

(1) Do foreign firms hire more female workers compared to domestic peers? Does FDI go to sectors with larger shares of female workers?

(2) Does FDI goes to sectors with greater gender wage equality?

(3) Do foreign firms are more or less likely to have women in top management positions? Is FDI concentrated in sectors with higher shares of firms with top-female managers?

(4) Do foreign firms are more or less likely to have female owners? Does FDI go to sectors with higher shares of women entrepreneurs?

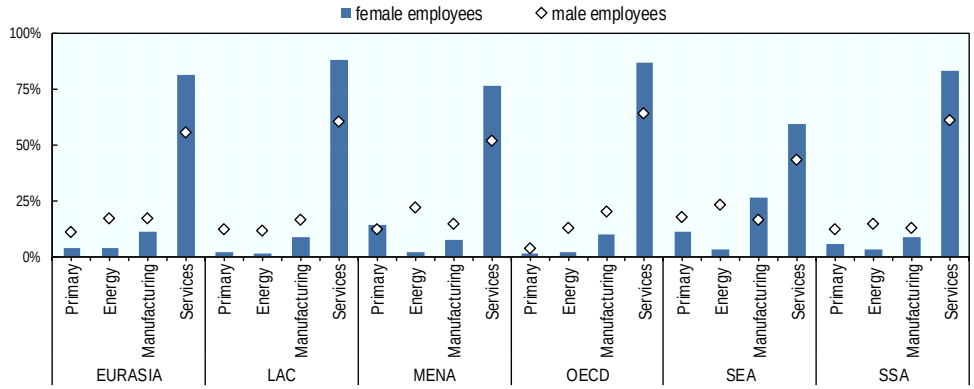
Female employment is concentrated in low value-added services sectors

Across all regions, employed women are disproportionately concentrated in the service sector. In OECD countries, services account for 87% of women's dependent employment, compared to 64% for men (Figure 5.1). Similar shares are found in Eurasia (81%), Latin America (88%), MENA (76%), and Sub-Saharan Africa (83%).[3] In Southeast Asia, the share of women employed in the services sector is lower (59%), while significant shares of female employees are also found in manufacturing (26%) and in the primary sector (11%). In the MENA region, a significant share of women is also observed in the primary sector (14%).

A more detailed analysis of the services sector shows that, in every region, the proportion of female employees is higher in low-value added services sectors, notably education, health and social work, while male employees tend to be concentrated in higher-value added services such as transport, trade and business services.[4]

Figure 5.1. Distribution of female and male employment across sectors

Share of female and male employees over total employees, 2017



Note: Figures 2 and 3 show the countries included in each region.
Source: OECD calculations based on ILO.

FDI is concentrated in sectors with lower female employment

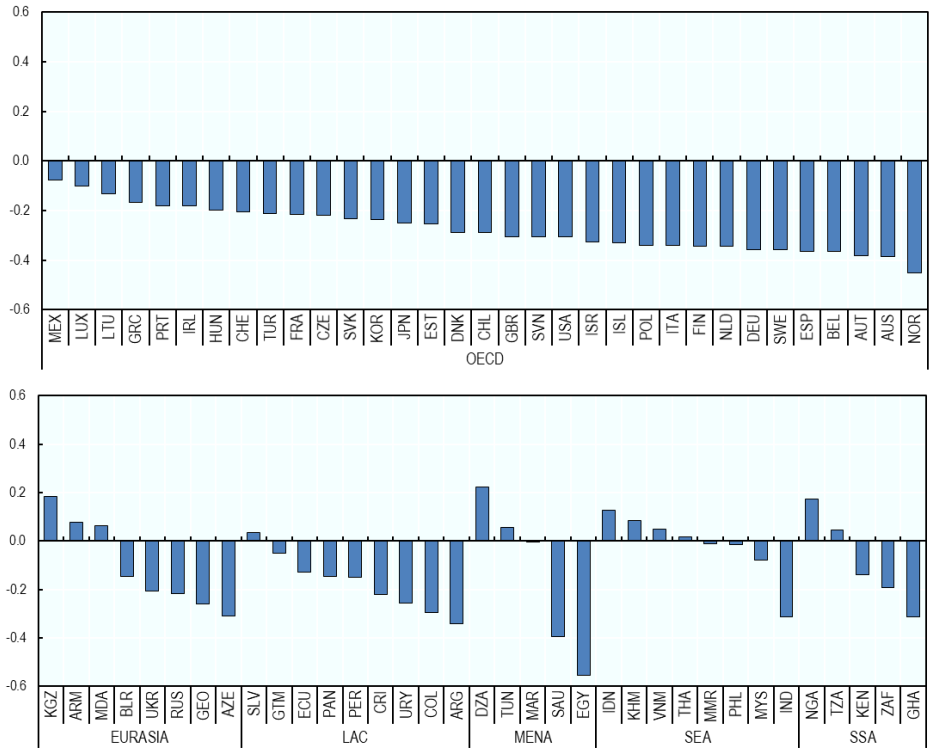
Some studies show that the effect of FDI on the female employment share varies with the level of development of the host country. In particular, in countries at early phases of industrialization, FDI tends to increase women's employment, especially in labour-intensive industries. However, as a country develops a reverse pattern is often observed in favour of men. These studies focus primarily on the manufacturing sector (Box 5.1).

An indicator assesses how greenfield FDI relates to gender employment equality, measured by the share of female employees over total employees, in a group of OECD and developing countries. Specifically, the indicator examines whether FDI is found relatively more in sectors with higher or lower shares of female employees. The indicator covers all sectors of the economy (agriculture, manufacturing and services).

The results show that in all OECD countries, FDI is concentrated in sectors with relatively lower shares of female employees (Figure 5.2). A negative relationship is observed also in most developing countries. A similar indicator covering only manufacturing (discussed in the next section) shows, however, that in most developing countries FDI is often found in labour-intensive manufacturing industries with higher shares of female workers, in line with existing evidence.

Figure 5.2. FDI and female employment

Is greenfield FDI concentrated in sectors with higher shares of female employees?
(yes if value > 0; no if value < 0)



Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. Share of female employees: number of female employees over total employees.
Source: OECD based on Financial Times' fDi Markets database, ILO and UN National Accounts.

A closer look at the sectoral composition of the indicator shows some common patterns across countries. In both OECD and developing countries, the negative relationship between FDI and the female employment share can be explained mostly by negative associations found in construction and transport services.[5] In OECD countries, manufacturing, finance and business activities also play an important role, while in developing countries mining is a key sector. The manufacturing sector explains the results in developing countries where FDI is positively associated to gender employment equality.

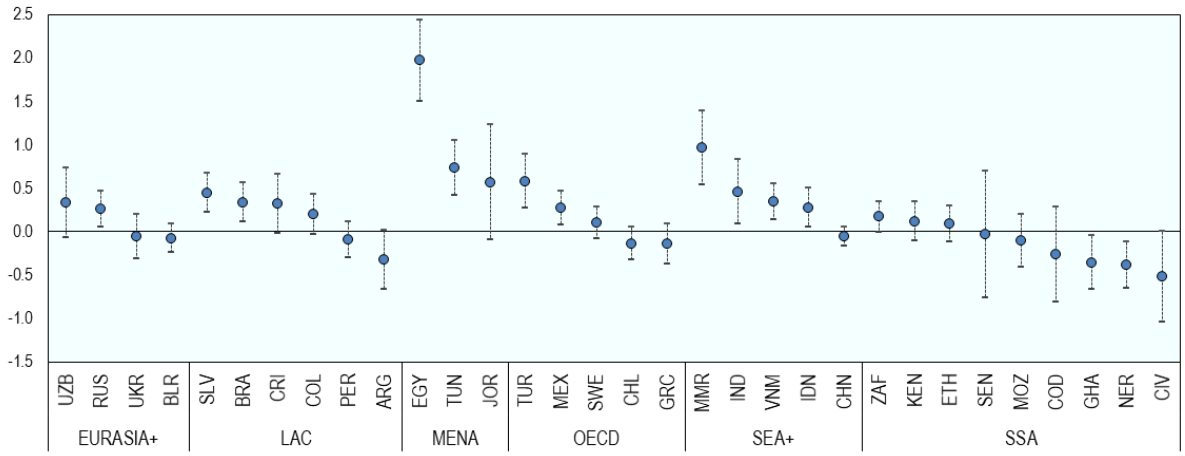
In some regions, foreign activity in manufacturing is associated with greater gender employment equality

The next set of indicators considers gender outcomes of firms in the manufacturing sector, primarily from developing countries. The first indicator compares the average share of female workers in foreign affiliates to that of domestic firms. Across most regions, foreign affiliates tend to employ higher shares of female workers relative to domestic firms (Figure 5.3). These differences are likely to mirror a strong presence of foreign firms in female-dominated garment manufacturing activities, but may also be a reflection of home and host country norms with respect to gender. In Sub-Saharan Africa, most countries exhibit no significant difference, while in Ghana and Nigeria foreign firms employ relatively fewer women than domestic peers.

Previous studies find similar results, though using different samples of countries and ownership definition. For example, Kodama et al. (2018) find that foreign affiliates in Japan have higher portions of women relative to domestic firms. They also provide evidence of a positive relationship between the share of female employees at various levels and the extent of foreign ownership.

Figure 5.3. Share of female workers of foreign and domestic firms

Do foreign manufacturing firms employ higher shares of female workers?
(yes if value > 0; no if value < 0)



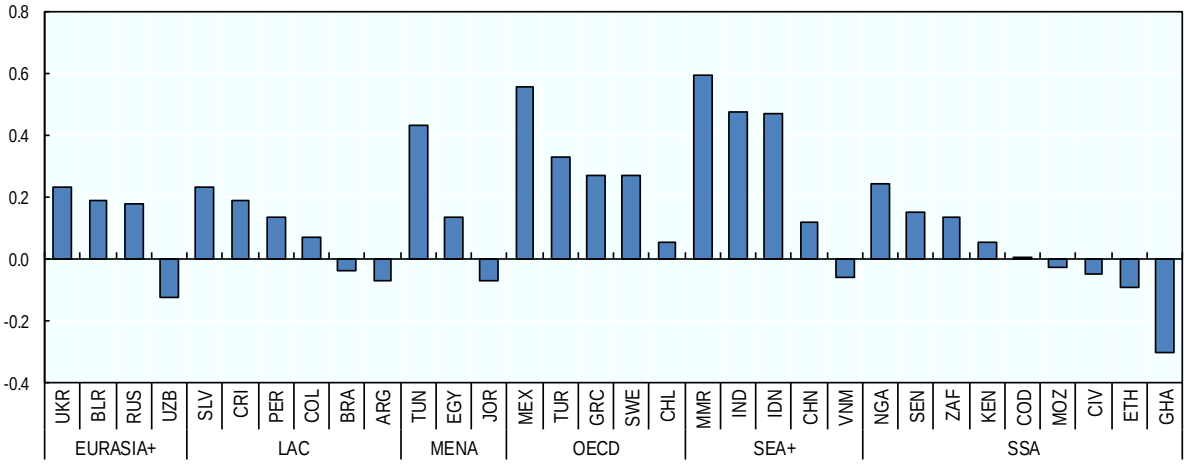
Note: The chart shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data. Share of female workers: number of female workers over total production workers
Source: OECD based on World Bank Enterprise Surveys.

Given that the industrial structure of FDI is likely to play an important role in the gender outcomes of foreign firms, another indicator examines whether FDI is concentrated in manufacturing industries with higher, or lower, gender employment equality (Figure 5.4). In 21 out of 30 mostly developing countries for which data are available, FDI is prevalent in manufacturing industries characterised by relatively higher shares of female workers.

In most countries, the positive relation between FDI and the share of female workers is explained by positive associations observed in labour-intensive industries, notably garments and food, which tend to be dominated by women. These results are in line with previous studies which find that in countries at early stages of industrialisation, foreign firms tends to increase female employment in labour intensive, export-oriented manufacturing industries (Box 5.1).

Figure 5.4. FDI and share of female workers in manufacturing

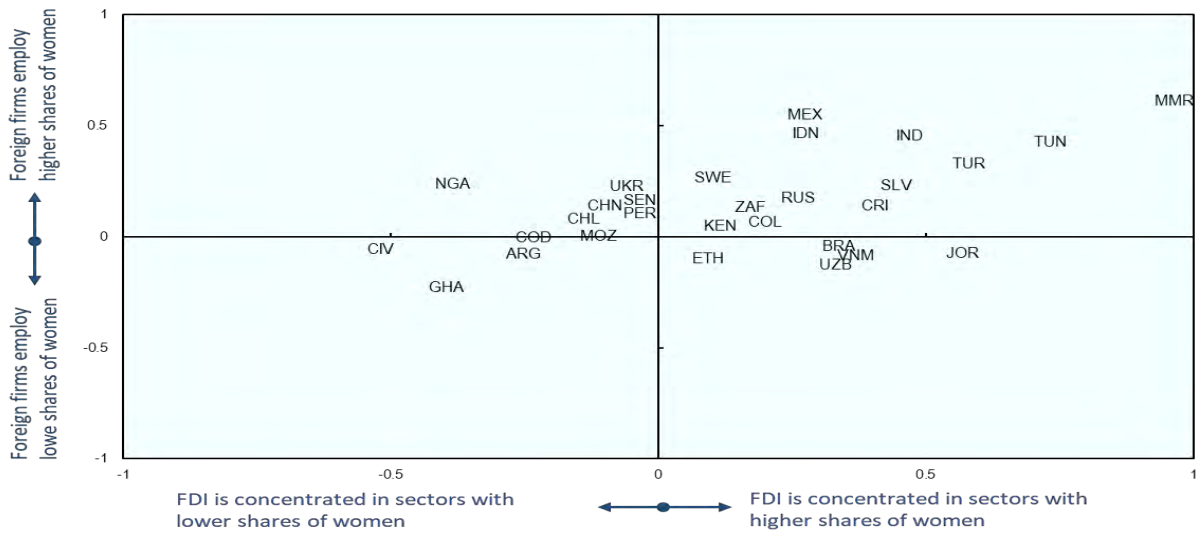
Is manufacturing FDI concentrated in sectors with higher shares of female employees?
(yes if value > 0; no if value < 0)



Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. Share of female workers: share of female workers in total production workers.
Source: OECD based on World Bank Enterprise Surveys.

Combining the above indicators on gender employment equality in manufacturing reveals that in countries where foreign firms hire larger shares of women relative to domestic firms, FDI tends to be concentrated in sectors with higher shares of female employment (Figure 5.5, upper-right quadrant), the case in most of the countries under analysis. In these countries, the indicators provide some evidence that FDI supports greater gender employment equality, although manufacturing sectors with higher female employment often pay lower wages (as shown below) and therefore the result needs to be taken with a pinch of salt.

Figure 5.5. FDI and gender employment equality in manufacturing



Note: The chart shows two Type 2 indicators. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

The sectoral distribution of gender wage gaps varies greatly across regions

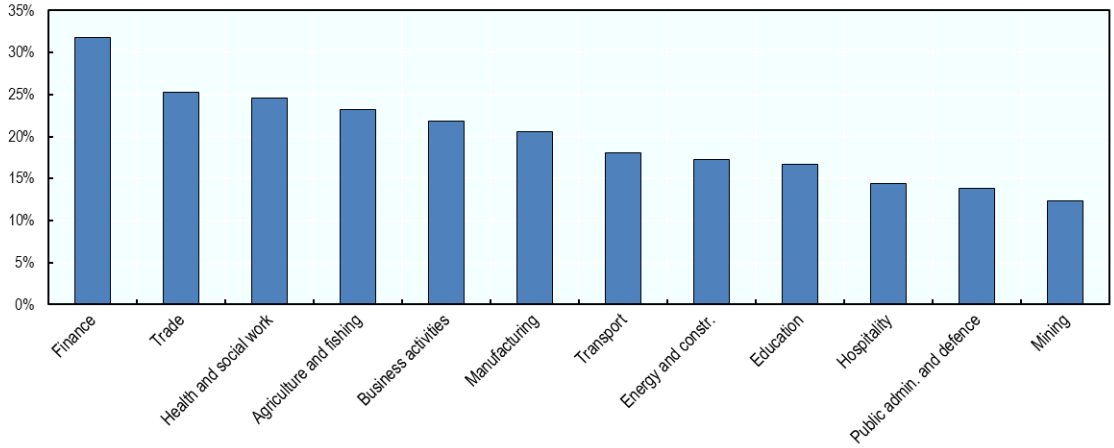
The gender wage gap, measured as the pay difference between men and women relative to men's pay, varies significantly across sectors and regions. In OECD countries, the largest wage gap is observed in finance (in finance women earn approximately 30% less than men) and trade (25%) (Figure 5.6). The lowest gender wage gaps are observed in mining (12%), and public administration (14%).

The results vary greatly across developing countries. While the financial sector is one of the most gender-unfriendly sectors in relation to pay in many regions (Eurasia, Latin America and Sub-Saharan Africa), considerable gender pay gaps are encountered also in business activities (Eurasia), agriculture (Latin America), transport services (MENA, Southeast Asia), hospitality (Sub-Saharan Africa), energy (Southeast Asia), and manufacturing (MENA). The sectors with the lowest gender pay gaps also vary greatly across regions: public administration (Eurasia, Latin America, Sub-Saharan Africa), agriculture (MENA), mining (Latin America, MENA), manufacturing and business activities (Southeast Asia).

In addition, considerable discrepancies in earnings between men and women exist also in sectors that are traditionally dominated by female workers, such as health and social work, education, and other social and private activities.

Figure 5.6. The gender wage gap by sector in OECD countries, 2017

Average gender wage gap across sectors



Note: The gender wage gap is calculated as the difference between the monthly average male wage and the monthly average female wage, relative to the monthly average male wage. For each country, the most recent year over the period 2014-2017 is considered.
Source: OECD based on ILO.

FDI is often observed in sectors with lower gender wage equality

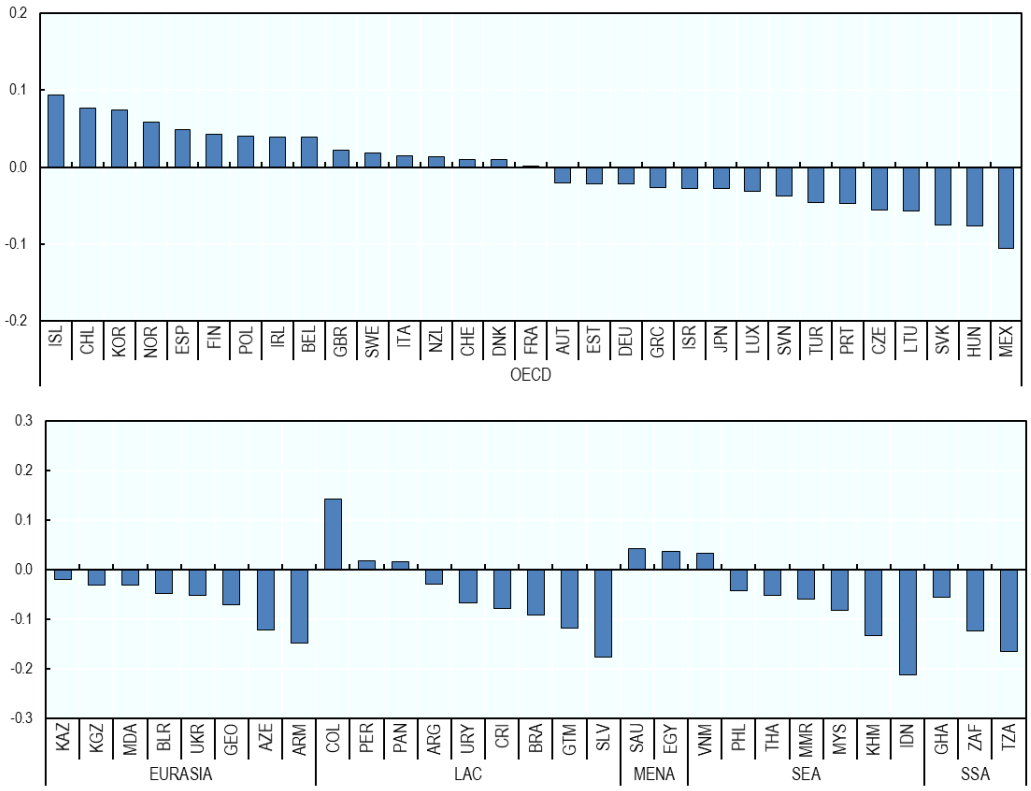
Turning to gender wage equality, existing evidence shows that the effect of FDI on the pay gap between men and women is not systemic, suggesting that a number of factors are at play. This seems to be explained by the fact that gender is highly correlated with other dimensions, such as skills, industry, occupation and so on. In addition, current evidence appears to be, to some extent, country and period specific (Box 5.1).

An indicator assesses whether FDI is concentrated in sectors with lower or higher gender wage inequality. The ratio between women's wage and men's wage provides a measure of gender wage equality, so that higher ratios correspond to higher gender wage equality (or lower gender wage gaps).[6] The results show that in most of the countries for which data are available, FDI is concentrated in sectors with higher gender wage gaps (Figure 5.7).[7] Overall, the results vary greatly across countries, especially in the OECD area. This is consistent with existing studies, which suggest that the link between foreign investment and gender wage equality is largely affected by country-specific factors.

In both OECD and developing countries, the negative relationship between FDI and gender wage equality is primarily explained by negative associations found in manufacturing and in services sectors such as finance, trade, and business activities. These sectors also tend to be characterised by lower shares of women.

Figure 5.7. FDI and gender wage equality in OECD countries

Is greenfield FDI concentrated in sectors with higher gender wage equality?
(yes if value > 0; no if value < 0)

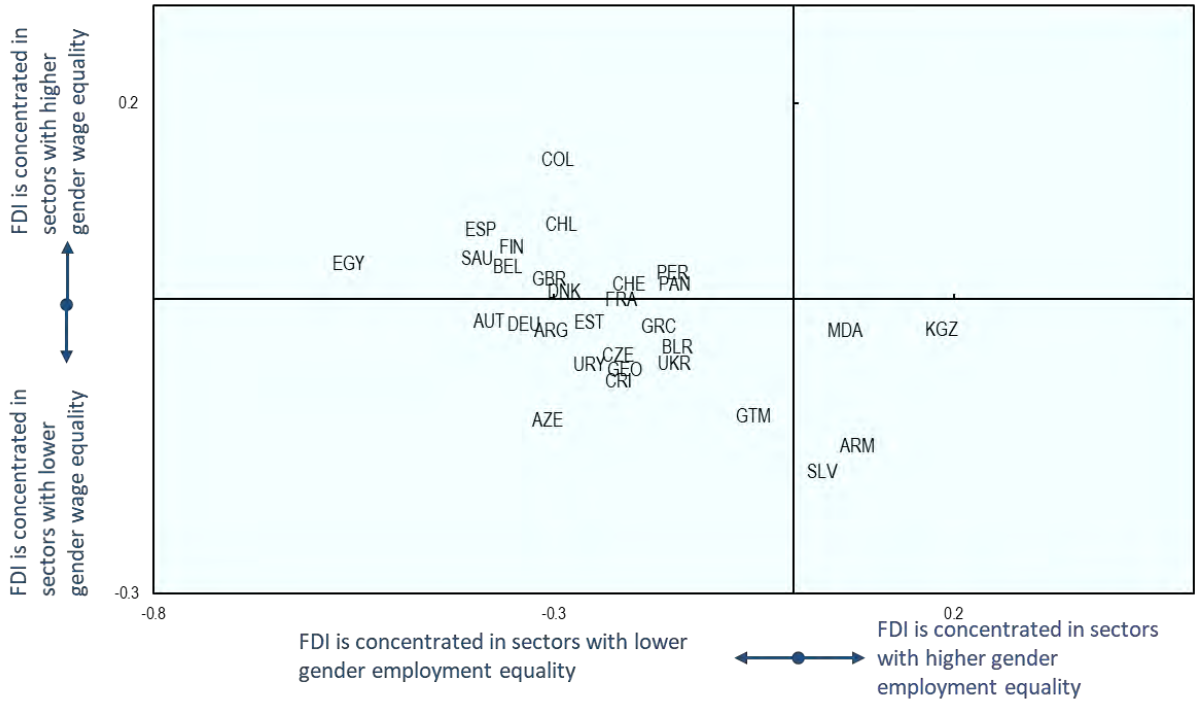


Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. Gender wage equality is measured by the ratio of monthly average female wage and monthly average male wage, so that higher ratios indicate lower differences between men and women's monthly earnings.
Source: OECD based on Financial Times' fDi Markets database, ILO and UN National Accounts.

Manufacturing plays an important role in countries where FDI is positively associated with gender wage equality, such as Peru and Panama. Nonetheless, other sectors may explain the positive association in other countries. For instance, in Colombia, a key engine is the mining sector, where a 'reverse' gender wage gap is observed, i.e. on average, women earn more than men. [8]

Combining the indicators for wage equality and employment equality (Figure 5.8) suggests that there is an inverse relationship between the wage and employment dimensions. This is likely because the sectoral composition of FDI plays a large role in its association with gender outcomes, rather than inherent differences across domestic and foreign employers. Sectors with relatively higher female employment tend to be lower-skilled and lower-wage, while sectors with high-skilled and better paid jobs tend to be male-dominated. Thus, countries with large female-dominated industries, which attract substantial foreign investment, tend to exhibit a higher wage gap; whereas countries that attract high-skilled or capital-intensive investment exhibit less of a wage gap but a larger employment gap, as very few women are employed in these higher-paid jobs. In both cases upgrading women's skills and facilitating their access to higher-paid activities can serve to reduce gender disparities.

Figure 5.8. Contribution of FDI to gender equality in wages and employment



Note: The figure shows two Type 2 indicators. See Annexes B and C for a description of the methodology and data. The share of female workers is used as a proxy for gender employment equality; women's monthly average wage relative to men's monthly average wage is used as a measure of gender wage equality.
Source: OECD based on Financial Times' fDi Markets database, ILO and UN National Accounts.

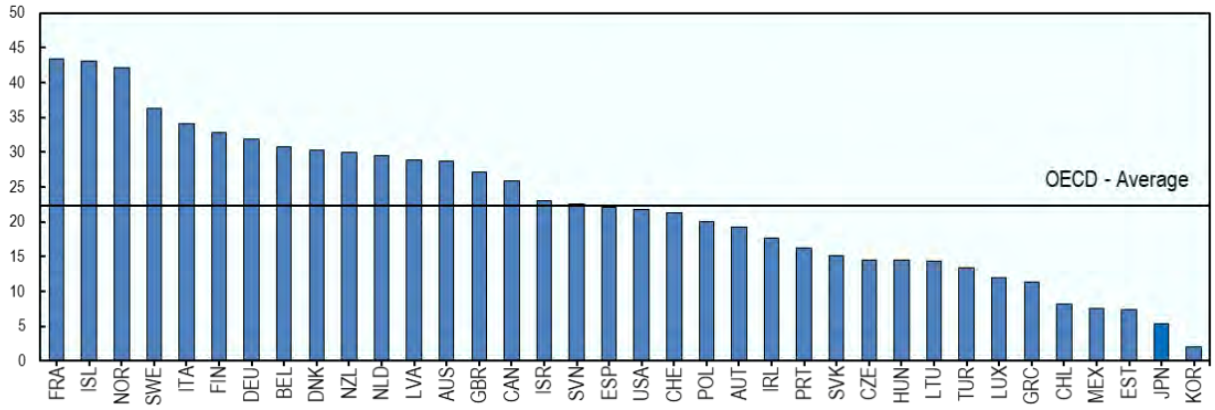
Women are underrepresented in senior positions

Globally, women are underrepresented in top management and on corporate boards. In the OECD area, less than one-third of managers are women, with small variations across countries (OECD, 2019). Moreover, on average in OECD countries the share of women on boards of publicly listed companies is below 25% (Figure 5.9). Similarly, in many developing countries few women reach positions that are well paid and enjoy high status, notably legislators, senior officials and managers (ILO, 2016).

In addition, even when they reach senior positions they continue to earn less, despite often being better educated than their male counterparts. Recent estimates show that the gender wage gap in relation to managerial positions is over 20% in several OECD (Austria, Israel, Portugal, the Slovak Republic, the United Kingdom) as well as in a number of developing countries (Brazil, Costa Rica, Ecuador, Ethiopia, Peru, the Russian Federation, South Africa) (ILO, 2016).

Figure 5.9. Women on corporate boards in the OECD area

Female share on boards of the largest publicly listed companies (in %, 2017)



Source: OECD Gender Data Portal

Women are equally likely to reach top managerial positions in foreign and domestic firms

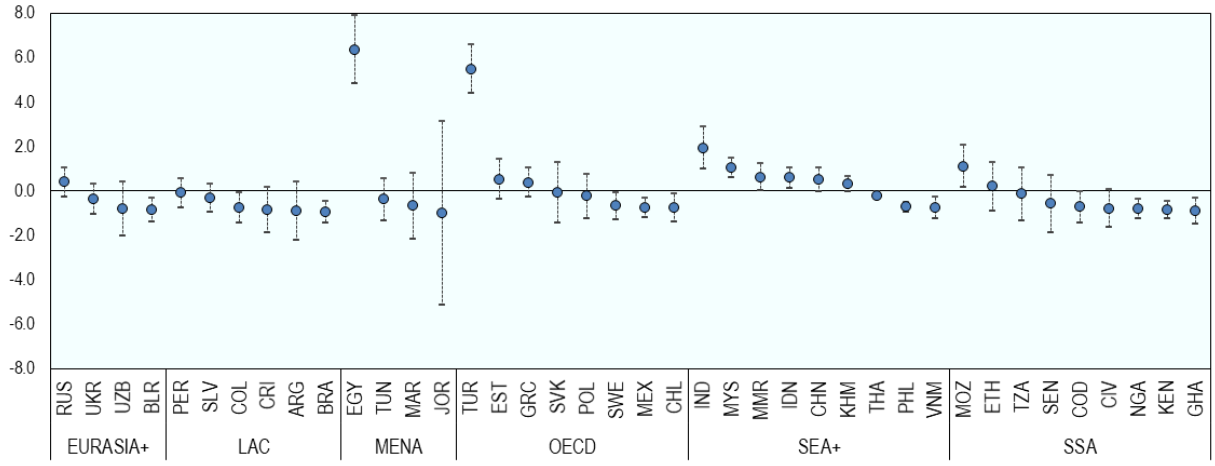
Foreign firms' employment practices, including promotion, strongly depend on corporate culture. Corporate culture is affected by home country norms and values, type of industry, modality of investment, among other factors. If foreign firms support women's career progression in the workplace more than domestic firms do, they may help women to achieve top managerial positions within the company. Case study evidence shows, however, that a few women reach top level positions in foreign companies (Box 5.1).

An indicator compares the share of foreign firms with women in top managerial positions with the same share for domestic manufacturers. The indicator provides an indication of whether foreign affiliates do better than domestic firms in helping women succeed in the workplace. The indicator also show whether differences between foreign firms and domestic firms are statistically significant.

The results show that, in most countries, there is no significant difference between the share of domestic and foreign firms with women in top management positions (Figure 5.10). This suggests that women are equally likely to reach top management positions in foreign firms and domestic firms. Nevertheless, in some countries those differences are significant. For instance, in Egypt, Turkey, Malaysia and Indonesia the share of foreign firms with women top managers is significantly higher than the share of domestic firms. On the contrary, in several countries from the OECD area, Southeast Asia and Sub-Saharan Africa the share of foreign firms with women in top management positions is lower.

Figure 5.10. Women top managers in foreign and domestic manufacturing firms

Is the share of foreign firms with female top managers higher than that of domestic firms?
(yes if value > 0; no if value < 0)



Note: The chart shows a type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Foreign activity is concentrated in manufacturing industries with higher shares of firms with women in top managerial positions

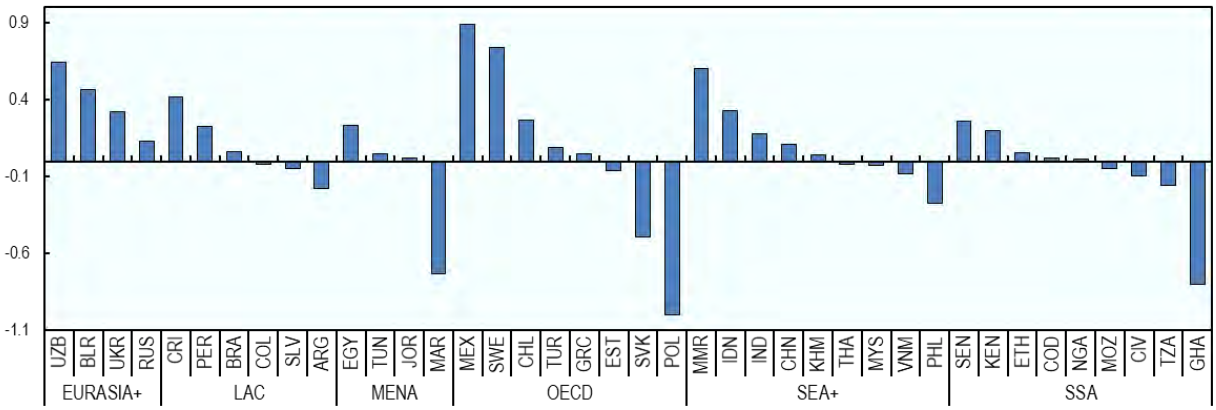
Besides supporting the career progression of women directly hired by them, foreign firms may also encourage domestic firms to do the same. In particular, domestic firms may change their employment practices to imitate those of successful foreign investors (i.e. demonstration effects) or to attract and retain female talent (i.e. competition effects).

An indicator shows whether FDI is concentrated in sectors with higher or lower shares of firms with women in top managerial positions in the manufacturing sector (Figure 5.11). Overall, the findings point to a positive correlation between manufacturing FDI and the share of women in managerial positions. In particular, in 21 out of 30 countries, FDI is found more in manufacturing industries with larger shares of firms with female top managers.

The results vary greatly across countries, even within the same region. For instance, in Egypt the indicator value points to a positive relation between FDI and the share of firms with female top managers, but the opposite is observed in Morocco. The sectors driving the relationship between FDI and the share of firms with women top managers may also differ considerably. For example, in Egypt the positive relationships is explained by positive associations found in textile, garments and chemicals, while in Jordan an important role is played by the food sector.

Figure 5.11. FDI and women in top-management positions

A. Is FDI concentrated in sectors with higher shares of firms with female top managers?
(yes if value > 0; no if value < 0)



Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data. The baseline is the average share of firms with female top managers across sectors weighted by the size of the sector (captured by sectoral value added). The FDI-weighted average is the average share of firms with female top managers across sectors weighted by the size of the sector and sectoral FDI.
Source: OECD based on World Bank Enterprise Surveys.

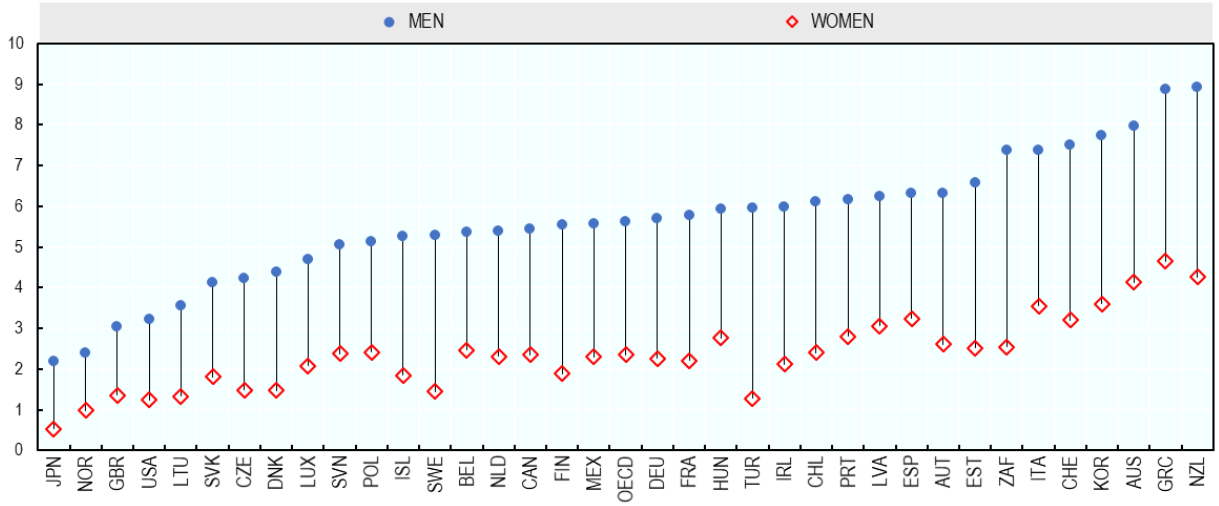
Women engage less in entrepreneurship than men

Women participation in the labour market has significantly increased over the past decades, although women still remain under-represented as entrepreneurs in both OECD and developing countries. In the OECD countries, businesses owned by women tend to be smaller and in a limited range of sectors, often at low capital intensity. Even when enterprises of the same size class are compared, women-owned businesses have lower sales, profits and productivity relative to businesses owned by men (OECD, 2012). Similarly, in developing countries, businesses owned by women tend to grow slower in both sales and employment and are often found in the informal sector and in less productive sectors (UNCTAD, 2014).

In all world regions, women are less likely than men to be self-employed and they are also more likely to work on their own as opposed to creating businesses with employees. Data for the OECD countries show that, on average, only one fifth of self-employed women have employees, compared to one-third for men. Moreover, the share of self-employed women with employees is, on average, three percentage points lower than the share for self-employed men (Figure 5.12). In developing countries, women owners represent the majority of businesses without employees in the informal sector (OECD, 2012).

Figure 5.12. Self-employed with employees by gender, 2017

Men and women self-employed, % of total employment, 2017



Source: OECD Social and Welfare Statistics

Across OECD and developing countries, female ownership is equally likely in foreign and domestic firms

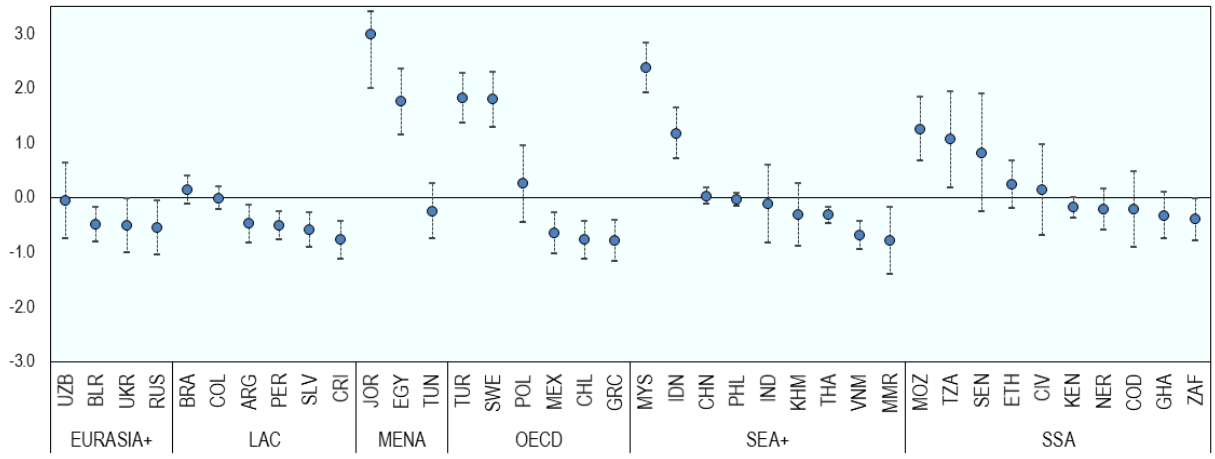
While women entrepreneurs tend to be underrepresented everywhere, the share of female-owned businesses varies widely across countries. Differences in relation to the business environment, policies, stage of development, among other factors, appear to explain such variation. Generally, countries with more gender-inclusive business environments and policies tend to have higher shares of female-owned businesses (OECD, 2012). In addition, existing evidence shows that women entrepreneurs in developing countries face additional constraints (e.g. higher barriers to entry in the formal sector). This suggests that foreign firms from more gender-inclusive countries are more likely to have women owners relative to domestic firms.

An indicator compares the share of foreign firms with women owners with the same share for domestic firms. The indicator covers both developing and OECD countries, and it is constructed using averages across 16 manufacturing sectors. Confidence intervals show whether the results are statistically significant.

Generally, the indicator is not statistically significant, suggesting that female ownership is equally likely in domestic and in foreign firms (Figure 5.13). A number of exceptions, however, can be observed. For example, in Jordan, Egypt, Turkey, Sweden and several other countries the share of foreign firms owned by women is higher. In other countries, especially from Latin America, the OECD area and Southeast Asia, however, women entrepreneurship is more likely in domestic firms.

Figure 5.13. Female ownership in foreign and domestic manufacturing firms

Is the share of foreign firms with women owners higher than that of domestic firms?
(yes if value > 0; no if value < 0)



Note: The chart shows a Type 1 indicator and the respective 95% confidence interval. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

FDI is associated with greater female entrepreneurship

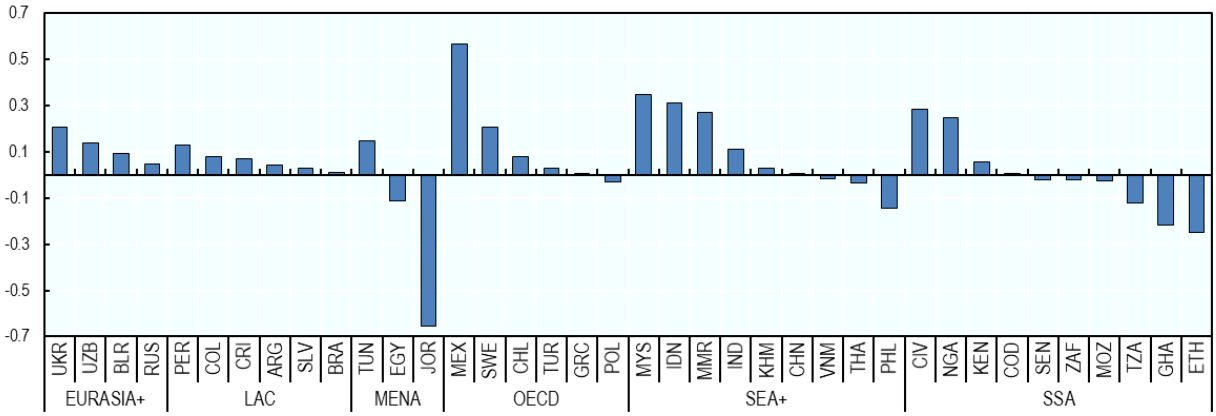
Almost no evidence exists on the effect of FDI on women entrepreneurship in host countries. One of the channels through which foreign firms may create new business opportunities for women entrepreneurs in host countries is by outsourcing or subcontracting tasks, especially in sectors with lower entry barriers for women entrepreneurs (e.g. less capital intensive sectors). However, due to several constraints (e.g. more difficult access to credit), female-owned businesses tend to be more vulnerable to competition than their male peers, and therefore might be harmed more by the presence of foreign firms.

Using data for 16 manufacturing industries, an indicator is constructed to study how FDI relates to women entrepreneurship in a group of OECD and developing countries (Figure 5.14). The share of women-owned enterprises measures the extent to which women entrepreneurship is prevalent in a given country and sector. The results point to a positive correlation between FDI and women entrepreneurship in the majority of the countries for which data are available. In particular, in 25 out of 37 countries, FDI is concentrated in manufacturing sectors with relatively higher shares of women-owned businesses.

While in all selected countries of Eurasia and Latin America a positive association between FDI and the share of firms with female owners is observed, in other regions the results are less clear-cut. For example, in Sub-Saharan Africa a positive relation is observed for Ivory Coast, Nigeria, Kenya and Congo, whereas a negative association is found in the remaining countries of the region. Sectors that are driving the results also change greatly across countries. For instance, in Ivory Coast and Nigeria the positive association is driven by the food sector, in Kenya by fabricated metal products, and in Congo by chemicals.

Figure 5.14. FDI and female ownership in manufacturing

A. Is FDI concentrated in sectors with higher shares of women-owned firms?
(yes if value > 0; no if value < 0)



Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Notes

[1] UNCTAD (2014) defines gender equality and women empowerment as follows: Gender equality refers to 'the equality between women and men, girls and boys, in all aspects of life including education, health, nutrition, access to economic assets and resources, political opportunity and freedom from coercion and violence'. Women empowerment 'is closely related to, but goes beyond, gender equality to cover not just women's condition relative to men's, but also their power to make choices and their ability to control key aspects of their own lives'.

[2] Especially in developing countries, women are often in informal or unpaid jobs. So, foreign firms may help them to move to formal, better paid jobs.

[3] Figures 5.2 and 5.3 show the countries included in each region.

[4] An OECD study shows that higher shares of women in sectors such as health and education reflect different attitudes between girls and boys already in school. In particular, women are more likely to avoid fields such as science that require high level of on-the-job training and long working hours. Conversely, they tend to choose fields such as education, that allow to better balance work with family responsibilities (OECD, 2010).

[5] The indicators do not tell how each country performs overall in terms of gender employment equality, but rather how FDI relates to gender employment equality in each country. For example, Mexico has a higher indicator value than Luxembourg (Panel A), but relatively lower gender employment equality, measured as the average share of female employees across sectors (30% in Mexico and 40% in Luxembourg). Similarly, Algeria has a higher indicator value than Tunisia (Panel B). Yet, the average share of female employees across sectors is lower in Algeria (10%) than in Tunisia (30%).

[6] In some cases, women's monthly average wage can be higher than men's monthly average wage. When this happens, the ratio is above 1 and a 'reverse' gender wage gap is observed.

[7] The value of the indicator does not show whether a country does better than another in terms of overall gender wage equality. Rather, it shows how FDI relates to gender wage equality in a country relative to other countries. For example, in Korea FDI is positively associated with gender wage equality, but the average level of wage equality in the country – measured by the average ratio between women's pay and men's pay across sectors - is the lowest among all OECD countries, including those where FDI is related to lower gender wage equality.

[8] Nevertheless, in Colombia the number of men employed by the mining sector is almost ten times that of women.

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Chapter 6. How does FDI relate to carbon footprint?

This chapter considers the relationship between FDI, sustainable energy access and carbon dioxide (CO_2) emissions, and examines the role that FDI can play in transitioning to a low-carbon economy, addressing Sustainable Development Goal 13 on taking action to combat climate change, and Sustainable Development Goal 7 on ensuring access to affordable and sustainable energy for all. It considers two key mechanisms through which FDI can mitigate CO_2 emissions: by delivering cleaner technologies, and by developing renewable energy infrastructure. The chapter presents indicators to measure the relationship between FDI and CO_2 emission based on these two key mechanisms.

6.1. Summary

This chapter examines how FDI relates to climate change mitigation (SDG13) and access to sustainable energy (SDG7), focusing on the carbon footprint of the economic activity of foreign firms and their contribution to renewable energy technologies and infrastructure. The mechanisms through which FDI can affect carbon footprint are identified based on a review of the literature, and include increasing the scale of economic activity; affecting the structural composition of economic activity; inducing the adoption of new energy-saving technologies; and influencing the uptake of clean energy sources.

A first set of indicators examines the relationship between FDI, the structure of the economy and CO_2 emissions per unit of output. The indicators suggest that in the majority of countries considered, FDI prevails in cleaner industries. Few exceptions include countries where fossil fuels constitute a large share of GDP and inward FDI. In other words, for countries that rely heavily on fossil fuels as a source of income, FDI might exacerbate this dependence, and consequently their carbon footprint.

A related second set of indicators considers the relationship between FDI, the structure of the economy and energy efficiency, measured in terms of output produced for a given level of electricity and heat consumption. Once again, aside from countries that are rich in fossil fuels, FDI tends to be observed in sectors that consume less electricity and heat, and are therefore more energy efficient. Moreover, foreign firms are found to be significantly more energy efficient, on average, than their domestic counterparts, in a third of the countries considered, across all regions. For these countries, the indicators provide some evidence that existing FDI may be conducive to improvements in energy efficiency. Conversely only some countries host foreign firms that are significantly less energy efficient than their domestic peers, and also operate in sectors that are more energy-intensive. In these countries there may be scope for targeting FDI that is less energy-intensive.

While increasing energy efficiency is essential in mitigating climate change in the long run, the forces driving up energy demand are outpacing progress on energy efficiency, resulting in accelerating global energy use. Thus, a critical avenue to curb greenhouse gas emissions in the immediate term and meet growing energy demands is to increase production and the use of renewable energy, and foreign investors can play an important role in this respect. A last set of indicators therefore examines FDI in renewable energy infrastructure in relation to FDI in fossil fuels and suggest that the stock of foreign investments in renewable energy accumulated over 2003-2017 was substantial, particularly for OECD and BRIC economies.

A closer look at FDI flows reveals that the contribution of FDI to renewables relative to fossil fuels is growing rapidly, not only in OECD countries but increasingly also in developing regions like Southeast Asia and Sub-Saharan Africa. This may be driven by the more advanced technological requirements associated with renewable power, better catered to by international investors. In other words, most countries are well-equipped to manage their own fossil fuel investments, while only few will have the capabilities for investing in renewable energy technologies. However, comparing FDI in renewables to the extent of emissions of the energy sector across 88 countries shows that for a majority of countries FDI is still concentrated in fossil fuels and the energy sector is still significantly polluting in terms of CO_2 emissions. In these countries policy can play an important role in creating greater incentive for investments that help transition to low-carbon energy infrastructure, reforming fossil fuel support measures or correcting regulations that weaken the business case for investment and innovation in low-carbon infrastructure.

6.2. Conceptual framework

According to the World Economic Forum's *Global Risks Report 2019*, environmental risks are perceived as the gravest global threats in the next decade, especially extreme weather events, climate change policy failures, and the accelerated pace of biodiversity loss (WEF, 2019; IPCC 2018). A global economy reliant on fossil fuels and the resulting rising greenhouse gas (GHG) emissions, now 50% higher than their 1990 level, are creating drastic changes to the climate. The extreme weather events witnessed in 2018 provide only a glimpse of the dire effects of climate change and the threat they pose to human wellbeing and ecosystems. The annual average losses from tsunamis, tropical cyclones, flooding and wildfires related to rising global temperatures amount to hundreds of billions of dollars (IPCC, 2018), and currently require USD 6 billion annually in disaster risk management alone (likely substantially more in the future), not to mention non-disaster costs (e.g. healthcare, agriculture). Sustainable Development Goal 13 (SDG13) is to "take urgent action to combat climate change and its impacts".

Box 6.1. Defining energy and emissions

Carbon dioxide (CO_2) is the primary greenhouse gas responsible for global warming. Other greenhouse gases also contributors to global warming but are beyond the scope of this chapter.

It should be noted also that carbon footprint is only one metric of climate change mitigation. There are other important dimensions (e.g. ecosystems, biodiversity), not addressed by this chapter. Moreover, low-carbon infrastructure development can generate negative social and environmental impacts (e.g. displacement of local population, biodiversity loss), and in devising climate mitigation policies these trade-offs that should be minimised.

Primary energy refers to sources of energy found in nature that have not been subjected to any transformation process, such as coal, peat, crude oil, natural gas, hydroelectric, geothermal, solar, wind, tidal, biomass and nuclear power.

Secondary energy refers to end-use fuels such as coal products, oil products, electricity and heat, obtained through the conversion of primary forms of energy.

Energy intensity of a commercial sector is a measure of the amount of energy used to produce a unit of output.

Energy efficiency refers to reducing the amount of energy use for a given level of output. Improvements in energy efficiency are generally achieved by adopting a more efficient technology or production process or by reducing energy losses. It can be measured as the inverse of energy intensity, or the amount of output produced for a given level of energy consumption. For simplicity we use the terms interchangeably.

Renewable energy is energy from sources that are naturally replenishing. It generally is considered to include six renewable-power generation sectors: geothermal, marine/tidal, small hydroelectric, solar, wind, and the combined sector biomass and waste.

Source: IEA (2018), IEA (2015), OECD (forthcoming 2019); Ang et al. (2017)

Against this backdrop, global energy demand is expanding well above the rate of deployment of clean energy resources, only slowing down the growth of fossil fuel use and CO_2 emissions. As the global economy grows, so too will the demand for energy. Sustainable Development Goal 7 (SDG7) is to "ensure access to affordable, reliable, sustainable and modern energy for all." Energy efficiency and renewable energy are seen as the twin pillars of sustainable energy policy. Improvements in energy efficiency have been the biggest contributor to reduced energy use since 2000, and the main factor behind the flattening of global energy-related GHG emissions since 2014 (IEA, 2017). In many countries energy efficiency is also seen to have a national security benefit by reducing the level of energy imports from foreign countries and slowing down the rate at which domestic energy resources are depleted. Continuing improvements in energy efficiency are not enough, however. A substantial increase in the production and uptake of renewable energy across the world is imperative to curb rising CO_2 emissions in meeting energy demands, and thereby limit global warming and improve energy security.

Mitigating global warming and ensuring access to sustainable energy are expected to positively affect many other SDGs (OECD, forthcoming 2019). For instance, providing electricity access (SDG7) can positively impact poverty eradication (SDG1) and education (SDG4). Similarly, climate change mitigation has many other benefits in terms of reduced air pollution and improved levels of health (SDG3) and less impact on ecosystems from fossil fuel extraction (SDG15).

Box 6.1 provides some definitions and clarifications for the following discussion.

FDI can help transition to cleaner technologies and energy sources

FDI can play an important role in curbing CO_2 emissions and thereby mitigate global warming, both through its effects on economic activity and by directly financing low-carbon energy infrastructure:

- **FDI can bring forward cleaner technologies.** Evidence stemming from the traditional literature on the trade-FDI-environment nexus (Grossman and Krueger, 1991; Copeland and Taylor, 1994; Porter and van der Linde, 1995) proposes that FDI affects a country's carbon footprint in contending ways by expanding the *scale* of economic activity, changing the structural *composition* of economic activity and delivering new *techniques* of production.[1] In isolation, the scale effect is generally expected to increase CO_2 emissions, since an increase in the size of an economy implies more production and, in turn, more emissions. The technique effect refers to a change in production methods resulting from an economy's growth process (and potentially the ensuing introduction of more stringent regulation), which can in turn be influenced by FDI inflows (e.g. through the transfer of technology from foreign to domestic firms). It is expected to reduce emissions by helping diffuse cleaner or energy-saving technologies (Pazienza, 2015). The composition effect is associated with a change in industrial structure driven by FDI, and its impact on emissions will depend on the production specialisation of a country. For instance, an FDI-driven sectoral shift toward services would be associated with energy savings and a reduction in emissions. The balance of these effects will depend on many factors, including the policy context and stage of development of a country. Empirical evidence on the relationship between FDI and CO_2 is mixed, although there is some consensus that the relationship is negative in high-income economies. Box 6.2 provides a summary of hypotheses used to explain FDI's effect on CO_2 emissions, and empirical tests of these hypotheses.

Box 6.2. A review of the relationship between FDI and CO_2 emissions

A large body of evidence investigates the effects of FDI on CO_2 emissions, often in relation to alternative economic rationales used to understand the FDI-environment nexus:

The *Environmental Kuznets Curve* hypothesis conjectures an inverted-U relationship between output growth and the level of pollution, expected to increase as a country develops and the economy grows but begin to decrease as rising incomes pass a turning point and create demands for tougher environmental regulation, bringing forth cleaner techniques of production (Grossman and Krueger, 1991).

The *pollution haven* hypothesis postulates that weak environmental regulation in a host country attracts inward FDI by profit-driven companies eager to circumvent costly regulatory compliance in their home countries, resulting in many developing countries turning toward relatively pollution-intensive activities (Jensen, 1996).

The *pollution halo* hypothesis maintains that stringent home regulations induce firms to find cleaner and more efficient technologies that allow them to become more competitive internationally. Multinationals are not driven by differences in the stringency of environmental regulations, rather, in applying a universal environmental standard multinationals engaging in FDI will tend to spread their greener technology to their counterparts in the host country (Porter and van der Linde, 1995).

Empirical studies on the effects of FDI on CO_2 are typically formulated as tests of these hypothesis, and have resulted in mixed findings, across different regions and income groups, as summarised in the table below. Broadly speaking, these studies find evidence of positive FDI effects on emissions more frequently in low- and middle-income countries than in high-income countries, although a number of studies that focus on developing countries find no such evidence. Regardless of whether MNEs are influenced by the stringency of environmental laws, this is likely to reflect differences in comparative advantage of advanced and developing countries and their resulting FDI profiles, with developing countries attracting relatively more polluting investments in heavy manufacturing and extraction activities, and advanced economies attracting less polluting investments in services and high-tech manufacturing.

Study	Countries	FDI increases CO_2
Hoffman et al. (2005)	122 countries	YES for low- and middle-income groups
Aliyu (2005)	14 developing countries	NO
Acharya (2009)	India	YES
Pao and Tsai (2010)	BRIC countries	YES
Al-Mulali (2012)	12 MENA countries	YES
Al-Mulali and Tang (2013)	GCC countries	NO
Blanco et al. (2013)	18 Latin American countries	NO
Ren et al. (2014)	China	YES
Omri et al. (2014)	54 countries	YES except for high-income group
Kivyiro and Arminen (2014)	6 Sub-Sharan African countries	NO
Pazienza (2015)	30 OECD countries	NO
Neequaye and Oladi (2015)	27 developing countries	NO
Seker et al. (2015)	Turkey	YES
Tang and Tan (2015)	Viet Nam	NO
Riti et al. (2016)	Nigeria	YES
Zhang and Zhou (2016)	China	NO
Zhu et al (2016)	5 ASEAN countries	NO
Solarin et al. (2017)	Ghana	YES
Behera and Dash (2017)	17 South and Southeast Asian countries	YES
Owuso-Brown (2017)	16 West African countries	YES

Box 6.3. Drivers, determinants and barriers to FDI in low-carbon technologies

Technology and finance are critical factors in the low-carbon transition. Foreign investment can play a significant role in facilitating this transition by contributing the needed financial and technological resources, but what drives cross-border investment in low-carbon technologies, and specifically renewable energy technologies (RETs), remains under-researched.

The *World Investment Report 2010: Investing in a Low-Carbon Economy* laid out a conceptual framework for low-carbon FDI, including the main drivers (mostly home country push factors) and locational determinants (host country pull factors) of such investments. Market conditions and trade barriers generally influence MNE decisions to invest abroad. Additional factors relevant for low-carbon FDI include pressures from consumers and shareholders, green branding strategies, direct government support (e.g. ODA), and energy and environmental regulations that support low-carbon technological development (and cross-border diffusion). In terms of attracting low-carbon investments, in addition to general determinants of FDI (e.g. openness, investment climate, market size and growth potential, access to natural and human resources), specific host country determinants include sophistication and concentration of the electricity market; climate mitigation policies designed to create a market for low-carbon products and services; and existing capabilities or industry clusters that attract strategic asset-seeking foreign investors.

Drivers (push factors)		Locational determinants (pull factors)	
Home market and trade conditions	• Competitive advantage (e.g. accumulated know-how) • Saturated home market • Trade barriers (tariff-jumping)	*General policy framework*	• FDI policies and electricity market • Climate policies (e.g. feed-in-tariffs) • Industrial policies (e.g. targeting equipment manufacturing)
Home government policies	• Energy/ environmental regulations • OFDI promotion and facilitation • Official Development Assistance • Export credit assistance	*Economic determinants*	• Strategic asset seeking (e.g. R&D) • Resource seeking (e.g. wind energy) • Efficiency seeking (e.g. skills) • Market seeking (untapped market)
Business and consumer trends	• Global company reputation and green branding • NGO/ consumer demands	*Investment promotion and facilitation*	• Project-specific incentives • Investment facilitation

Source: Adapted from UNCTAD (2010) and Hanni et al. (2011)

Subsequent studies have delved deeper into the specific factors both enabling and deterring private investment in renewable energy technologies, and assessed their relevance empirically, focusing on explicit climate mitigation policies, macroeconomic policies, the investment environment, the innovation environment, and potential policies that lock-in carbon-intensive technologies (Ang et al., 2017; Röttgers, and Anderson, 2018; Steffen et al., 2018; IMF, 2019). Broadly-speaking the evidence suggests that climate mitigation policies (e.g. carbon pricing, renewable energy certificates, feed-in-tariffs, public tenders) are a necessary condition to attracting low-carbon but insufficient. Existing policy frameworks and economic interests continue to be geared towards fossil fuels and carbon-intensive activities dampening the effects of climate policies. Moreover, investment climate factors (e.g. contract enforcement, red tape, corruption, regulatory quality) and the extent of competition in the electricity market affect investment flows in renewable power and also influence the effectiveness of climate mitigation policies in stimulating renewables patenting activity. Lastly, policies that affect financial markets and help reduce short-term bias and improve governance frameworks of financial institutions are found to support private climate finance.

Source: Ang et al. (2017); Röttgers, and Anderson (2018); Steffen et al. (2018); IMF (2019); UNCTAD (2010)

- **Foreign investors can directly contribute to developing renewable energy infrastructure.** Thanks to steep decreases in the cost of some critical renewable energy technologies, private investors have begun to profitably cater to the investment needs of this sector (Ang et al., 2017). Multinationals can play a critical role in the deployment and innovation of renewable energy technologies across borders. FDI in renewable energy is particularly relevant in the context of mitigating CO_2 emissions of emerging economies, where demand for energy is expected to grow most rapidly in the coming decades. The scale and scope of private foreign investment in renewable energy technologies remains under-researched, particularly in relation to its contribution to reducing reliance on fossil fuels and curbing CO_2 emissions. There is however, a growing literature on the drivers pushing firms to invest abroad in low-carbon technologies and the determinants leading to investments in specific host economies, including climate mitigation policies, the broader investment climate and potential policy misalignments, and innovation capabilities (Box 6.3). This project contributes to this evidence by deriving indicators of FDI in renewables relative to fossil fuels, and by comparing the foreign and domestic contribution to renewables.

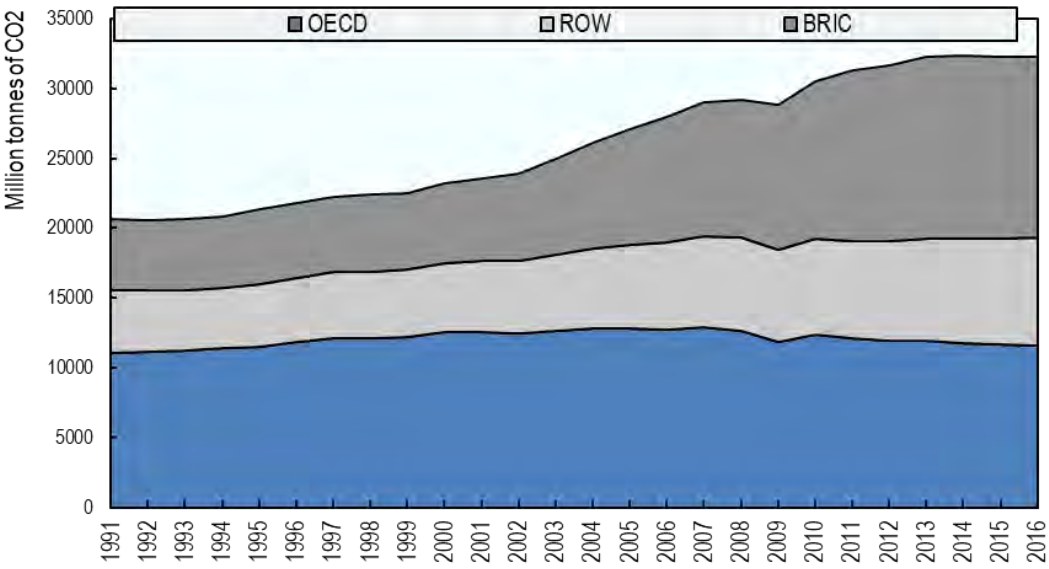
The energy sector is one of the main drivers of CO_2 emissions

World CO_2 emissions from fuel combustion have risen by 57% over the past 25 years, though the distribution of this growth varies widely across countries and regions. Emissions from OECD countries rose at a decreasing rate until 2005, when they started falling gradually (Figure 6.1). Emissions from developing countries, on the other hand, were relatively flat until 2000 and then started accelerating. The largest growth was experienced by BRIC economies, jointly accounting for two thirds of the CO_2 emissions from non-OECD countries, and 40% of global emissions in 2016. Nevertheless this expansion reached its peak in the early 2000s at rate of 11% per year and is now decelerating. Stronger growth in emissions in developing countries can largely be attributed to the much stronger economic growth they experienced over this period compared to in OECD countries.

The distribution of emissions across economic sectors is uneven, both in terms of direct emissions from fuel combustion in production activities (e.g. that involve the use of coal and oil products), and indirect emissions from use of electricity and heating. Indeed, electricity and heat are a significant source of global CO_2 emissions, accounting for almost half of total emissions from manufacturing and construction and three quarters of emissions from services (Figure 6.2, Panel A). Within manufacturing, electricity consumption accounts for over three quarters of total emissions for textiles, transport equipment, metal products and machinery (Figure 6.2, Panel B). Technologies that improve energy efficiency or that generate electricity from cleaner renewable sources are crucial for reducing the level of emissions associated, and foreign investment can play an important role in advancing such technologies.

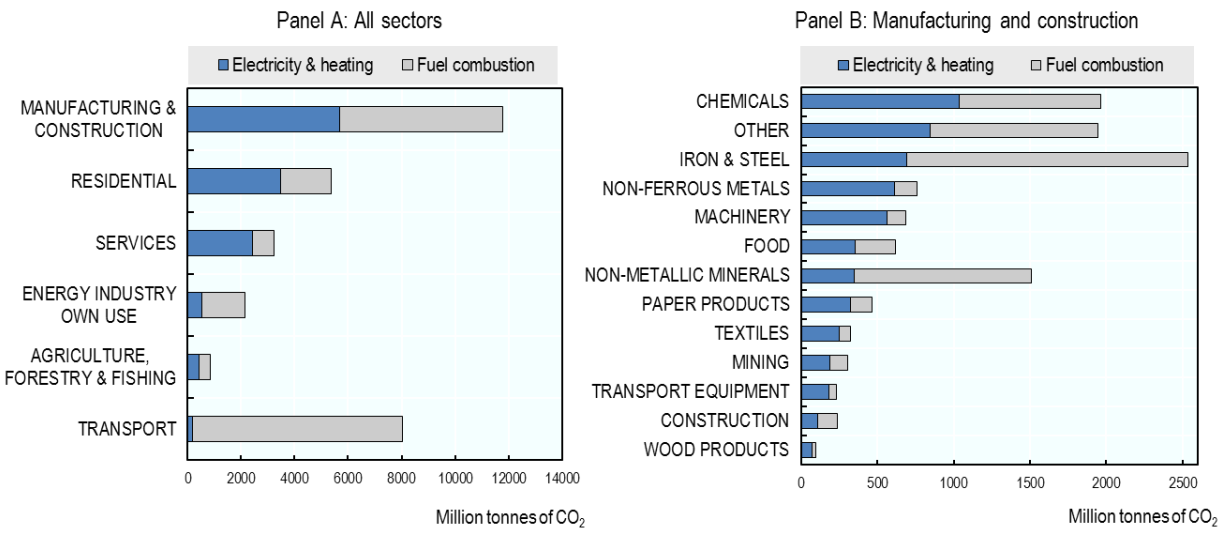
Indeed, the observed plateauing of global CO_2 emissions is consistent with both a movement of economic activity away from energy-intensive industry towards less intensive service sectors in more advanced economies, and a cleaner and more efficient energy sector. Evidence of the latter is also provided by the declining average emissions from electricity and heat generation particularly in advanced economies (Figure 6.3), and the accelerating contribution of renewable energy to total primary energy supply (Figure 6.4). It is worth noting that the largest increase in use of renewable power is observed in developing countries.

Figure 6.1. CO_2 emissions from OECD countries are declining



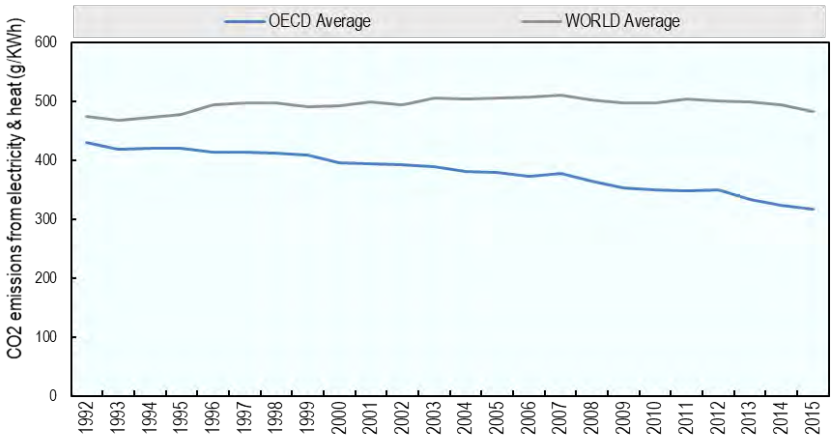
Note: BRIC: Brazil, Russia, India and China. ROW: rest of world.
Source: International Energy Agency's World Energy Statistics.

Figure 6.2. Electricity and heat consumption is an important source of CO_2 emissions



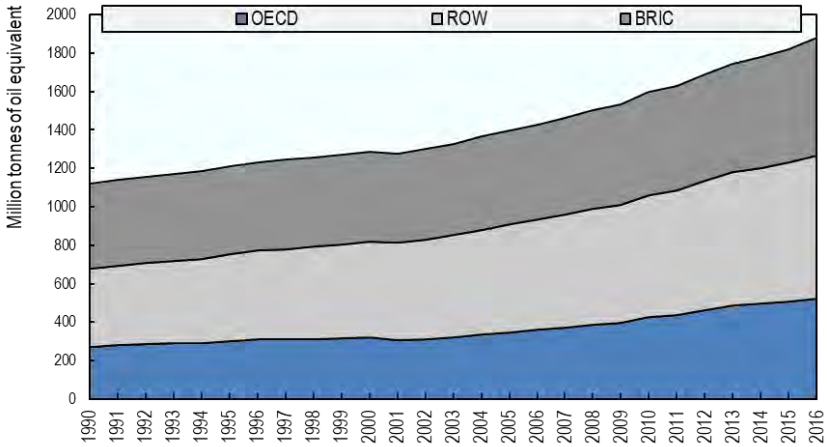
Note: Energy industry own use contains emissions from fuel combusted in oil refineries, for the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries. *Transport* contains emissions from the combustion of fuel for all transport activity, regardless of the sector.
Source: International Energy Agency's CO_2 Emissions database; International Energy Agency's World Energy Statistics.

Figure 6.3. Average CO_2 emissions from electricity and heat production are falling



Note: BRIC: Brazil, Russia, India and China. ROW: rest of world.
Source: International Energy Agency's CO_2 Emissions database.

Figure 6.4. The contribution of renewable energy to primary energy supply is accelerating



Note: BRIC: Brazil, Russia, India and China. ROW: rest of world. See Box 4.1 for a definition of primary and secondary energy.
Source: International Energy Agency's World Energy Statistics.

6.3. The indicators

The indicators proposed for examining the relationship between FDI and host countries' carbon footprint follow the discussion above. They cannot disentangle the effects of FDI on CO_2 emissions, but can provide some direction as to what mechanisms are at play. The indicators focus on two main transmission mechanisms: FDI's association with CO_2 emissions from economic activity; and FDI in renewable energy. More specifically, the indicators examine how FDI relates to the following outcomes:

(1) Is FDI concentrated in activities that generate higher or lower CO_2 emissions?

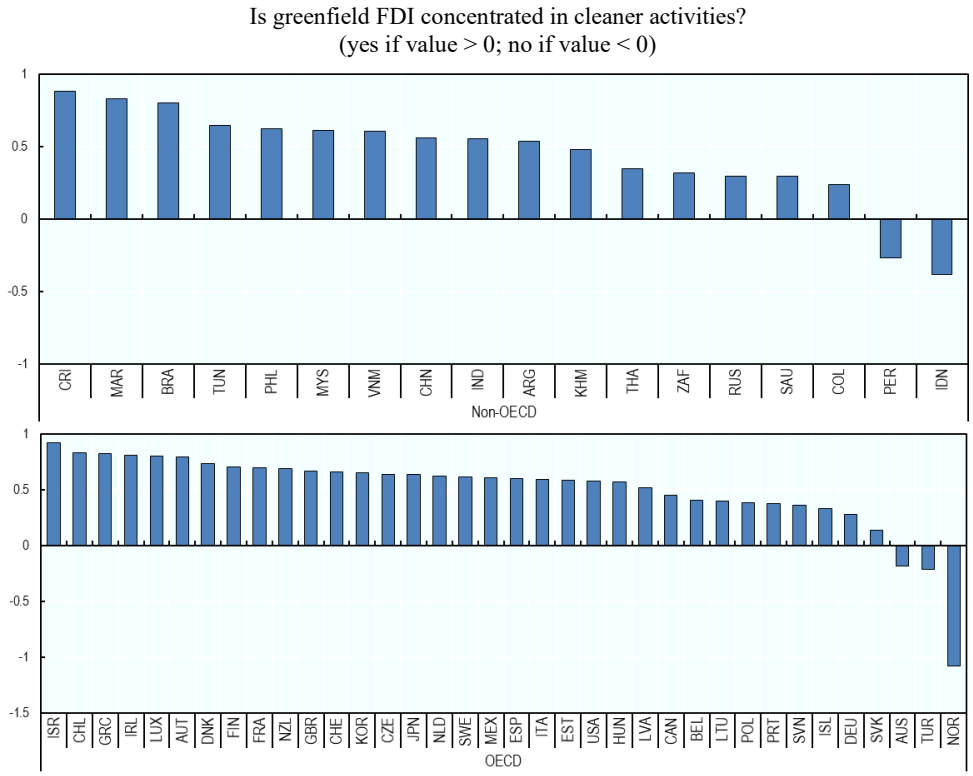
(2) Are foreign firms more energy efficient? Do they operate in industries that are more or less energy-intensive relative to domestic firms?

(3) To what extent do foreign firms invest in cleaner renewable energy sources?

FDI is more prevalent in cleaner and less emitting sectors

A first indicator examines whether FDI is found in sectors that produce higher (or lower) CO_2 emissions per unit of output, relative to the overall economy.[2] It shows that with few exceptions, greenfield investments are observed prevalently in cleaner sectors in terms of CO_2 emissions (Figure 6.5).[3] Exceptions include selected oil and gas producing countries like Norway, Australia, Indonesia, Turkey, and Peru, where fossil fuels account for a substantial share of total value of greenfield FDI projects over 2003-2016 (53%, 46%, 34%, 28% and 17%, respectively). This may be explained by the fact that in resource-rich countries, fossil fuels offer lucrative investment opportunities in extraction and energy transformation. In Peru and Indonesia a large share of FDI goes to iron and steel manufacturing (37% and 22%, respectively), and in Turkey to construction (12%). These heavily capital- and energy-intensive activities tend to attract large multinationals with the requisite capacity for such investments, relatively more than smaller domestic players.

Figure 6.5. FDI and CO_2 emissions



Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database; OECD Input-Output Tables; International Energy Agency's World Energy Statistics; International Energy Agency's CO_2 Emissions database.

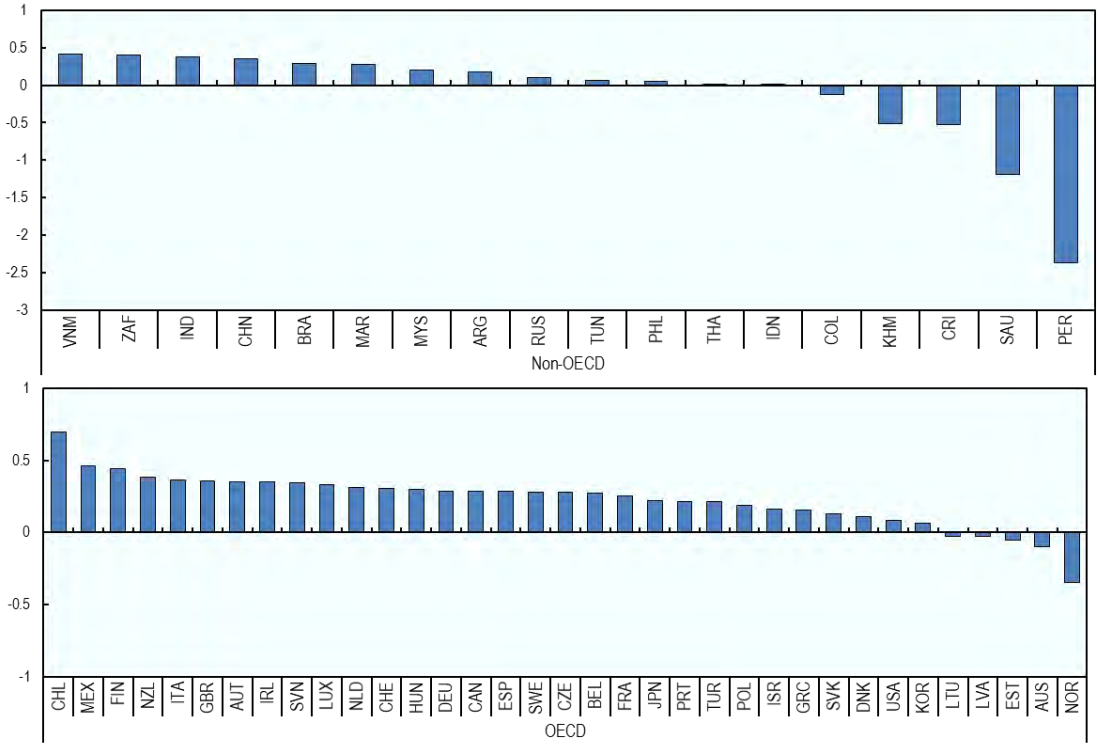
As discussed earlier, industries that are not very polluting may nevertheless consume a significant amount of electricity, which in turn may be associated with substantial CO_2 emissions. Sector-level information on emissions from fuel combustion with electricity and heat allocated to consuming sectors allows disentangling the extent of emissions from consumption of electricity and heat, and it relation to FDI. Thus an additional indicator

examines whether FDI is found in sectors that produce higher (or lower) CO_2 emissions from electricity and heat consumption (Figure 6.6).

In the majority of countries considered, FDI still prevails in industries with lower levels of emissions generated from electricity use, though the difference is less marked. The same exceptions are observed, with the addition of Colombia, Cambodia, Saudi Arabia, where energy-intensive fossil fuels account for 50%, 24%, and 14% of greenfield FDI flows, respectively, over the period considered. In the Baltic countries, a large share of FDI goes to construction and transport, and in Saudi Arabia, the energy-intensive chemical industry also accounts for almost 40% of FDI. Costa Rica also receives FDI in sectors where electricity use generates higher emissions, though the sectors driving this trend are less clear, and include many services sectors.

Figure 6.6. FDI and CO2 emissions from energy use

Is FDI concentrated in activities with lower emissions from electricity and heat use?
(yes if value > 0 ; no if value < 0)



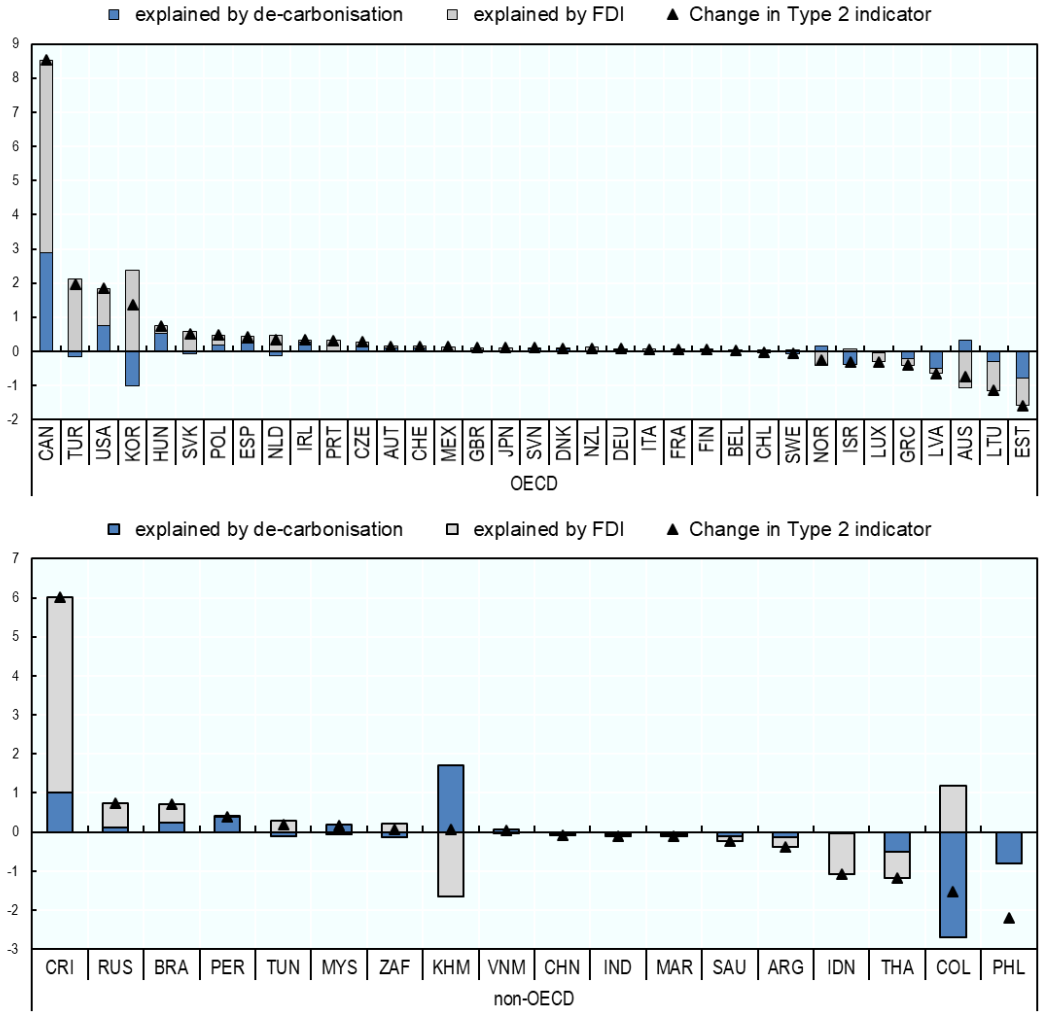
Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database; OECD Input-Output Tables; International Energy Agency's World Energy Statistics; International Energy Agency's CO_2 Emissions database.

Examining the growth in the above indicator over five years provides additional information on what has been driving observed changes in the link between FDI and emissions from energy use. Where the change in the indicator is positive and FDI's association with emissions from energy use has improved –notably Canada, Costa Rica, Turkey, USA and Korea– this trend is a result of a combination of de-carbonisation of energy-intensive activities (blue segment) and changes in the composition of greenfield FDI toward less emitting (or less energy-intensive) activities (grey segment) over the period considered (Figure 6.7).

The figure suggests that shifts in FDI toward less polluting industries are the strongest driver of improvements in the FDI-emissions link. In fact, in Turkey and Korea, CO_2 emissions from energy use increased over the period considered, but the change in the composition of greenfield FDI toward cleaner activities outweighs the overall higher levels of emissions. In Colombia, the rise in emissions from energy use (negative blue segment) outweighs the gains from reallocation of FDI to cleaner activities, resulting in a deterioration of the FDI-emissions link. Cambodia on the other hand, experienced a significant drop in emissions from energy sector, but the FDI-emissions link remained unchanged as a result of considerably increased FDI in energy-intensive activities like garment manufacturing.

Figure 6.7. FDI and CO_2 emissions over time

A. Is FDI increasingly concentrated in sectors with higher labour productivity?
(yes if value > 0; no if value < 0)



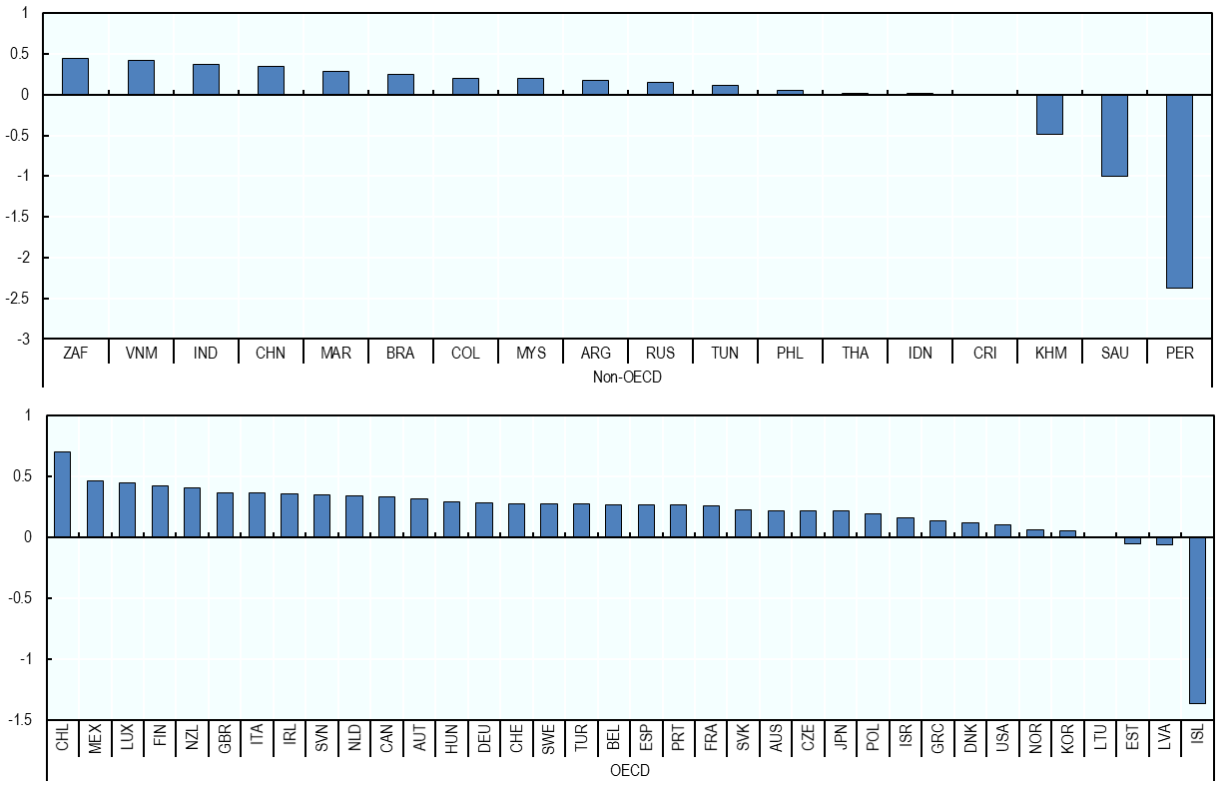
Note: The chart shows the factor decomposition of the cumulative growth of a type 2 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database; OECD Input-Output Tables; International Energy Agency's World Energy Statistics; International Energy Agency's CO_2 Emissions database.

FDI is associated with activities that are less energy intensive

The above results suggest that, aside from countries that are rich in fossil fuels, either FDI tends to be observed in sectors that consume less electricity and heat or, where FDI goes to energy-intensive sectors, these sectors are relatively clean. Sector-level information on electricity and heat consumption allow further disentangling the extent to which FDI is related with energy-intensive versus energy-efficient sectors (Figure 6.8). The resulting indicator is consistent with the previous findings: a majority of countries exhibit more FDI in less energy-intensive (more energy efficient) sectors, and the same select few exhibit greater FDI in more energy-intensive sectors (i.e. values above 0) – notably, coal, oil and gas. An exception exists in the case of Iceland, where 60% of FDI goes to iron and steel manufacturing, which is heavily energy-intensive. The fact that Iceland does not appear among the countries in which FDI is associated with higher CO_2 emissions is perhaps attributed to a relatively clean electricity sector in the country, potentially as a result of its abundant geothermal energy.

Figure 6.8. FDI and energy-intensive activities

Is FDI concentrated in activities that are less energy-intensive?
(yes if value > 0 ; no if value < 0)

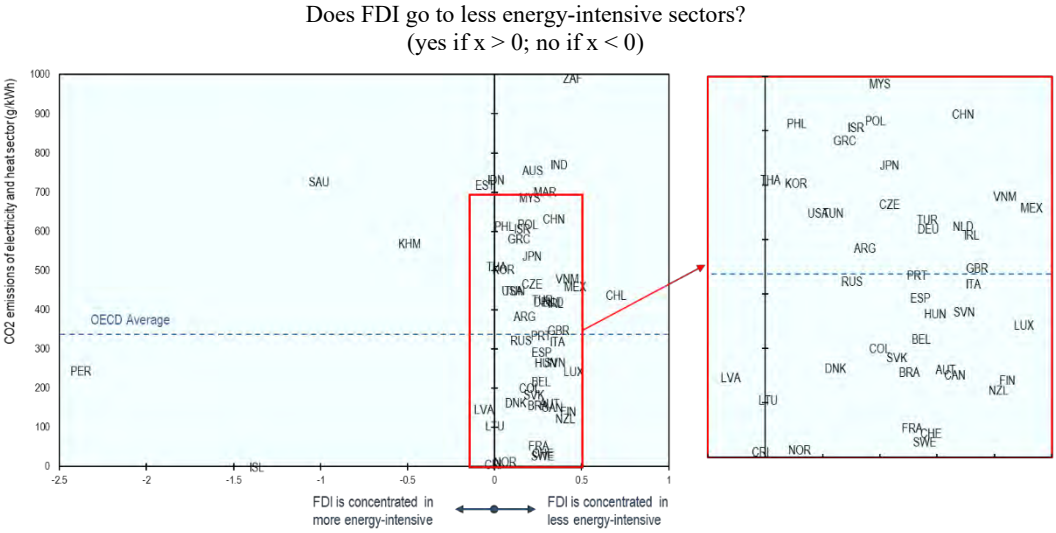


Note: The chart shows a type 2 indicator. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database; OECD Input-Output Tables; International Energy Agency's World Energy Statistics; International Energy Agency's CO_2 emissions database.

Combining this indicator with a measure of overall CO_2 emissions per unit of electricity and heat generation provides a comparison of energy intensity in relation to how clean the energy sector is in terms of CO_2 emissions (Figure 6.9). Countries in the upper-right

quadrant receive significant FDI in energy-efficient sectors, but the energy sector is relatively polluting. Conversely countries in the lower-left quadrant receive FDI primarily in energy-intensive sectors, but the energy sector is relatively clean. The figure shows that while FDI is prevalently in energy-efficient sectors in most of the countries considered, the energy sector is significantly more polluting than the OECD average for many countries. In other words there is considerable scope for cleaner electricity and heat production both in advanced and developing countries. Iceland, in the bottom left quadrant, once again stand out as a country with highly energy-intensive FDI but clean energy sources.

Figure 6.9. Energy intensity and emissions of the energy sector



Note: The chart shows a type 2 indicator. Peru (-2.2, 244) is omitted from the figure to aid visibility. See Annexes B and C for a description of the methodology and data.
Source: OECD based on Financial Times' fDi Markets database; OECD Input-Output Tables; International Energy Agency's World Energy Statistics; International Energy Agency's CO_2 emissions database.

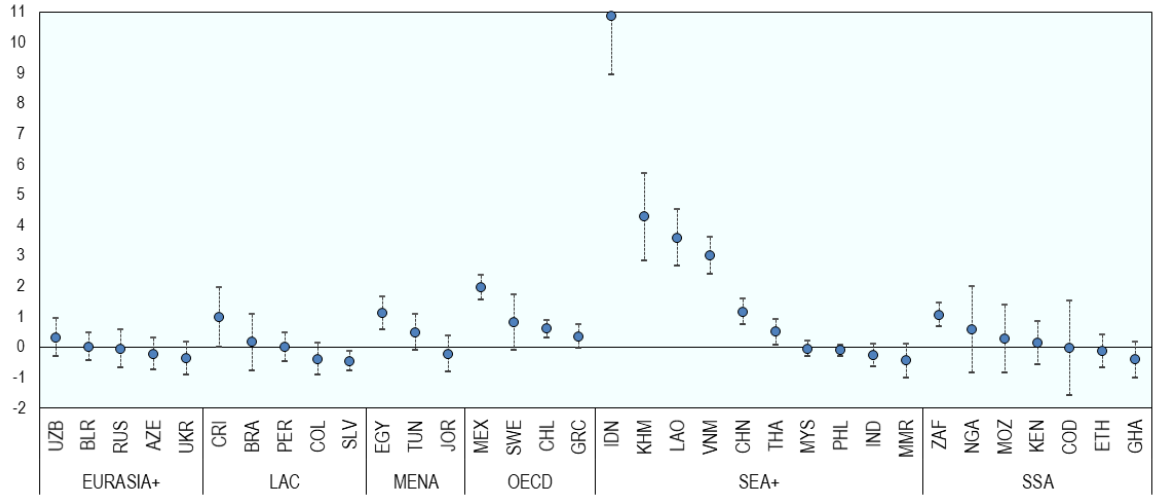
Foreign firms are more energy-efficient than domestic peers

While the above analysis suggests that greenfield FDI flows into industries that are less energy-intensive, it is not clear how this affects the energy efficiency of the sector. Are foreign investors bringing improvements to the host country in energy efficiency as a result of cleaner or energy-saving technologies or are they less energy-efficient than their domestic peers? Firm-level data on electricity and fuel costs from the World Bank Enterprise Surveys shed more light on this question. The following indicator compares sales over electricity and fuel costs across foreign and domestic firms in manufacturing. Since foreign and domestic firms face the same national electricity and fuel prices, effectively, the indicator captures the quantity of output sold per unit of electricity and fuel consumed, which serves as a proxy for energy efficiency.

The indicator is constructed as the ratio of the average energy efficiency of foreign firms over the average energy efficiency of domestic firms, where energy efficiency is defined as output over electricity and fuel.[4] Foreign firms appear to be more energy efficient than domestic firms for just over half of countries considered, although the difference is significant only for a third (Figure 6.10). These countries include Mexico, Chile, Costa Rica, China and a number of Southeast Asian countries. Only in one country, El Salvador, on the other hand, are domestic firms significantly more energy-efficient.

Figure 6.10. Foreign and domestic manufacturers' energy efficiency

Do foreign firms produce more output per unit of electricity and fuel than their domestic peers?
(yes if value > 0; no if value < 0)

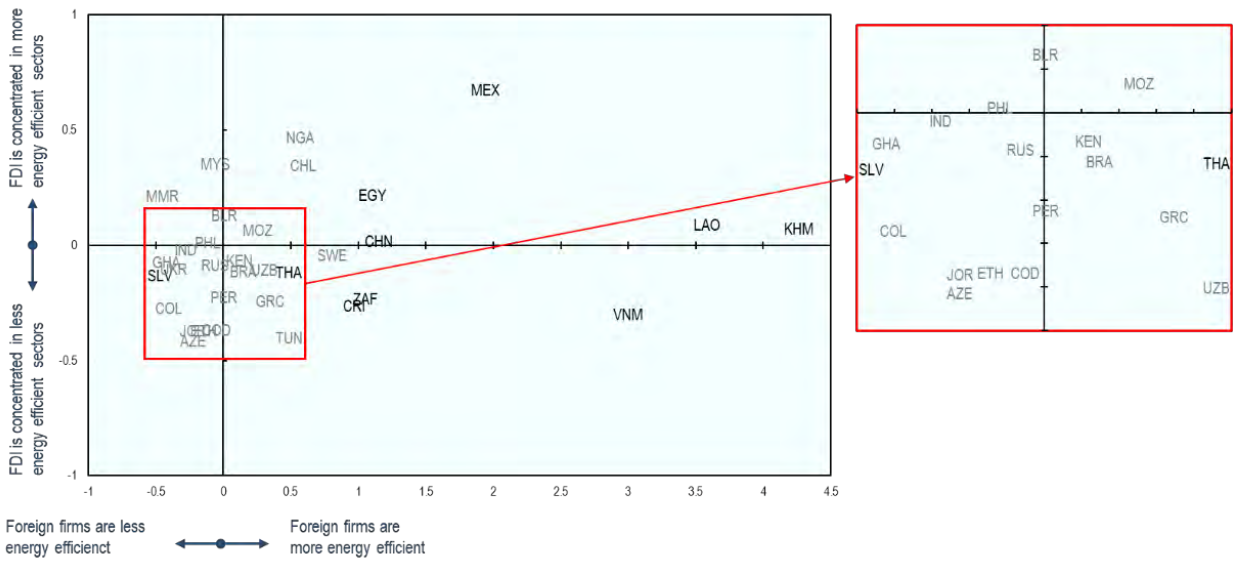


Note: The Figure shows a Type 1 indicator and corresponding 95% confidence interval. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

Aggregating firm-level data from the World Bank Enterprise Surveys can be used to construct an additional indicator that examines whether FDI (captured by sales of foreign affiliates) is observed in manufacturing sectors that are more or less energy-efficient. This indicator mirrors the one depicted in Figure 6.8 but is based on firm-level rather than sector-level data. Discrepancies with respect to the previous version are both a result of the differential coverage of sectors and the definition of FDI. The previous indicator considers greenfield FDI in all sectors including services, while the latter consider the activity of foreign MNEs in manufacturing only. For instance, in Brazil, when non-manufacturing sectors are included it appears that FDI prevails in less energy-intensive sectors, suggesting that significant FDI goes to services. Whereas when manufacturing is included more emphasis is given to energy-intensive industrial the activity of foreign affiliates, resulting in a negative value.

Combining the resulting indicator with the previous one provides further insight into the relationship between FDI and energy efficiency (Figure 6.11). Countries in the upper-right quadrant, like China, Mexico and Egypt, host foreign firms that are more energy efficient than their domestic counterparts on average and also operate in manufacturing sectors with higher average energy efficiency (such as for instance electronics). In these countries FDI is associated with improvements in energy efficiency, which may be amplified if energy-saving technologies are diffused to domestic firms. Conversely, countries in the lower-left quadrant host foreign firms that are relatively less energy-efficient and also operate in manufacturing sectors that are more energy-intensive. Thus the indicators suggest that existing FDI in these countries is associated with a deterioration of energy efficiency, although results are only statistically significant for El Salvador. In Viet Nam and Thailand (bottom-right quadrant), foreign firms are relatively more energy efficient than domestic peers but operate in manufacturing sectors that are relatively more energy-intensive (such as garment manufacturing). These firms may bring energy efficiency improvements to these sectors if domestic firms are able to absorb their energy-saving processes.

Figure 6.11. FDI and improvements in energy efficiency in manufacturing sectors



Note: The Figure shows a Type 1 and Type 2 indicator. Indonesia (10.9, -0.3) is omitted to aid visibility. Bold labels indicate statistical significance. See Annexes B and C for a description of the methodology and data.
Source: OECD based on World Bank Enterprise Surveys.

FDI in renewable energy is substantial for OECD and BRIC economies

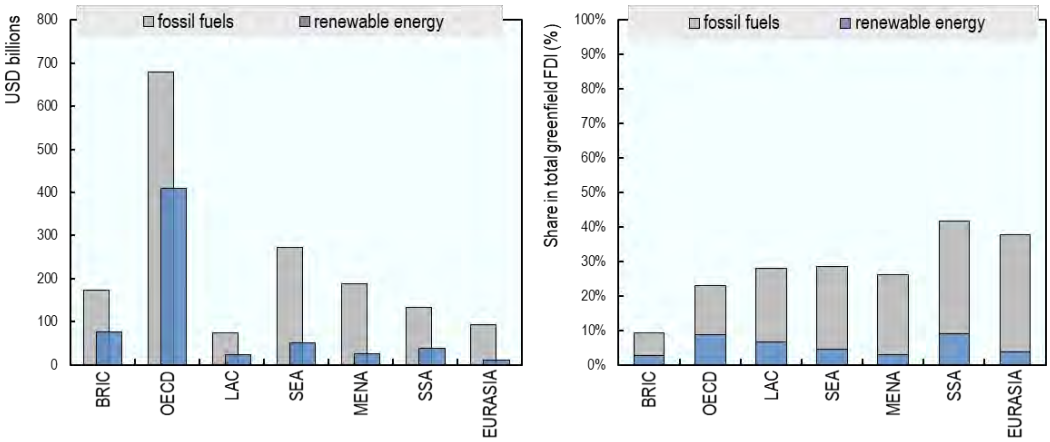
While increasing energy efficiency is essential in mitigating climate change in the long run, the forces driving up energy demand are outpacing progress on energy efficiency, resulting in accelerating global energy use (IEA, 2018). In this context, a critical avenue to curb greenhouse gas emissions in the immediate term and meet growing energy demands is to increase production and use of renewable energy.

According to greenfield FDI statistics, the stock of foreign investment in renewable energy accumulated over 2003-2017 was substantial, both in absolute terms and in relation to foreign investment in fossil fuels, particularly for OECD countries but also for BRICs (Figure 6.12).[5] In other regions the stock of FDI in renewable energy remains dwarfed by investment in fossil fuels by a factor of five and above.

Nevertheless, examining FDI flows reveals that this trend is changing rapidly. In 2003, FDI in renewables was less than 5% of total FDI flows in primary energy (i.e. the sum of investment in renewables and fossil fuels) across most regions including the OECD, and just over 10% for BRIC economies (Figure 6.13). By 2017, FDI in renewables was close to 80% of FDI in the primary energy sector for BRICs and over 60% for the OECD.[6] Other regions are quickly gaining ground, notably Southeast Asia and Latin America and the Caribbean, where FDI flows in renewables grew to over a third and a quarter of FDI in primary energy, respectively (compared to 0% and 5% in 2003).

Figure 6.12. The stock of FDI in renewables is substantial for OECD and BRICs

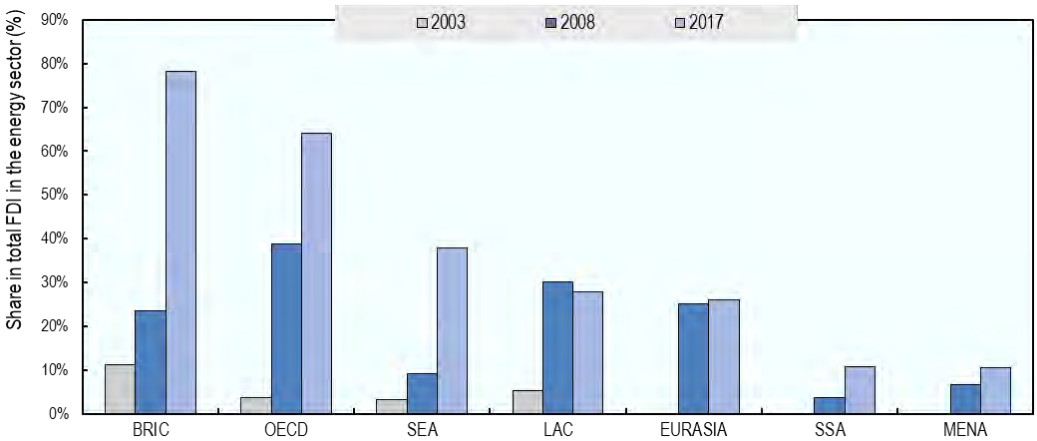
Greenfield FDI stock accumulated over 2003-2017



Note: The regional groupings are non-exhaustive. See Figure 4.13 for the countries considered in each region. *Source*: OECD based on Financial Times' fDi Markets database.

Figure 6.13. FDI in renewables is a significant share of energy investments across regions

Greenfield FDI flows: 2003, 2008 and 2017

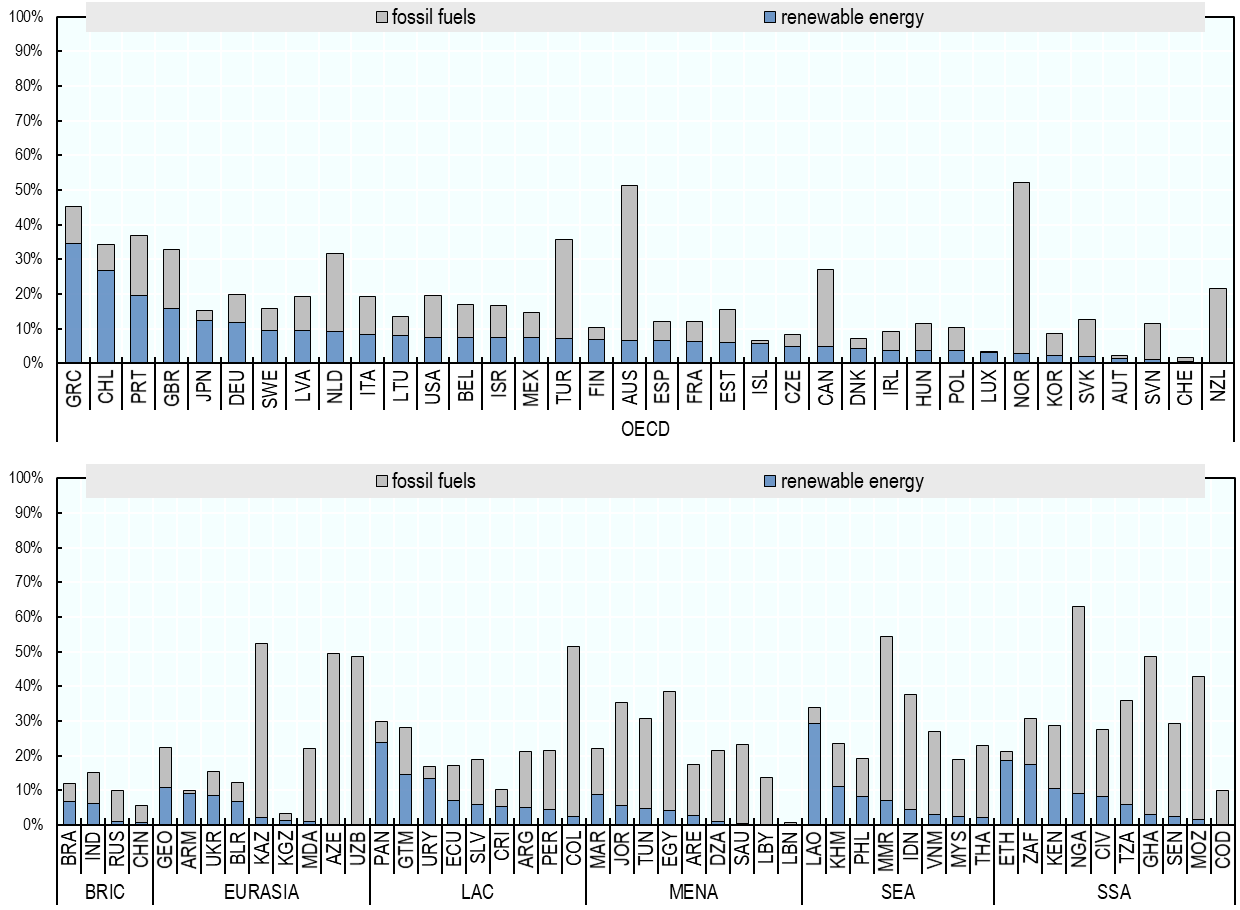


Note: The regional groupings are non-exhaustive. See Figure 6.13 for the countries considered in each region. The energy sector includes renewables (wind, solar, geothermal, tide/wave/ocean, small hydroelectric, and biomass) and fossil fuels (coal, oil and natural gas) and related extraction activities.
Source: OECD based on Financial Times' fDi Markets database.

At the national level, the stock of FDI in renewables exceeds FDI in fossil fuels for almost half of OECD countries (Figure 6.14), as well as for selected emerging economies from each region (with the exception of Middle East and Northern Africa). This may be driven by the more advanced technological requirements associated with renewable power. In other words, most countries, including emerging economies, are well-equipped to manage their own fossil fuel investments, while only few will have the capabilities for investing in renewable energy technologies. The stock of FDI in renewables constitutes a sizeable share of overall greenfield FDI in a number of developing countries, including Panama, Uruguay and Guatemala, Lao PDR, Ethiopia, South Africa and Kenya.

Figure 6.14. FDI in renewables exceeds FDI in fossil fuels for almost half of OECD countries

Share in total greenfield FDI accumulated over 2003-2017 (%)

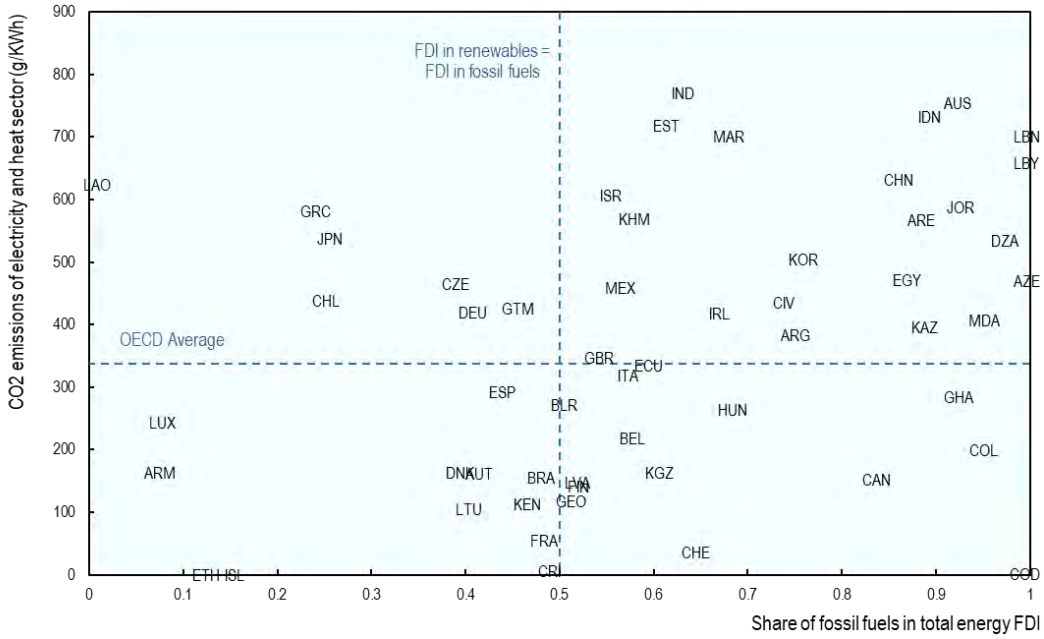


Source: OECD based on Financial Times' fDi Markets database.

Additional insights on FDI's contribution to reducing CO_2 emissions is provided by comparing the stock of FDI in fossil fuels relative to renewables with CO_2 emissions from the energy sector (Figure 6.15). Countries in the upper-right quadrant received greater investment in fossil fuels than in renewables and exhibit relatively high CO_2 emissions from electricity and heat production. In these countries, there is significant scope for increasing FDI's contribution to greening the energy sector. Similarly in the lower-right quadrant FDI is flowing to fossil fuels significantly more than renewables, but emissions from the energy sector are below the OECD average, suggesting that the domestic economy is investing in cleaner energy sources.

In the lower-left quadrant, on the other hand, countries receive more foreign investment in renewable energy than in fossil fuels, and generate relatively low CO_2 emissions from electricity and heat production. In these countries FDI already plays an important role in curbing emissions of the energy sector. In the upper-left quadrant, emissions from the energy sector are relatively high but greenfield FDI is flowing into renewables to a greater extent than fossil fuels, suggesting that energy sector may progressively become cleaner as a result of foreign investment.

Figure 6.15. FDI's contribution to limiting CO_2 emissions of energy sector



Note: BWA (1, 1285) and IRQ (1, 1140) are omitted from the chart to aid visibility. X > 0.5 FDI in fossil fuels is greater than FDI in renewables.
Source: International Energy Agency's CO_2 Emissions from Fuel Combustion database; Financial Times' fDi Markets database.

Notes

[1] The terms scale, composition and technique effects were first used by Grossman and Krueger (1991) in their investigation on the environmental impact of trade liberalisation within the context of NAFTA, and later applied to FDI (Gill, 2018; Pazienza, 2015; He, 2008, 2006).

[2] The sector breakdown follows the IEA classification, including 19 categories (see Annex C).

[3] These indicators do not reflect causal effects but associations between FDI and CO_2 emissions.

[4] A variant considers the combined energy efficiency of the overall foreign sector (i.e. total energy consumed by foreign firms per total output of foreign firms) relative to the domestic sector, and thereby gives more weight to the performance of larger firms. Findings are broadly consistent.

[5] In the remainder of the chapter BRICs are distinguished from other developing countries as they account for the bulk of CO2 emissions from the developing world (see Figure 1.1) but also the bulk of renewable energy investments.

[6] It is important to note that BRICs still invest heavily in fossil fuels, and are in fact the primary source of CO2 emissions. Information on FDI's share in total primary energy investments is necessary to gauge BRICs' overall positioning in terms of low-carbon energy.

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Annex A. Mapping of FDI qualities to SDGs and PFI

This mapping provides an assessment of the extent to which the 17 SDGs and their respective targets explicitly or implicitly refer to a potential role for FDI, foreign MNE activity and related policies to advance their achievement. It also describes whether and how the OECD Policy Framework for Investment (PFI) addresses (domestic and foreign) investment's contribution to each SDG, so as to ensure complementarity and alignment with the core policy framework underlying the planned FDI Qualities Policy Toolkit.

Some of the targets of the SDGs relate to objectives in terms of policy and institutional improvements, while others are directly about development outcomes in terms of enhanced prosperity and better conditions for people and the planet. The FDI Qualities Indicators focus exclusively on development outcomes, while policy-related targets will be considered when developing the FDI Qualities Policy Toolkit.

	SDG	*FDI qualities related to SDG targets*	Potential role of FDI, MNE activity and related policies to advance SDG targets	Covered in OECD Policy Framework for Investment (PFI)
	End poverty in all its forms everywhere	*Poverty reduction*	Goal 1 explicitly states that sound policy frameworks at the national, regional and international levels, based on pro-poor strategies, to support investment in poverty eradication actions need to be put in place. It further states that the mobilisation of resources (including private) to provide adequate means for developing countries to implement programmes to end poverty need to be ensured.	The PFI promotes transparency and appropriate roles for all stakeholders (including private investors) with a stake in poverty reduction. It argues that a business environment that addresses a broad range of policy areas that are covered under the PFI can increase foreign and domestic investment that accelerates broad-based economic growth and thereby contributes to poverty reduction.
	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	*Rural infrastructure* *Productivity in agriculture* *R&D in agricultural technologies and products*	The role of (foreign) investment is explicitly raised in the context of Goal 2. It targets to increase investment in rural infrastructure, agricultural research, technology development and plant and livestock gene banks to enhance productive agricultural capacity in developing countries. FDI in the agricultural sector more directly may also be relevant to make the sector in developing countries more productive.	There is separate PFI dedicated just on agriculture. It provides policy guidance to improve the business climate in agriculture and to attract foreign and domestic investment into the sector. The bottom line of the agriculture PFI is guidance to improve food security.
	Ensure healthy lives and promote well-being for all at all ages	*Health technologies/products* *Health infrastructure* *Health care coverage*	The Goal has a target to increase health investment (including the development of health infrastructure as well as new technologies related to the health sector (e.g. medicines and vaccines). FDI both in developed and developing countries is likely to contribute substantially to that end. Moreover, the provision of universal health care coverage is targeted and MNEs are likely to accelerate progress in this direction, e.g. if they voluntarily provide coverage for workers and their families.	The PFI does not make extensive reference on role of investment in the health sector. However, it discusses that a good investment climate needs to consider public health policies (e.g. to maintain public health and to improve the quality of human resources). The PFI further mentions that policies to improve the health of people would improve the quality of human resources or their productivity and reduce their exclusion from the labour market (e.g. access to universal healthcare).
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	*Vocational skills* *Managerial skills*	The role of private investment is not explicitly mentioned in Goal 4 and respective targets. Nonetheless, foreign MNEs (and private firms in general) have an important role to engage in technical and vocational training as well as in contributing to the supply of qualified teachers (in technical institutions). Foreign firms may be a key stakeholder to design the curriculum for vocational training and may engage in in-house training of employees.	The PFI dedicates a full chapter on human resources. It argues that the role of skilled and flexible human resources is at the centre for an attractive investment climate. Thus policies need to be coordinated to that end. Governments can encourage investors/companies to invest in human resources through on-the-job training, employer involvement in education, and training of external suppliers.

	Achieve gender equality and empower all women and girls	*Gender equality in workforce* *Gender equality in wages*	According to Goal 5 targets, discrimination and violence against all women and girls should end in any institution (of course including in foreign and other private companies). Women's full and effective participation and equal opportunities for leadership at all levels should be ensured (including in foreign and other private companies). While it is not explicitly mentioned, foreign companies may help accelerate progress towards gender equality and empowerment.	The PFI postulates that gender balance affects overall investment climate. It discusses government incentives to channel investment (including foreign) into activities with greater gender equity in the workforce (e.g. tax incentives). It also raises policy opportunities to combat gender discrimination in remuneration and career progression, to gender inequality in access to education and training. The chapter on infrastructure also argues that that there is a point to develop infrastructure projects to support greater gender equity. The finance chapter points to the need for equal access to finance for women and men.
	Ensure availability and sustainable management of water and sanitation for all	*Water pollution* *Waste water treatment* *Water infrastructure*	Industrial production contributes substantially to pollution and inefficiency of water use. As such, foreign manufacturers can support progress towards applying better practices and using improved technology in managing water resources. FDI can also be mobilised to invest in water management and infrastructure development.	The PFI discusses the important role of high quality 'water and sanitation' infrastructure for a good investment climate. Policies to enhance investment into water infrastructure, waste-water treatment and more efficient use of water resources are also covered (Ch. 9 on infrastructure). The PFI also mentions the need to involve domestic and foreign corporate investors in water management and infrastructure development.
	Ensure access to affordable, reliable, sustainable and modern energy for all	*Renewable energy* *Energy efficiency*	FDI in renewable energy infrastructure may be essential to substantially increase share of renewables in total energy mix. Furthermore, improved energy efficiency is required across the board, but foreign and domestic investors play an important role in moving towards higher efficiency levels, and investments into clean energy technologies. One target explicitly mentions that enhanced international cooperation to promote investment in energy infrastructure and clean energy technology is required – for that the promotion of FDI will be key.	The PFI has dedicated chapters on infrastructure with references to clean energy; and dedicated chapter on green investments with references to clean energy. Furthermore, the Chapter on investment promotion discusses policies to promote investment in renewable energy infrastructure or in intermediate inputs for clean energy (e.g. inputs for solar photovoltaic or wind-energy). A separate PFI just on investment in clean energy infrastructure is available, with more detailed policy guidance.
	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	*Productivity* *GVC upgrading* *SME inclusion* *R&D* *Job creation* *Job quality (wages and benefits)*	FDI can support sustained and equitable economic growth, and contribute to productivity, through diversification, technology upgrading and innovation as targeted under Goal 8 (e.g. MNEs may transfer technology to host economy firms, or engage in R&D). FDI can also support the creation of decent jobs, entrepreneurship and SME development (e.g. MNEs may establish supply linkages with local SMEs; or they are likely to pay fair wages according to international conventions)	The PFI argues that foreign and domestic investment can advance multiple policy objectives, making specific reference to aspects highlighted in targets under Goal 8. For that, a whole-of-government policy approach needs to be pursued to achieve policy coherence and progress on multiple goals.
		Worker safety *Labour and human rights*	FDI and MNE activity have a very important role to play to eradicate forced labour, end modern slavery, address child labour, protect labour rights and ensure safe and secure working environments. Increased pressure from consumers and the international community puts pressure on MNEs to operate responsibly.	The PFI dedicates a full chapter on policy guidance to foster Responsible Business Conduct, referring to risks outlined in Goal 8. Furthermore, the OECD Guidelines on Multinational Enterprises provide guidance on responsible business conduct for investors themselves.
		Financial sector development *Access to finance*	Foreign investment in domestic financial institution may also help to encourage and expand access to banking, insurance and financial services as postulated under Goal 8. On the one hand, FDI in the banking industry can support to that end; but on the other hand, the MNEs may also provide access to finance for host economy firms more directly.	The PFI dedicates a full chapter on the role of finance, financial sector development and access to finance, particularly for SMEs.

	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	*Infrastructure*	Infrastructure development is very much about investment into infrastructure and foreign firms' involvement is often critical, if funding from domestic investors and expertise of domestic developers is lacking.	The PFI has a full chapter dedicated to infrastructure (Ch. 9). Beyond a discussion on how to attract investment into infrastructure, high quality infrastructure is also seen as an essential component of a good investment and business climate more generally.
		Industrial development *GVC upgrading* *R&D* *Carbon footprint in industry*	The Goal also aims to substantially advance industrialisation, SME integration in global value chains, technological capabilities, innovation (including R&D), and environmental efficiency/carbon footprint in industrial sectors, particularly in developing countries. FDI is likely to play an important role in advancing progress towards achieving these targets as outlined under Goal 8.	The PFI provides policy guidance such as on investment facilitation and promotion (Ch. 2), tax incentives (Ch. 5), or investment and trade restrictions (Ch. 1 and Ch. 3). Adequate measures in these policy areas may increase foreign and domestic investment with the purpose of making progress towards the indicated targets. The PFI also has a chapter on the greening of the economy (Ch. 10), discussing the role of investment for lowering the carbon footprint in industry
	Reduce inequality within and among countries	*Territorial development* *Inclusion of all parts of society* *SME inclusion*	Under Goal 10, a reference is made that FDI should be encouraged to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes. Furthermore, the Goal aims at eliminating inequality and discrimination (e.g. regarding age, sex, disability, race, ethnicity, origin, religion or economic) within institutions (including foreign private firms). As such, MNE practices in addressing such inequality can play an important role in addressing the Goal 10 targets.	The PFI provides a broad statement on inequality and that a good investment climate can help reduce inequality within the economy. In terms of investment promotion and facilitation, tools to attract investment into less developed sub-national regions are discussed (Ch. 2). The chapter on human resources (Ch. 8) mentioned the need to provide equal opportunities for all in education and training, which will also be supportive for investment attraction. In terms of territorial inequalities within countries, the PFI makes only a marginal reference in the context of land (Ch. 1)
	Make cities and human settlements inclusive, safe, resilient and sustainable	*Sustainable transport infrastructure* *Sustainable housing*	Goal 11 requires significant investment in housing and transport infrastructure and disaster risk management systems. The role of private investment and particularly FDI is evident.	The PFI discusses that growing urbanisation in developing countries, and ageing infrastructures in developed ones, will rapidly strain existing infrastructure and will require not only significant amount of investments but also investment in more efficient and sustainable infrastructure modes. The infrastructure chapter makes various references to the need of boosting sustainable transport systems to address rising urbanisation.
	Ensure sustainable consumption and production patterns	*Waste and recycling* *Water, air and soil pollution* *Carbon footprint in industry* *Energy efficiency*	Targets under this Goal relate considerably to targets under Goal 6, 7 and 9. The role of FDI as stipulated in the discussion of those goals can be significant.	See discussion under Goal 6, 7 and 9.
	Take urgent action to combat climate change and its impacts	*Carbon footprint in industry* *Energy efficiency* *Sustainable transport infrastructure* *Sustainable housing*	Goal 13 complements other goals that relate to climate-related issues (particularly, targets under 7, 9, 11, and 12). The role of FDI as stipulated in the discussion of those goals can be significant.	See discussion under Goal 7, 9, 11 and 12.
	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	*R&D for sustainable ocean health* *Ocean biodiversity*	MNEs are important actors to support the Goal 14 agenda to conserve and sustainably use the oceans. Improved unilaterally-driven or publically-mandated practices of large MNEs in the fishing industry, for example, can at the core to achieve the targets. Furthermore, FDI in R&D for sustainable ocean health can also be important.	The PFI chapter on green investment (Ch. 12) addresses the role of investment in preserving or augmenting biodiversity, without specific reference to ocean biodiversity.

	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	*Biodiversity* *Forest protection*	MNEs are important actors to advance targets under Goal 15. They are using land extensively and their behaviour or changes in behaviour would directly affect achievements under this Goal. Additionally, specific targets under this goal mention that all actors including private firms are invited to mobilise resources to conserve biodiversity, manage forest sustainably, among others. As such FDI for action in Goal 15 is important.	The PFI chapter on green investment (Ch. 12) addresses the role of investment in preserving or augmenting biodiversity. No references to sustainable use of ecosystems, or forest management are made.
	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	*Corporate governance* *Corruption and bribery* *Responsible business conduct*	The role of FDI and MNE activity for Goal 16 is evident in targets related to the reduction of corruption and bribery and improved corporate governance in general. If MNEs are acting responsibly and set up accountable and transparent governance systems, they can contribute effectively to progress under Goal 16.	The PFI discusses governance issues in several chapters. As a tool for policy guidance, it provides guidance to policymakers as to how governance and institutional transparency and predictability can be improved. In the RBC chapter (Ch. 7), it studies to what extent foreign MNEs could directly contribute to improvements under Goal 16 and how governments can support them in doing so.
	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	*Tax revenues* *FDI quantity*	Goal 17 is about the implementation of the SDGs and securing adequate resources. The role of FDI as a source of finance and the role of MNEs as players in the eco-system of a sustainable global economy is discussed above. For the achievement of Goal 17 in particular, the role of corporate taxation to secure resources as well as the quantity of FDI flows into sustainable activities is highly relevant.	The PFI discuss the role of corporate taxation and tax incentives in particular. A prudent use of taxation tools is advised to ensure that required resources for education, health and other public services and infrastructures are secured. More broadly, the ultimate objective of the PFI is to enable increased FDI flows to support sustainable development and the implementation of the SDGs.

Source: OECD assessment.

Annex B. Methodology

This annex details the methodology for constructing the three types of FDI Qualities Indicators developed in this report, and points to some important limitations. In principle, all three types of indicators can be compiled for a given outcome, but coverage varies according to data availability and relevance to the outcome.

Indicator Type 1

Type 1 indicators measure how foreign firms perform relative to domestic firms for a given outcome. It takes positive value if foreign firms have higher outcomes than domestic firms and negative value if foreign firms have lower outcomes, on average. A variant of this indicator was developed in the context of initial work on FDI Qualities by Lejarraga and Ragoussis (2018). The indicator is constructed as the proportional difference between average outcomes of foreign firms and average outcome of domestic firms:

$$Type\ 1 = (\bar{Y}_F - \bar{Y}_D) / \bar{Y}_D$$

where $\bar{Y}_F$ is the average outcome of foreign firms and $\bar{Y}_D$ is the average outcome of domestic firms, and population averages are calculated using survey weights.

For outcomes that compare growth rates (i.e. labour productivity growth and employment growth) the indicators are constructed as level differences to avoid confusion with signs. The interpretation remains the same, although values are not strictly comparable.

$$Type\ 1_{Gr} = (\bar{Y}_F - \bar{Y}_D)$$

Confidence intervals are reported for Type 1 indicators, both to indicate the extent of firm heterogeneity (i.e. the extent to which the data at the firm level vary around the mean), and to indicate whether estimated differences are statistically significant at the 95% confidence level. In the figures, if the confidence interval crosses the zero line, the difference of average outcomes of foreign and domestic firms is not statistically significant. The confidence interval is calculated as follows:

$$CI = (\bar{Y}_F - \bar{Y}_D) \pm t_{0.25} * s_p \sqrt{\frac{1}{n_F} + \frac{1}{n_D}}$$

where CI represents the upper and lower bounds of the interval, s_p is the sample standard error, n_F is the number of observations of foreign firms and n_D is the number of observations of domestic firms used to construct the indicator. Following Donath (2005), sample-adjusted survey weights are used to calculate the standard errors.

We assume that the population variances are the same for foreign and domestic firms and use the more efficient pooled estimator for the variance (s_p^2):

$$s_p^2 = \frac{(n_F - 1)s_F^2 + (n_D - 1)s_D^2}{n_F + n_D - 2}$$

For indicators that compare population proportions (i.e. the proportion of foreign firms and the proportion of domestic firms), the variances are estimated as follows:

$$s_{\hat{p}}^2 = \hat{p}(1-\hat{p})$$

$$\hat{p} = \frac{Y_F + Y_D}{n_F + n_D}$$

where $\hat{p}$ is the overall proportion of firms (i.e. foreign + domestic) that report an outcome.

Indicator Type 2

Type 2 indicators show whether FDI is concentrated in sectors with higher or lower sustainable development outcomes, while controlling for the economic size of each sector.

This indicator type requires sector-level information on FDI, GDP, and the development outcome considered (e.g. labour productivity or wages), and compares two sector-weighted averages. The first weighted average (the "FDI-weighted" outcome) is a function of sector-level GDP and FDI. The second weighted average (the "baseline" outcome) only uses sector-level GDP shares as weights. The indicator is constructed as the proportional difference between the FDI-weighted and baseline outcomes:

$$Type\ 2 = \frac{\sum_s \omega_s Y_s - \sum_s \delta_s Y_s}{\sum_s \delta_s Y_s},$$

$$\omega_s = \frac{1}{\sum_s \frac{FDI_s}{FDI_{TOT}} \frac{GDP_s}{GDP_{TOT}}} \left(\frac{FDI_s}{FDI_{TOT}} \frac{GDP_s}{GDP_{TOT}} \right),$$

$$\delta_s = \left(\frac{GDP_s}{GDP_{TOT}} \right)$$

where Y_s is the average outcome of sector *s*; ω_s is the weight corresponding to sector *s* constructed using the product of the GDP share and the FDI share of sector *s*; δ_s is the GDP share of sector *s*. By controlling for sector-level GDP, the indicator provides information on the extent to which the relative distribution of FDI across sectors relates to economy-wide outcomes. The indicator takes positive value if the FDI-weighted outcome is higher than the baseline; and vice versa.

As with Type 1 indicators, Type 2 indicators based on growth rates are constructed as level differences to avoid confusion with signs:

$$Type\ 2_{Gr} = \sum_s \omega_s Y_s - \sum_s \delta_s Y_s$$

Confidence intervals cannot be calculated for Type 2 as it is based on sector-level rather than firm-level data.

Table B.1 provides an illustrative example of how the sector weights affect the Type 2 indicator based on two sectors. The indicator is above zero if a higher share of FDI goes to sector A that has a higher sustainability outcome (Examples 1 and 2), independent of the sector GDP shares. The indicator is below zero if a higher share of FDI goes to sector B with lower sustainability outcome (Example 5 and 6). The indicator is equal to zero if FDI shares are equal across the two sectors. The GDP shares affect the magnitude but not the sign of the indicator: the absolute value of the indicator is greater if larger economic sectors

receive more FDI (see Example 2 compared to Example 1), and lower (more negative) if larger economic sectors receive less FDI (see Example 6 compared to Example 5).

Table B.1. Illustrative example for Type 2 indicator, based on two sectors

Sector	$\frac{FDI_s}{FDI_{TOT}}$	$\delta_s = \left(\frac{GDP_s}{GDP_{TOT}}\right)$	$\frac{FDI_s}{FDI_{TOT}} * \frac{GDP_s}{GDP_{TOT}}$	ω_s	Sustainability outcome	Type 2
Example 1						
A	0.80	0.01	0.01	0.04	20.00	0.03
B	0.20	0.99	0.20	0.96	10.00	
Example 2						
A	0.80	0.50	0.40	0.80	20.00	0.20
B	0.20	0.50	0.10	0.20	10.00	
Example 3						
A	0.50	0.01	0.005	0.01	20	
B	0.50	0.99	0.495	0.99	10	0.00
Example 4						
A	0.50	0.50	0.25	0.50	20.00	0.00
B	0.50	0.50	0.25	0.50	10.00	
Example 5						
A	0.20	0.01	0.00	0.00	20.00	-0.01
B	0.80	0.99	0.79	1.00	10.00	
Example 6						
A	0.20	0.50	0.10	0.20	20.00	-0.20
B	0.80	0.50	0.40	0.80	10.00	

Decomposition of the growth rate of indicator Type 2

Some chapters in this report consider the evolution of a Type 2 indicator over time and decompose it into driving two factors: the outcome variable and FDI (for simplicity sector value added shares are kept constant during this exercise). This decomposition disentangles the extent to which the indicator changes (1) as a result of changes in outcomes (e.g. labour productivity) in sectors that have received the bulk of FDI, or (2) as a result of shifts in FDI to sectors with different outcomes. In the first case, the outcome variable is changing in sectors that receive significant FDI, potentially as a result of FDI. In the second case, FDI may or may not influence sector-level outcomes, but affects the structure of the economy by expanding activity in certain sectors relative to others.

Mathematically, this implies totally differentiating Type 2 indicator (Y) with respect to FDI (FDI) and the outcome under analysis (OUT).

$$Y = F(FDI, OUT)$$

$$dY = F_{FDI} dFDI + F_{OUT} dOUT$$

where F_i corresponds to the partial derivative of Y with respect to variable $i = \{FDI, OUT\}$. The equation is then divided by Y and each change is converted into a growth rate:

$$\frac{dY}{Y} = \left(\frac{F_{FDI} FDI}{Y}\right)\frac{dFDI}{FDI} + \left(\frac{F_{OUT} OUT}{Y}\right)\frac{dOUT}{OUT} = \beta \frac{dFDI}{FDI} + \gamma \frac{dOUT}{OUT}$$

where β measures the change in the Type 2 indicator explained by FDI, and γ denotes the variation in the Type 2 indicator explained by the outcome variable.

Indicator Type 3

Type 3 indicators measure whether sustainable development outcomes are higher or lower in industries with greater vertical linkages between foreign and domestic firms, where vertical linkages are defined as the extent of local sourcing by foreign firms. In other words, they measure the association between local input sourcing of foreign firms and outcomes in supplying industries; specifically whether development outcomes are better or worse in supplying industries that have more vertical linkages with foreign firms.

The construction of Type 3 mirrors that of Type 2. A weighted average (the "linkage-weighted" outcome) is a function of sector-level GDP shares and the share of local sourcing in total input purchases of foreign firms. The indicator is calculated as the proportional difference of the linkage-weighted measure and the baseline measure (which is the same as for Type 2 indicators):

$$Type\ 3 = \frac{\sum_s \omega_s Y_s - \sum_s \delta_s Y_s}{\sum_s \delta_s Y_s},$$

$$\omega_s = \frac{1}{\sum_s \frac{Link_s}{Link_{TOT}} \frac{GDP_s}{GDP_{TOT}}} \left(\frac{Link_s}{Link_{TOT}} \frac{GDP_s}{GDP_{TOT}} \right)$$

where Y_s is the average outcome of sector s; ω_s is now the linkage weight corresponding to sector s constructed using the product of the GDP share and the linkage share of sector s; δ_s is the GDP share of sector s.

Limitations

The FDI Qualities indicators come with some limitations. Most importantly, the indicators do not isolate causal effects, or the direction of causality. This means that the indicators are agnostic about whether FDI causes an outcome or vice versa, or whether correlations are driven by third factors. The indicators represent correlations rather than estimates of causal effects determined from carefully designed econometric models, and require contextualisation and additional information for interpretation. Future research may build on this work and use the indicators for empirical modelling of FDI impacts, taking into account relevant policy and non-policy control variables.

Beyond causality, interpretation of the indicators is ambiguous if taken in isolation. FDI in economic activities that are underperform from a sustainability point of view may actually help improve outcomes in the host country. For example, a Type 2 indicator on CO_2 emissions in production may reveal that FDI is concentrated in more polluting sectors. This outcome could have positive development implications if foreign firms bring cleaner technologies and practices and help reduce emissions in highly-polluting sectors, and negative implications if highly-polluting sectors expand due to FDI without any energy-saving technological improvements.

References

Donath, S. (2005), How to calculate standard errors for population estimates based on Australian National Health Survey data, https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1467-842X.2005.tb00252.x.

Annex C. Data

This annex describes the data used to construct the FDI Qualities Indicators developed in this report and related limitations. The main sources of data on development outcomes include: the World Bank Enterprise Surveys, OECD Statistics, ILO Statistics, Financial Times' fDi Markets database, International Energy Agency (Table C.1).

Type 1 indicators exploit information on firm-level outcomes and are exclusively based on World Bank Enterprise Surveys (WBES). Type 3 indicators use information on supply chain linkages of foreign firms, and are also based on WBES. The main source of sector-level FDI data used to construct Type 2 indicators is the Financial Times' fDi Markets database of announced greenfield FDI. Type 2 indicators also use information on sector-level value added or GDP, from UN National Accounts or OECD Input-Output Tables. Alternatively, for Type 2 indicators that are based on WBES outcomes, sales of foreign firms are used as a proxy for foreign firm activity, and value added information at the firm level is used to construct sectoral aggregates.

Table C.1. Data sources used by indicator

	Development outcomes	Country coverage	Sector coverage	Data source		
				FDI	Value added	Outcome
Productivity-innovation	Labour productivity and labour prod. growth	OECD	All	fDi Markets	UN National Accounts	OECD Stats
		non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Product and process innovation	non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	R&D expenditures	OECD	All	fDi Markets	UN National Accounts	OECD Stats
		non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Use of foreign technologies	non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
Skills	Skill intensity	OECD and non-OECD	All	fDi Markets	UN National Accounts	OECD PIAAC
	On-the-job training	non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Technical skill shortage/surplus	OECD (and limited non-OECD)	All	fDi Markets	UN National Accounts	OECD Skills for Jobs
Employment and job quality	Job creation per unit of FDI and employment expansion	OECD	All	fDi Markets	UN National Accounts	ILO, fDi Markets
		non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Wage levels	OECD	All	fDi Markets	UN National Accounts	ILO
		non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Job security (temporary employment)	non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Worker safety (injuries)	OECD (and limited non-OECD)	All	fDi Markets	UN Nat. Accounts	ILO
Gender equality	Gender employment and wage equality	OECD and non-OECD	All	fDi Markets	UN National Accounts	ILO
		non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Female top managers and owners	non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
Carbon footprint	CO2 emissions	OECD and non-OECD	All	fDi Markets	OECD Input-Output Tables	IEA
	Energy efficiency	OECD and non-OECD	All	fDi Markets	OECD Input-Output Tables	IEA
		non-OECD (and limited OECD)	Manufacturing	WBES	WBES	WBES
	Renewable energy	OECD and non-OECD	Energy sector	fDi Markets	-	fDi Markets

Depending on data availability, the analysis focuses on OECD countries (Table C.2) and five developing regions in which the OECD has ongoing regional initiatives on investment (Table C.3); namely, Eastern Europe and Central Asia (EURASIA), Latin America and the Caribbean (LAC), Middle East and Northern Africa (MENA), Southeast Asia (SEA), and Sub-Saharan Africa (SSA). EURASIA+ additionally includes the Russian Federation; and SEA+ additionally covers China and India.

Table C.2. Country coverage (OECD)

Country	ISO code	World Bank Enterprise Survey	
		Latest available year	Foreign firms observations
Australia	AUS		
Austria	AUT		
Belgium	BEL		
Canada	CAN		
Chile	CHL	2010	101
Czech Republic	CZE	2013	18
Denmark	DNK		
Estonia	EST	2013	21
Finland	FIN		
France	FRA		
Germany	DEU		
Greece	GRC	2018	32
Hungary	HUN	2013	12
Iceland	ISL		
Ireland	IRL		
Israel	ISR	2013	15
Italy	ITA		
Japan	JPN		
Korea	KOR		
Latvia	LVA	2013	18
Lithuania	LTU	2013	7
Luxembourg	LUX		
Mexico	MEX	2010	100
Netherlands	NLD		
New Zealand	NZL		
Norway	NOR		
Poland	POL	2013	23
Portugal	PRT		
Slovak Republic	SVK	2013	20
Slovenia	SVN	2013	13
Spain	ESP		
Sweden	SWE	2014	96
Switzerland	CHE		
Turkey	TUR	2013	52
United Kingdom	GBR		
United States	USA		

Table C.3. Country coverage (non-OECD)

Region	Country	ISO code	World Bank Enterprise Survey	
			Latest available year	Foreign firms obs.
Eastern Europe and Central Asia (EURASIA+)	Armenia	ARM	2013	10
	Azerbaijan	AZE	2009	25
	Belarus	BLR	2018	45
	Georgia	GEO	2013	8
	Kazakhstan	KAZ	2013	13
	Kyrgyzstan	KGZ	2013	16
	Moldova	MDA	2013	14
	Russian Federation	RUS	2012	49
	Ukraine	UKR	2013	42
	Uzbekistan	UZB	2013	35
Latin America (LAC)	Argentina	ARG	2017	29
	Brazil	BRA	2009	61
	Colombia	COL	2017	38
	Costa Rica	CRI	2010	42
	Ecuador	ECU	2017	12
	El Salvador	SLV	2016	49
	Guatemala	GTM	2017	18
	Panama	PAN	2010	9
	Peru	PER	2017	58
	Uruguay	URY	2017	20
Middle East and Northern Africa (MENA)	Algeria	DZA		
	Egypt	EGY	2016	75
	Jordan	JOR	2013	39
	Lebanon	LBN	2013	10
	Libya	LBY		
	Morocco	MAR	2013	22
	Palestinian Authority	PSE	2019	4
	Saudi Arabia	SAU		
	Tunisia	TUN	2013	58
	United Arab Emirates	ARE		
Southeast Asia Plus (SEA+)	Cambodia	KHM	2016	25
	China	CHN	2012	121
	India	IND	2014	57
	Indonesia	IDN	2015	96
	Lao PDR	LAO	2018	8
	Malaysia	MYS	2015	128
	Myanmar	MMR	2016	26
	Philippines	PHL	2015	256
	Thailand	THA	2016	60
	Viet Nam	VNM	2015	78
Sub-Saharan Africa (SSA)	Côte d'Ivoire	CIV	2016	26
	Democratic Republic of the Congo	COD	2013	42
	Ethiopia	ETH	2015	61
	Ghana	GHA	2013	61
	Kenya	KEN	2018	75
	Mozambique	MOZ	2018	50
	Nigeria	NGA	2014	148
	Senegal	SEN	2014	23
	South Africa	ZAF	2007	101
	Tanzania	TZA	2013	26

World Bank Enterprise Surveys

World Bank Enterprise Surveys (WBES) are used to develop all three types of indicators for several of the development outcomes considered (see Table C.1). The WBES firm-level database covers 131,000 formal (registered) companies with 5 or more employees from 139 (mostly developing) countries. The indicators presented in this report are constructed using the most recent surveys available for each country as of September 2019, and are restricted to surveys conducted over 2009-2019 (with the exception of South Africa, for which the latest available survey is from 2007). The surveys include manufacturing and services, but since coverage of services is inconsistent across countries and often limited to retail, only manufacturing firms were considered for the WBES-based indicators.

The WBES follow a stratified random sampling methodology. The strata are firm size, sector and geographic region within the country, but do not consider domestic and foreign ownership. However, as firm size, sector, and geographic region are jointly strong predictors of ownership, the surveys are expected to be representative of both foreign and domestic firms, provided that enough observations are available for the two sub-samples. A representativeness check was undertaken in initial work on FDI Qualities (Lejarraga and Ragoussis, 2018), and finds that the share of foreign multinationals in aggregate output calculated by the WBES is aligned with recent OECD estimates based on official sources.

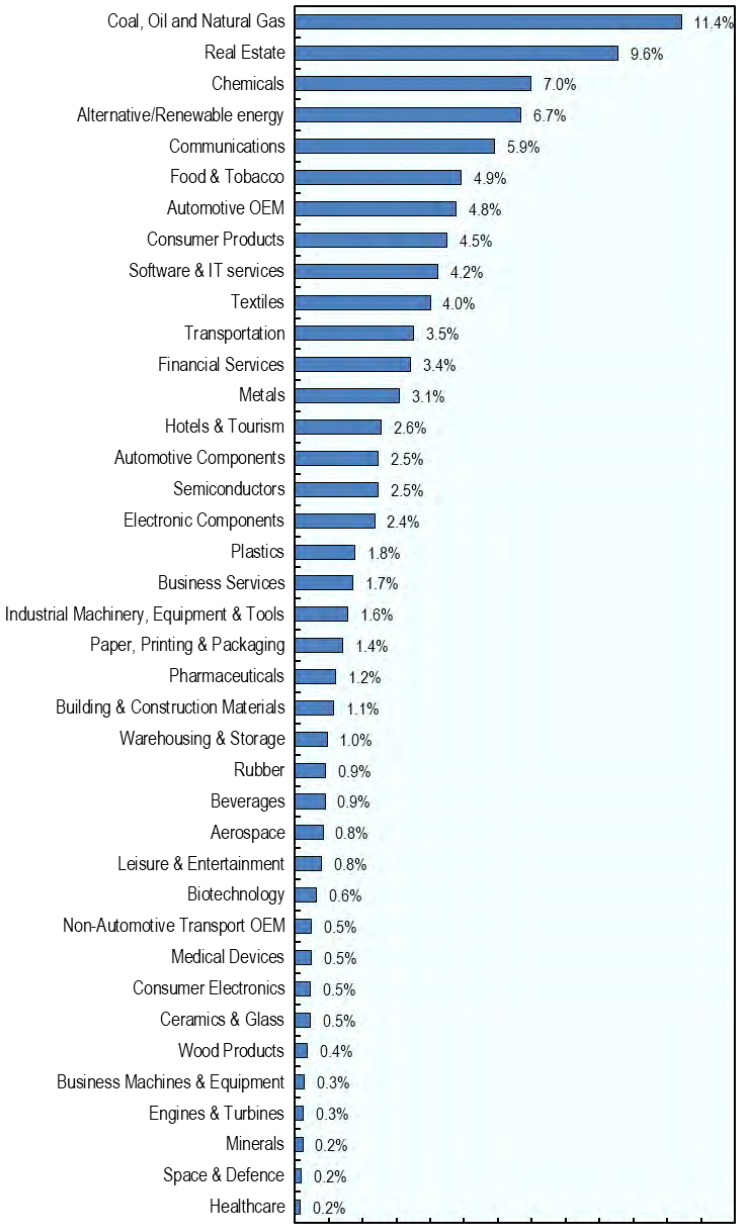
The indicators presented in this report are restricted to countries in which at least 20 domestic firms and 20 foreign firms respond to the relevant survey questions, and will vary across indicators. The surveys considered in this report for each country are reported in Tables C.2 and C.3. The reported number of observations is the number of foreign firm observations in the country survey (domestic firms are always more numerous than foreign firms). Missing responses to some survey questions mean that not all indicators are presented even if the total number of foreign firms is 20 or above. Sector disaggregation, sample size and survey year vary considerably across countries, which constitutes an important limitation of the data in terms of comparability.

Financial Times' fDi Markets database: Greenfield FDI

As information on sector-level FDI is scarce, Type 2 indicators are constructed using announced greenfield investments from the Financial Times' fDi Markets database as a proxy for FDI. Specifically, the measure of FDI is based on industry-level aggregates of announced greenfield investment projects covering 39 sectors, and is available for all countries considered over 2003-2017. For each year between 2011 and 2017, FDI stock is calculated as the sum of annual investment flows and previous year capital stock (i.e. zero depreciation is assumed), where initial stock is approximated as the sum of investment flows over 2003 to 2010. Figure C.1 illustrates the sector-level distribution of world FDI stocks in 2017, based on the methodology used in this study.

OECD FDI statistics were considered as an alternative, but do not lend themselves to constructing FDI Qualities Indicators because a varying number of sectors are classified as confidential across countries, and their coverage is limited to OECD countries. Following discussions with the FDI Qualities Policy Network, greenfield FDI was chosen over cross-border M&A used in previous iterations of this project as a proxy for FDI, because it captures new investments or expansions, as opposed to changes in ownership or mergers of existing activities. However, changes in ownership can also affect operations and related development outcomes in host countries, and could be used in future work as a robustness check. Generally-speaking, greenfield investment is a better proxy for FDI in developing countries, while cross-border M&A data serve as a good proxy for FDI in OECD countries.

Figure C.1. Share of total greenfield FDI stocks across sectors: 2017



Source: Based on Financial Times' fDi Markets database.

UN National Accounts Main Aggregates database

Sector-level value added data from the UN National Accounts database is used to calculate the baseline weighted averages of the development outcomes of Type 2 indicators for all but the carbon footprint cluster. The UN database is based on official data reported to the United Nations Statistic Divisions through the annual National Accounts Questionnaire, integrated with data estimates for years and countries with incomplete or inconsistent information. Value added is available for all countries considered in this report, over 1990-2016. Data are available for the 16 level 1 ISIC Rev.3 sectors. The advantage of this data

is that it covers the whole economy. The main disadvantage is that it does not allow for disaggregation within manufacturing, which comprises very diverse industries with potentially diverse sustainability characteristics.

OECD Input-Output tables

The OECD Input-Output Tables are used to derive estimates of sector size that are used to weight the development outcomes in Type 2 indicators related to CO_2 emissions. The data are available for 36 OECD countries and 20 emerging economies, over 2000-2011. The advantage of using these tables is that they provide a more granular sector disaggregation across manufacturing industries that vary considerably in terms of CO_2 emissions, than the UN National Accounts. The main disadvantage of these tables is that they have not been updated since 2011, and subsequent value added shares need to be estimated. Average growth rates over 2006-2011 are used to project value added shares up to 2016. These projections are used to normalise CO_2 emissions and energy consumption by industry-level value added. The assumption underlying these projections is that the structure of the economy has not shifted drastically over the six periods considered. This is a strong assumption, but does not affect the relationship between FDI and CO_2 emissions, only the baseline against which this relationship is compared.

ILO databases on labour market statistics

The gender equality and job quality chapters use information on number of employees, nominal monthly earnings, and workplace injuries available from the ILO. Data are available for a 102 countries, including all those considered in this study, over 2005-2017, although with varying degrees of missing information across countries. Data are disaggregated by broad sectors of economic activity comprising 21 level 1 ISIC Rev. 4 sectors.

Employees are defined as workers who hold paid jobs. The share of female employees over total employees is used as a measure of gender employment equality. Mean nominal monthly earnings of employees are used to assess wages (including by gender). The earnings of employees relate to the gross remuneration in cash and in kind paid to employees and exclude employers' contributions paid to social security and pension schemes. Hourly wage would be a better measure of the gender wage gap, as it would avoid the problem of differences in full-time and part-time employee, but is not available by sex and economic activity for most developing countries.

OECD Survey of Adult Skills (PIAAC)

The Survey of Adult Skills is developed and conducted by the Programme for the International Assessment of Adult Competencies (PIAAC). The survey measures adult proficiency in key information-processing skills (literacy, numeracy and problem solving in technology-rich environments) and gathers information and data on how adults use their skills at home, at work and in the wider community.

As of September 2019, the survey was conducted in 33 countries (of which 31 OECD countries) over two rounds, with a third round ongoing. Twenty-four countries participated in Round 1, with data collection taking place over 2011-2012, and nine countries took part in Round 2, with data collection taking place over 2014-2015. Data from Round 3, collected over 2016-2019, will be released in November 2019, with the addition of Ecuador, Hungary, Kazakhstan, Mexico, and Peru.

Information on the respondent's sector of activity (ISIC Rev. 4) is available for about 26% of total respondents across all countries. Information on sector is combined with information on skill intensity of the respondent's occupation (skilled, semi-skilled white collar, semi-skilled blue collar and unskilled) to construct a sector-level variable of skill intensity (number of skilled workers over total workers in each sector). Another variable makes use of information on sector and on whether the respondent received on-the job training during the last 12 months. The variable is calculated as the share of trained workers over total workers per sector. Survey weights are applied to obtain sector aggregates. Details on the survey and methodology are available at http://www.oecd.org/skills/piaac/.

OECD Skills for Jobs Database

Skill needs indicators are part of the OECD Skills for Jobs Database and provide an overview of the shortages and surpluses of skills, abilities, knowledge and workstyles across 31 OECD countries and 6 non-OECD countries, 18 sectors (ISIC Rev. 2) and 7 years (2010-2016). Abilities, knowledge types, skills and work styles follow the definition provided by O*NET (https://www.onetonline.org/skills/). Information on technical skills is used to construct an indicator relating imbalances of technical skills to FDI for OECD countries. Technical skills include operation analysis, technology design, equipment selection, installation, programming, operation monitoring, operation and control, equipment maintenance, troubleshooting, repair, quality control analysis. More details on the methodology and an overview of key results from the OECD Skills for Jobs Database are provided in OECD (2017).

International Energy Agency's World CO_2 emissions from Fuel Combustion

The World CO_2 Emissions from Fuel Combustion database of the International Energy Agency contains annual CO_2 emissions from fuel combustion across 23 sectors for over 140 countries, including all countries considered in this report, spanning 1971-2016. The database further breaks down CO_2 emissions from electricity and heat across consuming sectors, allowing information both on direct emissions and emissions from electricity and heat consumption. Combined with value added estimates from OECD input-output tables and greenfield FDI statistics from Financial Times' fDi Markets database, this data is used to construct an indicator relating FDI to CO_2 emissions per unit of output.

It is important to note that CO_2 emissions from the combustion of fuel for all transport activity, regardless of the sector, is reallocated to the transport sector, meaning that emissions of manufacturing or services industries do not capture the transport component of those industries, which can be significant.

International Energy Agency's World Energy Statistics

The World Energy Statistics database of the International Energy Agency contains information on electricity and heat consumption across 23 sectors for over 140 countries, including all countries considered in this report, spanning 1971-2016. Combined with value added estimates from OECD input-output tables and greenfield FDI statistics from Financial Times' fDi Markets database, this information is used to construct an indicator relating FDI to electricity and heat consumption per unit of output.

It is important to note that electricity and heat consumption in transport covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing, energy consumption of other economic sectors will underestimate their actual energy use, particularly if they rely heavily on transport activities.

www.oecd.org/investment