The Economic Impact of Outward Direct Investment

Final report
4 November 2024

Department for Business & Trade

The Department for Business and Trade is an economic growth department. We ensure fair, competitive markets at home, secure access to new markets abroad and support businesses to invest, export and grow. Our priorities are the Industrial Strategy, Make Work Pay, the Trade Strategy and the Plan for Small Business.

Table of Contents

List of tables and figures

Glossary of technical terms

Balance of Payments Manual 6 (BPM6)	International Monetary Fund (IMF) guidance manual for compilation of balance of payments statistics
Base erosion	Tax planning strategies used by multinational enterprises that exploit gaps and mismatches in tax rules to avoid paying tax, leading to diminished tax base for corporate income taxes
Brownfield	Investment in an existing production facility
Co-variable	A variable that may predict the outcome under study
Earnings	Earnings (expressed in absolute terms) on ODI (Outward Direct Investment) based on the profits and returns generated by the investment.
Equity capital	A parent firm's purchase of shares in a subsidiary
Foreign Direct Investment	Cross-border investment in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise resident in another economy
Friendshoring	Incentives for diverging trade and investments away from geopolitical risks to strategic allies
Global value chains	Production of goods and services through a network spread across different countries, where each country adds to a product before it's finished and sold.
Greenfield	Investment in a novel production facility

Hollowing out	De-industrialisation and offshoring of domestic employment abroad
Home country	The country in which the parent firm is based
Host country	The country in which the subsidiary or affiliate is based
Intracompany loans	A loan administered within a conglomerate. Often use as a means of FDI, intracompany loans can also be used to avoid paying tax
Inward Direct Investment	Foreign direct investment in the reporting economy, excluding portfolio investment
Outward Direct Investment	Foreign direct investment from the reporting economy, excluding portfolio investment
Partner country	Where the direct investment is invested
Profit-shifting	Shifting of corporate from one tax jurisdiction to another by a multinational enterprise, often using intangibles and transfer pricing
Portfolio investment	Cross-border transactions and positions involving equity or debt securities, other than those included in direct investment or reserve assets
Rate of return	Earnings expressed as a percentage of the investment
Reinvested earnings	A subsidiary choosing to reinvest earnings in itself rather than repatriating to the parent
Transfer pricing	The amount charged between associated enterprises for the purchase of goods, services or intangible property. Often used as a means of corporate tax avoidance

1.1 Executive summary

This report by LSE's Trade Policy Hub, commissioned by the Department for Business and Trade (DBT), investigates the economic associations of Outward Direct Investment (ODI) for the UK. This report is uniquely specific to the UK economy for the period from 2013 to 2019, exploring associations between ODI and key economic outcomes: earnings, productivity, employment, and exports. The report utilises datasets from ONS' Secure Research Service, employing primarily regression models to analyse the relationship between ODI and various economic outcomes. Given that only 1% of all UK firms have ODI positions abroad (which account for 24% of all UK employment and 32% of gross value added (GVA)), there is evidence of a disproportionate contribution of ODI from just a few very large companies.

Earnings

- UK ODI remains profitable. An average UK firm with ODI makes a 7.3% return on its ODI. This firm-level average rate of returns in the UK for this period varies by sector (2.8% to 13.1%), partner country (5% to 11.9%) and source region (4% to 10.2%). In absolute terms, average earnings are highest for financial services, ODI to Europe.

- The source region could be just as relevant as the target market and sector, possibly by acting as a proxy for firm size and other business characteristics. Deeper analysis also confirms that ODI to Europe and in certain services (for example energy, communications) generate lower returns. Given the UK's overexposure to these areas, there might be gains from diversification of UK ODI.

Productivity

- The assumption that UK ODI is associated with a productivity increase can be restated with confidence and we find no evidence of the 'hollowing out' effect due to UK ODI. For an average UK firm, a 10% increase in time-lagged investment position was associated with a 4.7% increase in its GVA, taking into account various firm-level characteristics.
- However, ODI in the services sector is not associated with an increase in productivity. The analysis could not verify whether ODI to R&D-intensive sectors or target markets heightened the impact on UK productivity either.

Employment

- Increasing ODI does not correlate with higher unemployment in the UK. For an average UK firm, a 10% increase in ODI was associated with a mere 0.2% decrease in UK employment, controlling for other variables.

- The employment effect isolated for various UK regions or sectors (controlling for other variables) does not vary significantly.

Exports

- ODI is associated with an increase in trade. For an average UK firm, a 10% increase in ODI was associated with a 0.39% increase in their exports, in line with research from other countries. It is also indicative of a complementary relationship between our ODI and exports.
- Export creation from the ODI effect seems to be marginally stronger in services, which could be due to revenues generated by franchising, intangibles, or management fees.

Conclusions

- In the case of the UK, there is no cause for concern about hollowing out or offshoring, which is currently debated in other G7 and Organisation for Economic Co-operation and Development (OECD) economies. UK ODI seems to have evolved into a more complementary and synergetic relationship with partner countries than in the past.
- The UK economy is dependent on ODI to seek economies of scale. However, only a few economies are large enough to absorb the sizeable ODI from the UK and offer a reasonable return.

- Results have also shown that global recessions and other exogenous effects could affect these conclusions on ODI. Similarly, the recent subsidy race among major economies and envisaged restrictive regulatory action such as investment screening could alter the effects of UK ODI in the future.

1.2 Introduction

1.2.1 Project background

DBT commissioned LSE's Trade Policy Hub to undertake research on the economic impact of ODI, which was completed in 2 phases between

September 2022 and March 2024. Through this research, DBT is seeking to enhance its understanding of the impacts of UK ODI on the UK economy. By gaining a deeper understanding of the associations and the factors that affect these, DBT can enhance ODI performance and tailor its promotion activities. The research also aids in identifying the best types of ODI to support in order to boost exports, in line with DBT's Export Strategy published in November 2021.

The research also adds to the ODI evidence base, such as tackling market access barriers in specific sectors, analysing global regions and types of economies and understanding the interplay between ODI and UK exports.

The UK is amongst the top foreign investing countries in the world, with ODI stocks exceeding £1.7 trillion in 2020 (ONS, 2023). Given this significant volume of investment, DBT aims to gain a deeper understanding of the relationship between ODI and the UK economy.

In the current global context, policymaking in macroeconomics and trade policy operates from assumptions that are in many ways antithetical to past knowledge about the benefits of ODI for the investing economy.

Academic and applied research (not least from East Asia or emerging and developing economies) have provided new literature and empirical evidence on the impact of ODI – which we cannot assume to apply generally. Much of the available research on UK ODI dates from a period before the intensification of regional and global value chains, China's entry into the (World Trade Organization) WTO, or the global financial crisis.

Hence, DBT is interested in associations between ODI and key economic outcomes of public interest (including earnings, productivity, employment, and exports), specifically for the UK in recent years. Furthermore, DBT's objective is to understand how these economic associations vary by destination country, industrial sector, the purpose of investment, as well as the UK nation or region of the parent company.

With a comprehensive understanding of associative relationships, this report could help shape its promotion activities to support and facilitate UK ODI that maximises economic gains to the domestic economy. Investment support may be leveraged to further economic growth objectives such as reducing regional disparities, Net Zero and increased UK R&D.

1.2.2 The purpose and structure of this report

This report aims to present findings that fill many evidence gaps and verify several working hypotheses concerning ODI and its impact on the UK economy.

This report is structured in the following manner:

1. First, the **Literature Review** looks at what we can infer from the existing research on UK ODI and discuss to what extent their findings may still apply. As the UK-specific research is dated, we then look to more recent international literature for additional research hypotheses.

2. We then discuss these past or external findings in the literature in the section on **Research Context** to prioritise research questions most relevant to the current debate in trade and investment policy of the UK today and explain the **Methodology** deployed for this purpose.

3. The **Results** section accounts for the findings from the descriptive statistics and each of the regressions undertaken.

4. The section on **Key takeaways** concludes the study.

In the annex, we provide the detailed methodology used for the study. The first part of the quantitative analysis was aimed at producing a range of descriptive statistics. Specifically, we calculated group-level averages for 3 variables: i) ODI earnings of UK firms, ii) ODI international investment positions of UK firms and iii) ODI rates of returns on earnings of UK firms.

The second part of the analysis assesses the effects of ODI on the productivity, employment and exports of UK firms. The analysis follows the academic literature in drawing upon econometric modelling to control for certain biases. In the annex, equations 1, 2 and 3 model the relationship between time-lagged ODI positions and productivity, employment and exports respectively.

1.3 Literature Review

1.3.1 Motivations and relevance of ODI

The existing ODI literature is a specific subtopic of Foreign Direct Investment (FDI), which refers to "cross-border investment where an investor resident in one economy establishes a lasting interest in and a

significant degree of influence over an enterprise resident in another economy" (OECD, 2022). FDI (and therefore ODI) is also distinct from portfolio investments. Possession of more than 10% of voting power in the overseas enterprise is commonly regarded as evidence of such an ODI or FDI relationship and distinguishes greenfield and brownfield investment, including Mergers and Acquisitions (M&A), from portfolio investment.

The last thirty years have been characterised by the global proliferation of FDI, thanks to the globalisation of capital, opportunities in investment access and rapid growth rates in developing economies. The UK economy has typified this trend, with a long-term gradual expansion in its FDI positions, not least thanks to the role played by capital markets in the UK.

Figure 1 shows this upward trend in the UK FDI position between the years 2012 and 2021. Looking further ahead, we might assume that FDI participation will continue to be imperative to the British economy as businesses seek complementary features to the domestic markets in overseas economies.

Figure 1: UK FDI position (GBP billion) in the last decade
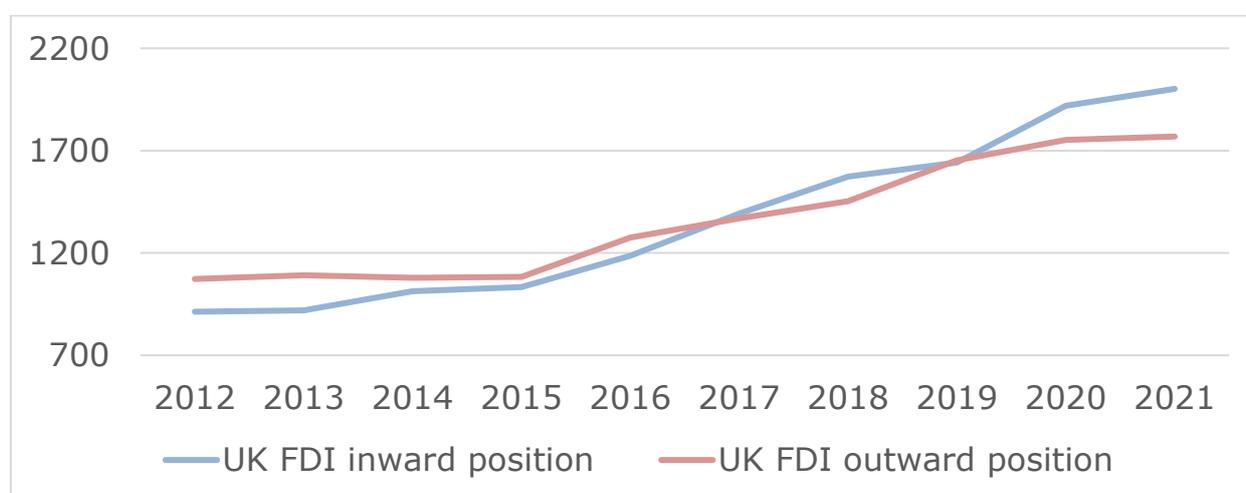
Source: (ONS, 2023)

The prevalence of FDI has been accompanied by a vast breadth of literature that endeavours to understand its determinants and consequences whilst also grappling with the changing nature of investment. Academics and policymakers increasingly distinguish between different **motivations** (horizontal, vertical, conglomerate platform) and **financing structures** (equity capital, reinvested earnings, and intracompany loans) as they attempt to leverage the benefits of FDI and mitigate against potential drawbacks.

Table 1: ODI motivations

FDI Motivation	Definition
Horizontal	Refers to overseas investment that creates a productive subsidiary capable of supplying local markets.
Vertical	Refers to overseas investment that leverages relative factor endowments by dividing production into several phases. Overseas subsidiaries represent a single link in a global value chain.
Conglomerate	Refers to overseas investment in a sector or industry that is unrelated to the parent's core business. Conglomerate FDI often occurs as a joint venture.
Platform	Refers to overseas investment that creates a productive subsidiary capable of supplying a third-country market.

Source: Own compilation

Factors like motivation or FDI structure are potentially relevant to controversial themes in the public discourse (topics like offshoring or corporate remittances). One could also assume that the motivation for UK ODI evolves (among the above 4 categories) over time as technologies or other economies develop or supply chain structures change.

However, there are no firm-level datasets that combine such ODI data with variables such as employment or overall returns. We can, therefore, only hypothesise about ODI motivation based on other factors in our analysis by interpreting circumstantial or intermediate factors.

In conclusion, we will first examine past research specific to UK ODI to discuss whether the conclusions drawn in these studies might still apply. We will then look to more recent evidence from other regions and stages of development to widen the discussion on ODI's impact on the investing economy.

1.3.2 Research specific to the UK economy

Significant and theoretically interesting associations between a country's ODI and other economic variables can often be discerned, but they are often contingent on a host of intermediate factors that ultimately reflect the home

country's unique macroeconomic profile and relative position in the global economy.

The UK also has a unique sectoral profile thanks to its prominence in the financial sector. While the transactions of large financial institutions are primarily portfolio investments, one might also assume that the UK's access to investment banking, M&As and unparalleled access to market capital create significant ODI, where UK businesses expand internationally to create a lasting presence in another country. Thus, to better understand the effects of ODI on the UK economy, it is appropriate to first review the small number of past studies that have explored the UK context specifically.

1.3.2.1. A snapshot of recent UK official statistics

First, we look to the official statistics. The ONS has issued a series of releases on ODI and the UK economy. *Foreign direct investment involving UK companies (directional): outward* provides annual, descriptive statistics on the investment of UK companies abroad, in accordance with the Balance of Payments Manual 6 (BPM6) (ONS, 2023). Statistics distinguish between investment flows, positions, earnings and to varying degrees, between industrial activity and target markets as well. As a result, they provide a comprehensive overview of the UK's ODI footprint.

Figure 2 shows that UK ODI is increasingly dominated by investment in Europe and the Americas (more detailed analysis will also show particular emphasis on North America), i.e., mature markets in the UK's geographic or economic proximity. This increase is business-driven (rather than policy-induced by new market access) and began in 2016. By 2021, the EU and the US accounted for two-thirds of UK ODI positions or 40% and 26% respectively.

Figure 2: UK FDI positions abroad by target market (GBP million)
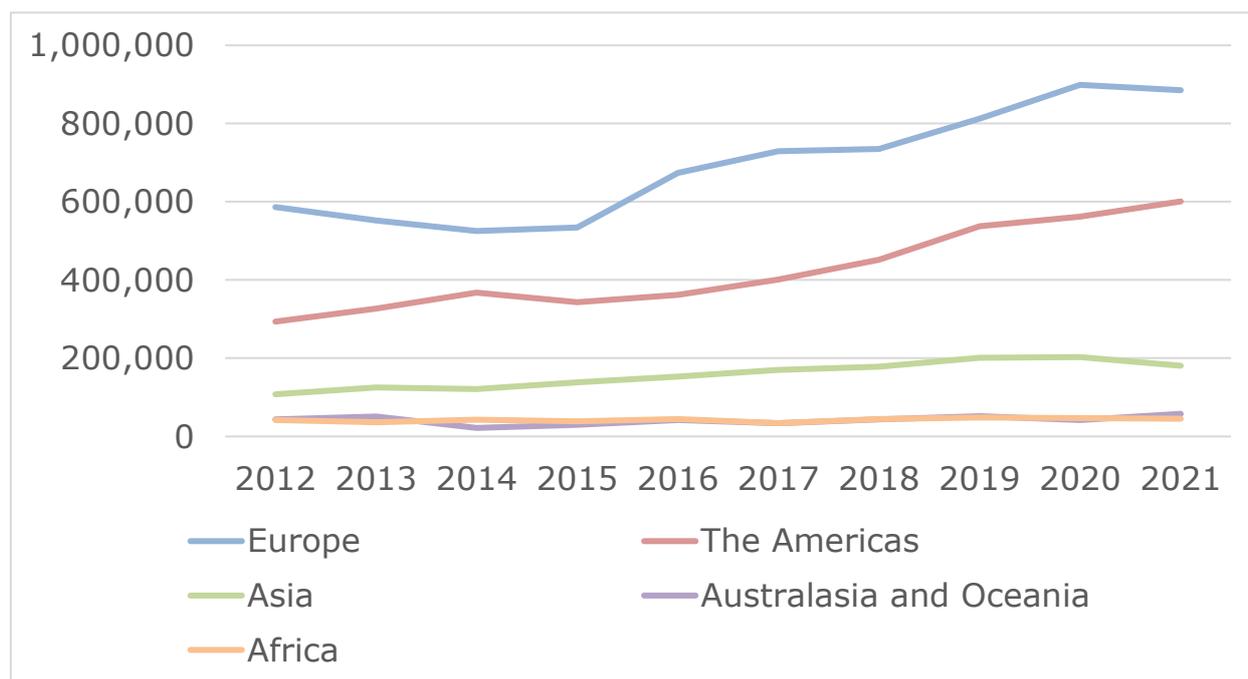
Source: (ONS, 2023)

Similar to the global figures reported by UNCTAD, **UK ODI appears to be a profitable endeavour.** As Figure 3 shows, implied rates of return on UK FDI assets range from 3.6%-7.7% between 2011 and 2018 (the last year data is available). The U-shaped development, where the overall rates of return of UK ODI declined until 2016 and recovered thereafter, is interesting and coincides with the increase of ODI going towards Europe and the Americas.

However, the increase in UK returns is likely not attributable to increased FDI positions in the EU and the US. Observing earlier publications, significant evidence exists that the rates of return on UK FDI assets vary by target market. In 2018, FDI assets in Asia and Africa made a positive contribution to the change in the overall UK rate of return (ONS, 2020a). By contrast, FDI assets in Europe and North America had a negative impact on the change in the overall UK rate of return.

At first review, the relative importance of specific partner countries does not seem to explain the impact on UK ODI returns since the returns improve while ODI is directed towards target markets. The recovery of ODI returns coincides with the recovery of corporate profits post global financial crisis and shifts in the valuation of the sterling.

Moreover, both ONS publications are also indicative of variation in industry-level results. Figure 4 shows the annual average implied rate of return on UK FDI assets by industry between 2011 and 2018. Of the industries studied, "manufacturing" and "mining and quarrying" appear the most profitable, with annual average implied rates of return of 24.2% and 12.4%, respectively. Information and communication and other industries appear least profitable, with annual average implied rates of return of 4.4% and 3.0%, respectively. It is, therefore, of particular interest to examine **whether partner country, sector, or global macro conditions (i.e. year)** have the biggest impact on UK ODI returns.

Figure 3: Implied rate of return on UK FDI assets (%)
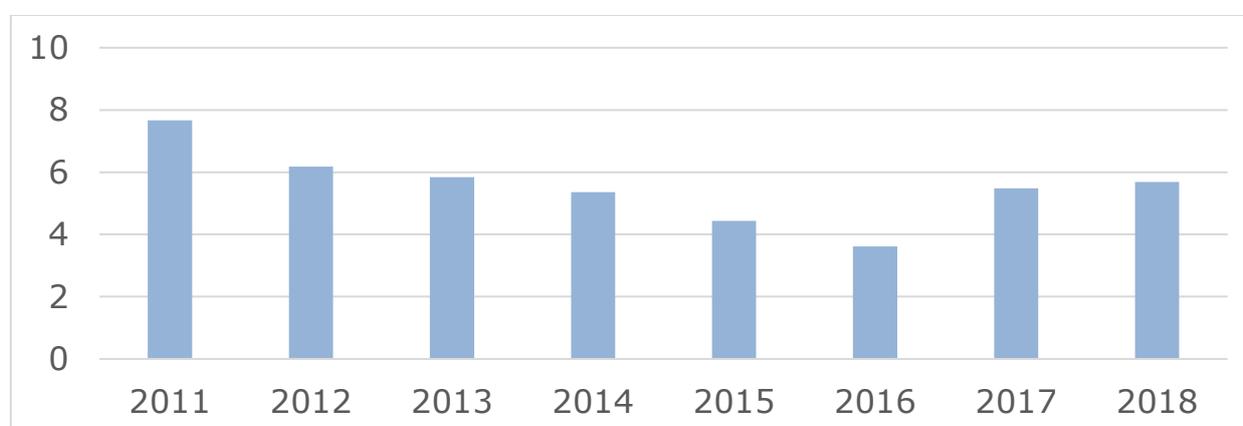
Note: Published FDI credits as a percentage of UK FDI assets
Source: (ONS, 2020b)

Figure 4: Annual average implied rate of return on UK FDI assets by industry, 2011-2018 (%)
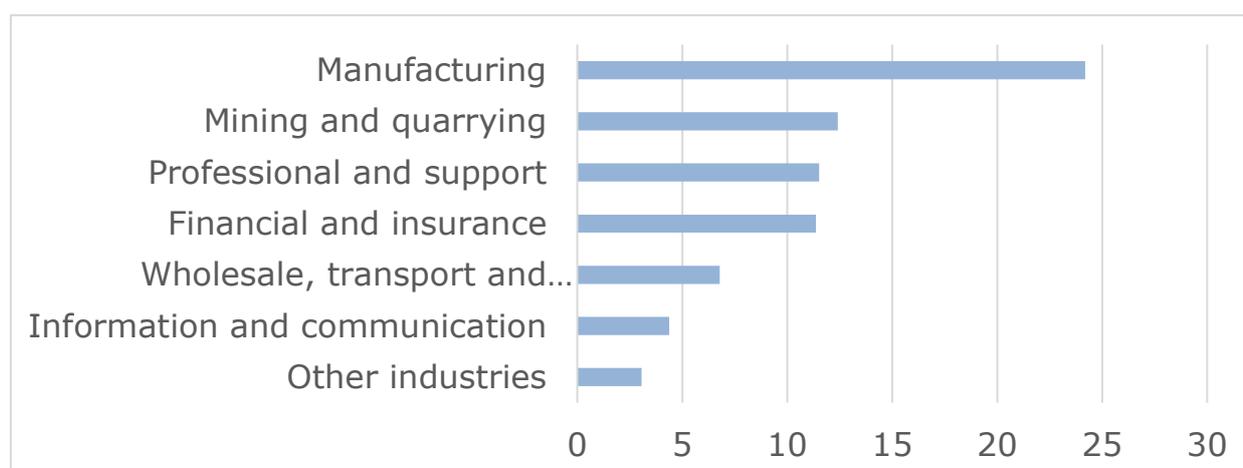
Note: Published FDI credits as a percentage of UK FDI assets
Source: (ONS, 2020b)

Finally, ONS has also released *UK foreign direct investment, trends and analysis: August 2020,* which considers the contributions of different FDI businesses to the UK economy in 2018 (ONS, 2020c). Amongst other things, the publication considers descriptive statistics on employment, productivity and exports. Findings are generally in line with existing literature and theory; firms that invest in overseas activities (through exports or ODI) contend with the costs of internationalising and are, therefore, **on average, larger and more productive.**

Observing Table 2, firms with ODI links (i.e. firms with either ODI or non-portfolio direct investments in both directions) accounted for just over 1% of the UK total in 2018. Yet, the same firms contributed to 24.5% of UK employment and approximately 32.3% of UK GVA. Firms with ODI links were also more likely to engage in international trade compared with firms with no FDI links.

Of the 27,300 UK firms with ODI links, just 25 firms accounted for around 10% of all ODI firm turnover. This is further evidence of the disproportional contribution of a handful of large-sized companies. Moreover, Table 3 shows that **a majority of businesses involved in exports (56%) or imports (65%) are also engaged in ODI** or foreign-invested firms.

Table 2: The contribution of different FDI businesses to the UK economy, 2018

Firm	UK businesses in thousands (% of total)	UK employment in millions (% of total)	UK aGVA in GBP billions (% of total)
Any FDI link	**52.8 (2.1%)**	**8.8 (30.3%)**	**654.4 (40.8%)**
Only inward FDI link	25.6 (1%)	1.7 (5.9%)	135 (8.4%)
Only ODI link	18.1 (0.7%)	4.3 (14.9%)	287.8 (17.9%)
Inward FDI and ODI link	9.2 (0.4%)	2.8 (9.6%)	231.6 (14.4%)
No FDI link	**2,446.9 (97.9%)**	**20.1 (69.7%)**	**949.9 (59.2%)**

Note: aGVA refers to approximate GVA

Source: (ONS, 2020c)

Table 3: The trade in goods status of different businesses in the UK, 2018 (latest available year)

Firm	Exporter	Importer	Importer and exporter
Any FDI link	23%	27%	16%
Only inward FDI link	21%	26%	15%
Only ODI link	22%	25%	16%
Inward FDI and ODI link	34%	40%	29%
No FDI link	4%	7%	1%

Source: (ONS, 2020c)

The ONS publication also considers the economic contribution of ODI firms by the target market. Figure 5 shows ODI firms' UK employment by target market. In keeping with established investment patterns, **firms investing in Europe and North America account for a significant share of UK employment**.

Figure 6 shows ODI firms' UK productivity by target market. Interestingly, firms investing in Asia and the Americas were, on average, more productive in 2018. This could also be an effect of longer distances that entail higher costs that can only be borne by large Multinational Enterprises (MNEs).

Figure 5: ODI firms' UK employment in millions by target market, 2018
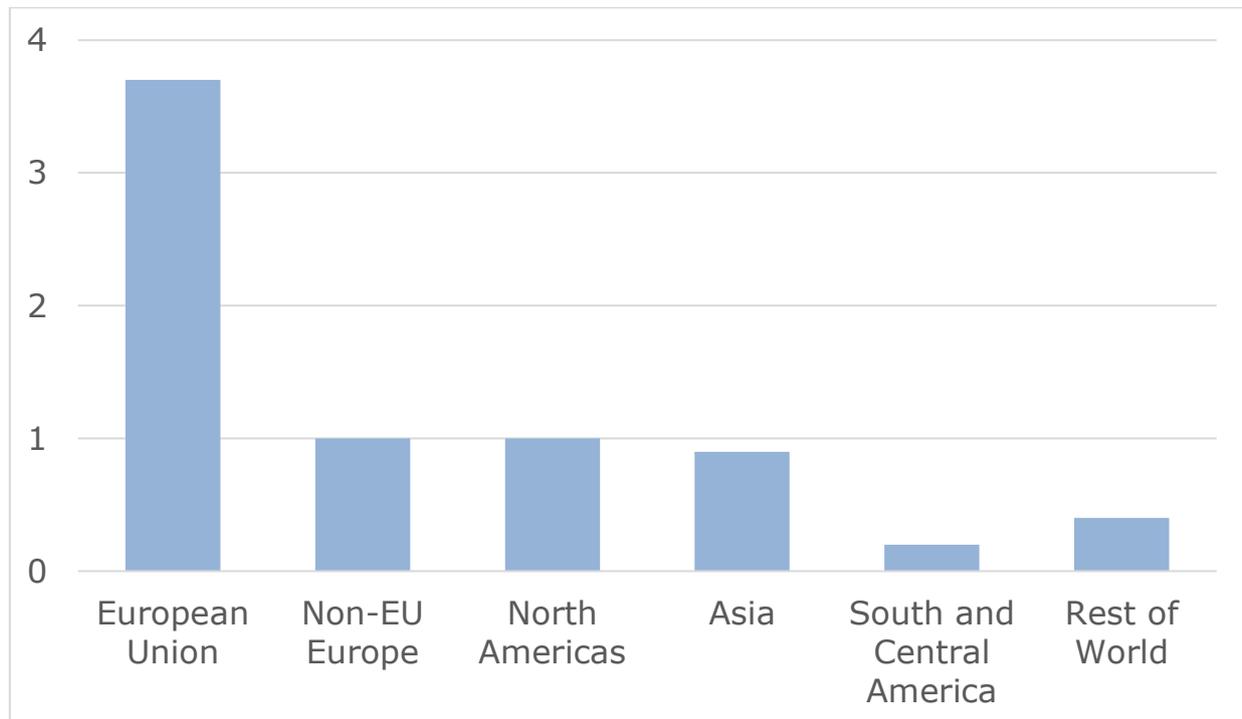
Source: (ONS, 2020c)

Figure 6: ODI firms' UK productivity by target market, 2018
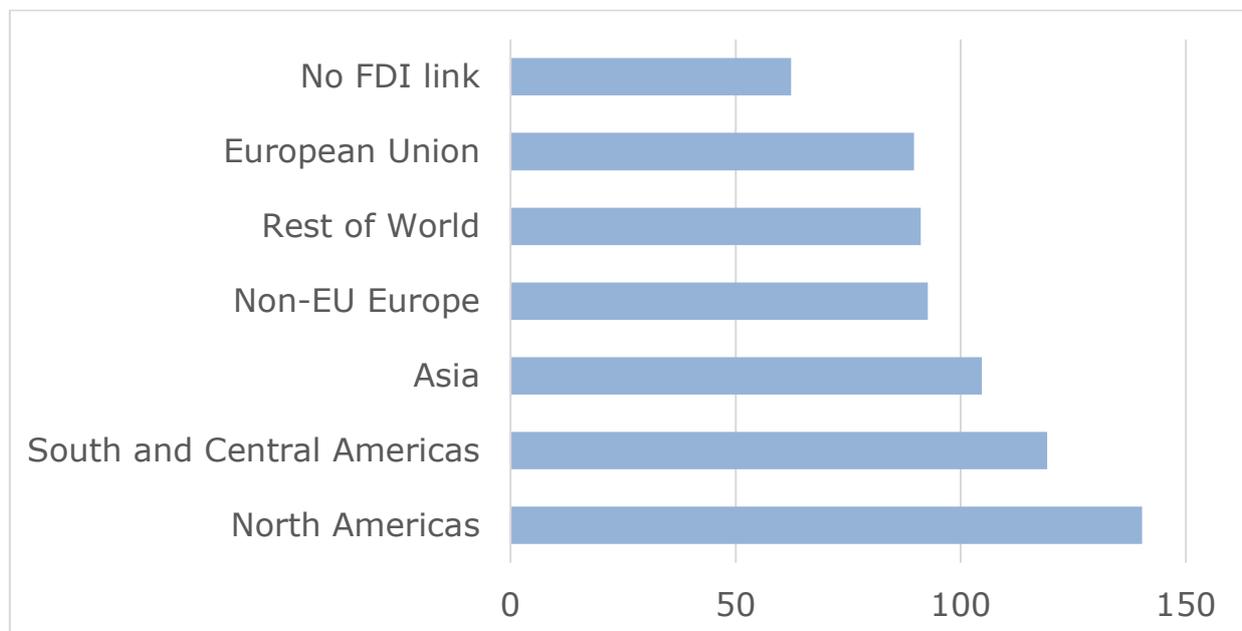
Note: Productivity measured in aGVA per worker and indexed accordingly
Source: (ONS, 2020c)

However, one should always be cautious about any causal links, given possible biases stemming from endogeneity and unobserved heterogeneity. For example, it could be incorrect to conclude that investing in Asia and North America causes firms to become more productive based upon results from the ONS publication: this could also be caused by highly productive firms tending to self-select by investing in more remote markets in the first place.

Without accounting for these biases, the ONS publication (and other analyses) highlight correlative relationships between variables. More often than not, such causal links are hard to establish through quantitative methods and are based on a practical understanding of interactions between macro policies and business behaviour or they may not be possible to prove quantitatively.

1.3.2.2. Driffield and others (2009)

The first UK-specific study, by Driffield and others(2009), establishes a new taxonomy for FDI in accordance with relative technology and factor cost differences. Using this taxonomy, they then link the different determinants of inward FDI and ODI with subsequent changes to productivity and employment.

More specifically, they estimate a production function and a labour demand function by adopting a generalized method of moments instrumental variable estimator that uses lags as instruments. The data used in the estimation represents a panel of 13 countries, 11 manufacturing sectors and 10 years (1987–96). Countries include all the major sources and destinations for UK FDI during the period in question. Data is compiled from various sources, including ONS, Structural Analysis (STAN) database, Analytical Business Enterprise Research and Development (ANBERD) database and others.

Results indicate that UK ODI was "dominated by investment into foreign **sectors that have lower unit labour costs** than the UK but with evidence of an increasing **trend towards technology sourcing** by UK industry". Overall, Driffield and others found that UK ODI had a **positive effect on domestic productivity**, even when originating from UK sectors with lower unit labour costs but higher R&D intensity than the corresponding destination sector. However, the dominance of ODI in **low-cost locations had implications for domestic employment**. UK ODI markedly reduced demand for unskilled labour between 1987 and 1996.

1.3.2.3. Simpson (2012)

The second study, by Simpson (2012), explores the relationship between the structure of British firms' ODI and the performance and organisation of their home-country operations from 1998-2004. Simpson utilises descriptive statistics to distinguish between UK MNEs that invest in high-wage economies, low-wage economies and both high and low-wage economies. In contrast to Driffield and others , Simpson found that the majority of **UK MNEs invest exclusively in high-wage economies**. Divergent findings could be attributed to temporal variation, sectoral scope (Simpson extends her research to the business services sector), as well as the different definitions used (countries with 'lower unit labour costs' than the UK are not necessarily 'low wage').

Building on her taxonomy, Simpson deploys Ordinary Least Squares (OLS) with various fixed effects to estimate 3 distinct equations:

1. To assess how productivity differs by MNE type, the plant-level output is modelled as a function of employment, real intermediate inputs, real capital stock, and MNE-type dummies.
2. To assess how different MNE types behave at home, 4 plant characteristics (output, employment, capital and input intensity) are modelled as a function of MNE-type dummies.
3. To assess the extent of offshoring employment amongst different MNE types, plant-level employment growth is modelled as a function of time-lagged MNE-type dummies and various plant characteristics.

Data on overseas investment is sourced from ONS' Annual Inquiry into FDI survey (AFDIS). Plant and establishment-level data are derived from the British Annual Respondents Database (ARD).

Results are extensive. Notably, Simpson identifies a **positive relationship between the scale of UK firms' overseas investment activities and their total factor productivity.** This applies to both business services and manufacturing sectors. Simpson also finds that UK MNEs **investing in low-wage economies exhibit slower employment growth** in the UK, a greater propensity to close plants and a lower propensity to open new ones in low-skill manufacturing industries. This supports the notion of 'hollowing out' – that is a de-industrialisation and offshoring of jobs – in labour-intensive manufacturing industries.

1.3.2.4. A summary of existing research on UK ODI

A summary of the existing research on ODI and the British economy is available below in Table 4. In addition to the analysis by ONS, both Driffield and others, (2009) and Simpson (2012) have utilised robust econometric techniques to assess the relationship between UK ODI and the home economy. By deploying fixed effects and instruments, researchers attempt to control for unobserved heterogeneity and endogeneity. As such, they use field-leading techniques to establish conditional correlations or associations that control for some level of bias. Problematically, it is very difficult to identify exogenous variation in ODI that would be required to produce robust causal estimates. In other words, ODI is often inextricably linked to the various dependent variables (such as productivity) that were studied in the analysis. No research is able to completely control for self-selection since the samples consist naturally of companies with ODI.

Beyond this unavoidable issue, the findings of Driffield and others (2009) and Simpson (2012) do not provide sufficient details on how to support and facilitate UK ODIs that maximise economic gains in the contemporary context. Their conclusions on the employment effects of ODI on low-wage economies were also drawn on data from the 1990s and early 2000s – that is a period prior to the peak of the China shock, global financial crisis (and subsequent recovery) and nearly thirty years of changing parities in the UK and overseas production costs and shifting asset and equity prices. It is, therefore, likely that previous insights on domestic employment and productivity (drawn from the '90s and '00s) no longer hold.

By contrast, recent publications by the ONS provide a comprehensive overview of ODI and the British economy. These releases are highly informative and establish a baseline understanding of relevant, contemporary trends. However, they rely on the analysis of descriptive statistics and make no attempts to account for established biases.

Table 4: Previous research on ODI and the British economy

Study	Aims	Data and methodology	Findings
Driffield and others (2009)	Links the different determinants of UK inward FDI and ODI to its effects on **productivity** and **employment** at the industry level from **1987 to 1996.**	Dynamic panel analysis deploying Generalized Method of Moments (GMM) instrumental variable estimator. Two distinct equations, total factor productivity (TFP) estimated using a one-step approach with output pitched against labour, capital, time-lagged FDI flows and various control variables. Labour demand pitched against time-lagged FDI flows and various control variables. Industry level data sourced from ONS, STAN, ANBERD and others.	UK ODI had a **positive effect on domestic productivity**, regardless of its determinants. However, ODI to **low-cost locations** (the most common type of ODI) markedly **reduced demand for unskilled labour** between 1987 and 1996.
Simpson (2012)	Explores the relationship between the structure of British firms' ODI and the **performance** and organisation of their home-country operations from **1998 to 2004.**	Panel analysis. OLS with fixed effects deployed to estimate 3 distinct equations. Plant level output pitched against MNE type dummies and various control variables. Plant level characteristics (output, employment and labour and capital intensity)	There is a **positive relationship** between the scale of UK firms' overseas investment activities and their **total factor productivity**. UK MNE's investing **in low-wage economies**

		pitched against MNE type dummies. Plant-level employment growth pitched against time-lagged MNE type dummies and various control variables. Data on overseas investment is sourced from ONS' AFDI. Plant and establishment-level data is derived from the British Annual Respondents Database (ARD).	**exhibit slower employment growth**, a greater propensity to close plants and a lower propensity to open new ones in low-skill manufacturing industries.
ONS (Various)	Combined, the ONS publications provide a comprehensive overview of recent trends in ODI and the UK economy.	These publications draw on descriptive statistics from various sources, including the AFDI survey and Pink Book data.	Numerous findings, including geographical and sectoral variation in the distribution of UK ODI, average rates of return by industry and the economic contributions of firms with ODI links.

Source: Own compilation

1.3.3 ODI research from outside the UK

There is an entire school of research dedicated to understanding the relationship between ODI and the home economy, inclusive of the literature on inward FDI. Much of the relevant work has also been synthesised by UNESCAP's OFDI Policy Toolkit for Sustainable Development, which aims to assist stakeholders in harnessing ODI for capacity, competitiveness and as an additional channel for sustainable development (UNESCAP, 2022).

Observing the Policy Toolkit and other relevant literature, research on ODI's relationship with the home economy is predominantly focused on repatriated

earnings, exports, productivity, and employment. Other home country correlations, such as know-how and technology, industrial upgrading, improved standards and practices and resource capabilities, have attracted less attention and could even be regarded as a subset of one or more 'main relationships'. For instance, the transfer of know-how and technology is just one avenue through which ODI can relate to home country productivity.

Extensive literature reviews and meta-analyses have already explored ODI's relationship with home country earnings, exports, productivity, and employment, with heterogeneous findings across all 4 dependent variables. Variation in the extent and direction of ODI's influence can be attributed to the range of econometric techniques deployed as well as contextual distinctions, not least the presence of important intermediate factors, like investment motivation, industrial sector, source region and destination market. Much of the latest research also focuses on the emergence of global value chains in other regions (notably emerging markets in East Asia).

However, these more recent findings may not apply to UK ODI, underscoring the merits of further evaluation. In this section, we shall evaluate the most interesting findings on ODI outside of the UK to see whether they form hypotheses to be tested for the UK economy in the past decade.

1.3.4 Research on financial earnings and repatriation

The repatriation of financial earnings from foreign operations is perhaps the most tangible means through which ODI can benefit the home country. Repatriated earnings are an important contributor to the capital account and can be re-invested domestically or used for other purposes.

Despite the recent decline in global returns (figure 7), ODI should be a productive endeavour as rational, profit-seeking firms invest abroad to maximise their earnings. ODI can assist firms in accessing new markets, streamlining production or circumventing tariffs and other at-the-border impediments to trade. In figure 7, there is a similar **U-shaped development** (decline of returns until 2017 on the global average), and the returns hit a double dip with the global pandemic beginning in 2020.

Figure 7: Estimated average rate of return on global ODI (%)
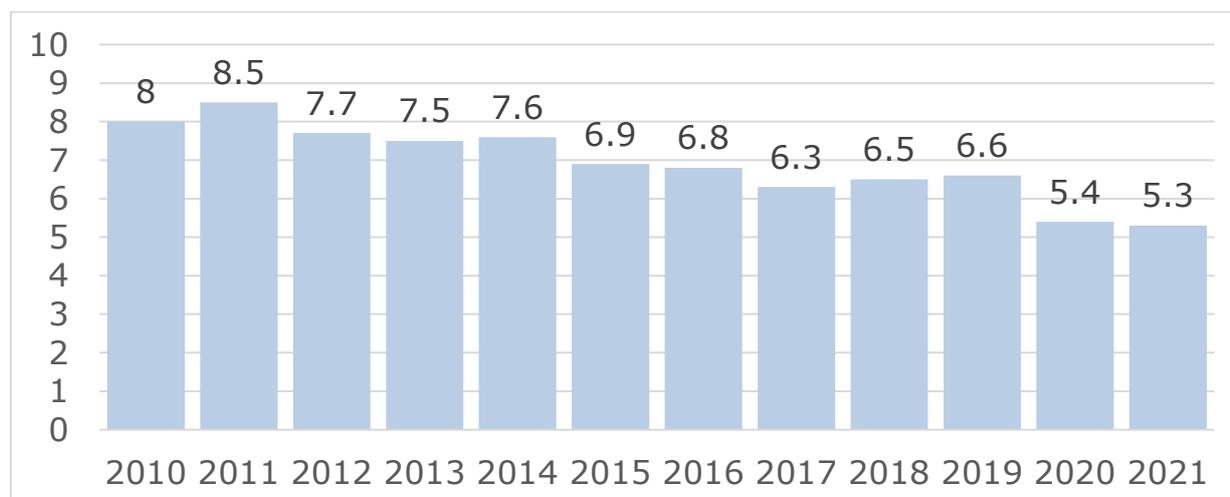
Note: Calculated using income and stock data from 144 countries in 2021. This represents more than 90% of global ODI stocks. ODI stock is measured in book value. Implied rates of return on ODI can appear higher than those on inward FDI due to methodological discrepancies, including the measurement of reverse investment.
Source: (UNCTAD, 2022)

A handful of studies have attempted to quantify the relationship between ODI and earnings at the firm level. Both Liu and Manzoor (2019) and Huang (2013) found **ODI to be detrimental to profitability and R&D expenditure**, respectively. Some caution must be exercised when interpreting these results, as they are deduced from highly specific samples in emerging economies and do not necessarily apply beyond their respective contexts. For instance, Liu and Manzoor hypothesise that ODI from certain Chinese firms was **motivated by geostrategy and cheap finance** as opposed to profitability. Meanwhile, Huang contends that government-sponsored incentives in Ho Chi Min City attracted a series of unviable ODI projects.

Moreover, measuring earnings at the firm level can be difficult as multinationals engage in complex financial flows between different cost centres, often in a bid to reduce corporate tax exposure. Intra-firm transactions using transfer pricing, royalty payments and intangibles are often used for **profit shifting**.

In this vein, most research draws on macro-level data to quantify rates of return, even if this is likely to yield something of an underestimate in the wider context of base erosion and profit shifting. UNCTAD (2022), Brada and Tomšík (2009), and Polat (2016) all draw upon the IMF's balance of

payments standard presentation data dissemination server to assess the extent of repatriated earnings. Similarly, Eurostat (2022) draws on its own internal balance of payments (BoP) data.

The existing literature does point to significant variation in rates of return on ODI. More specifically, returns differ with industry, reporting country and partner (UNCTAD, 2022). Certainly, there are also examples of failing ODI projects that prove costly to investors and the home economy (Huang, 2013). On balance, however, ODI continues to be a profitable endeavour. Despite a pandemic-induced decline from 2020, average rates of return on global ODI were estimated at more than 5% in 2021.

Complementary to research on rates of return is a body of scholarship exploring determinants of **reinvestment versus repatriation**. Lundan (2006) distinguishes between 3 explanatory factors:

1. Those encouraging **reinvestment**, including strong growth in the host economy, a stable exchange rate, rising income levels in a given industry.
2. Those encouraging **repatriation**, including a punitive corporate tax regime in the host economy, repatriation tax holidays at home.
3. Agency considerations or factors affecting multinationals' **decisions on dividend payments**. These could include cultural or institutional disparities, shareholder preferences for reliable earnings or even the maturity of the project in question.

Subsequent research from outside of the UK has given credence to various elements of Lundan's framework in a range of different contexts. Oseghale and Nwachukwu (2010) provide empirical evidence for good governance, market size, market growth rate, exchange rate, quality of labour and the profitability of existing operations as determinants of reinvestment. Meanwhile, Saloria and Brewer (2013) identify corporate tax rates, exchange rates, interest rates and the operational needs of MNEs as salient. Wolff (2007) found home and host country tax rates to directly affect reinvested earnings, although equity earnings and other capital components were less responsive. Finally, Polat (2017) demonstrates that the 'lifecycle' of FDI is important in explaining investors' propensity to repatriate.

Tables 5, 6 and 7 summarise selected research on ODI, financial earnings, and repatriation to the home country. Where possible, research employing robust econometric techniques to study advanced home countries is favoured.

Table 5: Selected research: ODI and earnings at the macro level

Study	Aims	Data and methodology	Findings
UNCTAD, World Investment Report (Various years)	Estimates rate of return on FDI.	Arithmetic calculations based on countries' FDI income and stock data, where available in IMF BoP database.	Average rate of return of around 7% on ODI over the last decade, with a marginal decline in recent years. Significant geographical variation, with investment in developing countries yielding higher average returns.
Eurostat, FDI – rates of return (2022)	Estimates rate of return on FDI.	Arithmetic calculations based on countries' FDI income and stock data. Data sourced from Eurostat, includes direct investment income by partner country and economic activity.	EU ODI yielded an average rate of return of around 5% 2013-2019. Inward FDI yielded an average rate of return of around 4% 2013-2020. Significant variation by partner, reporter and industry.

Source: Own compilation

Table 6: Selected research: ODI and earnings at the micro level

Study	Aims	Data and methodology	Findings
Liu and Manzoor (2019)	Explores the impact of ODI on productivity and profitability of **Chinese firms** along the BRI between 2004 and 2015	Panel analysis deploying Feasible Generalized Least Squares (FGLS) regression with fixed effects. Return on assets and earnings per share pitched against various dummy and control variables. Data from the Chinese Ministry of Commerce.	ODI generally associated with **deteriorating profitability** amongst Chinese firms. ODI exhibits mixed results in terms of productivity for the same firms.
Huang (2013)	Explores ODI as a determinant of firm level R&D expenditure in **Taiwanese** companies.	Dynamic panel analysis, deploying GMM system estimation. R&D expenditure pitched against ODI and other variables. Data sourced from Taiwan Economic Journal.	All else being equal , ODI in both mainland China and the rest of the world gives rise to **negative effects on the parent firm's R&D** investment growth. However, if earnings from foreign operations can be improved, then the negative effects can be reduced in the longer run.
Diep (2013)	Explores financial performance of **foreign-invested firms** in HCM City, **Vietnam**	Panel analysis deploying simple OLS regression. Basic earning power pitched against various factors influencing financial performance. Data sourced from firm accounts.	FDI enterprises generally associated with **reduced basic earning power**, with capital investment compensating for operating losses.

Source: Own compilation

Table 7: Selected research on ODI: Determinants of repatriation and reinvestment

Study	Aims	Data and methodology	Findings
Polat (2017)	Explores the determinants of FDI capital structure in 30 **OECD countries** from **2006 to 2014**.	Dynamic panel analysis, various estimation techniques including GMM system estimation. Data sourced from IMF BoP database.	Capital components (equity capital, reinvested earnings and intracompany loans) have their own distinct determinants. Equity capital and reinvested earnings are responsive to factors influencing the **business environment**. Intracompany loans are responsive to factors affecting the short-term **financial needs of foreign investors**.
Oseghale and Nwachukwu (2010)	Explores determinants of reinvestment of earnings by **US multinationals**.	Panel analysis deploying error component estimation. Reinvested earnings pitched against thirteen possible determinants. Data sourced from the US Department of Commerce.	Good governance, market size, market growth rate, exchange rate, quality of labour and profitability of existing operations are all **positively correlated with reinvested earnings**.
Wolff (2007)	Explores the effects **of tax rates on FDI**	Panel analysis deploying Heckman type selection model	Capital components respond differently to **corporate tax rates in home and host**

	capital structure in the EU.	and country dummies. Various components of FDI pitched against tax rates and other variables. Data sourced from Eurostat.	**economies**. Home and host country taxes have a direct effect on reinvested earnings.

Source: Own compilation

In sum, **findings on ODI and earnings reviewed above are highly specific** to the circumstances of respective studies, such as the country studied. There is a lack of systematic research on advanced economies and ODI in services. Nonetheless, behavioural patterns on repatriation and reinvestment appear to be determined by source and target market, as well as the relative parity of economic and policy conditions. However, it is also worth noting that unilateral fiscal reforms may have changed behavioural incentives since the periods studied. As investments mature (especially in emerging markets), capital requirements in the target market also change.

Taken together, the implications for UK ODI could be that returns may strongly follow general (and global) macroeconomic trends, whereas reinvestments and repatriation as the behaviour is a function of situation-specific factors. As UK corporate income tax (CIT) rates are typically slightly above the OECD average, profit shifting using intangibles or management fees, could very well affect those decisions.

Circumstances for such negative effects do not apply, as there are currently no policy instruments similar to BRI that steer UK firms. However, a geostrategic and politically induced diversification of ODI (including so-called 'friendshoring') may arise in the future.

1.3.5 Research on home country productivity

There is no broad, theoretical consensus on the relationship between ODI and home country productivity. Firms that invest in overseas activities (through exports or ODI) must contend with the costs of internationalising and are, therefore, on average, more productive to begin with. Successful expansions are also normally associated with further firm-level productivity gains. Although, overseas investment can have different relationships with the home economy.

Firms that invest overseas will enjoy better access to those markets since they operate there as localised firms with national treatment. This access allows firms to enjoy preferential regulatory treatment and better understand local market preferences and regulatory compliance issues.

In addition, the subsequent growth from international expansion leads to economies of scale, which reduces fixed costs and allows for reinvestment into further operational efficiency, R&D spending or further expansion.

Additionally, firms investing overseas may source knowledge from the host country, yielding additional operational improvements. Proximity to advanced technological clusters in the host country can facilitate knowledge transfers and collaborative research efforts, enhancing the firm's technological capabilities.

Conversely, ODI may be associated with a reduction in the size and productivity of home country activities. This could occur when the investing firm relocates a substantial portion of its operations to capitalise on relative factor endowments. In this instance, an overall increase in business productivity may not be enough to offset the loss of value-added activity in the home country as firms 'hollow out' their domestic production networks.

Moreover, the impact on different factors of production within the home country can be asymmetric. For instance, labour-intensive sectors or activities might be negatively affected, while capital-intensive sectors or functions involving high-skilled labour benefit from ODI. The retained operations might experience increased efficiency and profitability, leading to challenges in societal redistribution.

Beyond these direct effects, authors have also discussed indirect linkages between ODI and home country productivity. Hypothetically, the operational advantages of firms that invest overseas can 'spill over' to their domestic counterparts through supply chain relations and imitation. Contrarily, one might hypothesise that multinationals may deepen relationships with foreign buyers and suppliers, possibly to the detriment of home country businesses along the value chain.

In terms of empirics, the majority of more recent firm-level literature has confirmed a **positive relationship between ODI and labour productivity, total factor productivity and capital intensity** (Driffield, Love, and Yang, 2016; Barba Navaretti and others 2010; Jäckle and Wamser, 2010). Meanwhile, Tang and Altshuler (2015) and Vahter and Masso (2007) found MNE efficiency gains to 'spill over' to domestic firms.

A minority of firm-level studies reported **insignificant effects** between ODI and productivity (Sun, Fulginiti, and Chen, 2010). Interestingly, **State-Owned Enterprises appear to enjoy fewer productivity gains** than private firms when investing abroad (Huang and Zhang, 2017). Although these findings have been deduced from China's Belt and Road Initiative and are not necessarily representative of the UK context.

Research conducted at the country, region, or industry level is generally less conclusive in accordance with the established theory. Bodman and Le (2013) found ODI to have a positive influence on home country productivity, while Blitzer and Görg (2009) discerned no significant relationship. Hence, it is possible that we might find less conclusive results on productivity between ODI and certain UK regions.

Castellani and Pieri (2016) found ODI in sales, distribution, and marketing to boost labour productivity in Europe's regions, including those in the UK, between 2007 and 2011. With that said, **investment in manufacturing industries had a negative effect**, supporting the 'hollowing out' narrative.

Beyond the sector of investment, other intermediate factors have been identified as salient. Investment in advanced and **R&D intensive destination markets tends to yield higher productivity gains** (Liu and Manzoor 2019; Van Pottelsberghe de la Potterie and Lichtenberg, 2001). Meanwhile, '**absorptive capacity**', or the existing productivity gap between firms and industries, can also influence the positive relationship between ODI and productivity (Tang and Altshuler, 2015). Finally, the productivity gains derived from ODI may be more evident after **a long-term learning process**, although these findings relate to emerging MNEs (Cozza, Rabellotti, and Sanfilippo 2015; Herzer 2011).

A summary of selected research on ODI and home country productivity is available below in Table 8 and Table 9. Where possible, research employing robust econometric techniques to study advanced home countries is favoured.

Table 8**: Selected research on ODI and home country productivity**

Firm-level research

Study	Aims	Data and methodology	Findings

Wang, Zheng and Yu (2019)	Explores whether ODI improved the productivity of **Chinese firms** between **2000 and 2007**.	Quasi experimental methods. Propensity score matching and difference in difference. Data sourced from Industrial Enterprise Database.	FDI **significantly improved the productivity** of investing enterprises, compared to domestic enterprises.
Driffield, Love, and Yang (2016)	Examines the extent to which the knowledge or technological capability of foreign affiliates enhances the performance of their parent companies, drawing on a firm-level panel of more than **1,600 multinationals** and more than 4,000 of their overseas affiliates, covering **46 home and host countries** between **1996 and 2007**.	Dynamic panel analysis deploying GMM estimator. Parent total factor productivity pitched against affiliate TFP and various control variables. Data sourced from Bureau van Dijk (BvD).	Strong and consistent evidence that affiliate productivity has a **positive effect on parent productivity.** Falsification exercise confirms that results are not driven by common shocks affecting the productivity of both parents and affiliates.
Barba Navaretti and others (2010)	Examines how ODI to developing and less developed countries (LDCs) affect home	Quasi experimental methods. Propensity score matching, difference in difference and	No evidence of a negative effect of ODI to cheap labour countries. **In Italy, investment**

	activities of **French and Italian firms** that turn multinational between **1993 and 2000.**	average treatment effect. Data sourced from the French Ministry of Economic and Finance and Reprint dataset.	**enhances the efficiency** of home activities. In **France, ODI in cheap labour countries had no significant effect** on productivity.
Jäckle and Wamser (2010)	Compares the home-market performance of **German** MNEs and national firms, both before and after switching from national to multinational activities from **1994 and 2001.**	Quasi experimental methods. Propensity score matching and average treatment effect. Data sourced from USTAN and MIDI datasets.	ODI has a **positive effect on firm performance.** The post-growth rate differs between newly founded MNEs and domestic firms by about 4 to 8 percentage points for different productivity measures.

Source: Own compilation

Table 9: Selected research on ODI and home country productivity

Country-, region- and industry-level research

Study	Aims	Data and methodology	Findings
Castellani and Pieri (2016)	Using a novel data set on international investment projects, the paper builds measures of outward foreign direct	OLS with country dummies. Change in labour productivity growth over a 4-year period pitched against a number of ODI projects over a prior 4-year period	The number of ODIs in **manufacturing** activities is **negatively** associated with **productivity** growth in the home region, but

	investments (FDIs) for **262 regions of the EU-28**. This allows an estimation to be made of regressions of productivity growth over the **2007 to 2011** period as a function of the number of FDI projects.	and various control variables. Data sourced from fDi markets database.	investments **in sales, distribution and marketing** are associated with a **boost** in local productivity.
Blitzer and Görg (2009)	Estimates the effects of inward FDI and ODI on domestic productivity in various industries across **17 OECD** countries between **1973 and 2001**.	Panel analysis deploying FGLS regression with fixed effects. TFP pitched against FDI stock and various control variables. Data sourced from OECD databases ANBERD and STAN and the IMF International Financial Statistics (IFS) database.	Country's stock of ODI is, on average, **negatively related to productivity**. However, there is substantial heterogeneity in the effect across countries, with a number of countries, namely, France, Poland, Sweden, **UK** and US, **showing positive** associations between total ODI and domestic productivity.
Van Pottelsberghe	Investigates whether FDI	Panel analysis deploying OLS with	**ODI in R&D-intensive**

| de la Potterie and Lichtenberg (2001) | transfers technology across borders, looking at **13 advanced economies** between **1971 and 1990**. | fixed effects. TFP pitched against foreign R&D capital stock and various control variables. Data sourced from OECD, IMF and others. | **countries** is more likely to **increase** home country productivity. |

Source: Own compilation

The majority of research on ODI and home-country productivity has been conducted at the firm-level, where productivity effects appear most evident. The use of econometrics tends to be problematic due to unobserved heterogeneity and reverse causality. Most studies show that undertaking **ODI is associated with subsequent productivity gains**. Some research has also been conducted at the country, region and industry-level, although these studies tend to be less conclusive. Evidence suggests that ODI's relationship with productivity can vary by investment motivation, source region, target market and industry. There could **potentially be a lower (or negative) impact on productivity** from ODI for UK manufacturing, certain regions, or partner countries with assumed low R&D.

1.3.6 Research on home country employment

Of the relationships discussed, perhaps none have received as much scrutiny as the nexus between ODI and home country employment in the recent literature. The notion of a 'zero-sum game' (where firms' investment abroad occurs at the expense of their domestic job count) has garnered the attention of politicians and commentators over the past 3 decades (Crescenzi and others, 2022).

Theoretically, the relationship between ODI and home country employment is broadly akin to the relationship between outward investment and domestic productivity. As highly efficient firms grow in conjunction with foreign expansion, they may be inclined to increase their home country's workforce. Conversely, operations abroad can come at the expense of domestic activity and employment as businesses relocate production. In addition to these direct effects, ODI and the proliferation of multinationals carry complex repercussions along the value chain that can create or quell job creation at home.

Observing empirics, the majority of research on ODI and home country employment has been conducted at the firm level. In keeping with the

established theory, **findings are generally mixed.** Numerous studies have indicated that firms' FDI is associated with a relative increase in their domestic workforce (Hayakawa and others, 2013; Barba Navaretti and others, 2010; Yamashita and Fukao, 2010; Becker and Muendler, 2008). However, other authors have demonstrated a negative relationship between businesses' ODI and their home country employment (Gu, 2018; Jäckle and Wamser, 2010; Cuyvers and others, 2005).

A handful of studies have also been conducted at the country-, region- and industry-level to account for indirect linkages between ODI and home country employment. Interestingly, the majority of this aggregated research appears to support the notion of a positive relationship (Crescenzi and others, 2022; Bajo-Rubio and Díaz-Mora, 2015; Federico and Minerva, 2008). With that said, Elia, Mariotti, and Piscitello (2009) found ODI to have a detrimental impact on demand for workers in parent companies' "industrial regions" in Italy between 1996 and 2002.

The lack of broad consensus on ODI and home country employment is indicative of the complex links between foreign production and domestic employment, including variation in industrial organisation and comparative factor advantages. In the absence of a definitively positive or negative relationship, researchers have taken to identifying important co-variables and intermediate factors.

Naturally, **ODI motivation** appears salient once more. Hijzen, Jean, and Mayer (2011) showed how horizontal or 'market-seeking' ODI tends to increase domestic employment. By comparison, vertical or 'factor seeking' ODI is more often associated with the relocation of production and, therefore, exhibits insignificant or negative effects on domestic employment.

Hong, Lee, and Makino (2019) have made further distinctions among ODI motivations. They contend that investment motivated by "market seeking for scale and scope expansion", "natural resource seeking" or "strategic asset seeking" enhances domestic employment. Whereas investment motivated by '**market seeking**' is associated with declines in domestic demand or '**labour resource seeking**' is associated with reduced domestic employment.

Aside from motivation, the investment industry or sector seems relevant. Crescenzi and others (2022) found ODI to be linked with higher employment creation when investment occurred in high-tech manufacturing and services industries, as opposed to low-tech and traditional manufacturing. Similarly,

Bajo-Rubio and Díaz-Mora (2015) and Masso and others (2008) concluded that **positive employment effects were stronger in services than manufacturing**. According to Bajo-Rubio and Díaz-Mora (2015), this could be explained by the unambiguous market-seeking nature of ODI in services. While Crescenzi and others (2022) reason that high tech and services firms may be more receptive to new knowledge from foreign affiliates.

The authors have highlighted the importance of the destination market and source region as well. **ODI in advanced economies tends to have a greater, positive effect** on domestic employment (Cozza, Rabellotti, and Sanfilippo, 2015; Debaere, Lee, and Lee 2010; Harrison and McMillan 2010) although this is disputed by Barba Navaretti and others (2010) and Konings and Murphy (2006). Conversely, ODI sourced from less-developed economic regions is associated with heightened employment gains (Crescenzi and others, 2022).

Finally, the impact of ODI on home country employment tends to be particularly evident in the long term, or a period of around 3 years (Hijzen, Jean, and Mayer 2011). Whereas the data period examined in our study (2013-2018) may suffice for this purpose, the absence of investment motivation in our data (a key variable in the above studies) will limit our analysis. In particular, services are typically market-seeking, whereas manufacturing can be both market and labour-seeking.

A summary of selected research on ODI and home country employment is available below, in Table 10 and Table 11. Where possible, research employing robust econometric techniques to study advanced home countries is prioritised.

Table 10: Selected research on ODI and home country employment

Firm-level research

Study	Aims	Data and methodology	Findings
Hayakawa and others (2013)	Investigates changes to domestic employment after initial ODI by **Japanese manufacturing**	Quasi experimental methods. Propensity score matching in combination with a difference-in-difference estimator. Data sourced from	In the case of **horizontal** ODI, there are **few impacts** on production workers and a gradual long-term

	firms between **1992 and 2005**. Distinguishes between **vertical and horizontal** FDI and **production and non-production** activities in the home country.	Basic Survey of Japanese Business Structure and Activities.	increase in non-production workers. For **vertical** ODI, the number of workers **does not dramatically change**.
Cozza, Rabellotti, and Sanfilippo (2015)	This paper investigates the effects of ODI in advanced European countries on **Chinese parent firms** between **2003 and 2011.**	Quasi experimental methods. Propensity score matching in combination with a difference-in-difference estimator. Data sourced from Emerging Multinationals' Events and Networks Database, which is based on fDi markets and Bureau van Dijk (BvD).	Investments in Europe have a **positive and significant impact on employment in Chinese** EMNEs.
Hijzen, Jean, and Mayer (2011)	Estimates the home effects (employment, exports, capital intensity etc.) of establishing foreign **production** amongst **French firms** from **1987-1999.**	Quasi experimental methods. Matching techniques in combination with a difference-in-difference estimator. Data sourced from the Enquête Annuelle des Entreprises (EAE) survey.	**Market seeking** ODI was **job creating**. **Factor-seeking** ODI had **no effect** on domestic employment. **Services ODI had a particularly positive effect** on domestic employment.
Jäckle and	Compares the home-market	Quasi experimental methods. Propensity	Employment growth rates are

Wamser (2010)	employment of **German** multinational enterprises (MNEs) and national firms, both before and after switching from national to multinational activities from 1994 and 2001.	score matching and average treatment effect. Data sourced from USTAN and MIDI datasets.	**negatively related** to ODI, suggesting that home and foreign employment are **substitutes**.

Source: Own compilation

Table 11: Selected research on ODI and home country employment

Country-, region- and industry-level research

Study	Aims	Data and methodology	Findings
Crescenzi and others (2022)	Examines the relationship between **'greenfield'** ODI and local employment levels **in 179 US economic areas** between 2005 and 2014.	Panel analysis deploying OLS with various fixed effects. US region- and industry-specific domestic employment levels are pitched against multiple, time-lagged ODI variables (including the number of jobs created abroad) and various control variables. Data sourced from fDi markets and various US Bureaus.	The link between ODI and domestic local employment is generally positive. The relationship is **industry-specific** - higher employment creation due to ODI occurs in **high-tech manufacturing and services industries**, rather than in low-tech and traditional ones. **Lagging US regions benefit the most** from the positive

			employment returns of ODI.
Bajo-Rubio and Diaz-Mora (2015)	Analyse the impact on domestic employment resulting from ODI performed by **Spanish** firms, using industry data for the period **1995–2011**.	Dynamic panel analysis deploying GMM. Sectoral employment level pitched against time lagged, sectoral ODI flows, as well as various control variables. Data sourced from the National Statistics Institute.	In general, the results showed a **positive**, though quantitatively **small**, impact of ODI on domestic employment. The strongest positive effects were found for those ODI flows addressed to the EU (in particular the EU-15) and Latin America; a **negative effect was detected** only for ODI addressed to non-EU **advanced economies**.
Elia, Mariotti, and Piscitello (2009)	Investigates the effects of ODI on employment in **Italian** parent firms' industrial regions for the period **1996-2002**.	Dynamic panel analysis deploying Seemingly Unrelated Regression (SUR) with fixed effects. The composition of sectoral employment is pitched against Italian foreign affiliates' number of employees abroad and various control variables. Data sourced from Reprint database and the National Institute for Social Security.	ODI to high- and low-income countries both **negatively** impact the demand for **low skilled** workers in the parent company's ''industrial region'', and also on the demand for **high skilled workers,** when foreign affiliates are **in high**

			income countries.

Source: Own compilation

Research on ODI and home-country employment has been conducted at various levels, reflecting the wide availability of relevant data. Econometrics tends to be deployed to control for unobserved heterogeneity and reverse causality. Findings are generally mixed, with ODI's employment effects varying by source region, target market and industry. **The assumption of employment creation at home via ODI in high-value-adding countries or sectors seems well-established.** The role of investment motivation is again underexplored due to the difficulties of classifying investment in this way.

1.3.7 Research on home country exports

The relationship between ODI and home country exports is multifaceted and has attracted an abundance of research, particularly with the formation of global value chains. From a theoretical standpoint, ODI has been framed as **substitutive or complementary** to home country exports, with the nature of the relationship generally depending on the motivation behind the ODI (Forte and Silva, 2017).

Horizontal investment relates to the creation of a productive subsidiary capable of supplying an overseas market, although other activities like research and development may be retained at home. As horizontal investment is motivated by the search for markets (Mariotti and Piscitello, 2009), it is naturally disposed to a substitutive relationship with home country exports as host country production displaces international trade flows.

By contrast, vertical investment aims to leverage relative factor endowments by dividing production into several phases, resulting in specialisation and supply-chain fragmentation. Overseas subsidiaries specialise in a particular stage of the production process and represent a single link in a global value chain. As **vertical investment is motivated by the search for resources or inputs** (Mariotti and Piscitello, 2009), it is more conducive to a complementary relationship with home country exports as it will prompt an increase in intra and inter-firm trade.

In terms of empirics, researchers have explored ODI's effects on home country exports at the country, industry, firm and product levels. **The majority of studies, particularly those drawing on aggregated data,**

tend to support a complementary relationship between ODI and home country exports (Kapoor & Arora, 2022). However, a minority of studies have successfully demonstrated a more substitutive relationship in specific contexts (Forte and Silva, 2017).

Table 12: The relationship between ODI and home country exports by study

Level of analysis	Positive (complimentary)	Negative (substitutive)	Mixed	Non-statistically significant	Total
Country	21	5	4	2	32
Industry	9	0	2	1	12
Firm	12	1	4	0	17
Product	3	0	1	0	4
Total	45	6	11	3	65

Note: Indicative table derived from a peer reviewed meta-analysis. This table should be interpreted with an awareness of heterogeneity in methods and data across the aggregated research.
Source: (Kapoor & Arora, 2022)

In view of heterogeneous results that appear to depend on the motivation behind the investment, researchers have taken to exploring the determinants and nuances of horizontal and vertical ODI to better understand its relationship with home country exports. Several covariables have been identified.

Looking at the host country, Beugelsdijk, Pedersen, and Petersen (2009) and Xiong and Sun (2019) reason that **developing economies with inexpensive endowments are likely to attract vertical ODI** with a complementary effect on exports. Meanwhile, horizontal ODI and its associated substitutive effect is more inclined towards developed economies where consumers command higher purchasing power.

Krautheim (2013) places emphasis on **the proximity of the host economy**. Long distance markets are more likely to necessitate horizontal ODI, whereas middle distance markets may only require commercial subsidiaries with production remaining in the home economy.

Institutions in the host country are important as well. Liberal trade policies, including the establishment of special economic zones (SEZs), where businesses receive preferential tax or regulatory treatment and attract

international production networks and vertical investment. By contrast, trade restrictive measures tend to foster horizontal ODI (Mullen and Williams 2011). Host country policies that mandate national inputs may also lead to a substitutive relationship at the product level (Blonigen 2001).

On one hand, the very large portion of markets in close proximity as target markets leads to a hypothesis that UK ODI could be dominated by vertical ODI. On the other hand, the fact that UK ODI is predominantly in OECD economies with similar factor endowments and that typically do not implement SEZs suggests the opposite. Given the contradicting theories and mixed conclusions in previous research, horizontal and vertical ODI takes second priority in our analysis of exports.

Aside from host country characteristics, authors have focused on the nature of the subsidiary. Younger subsidiaries could be conducive to a complementary relationship as they are more reliant on inputs from the parent firm (Lim and Moon, 2001).

Finally, product lines have also been cited to explain the relationship between FDI and home country exports. Specifically, a company's presence in the host country may improve rapport with consumers. By extension, the existence of multiple products in a given line could lead to increased demand for other products produced in the home country (Head and Ries 2004). In this scenario, investment would exhibit a complementary effect on home country exports.

A summary of selected research on ODI and home country exports is available below, in Table 13 and Table 14. Where possible, research employing robust econometric techniques to study advanced home countries is favoured.

Table 13: Selected research on ODI and home country exports

Country and industry-level research

Study	Aims	Data and methodology	Findings
Xiong and Sun (2019)	Explores the linkage between exports and FDI by examining its relationship in **over 140**	Panel analysis deploying OLS with various fixed effects to estimate a gravity model. Bilateral trade flows	**Complementary** relationship for ODI **from developed to developing** countries.

	countries from **2001 to 2006.** Particular focus on ODI from developed economies.	pitched against time lagged ODI flows and numerous control variables. Data sourced from UNCTAD, COMTRADE and CEPII.	**Substitute** relationship for ODI **from developed countries to other developed** countries.
Chen, Hsu and Wang (2012)	Examines the effects of ODI on the competitiveness of **Taiwanese exports** across 15 industries between **1991 and 2007**.	Panel analysis deploying OLS with fixed and random effects. Multilateral, sector specific exports pitched against time lagged FDI flows and various control variables. Data sourced from Ministry of Economic Affairs (MOEA) of Taiwan	Exports in Taiwan are **positively associated** with O-FDI by Taiwanese firms. This finding supports the view that ODI complements home country exports and concurs with the majority of earlier empirical findings which focus on developed home countries.
Kang (2012)	Analyses the impact of ODI and inward FDI flows between Korea and developed and developing countries on **Korean exports** in 12 **manufacturing sectors** over the **1988 to 2006** period.	Dynamic panel analysis deploying system GMM to estimate the effects of sector-specific FDI variables, time lagged sector-specific export variables and other control variables on bilateral sector-specific exports. Data sourced from Korean Ministry of	**ODI to developing countries is more likely to increase Korean exports** to those countries than ODI to developed countries.

		Knowledge-Based Economy and Export-Import Bank of Korea.	
Mullen and Williams (2011)	Examines how **Canadian exports to OECD** trading partners are influenced by ODI and inward FDI flows to/from that country between **1989 and 2007.**	Dynamic panel analysis deploying GMM difference to estimate a gravity model. Bilateral trade flows pitched against time lagged FDI positions and exports. Data sourced from Statistics Canada.	Inward FDI from a specific source is associated with more exports flowing to that country. The impact of **ODI on export activity is ambiguous**.

Source: Own compilation

Table 14: Selected research on ODI and home country exports

Firm- and product-level research

Study	Aims	Data and methodology	Findings
Engel and Procher (2013)	Analyse the ODI – export relationship and the relationship between ODI and domestic employment simultaneously on a large database **of French firms** between **2000 and 2007**.	Quasi experimental methods. Propensity score matching and difference in difference estimator. Data sourced from European AMADEUS database and Bureau van Dijk (BvD).	Substantial rise in the export share for firms becoming engaged in ODI, indicating **that ODI and exports are complements** rather than substitutes. The complementarity between ODI and exports is **stronger for**

			switching firms in high-tech industries than for switching firms in low-tech industries.
Nishitateno (2013)	Explores the nexus between ODI and trade in intermediate goods using product-level data from the **Japanese auto industry** which covers 32 products and 49 host countries over the period **1993 to 2008**.	Panel analysis deploying PPML to estimate the effects of time lagged FDI stock variables and other product-specific variables on product specific exports. Data sourced from various national datasets including Ministry of Finance and Japanese Automotive Parts Industry.	ODI by upstream firms leads to **additional exports** of intermediate goods from the home country. That is, a complementary relationship between **ODI and intermediate exports**.
Head and Ries (2001)	Investigates the effects of direct investment abroad on exports, using 25 years of data on **932 Japanese manufacturing firms**.	Panel analysis deploying OLS with various fixed effects. Firm level exports pitched against counts of distribution and manufacturing investment for all years prior, as well as various firm characteristics. Data sourced from financial statements of public companies.	**Net complementary relationship.** However, there are important **differences across firms**. Those that are unlikely to supply overseas production facilities with intermediate inputs are less likely to have ODI stimulate exports.

Source: Own compilation

In sum, we observe that many of these studies are dated, coinciding with the period after the conclusion of the Uruguay Round or China's entry into the WTO – and before the global financial crisis and subsequent trade contraction. Some of the data predates the developments in information technology and the internet that dramatically facilitated trade and multinational business. Some studies are also either sector-specific or cover countries with very narrow export interests, for example Japan, Korea, Taiwan and their respective manufacturing sectors.

1.4 Research context and methodology

1.4.1 Research context and decision-making factors

The research review has shown that UK ODI has evolved since the late 1980s when it was dominated by the search for lower labour and production costs and towards technology sourcing and market-seeking in high-income economies. This shift is likely to be reflected in the ODI impact of variables such as employment productivity and returns. In the past decade, the global economy was further specialised through global value chains – a development that was fuelled by ODI.

1.4.1.1. Questions on earnings and returns

The review has shown overseas sources of revenues and earnings are just one of numerous motivations for ODI. It remains an important driver for economic growth and corporate remittances, especially as the UK and other G7 or OECD economies naturally see slower growth than other emerging markets in earlier stages of economic development. **FDI (or ODI) market access acts as a means to address global imbalances** if the firms of the G7 or OECD economies can tap into the faster growth available abroad.

However, any analysis of earnings and returns is distorted by currency fluctuations – especially given that the **majority of FDI transactions are executed in US dollars**, which appreciated 20% over the last decade. On one hand, such appreciation naturally boosts any USD nominated earnings from past investments. On the other hand, dollar appreciation makes new investments or acquisitions more costly for firms without currency reserves.

In sum, we are interested to see:

- While we expect variations in earnings and returns by partner country, sector, or UK source region, we are also interested in their relative importance. This may be particularly useful for determining various prioritisation decisions in negotiations or promotional activities.
- In addition, the impact of these variables on returns ought to be examined **independent of year**, that is, the changes in global economic conditions, exchange rates or other temporal variations.

However, we will not be able to identify the factors highlighted in the research on reinvestment or repatriation of profits into the UK due to the limitations in the dataset.

1.4.1.2. Questions on productivity

As we have established, firms that invest abroad tend to be larger and, therefore, more productive. Evidently, productivity is not entirely attributable to the scale effects of larger companies. However, descriptive statistics confirm that internationalisation through ODI is still dominated by large multinationals. We deduce from table 8 that only 1% of UK firms (approximately 27,000 firms) have any ODI links, but they account for a quarter of UK employment and one-third of all UK value-added. This concentration has some important consequences: Firstly, the bias due to reverse causality of large and productive firms must be controlled. Secondly, even **relatively small changes may have significant effects** on the national economy, as a small group of firms affect a relatively large portion of the economy.

UK-specific research from **past decades has shown a positive effect on domestic productivity** even for ODI to destinations with lower cost levels, including total factor productivity.

- First and foremost, we seek to **verify that the overall assumption of ODI as productivity-enhancing** still holds in recent years, especially given the development towards higher specialisation and global supply chains.
- We also seek to determine whether sectors and partners with high R&D spending are associated with higher productivity effects.
- Or any indication of a '**hollow out' effect that has been observed in the research conducted on EU ODI** in manufacturing to other countries.

1.4.1.3. Employment

Findings on employment are generally mixed and inconclusive depending on the circumstances and investment motivations. Offshoring of domestic jobs overseas are a controversial and disputed topic in many other countries. The research also suffers from the fact that investment motivation (derived through qualitative assessment), a key determinant for offshoring, cannot be linked to the firm-level dataset.

Past UK-specific research has indeed shown that MNEs investing in low-wage economies exhibit slower employment growth or a lower propensity to open new plants in low-skill manufacturing industries, which supported the notion of 'hollowing out' in low-skill manufacturing industries. But this research was

based on a period prior to the China shock, the global financial crisrs (and subsequent recovery), and other developments that have changed the parity between UK and overseas production costs and equity prices.

- Initially, we are interested in whether the association **between UK ODI and domestic firm-level employment seen in previous periods** is still present.
- It is of interest whether there are any variations for specific target countries or source regions of ODI. **Some sectors could be vulnerable to unemployment induced by ODI**. For example, certain sectors (for example, services) could be more naturally market-seeking since they depend on commercial presence, whereas manufacturing can be either market or labour-seeking.

1.4.1.4. Exports

Available research has been framed as substitutive or complementary to home country exports, which often depends on the investment motivation and FDI structure. However, whether a specific example of ODI is a case of horizontal or vertical integration of overseas subsidiaries cannot be determined without a qualitative survey.

In any case, the relationship between ODI and exports is not clear-cut and available studies were often conducted in export-led manufacturing sectors in Japan, Korea and Taiwan – which is a poor fit for most cases of UK sectoral ODI and exports. We therefore ask:

- Whether **UK ODI leads to increased exports** overall.
- Any sectors that particularly stand out as **substitutive or complementary** for export flows.

1.4.2 Methodology

To better understand policy and issue linkages above, this analysis relies on figures from the ONS' Secure Research Service. It draws on data from the AFDIS, the Annual Business Survey (ABS), the International Trade in Services dataset (ITIS) and the linked Trade in Goods Inter-Departmental Business Register (TIG-IDBR) dataset.

Following the established literature, the analysis deploys different methodologies depending on the dependent variable in question. To assess the effects of UK ODI on earnings, the analysis looks to complement ONS' existing work by providing firm-level averages for the ODI earnings of UK firms and associated rates of returns. The descriptive statistics presented

also distinguish between the sector of foreign affiliate; the target market at the continental level; and the source region of the UK parent. Regrettably, results are unable to distinguish between the purpose of investment in the absence of reliable data.

To assess the effects of ODI on the productivity, employment and exports of UK firms, the analysis follows the academic literature in drawing upon econometric modelling to control for certain biases. In the annex, equations 1, 2 and 3 model the relationship between time-lagged ODI positions and productivity, employment, and exports, respectively. To try and account for unobserved heterogeneity and self-selection, the analysis uses System GMM as its preferred estimator.

A full description of the methodology is available in the annex. There are 3 major caveats to be aware of when interpreting results.

First, the specifications deployed are in line with existing best practices in making some attempt to control for endogeneity. Nonetheless, best practices primarily establish associations between ODI and outcome variables rather than estimating causal effects. This is because it is unclear where to find plausibly exogenous variation in ODI that would be required for generating robust causal estimates. As such, this limitation is somewhat unavoidable.

Second, the datasets used are restricted only to firms that engaged in ODI from 2013 to 2019. Therefore, results relate to the intensive margin of ODI, and do not account for UK firms that did not invest abroad during this period. As such, policy implications directly apply to firms that have already invested overseas.

Third, the system GMM estimator cannot produce regression coefficients for time-invariant variables like industry, target market and source region. To study variation in the effects of ODI, we conduct further analysis distinguishing between subsamples.

1.5 Results

1.5.1 Results for financial earnings

1.5.1.1. By sector

Beginning with the descriptive statistics outlined, Table 15 displays firm-average earnings (in absolute monetary terms) and firm-average rates of return (in percentage of the investment) on UK ODI by sector from 2013-2019. First of all, UK ODI yielded positive, firm-average earnings and rates of return across all sectors from 2013 to 2019. This underscores the importance of ODI as a source of income for UK firms.

Unweighted firm-average rates of return across all sectors were estimated at 7.3%. In other words, when an average UK firm invested abroad, it yielded a return of 7.3%. This is slightly larger than the estimated average rates of return on global ODI reported by UNCTAD (2022) but less than the average implied rates of return on UK ODI reported by ONS (2022b). The gap seems particularly pronounced in certain sectors. For instance, firm-average rates of return in the manufacturing sector were recorded at 8.3% by this analysis, compared with ONS figures for overall rates of return of 24%.

There are 2 possible reasons for this discrepancy: first, the ONS release refers to a slightly different period (2011-2018). Second, the ONS release refers to overall rates of return, rather than firm-averages. In sectors where a minority of very successful companies account for a high proportion of earnings, overall implied rates of return may be higher than firm-average rates of return.

Like ONS (2022b), UNCTAD (2022) and Eurostat (2022), this analysis observes sectoral heterogeneity in rates of return on ODI. Certain service sectors, including all other distribution, hotels, restaurants, and construction, offer exceptional firm-average rates of return, albeit on smaller firm-average investment positions. Energy and Water, Manufacturing, and Banking and Finance offer solid firm-average rates of return and the highest firm-average earnings overall. Meanwhile, firm-average rates of return tend to be lower in agriculture, forestry and fishing and particularly in transport and communication.

In sum, the variation in rates of return by sector or the high average earnings (in absolute terms) in the financial services and energy sectors are expected. These results are generally in line with the sectoral ranking of industry returns. Additionally, the average earnings are also indicative of the sizes of companies or investments involved in the sector.

Table 15: Average earnings in absolute terms on UK ODI by sector, GBP million (rate of return %)

SIC sector	2013	2014	2015	2016	2017	2018	2019	Average	Observations (all years)
Agriculture, Forestry & Fishing	11194 (8.7%)	9253 (4.7%)	10350 (5%)	5291 (2.3%)	11362 (4.6%)	11000 (4.2%)	9155 (3.5%)	9658 (4.7%)	3470
Energy and Water	17851 (8.4%)	15701 (7.9%)	1139 (0.6%)	1650 (0.9%)	9806 (6%)	19596 (11.8%)	19446 (11.9%)	12170 (6.8%)	5136
Manufacturing	16586 (9.7%)	16038 (8.8%)	19324 (10.3%)	15454 (6.8%)	26601 (11.8%)	20380 (7.8%)	9393 (3%)	17682 (8.3%)	29852
Construction	189 (11.4%)	99 (7.1%)	132 (9.6%)	214 (13.9%)	86 (8.7%)	436 (2.9%)	426 (2.7%)	226 (8%)	4787
Distribution, Hotels, Restaurants	6344 (9.4%)	4716 (6.9%)	6060 (8.5%)	7996 (10.5%)	9550 (8.5%)	11348 (9.3%)	11661 (9.6%)	8239 (9%)	29149
Transport and Communication	1583 (1.5%)	3423 (3%)	4165 (3.2%)	4134 (2.5%)	5927 (3.8%)	5189 (3.7%)	2804 (2.1%)	3889 (2.8%)	26709
Banking and Finance	24577 (7.4%)	18749 (6%)	15132 (5.1%)	16399 (4.3%)	23573 (5.1%)	25415 (5.3%)	38282 (7.9%)	23161 (5.9%)	95632
All other	380 (7.7%)	494 (13.6%)	891 (13.8%)	141 (2.4%)	1161 (24.3%)	1044 (14.7%)	792 (15.4%)	700 (13.1%)	7056
Observations (all sectors)	16975	20703	22022	34148	34280	36159	37504		

Note: all results are firm-level averages.

1.5.1.2. By target market

Turning to variation in earnings by target market, Table 16 displays firm-average earnings and firm-average rates of return on UK ODI by target market. As with sectoral distinctions, UK ODI yielded positive firm-average earnings and rates of return across all continents from 2013 to 2019. This highlights the absence of notable disinvestment and the global success of UK ODI.

There is significant target market heterogeneity in firm-average earnings on UK ODI. In keeping with the findings of ONS (2022a), firm-average rates of return are highest in Africa, although firm-average earnings are relatively slight. Oceania and, to a lesser extent, Central and South America also offer good, firm-average rates of return on smaller firm-average investment positions. Elsewhere, Asia offers excellent firm-average rates of return on a significant, firm-average investment position. Meanwhile, Europe and North America offer the highest firm-average earnings (in absolute terms), albeit with relatively low rates of return percentage-wise, relative to the original investment).

Asia is unique as it generates both high returns and high average earnings. On balance, results are in keeping with the hypothesis that rates of return are generally higher on ODI that is invested in developing economies (UNCTAD, 2022). Nonetheless, the importance of established markets in Europe and North America should not be underestimated as a source of the highest firm-average earnings despite lower rates of return. High average earnings in these markets indicate large investments by UK-based MNEs.

Table 16: Average earnings on UK ODI by target market, GBP million (rate of return %)

Partner Continent	2013	2014	2015	2016	2017	2018	2019	Average	Observations all years
Africa	4674 (15.2%)	3480 (9.5%)	1264 (4%)	2673 (7.6%)	3588 (13.4%)	6100 (17.6%)	6460 (16.1%)	4034 (11.9%)	10602
Asia	15289 (11.7%)	16847 (13.2%)	14471 (10%)	12102 (7.5%)	16353 (9.2%)	20159 (10.8%)	16851 (8.6%)	16010 (10.1%)	32805
Central and South America	5418 (9.6%)	5742 (7.6%)	4754 (6.9%)	2726 (3.9%)	3810 (5.7%)	3516 (5.7%)	800 (1.5%)	3824 (5.8%)	12061
Europe	30866 (6.3%)	22360 (4.3%)	22096 (4.1%)	25844 (3.8%)	39634 (5.4%)	39092 (5.3%)	41501 (5.7%)	31628 (5%)	115017
North America	18813 (7.2%)	17043 (5.8%)	12029 (4.4%)	5799 (2%)	20605 (6.2%)	20871 (5.4%)	23379 (5.4%)	16934 (5.2%)	21821
Oceania	3644 (7.2%)	3001 (13.8%)	2579 (8.6%)	2136 (5.1%)	4075 (12%)	4671 (10.7%)	2968 (6.2%)	3296 (9.1%)	9485
Observations (all continents)	16975	20703	22022	34148	34280	36159	37504		

Note: all results are firm-level averages.

1.5.1.3. By source region

Table 17 displays firm-average earnings on UK ODI by source region. As with other distinctions, UK ODI yielded positive firm-average earnings and rates of return across all source regions from 2013 to 2019. This underscores the importance of ODI as a lucrative source of income for firms across the UK.

There is significant regional heterogeneity in firm-average earnings on UK ODI. London and the South East offer the highest firm-average earnings over the period in question. This is unsurprising given the established capital intensity of those regions. With that said, firm-average rates of return are actually higher on ODI originating in the North West and Wales. Meanwhile, ODI originating from the East Midlands, East of England, and Scotland also enjoys a comparable rate of return over the period in question.

Rates of return are slightly lower in other regions. Nonetheless, the results clearly illustrate how the promotion of ODI can contribute to reducing the UK's regional disparities by increasing the earnings of firms across the UK, which could be used for further productivity-enhancing investments if they were repatriated.

Table 17: Average earnings on UK ODI by source region, GBP million (rate of return %)

Source Region	2013	2014	2015	2016	2017	2018	2019	Average	Observations (all years)
North East	473 (3.8%)	900 (6.5%)	654 (4.9%)	805 (5.3%)	1421 (7.6%)	1402 (6.1%)	671 (3.2%)	904 (5.3%)	4894
North West	7274 (12.2%)	5429 (9.1%)	5166 (8.8%)	7829 (13.5%)	8083 (11.3%)	7872 (9%)	7462 (7.6%)	7016 (10.2%)	12145
Yorkshire & Humberside	2697 (7.3%)	2291 (5.5%)	1444 (3.7%)	1560 (2.5%)	2806 (4.8%)	3642 (6.7%)	2485 (5.2%)	2418 (5.1%)	8217
East Midlands	2416 (6.3%)	1606 (5.2%)	1630 (4.1%)	1490 (4.2%)	3016 (7.8%)	3060 (6.9%)	1961 (4.7%)	2168 (5.6%)	7338
West Midlands	2420 (5.9%)	2388 (5.4%)	1777 (4.5%)	2585 (4.8%)	2894 (5.3%)	4606 (7.1%)	3063 (3.8%)	2819 (5.3%)	8794
East of England	4041 (7.5%)	3343 (5.6%)	2973 (5%)	2613 (3.7%)	3470 (4.7%)	5394 (6.1%)	6129 (6.6%)	3995 (5.6%)	13144
London	17181 (8.7%)	15427 (7.9%)	9812 (4.8%)	12094 (4.9%)	23160 (7.6%)	25813 (7.9%)	27312 (8.1%)	18686 (7.1%)	24909
South East	11392 (6.8%)	9421 (6.5%)	6510 (4.2%)	6245 (3.9%)	14710 (8.4%)	13778 (7.8%)	15143 (7.9%)	11028 (6.5%)	15653
South West	3016 (6%)	1649 (3.7%)	1919 (4.1%)	2277 (3.4%)	2784 (3.4%)	3220 (3.6%)	3672 (4.1%)	2648 (4%)	8426
Wales	775 (6%)	579 (5.2%)	357 (3.8%)	1023 (7.8%)	1075 (10.6%)	1560 (10.3%)	1343 (9.3%)	959 (7.6%)	5041

Scotland	7210 (7.6%)	6161 (5.4%)	5639 (4.9%)	4196 (3%)	6477 (5.2%)	7936 (8.4%)	7585 (8.2%)	6458 (6.1%)		8778
Observations (all regions)	7910	11520	12704	19170	20465	22221	23349			

Note. Firm-level averages. The Northern Ireland Statistics and Research Agency (NISRA) carries out its own Annual Business Survey.

1.5.1.4. Panel regression with dummy variables

In addition, we also ran panel regressions with rate of return modelled as a function of dummy variables, with industry and year fixed effects. In the first regression (Table 18), we look at the target market, using the highest observation on returns (Africa) as the baseline. In the second regression (Table 21), we look at source region with the North East as a baseline. These coefficients reveal how much a market, sector, or region deviates from its respective baseline.

These results show the relative importance of the target region compared to the sector where the ODI occurs. The results indicate significant results for a majority of the regions, indicating that the lower returns from Europe are statistically significant. Similarly, regression results on source regions are statistically significant for most regions, indicating weaker returns for ODI from the South East, East Midlands, East of England, South West, Wales and Scotland.

We also see some interesting common results for the fixed effects in sector and time in the 2 regressions. While coefficients of fixed effects are not of direct interest, we see strong and significant dummy coefficients for 2015 (which was the year of a global large-scale sell-off on the equity markets, with indices like DJIA and FTSE dropping -3%), indicating lower returns in energy, communications, and financial services.

Table 18: Regression results for rate of return as a function of target market[1]

Baseline: Africa

	Coefficient	z-score
Asia	0.0055	0.2030
Central and South America	-0.0492*	-1.7951
Europe	-0.0928***	-3.3972
North America	-0.0501*	-1.8350

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[1] 1 star * 95% Confidence Interval (CI) is Z-value approximately ±1.645 or higher, corresponding to a p-value less than 0.05 (significant at the 5% level). This represents a 95% confidence level.
2 stars **: 99% CI. Z-value approximately ±2.33 or higher, corresponding to a p-value less than 0.01 (significant at the 1% level). This represents a 99% confidence level.
3 stars ***: 99.9% CI. Z-value approximately ±3.09 or higher, corresponding to a p-value less than 0.001 (significant at the 0.1% level). This represents a 99.9% confidence level.

Oceania	-0.0015	-0.0552

Table 19: Regression results for rate of return as a function of target market

Baseline: Agriculture, Forestry and Fishing

	Coefficient	z-score
Energy and Water	-0.0701**	-2.1955
Manufacturing	-0.0347	-1.0857
Construction	0.0101	0.3166
Distribution, Hotels and Restaurants	0.0279	0.8744
Transport and Communication	-0.0958***	-3.0020
Banking and Finance	-0.0577*	-1.8077
All Other	-0.0915***	-2.8473

Table 20: Regression results for rate of return as a function of target market

Baseline: 2013

	Coefficient	z-score
2014	-0.0021	-0.0748
2015	-0.0880***	-3.1101
2016	0.0305	1.0776
2017	0.0135	0.4791
2018	-0.1133	-0.1162
2019	-0.0041	-0.1449
constant	0.1816***	5.2931
total obs.	3658	

Table 21: Regression results for rate of return as a function of source region

Baseline: North East

	Coefficient	z-score
North West	-0.0582	-1.5324
Yorkshire and Humberside	-0.0533	-1.4048
East Midlands	-0.0856**	-2.2506
West Midlands	-0.0502	-1.3177
East of England	-0.0805**	-2.1152
London	-0.0447	-1.1753
South East	-0.0914**	-2.4074
South West	-0.0799**	-2.0984
Wales	-0.0726*	-1.9085
Scotland	-0.0648*	-1.7073

Table 22: Regression results for rate of return as a function of source region

Baseline: Agriculture, Forestry and Fishing

	Coefficient	z-score
Energy and Water	-0.0702**	-2.1639
Manufacturing	-0.0347	-1.0712
Construction	0.0100	0.3095
Distribution, Hotels and Restaurants	0.0278	0.8587
Transport and Communication	-0.0959***	-2.9580
Banking and Finance	-0.0578*	-1.7821
All Other	-0.0913***	-2.7985

Table 23: Regression results for rate of return as a function of source region

Baseline: 2013

	Coefficient	z-score
2014	-0.0022	-0.0766
2015	-0.0882***	-3.1161

2016	0.0301	1.0655
2017	0.0132	0.4687
2018	-0.0036	-0.1283
2019	-0.0042	-0.1485
constant	0.2124***	5.3353
total obs.	3658	

1.5.1.5. Potential *implications of the findings*

As we have seen in Figure 2 , UK ODI is dominated by large investment positions in Europe and, to a lesser degree, North America. The cultural or geographic proximity to these massively scalable markets is a comparative advantage for UK firms, while the ability to compete in highly competitive markets is a testament to their competitiveness.

The result for North America in Figure 2 demonstrates a slightly higher return than Europe. The other high-performing market is Asia, which has increased in global relevance. We also see a combination of very high earnings in absolute terms with high returns in Asia. However, UK ODI is assumed to be primarily in Mainland China and stems from a time before the pandemic and the recent slowdown in China with asset devaluations. Elsewhere, Africa, South America and Oceania also show high returns but are so far small, niche markets for UK ODI.

Finally, both descriptive analysis and regressions show that the **source region could be just as relevant** as other variables. However, this observation comes with some caveats since source regions can be intermediary variables for other features, such as company size, models of integration or ODI motivation.

1.5.2 Results on productivity

In terms of results from the regression analyses, Table 24 displays results of the productivity regression (described under section 1.8.1.2 in the annex) where firms' approximate GVA is modelled as a function of their time-lagged investment position, employment, capital expenditure and other variables.

Recalling that System GMM is the preferred estimator, a 10% increase in firms' time-lagged investment position is associated with a 4.69% increase in their approximate GVA, controlling for employment, capital expenditure and other variables. This result is significant at the 99% confidence interval.

In other words, heightened ODI is associated with a subsequent increase in firms' productivity. These findings are in keeping with those of Driffield and others (2009) and Simpson (2012).

Table 24: Selected regression results for association between ODI and productivity (specification outlined in Equation 1)

Lagged International Investment Position	GVA Pooled OLS	GVA Arellano-Bond	GVA System GMM
Coefficient	0.0024	0.0007	0.4688***
Std. error	0.0036	0.0135	0.0326
z-score	0.6641	0.0493	14.3688
p-value	0.5068	0.9607	0.000
total obs.	1723	593	593

1.5.2.1. Regressions on sub-*sets of samples*

To study the variation in the effects of ODI on productivity, we ran separate regressions on subsamples distinguishing between sectors, target markets, and source regions. However, in many instances, these subsamples were too small to produce meaningful results. Therefore, the data was aggregated into subsamples according to the following groups:

1. Source region (London and South-East, against the rest of the UK)
2. Target market (Low income, meaning Africa, Asia and Central and South America, against high income, meaning Europe, North America and Oceania)
3. Sector (goods against services)

It is important to note that these groupings are merely indicative and not precise. For instance, ODI to Asia (grouped into low-income countries) contains elements of UK investments in Japan, Singapore or Korea, while Oceania includes small elements of the Pacific Islands.

We ran the baseline regression using system GMM on these subsamples.[2] A 10% increase in firms' time-lagged investment position is associated with 0.13% increase in their approximate GVA for ODI from London and the

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[2] *The productivity regression uses data updated by the ONS, while the employment and exports regressions use the dataset prior to the latest update.*

South East and with a 0.05% decrease in their approximate GVA for ODI from the rest of the UK, controlling for employment, capital expenditure and other variables. These results are not statistically significant even at the 90% confidence interval.

Table 25: Regression results for association between ODI and productivity by subsamples of source regions

Lagged International Investment Position	GVA London and South East	GVA Rest of the UK
Coefficient	0.0131	-0.0052
Std. error	0.0162	0.0104
z-score	0.8090	-0.4952
p-value	0.4185	0.6205
total obs.	987	2044

A 10% increase in firms' time-lagged investment position is associated with a 0.075% increase in their approximate GVA for ODI to low-income target markets and a 0.12% increase in their approximate GVA for ODI to high-income target markets, controlling for employment, capital expenditure, and other variables. These results are not statistically significant even at the 90% confidence interval.

Table 26: Regression results for association between ODI and productivity by subsamples of target markets

Lagged International Investment Position	GVA Low Income	GVA High Income
Coefficient	0.0075	0.0120
Std. error	0.0130	0.0098
z-score	0.5753	1.2299
p-value	0.5651	0.2187
total obs.	1284	3472

A 10% increase in firms' time-lagged investment position is associated with a 0.094% increase in their approximate GVA for ODI on goods and with a

0.23% decrease in their approximate GVA from ODI on services, controlling for employment, capital expenditure and other variables. The result on goods is not significant, while that on services is significant at the 90% confidence interval.

Table 27: Regression results for association between ODI and productivity by subsamples of sectors

Lagged International Investment Position	GVA Goods	GVA Services
Coefficient	0.0094	-0.0225*
Std. error	0.0207	0.0116
z-score	0.4524	-1.8490
p-value	0.6510	0.0513
total obs.	828	1622

1.5.2.2. Potential implications

First and foremost, ODI's association with productivity still holds true. In light of the discussions on how the UK and other OECD countries must boost their productivity to close the 'productivity gap', these findings are highly relevant given that most productivity-enhancing measures (for example infrastructure improvements, labour force upskilling, R&D, investments in technology) are not easily operationalised in the short-term

However, the analysis cannot definitively discern whether it is due to the absorption of overseas efficiencies and R&D or general scale effects from internationalisation. Moreover, the analysis could not verify that sectors and partners with high R&D spending are also associated with higher productivity. However, there are only very slight 'hollowing out' effects, and there is some likelihood that the productivity effects for services are less certain.

1.5.3 Results on employment

Table 28 shows the results of the employment regression (described under section 1.8.1.2 in the annex) where firms' UK employment is modelled as a function of their time-lagged investment position, their turnover and other variables.

Recalling that System GMM is the preferred estimator, a 10% increase in firms' time-lagged investment position is associated with a 0.17% decrease

in their UK employment, controlling for turnover and other variables. This result is statistically significant at the 99% confidence interval.

In other words, heightened ODI is associated with a subsequent decrease in firms' UK employment. With that said, the average associated reduction is extremely slight.

These findings diverge from those of Driffield and others (2009) and Simpson (2012), who observe UK firms' overseas investment to be associated with a marked reduction in labour demand. Although findings used different methodologies, the implication is that outsourcing appears less pervasive in 2013 to 2019, relative to previous periods from 1987 to 1996 and 1998 to 2004.

Table 28: Selected regression results for association between ODI and employment (specification outlined in Equation 2)

Lagged International Investment Position	Employment Pooled OLS	Employment Arellano-Bond	Employment System GMM
Coefficient	-0.0075***	-0.0039	-0.0174***
Std. error	0.0023	0.0059	0.0041
z-score	-3.274	-0.6561	-4.2389
p-value	0.0011	0.5118	0.000
total obs.	17796	9978	9978

1.5.3.1. Regressions on sub-*sets of samples*

Similar to previous sections, a regression on a subset of the sample was run to generate statistically significant results. These results are presented in Tables 29 to 31.

Here, a 10% increase in firms' time-lagged investment position is associated with a 0.31% decrease in their UK employment for ODI from London and the South East and with a 0.33% decrease in their UK employment for ODI from the rest of the UK, controlling for turnover and other variables. These results are significant at the 99% confidence interval.

Table 29: Regression results for association between ODI and employment by subsamples of source regions

Lagged International Investment Position	Employment (London and South East)	Employment (Rest of the UK)
Coefficient	-0.0309***	-0.0329***
Std. error	0.0042	0.0022
z-score	-7.2968	-15.0263
p-value	0.0000	0.0000
total obs.	7836	15308

A 10% increase in firms' time-lagged investment position is associated with a 0.09% decrease in their UK employment for ODI to low-income target markets and a 0.21% decrease in their UK employment for ODI to high-income target markets, controlling for turnover and other variables. The result for low-income target markets is not statistically significant, while that for high-income target markets is significant at the 99% confidence interval.

Table 30: Regression results for association between ODI and employment by subsamples of target markets

Lagged International Investment Position	Employment Low Income	Employment High Income
Coefficient	-0.0086	-0.0209***
Std. error	0.0084	0.0041
z-score	-1.0296	-5.0768
p-value	0.3032	0.0000
total obs.	2751	10112

A 10% increase in firms' time-lagged investment position is associated with a 0.25% decrease in their UK employment for ODI on goods and with a 0.17% decrease in their UK employment for ODI on services, controlling for turnover and other variables. These results are significant at the 99% confidence interval.

Table 31: Regression results for association between ODI and employment by subsamples of sectors

Lagged International Investment Position	Employment Goods	Employment Services
Coefficient	-0.0250***	-0.0174***
Std. error	0.0086	0.0055
z-score	-2.9131	-3.1871
p-value	0.0036	0.0014
total obs.	1359	6432

1.5.3.2. Potential implications

Past UK-specific research has shown that, in general, UK MNE's investing in low-wage economies have led to slower domestic employment growth in low-skill manufacturing industries. However, the regressions show that there is almost **no negative employment effect** associated with UK ODI. The associated decrease in unemployment is 59 times smaller than the increase in ODI.

This is also the case when we look at offshoring-sensitive areas like **manufacturing, or regions outside of London and the South East**. Employment effects for these subsets are consistently near zero. This could indicate that UK ODI motivation is primarily market-seeking, vertical and complementary to domestic business processes in the home market. Such a conclusion provides a renewed level of confidence in promoting ODI in the public discourse.

1.5.4 Results on exports

Lastly, Table 32 shows the results of the export regression (described under section 1.8.1.2 in the annex) where the sum of firms' goods and services exports is modelled as a function of their time-lagged investment position, turnover and other variables.

Recalling that System GMM is the preferred estimator, a 10% increase in firms' time-lagged investment position is associated with a 0.39% increase in their goods and services exports, controlling for turnover and other variables. This result is significant at the 90% confidence interval.

In other words, heightened ODI is *associated* with a subsequent increase in UK firms' export of goods and services. These findings are in keeping with the majority of academic research on this topic (Kapoor and Arora, 2022).

Results are indicative of a complementary relationship between UK ODI and home-country exports. The implication is that greater participation in globalised production networks leads to an increase in intra and inter-firm trade.

Table 32: Selected regression results for association between ODI and exports (specification outlined in Equation 3)

Lagged International Investment Position	Exports Pooled OLS	Exports Arellano-Bond	Exports System GMM
Coefficient	0.0021	0.0241	0.0385*
Std. error	0.0073	0.0206	0.0204
z-score	0.2946	1.171	1.8915
p-value	0.7683	0.2416	0.0586
total obs.	5633	2647	2647

1.5.4.1. Regressions on subset of samples

Similar to previous sections, we ran a regression on a subset of the sample that has been grouped into larger groups to generate significant results. These results are presented in Tables 33 to 35.

Here, a 10% increase in firms' time-lagged investment position is associated with a 0.097% increase in their goods and services exports for ODI from London and the South East, with a 0.064% decrease in their goods and services exports for ODI from the rest of the UK, controlling for turnover and other variables. These results are not statistically significant even at the 90% confidence interval.

Table 33: Regression results for association between ODI and exports by subsamples of source regions

Lagged International Investment Position	Exports (London and South East)	Exports (Rest of the UK)
Coefficient	0.0097	-0.0064

Std. error	0.0169	0.0095
z-score	0.5762	-0.6727
p-value	0.5645	0.5012
total obs.	4484	11888

A 10% increase in firms' time-lagged investment position is associated with a 0.059% increase in their goods and services exports for ODI to low-income target markets and with a 0.14% increase in their goods and services exports for ODI to high-income target markets, controlling for turnover and other variables. These results are not significant even at the 90% confidence interval.

Table 34: Regression results for association between ODI and exports by subsamples of target markets

Lagged International Investment Position	Low Income Exports	High Income Exports
Coefficient	0.0059	0.0142
Std. error	0.0277	0.0152
z-score	0.2136	0.9343
p-value	0.8309	0.3502
total obs.	2027	5874

A 10% increase in firms' time-lagged investment position is associated with a 0.36% increase in their goods exports and with a 0.546% increase in their services exports, controlling for turnover and other variables. The result for goods is not significant even at the 90% confidence interval while for services is significant at the 95% confidence interval.

Table 35: Regression results for association between ODI and exports by subsamples of sectors

Lagged International Investment Position	Goods Exports	Services Exports
Coefficient	0.0360	0.0546**
Std. error	0.0237	0.0246
z-score	1.5179	2.2198
p-value	0.1290	0.0264

total obs.	1178	2938

1.5.4.2. Potential implications *from the findings*

Although no detailed information on investment motivation and financial structure is available, the analysis shows that **UK ODI is associated with an increase in exports** – and, therefore, very likely to have a strong export-creating effect. The results further support the notion that there is much less offshoring and substitution of domestic activities.

While it cannot be verified whether this export creation effect varies with target market characteristics (such as developing or high-income economies) or industry, **the effect is statistically certain for services.** This could be the effect of transnational value chains, franchising arrangements, or other conglomerations between the UK and the subsidiary markets. Alternatively, it could indicate profit shifting of revenues back into the UK economy using licensing and management fees that are recorded as services exports in the balance of payments.

1.6 Key takeaways

1.6.1 Technical results

Reflecting on the existing literature and preliminary results, this analysis yields the following key takeaways on UK ODI and the home economy:

- Firms that invest in overseas activities (through exports or ODI) contend with the costs of internationalising and are therefore, on average, larger and more productive. UK firms with ODI accounted for just over 1% of the UK total in 2018. Yet, the same firms contributed to 24.5% of UK employment and approximately 32.3% of UK GVA.

- For every year from 2013 to 2019, UK ODI yielded positive firm-average earnings when disaggregated by SIC section, partner continent, and Nomenclature of Territorial Units for Statistics 1 (NUTS 1) region. There is no evidence of pervasive disinvestment, and British ODI should be regarded as a global success and an important source of income for firms across the UK.

- At the sectoral level, distribution, hotels and restaurants, construction, and all other services yield the highest firm-average rates of return (expressed in percentages) on ODI, while Energy and Water, Manufacturing, and Banking and Finance yield the highest firm-average returns in absolute terms.

- Firm-average rates of return are highest percentage-wise in Africa, Asia, and Oceania. Nonetheless, the importance of established markets in Europe and North America should not be underestimated as they absorb high amounts of ODI and, therefore, generate the highest average firm earnings (in absolute terms).

- London and the South East offer the highest firm-average earnings (that is, in absolute terms) over the period in question. However, firm-average rates of return (that is, in percentage terms) are actually higher on ODI originating in the North West and Wales and comparable on ODI from the East Midlands, East of England, and Scotland. The results show that promoting ODI can contribute to reducing the UK's regional disparities increasing the earnings of firms across the UK.
- Regression results show that heightened ODI is associated with a subsequent increase in firms' productivity. Specifically, a 10%

increase in firms' year-lagged investment position is associated with a 4.69% increase in their approximate GVA, controlling for employment, capital expenditure, and other variables. Comparisons of subsamples (London versus the rest of the UK, goods versus services, low versus high-income target market) only reveal that the productivity effect could be less pronounced for services.

- A 10% increase in firms' year-lagged investment position is associated with a 0.17% decrease in their UK employment, controlling for turnover and other variables. This average associated reduction is extremely small and differs from the past findings of Driffield and others (2009) and Simpson (2012). Caution should be exercised when comparing divergent methodologies, but the effects of outsourcing appear less pervasive from 2013 to 2019 relative to previous periods. The impact on services and London seems even less pronounced than other groups.

- Heightened ODI is also associated with a subsequent increase in UK firms' export of goods and services. Specifically, a 10% increase in firms' time-lagged investment position is associated with a 0.39% increase in their goods and services exports, controlling for turnover and other variables. Results are indicative of a complementary relationship between UK ODI and home-country exports in globalised production networks, leading to an increase in intra or inter-firm trade.

- As a final technical comment, these results were produced in accordance with best practices in trade and investment data. While all use of econometrics comes with caveats on reverse causality or biases, **the conclusions are robust: on average, a UK firm that increased its ODI during 2013-2019 yielded positive returns, improved its productivity, and generated exports without hollowing out of the UK economy.** Risks of reverse causality are minimised through the use of time-lagged positions and marginal intensity. However, the results neither confirm nor reject a counterfactual, meaning a UK firm that did not increase its ODI could have enjoyed the same gains if it had done so.

1.6.2 Conclusions

Unpacking these technical findings has shown that the complexity surrounding ODI involves many unique features in the UK economy. The

results from this analysis do not raise any major concerns currently debated in many G7 and OECD economies, such as offshoring—at least for the post-global financial crisis and pre-pandemic periods we have studied in this case.

Due to the datasets and firm-level research methods chosen, any data on industrial organisation, financial structure and investment motivation were not available. Yet several results indicate that **UK ODI has evolved towards a more market-seeking or complementary relationship** with the ODI target market over the past decades. Going forward, integrated cluster negotiations on ODI (meaning FDI) and trade (that is, services market access) could develop such synergies for UK offensive interests.

This has some important implications going forward. As the growth gaps in both productivity and GDP in the world economy remain constant, **UK firms become more dependent on leveraging their ODI to seek economies of scale**. While UNCTAD and descriptive statistics often point to the higher growth rates in developing countries, few markets are large enough to **absorb the sizeable ODI** coming from a major investor like the UK, especially from its financial sector. In extension, the search for increased returns and scale for UK firms requires geographic diversification and calls for detailed analysis that goes beyond what is discussed in this study.

Not least given the diverging macroeconomic developments in the EU, the US and Mainland China. In terms of sectors, the overexposure to ODI in financial services seems to suggest an underperformance in other UK industries despite being profitable and productivity-enhancing.

The absence of strong hollowing-out effects, results in strong commercial benefits for the UK from both inward FDI and ODI. This aspect is particularly relevant in the current **inflationary environment,** where partner countries are interested in inward FDI (and therefore UK ODI) while prospects for new export market access are typically limited due to lower opportunities for export-led growth and limited policy space for trade liberalisation.

Reciprocal liberalisation of FDI (meaning both inward FDI and ODI) could also create new trade flows due to the export-creating effects of investments in both directions. In other words, the UK – thanks to its investment-driven growth model – could be better placed than many export-led economies under the current conditions. The UK could be one of the economies that is best placed to gain from multilateral FDI negotiations

that would induce large-scale investment liberalisation or facilitation – beyond the WTO Investment Facilitation for Development (IFD) initiative.

Finally, there are some ongoing developments in the current policy environment that could potentially change some of the conclusions drawn in this study. Results have also shown that global **recessions** and other exogenous shocks could cause a change. Other shocks could be policy-induced – for example, a **subsidy race** among major economies with producer or user subsidies disregarding national treatment obligations which may have a strong relocation effect which is not yet visible in any reported data. Similarly, given the high concentration of UK ODI into a few sectors and partner countries, disruptive **regulatory action** in some key offensive areas could immediately impact overall UK ODI returns. Geopolitical risks could also discourage UK ODI or redirect it towards countries with lower but more stable returns. While such developments may be difficult to mitigate, their implications on the balance of payment and macroeconomic position cannot be overlooked.

1.6.3 Areas for further analysis

The research approach using regression methods of firm-level data has provided many useful insights on the average impact of UK ODI. Nevertheless, regression-based analysis is not always the best-suited approach to understanding the complex economic interactions involved in ODI. For instance, the following research questions were raised during the project:

- Investment motivation is understandably not available in ONS firm-level data. While some third-party datasets include such information, their data collection methods are understandably less reliable than actual firm-level data.

- Competitive analysis and benchmarking of ODI against other G7/EU3: While UK ODI is competitive and extensive overall, it is also known that it may be lower in several areas outside of financial services. A relatively simple analysis of comparative advantages against other G7 countries may reveal areas and pathways towards improving ODI performance.

- Analysis of enterprise characteristics and ODI strategies: More targeted questions on UK companies engaged in ODI can yield useful insights. For example, the extent to which foreign-invested firms are engaged in UK ODI in Europe may shed light on the UK's role as a

regional hub. Another example is the characteristics among UK firms with high ODI and high R&D expenditure, or UK SMEs engaged in ODI.

- Remittances, profit shifting and ODI: While nothing in this report indicates an immediate detrimental effect on UK public finances, a more targeted study on repatriation and reinvestment patterns of UK firms abroad may provide insights on how to grow the UK tax base and ODI contribution to reducing the UK's regional disparities. A related question is the characteristics of ODI that seem to rely on a high level of intangibles typically associated with corporate tax base erosion.

- Insights gathered from this project (and other past studies) can be used to project forecasts and scenario analysis for short-term policy planning. Subjects to be studied could include a subsidy war, for example, fiscal incentives in the US, EU, China, and its impact on UK macroeconomics; or the impact of a more restrictive stance against UK ODI in the G20.

- In recent years, ODI has also been subject to scrutiny and debate within the G7 cooperation on economic security. Subjects for a deeper risk assessment could include the dependency on non-market economies; or how UK ODI may impact sensitive technology leakage abroad.

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1.8 Annex

1.8.1 Full methodology

1.8.1.1. Descriptive statistics

This stage of the project was aimed at producing a range of descriptive statistics. Specifically, we calculated group-level averages for 3 variables: i) ODI earnings of UK firms, ii) ODI international investment positions of UK firms and iii) ODI rates of returns on earnings of UK firms. The 3 measures were calculated on 3 different levels: 1) sector of foreign affiliate, 2) target market defined on the continental level, 3) region of parent firm in the UK.

To define the sector of foreign affiliate, we used the variable industry code from AFDIS which provides 3-digit Standard Industrial Classification (SIC), which we aggregated to the 1-digit SIC level. To define the target market, we used variable *country_code* from AFDIS which gives the country, in which ODI was targeted. We aggregated this variable on the continent level in order to avoid disclosure. To define source region, we used the variable region from the ABS which gives the ITL (previously called NUTS) region classification. The same approach was used to define these variables for different dependent variables.

We obtained firm earnings from variable *d1999* and the investment position from variable *d3992* in AFDIS.

To merge AFDIS with the ABS, we used variable ABS variable *entref* and AFDIS variable *wowentref*. These variables identify observations at the enterprise level. The country codes in AFDIS which provide the target market were not provided in the geographic identifier folder, so we did this manually instead.

The specific version of the ABS that was used throughout most of the analysis (apart from for measuring the effects on productivity) were the Universe files. These Universe files contain data on all UK firms and thus is more comprehensive than the other 2 ABS datasets (Regional files and Respondents files). Both the LU and RU universe files were used.

1.8.1.2. Regression models

To estimate the effects of ODI on the **productivity** of UK firms we use the expression outlined below.

Equation 1

$$GVA_{it} = \beta\,Investment\,Position_{i,t-1} + \alpha_0 GVA_{i,t-1} + \alpha_6 Capital Expenditures_{it}$$

$$+ \alpha_1 Turnover_{it} + \alpha_2 Employment_{it} + \alpha_3 Industry_i +$$

$$+ \alpha_4 Target\,Market_i + \alpha_5\,Source\,Region_i + \mu_i + \gamma_t + e_{it}$$

Where GVA_{it} is approximate gross added value (GVA) at time t for firm i and provides a measure of productivity. Our regression also includes a lag of GVA which corrects for autocorrelation. The coefficient of interest is β which measures the effect of ODI (given by *lagged* Investment Position) on productivity. It is common in the literature to use the lagged Investment Position instead of current Investment Position, that is, $Investment\,Position_{i,t-1}$ instead of $Investment\,Position_{i,t}$. We also control for Capital Expenditures, Turnover, Industry, Employment, Target Market and Source Region. Last, we add individual fixed effects μ_i, time fixed effects γ_t, and the error term e_{it}. We assume that the individual fixed effects are correlated with Investment Position and Turnover. In addition, we assume that Investment Position and Turnover are all endogenous variables in the sense that their correlation with the error term e_{it} is not zero. Note that our continuous variables are in logs (so that they can be interpreted as percentage changes).

There are 3 main reasons why estimating the model above is difficult:

- First, the presence of the fixed effects means that simple (pooled) OLS estimation will give an inconsistent estimate of β. So, we need to eliminate the fixed effect by taking first differences where first differences are defined as (e.g.) $\Delta GVA_{it} = GVA_{it} - GVA_{i,t-1}$.
- Second, some of the control variables are endogenous or become endogenous as a result of the first difference transformation. For instance, $\Delta GVA_{i,t-1}$ becomes endogenous, so we need to control for this by using its lagged values as instruments. This is usually done via the Arellano-Bond estimator.
- Third, the coefficient on the lag of GVA is quite high. This might bias our estimates in short panels, as argued in Blundell and Bond (1998). For this reason, using the Arellano-Bond estimator is not ideal. So, econometricians suggest the use of the Blundell-Bond estimator which is also known as the system GMM (the command xtdpdsys in the Stata software). This is our preferred estimator.

GMM is commonly used in models that involve complex relationships and issues like unobserved heterogeneity and self-selection that can be used for a range of different models. It provides an efficient estimation even in the presence of heteroskedasticity or autocorrelation, making it a robust choice for complex models. Unfortunately, when using the system GMM, we cannot get values for time-invariant variables such as Industry, Target Market and Source Region. All time-invariant variables are eliminated due to the first difference transformation. Thus, to study variation in the effect of ODI, we took subsamples for i) each industry, ii) each target market, and iii) each source region.

The data for the models was taken from AFDIS and ABS from 2013 to 2019. From AFDIS, we used enterprise reference number (*wowentref*), target market (*country_code*), industry of foreign affiliate (*industrycode*) and investment position *(d3992)*. From ABS, we used enterprise reference number (*entrent*), source region (*region*), IDBR employment (*empment*), turnover (*turnover*), productivity (approximate GVA at market prices, *wq611*), net capital expenditures (on land and existing buildings, *wq531*). Note that in contrast to specifications for employment and exports, here we use the ABS Respondent data, rather than ABS Universe data. This is because productivity and capital expenditures variables are unavailable in the ABS Universe, resulting in smaller sample sizes. The solution is described in section 1.8.1.3 below.

To estimate the effects of ODI on the **employment** of UK firms we use the expression outlined below.

Equation 2

$$Employment_{it} = \beta \, Investment \, Position_{i,t-1} + \alpha_0 Employment_{i,t-1} +$$

$$+ \alpha_1 Turnover_{it} + \alpha_3 Industry_i +$$

$$+ \alpha_4 Target \, Market_i + \alpha_5 Source \, Region_i + \mu_i + \gamma_t + e_{it}$$

Where $Employment_{it}$ is the employment at time t for firm i. Our regression also includes a lag of Employment which corrects for autocorrelation. The coefficient of interest is β which measures the effect of ODI (given by *lagged* Investment Position) on employment. We also control for Turnover, Industry, Target Market and Source Region. Last, we add individual fixed effects μ_i, time fixed effects γ_t, and the error term, e_{it}. We assume that the individual fixed effects are correlated with Investment Position and

Turnover. In addition, we assume that Investment Position and Turnover are all endogenous variables in the sense that their correlation with the error term e_{it} is not zero.

Once more, there are 3 main reasons why estimating the model above is difficult.

- First, the presence of the fixed effects means that simple (pooled) OLS estimation will give an inconsistent estimate of β. So, we need to eliminate the fixed effect by taking first differences where first differences are defined as (for example) $\Delta Employment_{it} = Employment_{it} - Employment_{i,t-1}$.

- Second, some of the control variables are endogenous or become endogenous as a result of the first difference transformation. For instance, $\Delta Employment_{i,t-1}$ becomes endogenous, so we need to control for this via using its lagged values as instruments. This is usually done via the Arellano-Bond estimator.

- Third, the coefficient on the lag of Employment is quite high. This might bias our estimates in short panels, as argued in Blundell and Bond (1998). For this reason, using the Arellano-Bond estimator is not ideal. So, econometricians suggest the use of the Blundell-Band estimator which is also known as the system GMM (the command xtdpdsys in the Stata software). This is our preferred estimator.

Unfortunately, when using the system GMM, we cannot get values for time-invariant variables such as Industry, Target Market and Source Region. All time-invariant variables are eliminated due to the first difference transformation. Thus, in order to study the variation of the effect of ODI, we took subsamples for i) each industry, iI) each target market, and iii) each source region.

The data for the statistics was taken from AFDIS and ABS. From AFDIS, we used, enterprise reference number (*wowentref*), target market (*country_code*), industry of foreign affiliate (*industrycode*) and investment position (*d3992*). From (universe) ABS, we used enterprise reference number (*entref*), source region (*region*), IDBR employment (*empment*) and turnover (*turnover*).

To estimate the effects of ODI on the **exports** of UK firms we use the expression outlined below.

Equation 3

$$Exports_{it} = \beta\ Investment\ Position_{i,t-1} + \alpha_0 Exports_{i,t-1}\ +$$

$$+\ \alpha_1 Turnover_{it}\ +\ \alpha_3 Industry_i\ +$$

$$+\ \alpha_4 Target\ Market_i\ +\ \alpha_5\ Source\ Region_i\ +\ \mu_i\ +\ \gamma_t + e_{it}$$

Where $Exports_{it}$ is (total goods and services) exports at time t for firm i. Our regression also includes a lag of Exports in order to correct for autocorrelation. The coefficient of interest is β which measures the effect of ODI (given by *lagged* Investment Position) on exports. We also control for Turnover, Industry, Employment, Target Market and Source Region. Lastly, we add individual fixed effects μ_i, time fixed effects γ_t, and the error term, e_{it}. We assume that the individual fixed effects are correlated with Investment Position and Turnover. In addition, we assume that Investment Position and Turnover are all endogenous variable in the sense that their correlation with the error term e_{it} is not zero.

Once more, there are 3 main reasons why estimating the model above is difficult.

- First, the presence of the fixed effects means that simple (pooled) OLS estimation will give an inconsistent estimate of β. So, we need to eliminate the fixed effect by taking first differences where first differences are defined as (e.g.) $\Delta Exports_{it} = Exports_{it} - Exports_{i,t-1}$.
- Second, some of the control variables are endogenous or become endogenous due to the first difference transformation. For instance, $\Delta Exports_{i,t-1}$ becomes endogenous, so we need to control for this via using its lagged values as instruments. This is usually done via the Arellano-Bond estimator (the command xtaband in the Stata software).
- Third, the coefficient on the lag of Exports is quite high. This might bias our estimates in short panels, as argued in Blundell and Bond (1998). For this reason, using the Arellano-Bond estimator is not ideal. So, econometricians suggest the use of the Blundell-Band estimator which is also known as the system GMM (the command xtdpdsys in the Stata software). This is also our preferred estimator.

Unfortunately, when using the system GMM, we cannot get values for time-invariant variables such as Industry, Target Market and Source Region. All time-invariant variables are eliminated due to the first difference transformation. Thus, in order to study the variation of the effect of ODI, we

took subsamples for i) each industry, ii) each target market, and iii) each source region.

The data for the models was taken from AFDIS, ABS, ITS and the linked TIG-IDBR. The data was linked on the basis of the enterprise reference number and year which appear in all 4 datasets. From AFDIS, we used, enterprise reference number (*wowentref*), target market (*country_code*), industry of foreign affiliate (*industrycode*) and investment position (*d3992*). From (universe) ABS, we used the enterprise reference number (*entref*), source region (*region*), IDBR employment (*empment*) and turnover (*turnover*). From ITIS, we used the variables enterprise reference number (*wowent*), total exports of Services (*g204_j* and *q204_w*) and product (*products*). Last, from Linked TIG-IDBR, we used: the enterprise reference number (*wowref*) and total exports of goods (*emp_weight*).

1.8.1.3. Samples Size

In the previous discussion on the productivity equation (1.8.1.2), it was noted that the ABS-AFDIS linkage led to fewer observations. To increase the sample size in order to get non-zero results for sub-sample regressions, we thus define our observations not on the simple (enterprise, year) level, but on a more granular level. Specifically, we did the following calculations:

- Industry: observations were defined on enterprise, industry, year level. We did not aggregate up enterprises across different industries in order to get (enterprise, year).
- Target Market: observations were defined on (enterprise, target market, year) level. We did not aggregate up enterprises across different target markets in order to get (enterprise, year).
- Source Region: observations were defined on (enterprise, source region, year) level. We did not aggregate up enterprises across different source regions in order to get (enterprise, year).

For consistency purposes, the same approach was used for all 3 outcomes of interest (Employment, Productivity, Exports) for sub-sample regressions. This ensures that our results are comparable across different outcomes.