

# **Scotland's Inward Investment Plan**

## **Analytical Methodology Note**

**Trade and Investment Analysis  
Business, Investment and Trade Economics  
Office of the Chief Economic Adviser**



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## 1. Introduction

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1. This methodology note sets out the analytical methodology underlying the Scottish Government's 'Scotland's Inward Investment Plan: Shaping Scotland's Economy'.
2. The analysis was led by the Office of the Chief Economic Adviser (OCEA) and carried out by an analytical working group drawn from OCEA, Scottish Development International, Scottish Enterprise, Skills Development Scotland and Highlands and Islands Enterprise.
3. The plan is evidence-led and is based on a detailed programme of analysis. This analysis draws on more than 25 data sets, including from Scottish Government statistics, the Office for National Statistics, Scottish Development International, Financial Times FDI markets, EY, the Department for International Trade (DIT), OECD and NESTA, which were interrogated to build our understanding of the impacts of inward investment on the economy, to identify our areas of current and future competitive and comparative advantage and to understand the types of projects likely to deliver the widest range of benefits.
4. The plan also draws on the rich economic literature on foreign direct investment (FDI), including the emerging literature on assessing and targeting quality FDI. The relevant literature is summarised in section 3 of this methodology note.
5. The objective of the analysis has been to comprehensively review Scotland's approach to inward investment and to consider how inward investment can best help realise the Scottish Government's objectives for a strong, inclusive economy. The plan aims to maximise the benefits of inward investment to Scotland's economy, supporting the delivery of sustainable and inclusive growth.
6. This plan forms a key pillar in the evidence-led suite of policies and actions aimed at further strengthening and internationalising Scotland's economy. The analysis underlying it has been developed to be complementary to the analysis in Scotland's export plan, *A Trading Nation*, and to lay the groundwork for the upcoming Capital Investment Plan.
7. This technical note is split into 5 sections. This section, Section 1, introduces the note. Section 2 defines inward investment for the purposes of the plan and sets out the data used for the analysis. Section 3 explains the benefits of inward investment and the market failures which the plan aims to address. Section 4 sets out an analysis of Scotland's current inward investment performance and explains the modelling carried out to assess the impacts of improving this performance. The impacts of Covid-19 and Brexit are also considered. Finally, Section 5 describes the analysis underlying the selection of the nine opportunity areas. There is an Annex at the end of the note containing other supporting evidence.

## **2. Data and Definitions**

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### **Defining inward investment**

8. For the purposes of the plan we define an inward investor as a company or institution headquartered outside of Scotland that establishes a base of operations within Scotland, creating jobs and associated capital investment. The term 'inward investment' is used throughout this note in order to cover both foreign direct investment (FDI) and similar investment from the rest of the UK into Scotland. We define an inward investor as a company or institution headquartered outside of Scotland that establishes a base of operations within Scotland, creating jobs and associated capital investment.
9. Inward investment can be in the form of starting a new venture (greenfield), an expansion or an investment through a merger and/or acquisition (M&A), when a foreign firm, or firm based in the rest of the United Kingdom (rUK), merges with or acquires an existing Scottish firm. For the purposes of the plan, and in line with EY analysis, M&A is only in scope where a proposed merger or acquisition results in new jobs or facilities being created.
10. Whilst capital investment (monetary investment seeking a return) often forms part of inward investment, this plan does not cover projects that consist solely of capital investment. Our approach to those projects and investors will be addressed in our forthcoming capital investment plan.

### **Data sources**

11. The main data source used for this plan is Financial Times' fDi Markets database.<sup>1</sup> fDi Markets compiles detailed data on FDI projects across the world. The data is at company level and shows the capital expenditure and jobs associated with a project and the source and destination geographies. The database contains historic data dating back to 2003 and is updated on a monthly basis.
12. Other data sources used are referenced throughout this note.

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<sup>1</sup> fDi Markets, a service from the Financial Times Limited (2020). All Rights Reserved.

### 3. Economic Rationale for the Inward Investment Plan

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13. As described above, The Scottish Government and agency partners have taken this opportunity to conduct an evidence-led review, starting from first principles, on Scotland's performance at attracting inward investment and realising wider economic benefits from that investment, in line with the values and priorities set out in the main document. The review has also considered the role of government in most effectively acting to maximise the positive impacts of inward investment.
14. There are a number of motivations for government intervention in the market for inward investment:
- Inward investment creates high-quality jobs and makes a significant contribution to key areas of the economy, including its impact on output, research and development spending and exports.
  - Inward investment can also bring important indirect benefits to the Scottish economy. Inward investors bring access to global technology, markets and finance, all of which can spill over to domestic businesses and raise productivity.
  - There are recognised failures in the market for inward investment (so called 'market failures'). These are considered below. Government plays a key role in solving these market failures to allow the full benefits of inward investment to be realised.
15. The benefits of inward investment vary project to project and government has a significant role in shaping the economic impacts through the choice of which projects to support.
16. There is an extensive economic literature examining the impact of FDI on the host economy. This section briefly summarises some of the relevant findings from this literature. Section 5 describes how the insights from the economic literature have been used to choose the priority opportunity areas identified in the plan.
17. Inward investment has both direct and indirect effects on the economy. The direct effects are the impacts that are directly attributable to the incoming firm. This includes the jobs that the project creates, the capital expenditure and the increase in output as a result of the firm's production. These directly contribute to both the national and regional economy. In addition, inward investment has significant indirect impacts through competition and demonstration effects. These are shown in Figure 1 and explained further in Section 3.2.

Figure 1: The direct and indirect effects of inward investment



### 3.1 The direct benefits of inward investment to the Scottish economy

#### Inward investment businesses make a large contribution to Scotland's economy

18. Inward investment has a significant impact on Scotland's economy at both a national and regional level. Although only 3% of businesses in Scotland are owned outside of Scotland, they account for:

- 34% of employment (624,000 jobs)
- 46% of Scottish GVA (£41.7bn)
- 50% of turnover in Scotland (£119.6bn)<sup>2</sup>
- 63% of business R&D spending (£782m)<sup>3</sup>
- 77% of Scottish exports (£24.2bn), and 86% of Scotland's top 100 exporters are foreign or rUK-owned.<sup>4</sup>

(Note that these figures exclude the public and financial sectors and some parts of agriculture.)

Figure 2: Contribution of inward investment to Scotland's economy (%)



Source: Office of the Chief Economic Adviser analysis using data from Scottish Annual Business Survey, Business Enterprise Research and Development statistics and Export Statistics Scotland

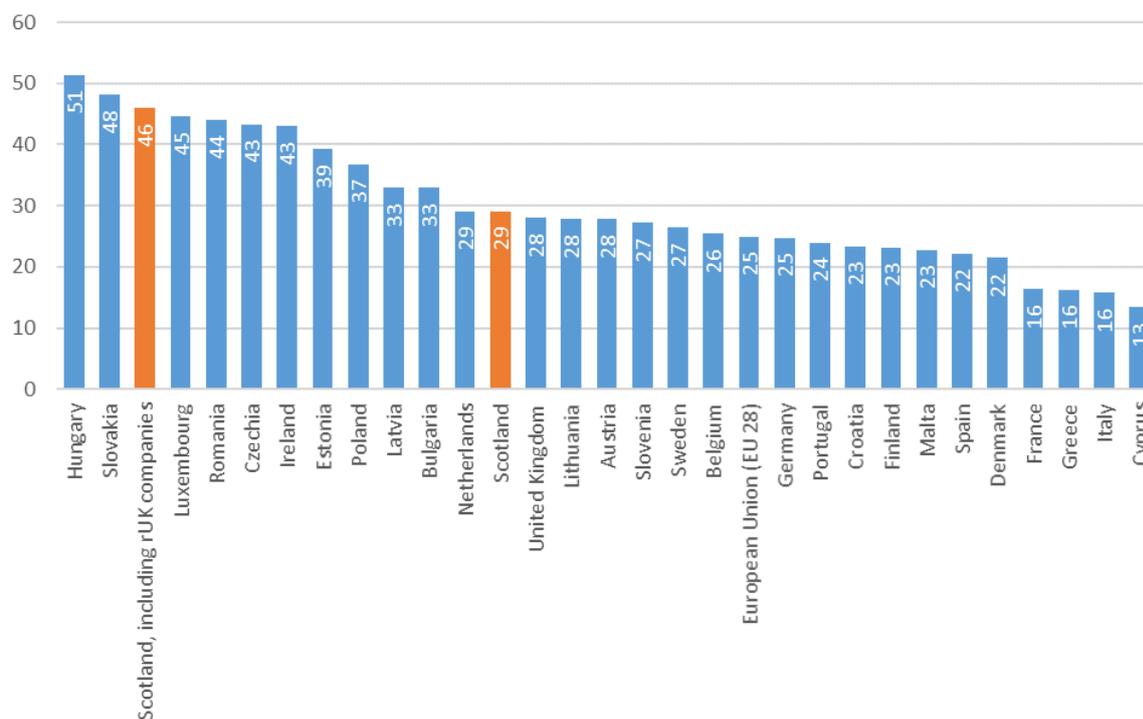
19. Foreign owned companies make up a similar share of the Scottish economy to that in many other countries in Europe (e.g. Germany, Sweden and Austria). Countries with lower shares of GVA from foreign-owned companies include France, Greece and Italy.

<sup>2</sup> Scottish Annual Business Statistics 2018

<sup>3</sup> Business Enterprise Research and Development 2017 statistics

<sup>4</sup> Export Statistics Scotland 2018

Figure 3: Share of value added by foreign-controlled enterprises, 2016



Source: Eurostat and Scottish Annual Business Statistics 2018

Note: only covers non-financial business economy

### Inward investment can create high quality jobs

20. Inward investment is a powerful tool for job creation. The 670 inward investment projects that landed in Scotland over the period 2017 to 2019 were associated with 37,856 jobs. Table 1 shows Scotland's trade and inward investment agency, Scottish Development International's (SDI), recent performance.

Table 1: SDI Involvement 2018 to 2019

Project Type	Number of Projects	New Jobs	Safeguarded Jobs
<b>Expansion</b>	54	4615	2847
<b>Safeguarding</b>	7	0	542
<b>New</b>	48	2070	0
<b>Totals</b>	109	6,685	3,389

Source: SDI

21. It is important to note that not all the new jobs will be additional, as new jobs may displace existing jobs. Studies carried out at the UK level show that roughly for every five jobs created by inward investment one job at domestic firms is displaced, although this is likely to vary significantly depending on the industry, the type of job and the geography.<sup>5</sup>

<sup>5</sup> Driffield (2002), 'Indirect employment effects of foreign direct investment into the UK'

22. The jobs that inward investment create tend to be higher wage and more productive on average than those created by domestic firms. Table 2 shows the gross wages and salaries per head for Scottish owned businesses, businesses owned in the rest of the UK (rUK) and foreign owned businesses across different industries. It shows that across all industries except 'other services', foreign owned business pay higher wages on average. It should be noted that these are not necessarily like-for-like comparisons, with foreign-owned firms typically being larger and able to enjoy economies of scale. For example, Scottish-owned firms have a high prevalence of smaller family-owned firms and sole traders, which also has its own benefits. Like-for-like comparisons at the UK level find that foreign-owned firms are more productive.<sup>6</sup>

Table 2: Gross wages and salaries per head by ownership and sector

Gross wages and salaries per head (£), by ownership and sector				
SIC	Sector	Scottish Owned	rUK Owned	Foreign Owned
ABDE	Primary Industries (ABDE)	37,606	55,457	68,838
C	Manufacturing	24,612	33,307	39,850
F	Construction	22,574	40,504	34,357
G	Wholesale, retail and repairs	14,781	13,231	18,279
H	Transport and storage	23,605	30,596	32,213
J	Information and communication	25,943	33,462	48,588
M	Professional, scientific and technical activities	26,050	42,177	44,588
N	Administrative and support service activities	17,801	20,432	19,351
z - ILPQRS	Other services	15,300	15,279	15,113

Source: Office of the Chief Economic Adviser analysis using data from Scottish Annual Business Statistics 2018

23. Table 3 shows the same is true by region in Scotland. It should be noted that these are averages across a whole sector and region. Within a sector or region there will be a distribution of wages across different ownership types and there may well be domestic firms that pay the same or more than the average foreign owned firm.

Table 3: Gross wages and salaries per head by ownership and region

Gross wages and salaries per head (£), by ownership and region			
Region	Scottish owned	RUK owned	Internationally owned
<b>01. Aberdeen City</b>	26,479	36,425	52,083
<b>02. Aberdeenshire and Angus</b>	21,391	29,414	38,959
<b>03. North Ayrshire, South Ayrshire and East Ayrshire</b>	16,769	18,573	27,142
<b>04. City of Edinburgh</b>	21,609	23,662	26,302
<b>05. Dundee, Fife and Clackmannanshire</b>	20,331	20,101	25,865
<b>06. City of Edinburgh</b>	19,250	23,215	25,876
<b>07. Highlands and Islands</b>	16,898	17,107	25,434
<b>08. North and South Lanarkshire</b>	18,374	20,820	25,906

<sup>6</sup> Harris and Robinson (2003), 'Foreign ownership and productivity in the UK'

<b>09. East Lothian, West Lothian, Midlothian</b>	19,895	18,372	27,092
<b>10. Perth, Stirling and Falkirk</b>	20,554	19,859	27,854
<b>11. Renfrewshire, Dunbartonshire, Inverclyde</b>	17,502	19,782	27,413
<b>12. South of Scotland</b>	15,921	17,447	26,534

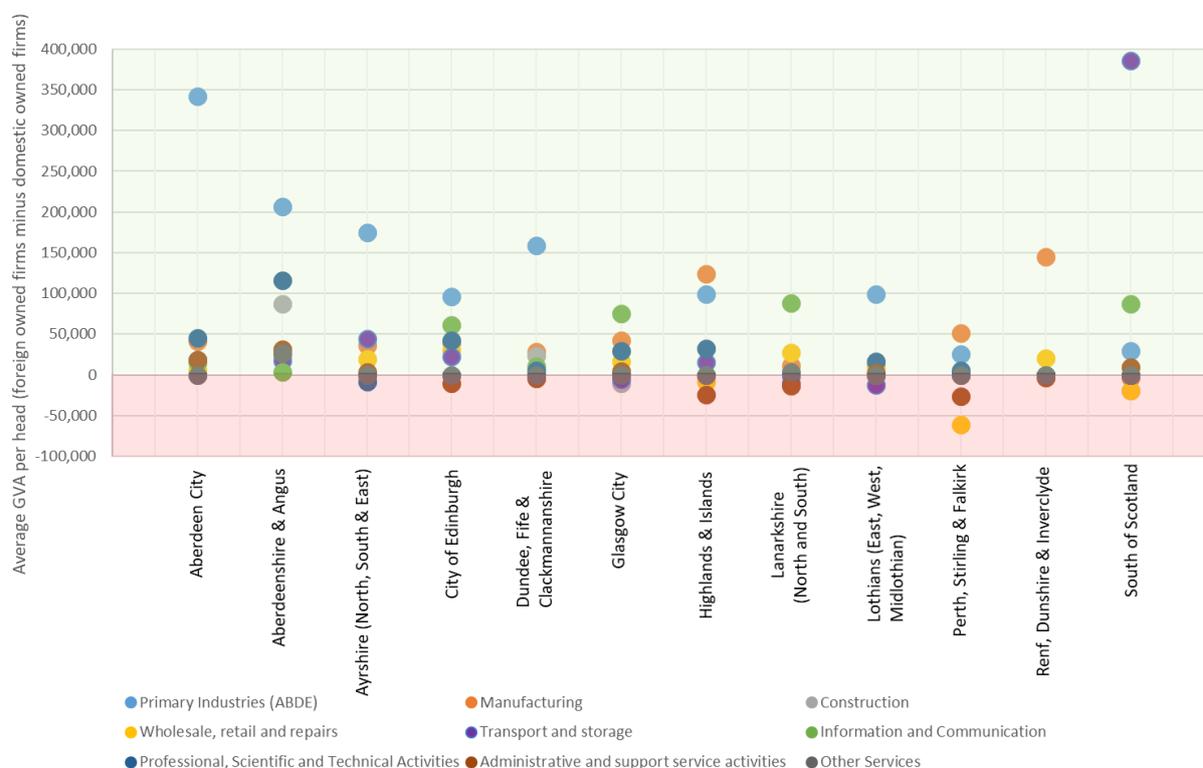
Source: Office of the Chief Economic Adviser analysis using data from Scottish Annual Business Statistics 2018

### 3.2 The indirect effects of inward investment on the Scottish economy

24. As well as the direct effects of creating jobs and producing output, inward investment can have significant indirect effects on the host economy.

25. Foreign owned businesses are on average more productive and some of the productive advantages of these firms can spillover to domestic firms.<sup>7</sup> Figure 4 shows that there is a productivity advantage for foreign owned firms across most regions and industries in Scotland. These businesses also tend to be more export-intensive and invest more in business R&D spending than the average domestic firm, both of which are associated with greater productivity.<sup>8</sup>

Figure 4: Productivity advantage of foreign-owned firms, sectors and regions



Source: Office of the Chief Economic Adviser analysis using 2017 data from Scottish Annual Business Statistics

<sup>7</sup> See for example Haskel et al (2002), 'Does inward foreign direct investment boost the productivity of domestic firms?'

<sup>8</sup> OECD (2019), 'FDI Qualities Indicators: Measuring the sustainable development impacts of investment', for example sets out the evidence that this is also the case across a wide range of countries

26. The indirect impacts of inward investment businesses that provide rationale for the plan can be split into two effects:<sup>9</sup>

Competition effects: as shown in Section 3.1, inward investors tend to be more productive on average than domestic firms in the same sector. New inward investment projects can therefore introduce new competitive pressures for domestic firms. Competition can stimulate innovation and productivity increases and make domestic firms more efficient. Alternatively, if domestic firms are not able to compete they can be put out of business (so called 'displacement effect', which can also be positive if employment shifts to firms offering more productive, higher wage jobs).

Demonstration effects: domestic businesses can learn new ways of operating from inward investors that can improve their productivity. These demonstration effects can occur through supply chains – for example an inward investment company may share some know-how with its suppliers in order to get better inputs into its production. They can also occur through the movement of employees between firms, with workers bringing the skills and knowledge they have gained at inward investment firms to their new employers.

27. The literature tends to find that, for developed countries like Scotland, while inward investment can certainly have displacement effects, these are outweighed by the positive spillover impacts resulting in significantly net positive impacts for the host economy. For example, Gillespie et al (2001) finds that efficiency spillovers are significant in Scotland and can act to increase GDP.<sup>10</sup> However, the literature is still somewhat inconclusive on this point in general, with some papers finding weak evidence of productivity spillovers and others finding significant impacts. A reasonable conclusion from the evidence is that the impacts can vary depending on the characteristics of both the incoming project and of the host economy in which the project lands.<sup>11</sup>

28. The key strands identified in the literature examining the differential impacts of projects depending on their characteristics and those of host economy are as follows:

- Supply chains – as well as the direct benefits of purchasing products and services from domestic business, the economic literature suggests that benefits from foreign-owned firms can spill over to domestic firms through supply chain developments. Firms have an incentive to transfer knowledge to their suppliers in order to improve the quality of their inputs. Additionally, downstream firms benefit from a greater variety and quality of inputs.<sup>12</sup>

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<sup>9</sup> See for example World Bank (2018), 'Global Investment Competitiveness Report' and Department for International Trade (2018) for a summary of the literature on these two effects

<sup>10</sup> Gillespie, McGregor, Swales, Yin (2001), 'A regional computable general equilibrium analysis of the demand and efficiency spillover effects of foreign direct investment'

<sup>11</sup> See the following for a summary of the literature: Driffield et al (2019), 'FDI and local productivity'

<sup>12</sup> See for example Driffield et al (2005), 'Inward investment, transactions linkages, and productivity spillovers' and Smarzynska (2003), 'Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages'

- Innovation – innovative inward investors who bring new technologies can have particularly beneficial impacts.<sup>13</sup> The benefits from innovation and research and development spending in Scotland can benefit other firms throughout the economy through knowledge spillovers and demonstration effects. In addition, employees of innovative inward investment firms may use the knowledge they have gained to start their own innovative companies.<sup>14</sup>
- Labour market and skills – a well-functioning labour market helps to spread the benefits from inward investment firms through the movement of labour, with employees bringing skills and experience with them when they move job. Higher wages from inward investment companies can also spillover to other firms, leading to wider wage increases.<sup>15</sup>
- Agglomeration and cluster building – there are more opportunities for knowledge and good business practices to spill over to other firms when there are many similar firms in close proximity geographically.<sup>16</sup>
- Productivity – targeting inward investment firms that are world-class in their levels of productivity offers the potential for some of their practices and other ways of doing business to spill over to domestic firms.
- Regional impacts – spillovers can often be local, so it is important to identify regional strengths, and the potential for local cluster building to attract inward investors into different regions of Scotland so that regional economies can also benefit.<sup>17</sup> Domestic regional investment is in general stimulated by inward investment, although this can depend on the characteristics of the region.<sup>18</sup>
- Absorptive capacity – the capacity of domestic firms to absorb the beneficial spillovers from inward investment is a key factor in realising spillovers. This can include factors such as the technology gap between domestic and foreign firms, the skill level of employees, the geography and spatial proximity of firms to entrants and the efficiency and liquidity of labour markets.

29. The benefits from these positive spillovers are not captured directly by the inward investor. Put in another way, the social and economic benefits of a firm's investment will exceed the private benefits accruing to that firm. For example, a new inward investor will not consider the positive impacts they may make on third party firms' productivity. This can result in a sub-optimal level of inward investment from the perspective of the wider economy. This provides clear rationale for the government to provide support to raise the level of inward investment so as to realise more of the positive spillover benefits.

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<sup>13</sup> See for example Driffeld and Love (2007), 'Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis'

<sup>14</sup> See for example Rodríguez-Pose & Crescenzi (2008), 'Research and Development, Spillovers, Innovation Systems, and the Genesis of Regional Growth in Europe'

<sup>15</sup> Driffeld and Girma (2003), 'Regional foreign direct investment and wage spillovers: plant level evidence from the UK electronics industry'. It should be noted that it is not clear whether this is an aggregate benefit since wage increases in domestic firms might lead to employment losses.

<sup>16</sup> For a discussion of the literature on this see Driffeld and Hughes (2002), 'Foreign and domestic investment: regional development or crowding out?'

<sup>17</sup> Girma and Wakelin (2000), 'Are there regional spillovers from FDI in the UK?'

<sup>18</sup> Driffeld and Hughes (2002), 'Foreign and domestic investment: regional development or crowding out?'

30. Section 5 describes how these key findings from the literature are used to inform the choice of opportunity areas in the inward investment plan.

### 3.3 Market failures in the market for inward investment

31. The impact of positive spillovers and the sub-optimal level of inward investment in the absence of government intervention explored above is one example of a market failure. Here, the term market failure is used to describe a circumstance in which there are potential economic benefits that the private sector would not realise in the absence of government intervention.

32. There are other market failures in the inward investment market that justify government intervention and help to shape the appropriate policy responses for maximising the positive impact of inward investment on the Scottish economy.<sup>19</sup> These include:

- Information failures: firms make investment decisions based on an assessment of likely benefits, costs and risks. Without adequate information on the Scottish market and the potential benefits, foreign firms may find it difficult to accurately assess the opportunities available. Furthermore, it can be prohibitively expensive for an individual firm to pay for full information about the opportunities (whether through consultancy advice or in staff time). Government can overcome this market failure through producing market information and through public information campaigns to help businesses properly assess the benefits of investing in Scotland.
- Network and intermediation failures: social networks and intermediaries are very important for inward investment flows and enable businesses to identify opportunities and gain access to overseas contacts and information. It is expensive for a business to pay for their own overseas network or intermediaries and so the private sector alone does not tend to lead to adequate provision. Government can also be uniquely well placed to be a trusted intermediary in the inward investment market.
- Coordination failures: there is often the possibility for cost savings through coordination between private inward investment firms, for example around sharing the cost of new infrastructure they might need. However, there can be market failures around businesses not contributing equally or sharing equally in the benefits (so called free riding) that can stop this cooperation from happening. Government can overcome some of these issues, for example through coordinating the activities of different inward investment projects or through cluster and enterprise policy.
- Under-investment in skills: there are market-wide benefits from firms upskilling staff with the transferable skills that they can take to other employers. However, individual business may under-invest in these types of skills as they do not believe that they will capture the benefit from them.

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<sup>19</sup> This list of market failures draws on evidence compiled in 'International trade and investment: the economic rationale for government support', former Department for Business, Innovation and Skills

33. The 2017 evaluation of SDI's investment promotion activities carried out by SQW provides evidence that SDI's activities help to reduce market failures and increase the level of inward investment over and above what it would have been in the absence of their assistance. The evaluation finds that just under half (44%) of inward investment projects in Scotland would not have happened had it not been for SDI's support. Furthermore, an additional 40% would have been smaller or delayed and only 7% of projects would have gone ahead in the same way without support.<sup>20</sup>

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<sup>20</sup> Strategic evaluation of SDI international activities: final report, SQW, 2017

## 4. Understanding Scotland's Performance

### 4.1 Current headline performance

34. Having established the economic benefits of inward investment and the market failures that justify government intervention we now turn to understanding Scotland's performance at attracting inward investment and realising wider economic benefits from that investment.

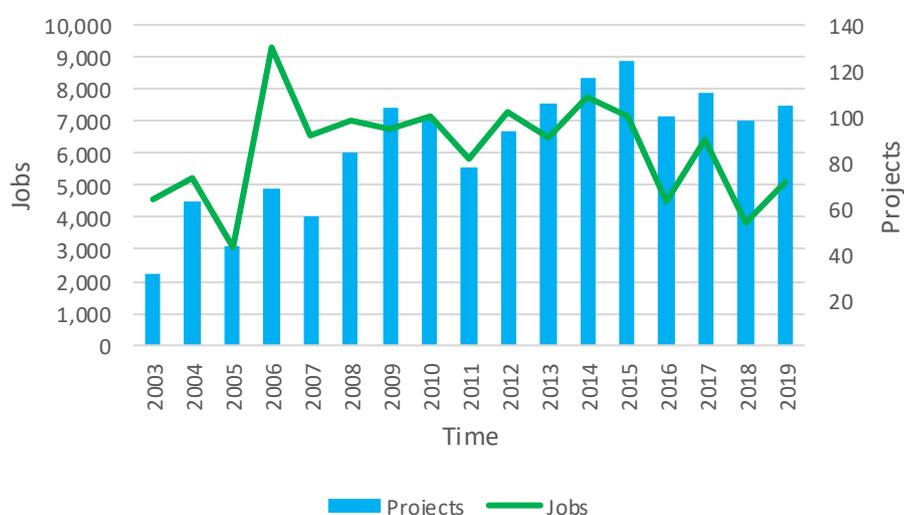
35. Scotland has shown strong performance at attracting inward investment. The economic disruption caused by Covid-19 is, however, having significant impacts on the global inward investment market. This section describes the historic flows of inward investment into Scotland and examines the impacts of Covid-19 on these flows. Due to differing data sources this section splits out foreign direct investment from similar investment from the rest of the UK.

#### Foreign direct investment

36. For the last seven years Scotland has secured the most inward investment projects of any UK nation or region outside of London. During 2019, Scotland secured 101 projects, a rise of seven projects, or 7.4% from the 94 projects recorded in 2018. The increased FDI flow saw Scotland's share of all UK projects rise to 9.1% from 8.9% in 2018. In 2019, Scotland also received the highest number of jobs created through FDI of any UK nation or region outside of London, receiving 6,438 in that year. Glasgow, Edinburgh and Aberdeen all rank in the top 10 UK cities for inward investment projects, attracting 23, 22 and 15 projects respectively in 2019.<sup>21</sup>

37. Figure 5 shows FDI into Scotland over the period 2003 – 2019. Project numbers have grown significantly over the period, from 31 projects in 2003 to a peak of 124 projects in 2015. The chart also shows that FDI is volatile and can react quickly to changes in the global economy. Job numbers can also vary significantly due to the size and type of projects in any one year.

Figure 5: FDI into Scotland, projects and jobs, 2003 - 2019

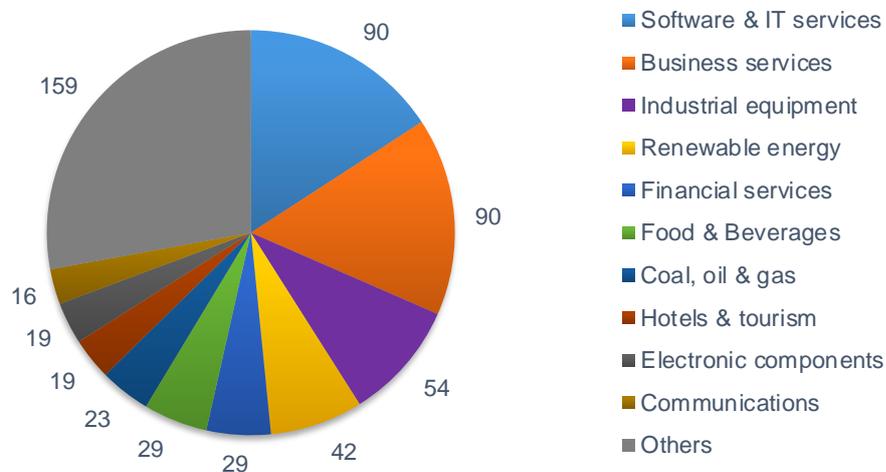


Source: Office of the Chief Economic Adviser analysis using data from fDi Markets

<sup>21</sup> EY Scotland Attractiveness Survey 2020

38. Historically Scotland has been most successful at attracting FDI in software & IT services, business services, coal, oil & gas, renewable energy and financial services sectors. Figure 6 below shows Scotland's top 10 sectors for FDI projects. The top 5 FDI sectors account for more than 50% of both projects and jobs. The grey 'other' section represents another 25 smaller sectors.

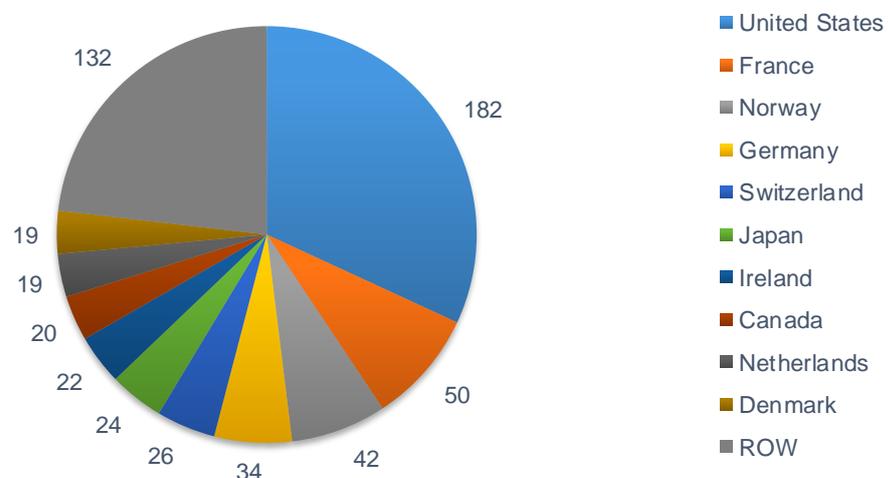
Figure 6: Number of FDI projects by sector, 2015 – July 2020



Source: Office of the Chief Economic Adviser analysis using data from fDi Markets

39. Scotland's main sources of FDI are the United States, France, Norway, Germany and Switzerland. Figure 7 shows the breakdown of Scotland's top 10 sources of FDI in the period 2015 – July 2020 (the latest data available). The top 10 sources of FDI accounts for 77% of projects and 81% of jobs. Our top 5 sources represent more than 50% of FDI into Scotland.

Figure 7: Number of FDI projects by source country, 2015 – July 2020



Source: Office of the Chief Economic Adviser analysis using data from fDi Markets. Note: ROW indicates 32 further rest of world countries

## Investment from the rest of the UK

40. Table 4 shows the number of inward investment projects into Scotland originating in another nation or region of the UK. On average over the period 2017 to 2018, the only period for which data is available, there were 46 projects a year bringing 4,225 jobs a year into Scotland.

Table 4: Inward investment projects from the rest of the UK into Scotland, 2017-18

	Number of projects	Capex (£m)	Jobs
2017	41	256	3,385
2018	51	338	5,064
<i>2-year average (2017 and 2018)</i>	<i>46</i>	<i>297</i>	<i>4,225</i>

Source: Office of the Chief Economic Adviser analysis using data from Wavteq<sup>22</sup>

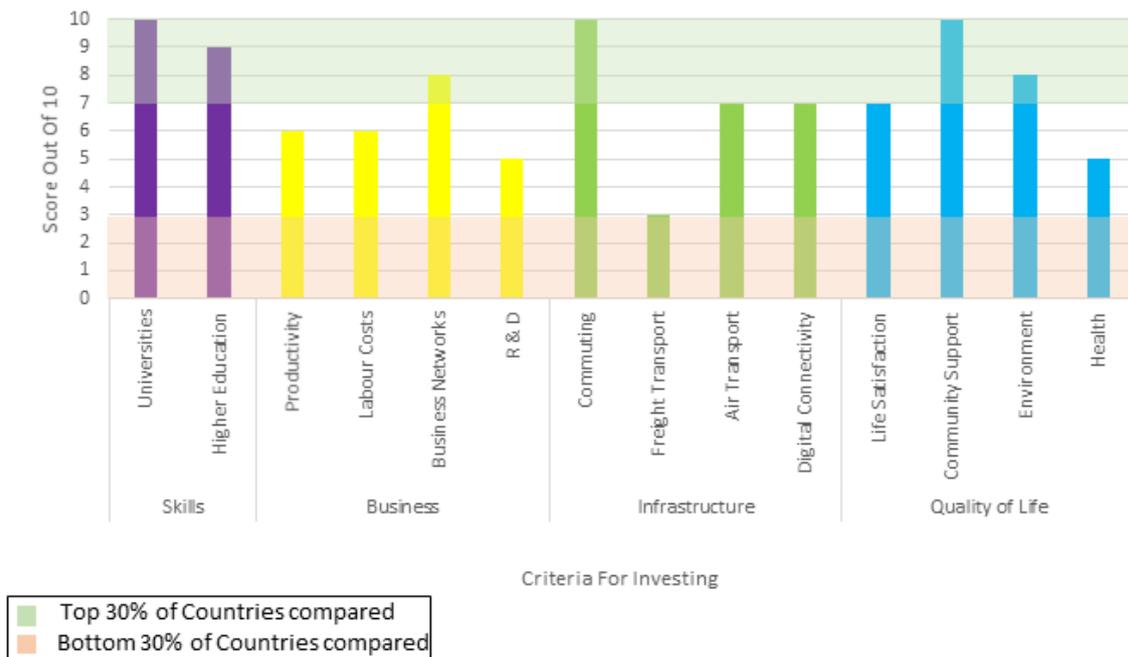
## Understanding Scotland's attractiveness to inward investors

41. There is a wide economic literature on the factors that attract inward investment. In addition, the EY Attractiveness Survey provides survey evidence on why investors choose a regional location in the UK.
42. Figure 8 shows Scotland benchmarked against international comparator countries across a range of these attraction factors.
43. In order to make the range of indicators comparable, Scotland was given a score out of 10 for each indicator dependent upon how well Scotland compared to the other countries. A score of ten was allocated if Scotland ranked in the top decile, in the second decile a score of 9 and so on. This allowed for differences in data, units of measurement and even which countries were used as comparators. In order to adjust for population size some indicators were calculated on a per capita basis. The table shows that Scotland performs well on a number of measures, particularly in relation to skills and quality of life, but is in the middle range in terms of some of the business measures and health and performs poorly in terms of freight transport infrastructure. The full list of data sources used, along with the comparator countries chosen is in the Annex.

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<sup>22</sup> <https://www.wavteq.com>

Figure 8: Comparing Scotland's attraction factors for inward investment



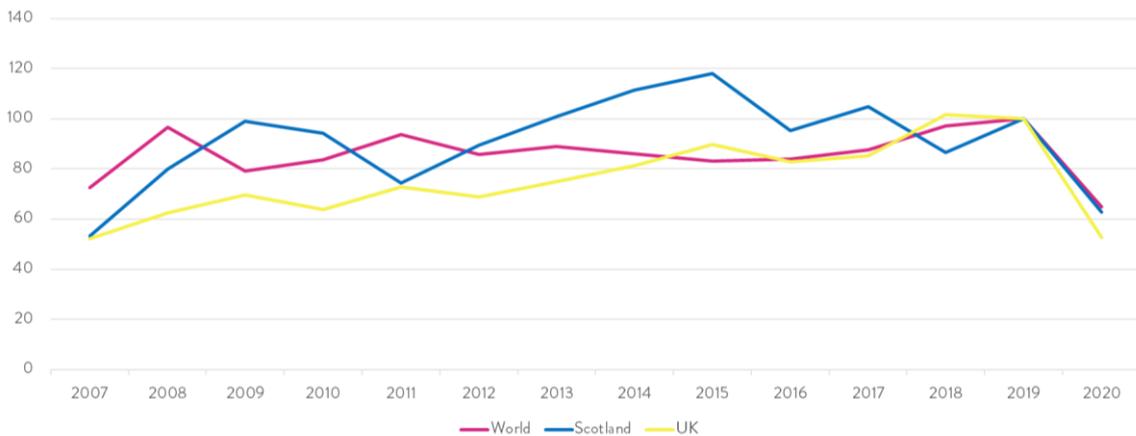
Source: Office of the Chief Economic Adviser analysis, full source list in Annex

### Covid-19 and Brexit

44. Covid-19 has already had a significant impact on FDI with sharp declines in global flows. UNCTAD forecasts a decrease in global FDI by up to 40 per cent in 2020, from their 2019 estimated value of \$1.54 trillion. This would bring FDI below \$1 trillion for the first time since 2005. FDI is projected to decrease by a further 5 to 10 per cent in 2021 but to begin to recover in 2022.<sup>23</sup>
45. A rebound in 2022, with FDI reverting to the pre-pandemic underlying trend, is possible, but only at the upper bound of expectations. Significant reductions in earnings are forecast from multi-national enterprises (MNEs), a key source of FDI projects. The extent of the decline in investment will depend in part on the depth and length of the pandemic in world regions, industry responses and government policies. In terms of recovery, it is anticipated that some postponed investments may be quickly reinstated but, in general, global production networks are likely to be impacted for an extended period. Moreover, there are early signs that Covid-19 is not only influencing the scale of investment but also asserting a more systemic influence on investment strategies. This could include re-engineering of supply chains to achieve greater strategic autonomy, increased supply chain diversification and an emphasis on resilience.
46. Following global trends, FDI into Scotland has substantially decreased in 2020 compared to 2019. This was to be expected with many businesses forced to close and travel restrictions put in place to control the spread of the virus.
47. Figure 9 and Figure 10 show the impact of Covid-19 on FDI flows into Scotland. Figure 9 shows monthly project numbers to allow for comparison between 2020 and previous years. This chart accounts for projects up to and including May 2020.

<sup>23</sup> United Nations Conference on Trade and Development, 'World Investment Report 2020'

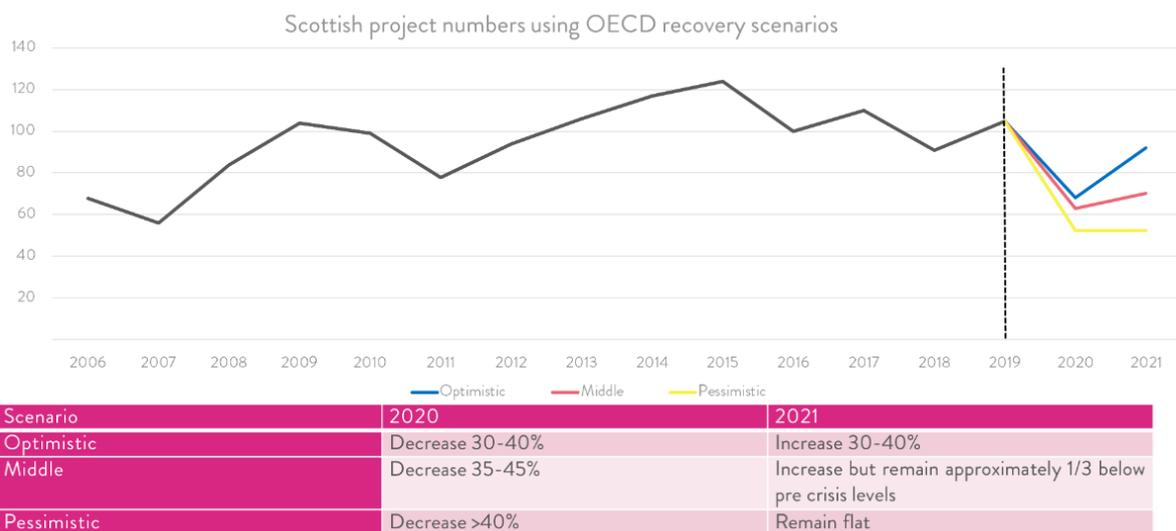
Figure 9: Average monthly projects into Scotland, indexed 2009=100



Source: Office of the Chief Economic Adviser analysis using data from fDi Markets

48. The OECD present three potential scenarios for future global inward investment trends: pessimistic (decrease more than 40% then remain flat); mid-range (decrease by 35-45% in 2020 then increase but remain approximately a third below pre-crisis levels); and optimistic (decrease by 30-40% in 2020 and then partially bounce back with an increase of 30-40% in 2021). Historic data show that Scotland’s FDI roughly follows global FDI trends, so these scenarios are also considered to be relevant to Scotland. Figure 10 shows these scenarios applied to Scotland’s FDI.

Figure 10: Scottish project numbers using OECD recovery scenarios



Source: Office of the Chief Economic Adviser analysis using data from fDi Markets and OECD 'Foreign direct investment flows in the time of Covid-19'<sup>24</sup>

49. There is evidence that Brexit has already reduced the flow of inward investment projects into the UK. The UK Trade Policy Observatory, at the University of Sussex,

<sup>24</sup> <https://www.oecd.org/coronavirus/policy-responses/foreign-direct-investment-flows-in-the-time-of-covid-19-a2fa20c4/>

estimate that, in the years following the referendum, there were 16-20% fewer FDI projects than there would have been if the UK had voted to remain a member of the EU.<sup>25</sup> On the other hand, more recent evidence from the EY UK Attractiveness Survey suggests that Brexit-related uncertainty was a less significant risk factor for investors than it had been in previous years (24% cited it in 2020 as opposed to 38% in 2019). However, the majority of investors (53%) surveyed by EY said that the UK after Brexit was either 'slightly less attractive' or 'significantly less attractive' for inward investment.<sup>26</sup>

## **4.2 Scotland's performance at realising economic spillovers from inward investment**

50. As described above, Scotland has shown strong performance at attracting inward investment with the most inward investment projects of any UK nation or region outside of London.<sup>27</sup> There is also evidence, described in Section 3.3, that government action has contributed to this success.
51. While Scotland has performed well at realising the direct benefits of inward investment, evidence suggests that there is scope to improve performance in maximising the wider impacts of inward investment to the economy. The UK Department for International Trade (DIT) has produced analysis comparing the performance of the nations and regions across the UK in capturing the wider economic benefits of FDI, in terms of economic variables such as GVA, wages and productivity.
52. These comparisons, across a range of metrics, are shown below. It can be seen that Scotland outperforms the UK average on all spillover measures. However, in each case, there are regions which outperform Scotland, highlighting the benefits to the wider economy that could be gained from a more focussed and targeted approach to inward investment attraction which explicitly seeks to capture more of these wider impacts.<sup>28</sup>

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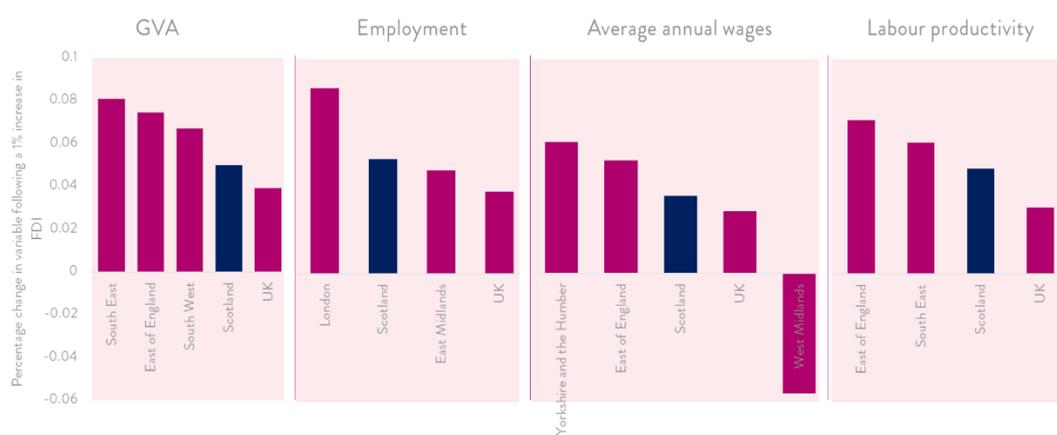
<sup>25</sup> <https://blogs.sussex.ac.uk/uktpo/files/2018/10/BP23interactive.pdf>

<sup>26</sup> EY UK Attractiveness Survey 2020, [https://www.ey.com/en\\_uk/attractiveness/20/uk-attractiveness-survey](https://www.ey.com/en_uk/attractiveness/20/uk-attractiveness-survey)

<sup>27</sup> EY Scotland Attractiveness Survey 2020

<sup>28</sup> Department for International Trade, 'Estimating the economic impacts of FDI to support DIT's promotion strategy'. Only impacts that are different from zero at a statistically significant level are shown, hence not all regions feature in the charts.

Figure 11: Estimating the wider economic impacts of FDI



Source: Office of the Chief Economic Adviser analysis using data from Department for International Trade, 'Estimating the economic impacts of FDI to support DIT's promotion strategy'

53. Further evidence from Driffield and Lavoratori (2020) suggests that Scotland accrues lower than average productivity spillovers from FDI. The authors focus on the manufacturing sector and find that across the UK the average impact of FDI on firm's productivity is 0.015. This implies that a doubling of FDI would increase the average UK firm productivity by 1.5%. As the authors point out, while this may seem small, year on year productivity growth in the UK is well under 2%. This therefore shows the significant role that FDI can play in improving productivity.<sup>29</sup>
54. However, for Scotland, the authors find that, based on historic performance, a doubling of FDI would only increase productivity by 0.1%, significantly lower than the UK average of 1.5%.
55. Put simply, not all inward investment is equal and different projects can yield different magnitudes of spillovers. Additionally, as described in Section 5, the literature shows how the characteristics of the host economy are important in successfully realising economic spillovers.
56. As part of the plan, the Office of the Chief Economic Adviser carried out analysis to understand the potential benefits for Scotland of improving this performance using the Scottish Government's Computable General Equilibrium (CGE) model.

### 4.3 Modelling the impacts of increasing economic spillovers

57. The Scottish Government's Computable General Equilibrium (CGE) model has been used for this analysis. The model is a large scale multi-sectoral simultaneous equation model, calibrated using data derived from Scottish Input-Output tables and econometric estimates of key relationships across the economy. The model was originally built by the University of Strathclyde, and has previously been used

<sup>29</sup> Driffield and Lavoratori (2020), 'Spillovers from inward investment – a comparison of Northern Ireland with the rest of the UK'

for modelling possible changes in projected future migration patterns<sup>30</sup> as well as the potential sectoral economic impact of different Brexit scenarios.<sup>31</sup>

58. The model covers firms, households and government in detail. For firms, there are 21 different aggregated sectors modelled in the Scottish economy, covering activities ranging from Agriculture and Fishing to Construction and Financial Services. The model interlinks the production decision making of these sectors with the decision making of government and households to appropriately portray a snapshot of production and activity in the Scottish economy. This activity is determined by prices, both in domestic markets and in international markets. Prices in domestic markets are determined by supply and demand in every market, including the price of domestically produced goods and service, the wage rate in the economy, and the return to capital. Households derive income from wages and capital income, while governments derive revenue from both direct and indirect taxes. Firms earn income from selling goods and services to both the domestic market as well as overseas.
59. The economic modelling approach compares a baseline scenario of the Scottish economy to what would happen to the Scottish economy under the alternative scenario. In this case, the alternative scenario is a 4% increase in labour productivity by 2040, to reflect the potential effects of increasing Scotland's performance at capturing spillovers to similar levels seen in the East of England (the best performing UK region as estimated by DIT).<sup>32</sup> The change between the baseline and the alternative scenario then provides an illustration of the economic impacts of higher spillovers effects in Scotland.
60. The alternative scenario modelled the impact of increasing labour productivity by 4% by 2040. The modelling made the following assumptions for the alternative scenario:
- The shock was assumed to gradually occur over a 20 year horizon. In other words, labour productivity was assumed to increase by 0.02% each year for 20 years until a total 4% increase in labour productivity was achieved. This assumes that any increase in labour productivity would likely be achieved over time as opposed to occurring instantaneously.
  - The modelling assumptions state:
    - Sectors are forward-looking in their decision making. This means that production and investment decisions are determined by expected future costs of production and expected returns to investment.
    - Households are also forward-looking in their decision making. This means that consumption decisions each year depend on the expected price of

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<sup>30</sup> For more information, see the technical annex of "Scotland's population needs and migration policy: discussion paper" <https://www.gov.scot/publications/scotlands-population-needs-migration-policy/pages/7/>

<sup>31</sup> For more information, see the publication "Brexit: Sectoral Economic Impact Analysis" <https://www.gov.scot/binaries/content/documents/govsct/publications/publication/2019/02/state-economy-february-2019/documents/brexit-scottish-sectoral-economic-impact-analysis/brexit-scottish-sectoral-economic-impact-analysis/govsct%3Adocument/00546072.pdf>

<sup>32</sup> Department for International Trade, 'Estimating the economic impacts of FDI to support DIT's promotion strategy'

consumption in the following year, interest rates and how much future consumption is valued (also known as the discount rate).

- Governments are assumed to maintain a balanced budget deficit. All additional revenues are spent in areas of the economy which currently see government activity, i.e. higher spending in areas such as public administration, defence, education and health.
- Migration is assumed to occur between Scotland and the rest of the UK (rUK). This is determined by relative wage rates, where higher wage rates in one region will drive higher inward migration from the other region.

61. The aggregate economic results are shown in Figure 12 and report the change from the baseline in 2040 (that is, the percentage difference between the alternative scenario and the baseline). Overall, the economy is 2.6% (£4.2bn) larger in 2040 than it otherwise would have been in the baseline scenario. This translates into 1.2% higher real government revenues, with higher direct and indirect revenues than otherwise would have been. To provide an illustrative example, a 1.2% increase in onshore revenue would be equivalent to £680m in additional revenue to government.<sup>33</sup>

62. There is also a significant boost to the competitiveness of Scottish firms, resulting in higher total (both rUK and International) exports of 2.4% (£2.1bn). With higher labour productivity, Scottish firms are now able to produce the same goods at relatively lower costs, because each employed person now can produce more than they did before in a given time. As a result, demand for Scottish goods and services increases in both the rest of the UK and internationally. Households benefit from lower domestic prices, allowing for household consumption to increase by 0.1% (£119m).

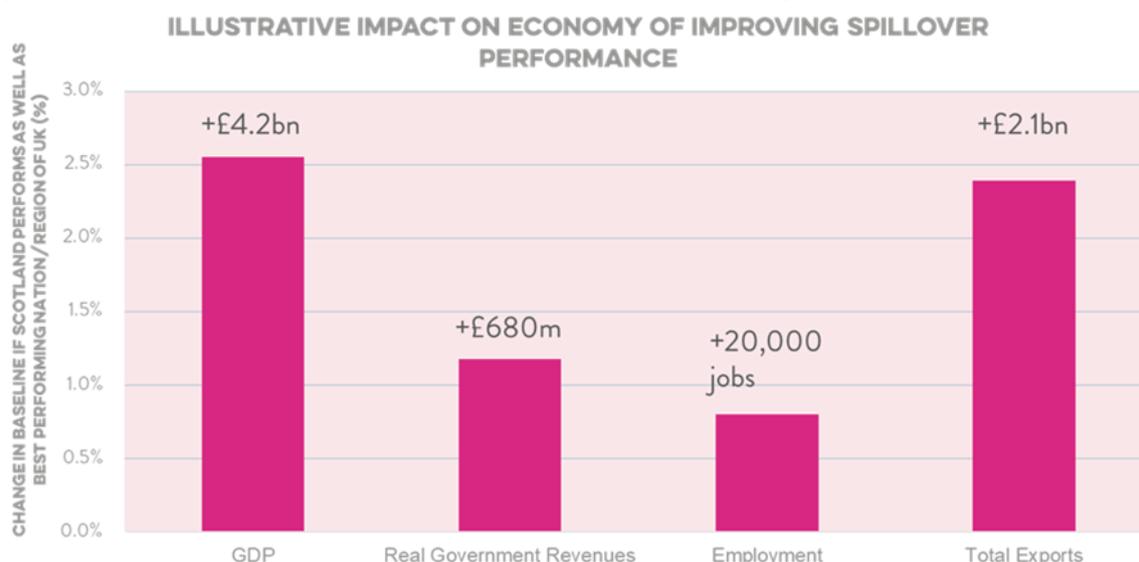
63. The estimate of the impact on jobs is estimated using the regional econometric estimates from DIT (2018).<sup>34</sup> The employment spillover coefficient for Scotland is compared to the best performing region outside of London, which is Wales, and applied to Scotland's employment baseline. This finds that increasing spillover performance to match Wales would increase employment in Scotland by 0.8% (around 20,000 jobs).

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<sup>33</sup> Revenue measured in 2019-20 prices. Revenue here refers to a mixture of Devolved Taxes and those reserved to the UK Government.

<sup>34</sup> Department for International Trade, 'Estimating the economic impacts of FDI to support DIT's promotion strategy'

Figure 12: Illustrative impact on the economy of improving spillover performance



Source: Office of the Chief Economic Adviser Analysis using the Scottish Government Computable General Equilibrium Model

### Using the East of England as a comparator

64. As outlined above, the East of England region is used as a comparator to Scotland in order to understand the potential impacts of greater economic spillovers. The Department for International Trade analysis highlighted above suggests that the East of England performs strongly when it comes to gaining wider economic impacts from inward investment projects. Other sources report the same finding, including the aforementioned paper by Driffield and Lavoratori (2020) which finds that the East of England performs more strongly than the UK average when it comes to productivity spillovers from inward investment.<sup>35</sup> Moreover, the East of England shares some similarities with Scotland which show it as a worthwhile comparator when it comes to inward investment.

65. The East of England region is located to the north of London and encompasses the counties of Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk. From the point of view of inward investment, key drivers include Cambridge, which accounted for 19% of all projects into the region over the last decade, the airports Luton and Stansted and Felixstowe, Britain's biggest container port.<sup>36</sup>

66. Scotland and the East of England have similar sized populations, with 5,463,300 people living in Scotland and 5,847,000 in the East of England.<sup>37</sup> There are a similar number of universities per capita.

67. In terms of sectors, the inward investment projects that Scotland attracts are not hugely different from those that the East of England attracts (see Figure 13). The

<sup>35</sup> Driffield and Lavoratori (2020), 'Spillovers from inward investment – a comparison of Northern Ireland with the rest of the UK'

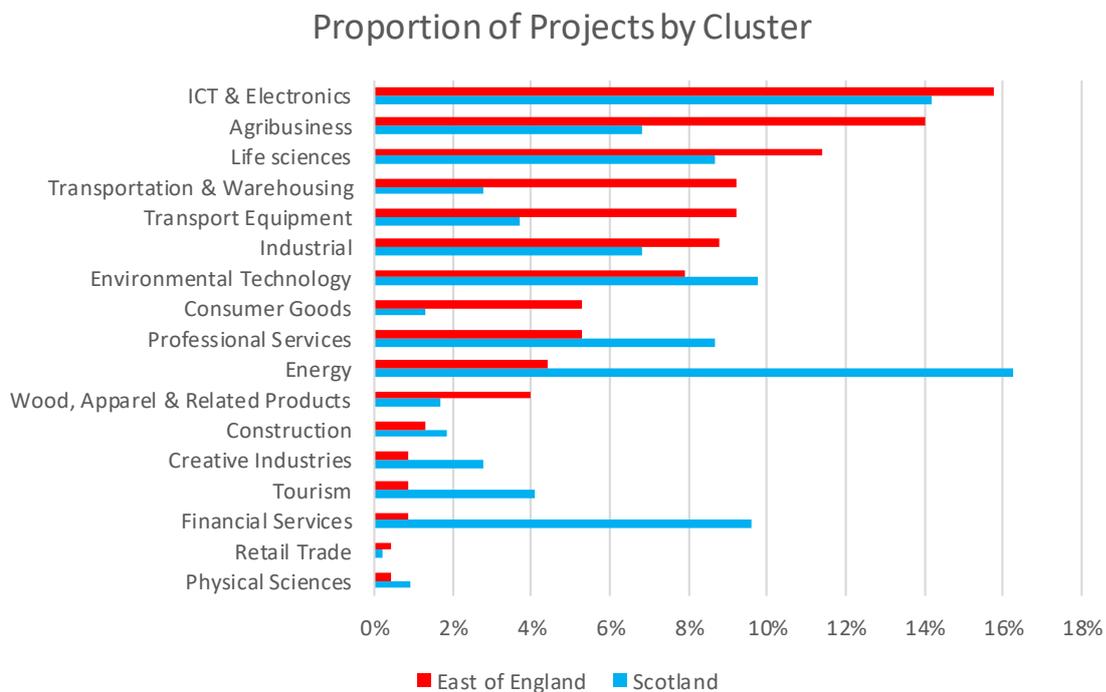
<sup>36</sup> Source: <https://www.portoffelixstowe.co.uk/>

<sup>37</sup> National Records of Scotland and ONS 2011 census estimates

exceptions are transportation and warehousing projects which make up a much more significant part of the East of England's FDI mix (likely driven by the transport infrastructure mentioned above and the location near London) and energy and financial services, which are much more significant in Scotland.

68. While R&D intensive sectors like ICT and electronics and life sciences might account for a similar proportion of projects coming into Scotland and the East of England, data on the amount of government and business R&D shed light on what may be a factor driving the East of England's high performance.

Figure 13: The Proportion of Projects by Cluster

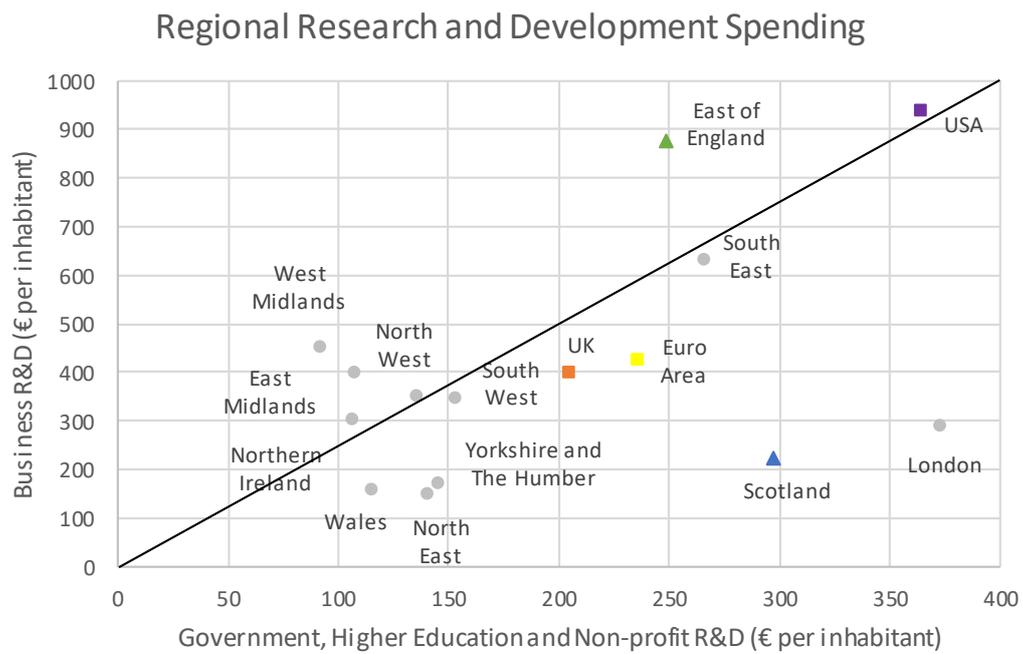


Source: Office of the Chief Economic Adviser analysis using data from fDi Markets

69. Figure 14 shows that the East of England benefits from very high government and business R&D spending. Scotland by contrast has high public spending on R&D but much lower private spending by businesses. This difference shows the strength of the knowledge economy built around the University of Cambridge. High levels of innovation coupled with an agglomeration of similar businesses are identified in the literature as key drivers of economic spillovers from investment, suggesting why the region performs so well in capturing wider benefits from inward investment.

70. This section has shown that, while Scotland performs strongly at some of the headline measures of inward investment, there are large potential gains from improving Scotland's performance in terms of the wider economic benefits from projects. The East of England example shows that attracting projects that are likely to be R&D intensive and building clusters of related activity may be a way to realise these potential gains. Section 5 picks up on this analysis and describes the development of an analytical framework to identify the key actions for taking this forwards.

Figure 14: Research and Development Spending by Source in Different Regions



Source: Adapted from [A resurgence of the regions: rebuilding innovation capacity across the whole UK](#) using data from [Eurostat](#)

## **5. Identifying the Priority Actions to Maximise Spillovers**

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### **5.1 Developing an analytical framework to understand and maximise the indirect impacts of inward investment in Scotland**

71. The previous sections have shown that inward investment already brings significant benefits to the Scottish economy but that there is further potential to use inward investment to drive economic spillovers and help shape Scotland's future economy in line with the Scottish Government's values and priorities. This section analyses one of the key areas in which the Scottish Government and agencies can influence the inward investment market – the choice of which sectors to focus resources on. The main plan document sets out the nine opportunity areas that have been selected. This section of the methodology note provides more detail on how these areas were chosen.
72. The choice of the nine opportunity areas is based on a thorough programme of analysis drawing on a wide range of data sets and a detailed review of the relevant economic literature. The analysis:
- Identifies Scotland's areas of comparative advantage in attracting inward investment;
  - Matches these to areas of global opportunity based on a sectoral assessment of global trends - the global economic impacts of Covid-19 are also taken into account;
  - Assesses the potential direct and indirect impacts of different project sectors and types, in conjunction with an analysis of the Scottish economy, in order to understand the projects that may have the largest impact on the Scottish economy.
73. The analytical framework therefore aims to find opportunity areas where Scotland has strengths to attract inward investment, where there are significant global opportunities to do so and which will maximise the positive economic impacts, in line with the measures set out in Scotland's National Performance Framework.<sup>38</sup>
74. The analysis has also robustly tested the opportunity areas to understand how they will fare in the post Covid-19 economy and to scope their resilience to the economic disruption caused by Covid-19.

### **5.2 Understanding Scotland's comparative advantage**

75. Comparative advantage is a concept that has been borrowed from trade analysis. For trade it describes the areas in which a country can produce a product or service more efficiently than other countries, relative to other products or services it could produce. To use this concept in practice it is helpful to calculate a Revealed Comparative Advantage (RCA) indicator which provides a measure of comparative advantage by observing past and current trade flows.

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<sup>38</sup> <https://nationalperformance.gov.scot/what-it>

76. The same concept can be applied to establish which sectors a country has an advantage (or disadvantage) in when it comes to cross-border investment flows. This is a convenient metric for understanding a country's strengths as it can be observed directly from inward investment data. The formula used is as follows:

$$RCA_{sector}^{Scotland} = \frac{FDI_{sector}^{Scotland} / FDI_{total}^{Scotland}}{FDI_{sector}^{Europe} / FDI_{total}^{Europe}}$$

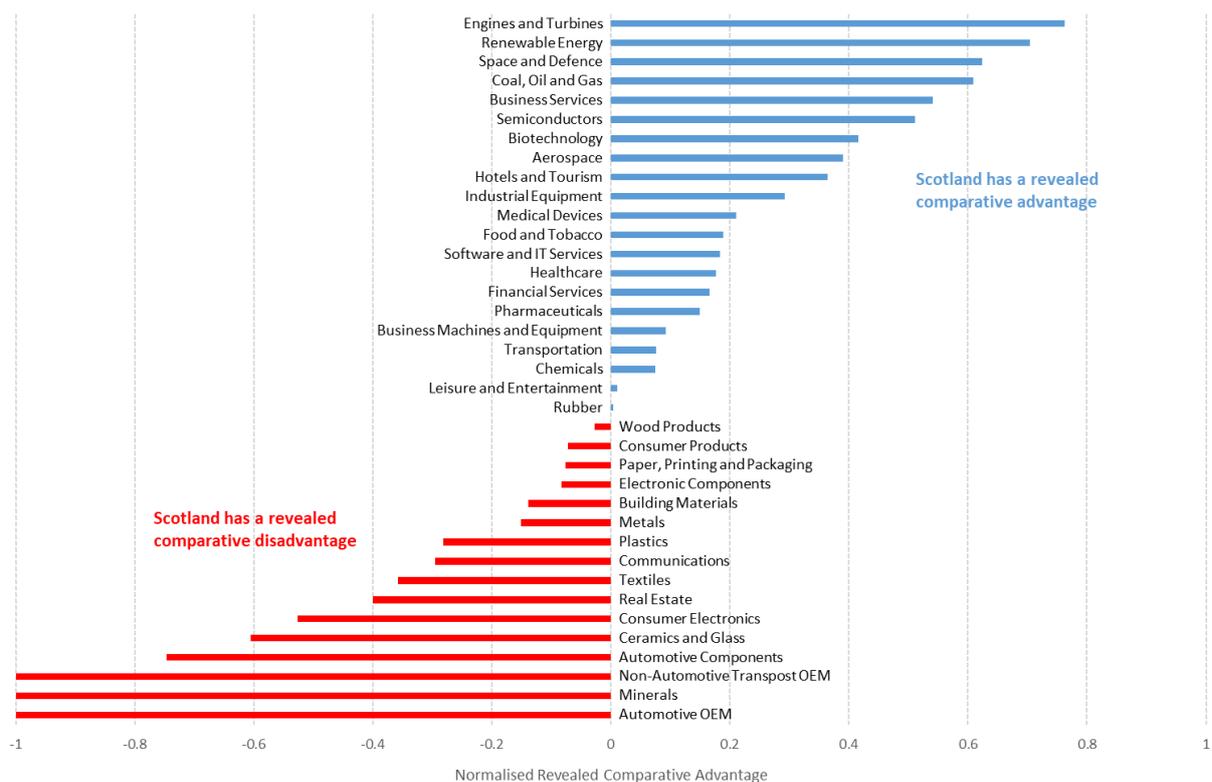
77. Essentially this calculates the degree to which Scotland attracts projects in a sector as compared to the European average. The comparison here is to Europe rather than all global projects as the evidence suggests that Scotland tends to compete with other European nations for inward investment.

78. In practice it is more intuitive to use a normalised version of the index, called the Normalised Revealed Comparative Advantage (NRCA) indicator, as this is bounded by -1 and 1 with a negative number indicating a comparative disadvantage and a positive number indicating a comparative advantage. This is defined as:

$$NRCA_{sector}^{Scotland} = \frac{RCA_{sector}^{Scotland} - 1}{RCA_{sector}^{Scotland} + 1}$$

79. Figure 15 shows this index calculated for Scotland using data from 2009-18.

Figure 15: Scotland's revealed comparative advantage in FDI by sector



Source: Office of the Chief Economic Adviser analysis using data from fDi Markets.

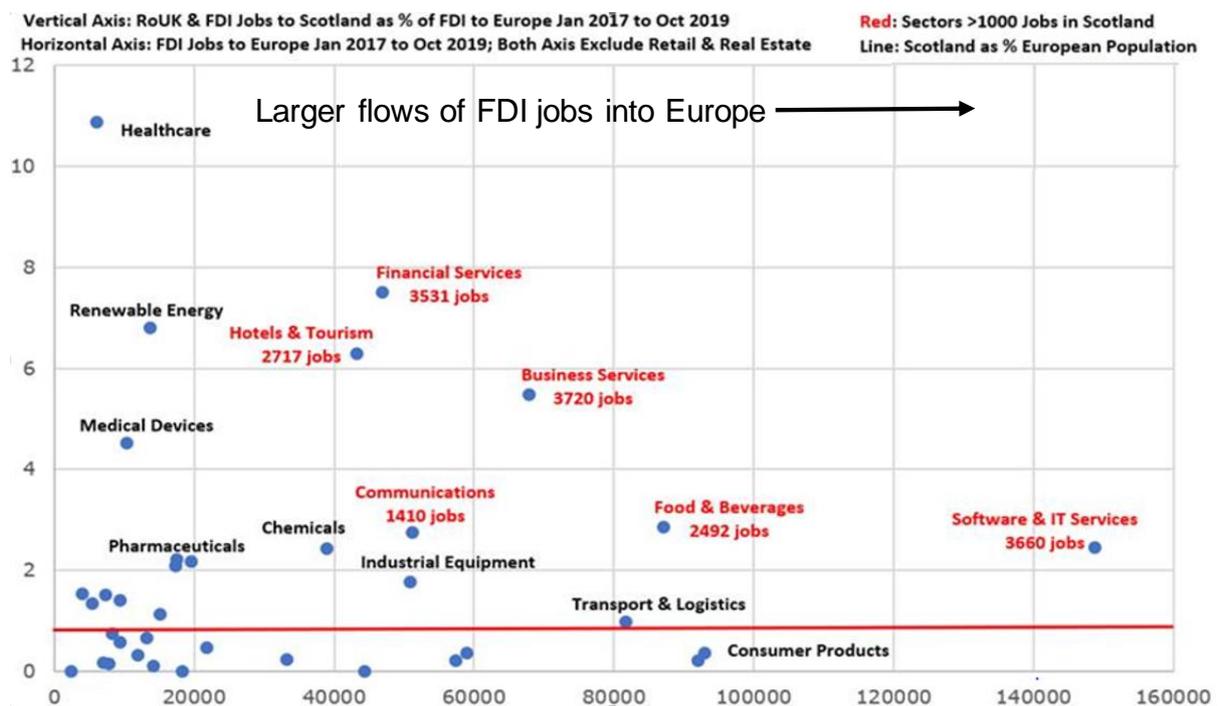
### 5.3 Identifying areas of global opportunity

80. To identify areas of global opportunity, flows of global FDI projects into Europe were analysed using data from fDi Markets. Figure 16 shows Scotland's success at attracting inward investment, attracting a much larger share than its population across a range of sectors. It also shows where the large flows are into Europe, with sectors such as software and IT, food and beverages and financial and business services making up a large share of projects.

81. In order to make the analysis future facing rather than just relying on historic data, a wide range of qualitative evidence and expert advice has been sought to understand which sectors are expected to grow in the future. This has been paired with quantitative analysis looking at growth rates of different sectors.

82. As Figure 16 shows, software and IT is by a large margin the largest FDI sector into Europe. This sector has also been growing strongly over time. Other sectors such as food and beverages, business services and financial services also have large flows into Europe.

Figure 16: Scotland's competitive sectors matched against deal flows into Europe



Source: SDI Analysis using data from fDi Markets

### The impacts of Covid-19

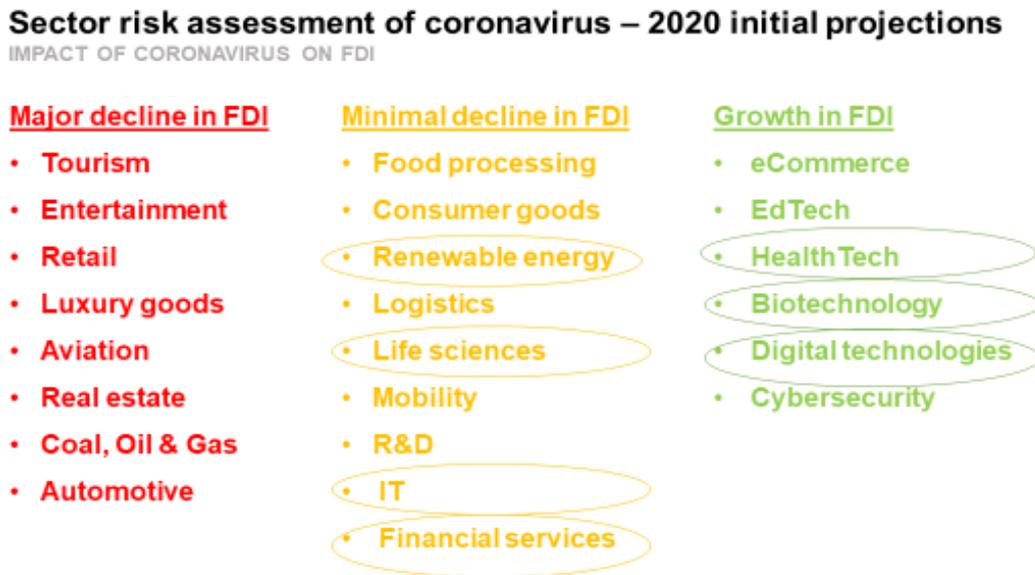
83. These opportunity areas have also been analysed to understand their resilience to the economic disruption caused by Covid-19.

84. Analysing the latest available FDI data from fDi Markets shows that all sectors have seen a major decline over the first seven months of 2020 – based on current data sectors have seen declines ranging from -1.6% (renewable energy) to -86%

(healthcare) relative to the same period in 2019. Wood products is the only sector to have seen an increase over this period (9.7%).

85. Independent research by market commentators such as Wavteq, OCO Global and EY shows the areas that are likely to be amongst the most resilient (Figure 17). Sectors such as healthtech, digital, energy transition, software and IT and financial services are amongst those they identify as most robust to the economic shock of Covid-19. Current data show that not all FDI has been paused during the current crisis. For example, within the renewable energy sector, there have been major new offshore wind projects announced during the crisis.

Figure 17: Resilience of opportunity areas (circled) to Covid-19



Source: Wavteq<sup>39</sup>

#### 5.4 Assessing the wider economic impacts of projects

86. Sections 5.2 and 5.3 have outlined how the analysis has identified sectors where Scotland has strengths and where there are global opportunities to take advantage of. This section sets out the analysis underlying the objective of the plan to maximise the positive wider economic benefits of projects. As argued in Section 3, there is a clear rationale for government intervention and support in the market to encourage these spillovers. Section 4 demonstrated the significant positive impact that could come about from improving Scotland’s performance in this regard. How then can we understand and identify the sorts of projects that are likely to have the biggest positive spillover impacts?

87. The starting point is the literature review summarised in Section 3. This review picked out the evidence on the project characteristics that drive positive spillovers.

88. These findings from the literature have been paired with the values and economic priorities set out in the main document, with the result being a series of wider

<sup>39</sup> <https://www.wavteq.com/>

economic impact indicators that capture the potential of different sectors to deliver benefits as well as their strategic fit with the values described in the plan. The indicators chosen, along with a description and the source are shown in Table 5. Note that there is overlap between some of the themes listed.

Table 5: Wider economic impact indicators

Theme	Indicator	Description	Source
<b>Supply Chain</b>	Input/output	Indirect and induced impact for every £1m spent	Scottish Government Input Output Tables
<b>Spillovers</b>	DIT Spillover - GVA	Econometric estimates of the magnitude of spillovers from a 1% increase in FDI	DIT research "Estimating the economic impact of FDI to support the Department for International Trade's promotion strategy"
	DIT Spillover - Employment		
	DIT Spillover - Wages		
	DIT Spillover - Productivity		
<b>Innovation</b>	Patents and Trademarks	Analysis on the scale of Scottish patents in different sectors	NESTA, Mapping Innovation in Scotland Findings 2019
	R&D - BERD expenditure	Expenditure on R&D performed within businesses in Scotland	Scottish Government BERD Statistics
	R&D - BERD as % of turnover	BERD expenditure as a share of turnover within businesses in Scotland	
<b>High Wages</b>	High Wages	Gross wages and salaries per head	Scottish Annual Business Survey
<b>Productivity</b>	High GVA per worker	Gross value added per head	Scottish Annual Business Survey
<b>Regional Impact</b>	Regional Impact	Location quotients based on regional spread of employment	Location quotients - Internal Scottish Government data showing distribution of employment
<b>Natural Capital</b>	Natural Capital	Indicator taking the value 0 or 1 based on whether Scotland has natural capital relevant to the sector	Scottish Government Natural Capital accounts
<b>Agglomeration</b>	Agglomeration	Indicator taking the value 0 or 1 based on qualitative evidence and BEIS clusters research	Judgement based on employment statistics and BEIS research on UK clusters

89. Many of these data sources use different sector definitions and are defined at different levels of aggregation. In order to best align the analysis to the FDI data,

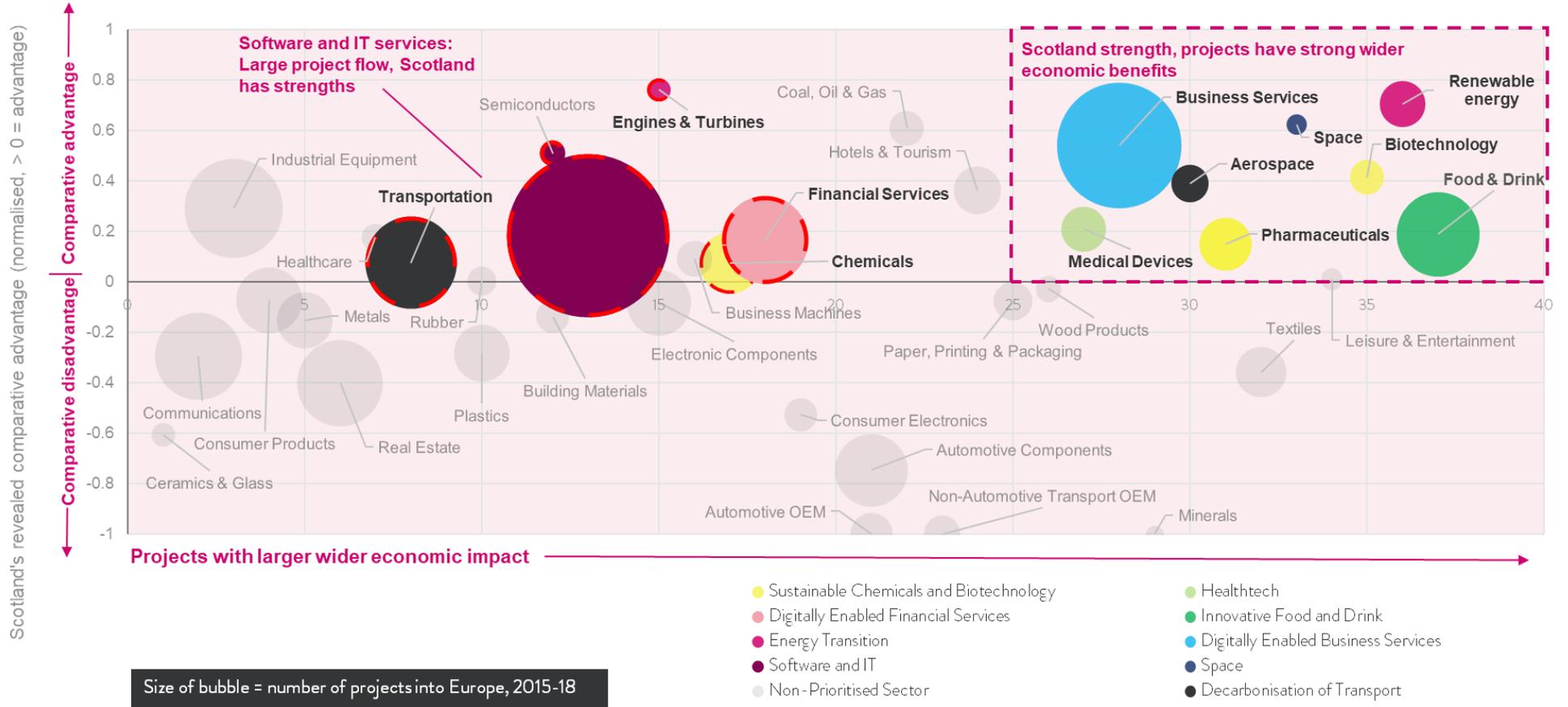
the indicators are defined based on the sector definitions in the fDi markets database. A mapping exercise has been carried out to map the other data sources used to this sector definition.

90. To make the indicators comparable the data is converted into a score out of 100 within each indicator. The sector with the highest value for each indicator gets a score of 100. All other sectors are scaled depending on how far away they are in value from that maximum. Different scaling systems were tried, including a simple ranking, but the benefit of the chosen method is that it preserves the distance between sector values. For example if one sector were to have much higher average wages than others then this 'distance' is reflected in the distribution of scores. In order to make assessments between sectors the indicators are combined to provide a single score for each sector. A number of different weightings were tested. The results were found to not be especially sensitive to a number of reasonable weightings and for simplicity an equal weighting was chosen. A full list of the sectors with the data for the indicators is in the Annex.

## 5.5 Combining the analysis to choose opportunity areas

91. This analysis identified the 'points of intersection' where Scotland's specific global competitive strengths intersect with the major flows of investment and the sectors and types of investment that typically yield greater economic spillovers to the wider economy, as well as aligning with the values set out in the main plan document.
92. Figure 18 summarises the results of this analysis. It highlights the sectors in which Scotland has a comparative advantage (vertical axis), the extent of wider positive impacts on the economy (horizontal axis) and the deal flow, or opportunity for growth in each sector (the size of the 'bubble'). This analysis allows us to identify the sectors which offer the greatest opportunity to achieve the objectives outlined in the main plan document. The quantitative evidence shown in the chart was also subject to a "sense-check review" with the assistance of sector experts and using qualitative evidence.
93. The areas highlighted with red dotted lines show the sectors that the data identifies as priority sectors, or opportunity areas, for inward investment. Where bubbles are coloured, this shows that they are included in the prioritised opportunity areas. Greyed out sectors are not priorities. Of the red dotted areas on the chart, the box in the upper right quadrant shows the sectors where Scotland performs strongly and that score highly against the wider economic impact score set out previously.
94. Some sectors indicated a potential in purely economic terms but did not match with the values and aspirations for Scotland's economy described in the main plan document (including coal, oil & gas). Other sectors such as software and IT services do not score as highly as some others on wider economic impacts, but Scotland has a comparative advantage in this area and there is a very large flow of projects into Europe (as evidenced by the size of the bubble). Sectors such as space currently demonstrate a relatively small opportunity but this is expected to grow substantially as the sector matures. In other broad sectors, such as financial services, prioritisation is based on the future prospects for the sector in the area of digitally enabled financial services.

Figure 18: Targeting opportunities that will deliver wider benefits to Scotland



Source: Office of the Chief Economic Adviser Analysis using data from multiple sources (see Table 5 for full list of data sources)

## **The nine opportunity areas**

95. This note has set out the extensive programme of analytical work that underlies Scotland's Inward Investment Plan. This work uses the best available evidence from a wide range of different policy areas and combines this with detailed sector expertise to identify the key actions for maximising the positive impact of inward investment for Scotland's economy, aligned with the Scottish Government values and priorities set out in the plan. The nine opportunity areas identified are set out below.

1. Energy transition
2. Decarbonisation of Transport
3. Software and IT
4. Digital Financial Services
5. Digital Business Services
6. Space
7. Healthtech
8. Transformation of Chemical Industries
9. Food & Drink Innovation

96. This analytical note has demonstrated the substantial positive impact that inward investment has on the Scottish economy. It has shown that, while Scotland's performance to date has been strong when it comes to headline measures, there are significant future opportunities for further improving Scotland's ability to capture all the economic benefits from inward investment. The identification of these nine opportunity areas will allow the Scottish Government and agencies to mobilise public sector support around a single vision and a clear set of priority areas to drive these benefits.

## Annex

Table 6: Data and country comparisons used for comparing Scotland's attraction factors

Indicator	Description	Compared Against	Data Source
Universities	Number of universities (per capita) in the global top 200 according to Times Higher Education	26 Countries - Worldwide	Times Higher Education, 'World University Rankings' <a href="https://www.timeshighereducation.com/world-university-rankings">https://www.timeshighereducation.com/world-university-rankings</a>
Higher Education	Percentage of adults educated to at least higher education level	46 Countries - Worldwide	OECD
Productivity	GDP per hour worked	36 Countries - OECD	OECD; Scotland Labour Productivity Statistics
Labour Costs	Total Labour costs	29 Countries - Europe	Scottish Annual Business Statistics; ONS average hours worked statistics; Eurostat
Business Networks	Regional Entrepreneurial and Development Index	125 regions in 24 Countries - Europe	Regional Entrepreneurial and Development Index, European Commission
R & D	Gross R&D Spending	36 Countries - OECD	Scotland GERD statistics; OECD
Commuting	Average daily commute times	52 Countries - Worldwide	Department for Transport Travel to Work statistics; Dalia Research, 'the countries with the longest and shortest commutes'
Freight Transport	Thousand million tonnes-kms/capita (Road Freight)	28 Countries - EU	Transport for Scotland; Eurostat
Air Transport	Number of international (incoming and outgoing) air passengers per capita	37 Countries - Worldwide	Transport for Scotland; Eurostat
Digital Connectivity	Percentage of households in areas served by fibre-based broadband networks	18 Countries - Worldwide	Ofcom
Life Satisfaction	Self-assessed level of overall satisfaction	37 Countries Worldwide	OECD Regional Wellbeing Index
Community Support	Perceived support from social networks	37 Countries Worldwide	OECD Regional Wellbeing Index
Environment	Air Quality	37 Countries Worldwide	OECD Regional Wellbeing Index
Health	Life expectancy and mortality rates (adjusted for age)	37 Countries Worldwide	OECD Regional Wellbeing Index

Table 7: Wider economic impact indicators

Sector / Sub-sector	Supply Chain	Spillovers				Innovation			High Wages	Productivity	Regional Impact	Natural Capital	Agglomeration
	Input/output	DIT Spillover - GVA	DIT Spillover - Employment	DIT Spillover - Wages	DIT Spillover - Productivity	Patents and Trademarks	R&D - BERD expenditure	R&D - BERD as % of turnover	High Wages	High GVA per worker	Regional Impact	Natural Capital	Agglomeration
Aerospace	£ 520,000	£ 62,100	0.83	0.14	0.19	0	£ 9,497	0.3%	£ 39,850	£ 90,266	4	0	1
Automotive Components	£ 229,000	£ 62,100	0.83	0.14	0.19	0	£ 9,978	1.2%	£ 39,850	£ 90,266	4	0	0
Automotive OEM	£ 229,000	£ 62,100	0.83	0.14	0.19	0	£ 9,978	1.2%	£ 39,850	£ 90,266	4	0	0
Biotechnology	£ 450,000	£120,169	2.48	0.03	0.04	1	£ 54,715	19.6%	£ 44,588	£ 90,594	8	0	1
Building Materials	£ 297,250	£ 26,411	0.50	0.03	0.05	0	£ 378	0.9%	£ 39,850	£ 90,266	12	0	0
Business Machines & Equipment	£ 229,000	£ 16,020	0.23	0.08	0.08	0	£ 35,590	5.8%	£ 39,850	£ 90,266	4	0	0
Business Services	£ 333,143	£120,169	2.48	0.03	0.04	0	£308,895	0.9%	£ 44,588	£ 90,594	2	0	1
Ceramics & Glass	£ 329,000	£ 26,411	0.50	0.03	0.05	0	..	0.4%	£ 39,850	£ 90,266	3	0	0
Chemicals	£ 279,250	£ 38,619	0.37	0.05	0.10	1	£ 15,154	0.5%	£ 39,850	£ 90,266	3	0	0
Coal, Oil & Gas	£ 275,000	£ 38,619	0.37	0.05	0.10	0	£ 479	0.2%	£ 39,850	£ 90,266	3	1	1
Communications	£ 340,000	£ 42,652	0.50	0.02	0.03	0	£ 3,386	0.1%	£ 48,588	£ 134,349	1	0	0
Consumer Electronics	£ 218,000	£ 16,020	0.23	0.08	0.08	0	£135,235	5.8%	£ 39,850	£ 90,266	4	0	0
Consumer Products	£ 302,000	£ 26,411	0.50	0.03	0.05	0	£ 17,721	3.3%	£ 39,850	£ 90,266	4	0	0
Electronic Components	£ 218,000	£ 16,020	0.23	0.08	0.08	0	£ 35,590	5.8%	£ 39,850	£ 90,266	4	0	0
Engines & Turbines	£ 316,000	£ 26,411	0.50	0.03	0.05	1	£ 35,590	1.0%	£ 39,850	£ 90,266	4	0	0
Financial Services	£ 435,000	£ 20,705	0.18	0.01	0.02	0	£180,095	0.2%	£ 44,588	£ 90,594	2	0	1
Food & Tobacco	£ 386,000	£207,439	5.50	0.15	0.44	0	£ 24,069	0.3%	£ 31,175	£ 81,048	15	1	1
Healthcare	£ 544,000	£ 38,619	0.37	0.05	0.10	0	£ -	0.1%	£ 15,739	£ 33,340	8	0	0
Hotels & Tourism	£ 513,000	£ 58,114	1.73	0.01	0.01	0	£ -	0.0%	£ 15,491	£ 26,286	13	1	1
Industrial Equipment	£ 267,000	£ 26,411	0.50	0.03	0.05	0	£ 35,590	1.0%	£ 39,850	£ 90,266	4	0	0
Leisure & Entertainment	£ 667,000	£952,595	18.13	0.03	0.07	0	£ 19,173	0.0%	£ 20,082	£ 33,340	13	0	0
Medical Devices	£ 229,000	£ 26,411	0.50	0.03	0.05	1	£ 61,396	5.8%	£ 39,850	£ 90,266	8	0	1
Metals	£ 245,500	£ 56,407	0.98	0.06	0.08	0	£ 378	0.9%	£ 39,850	£ 90,266	4	0	0
Minerals	£ 331,000	£ 13,366	0.03	0.03	0.15	0	£ 619	..	£ 68,838	£ 390,801	3	1	0
Non-Automotive Transport OEM	£ 402,500	£ 62,100	0.83	0.14	0.19	0	£ 9,978	0.3%	£ 39,850	£ 68,964	4	0	0
Paper, Printing & Packaging	£ 381,000	£ 85,283	1.78	0.13	0.20	0	£ 4,025	0.2%	£ 39,850	£ 90,266	4	0	0
Pharmaceuticals	£ 174,000	£ 38,619	0.37	0.05	0.10	1	£163,658	3.7%	£ 39,850	£ 90,266	8	0	1
Plastics	£ 489,000	£ 38,619	0.37	0.05	0.10	0	£ 5,099	0.4%	£ 39,850	£ 90,266	4	0	0
Real Estate	£ 487,500	£952,595	18.13	0.03	0.07	0	£ -	0.1%	£ 31,363	£ 53,745	6	0	0
Renewable energy	£ 815,000	£ 32,450	0.24	0.03	0.09	1	£ 17,412	0.1%	£ 68,838	£ 390,801	9	1	1
Rubber	£ 489,000	£ 38,619	0.37	0.05	0.10	0	£ 5,099	0.4%	£ 39,850	£ 90,266	4	0	0
Semiconductors	£ 316,000	£ 16,020	0.23	0.08	0.08	0	£ 35,590	1.0%	£ 39,850	£ 90,266	4	0	0
Software & IT services	£ 242,000	£ 42,652	0.50	0.02	0.03	0	£ 61,482	1.6%	£ 48,588	£ 134,349	1	0	1
Space & Defence	£ 327,000	£ 62,100	0.83	0.14	0.19	0	£159,196	0.3%	£ 32,213	£ 68,964	4	1	1
Textiles	£ 260,000	£ 85,283	1.78	0.13	0.20	0	£ 4,954	0.8%	£ 39,850	£ 90,266	14	0	1
Transportation	£ 402,500	£ 67,663	1.39	0.03	0.04	0	£ 2,017	0.0%	£ 32,213	£ 68,964	10	0	0
Wood Products	£ 615,000	£ 26,411	0.50	0.03	0.05	0	£ 4,025	0.1%	£ 39,850	£ 90,266	11	1	0
SOURCE	Scottish Government Input Output Tables	DIT research "Estimating the economic impact of FDI to support the Department for International Trade's promotion strategy"				NESTA	Scottish Government BERD Statistics		Scottish Annual Business Survey	Scottish Business Survey	Location quotients based on employment	Scottish Government Natural Capital accounts	Judgement based on employment statistics and BEIS research on UK clusters

## References

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Department for Business, Innovation and Skills (now BEIS) (2011), 'International trade and investment: the economic rationale for government support', <https://www.gov.uk/government/publications/the-economic-benefits-of-support-for-international-trade-and-investment>

Department for International Trade (2018), 'Estimating the economic impacts of FDI to support DIT's promotion strategy', <https://www.gov.uk/government/publications/estimating-the-economic-impact-of-fdi-to-support-dits-promotion-strategy-analytical-report>

Driffield (2002), 'Indirect employment effects of foreign direct investment into the UK', <https://doi.org/10.1111/1467-8586.00079>

Driffield and Girma (2003), 'Regional foreign direct investment and wage spillovers: plant level evidence from the UK electronics industry', <https://doi.org/10.1111/1468-0084.t01-1-00057>

Driffield, Hendriks, Lavoratori (2019), 'FDI and local productivity', *Enterprise Research Centre State of the Art Review*, <https://www.enterpriseresearch.ac.uk/wp-content/uploads/2019/06/No31-SOTA-FDI-and-local-productivity-DriffieldHendriksLavoratori.pdf>

Driffield and Hughes (2002), 'Foreign and domestic investment: regional development or crowding out?', *Regional Studies* 37.3

Driffield and Lavoratori (2020), 'Spillovers from inward investment – a comparison of Northern Ireland with the rest of the UK', *ERC Research Report* [https://www.enterpriseresearch.ac.uk/publications/spillovers-from-inward-investment-a-comparison-of-northern-ireland-with-the-rest-of-the-uk/?mc\\_cid=f5a23a3889&mc\\_eid=3d54fc7956](https://www.enterpriseresearch.ac.uk/publications/spillovers-from-inward-investment-a-comparison-of-northern-ireland-with-the-rest-of-the-uk/?mc_cid=f5a23a3889&mc_eid=3d54fc7956)

Driffield and Love (2007), 'Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis', *Journal of International Business Studies*

Driffield, Munday and Roberts (2005), 'Inward investment, transactions linkages, and productivity spillovers', <https://doi.org/10.1111/j.1435-5597.2004.tb01934.x>

EY, 'EY attractiveness survey Scotland 2020', [https://www.ey.com/en\\_uk/attractiveness/20/battling-back-ey-attractiveness-survey-scotland](https://www.ey.com/en_uk/attractiveness/20/battling-back-ey-attractiveness-survey-scotland)

Gillespie, McGregor, Swales, Yin (2001), 'A regional computable general equilibrium analysis of the demand and efficiency spillover effects of foreign direct investment', from *Inward Investment, Technological Change and Growth*, pp 178-209

Girma and Wakelin (2000), 'Are there regional spillovers from FDI in the UK?', <https://www.nottingham.ac.uk/gep/documents/papers/2000/00-16.pdf>

Harris and Robinson (2003), 'Foreign ownership and productivity in the UK: Estimates for UK manufacturing using the ARD', *Review of Industrial Organisation* 22

Haskel, Pereira, Slaughter (2002), 'Does inward foreign direct investment boost the productivity of domestic firms?', <https://www.nber.org/papers/w8724>

Jones (2019), 'A resurgence of the regions: rebuilding innovation capacity across the whole UK', [http://www.softmachines.org/wordpress/wp-content/uploads/2019/05/ResurgenceRegionsRALJv22\\_5\\_19.pdf](http://www.softmachines.org/wordpress/wp-content/uploads/2019/05/ResurgenceRegionsRALJv22_5_19.pdf)

OECD (2019), 'FDI Qualities Indicators: Measuring the sustainable development impacts of investment', Paris. [www.oecd.org/fr/investissement/fdi-qualities-indicators.htm](http://www.oecd.org/fr/investissement/fdi-qualities-indicators.htm)

OECD (2020), 'Foreign direct investment flows in the time of Covid-19', <https://www.oecd.org/coronavirus/policy-responses/foreign-direct-investment-flows-in-the-time-of-covid-19-a2fa20c4/>

Rodríguez-Pose and Crescenzi (2008) Research and Development, Spillovers, Innovation Systems, and the Genesis of Regional Growth in Europe, *Regional Studies*, 42:1, 51-67. <https://doi.org/10.1080/00343400701654186>

Smarzynska (2002), 'Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages', *Policy Research Working Paper Series* 2923, The World Bank.

SQW Consulting (2017), 'Strategic evaluation of SDI international activities: final report', <http://www.evaluationsonline.org.uk/evaluations/Browse.do?ui=browse&action=show&id=682&taxonomy=INT>

UK Trade Policy Observatory (2018), 'Not backing Britain: FDI inflows since the Brexit referendum', <https://blogs.sussex.ac.uk/uktpo/files/2018/10/BP23interactive.pdf>

United Nations Conference on Trade and Development (2020), 'World Investment Report 2020', <https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2769>

World Bank (2018), 'Global Investment Competitiveness Report 2017/2018: Foreign Investor Perspectives and Policy Implications.' Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/28493>