Economic impact of IAG in Ireland

Report

May 2023

pwc

Foreword

IAG asked PwC to independently assess the impact of their operations on the economies of Ireland, the United Kingdom, Spain, and the European Union as a whole. Specifically, PwC were asked to assess the contribution IAG makes through its supply chain, the domestic and global connectivity enabled by its airlines' operations, and the economic contribution generated by this connectivity.

At PwC our purpose is to build trust in society and solve important problems. To this end, economic impact assessments such as these are important, in that they provide a more holistic view of the value created by firms than financial reporting does alone. Total impact modelling considers not only the value created directly by a firm, but the wider value to the economy generated by its entire supply chain. These metrics therefore help leaders and policymakers make decisions that benefit society as a whole.

We are delighted to present this Ireland economic impact assessment, focusing on the domestic contribution of IAG's activities to the Irish economy. IAG's operations contributed €1,100m to the Irish economy in 2019, and supported 7,000 jobs. The catalytic impact of the tourism and business travel its airlines facilitate additionally contributed €1,073m, and a further 7,400 jobs.

Additionally, IAG's cargo operations carried approximately 429,000 metric tonnes of cargo in 2019, reaching 136 countries; typically made up of the transport of high value goods.

Looking to the future, IAG's focus on sustainability and innovation means it is well positioned to continue growing its contribution to the Irish economy, whilst taking steps to minimise the environmental impact of its activities. IAG was the first airline group to commit to net zero carbon emissions by 2050, and has also committed to net zero Scope 3 emissions by 2030. Its investment in new technologies such as sustainable aviation fuel and hydrogen-powered flight contribute to its strategy to achieve these objectives.

It has been a pleasure to work with IAG and its operating companies, visiting their sites, meeting their staff, and learning about their logistical operations and innovations. We trust you will enjoy exploring our findings in this report.

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Executive Summary

Figure 1: Key findings on IAG's contribution to the Irish economy

IAG's activities contributed

€1,100m to the Irish economy in

€803m	€236m	€95m
Direct contribution	**Indirect contribution**	**Induced contribution**

For every €1 spent by IAG in Ireland, €0.86 of gross value added is generated throughout the Ireland's wider economy.

IAG supported approximately

7,000 Ireland jobs in 2019

4,000	2,100	765
Direct employment FTE	**Indirect employment FTE**	**Induced employment FTE**

The tourist and business activities catalysed by IAG's flights contributed

€1,073m to the Irish economy in 2019

€739m	€259m	€84m
Direct	**Indirect**	**Induced**

These activities additionally supported 7,400 Irish jobs:

c.6,000	c.950	c.407
Direct employment FTE	**Indirect employment FTE**	**Induced employment FTE**

Purpose of this report

IAG has commissioned PwC to conduct this economic impact assessment of IAG's activities in the Republic of Ireland (hereinafter Ireland). In it we analyse the contribution IAG makes to the Irish economy, both in terms of traditional economic measures such as its contribution to Gross Value Added (GVA) and jobs, and the catalytic economic benefits resulting from the connectivity enabled by its airlines, supporting trade, business activities, and tourism spending. In addition, we assess how IAG is supporting the decarbonisation of the aviation industry and driving innovation within the sector.

We have also completed companion reports on the impact of IAG's activities in the economies of the UK, Spain, and across the whole of the European Union which address these same topics in these geographies.

We used data provided by IAG to identify how the business activities of IAG and its airlines provide economic value, and we quantify this impact using recognised techniques. The data used in this report is from 2019 due to the large impact of the Covid-19 pandemic on air travel globally between 2020-2022. Whilst air travel is recovering strongly to the pre-pandemic level (with passenger numbers in the industry as a whole expected in 2023 to reach 86% of the 2019 peak) there is not a full year of data available from IAG at the time of writing. Therefore, we consider 2019 to be the most representative year of data to indicate the economic value which IAG creates.

Key findings

IAG supports approximately 7,000 jobs in Ireland and contributes €1,100m to Ireland GVA. IAG supports a significant supply chain across the aviation sector and beyond, consisting of businesses in Ireland and abroad, including thousands of small and medium sized companies. The tourism and business travel to Ireland facilitated by IAG's airlines drives a further catalytic impact on the economy supporting an additional 7,400 jobs and €1,073m of GVA in Ireland.

As an airline group IAG provides economic and social benefits to Ireland by enabling global connectivity in the movement of people and goods. Aer Lingus is the most flown IAG airline in Ireland and has been flying customers and goods from and around Ireland for over 80 years. Aer Lingus's Dublin Airport hub facilitates the movement of goods and people from Ireland around the world efficiently, even when direct routes would not be feasible, thereby increasing the connectedness of Ireland. IAG's other airlines, British Airways (BA, Iberia and Iberia Express, LEVEL, and Vueling add to its global reach. Flying 11.3 million passengers, 102 routes and directly connecting Ireland to 20 countries, IAG's airlines play a critical role in connecting Ireland with the world. This connectivity supports business activities and inbound tourist spending which bring value to the Irish economy. IAG's airlines also facilitate trade, particularly of high value goods by using large bellyhold capacity on long-haul passenger flights.

This report also identifies some of the broader contributions that IAG makes which will support the future of the Irish economy. Firstly, the future of aviation will need to be more sustainable. IAG has been an industry leader in the decarbonisation of aviation, committing to net zero emissions by 2050 and investing in new technologies and sustainable aviation fuel as part of its transition to meet these targets.

We hope that you enjoy exploring the findings of this report and learning about the many ways in which IAG benefits the Ireland economy.

We have found that:

- IAG contributes €1,100m gross value-added to Ireland GDP, made up of €800m direct, €230m indirect and €95m induced contribution. This means that for every €1 spent by IAG in the Irish economy, €0.86 GVA is supported elsewhere across the economy.
- Through facilitating tourism and business travel, IAG's airlines support an additional €1,073m of catalytic GVA and c.7,400 FTE jobs across the Irish economy. This catalytic effect is particularly strong in hospitality, transport, culture, and recreation. This means that for each passenger who flies with IAG to Ireland, there is a catalytic impact of €318 contributed to Ireland GVA.
- IAG supports c.7,000 FTE jobs across the Irish economy made up of c. 4,000 direct (industry operations), c. 2,100 indirect (supply chain) and c.765 induced (resulting from spending by direct and indirect employees) employment. For every direct IAG employee, a further 0.7 FTE jobs are supported in the Irish economy.
- Additionally, for every 1,000 passengers flying with IAG to Ireland, 2.1 FTE jobs are supported through the catalytic spending of IAG passengers.
- The 'hub and spoke' model operated by Aer Lingus is unique in Ireland, and plays a major role in connecting Ireland to the rest of the world, especially the US, being responsible for over 40% of the North Atlantic capacity from Ireland to the US.
- IAG's airlines, including IAG Cargo, transported 428,520 metric tonnes of freight reaching 136 countries in 2019. Air cargo is disproportionately used for high value-added goods contributing to a positive air transport balance of payments.
- IAG is an industry leader in sustainability, setting industry leading targets for decarbonisation, prioritising a sustainability strategy, and investing in the technology needed to fulfil its transition plan and enable it to reach net zero emissions by 2050.
- IAG supports innovation as a means to respond to challenges the aviation industry is facing, with its core innovation platform Hangar 51 helping to support and scale emerging technologies across travel.

Introduction

International Airlines Group

Overview

IAG is a global airline group which carried 118.7 million passengers to 279 destinations internationally in 2019. The group includes major airlines in Ireland, the UK, and Spain: Aer Lingus, British Airways (including BA CityFlyer), Iberia (including Iberia Express), LEVEL, and Vueling. IAG is the group's parent company, and is dual registered on both the London and Spanish Stock Exchanges. Within the group, IAG's airlines maintain their distinctive brands and focus on their customers, the competitive environment and people, while IAG, at the corporate centre, works to drive synergies, and maximise group performance.

History

Launched in 2011, IAG has been increasing its global presence and capabilities over the last 12 years.

Timeline of IAG

January 2011
British Airways and Iberia merge, creating the International Airlines Group (IAG). Shares in IAG start trading.

December 2012
Iberia Express, and Iberia subsidiary, is launched.

April 2013
IAG acquired Vueling, a leading short-haul airline in Spain.

August 2015
IAG acquired Irish airline, Aer Lingus.

March 2017
LEVEL, IAG's new low-cost, long-haul airline brand, starts operating.

June 2019
IAG became the first airline group in the world to commit to achieving net zero carbon emissions by 2050.

October 2021
Aer Lingus UK begins operations from Manchester to New York, Orlando and Barbados.

October 2010
The alliance between British Airways, Iberia and American Airlines completes after getting the go-ahead from regulators in the European Union and the U.S.

April 2011
British Airways World Cargo and Iberia Cargo merge, forming IAG Cargo.

October 2012
A partnership between Japan Airlines and British Airways is agreed, providing customers with more links between Europe and Japan.

August 2014
IAG GBS is incorporated, delivering back office services to all IAG operating companies.

October 2016
Hangar 51, IAG's innovation accelerator program, is launched, allowing IAG to collaborate with start-ups.

June 2018
LEVEL Austria, which offers short-haul flights from Vienna, takes its first flight.

April 2021
IAG was the first European airline to commit to 10% Sustainable Aviation Fuel by 2030.

January 2023
Aer Lingus enters a franchise relationship with Emerald Airlines. The agreement will support Aer Lingus's Dublin Hub strategy by providing connectivity of UK provincial airports to North America via Dublin.

Group Structure

IAG, as the corporate entity at the centre of the group, oversees coordination across the group, manages and executes central functions, creates synergies, and fosters collaborative working and the sharing of best practices.

IAG has three overall strategic priorities: strengthening a portfolio of world-class brands; growing global leadership positions; and enhancing IAG's common integrated platform. IAG has five airline brands: two "full service" carriers British Airways and Iberia, two "value" carriers Aer Lingus and Iberia Express and finally two "low cost" carriers, LEVEL and Vueling.

In addition, IAG has central platforms which run cross airline services: IAG Cargo which is the group's cargo division operating a global freight network; IAG Loyalty which manages loyalty products and services including running the Avios loyalty currency; IAG Global Business Services (GBS) which delivers centralised services across procurement, finance and airport operations; and IAG Tech which supports digital and IT across the group. Across IAG businesses there are cross-cutting coordination activities and central functions which are carried out at the group level. The key areas of intra-group coordination are across: fleet, maintenance, repair & overhaul, fuel, network, commercial, customer. The common central functions at the group level: investor relations, finance, people, sustainability, corporate affairs, communications, legal, strategy, and merger & acquisitions.

Figure 2: IAG's group structure

IAG's purpose is "to connect people, businesses and countries", which supports its vision to be the world's leading airline group. IAG is Europe's fourth largest airline group by passenger numbers (after Ryanair group, Lufthansa group, and Air France KLM).[1] As of 2019 IAG's airlines flew from 5 airports in Ireland, operating a total of 107 routes. IAG's airlines connect Ireland to 20 countries and carried over 12 million international passengers annually. IAG has a very strong presence at Dublin's airport with 10.8 million IAG passengers, which represented 33% of the total airport's passengers.

Report scope

IAG brands in scope of this report are: Aer Lingus, British Airways, Iberia, Iberia Express, Vueling, LEVEL, and IAG Cargo. For our purposes BA CityFlyer data is included in the British Airways analysis, and Iberia Express and LEVEL data is included within Iberia analysis. The format of data received from IAG is such that disaggregation of economic impacts by airline is possible in some but not all parts of our analysis. IAG Loyalty is not included in the scope of this project which concentrates on IAG's contribution from airline operations and associated impacts.

The modelling in this report is based on 2019 data, as this was the last complete year of representative data prior to the pandemic. 2020 and 2021 were abnormal years for the global travel industry due to the Covid-19 pandemic and associated travel restrictions, and a full year of 2022 data was not available at the time of preparing this report. The International Air Transport Association (IATA), the global airline trade association, expects numbers travelling in 2023 to be 86% of the 2019 peak.[2] However, it is important to note that IAG's business has moved on in some key ways since 2019.

Report structure

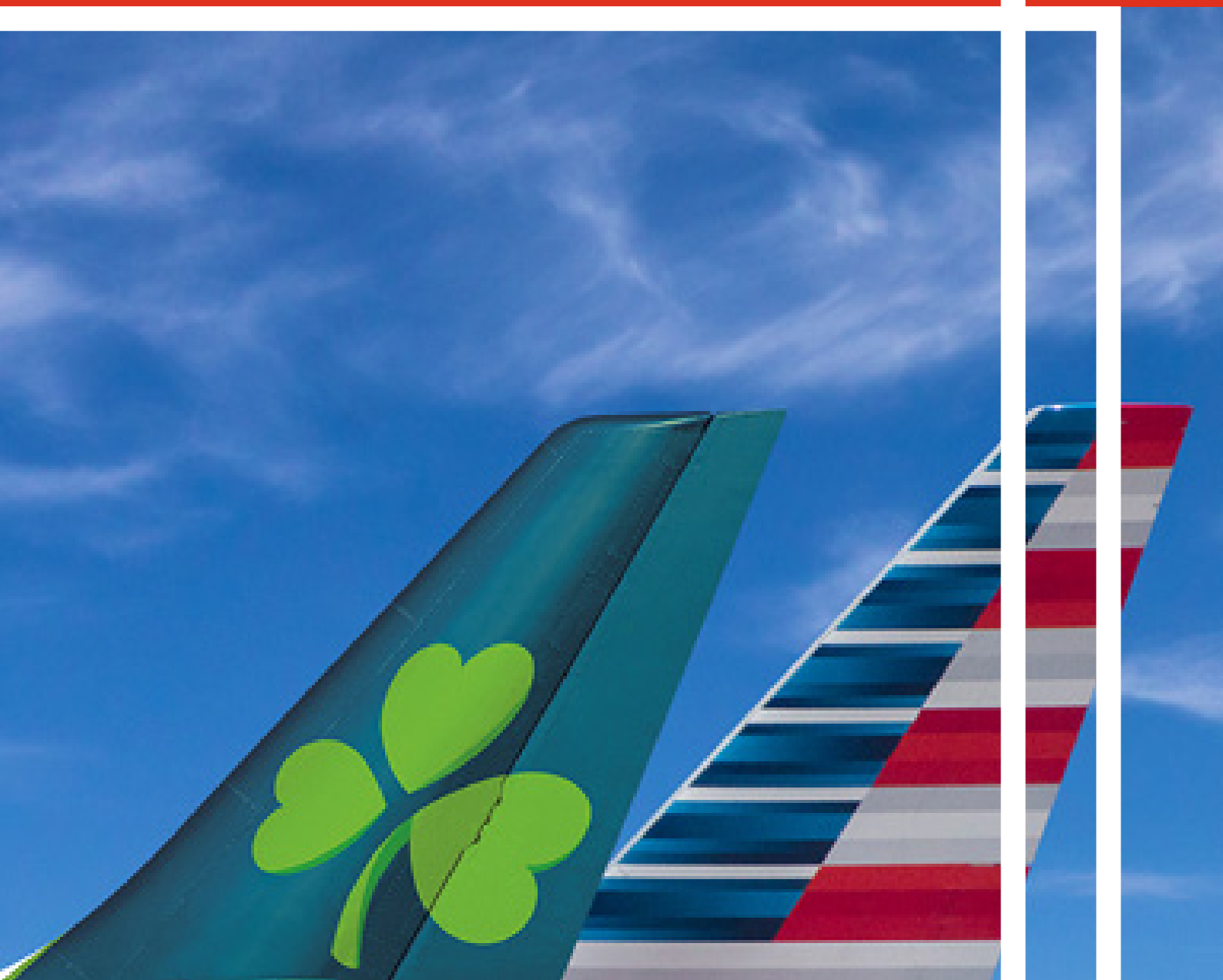
In this report we analyse the contribution IAG makes to Ireland's economy, both in terms of traditional economic measures, and its broader role, such as in enabling connectivity and facilitating innovation. The report structure is as follows:

- Economic impact methodology
- Ireland Economic Impact
- Connectivity Impact
- Sustainability
- Innovation
- Appendix 1: Technical approach and detailed methodology
- Appendix 2: Additional data

[1] Centre for Aviation, https://centreforaviation.com/analysis/reports/ryanair-heads-europes-top-20-airline-groups-by-pax-2019-510111

[2] IATA, Airlines Cut Losses in 2022; Return to Profit in 2023, Press Release No: 56 Date: 6 December 2022, https://www.iata.org/en/pressroom/2022-releases/2022-12-06-01/

Calculating economic impact



Economic Impact Modelling

Direct, Indirect, and Induced impacts of IAG's Ireland operations.

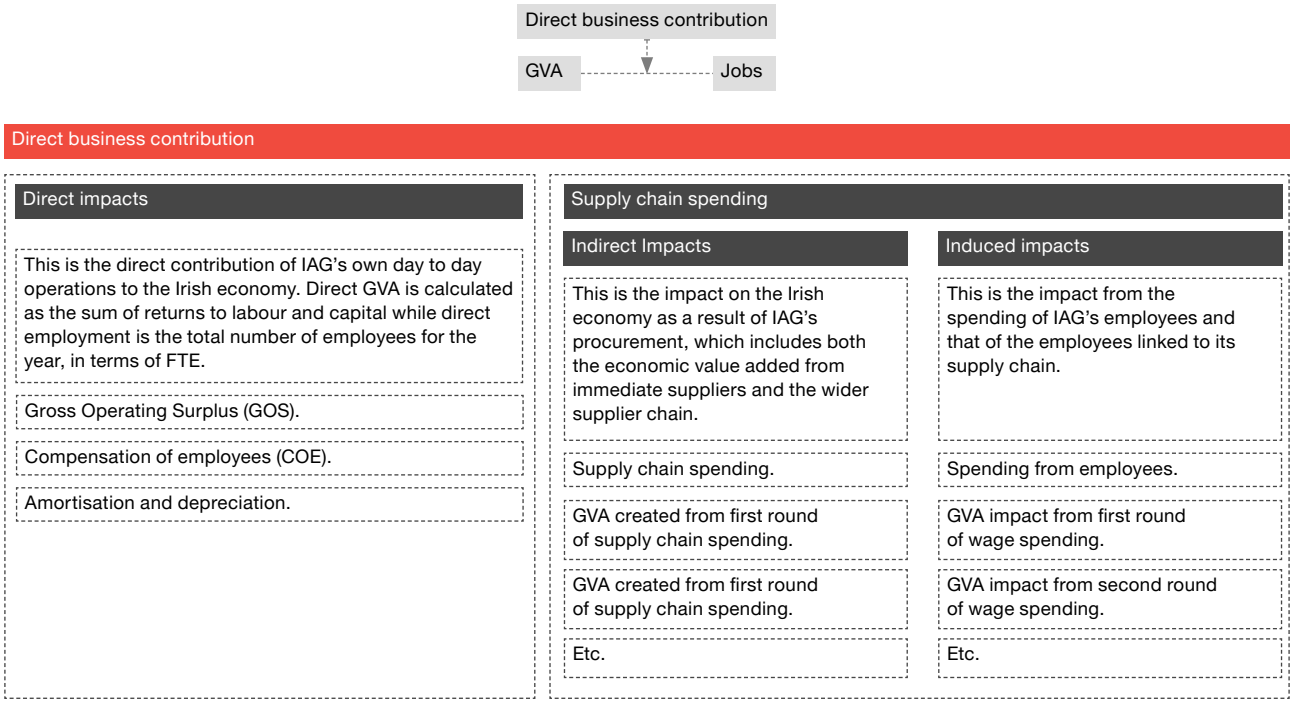
We present IAG's contribution to Irish economy in terms of two key economic indicators:

- **Gross Value Added (GVA)**
  - GVA is the value added produced by an organisation. This is a standard concept used by national statistical authorities, including the CSO, and is the equivalent of contribution to GDP, but with an adjustment to prices so that they don't include final taxes - that is, GDP but at 'basic prices'.
  - GVA encompasses the core, measurable, ways in which organisations such as IAG add value to the economy, including: operating profits; compensation of employees, taxes on production and measurement of depreciation and amortisation (these two account for the capital used by an organisation during the production process).
  - This is equivalent to an industry's output less the value of the intermediate inputs used in the production process.[3]
- **Employment** – Annual full–time equivalent (FTE) jobs supported.

We set out IAG's economic impact across three key components:

- **Direct impact:** This is the contribution of IAG's own day-to-day operations to Ireland's economy. Direct GVA is calculated as the sum of returns to labour and capital, while direct employment is the total number of employees for the year, in terms of FTE.
- **Indirect impact:** This is the impact on Ireland's economy as a result of IAG's procurement, which includes both the economic value added from immediate suppliers and the wider supplier chain (for instance, the supplier of the supplier).
- **Induced impact: :** This is the impact from the spending of IAG's employees and that of the employees linked to its supply chain.

Figure 3: Breakdown of the direct business contribution made by IAG to the Irish Economy



[3] GVA quantifies the same set of economic activities as Gross Domestic Product (GDP) but in terms of factor cost.

We refer to the combination of direct, indirect and induced impacts as the “economic contribution” throughout the report.

Geographies

IAG’s airlines operate globally, but the scope of this report is capturing its economic contribution to Ireland’s economy. We have produced companion reports which capture the economic contribution of IAG to the economies of Spain, the European Union, and the United Kingdom.

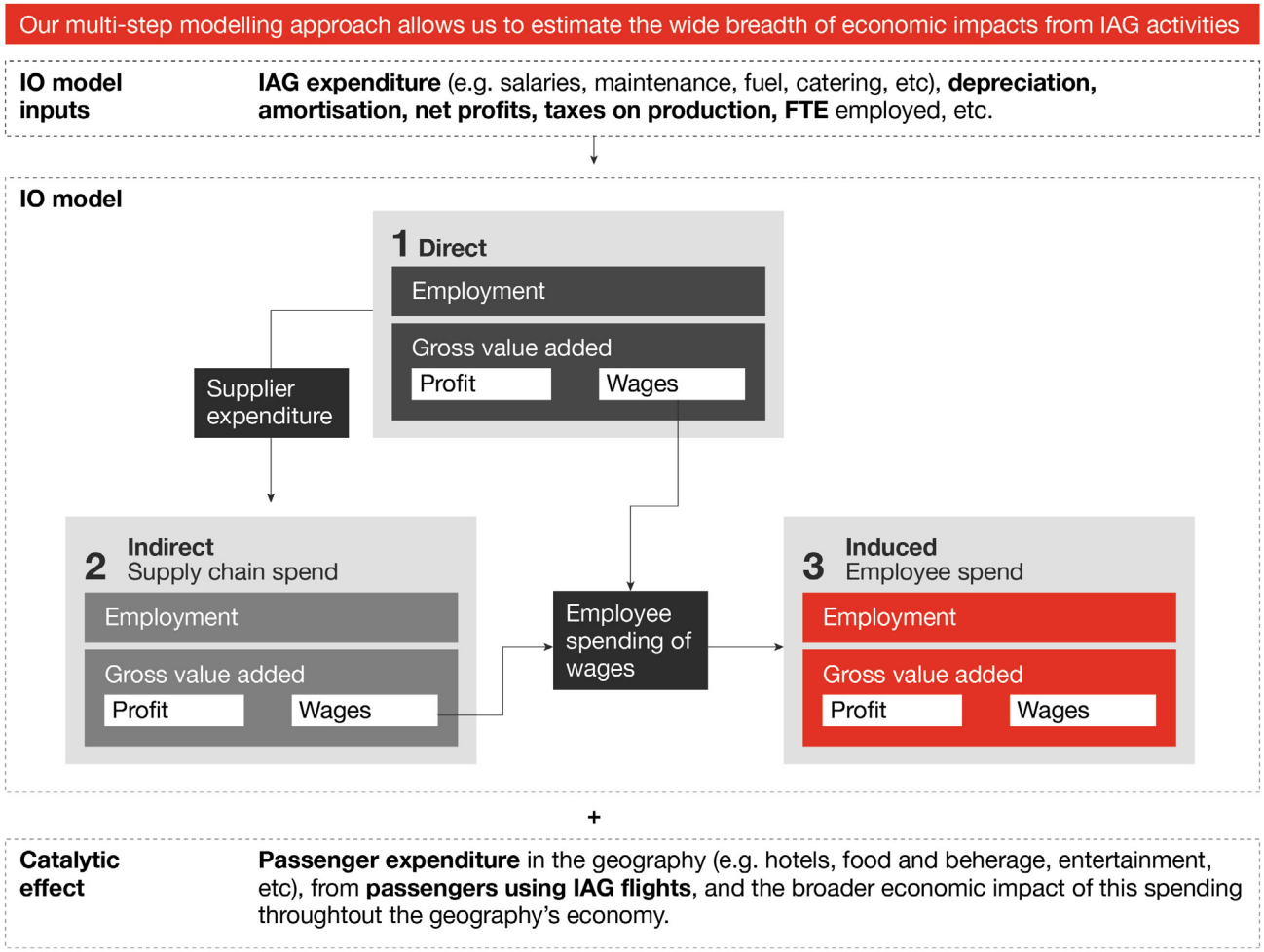
Industries

Our analysis segments Ireland economy across 36 industry sectors for each country, chosen to best reflect IAG’s supply chain spending. We used the OECD and WTO’s codes to define these sectors, which range from manufacturing to accommodation and food. A full list of which can be found in the Appendix.

Modelling approach

Figure 4 illustrates a simplified breakdown of our modelling approach, for IAG operations and catalytic spend. For a more detailed breakdown of our modelling methodology, please see Appendix 1.

Figure 4: Summary of economic impact methodology



Ireland economic impact

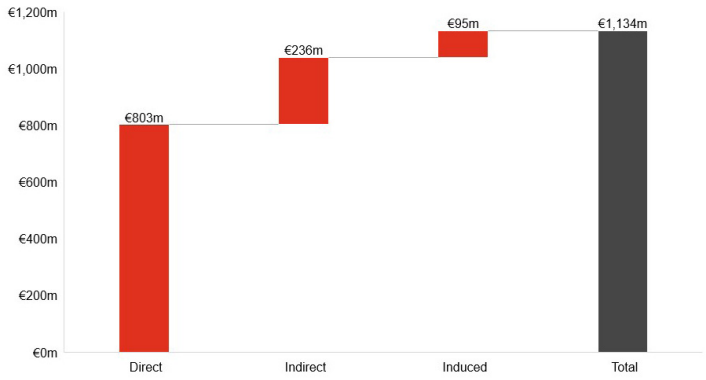
Direct Business Contribution

GVA Contribution

In 2019 IAG contributed €1,100m to Ireland Gross Value Added (GVA. This contribution is composed of:

- **€803m direct contribution -** from profits and wages and relevant taxes, all generated by IAG in Ireland.
- **€236m indirect impact -** through the supply chain purchases made by IAG in Ireland.
- **€95m induced impact - as IAG enables** wage spending in the economy, via its own employees, and employees throughout its supply chain.

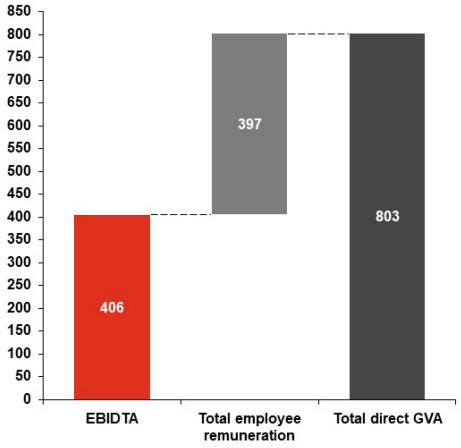
Figure 5: IAG contributed c.€1.1bn GVA to the Irish economy through a combination of its direct, indirect and induced impacts in 2019



Direct GVA contribution

IAG's direct contribution comprises €397m of employee compensation; and €406m of earnings before interest, tax, depreciation and amortisation (EBITDA) and; all associated with Ireland.

Figure 6: IAG's direct economic impact was driven by its profitability (€406m EBITDA) and compensation of employees (€397m) in 2019.

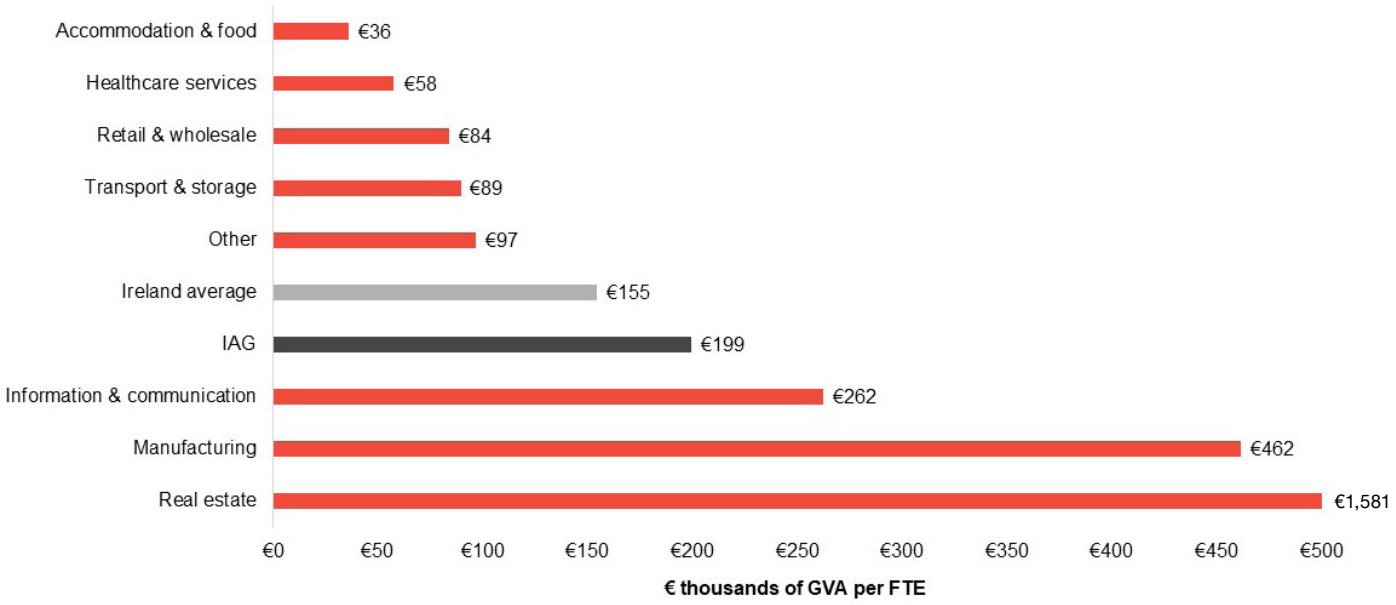


[4] Relevant taxes are any taxes on the production of goods and services, and not taxes on final goods or services sold, or taxes related to employment.

The Direct GVA contribution of a company to national GDP is made up of gross operating surplus (GOS), compensation of employees (COE), and taxes on production. Below, we provide a short explanation for GOS and COE, showing IAG's direct impact through each of these channels to the Irish economy:

1. **Gross Operating Surplus (GOS):** This concept is broadly equivalent to EBITDA, in a company's financial accounts. For a company that operates across borders, such as IAG, the value of EBITDA associated with the Irish economy is equivalent to IAG's taxable income in Ireland. In this case, it relates to the income of Aer Lingus, which reported an EBITDAR of €406m in 2019 . We include further information related to this in our methodology.
2. **Compensation of employees (COE):** with respect to IAG, these have two main components: wages and salaries (including benefits in kind and pension contributions) and national insurance contributions from IAG to the Irish Government. For 2019, IAG's total employment compensation to employees based in Ireland was €397m. Overall, the direct GVA of IAG in Ireland amounted to €1.1bn in 2019. When compared to the number of IAG employees in Ireland, this is a comparatively high value add per worker. For example, Figure 7 displays the GVA per worker for the sectors in our analysis and Ireland as a whole. The IAG average GVA of €199,00 per full time equivalent worker is significantly higher than that of the Irish average (€155,000); indeed its GVA per worker is fourth. This stems from the relatively high profitability of IAG, and wage levels of its employees, compared to the average of the other Irish sectors we have analysed.

Figure 7: IAG has a significantly higher GVA per full time equivalent worker than the Irish average (€ '000s)

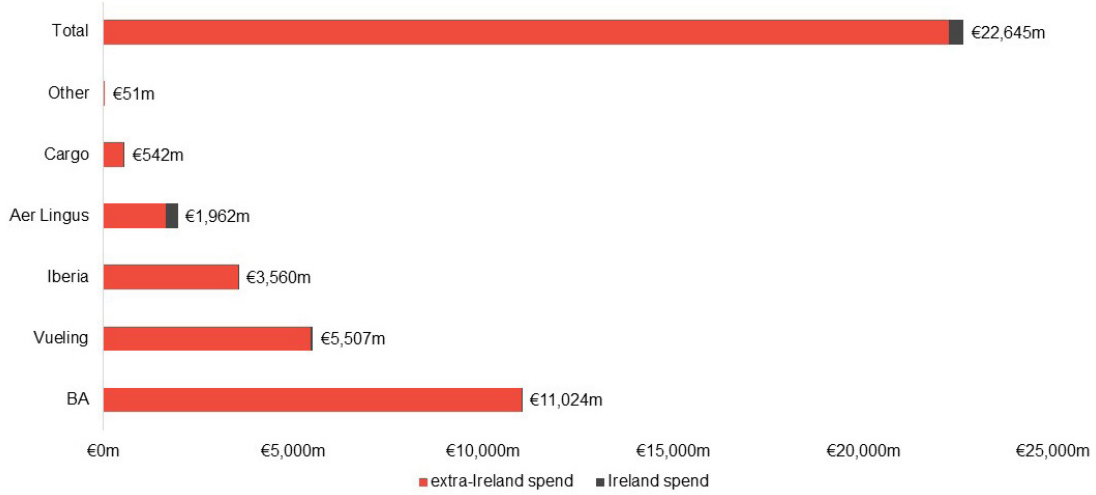


[6] EBITDAR is equivalent to EBITDA, but is also before any deduction for 'rentals'. In the case of IAG, it is most appropriate to use EBITDAR, as rental payments are conceptually associated with amortisation under the 'right to lease' arrangements

Indirect and Induced GDP contribution

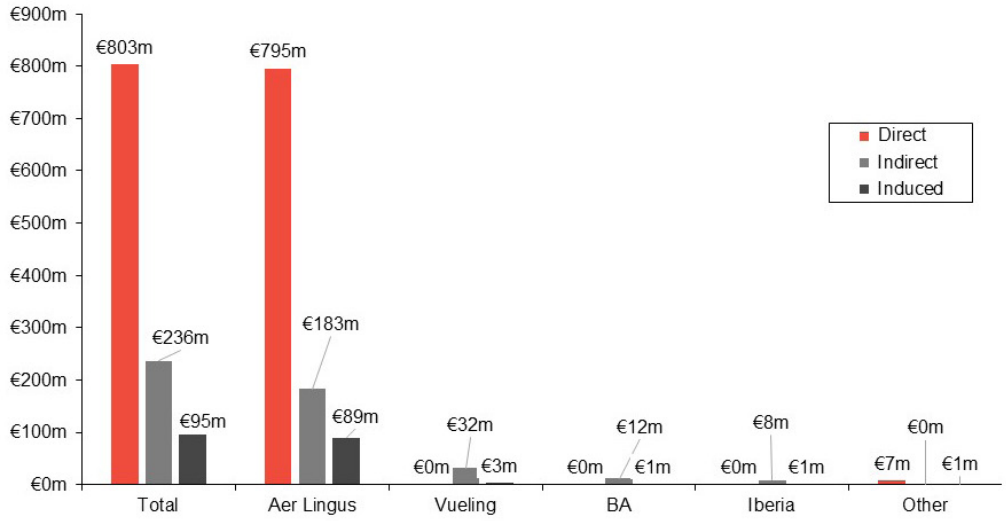
The indirect and induced contributions occur through supply chain and wage spending of IAG. In 2019, IAG's operational and capital expenditure amounted to an equivalent of €23bn. This operational and capital expenditure was through the channels of the different IAG operating companies, as displayed in Figure 8, below.[7]

Figure 8: Almost €385m of IAG's total operational and capital expenditure was directed to Ireland based suppliers, with a total expenditure of €23bn.



This operational expenditure and capital expenditure has knock-on effects on the GVA of IAG's supply chain, as employees spend their wages and suppliers purchase goods from other Irish - based suppliers. Overall, IAG's supply chain (indirect impact) was €236m, as IAG's suppliers contribute towards Ireland GDP, and the effect reverberates further throughout the supply chain. Moreover, IAG has an overall wage-spend (induced) impact of €95m, as its relatively high proportion of wage spend creates further economic value throughout the Irish economy.

Figure 9: IAG's operational, capital and employment expenditure creates further €236m and €95m of value in the Irish economy, through its supply chain and wage-spend impacts, respectively[8]



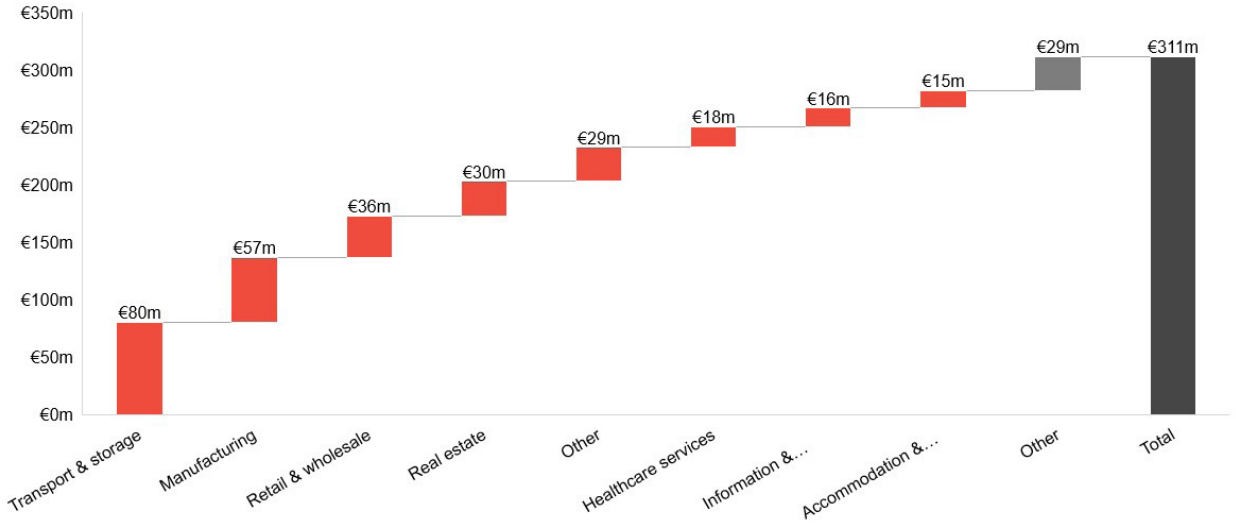
Through its operations, IAG generates a total GVA of 1.1bn in the Irish economy. This can be disaggregated into direct, indirect and induced GVA impacts of €803m, €236m and €95m respectively.

GVA can additionally be disaggregated by airline. Aer Lingus generates 94 % of overall IAG GVA in Ireland. It is expected that Aer Lingus would have the largest impact as the majority of operational expenditure and wage spending from IAG is incurred by Aer Lingus.

[7] It should be noted that the definitions of operational expenditure and capital expenditure may not align with that in any given financial account, as operational expenditure so defined above does not include compensation of employees (COE), which typically would be included in Financial reporting. COE is accounted for by our model, though we do not display it above.

[8] Please note that the 'Other' category in Figure 9 also includes Iberia, IAG Cargo and Vueling.

Figure 10: IAG generated value across a wide range of sectors in the Irish economy, with GVA impacts by sector were largest in the the transport and storage sector (c.€80m)



Information & Technology Accommodation & Food

Indirect and Induced GVA impacts by IAG by sectors in the Irish economy

Based on our sectoral classifications, IAG generates the greatest GVA in the transport & storage sector, as a result of the supply chain and wage spending impacts.

IAG's impact across these sectors shows a fairly even spread across important sectors in the economy. This is explained by IAG's supply chain activities, which stretch into other sectors such as manufacturing, retail & wholesale, and real estate. This in turn generates significant value across a wide variety of sectors, generating positive supply chain impacts.

Contribution to employment

In 2019 IAG contributed 6,948 full time equivalent (FTE) jobs to the Irish economy. This contribution is comprised of:

- **4,030** direct contribution - IAG's FTE employees within Ireland.
- **2,153** indirect impact - jobs created through the supply chain purchases made by IAG in Ireland.
- **765** induced impact - jobs created throughout the supply chain as IAG enables wage spending in the economy, via its own employees, and employees throughout its supply chain.

This results in a high employment multiplier of 1.72, so that for every one job supported by IAG in Ireland, a further 0.7 jobs are supported in the wider Irish economy. As with GVA, AerLingus is the IAG airline that contributes the most to direct employment in Ireland, accounting for 85% of IAG's total employees in Ireland.

Figure 11: IAG supported almost 7,000 full time equivalent jobs in the Irish economy in 2019

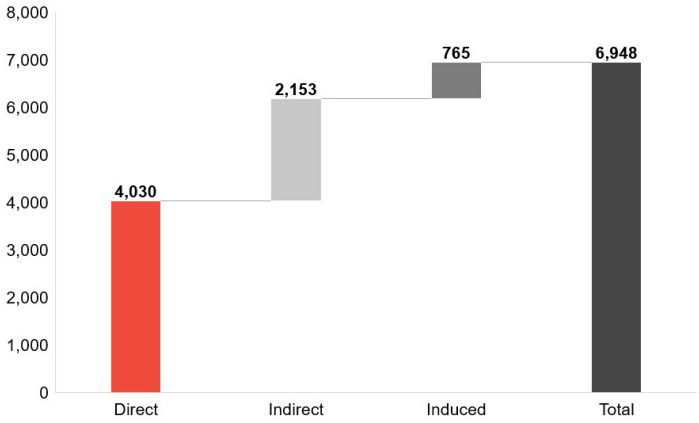
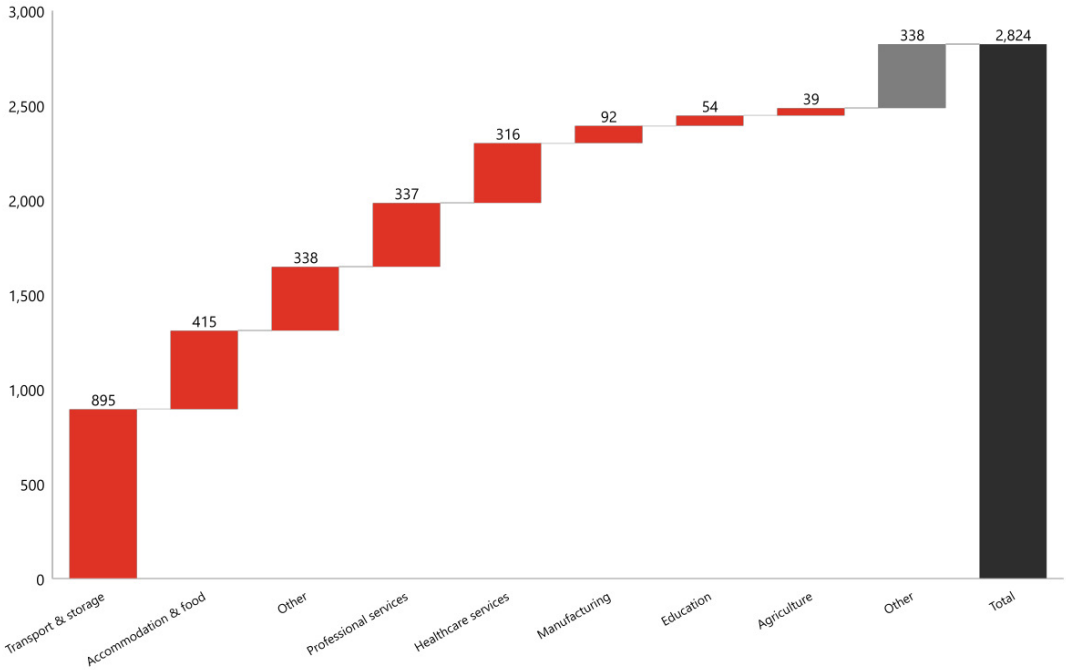
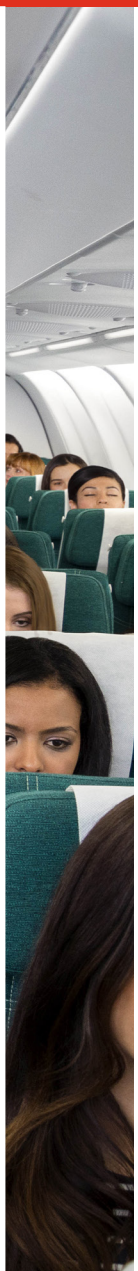


Figure 12: IAG supported c.2,800 indirect and induced jobs across a wide range of sectors in the Irish economy



The sectoral split of jobs supported by IAG in Ireland differs slightly from the sectoral split of GVA as a result of the relatively different employment intensities of each sector. While transport & storage is the sector contributing the most in terms of both GVA and employment, the second sector in employment contribution is accommodation and food followed by professional services and healthcare services. IAG's activities in Ireland support a wide variety of sectors, in different ways, with labour intensive industries benefiting from its supply chain impact.

Connectivity



This sections analyses the connectivity impacts derived from IAG airlines operations on:

- Passenger connectivity and hub effects
- Economic value of connectivity in terms of GVA, employment, and investment
- Catalytic impact derived from tourist expenditure
- Trade and cargo

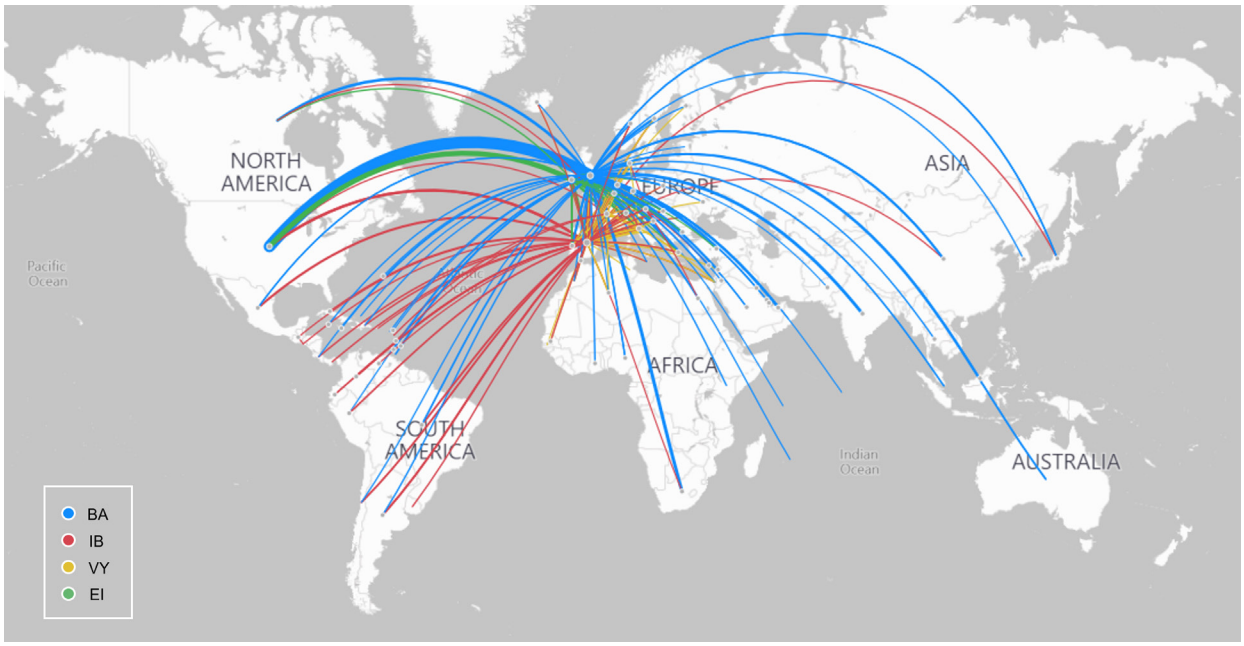
IAG's airlines provide connectivity globally, and between Ireland and the world. In this section of the report we set out the global scale of IAG's airlines operations, and specifically the connectivity it provides to Ireland. We then identify the economic benefits which accrue to Irealnd as a result of this connectivity provided by IAG's airlines, including trade, tourism and business impact.

IAG provides a unique platform that enables the group airlines to efficiently fulfil its purpose: to connect people, businesses and countries around the world. The role of the group and its operating airlines is key in enabling social connectivity, including for families, and for social networks that are dispersed across the world. In addition, IAG airlines support business through enabling the freight of goods and making it easier for companies to establish business relationships from in-person meetings. Finally, the group contributes to the social and economic development of many regions around the world by offering frequent connecting flights from a great number of countries as well as committing with social initiatives such as vaccines transportation during Covid-19.

The enabler to achieve IAG's purpose "to connect people, businesses and countries around the world" is the global network that the group has developed. The network allows people and business to move between different countries and continents with a large and adapted offer to all needs through its diversity of airlines, ranging from full service to low cost and the leadership positions of these companies in the markets in which they operate. Each of the airlines operates independently but has the support of the group to adapt best practices, capital and operational efficiency and therefore, be able to offer a better and more competitive service to its customers.

IAG airlines offer connections all around the world; Figure 13 depicts the routes offered by IAG in 2019, this being the last full year with representative data before the Covid-19 pandemic[9]. IAG airlines connected 101 different countries, carrying 118.7 million passengers across the world in 2019. The airlines together offered 1,076 different routes, 891 of which were international, carrying 90.7 million passengers, and 185 were domestic[10], carrying almost 28 million passengers. Most of the routes have the United Kingdom, Spain or Ireland as either the origin or/and destination of the flight as these are geographic homes of IAG's airlines.

Figure 13: IAG airlines operated 1,076 routes in 2019, connecting 101 countries around the world with the United Kingdom, Spain and Republic of Ireland



Source: IAG database.[11] Note: Flows are expressed in number of passengers (i.e. a thicker line shows a larger number of passengers)

[9] For the purpose of this report, the data shown will refer to year 2019, since it is the last year before the Covid-19 pandemic where data is representative and available.

[10] We refer to domestic routes to all the routes that connect two cities or villages within a country (e.g. Madrid Barajas - Barcelona El Prat or London Heathrow - Manchester would be categorised as domestic routes whereas Madrid Barajas - London Heathrow would be categorised as an international route).

[11] The graphics in this document exclude routes to Russia and Ukraine which were flown in 2019 but have since ceased due to the ongoing conflict.

Description of each of IAG's key airline's operations globally

Aer Lingus (registered in the Republic of Ireland[12])

Aer Lingus carried 11.6 million passengers in 2019 and operated a total of 102 routes. More than 83% of the routes connected countries within Europe, with 97% having either the origin or destination in the Republic of Ireland. The most common route by number of passengers was Dublin - London Heathrow, which carried 1.1 million passengers, followed by Dublin - London Gatwick and Dublin - Paris. In 2021 Aer Lingus reinforced its international connectivity network by starting operations from a new base in Manchester airport, enabling it to offer direct transatlantic connectivity from Manchester to the US and Caribbean.

British Airways (registered in the UK, subsidiaries: BA CityFlyer)

British Airways is the largest airline within IAG, carrying more than 48 million passengers in 2019 and operating 298 routes[13], connecting the UK internally and to the world. British Airways has a hub at London Heathrow, the airport which most of its routes fly to or from, and where British Airways has a 46.5% share of total passengers using the airport. Through its hub-and-spoke model, British Airways connects 9 cities in the UK with 81 countries, with its most popular destinations being New York, Edinburgh, and Glasgow.

Iberia (registered in Spain, subsidiaries: Iberia Express, LEVEL)

Iberia carried more than 24 million passengers in 2019[14], operating a total of 255 routes within Spain and around the world. The main domestic routes operated in were Madrid - Barcelona and Madrid - Tenerife, while the main international route was Madrid - London Heathrow. Iberia also has a hub-and-spoke operating model, with Madrid Barajas a hub airport that in 2019 connected 29 Spanish cities with 106 cities around the world, with 43% of Iberia's total passengers using this airport. In addition, Iberia is the main airline connecting Spain to the Americas with 54.7% of passengers travelling between Latin America and Spain using Iberia.

Vueling (registered in Spain)

Vueling provides connectivity within Europe, flying between 137 European cities in 2019, carrying 34.5 million passengers across 421 routes. Barcelona is the main route that Vueling flights operate from, involved in 31% of Vueling routes, and from which the most popular destinations were Palma de Mallorca, Paris Orly, and Ibiza. In addition to connecting major cities in Europe, Vueling also flies to 40 European countries, 9 Africa including Morocco, Algeria, Egypt, Cape Verde, Gambia, Ghana, Senegal, and Tunisia, and Lebanon, Israel & Jordan in the Middle East.

The number of passengers IAG carries[15] has grown on average 10.9% per annum between 2011 and 2019, with an aggregate growth rate of 130% between 2011 and 2019 thanks to a combination of organic growth and acquisition.Since the group creation in 2011 following the merger of British Airways and Iberia, IAG has acquired other companies, including Aer Lingus, and created new brands to provide more adapted services to their customers. The group's structure allows the different brands to focus their efforts on their addressable markets, customer proposition, cultural identities, commercial strategy and industrial relations.

Passenger numbers during the 2020 and 2021 were significantly negatively impacted by travel restrictions associated with the Covid-19 pandemic; however there has been strong growth in passenger numbers during the first three quarters of 2022, reflecting a return to normality in the industry. From 2021 to 2022 IAG's passenger growth was 144%, outperforming the global airline industry[16].

[12] Aer Lingus UK is registered in the UK and it has UK air operator certificate (AOC) for the Manchester operations

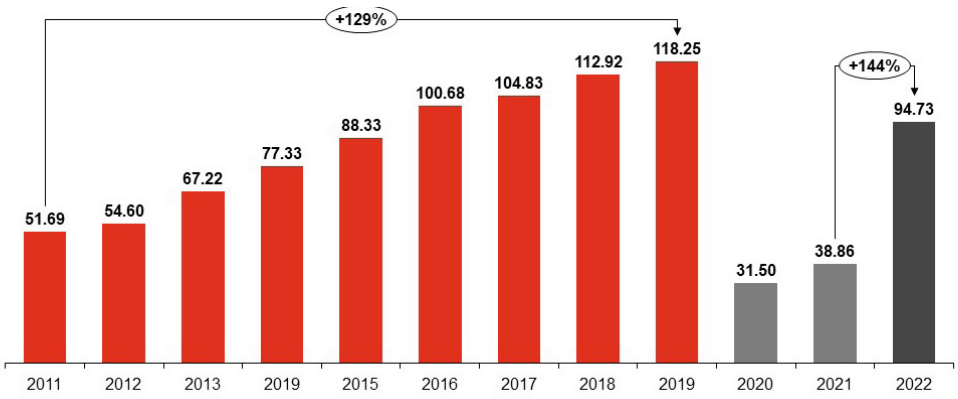
[13] Source, IAG database

[14] Data from IAG may differ from the data provided by AENA as one domestic passenger is counted twice by AENA and only once by IAG.

[15] In order to be consistent with the technical literature in this field we note that a passenger is a seat on a plane. Therefore typically a traveller will be a passenger twice - once on their outbound and once on their inbound journey. A traveller is someone who moves between different geographic locations, for any purpose and any duration. A visitor is a traveller who is taking a temporary trip for the purpose of business or leisure. A tourist is a visitor if their trip includes an overnight stay. As we are reporting around air travel, almost all visitors will be staying overnight and therefore are tourists too. For simplicity we will use 'passenger' unless otherwise noted.

[16] IATA. Passenger Demand Recovery Continued in December 2022 & for the Full Year. Press Release No: 4. Date: 6 February 2023, https://www.iata.org/en/pressroom/2023-releases/2023-02-06-02/#:~:text=International%20traffic%20in%202022%20climbed,compared%20to%20the%20prior%20year

Figure 14: IAG airlines carried 118.73 million passengers in 2019, with an aggregate growth of 129% since 2011 and a fast recovery in 2022 from the Covid-19 pandemic

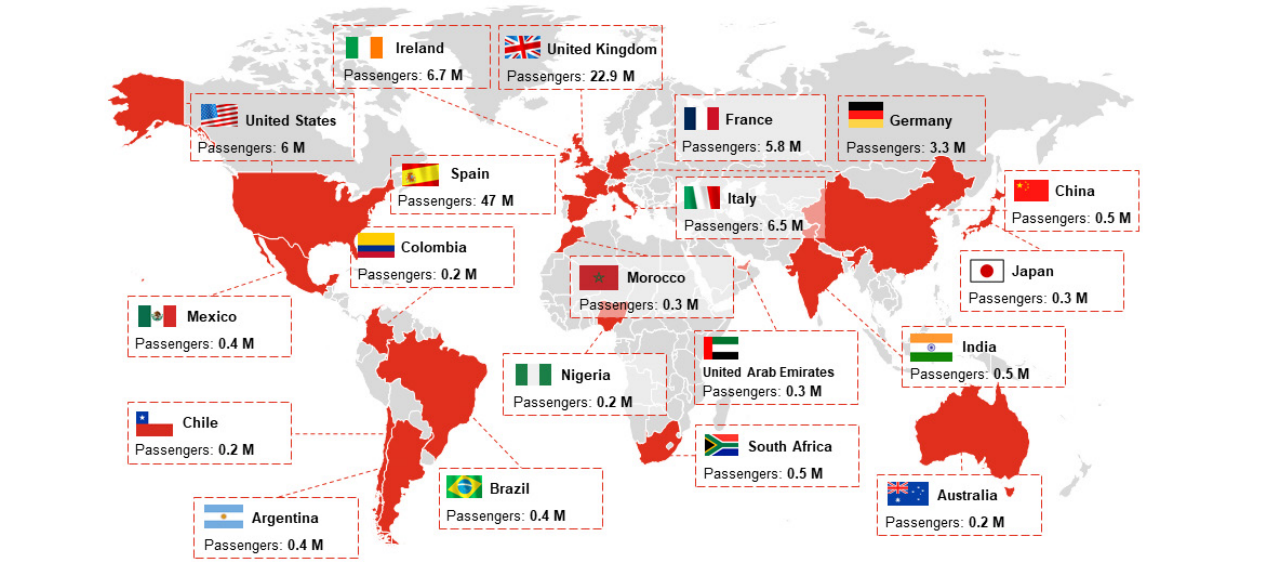


Source: IAG Group (Traffic statistics report)

Besides carrying passengers, IAG contributes to international trade growth through the freight of high value goods mainly using the large bellyhold capacity existing in its long-haul passenger flights operated by Aer Lingus, British Airways, and Iberia. IAG Cargo is the goods transport division of IAG Group operating an air freight network, reaching 136 countries[17] and carrying more than 428,520 metric tonnes[18] of freight across the world in 2019[19]. IAG Cargo can operate in every destination reached by IAG operating airlines' network and is used by over 10,000 businesses (clients) to move goods around the world. IAG freights over 33% of total air cargo into and out of Ireland.

As shown in Figure 15, Ireland is the third country that received the most IAG's passengers in 2019, reaching 6.7 million passengers[20] thanks to the connectivity provided by Aer Lingus and other IAG airlines.

Figure 15: Ireland is the third destination[21] country for IAG passengers, facilitating the arrival of over 6 million passengers



Source: IAG, National Statistics Institutes (ONS, INE, CSO)

[17] IAG Cargo uses subcontractors to reach countries where IAG airlines do not have routes.

[18] IAG Cargo has provided data on cargo weight but not regarding cargo value.

[19] Bellyhold space refers to the vacant space in the bellyhold of passenger aircrafts that are operated by IAG airlines after the travellers' luggage has been loaded.

[20] 47 million passengers or 23.5 million tourists as each tourist uses arrives and departs from Spain.

[21] The country of destination refers to the place where the passenger lands, the final destination country of its journey. For instance, a passenger that flies from London Heathrow to Madrid Barajas and comes back to London Heathrow, has its destination in Madrid Barajas.

IAG passengers connectivity in Ireland

In 2019 IAG's airlines flew from the airports of Dublin, Cork, Shannon, and Knock operating a total of 107 international routes[22]. IAG's airlines connected Ireland to 20 countries and 71 cities in Europe and America, carrying 12.4 million international passengers annually, representing 33% of total Ireland passenger traffic in 2019. IAG greatly contributes to the connectivity of Ireland, carrying a large share of the passengers in the three main airports in the country. Dublin airport is the busiest airport, where IAG airlines carried 33% of the passengers, followed by Cork, with an IAG airlines share of 38%, and Shannon, with IAG operating companies carrying 30% of the passengers in 2019.

Dublin as a hub

Dublin airport plays a key role in connecting Ireland to the world. As noted in the sections above, through Aer Lingus, IAG operates a hub-and-spoke model in Dublin which enables strong connectivity between regions across Ireland and reaching multiple global destinations. This is beneficial to both passengers and cargo, because it provides a global network which is easily accessible to Ireland. IAG airlines have a very strong presence at Dublin's airport with 10.8 million IAG passengers, which represented 33% of the total airport's passengers.[23]

In terms of the routes operated at this airport in 2019, IAG airlines had a strong presence in six out of the ten busiest routes in Ireland. The route which carried the largest number of passengers was Dublin - London Heathrow where Aer Lingus and British Airways accounted for the majority of the passengers. This fact shows the relevance of IAG airlines in connecting the Republic of Ireland with the UK, and in particular, with Heathrow the airport with best connectivity in Europe in 2019.

IAG airlines also contributed significantly to the connectivity between Dublin and Paris, in which the group airlines have a share of 56,5% in the route Dublin - Paris Charles de Gaulle. IAG airlines also operates many other routes such as the one connecting Dublin to Málaga, the tenth most popular route in the airport in which they have a share of 51% of total passengers.

Finally, IAG airlines had also an important role in the routes from Dublin to London Gatwick, Amsterdam Schiphol and Birmingham, with a passenger share between 29% and 35% in 2019.

Connecting Ireland internationally

In 2019 IAG's airlines operated 107 international routes from 5 Irish airports, flying a total of 12.4 million passengers. Aer Lingus is the most important IAG operating company in Ireland accounting for 93% of the flights in 2019 and carrying 11.3 million passengers. The key airport for international flights was Dublin's airport which operated 77% of the international routes offered by IAG airlines in Ireland, followed by Cork (16%) and Shannon (5%).

The network offered by IAG from Ireland is extensive, with connections to countries such as the United States, Italy, Spain, Canada, or Turkey. The routes with the highest number of passengers were flights between Dublin's airport and the destinations of London (2.3 million passengers), Paris (520,000 passengers[24]), and New York (400,000 passengers).

Connectivity from Ireland to North America

In 2019, Aer Lingus offered 16 direct routes between North America and Ireland, including New York, Chicago, Boston, Orlando, San Francisco, Washington D.C. and Toronto. The airline transported more than 2.5 million passengers between Ireland and North America, with the routes of New York, Boston and Chicago to Dublin being the busiest ones. Specifically, the route Dublin - New York was the largest in number of passengers carrying 400.000 passengers in 2019. Boston was the second most popular destination, with 379.000 passengers, and Chicago the third one with 348.000. Overall, these three routes represented 44% of all passengers travelling between North America and Ireland with IAG airlines. The airline experienced an accelerated transatlantic flights growth of Aer Lingus post acquisition by IAG.

In 2022, the company restarted a large number of routes to the US, after having stopped them due to Covid-19 restrictions. These routes included destinations such as Philadelphia, Los Angeles, and Seattle. Moreover, Aer Lingus has increased the frequency of flights to Chicago and Washington D.C.[25]

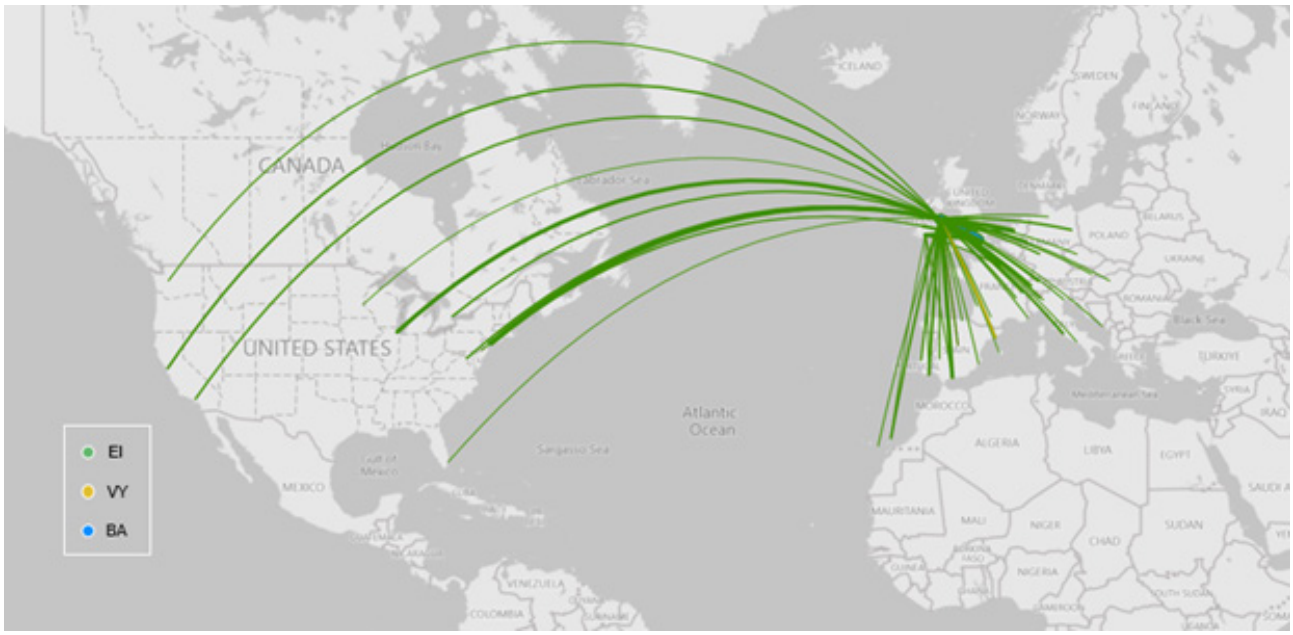
[22] Aer Lingus regional franchise partners operated Donegal-Dublin route though in 2019.

[23] CSO and IAG

[24] Including routes operated by Aer Lingus and Vueling

[25] In 2023 Aer Lingus will restart routes connecting Dublin to Hartford, Connecticut and commence new routes to Cleveland and Ohio. In order to growth further Aer Lingus will take a further 6 A321NEO XLR aircraft in 2024 and 2025.

Figure 16: IAG airlines carried 12.4 million passengers in international flights, connecting Ireland to 71 cities in Europe and North America



Source: IAG database. Note: Flows are expressed in number of passengers

Aer Lingus is a key airline to provide connectivity between Ireland and North America being the only carrier offering direct flights between Ireland and the West Coast in the US. Since 2015 when IAG acquired Aer Lingus, there has been an accelerated growth in the number of transatlantic routes connecting Ireland to the US.

The connectivity between Ireland and the US is particularly important for firms in industries such as software, IT or pharmaceutical sector.

Economic value of connectivity

The air connectivity which IAG's airlines provides economic benefits to Ireland's economy. Air transport enables key flows such as tourism, trade, investment, and knowledge. Air routes that connect cities contribute to economic growth by boosting the supply side of the economy and facilitate investment flows.

That is particularly relevant for the Irish economy, an island economy, where the aviation sector is essential for the tourism industry, trading relationships and for connecting Ireland with the rest of the world[26] . Key economic variables which are affected by spillover benefits of air connectivity are:

- GDP
- Employment
- Tourism, including education tourism
- International trade (goods and services)
- Foreign Direct Investment

Ireland's economy has a strong services focus, with large firms in sectors such pharma, software services, and IT & communication services. Firms operating in these sectors are likely to benefit from the high connectivity provided by IAG transport services.

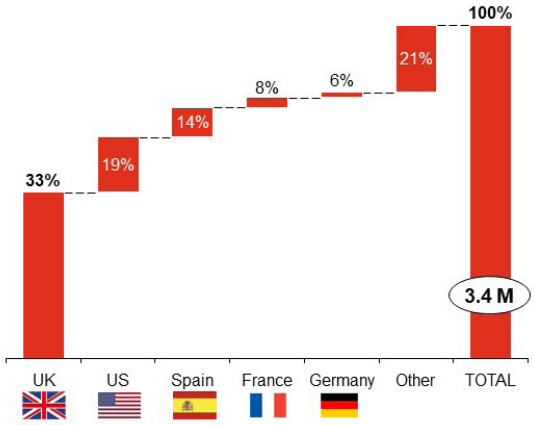
In this section of the report we firstly describe and then quantify the catalytic economic benefit to Ireland's economy of the passengers brought to Ireland by IAG airlines, and then we discuss the importance of IAG's cargo operations for Ireland trade.

[26] Ministry of Transports. A National Aviation Policy For Ireland. August 2015. https://assets.gov.ie/14197/9b90e1b8a47d47c8950ead2492a54030.pdf

Passenger inflow to Ireland by IAG

People from across the globe arrive in Ireland for leisure, business, education purposes and personal travel on IAG's airlines. In 2019 3.4 million passengers arrived at Irish airports on IAG services with the most common destination they travelled from were the UK, the US and Spain as shown in Figure 17.

Figure 17: IAG international passengers to Ireland by departing country



Source: IAG and CSO

Of the total international passengers arriving to Ireland (3.4 million[27]) by IAG airlines 33% travelled from the UK, and 19% from the US. 52% of total IAG international passengers arrived from these two countries followed by passengers arriving from Spain.

Supporting tourism in Ireland

IAG passengers make up 33% of all airport passengers in Ireland. The arrival of international tourists to a city or region has an impact on the local economy derived from the expenditure of visitors on accommodation, transport, restaurants, retail, or other activities. This catalytic impact can be measured in terms of GVA and FTE jobs creation. In the section below we calculate this catalytic impact in terms of the direct, indirect and induced impact of tourists brought to Ireland by IAG's airlines.

Catalytic impact

In addition to contributing to Ireland's economy through its operational and capital expenditure as explained in the sections above, IAG plays a key role in catalysing tourism in Ireland. In this section we estimate the contribution of this catalytic effect to Ireland's economy. In doing so, we calculate the gross value added and employment generated by tourism and business travel spending by IAG's international and domestic passengers.

The total catalytic impact is the result of:

- a direct impact: the contribution to the economy of the expenditure made by IAG passengers (in restaurants, hotels, etc.);
- an indirect impact: the onward supply chain impact of the business where IAG passengers spend money (e.g. providers of foods and drinks to the restaurants, utilities, etc.); and,
- an induced impact: the contribution to Ireland's economy resulting from employment supported by IAG passenger expenditure (e.g. rent, transport, groceries, etc).

To estimate the catalytic impact, we use the total number of passengers travelling to and within Ireland, and compute tourism expenditure per passenger, and the sectoral composition of this expenditure for domestic and international passengers using CSO data. In 2019 the total expenditure for all international passengers (those flying with IAG airlines and those flying with other airlines) was €4,700m[28] .

[27] CSO: Overseas travel and tourism to Ireland

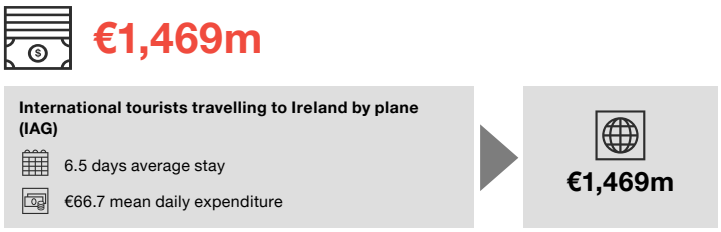
[28] CSO and PWC Spain

Passenger expenditure

Our modelling suggests total expenditure by IAG passengers in Ireland economy was €1,469m in 2019. Out of the total spending by international air passengers in Ireland, IAG passengers contribute approximately 31%.

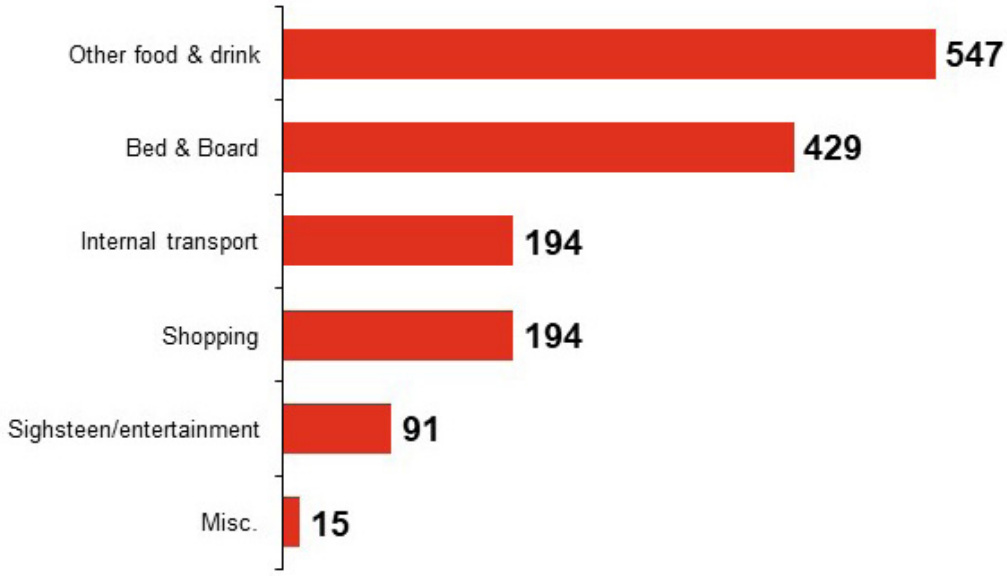
The expenditure of IAG passengers in 2019 was distributed as shown in Figure 19. Food and drink was the main component of expenditure €547m, followed by Bed & Board (Accommodation) expenditure €429m. There is also expenditure related to transport, including on road, railways, and water. Smaller contributions go to a broad range of other sectors, including: shopping, entertaining and other.

Figure 18: Total expenditure in Ireland by IAG passengers



Source: IAG, CSO and Fâilte Ireland

Figure 19: Distribution of IAG passengers' main expenditures in Ireland, 2019 (€m)



Source: IAG, CSO and Fâilte Ireland

GVA impact

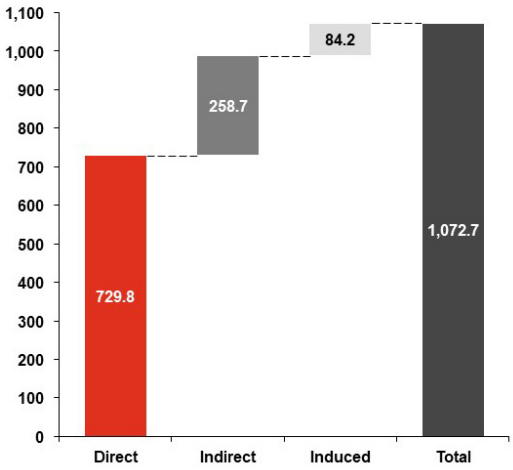
Figure 20 shows the direct, indirect, and induced impact on Ireland GVA that the expenditure of IAG airlines passengers has. While direct refers to the impact on the business that the passenger spent the money, indirect refers to the impacts on the value chain of the business, and the induces refers to the impact resulting from employees (of the main business & value chain business) expenditure.

Total IAG catalytic effect in Ireland was at €1,073m.

This is comprised of:

- **A direct impact of €729.8m**
  - This is the impact that results from the IAG passengers' total expenditure in the economy.
- **An indirect impact of €258.7m**
  - This is the impact that results from the industry value chain in the recipient sectors of passenger expenditure.
- **An induced impact of €84.2m**
  - This is the impact of the spending by the households that have been impacted directly and indirectly, eg. hotel employees' expenditures.

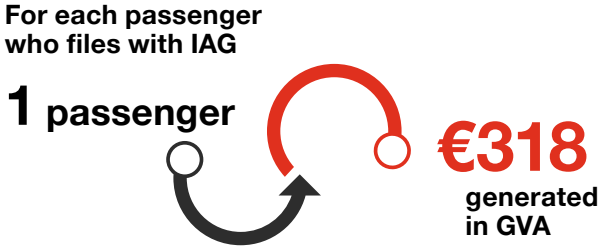
Figure 20: IAG catalytic impact in Ireland, GVA 2019 (€m)



Source: IAG, CSO and Fâilte Ireland

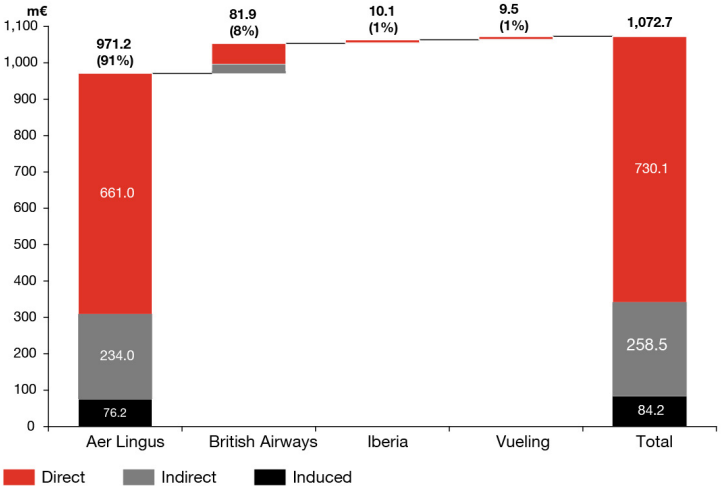
Figure 21: IAG's GVA multiplier in Ireland, 2019

For each passenger who flies with IAG to Ireland, there is a catalytic impact of €318 to Ireland GVA, reflecting IAG's contribution to Ireland's economy through all economic activities.



As shown in Figure 22, Aer Lingus is responsible for 91% of the total IAG catalytic impact with Aer Lingus passengers contributing €971m out of the €1,072m that IAG's passengers contribute to the national GVA. British Airways represents 8% of total IAG's catalytic impact in Ireland, while Vueling and Iberia together contribute 2% of the catalytic impact.

Figure 22: Distribution of catalytic impact by airline in Ireland, 2019

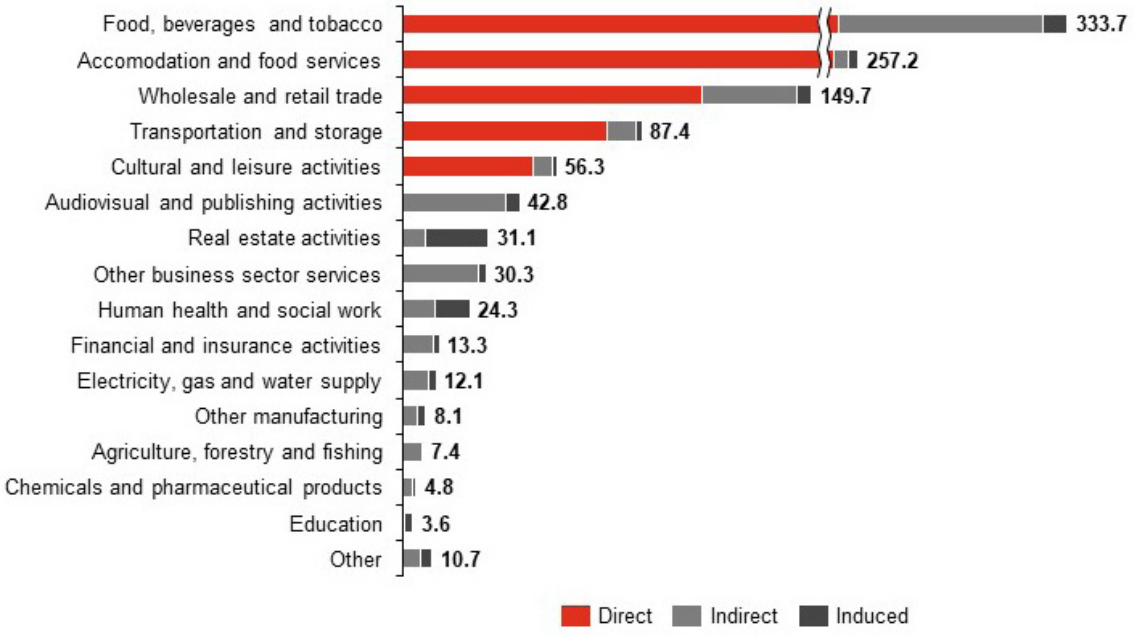


Source: IAG, CSO and Fâilte Ireland

The catalytic impact benefits a range of sectors across the Irish economy. The largest single catalytic contribution is to Food and Beverages at €334m, followed by Accommodation and Food services €257m, and Wholesale and Retail sale €150m. The majority of these impacts are direct, i.e. they are directly resultant of IAG passenger spending.

Other, smaller, sectoral impacts, such as that on Transport and Storage (€87m) have a more substantial indirect and induced impact, representing that these are a result of other industries' supply chains, or expenditure by employees by directly impacted industries where that employment is supported by IAG passenger spending. The 'Other' category captures the economic benefit provided to a range of economic sectors, with the largest in the category being: construction, insurance services, manufacturing, and consultancy services.

Figure 23: Total IAG catalytic impact by sector Ireland 2019 (€m)



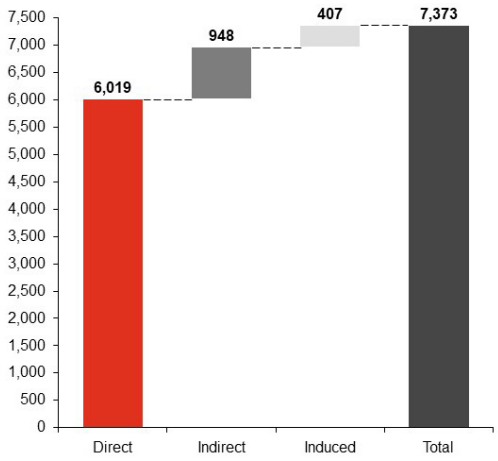
Source: IAG, CSO and Fâilte Ireland

Jobs impact

IAG's catalytic effect supported approximately 7,400 full-time equivalent (FTE) jobs in Ireland in 2019. These FTE jobs are the result of the total expenditure made by passengers in Ireland in the sectors described in Figure 24. This is comprised of:

- **c. 6,000 FTE jobs directly supported**
  - These are jobs supported by the expenditure of IAG passengers in Ireland, e.g. jobs that are created in hotels, restaurants, and transport to provide services.
- **c. 950 FTE jobs indirectly supported**
  - These are jobs supported by supply chains of the sectors where the passengers spent money, e.g. jobs created in the supply chains of hotels and restaurants.
- **c. 400 FTE jobs that are induced**
  - These are jobs that are supported by the spending of employees who are employed directly and indirectly, e.g. jobs created by the expenditure of employees who work in retail or hospitality in their day-to-day lives.who work in retail or hospitality in their day-to-day lives.

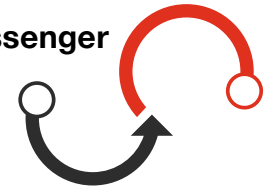
Figure 24: Catalytic effect of IAG on employment (FTE) in Ireland



This means that for every 1,000 passengers flying with IAG to Ireland, 2.1 FTE jobs are supported.

For every 1,000 passengers who fly to Ireland with IAG

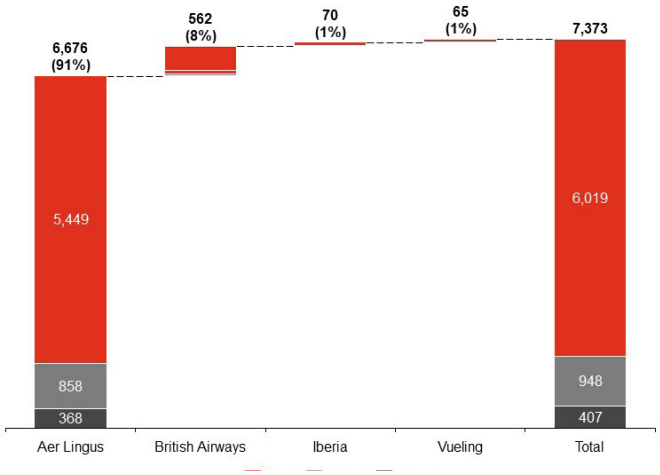
1,000 passenger



2.1 jobs(FTE) are supported

Figure 25: Catalytic effect of IAG on employment (FTE jobs) in Ireland by airline, 2019

91% of the total catalytic impact of IAG's airlines on FTE jobs in Ireland comes from Aer Lingus. Aer Lingus passenger expenditure supports 6,700 of the roughly 7,400 FTE jobs. British Airways passenger expenditure supports c.600 FTE jobs, while Vueling and Iberia c.140 FTE jobs.

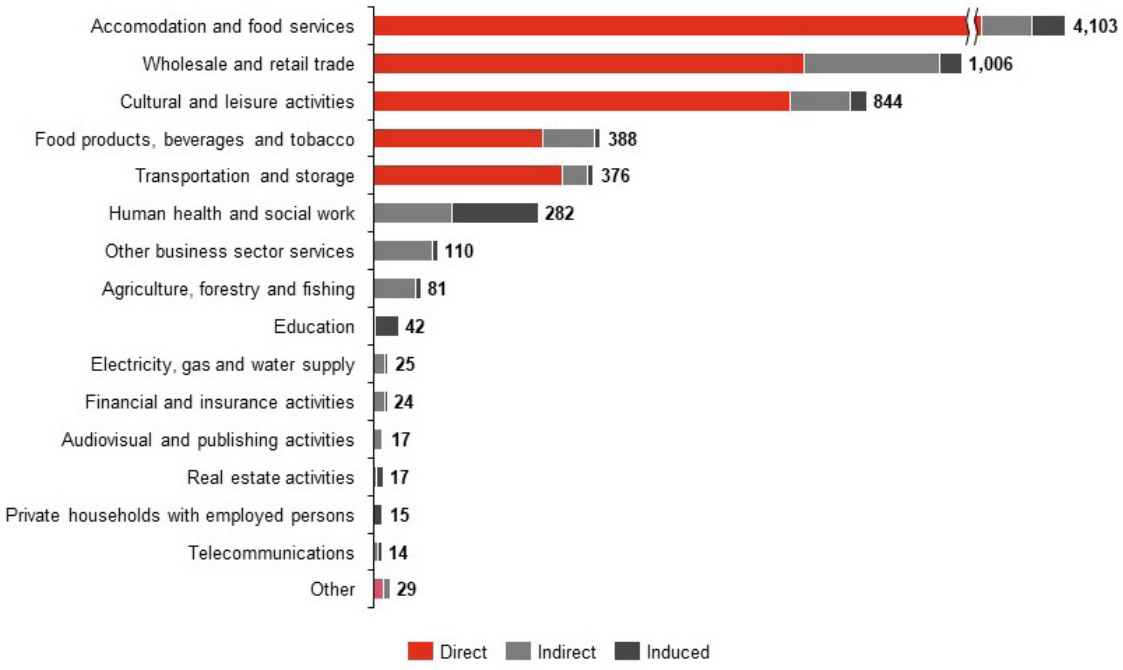


Source: IAG, CSO and Fâilte Ireland

The catalytic impact on employment of IAG passenger spending in Ireland is distributed across 36 different sectors, evidencing a broad impact of IAG to Ireland job creation. The largest sector which benefits from an employment catalytic impact of IAG passenger spending is the provision of accommodation and food services where c.4,100 FTE jobs are generated. This is followed by wholesale and retail trade with c.1,000 FTE jobs. The third and fourth largest sectors in terms of employment impact are cultural and leisure activities and supporting c. 840 jobs.

Most of the jobs created are the result of the direct impact, meaning that they directly result from IAG passenger spending. However, there is also evidence of substantial indirect and induced impact on jobs in Spain, particularly human health and social work and other business sector services. These are jobs supported as a result of spending from IAG passengers flowing through the supply chain to other industries, or spending of IAG employees, and Irealnd households working in the supply chain sectors.

Figure 26: Catalytic effect on employment (FTE) of tourism resulting from IAG passengers by sectors, Ireland 2019



Cross-border trade

IAG Cargo operations

IAG Cargo is the cargo division of IAG Group operating (picking up and setting up freight) in 136 countries and transporting more than 428,520 metric tonnes[29] (including transhipments - the transfer of cargo between transport forms) of freight across the world in 2019. In the case of Ireland, IAG freights over 33% of total cargo and over 30% of total Dublin cargo.

IAG Cargo's activity contributes to facilitating international trade and access to international supply chains, a major engine of economic growth. Air cargo is a particularly important transportation mode for high added-value products.

IAG Cargo product offerings[30] include:

- IAG General Cargo, under categories of loose or unitised[31].
- IAG Cargo Air Mail.
- IAG Cargo Constant Fresh designed for temperature sensitive perishable products.
- IAG Cargo Constant Climate designed to transport pharmaceutical goods.

Other IAG Cargo solutions include: Prioritise (express services), Courier, Dangerous groups, General cargo or Live animals and pets.

The majority of demand for air freight is for products that are high value-added, and perishables. Examples of these are pharmaceuticals, fresh products, IT products, energy machinery, and gold.

IAG Cargo operates a forwarder business model where the majority of cargo is transported in the hold of passenger aircraft on long-haul routes as opposed to dedicated freight aircraft using the three hubs IAG airlines has in London Heathrow, Madrid Barajas, and Dublin Airport as distribution centres. This model allows IAG Cargo to utilise the large number of passenger routes in IAG's network to transport cargo worldwide on frequent flights. IAG Cargo's top five routes by origin and final destination (at the country level) are the US to the UK (45,404 metric tonnes), India to the US (31,519 metric tonnes), the US to India (27,515 metric tonnes), domestic routes in Spain (24,214), and China to the UK (19,189 metric tonnes). In the case of Aer Lingus is especially important the large number routes from Ireland to the US that being used for cargo transport.

Figure 27: The routes with the largest weight of cargo transported by IAG worldwide in 2019 were between the United Kingdom with the United States, followed by the United States with India

Source: IAG Cargo. Note: A thicker line shows a larger number of metric tonnes

[29]IAG Cargo has provided data on cargo weight but not cargo value. The methodology used to allocate the cargo transported by IAG has been to select the maximum data recorded by order and route (since it is not possible to discriminate whether cargo is collected or deposited at each airport through which the aircraft passes on a route). With this, we try to get as close as possible to the real data without incurring in overestimation of the cargo transported by IAG.

[30] IAG Cargo only provided data on the metric tonnes, the product offering is the closest approach to know the freighted products

[31]Loose cargo is a single item, and unitised cargo refers to a group of items that are shipped together.

Transporting pharmaceuticals including Covid-19 vaccines

IAG Cargo plays a key role delivering vaccines around the world due to its Constant Climate Service. During the Covid-19 pandemic IAG supported delivering this vaccine to millions.

- In 2021 IAG Cargo transported over 19 million doses of Covid-19 vaccines around the world.
- IAG Cargo partnered with UNICEF to support its COVAX programme which was aiming to provide equitable global access to Covid-19 vaccines, delivering four million doses of vaccines to Nigeria.

IAG was able to deliver this due to this is its cold chain service Constant Climate and climate controlled facilities at the key hub airports. These ensure that products are kept at the optimum temperature throughout the time they are in the airport.

Dublin Airport: The Constant Climate located in Dublin is providing services to the growing pharmaceutical market operating in Ireland, the Constant Climate handling facility provides 50m2 2-8°C area and twin-chamber five airline pallet temperature-controlled modules.

London - Heathrow: The Constant Climate Centre is a dedicated site for pharmaceutical shipments, and has separate temperature-controlled zones, at 2-8°C and 15-25°C totalling 6,000 square feet.

Madrid - Barajas: In February 2019 IAG Cargo opened a new centre dedicated to its Constant Climate product for transporting time and temperature-sensitive pharmaceutical products. The facility has two dedicated temperature-controlled chambers for 2-8°C and 15-25°C goods totalling over 900 square metres.

Cargo's impact on Ireland trade

IATA estimates that a 1% increase in air cargo connectivity[32] is associated with 6% more trade, widening business opportunities for firms and consumer choices.[33]

In 2019 Ireland had a negative overall goods & services trade balance of minus €14.1bn, consisting of a service balance deficit of minus €75bn and a goods balance surplus of €61bn. The positive goods balance is a result of Ireland's economy specialisation in high added-value goods. Ireland's good exports are led mainly by medical and pharmaceutical products and chemical products, reflecting how high-skilled labour force sectors have a relevant presence in the national economy.

[32] "Air connectivity is a composite measure reflecting the ease of accessing various locations around the world.It is a composite measure reflecting the number and economic importance of the destinations served from a country's major airports and the number of onward connections available from each destination". IATA. Air Connectivity. Measuring the connections that drive economic.

[33] IATA. Air Connectivity. Measuring the connections that drive economic growth.https://www.iata.org/en/iata-repository/publications/economic-reports/air-connectivity-measuring-the-connections-that-drive-economic-growth/

[34] CSO

[35] CSO data

IAG Cargo operations in Ireland

In 2019 Dublin's airport freighted 91% of total Irish air freight (133 thousand metric tonnes out of total 146 thousand metric tonnes) where IAG bellyhold cargo made up almost 82% of the total cargo (approximately 49,000 metric tonnes in 2019), benefiting from the long haul flights availability.

IAG Cargo in particular contributes to international trade in Ireland, handing over 33% of total air cargo in Ireland, and over 30% of goods at Dublin's airport in 2019. (see Cross-border section for further information on IAG Cargo activity).

>33% of total
Ireland Cargo
Freight by IAG

>30% of total
Dublin Cargo
Freight by IAG

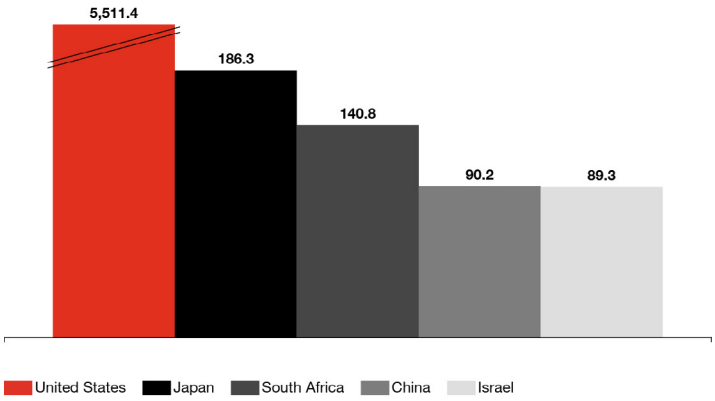
Figure 28: IAG contributes to Ireland connectivity by importing and exporting goods at several airports[36] all around the country. There are 3 locations that receive cargo from IAG, and 4 locations that send cargo through IAG, with Dublin the largest in origin and Shannon the largest in destination.

Source: IAG Cargo. Note: The relative size of each bubble denotes kilograms of cargo sent (left) or received (right) by airport

[36] The map has been populated using IAG Cargo data and includes some airports on the network which are served by trucks as bonded freight not by IAG airline capacity.

IAG airlines exported 7,000 metric tonnes from Ireland in 2019. The largest destination countries were the United States (5,511 metric tonnes), followed by Japan (186 metric tonnes), South Africa (141 metric tonnes), and China (90 metric tonnes).

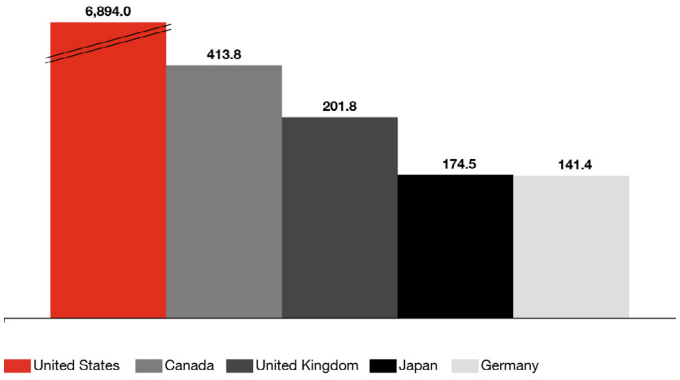
Figure 29: Main destination of Ireland exports by IAG, 2019 (metric tonnes)



Source: IAG Cargo

IAG airlines imported 8,825 metric tonnes to Ireland in 2019. The largest origin countries for these imports were the United States (6,894 metric tonnes), Canada (414 metric tonnes), the United Kingdom (202 metric tonnes), Japan (175 metric tonnes), and Germany (141 metric tonnes).

Figure 30: Main origins of Ireland's imports by IAG, 2019 (metric tonnes)

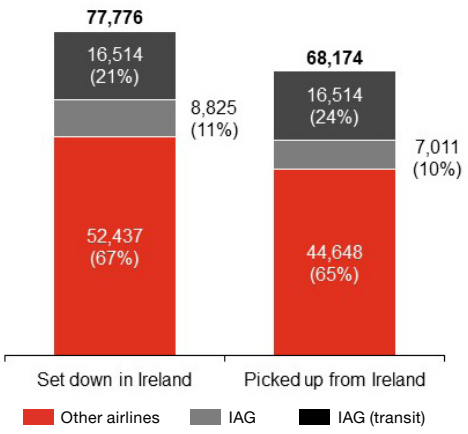


Source: IAG Cargo

Dublin's airport has a critical role in the functioning of the air cargo in Ireland. The airport is the largest air freight location in Ireland, supported by the large number of consolidation centres and freight facilities of forwarders in the surroundings of the airport, aiding product distribution and improving connections to other airports for custom-bonded trucks.

IAG Cargo freighted 33% of total air cargo arriving to Ireland's airports (as measured by weight), 65% in transit and 35% final set down (Figure 31). For cargo leaving Ireland airports, IAG Cargo freighted 33% of this), 70% in transit and 30% final set down. More than 40% of IAG goods transportation that goes to Dublin or leaves from this airport is for transit. Once the freight arrives at Dublin, it is distributed by air, mainly to countries outside British Isles, o. IAG therefore plays a vital role in the transit in the functioning of global value chains essential to the manufacturing of many products such as cars, cell phones, and other IT equipment.

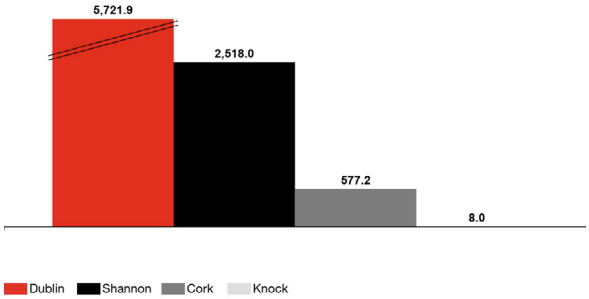
Figure 31: IAG cargo in Ireland, 2019 (metric tonnes)



Source: Civil Aviation Authority & IAG Cargo

Dublin is the airport where the largest volume of cargo is imported to, with 5,722 metric tonnes arriving ('set down freight') in 2019, followed by Shannon with 2,518 metric tonnes.

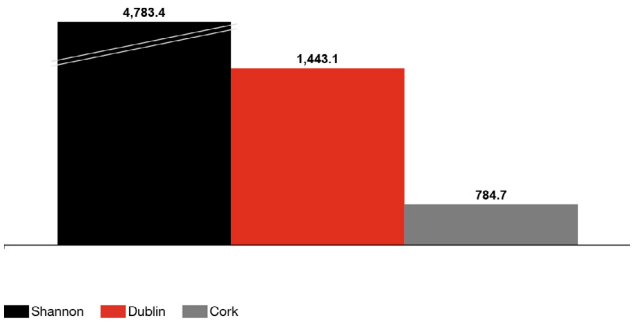
Figure 32: Ireland's set down freight by airports. Only final destination, 2019 (metric tonnes)



Source: IAG Cargo

However, Shannon airport had the largest volume of goods exported ('picked up freight') considering only the origin of the product and excluding products in transit, followed by Dublin and then Cork airports. Shannon airport supports the exporting companies located in the area connecting Shannon, and the West of Ireland as a whole.

Figure 33: UK's picked up freight by origin airport, 2019 (metric tonnes)



Source: IAG Cargo

Sustainability

The aviation industry faces a challenge to decarbonise in order to keep the EU on track to meeting its environmental commitments. The sector is in the process of adapting so that it can continue to provide the economic benefits described in this report, including its contribution to EU GDP, jobs, trade and connectivity, whilst minimising the impact it has on the environment.

Domestic and international aviation accounted for 3.8% of EU greenhouse gas (GHG) emissions in 2019[37]. Passenger levels are rapidly recovering after the Covid-19 pandemic, with the International Air Transport Association (IATA), the global airline trade association, expecting numbers travelling in 2023 to be 86% of the 2019 peak.[38] Forward projections estimate a doubling of passenger numbers by 2040.[39] As a result of this expansion and the carbon intensity of the industry, aviation is forecasted to be a sector with one of the largest residual emissions remaining after technically and economically feasible reductions in the UK by 2050.[40]

Improving the sustainability of the aviation industry is an important component in meeting the EU's commitment to be climate-neutral by 2050 – an economy with net-zero greenhouse gas emissions.

Green Deal & the Sustainable and Smart Mobility Strategy

The European Commission presented in 2019 the European Green Deal[41] with the goal of transforming the EU into a modern, resource-efficient and competitive economy, ensuring:

- no net emissions of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind

The aviation industry faces a challenge to decarbonise in order to keep the EU on track to meeting its environmental commitments: transform Europe into the first climate-neutral continent by 2050[42]. The goal requires cutting transport-related greenhouse emissions by 90%. However domestic and international aviation accounted only for 13.9% of total transport greenhouse emissions in EU-28 in 2018[43], being the road transport responsible for 71.1% of total emissions.

In order to tackle the transport and aviation emissions, the Sustainable and Smart Mobility Strategy sets out a list of measures to support aviation's sustainable transformation:

- supporting the development of new aviation technologies
- making flying more efficient through the Single European Sky
- gradually replacing fossil jet fuel with sustainable alternatives
- making sure carbon emissions are cut in a cost effective way through the EU Emissions Trading System

The aviation sector is in the process of adapting so that it can continue to provide the economic benefits (GDP & trade), connectivity, while stimulating innovation whilst minimising the impact it has on the environment committing to:

- sustainability and net zero carbon emissions by 2050 for all flights within and departing from Europe, as expressed in the DESTINATION 2050 initiative of 2021,
- European Union Fit For 55 and RefuelEU Aviation; to foster biofuel use, with a minimum mandate for the use of SAF on flights of 2% in 2025, 5% in 2030, and a gradual increase to 63% in 2050.

IAG sustainability leadership

IAG's past achievements and future strategy demonstrate that it is committed to making the aviation industry a more sustainable part of the EU economy, and the group will play a central role in the sector's decarbonisation.

IAG has a history of leadership in the aviation industry's progress towards sustainability, including setting precedents for meaningful and challenging targets:

- In 2019 IAG became the first airline group to commit to reaching **net zero carbon emissions by 2050**, meaning it will remove all the direct and indirect emissions associated with IAG operations (such as aircraft fuel and ground facility electricity).
- IAG stretched this target further in 2021 becoming the first airline group to commit to reaching **net zero Scope 3 emissions by 2030**, meaning it will additionally remove all indirect emissions associated with products IAG buys and sells (such as emissions related to aircraft deliveries).
- In 2021 IAG became the first airline group to commit to **10% sustainable aviation fuels (SAF) by 2030**.

Looking forward, IAG's vision is to be one of the world's leading airline groups on sustainability. IAG is a large airline group which understands that its scale supports its ability to influence the sector as a whole, and it takes seriously its ability to play a leadership role in the sector, taking on a variety of leadership positions in industry associations.

Globally IAG representatives are active in IATA's Sustainability and Environmental Advisory Council and working groups. IAG representatives lead sustainability activities within the Oneworld Alliance, including chairing the Environmental and Sustainability Best Practice Group.

[37] European Commission. European Environmental Agency (EEA)
[38] https://www.iata.org/en/pressroom/2022-releases/2022-12-06-01/
[39] https://www.iata.org/en/iata-repository/publications/economic-reports/airline-industry-economic-performance---june-2022---report/
[40] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1095952/jet-zero-strategy.pdf
[41] Green Deal encompasses the European Climate Law, the Sustainable and Smart Mobility Strategy, and the Zero Pollution Action Plan
[42] The 2021 European Climate law
[43] EEA.

IAG sustainability strategy

In its 2021 Sustainability Report IAG sets out its ambitions and strategies to drive change to create truly sustainable aviation, and meet these targets.[44] IAG has aligned its environmental strategy to its overall strategic priorities, and sets out nine strategic priorities against which its sustainability strategy and progress is tracked. These are:

1. Clear and ambitious targets relating to IAG's most material issues
2. Low-carbon transition pathways embedded in business strategy
3. Management incentives aligned to delivering a low-carbon transition plan
4. Leadership in carbon disclosures
5. Accelerating progress in low-carbon technologies including aircraft technology, SAF, carbon offsets and carbon removals
6. Accelerating innovation in low-carbon technology as above
7. Industry leadership in the innovation and deployment of SAF including power-to-liquids
8. Stepping up our social commitments including on diversity, employee engagement and sustainability as a core value
9. Industry leadership in stakeholder engagement and advocacy

IAG transition plan

IAG has created a Flightpath Net Zero strategy in order to meet its net zero emissions target which it recognises is essential in order to limit global warming below 1.5°C. Its roadmap is a 30 year plan, incorporating short (1-2 year) and medium term (3-5 year) targets to stay on track. The pillars of this roadmap are: new aircraft and operations; Sustainable Aviation Fuels (SAF); market-based measures with offsets; and carbon removals.

Flighpath net zero

IAG launched its Flightpath net zero[45] a package of measures to reduce its carbon footprint by 2030 and to reach net zero CO2 emissions across its full operations and supply chain by 2050. Flightpath net zero highlights:

- 1st airline group worldwide to commit to achieve net zero carbon emissions by 2050
- By 2025: 10% reduction in CO2 per passenger kilometre
- By 2030: 20% reduction in net CO2 and use of 10% sustainable aviation fuel
- By 2050: Net zero CO2 across its full operation and supply chain

[44] Introduction to Sustainability. Driving change to create truly sustainable aviation. Annual Report and Accounts 2021 https://www.iairgroup.com/~/media/Files/I/IAG/documents/sustainability/sustainability-report-2021.pdf

[45] Flightpath net zero, https://www.iairgroup.com/en/sustainability/flightpath-net-zero

Supply chain strategy

IAG extended its net zero commitment for 2050 to its supply chain in 2021. IAG is committed to supporting and monitoring its suppliers' performance to ensure that all products and services provided to IAG reach net zero emissions by 2050. IAG Global Business Services (IAG GBS) leads on this mission and is supported by EcoVadis which provides sustainability ratings to enable IAG to monitor its supply chain.

Sustainable Aviation Fuel (SAF)

IAG has committed to using 10% SAF by 2030 with appropriate government support, and estimates that this will be the equivalent of using 1 million tonnes of sustainable fuel. This commitment is important as IAG's scale is able to support the development, improvement and availability of SAF for the whole sector. IAG is investing $865m[46] in SAF purchasing and investments to support the construction of a waste residue plant in the North East of England. Purchasing SAF and future purchase agreements help to support the financial viability of SAF, in addition to the investments in SAF production capacity that IAG has made. IAG has also been responsible for coordinating the oneworld roadmap to 10% SAF by 2030. The report "Sustainable aviation fuels: A key lever to decarbonise aviation" from the European Union notes that the production of SAF can create economic opportunities, particularly in rural areas where feedstocks for SAF can be sourced. It also suggests that the development of a domestic SAF industry can help reduce the EU's trade deficit in aviation fuels.

Innovation in low-carbon technologies is central to IAG's sustainability strategy, and provides a route to meet decarbonisation targets across the group and to drive industry-wide change. The next section of this report focuses on how IAG is supporting innovation in the aviation sector, to support sustainability and other goals.

Four key pillars to in Aer Lingus strategy to reduce the airline environmental impact.

Carbon Reduction

- Aer Lingus transatlantic fleet of 23 aircraft now includes eight Airbus A321neo LR which offer a 23% fuel saving versus its predecessor.
- Aer Lingus has six Airbus A321XLR aircraft on order over the coming years. The A321XLR offers 30% lower fuel burn per seat than previous-generation aircraft.
- Sustainable Aviation Fuel (SAF) plays a large part in Aer Lingus journey to net-zero emissions by 2050.

Energy Efficiency

- Aer Lingus is upgrading its ground fleet to electric vehicles. 68% of our light-weight ground fleet is now electric.
- The new LED-lit staff car parks reduce energy consumption by 33% versus 2019.
- Aer Lingus is exploring more energy efficient solutions for the company office buildings.

Waste Reduction

- Aer Lingus has reduced the use single-use plastics almost 23 tonnes a year by introducing birchwood cutlery packs.
- Aer lingus has reduced the need for newspapers and magazines onboard by introducing digital alternatives - a saving of 14 tonnes of paper per year.
- Aer Lingus is taking steps to minimise food waste onboard and have set waste-reduction targets to 2025.

Noise Reduction

- The Airbus A321neo LR is 50% quieter compared to its predecessor.
- In 2019, Aer Lingus consistently ranked as one the strongest performing airlines in the UK continuous descent "Fly Quiet and Fly Green" league which results in less noise and fuel burn.

[46] Including future investments and purchases

[47] European Commission

Innovation

IAG's innovation strategy

IAG is investing in solving these business challenges through research and innovation. Innovation is a focus across multiple areas of the business, including accelerated climate tech adoption, customer solutions, and operational efficiency. Innovation within IAG happens both at the level of the group, and individual airlines. IAG supports innovation across a range of areas: sustainability and fuel innovation, airside innovation, new customers and loyalty offerings, and enhanced tech and cyber.

Hangar 51 is IAG's core innovation platform to fund, support and scale emerging technologies. Launched in 2016, its mission is to work with start-ups and scale-ups that can help innovate and transform IAG, as well as the wider travel industry.

Hangar51 programmes include:

- Accelerator, to scout for and rapidly test new technologies
- Labs, to rapidly prototype new solutions for operational use
- Venture capital, to support the growth of early-stage start-ups
- Incubator, to support the implementation of new technologies within our operations and the commercial development of portfolio companies
- R&D, to horizon scan for new opportunities and technologies to stay at the forefront of innovation relevant to the sector

IAG Tech is the group's internal platform which supports the group to enhance their technology capabilities. IAG Tech works across the group's operating companies and helps to roll out new technologies across the business to embed innovation in practices. This includes implementing new platforms and systems, and delivering initiatives to reduce costs and improve efficiency such as the automation of processes.

Emu

Emu Analytics joined IAG's Hangar 51 global accelerator programme and was embedded within IAG to develop innovative digital twin solutions focused on cargo and passenger logistics. As part of this work, BA and IAG Cargo now have access to real-time tools that assist with tactical decision-making; saving fuel, cost and improving overall ground operations.[48]

[48] https://www.emu-analytics.com/casestudies/iagcargo

[49] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1095952/jet-zero-strategy.pdf

Innovation in sustainability

Innovation is a central part of IAG's response to the challenge of making the aviation industry more sustainable. Climate technology is supported by IAG through Hangar 51, which ran the first dedicated sustainability accelerator in aviation in 2019. This support has continued, with a 'Future energy' category introduced into its accelerator programme which works with start-ups across sustainable innovation to speed up the industry's decarbonisation. The development of new technologies here helps IAG to meet its sustainability targets, decarbonise the group, and support the industry as a whole becoming more sustainable. The 2022 Jet Zero Strategy notes that the technologies which will be needed to decarbonise aviation are still being developed, making innovation central to the sector's green transition.[49] Creating new jobs and technologies as part of this transition demonstrates how innovation, sustainability and economic output can all be advanced while the sector undergoes these significant changes.

ZeroAvia

Through Hangar 51 IAG invested in ZeroAvia, an innovator in hydrogen-powered aircraft. They use water-based, sustainable ethanol as the basis for producing fuel. This partnership is intended to accelerate the development of a zero emission plane using this alternative fuel source.

In 2020 ZeroAvia achieved a world first by powering a flight of a commercial-sized aircraft using a hydrogen fuel cell. This technology could enable routes to be powered by hydrogen in the future, and is an example of an investment in innovation which is part of IAG's plan to reach net zero by 2050.[50]

[50] https://mediacentre.britishairways.com/factsheets/details/86/Factsheets-3/217?category=1&pgck=L2ZhY3RzaGVldHM-

Conclusion

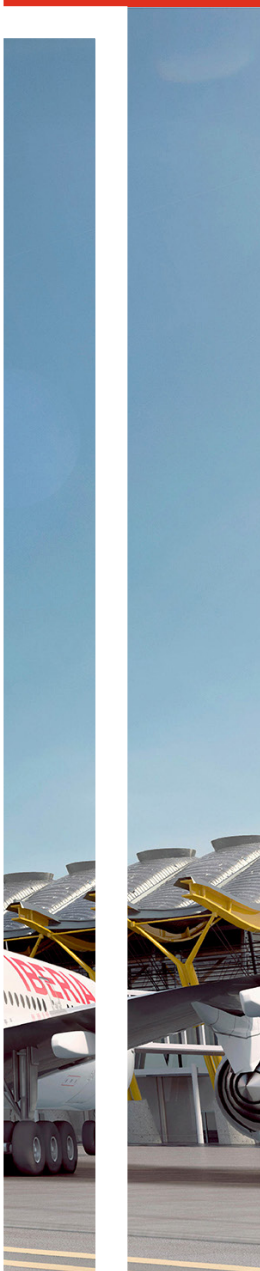
IAG makes a significant economic and social contribution to Ireland by enabling global connectivity in the movement of people and goods. As the Ireland flag-carrier, Aer Lingus is the most flown IAG airline in Ireland, operating from its Dublin's airport base in a hub-and-spoke operating model, facilitating the movement of goods and people from Ireland around the world.

IAG contributes €1,100m gross value-added to Irish GVA, and supports c.7,000 FTE jobs, by its direct, indirect, and induced impacts. For every €1 spent by IAG In the Irish economy, €0.86 GVA elsewhere across the economy, and for every direct IAG employee, a further 1.7 FTE jobs are supported in the Irish economy. Additionally, through the tourism and business travel its flights facilitate, an additional €1bn of catalytic GVA and c.7,400 FTE jobs are supported in Ireland.

Additionally, IAG's airlines, including IAG Cargo, transported 428,520 metric tonnes of freight in 2019, reaching 136 countries. Due to the high value of this cargo, this contributes to Ireland maintaining a balance of goods surplus.

IAG is also an industry leader in sustainability, setting industry leading targets for decarbonisation. It also has a forward-looking approach to innovation, with initiatives such as Hangar 51 helping to support and scale emerging technologies across travel.

Appendix 1: Technical approach and detailed methodology



Our approach

Step 1: Building the input–output model

We built a bespoke input–output model using the following CSO data:

- The Irish's input–output tables
- GVA, employment and consumption data by industry
- National and regional labour productivity levels over time.

Step 2: Applying the model to IAG's operational expenditure

Once constructed, we apply the model to data provided to us by IAG. This data includes:

- Operational expenditure by IAG operating company, supplier, and location. This is matched to proprietary PwC data.
- Capital expenditure by IAG operating company, supplier, and location.
- Aggregated employment data, by IAG operating company, pay band, and location. These data are aggregated to FTE equivalents.

Economic Modelling Approach

Measuring economic contribution

We estimated IAG's economic contribution to the Irish economy against two indicators:

1. Contributions to GDP: measured in terms of Gross Value Added (GVA).
2. Employment: expressed as the number of full time equivalent (FTE) jobs supported.

GVA measures the value that is added by a business or industry sector. It is measured as the difference between the value of goods and services produced and the goods and services used as an input. It is, therefore, the company and sector level equivalent of GDP, and summing all sector–level GVA in an economy produces a measure of that economy's GDP.[51]

The contribution across the indicators are divided into three tiers:

- **Direct impact:** This is the impact of IAG's own day to day operations. Direct GVA is calculated as a sum of returns to labour and capital, while direct employment is the total number of employees for the year, in terms of FTE.
- **Indirect impact:** This is the impact on the Irish economy as a result of IAG's procurement, this includes both the economic value added from immediate suppliers but also of the wider supplier chain (supplier of the supplier and so on).
- **Induced impact:** This is the impact from the spending of IAG's employees and that of the employees linked to the supply chain.

Approach to estimating the direct economic contribution

We use an income approach[52] using data from IAG's financial accounts to calculate its direct contribution to GVA. To calculate the direct employment contribution, we used human resources data.

Approach to estimating indirect and induced economic contribution

We used an input-output model to estimate IAG's indirect and induced contribution to the economy. Input-output modelling enables us to account for how industries interact and relate to one another, by estimating how activity by one company stimulates economic activity elsewhere in the economy.

An input output table provides information on what a typical business in the suppliers sector requires for producing one unit of output. It allows us to trace the typical input requirements through the entire supply chain for production activities in each sector and calculate the total value of production stimulated. An input-output table also provides data on the share of revenue that constitutes profit and wages for each sector. Hence we can apply this ratio to the total production value simulated and estimate the total GVA in the supply chain by sector associated with this.

Additional statistics on employment provide information on the number of individuals that work in any particular sector. As we know the output simulated in each sector, we can estimate the production value to job ratio. We then apply this to the total production value simulated in the supply chain, which allows us to estimate indirect employment, i.e. the number of jobs supported in the supply chain.

These steps are repeated to calculate the induced contribution, with an addition of using wage data to estimate how much production is stimulated in the supply chain that supports the products employees buy, e.g. arts, entertainment and food.

We then applied IAG's financial and employment data to the multipliers for each of the key indicators, to estimate the indirect and induced contribution across Ireland.

Deriving the Multipliers

We derive Type I, and Type II, multipliers for output, GVA and employment. Type I multipliers account for the direct and indirect impact, while Type II also capture the induced impact. In order to derive the multipliers, we first construct a technical matrix, A, which shows detailed purchases per unit of output by the purchasing firm from the various domestic supplying industries. It is calculated by dividing the entry in each row by the total gross output for its respective column.

Calculating Type I multipliers:

- We use a technical A_1 matrix, in which each cell in row i and column j represents the value of industry i's output required to produce a unit of output in industry.
- In the case of the Irish model the technical matrix A_1 in a 36 x 36 matrix.

[51] After adjusting for taxes and subsidies on products.

[52] Note: Income approach is a method of calculating GDP, which is based on the idea that all expenditures in an economy should equal total income generated by the production of economic goods and services

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- We use a technical A_1 matrix, in which each cell in row i and column j represents the value of industry i's output required to produce a unit of output in industry j.
- In the case of the Irish model the technical matrix A1 in a 36 x 36 matrix

Calculating Type II multipliers

- To calculate Type II multipliers, we also include an additional notional sector, 'endogenous labour'. It involves adding a new row that is composed of the ratio between compensation of employees and total output, and a column that consists of the ratios of private consumption on each industries output to an estimated household income. Hence for the Irish model the technical matrix A_2 becomes:
  - For the Irish model a 36 x 36 matrix
  - From the A matrices, we then calculate the Leontief matrices.[53] In order to do this we first construct the I - A matrix, where I is an identity matrix with the same dimensions as A[54].

For Type I multipliers we invert the I - A matrix, excluding the column for private consumption and row for compensation of employees, yielding $L_1 = (I - A_1)^{-1}$. This returns a matrix of output multipliers.

To calculate Type I GVA and employment multipliers we take each sectors respective 36 x 1 column vector of output multipliers for L_1: (Note 36 x 1 column vector for the Irish model).

Where i = buying (column) IAG's sector corresponding to the Input Output Table.

We then calculated the 1 x 36 row vector of GVA-to-output ratios across the buying sectors:

$$x = \begin{bmatrix} GVA_1 & \cdots & GVA_{36} \\ Output_1 & & Output_{36} \end{bmatrix}$$

To calculate the GVA effect for each sector we multiply the row vector by the column vector:

$$GVA\ Effect_i = x \cdot l_i$$

The type I GVA multiplier is then calculated as the following:

$$Type\ I\ GVA\ Multiplier\ for\ sector\ i = \frac{GVAEffect_i}{GVA_i/Output_i}$$

Repeating the steps above, but instead with a row vector of employment-to-output ratios for each buying sector will yield Type I Employment Multipliers.

$$y = \begin{bmatrix} Employment_1 & \cdots & Employment_{36} \\ Output_1 & & Output_{36} \end{bmatrix}$$

$$GVA\ Effect_i = y \cdot l_i$$

$$Type\ I\ Employment\ Multiplier\ for\ sector\ i = \frac{Employment\ Effect_i}{Employment_i/Output_i}$$

[53] Also referred to as the Leontief inverse

[54] The Identity matrix is a matrix in which all elements along the principal diagonal are 1 and the remaining elements are zero.

For Type II multipliers, we inverted the $I - A$ matrix, including the column for private consumption and row for compensation of employees yielding $L_2 = (I - A_2)^{-1}$. As explained above the L_2 differs from L_1 because it includes the induced effects in addition to the direct and the indirect effects. The induced effect is a result of the additional spending of employees.

Again, repeating the steps above to calculate the sectoral GVA output ratios, GVA effects and GVA multipliers using l_2 instead of l_1 will yield Type II GVA multipliers, and similarly for Type II Employment multipliers.

Direct GVA estimation

The process for estimating the direct GVA impact on one country or region for multinational organisations such as IAG is not straightforward. This is because IAG creates value across borders, so it is not immediately obvious how the aggregate value that IAG creates should be attributed. To make the question even more complex, much of IAG's capital is mobile – meaning that the production process itself is mobile. To address these complications in allocating IAG's capital, we follow two principles below which provide the foundation of our estimate of IAG's direct GVA impact in Ireland.

Firstly, allocation of GVA from multinational organisations to an area within national boundaries should follow the same principles as that of the ICSO for Ireland in tandem with relevant international national accounting standards such as the System of National Accounts (2008) (SNA, 2008), published by the United Nations in conjunction with the European Commission, the Organisation for Economic Co-operation and Development, the International Monetary Fund and the World Bank Group.

Secondly, the allocation of GVA from IAG should follow the same principles as used by the CSO in the compilation of the Input - Output tables in their National Accounts, which contain GVA aggregates by industry. This indicates that GVA is equivalent to: Gross Operating Surplus + Compensation of Employees + Taxes on Production. Each of these terms are examined below:

1. **Gross Operating Surplus (GOS):** GOS in its appearance in National Accounts such as the Input Output table is not net of depreciation. This is broadly equivalent to the concept of earnings before interest, taxes, depreciation, and amortisation, as stated in the financial statements.
   In order to assess IAG's EBITDA relevant to Ireland, it must be determined what portion of IAG's profits are relevant to Irish activity. The CSO uses taxable profits as the starting point for understanding a company's gross operating surplus. This is informative, as it shows the county in which subsidiaries' profits are booked should be the country against which their GVA is accounted.
   As such, all EBITDA from IAG subsidiaries that are generated in Ireland should be understood as contributing to Ireland GVA.
2. **Taxes on production**: these are defined as 'unrequited payments levied on the production and importation of goods and services, the employment of labour, the ownership and use of buildings or other assets used in production'
3. **Compensation of employees (COE)**: with respect to IAG, these have two main components: wages and salaries and social insurance contributions payable by employers. Wages and salaries should be understood broadly, including benefits in kind and pension contributions.

In order to understand the proportion of this relevant to Ireland, we use data on wages and employee numbers by region, provided to us by IAG.

Catalytic impact on the Irish economy enabled by IAG's operations

Below, we set out the methodology for estimating the catalytic impact of IAG passengers expenditure on the Irish economy.

Step 1: Estimating the number of IAG passengers who are not domiciled in Ireland

IAG supplied us with a total number of passengers by route. However, this data was not disaggregated by direction of travel, so we make the simplifying assumption that a representative aeroplane is equally likely to carry empty seats in either direction, in any given cabin and on any given route. For the subset of IAG flights that are international, we therefore divide the total passenger numbers by 2.

- Calculating inbound factor ratios:
  - The 'inbound factor ratio' calculates for a given international route, the split of passengers between international passengers from a foreign country arriving in Ireland compared to the number of Irish passengers travelling back to Ireland (as an example, in the case of US & UK routes the inbound factor is 45%, meaning that 45% of the passengers on the route are from the US).
  - Using international passenger survey (IPS) data from the CSO we can compute the inbound factor ratio by dividing the number of international passengers between two countries in a route oing to the Ireland (e.g. US residents travelling to Ireland by air) by the number of passengers that travel from Ireland to the US and the number international passengers from that country travelling to Ireland (e.g. Spanish residents travelling to the US + US residents travelling to Ireland by air).
- To obtain the number of international passengers arriving in Ireland flying with IAG we multiply the total number of IAG passengers arriving per country by the inbound factor ratio of that particular country.

Step 2: Calculating passenger expenditure

- To compute the expenditure of international passengers:
  - We obtain the share of IAG international passengers by dividing IAG international passengers arriving in Ireland by all international passengers arriving by plane into Ireland.
  - We multiply the expenditure by the sector of international air passengers arriving into Ireland by the share of IAG international passengers.
- To compute the domestic expenditure of domestic passengers:
  - We multiply the total expenditure of domestic tourists in Ireland (CSO) by 2% - the percentage of domestic tourists that travel by plane.
  - To estimate the increased rate of the consumption level of a domestic passenger when travelling (compared when not travelling) we divide the daily average expenditure of a domestic passenger by the average daily expenditure of a domestic passenger minus 1.
  - We multiply the amount of the expenditure of domestic tourists travelling by plane by the share of IAG passengers in the air tourism market. We assume that the share of IAG in Ireland's tourism market is equivalent to the share of IAG in the domestic air tourism market in Ireland. We multiply the increase of consumption when travelling domestically (+61%) to obtain the proportion of consumption by domestic tourists which is the result of travelling.
- To estimate the catalytic impact we assign the total expenditure of domestic and international passengers to the 36 different sectors in the Input - Output Table.

In the catalytic effect distribution by industry we include direct impact as we have to estimate the GVA generated by passengers expenditure. In sum, we get expenditure data from CSO to estimate GVA generated by that expenditure.

Appendix 2: Additional Data

Below are some additional results from that are not included in the main body of the report.

Figure 34: AerLingus supported c.2,400 jobs, from supply chain and wage-induced spending, in the Irish economy

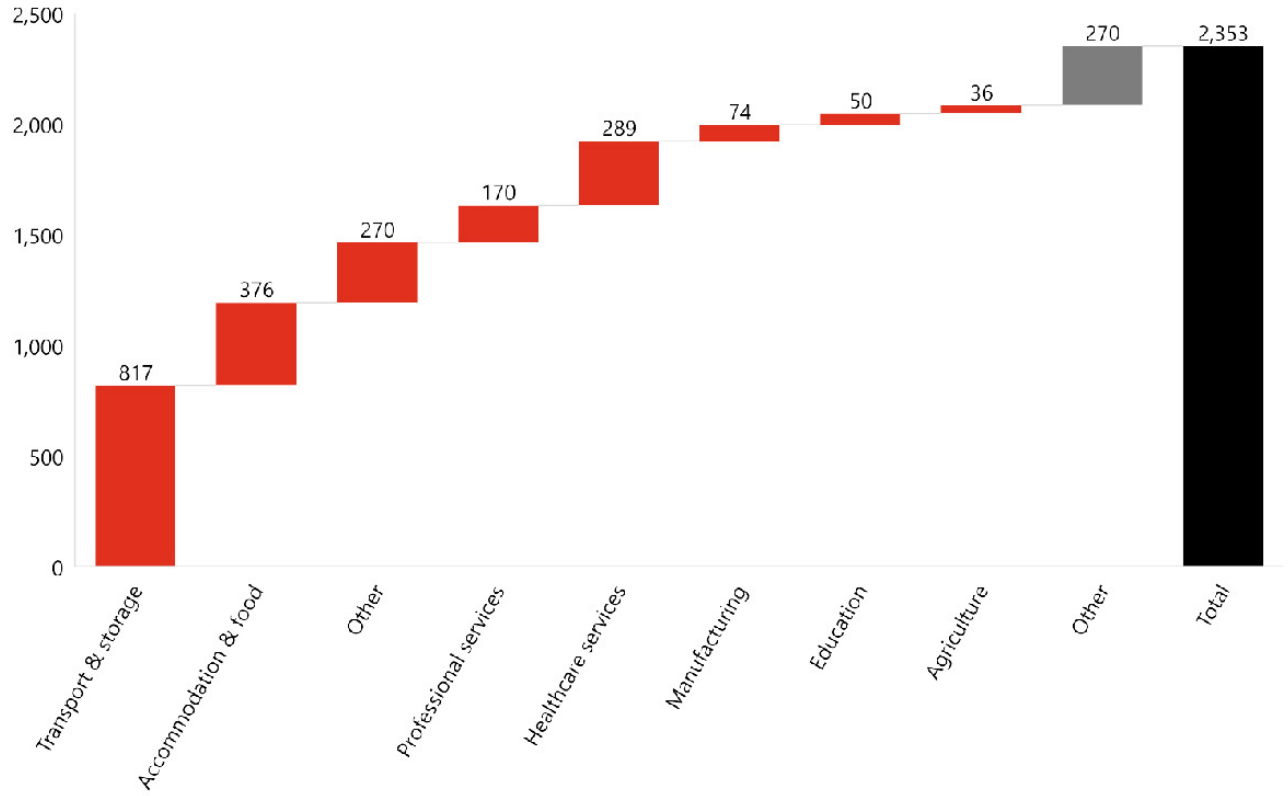


Figure 35: Vueling supported c.200 jobs, from supply chain and wage-induced spending, in the Irish economy

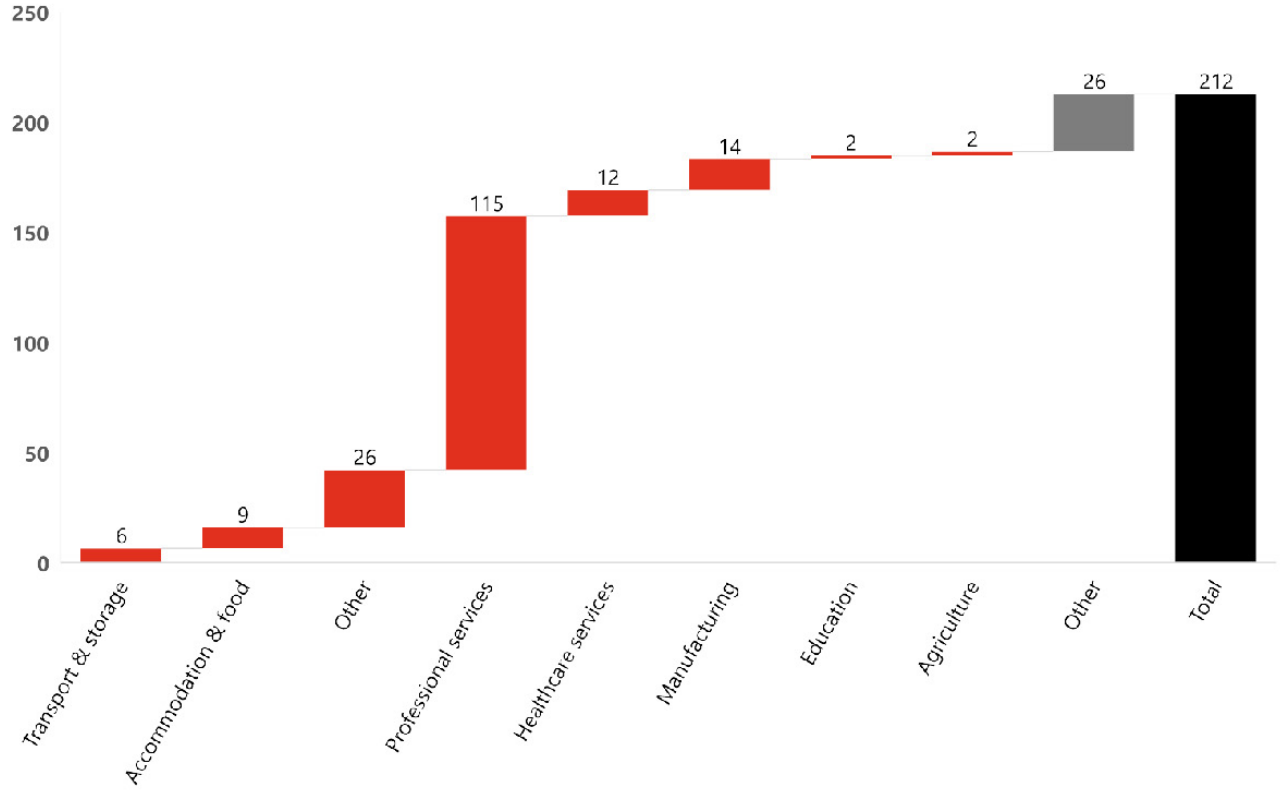


Figure 36: BA supported 160 jobs, from supply chain and wage-induced spending, in the Irish economy

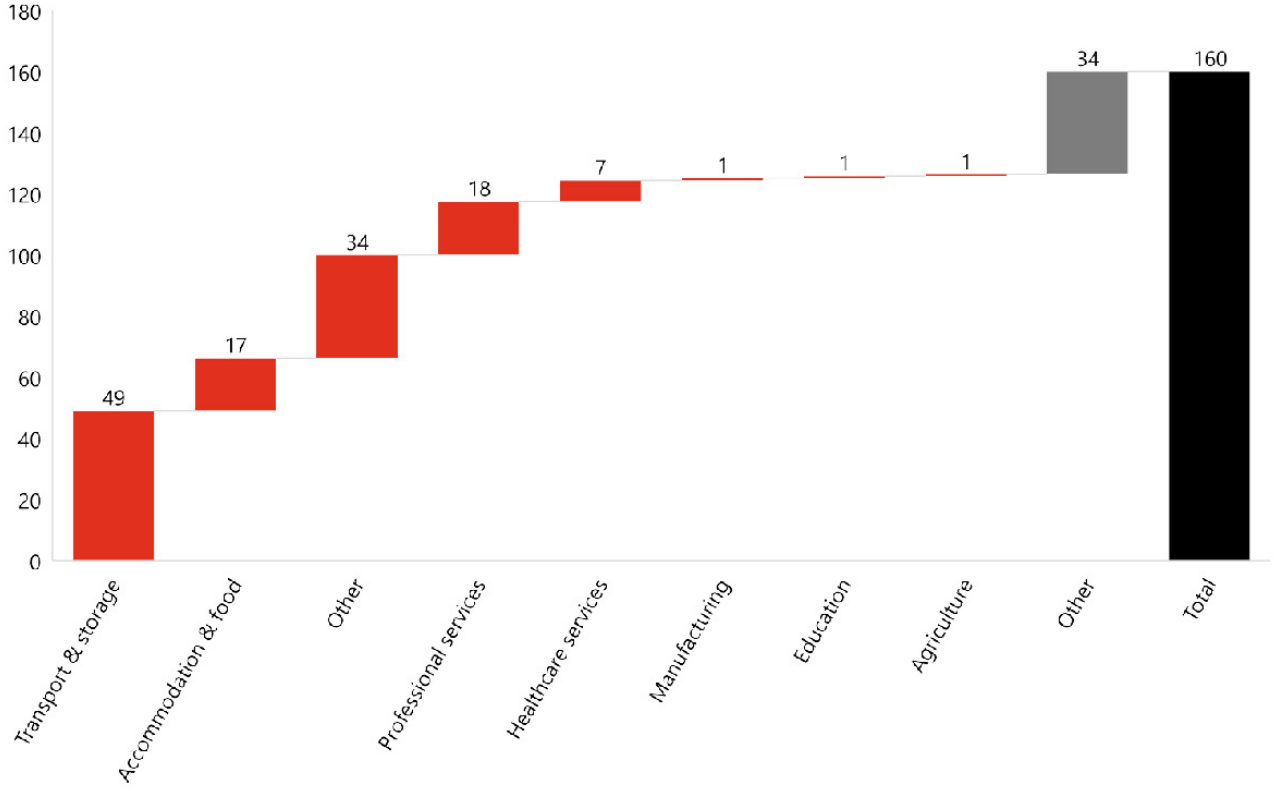


Figure 37: Iberia supported c.70 jobs, from supply chain and wage-induced spending, in the Irish economy

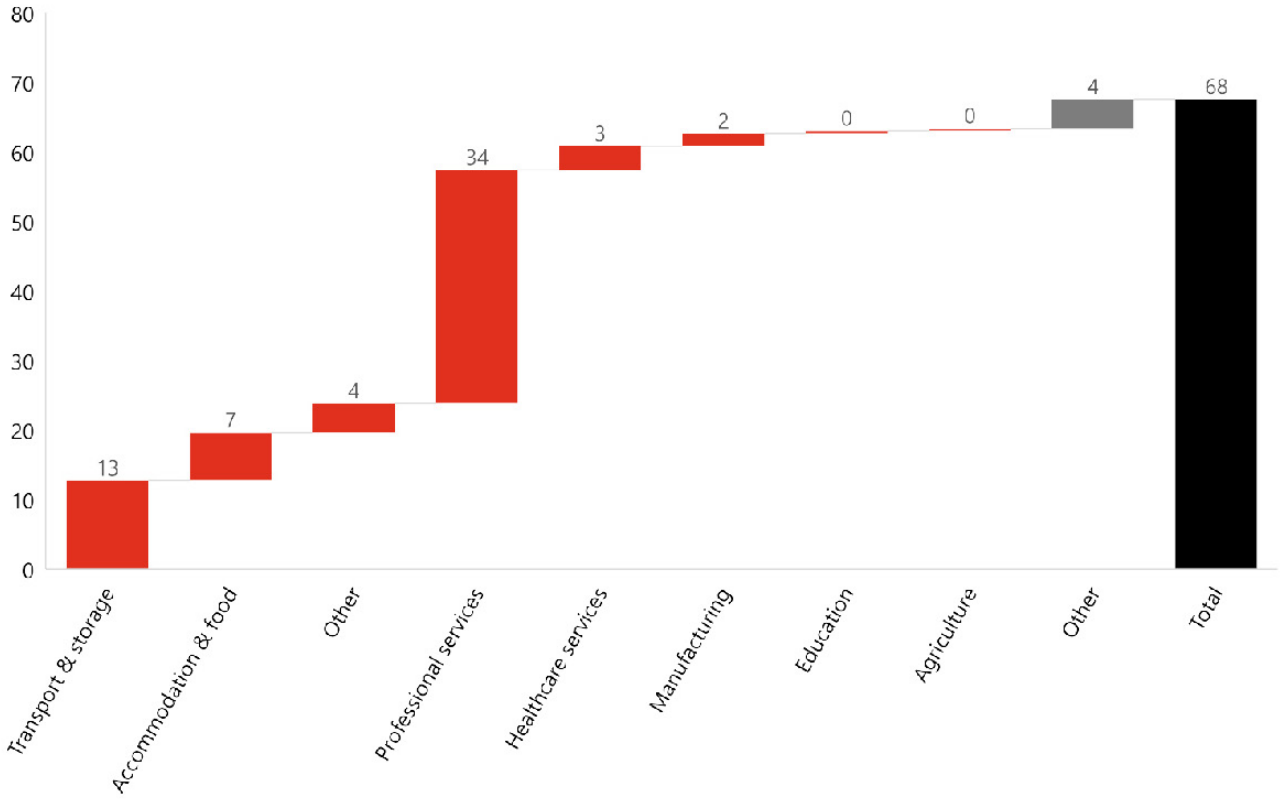


Figure 38: IAG Cargo supported c.20 jobs, from supply chain and wage-induced spending, in the Irish economy

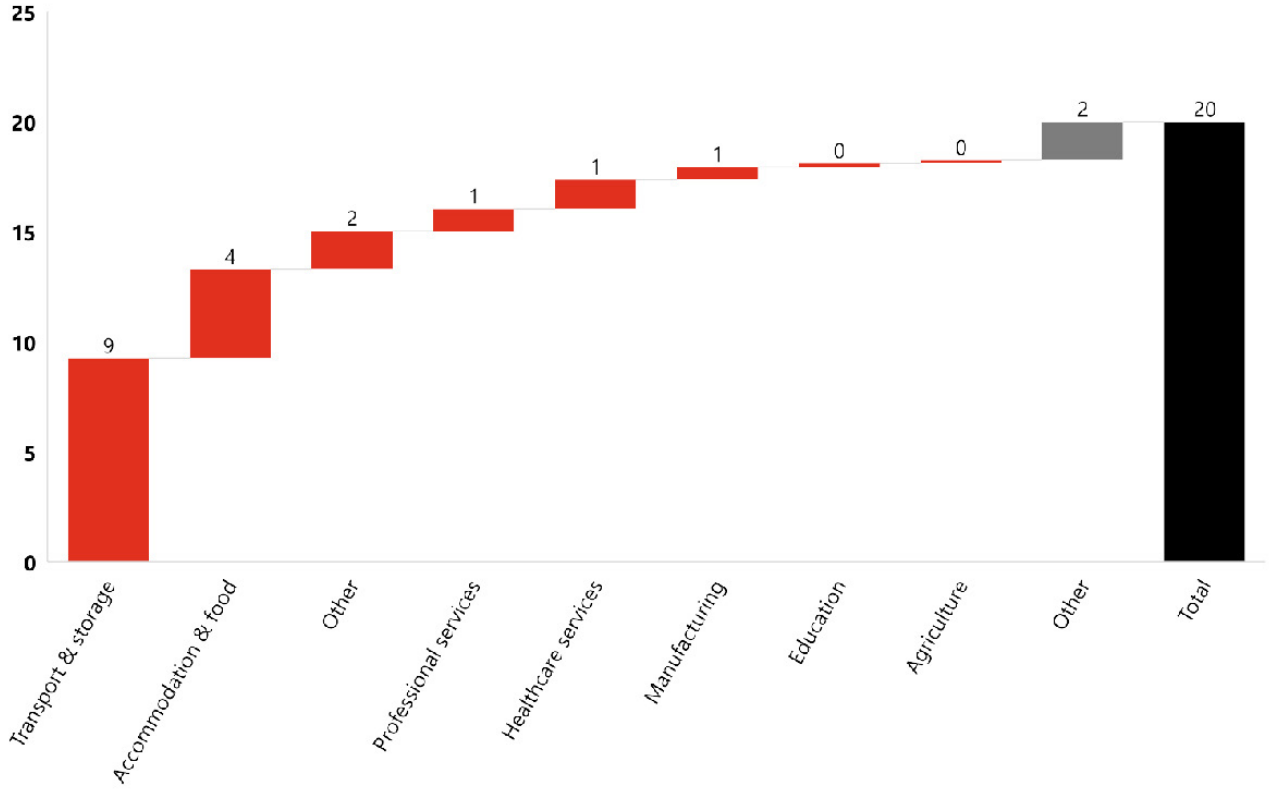
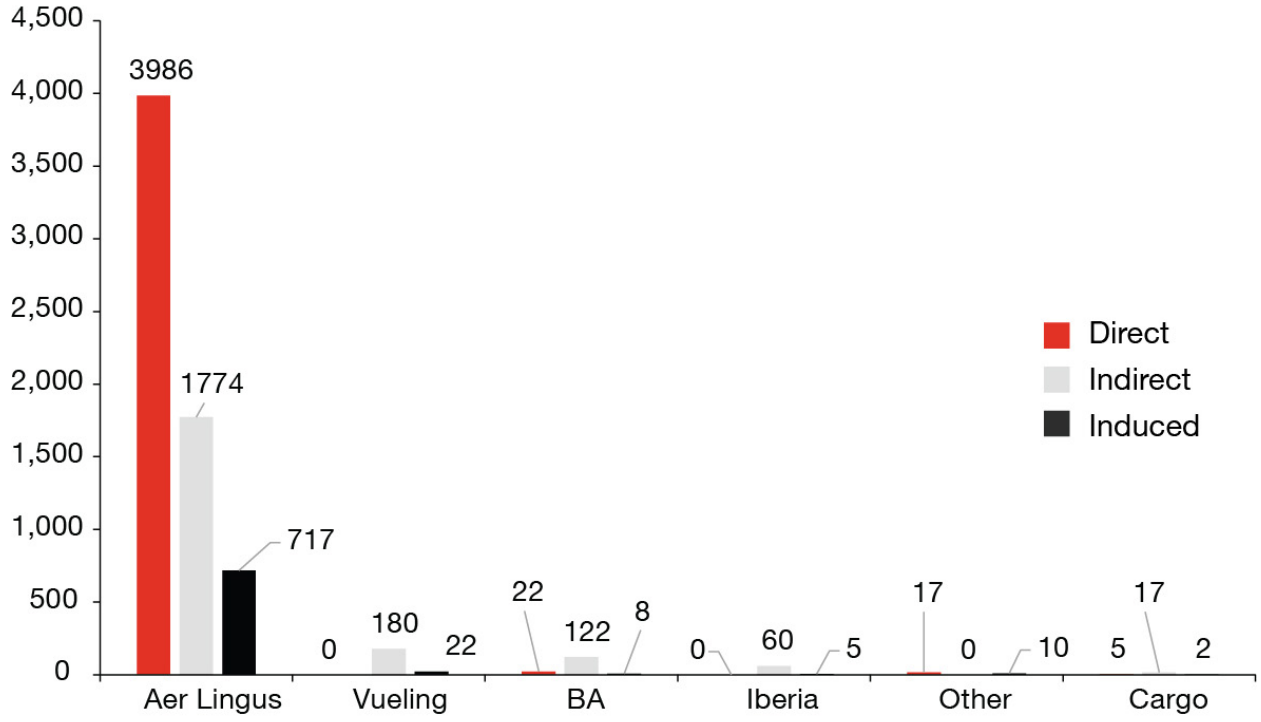


Figure 39: IAG supported a large number of full time equivalent employees (FTE) in Ireland, across different channels of impact



IAG supports a significant number of jobs across impact channels in Ireland. Aer Lingus has a proportionally higher weighting of direct impacts, with other airlines having comparatively higher indirect impacts. The difference in impacts by channel is because other IAG airlines have lower direct employment in Ireland, but still make supply chain purchases that then lead to broader employment impacts throughout the Irish economy.

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