The Economic Impact of the Seafood Sector:

Greencastle

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Table of contents

Foreword

The Economic Impact of the Seafood Sector: Greencastle

In 2019, BIM completed the project to evaluate Ireland's top ten seafood ports and assess the importance of the seafood sector directly and downstream in these ports, their hinterlands and at the regional and national levels. The seafood sector is a primary driver of rural economies around the coastline of Ireland and acts as an anchor in these locations around which other supporting service sectors develop. This report reveals the results of this project for the port of Greencastle and its hinterland. Greencastle is an important seafood port in Ireland with high volumes of seafood landed here annually and a fleet that is active around the island throughout the year.

Greencastle is located in the Inishowen peninsula in the north-east of county Donegal. The hinterland of Greencastle covers over half of the Inishowen peninsula and incorporates the important shellfish port of Malin Head. The Inishowen peninsula is a mountainous region with typical soils that characterise the quality of agricultural land as poor. This location, near the most northerly point in Ireland, Malin Head, means that connectivity with major urban centres of the Republic of Ireland are very poor with Dublin a distance of 268km via Derry. Connections with Northern Ireland are better with close proximity to Derry (36km) and at a 117km distance from Belfast. Given the areas natural beauty and proximity to Derry there is a strong tourism sector with important manufacturing and professional services sectors given the Derry commuter belt aspect of the hinterland.

In this report, it is shown that the seafood sector has significant multiplier effects in terms of gross value added, employment and wages downstream in the local economy. In total, 11% of the hinterland economy can be attributed to the seafood sector encompassing direct, indirect and induced effects. Direct employment of the seafood economy in the region is 330 while a further 90 jobs are generated locally through the supply chain and induced effects. The sector generates €11 million annually in direct wages and stimulates a further €3.2 million downstream at the regional level. Further downstream effects occur outside the region at the national level.

Participation in this survey by seafood producers around Greencastle was the joint-highest of this project, with a response rate of 57%. Special thanks are due to all participants in the survey and to John D. O'Kane ((Foyle Fishermen's Co-op Ltd)) and Eddie Kelly (Malin Head Fishermen's Co-operative) for their time and knowledge throughout this project and assistance in delivering this high level of participation. Richard Curtin, Economic and Strategic Services Unit, BIM, would also like to recognise the excellent work carried out by Oxford Economics and Perceptive Insight in the course of this project.

Executive summary

The seafood sector at the port

The seafood industry makes a significant contribution to the Greencastle economy. In 2018, direct seafood activity at the port is estimated to have generated €46.2 million in turnover. Commercial fishing is the largest seafood sub-sector, generating €31 million in turnover, followed by fish processing (€8.5 million) and aquaculture (€6.7 million). When translated into GVA, the seafood sector makes a €26 million direct contribution to the local port economy (8% of the local economy). The sector is also estimated to support 330 direct jobs.

Our survey also identified the key characteristics of the local seafood industry and the business environment for Greencastle operators. The industry is well established, with most firms established over ten years ago. Turnover also appears to be stable or increasing for most local businesses, and 23% of operators had made capital investments in 2018. Though average investments were low compared to some other ports, it still reflects a degree of confidence in the local seafood sector.

Analysing the survey results allows us to quantify the ports' seafood sector value within the regional economy. Once the indirect and induced effects are calculated, we estimate that the total economic contribution of the seafood sector at Greencastle equated to €35.3 million of GVA across the Border economy in 2018. The seafood sector at the port also supported an estimated total of 420 jobs across the region, in addition to supporting €5.4 million in tax revenues.

€26m

Direct GVA in 2018

The seafood sector makes a significant contribution within the local port economy.

€35m

Total GVA contribution to the Border in 2018

The seafood sector makes a significant contribution to the wider regional economy.

Fig. 1. The estimated benefits of the port seafood sector, 2018

Port seafood sector	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	26.0	330	11.0
Indirect	5.3	45	1.6
Induced	4.0	45	1.6
Total	**35.3**	**420**	**14.3**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

The role of the individual seafood sub-sectors

Our analysis of the seafood sector at the port produces the following headline findings throughout the region (which again will include the combined direct, indirect and induced impacts).[1]

- Activity in the commercial fishing sub-sector has been estimated to sustain 290 jobs, €11.9 million of wages and €27.3 million of GVA;
- Activity in the aquaculture sub-sector has been estimated to sustain 85 jobs, €1.9 million of wages and €5.9 million of GVA; and
- Activity in the fish processing sub-sector has been estimated to sustain 75 jobs, €1.5 million of wages and €5.3 million of GVA.

Socio-economic characteristics

The seafood industry plays a key role in the Greencastle economy. Nearly 22% of jobs in the local port economy belong to either the Agriculture, forestry & fishing or the Manufacturing, mining & utilities sectors. Analysis of Census data shows faster growing private service sectors are generally underrepresented. Unsurprisingly, therefore, the local economy experiences net out-commuting as residents travel elsewhere for employment and a number of economic indicators underperform the national and regional benchmarks.

Greencastle has an ageing population, with above average shares of those aged 65 and over. Furthermore, the educational profile is notably weaker than the national average, with 23% of residents identified as having only primary education or lower as their highest level of attainment. The accessibility to occupations in the Agriculture, forestry & fishing sector is therefore an important source of employment for a sizeable share of the population with lower qualification levels.

As a result, the seafood sector is likely to be play a significant role in the local port economy through its provision of direct jobs, supply chain spending in local businesses and the consumer spending it supports. Looking forward, a vibrant and growing local seafood sector will be important for the economic and demographic health of the local area.

1 Summing the benefits of all three elements within our definition of the seafood sector (fishing, aquaculture and processing) will overestimate the indirect and induced impacts, and as a result, overall impacts. This is because the supply chain of the processing sub-sector will likely contain a proportion of the port's fishing sub-sector and its supply chain. To get the direct totals (for employment, GVA and wages), we add all the three sub-sectors. However, for the indirect and induced totals, we sum those of the processing sub-sector with a proportionate share of the fishing and aquaculture (according to the proportion of sales not destined for local processors and informed by the interview process). The remainder of the fishing and aquaculture indirect and induced impacts will already be accounted for within that of the processors.

1. Introduction

1.1 About the study

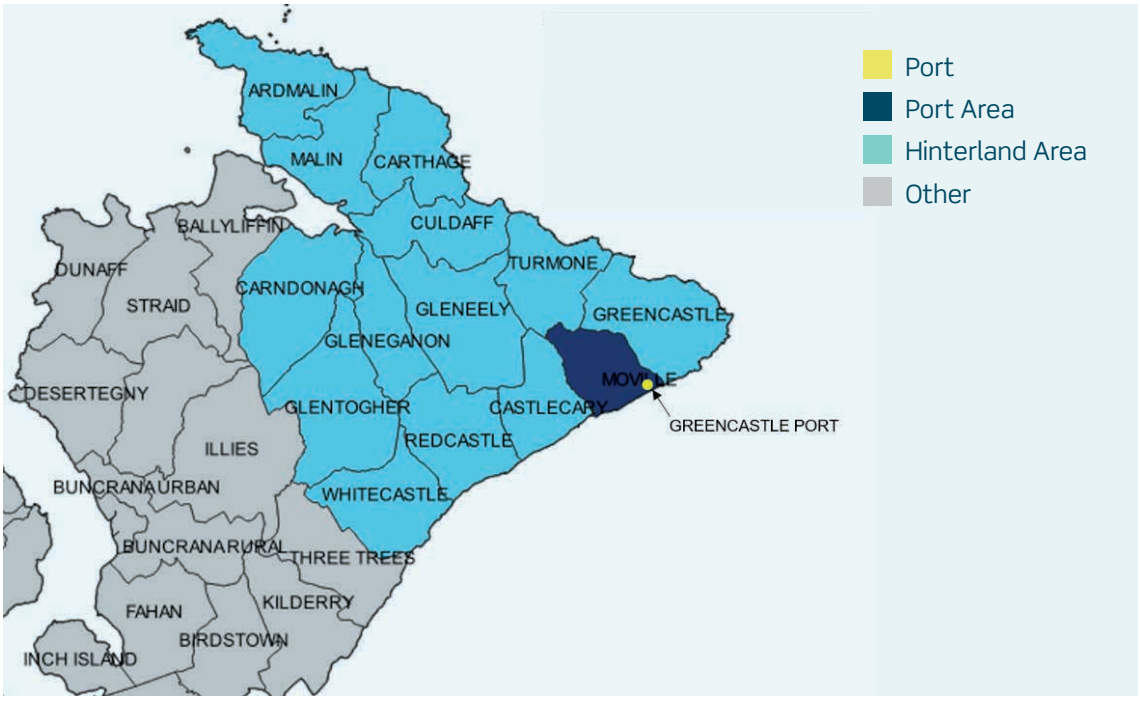
The Irish Seafood sector is an important component of the Irish economy. It is, however, more important to coastal communities around the country given its concentration at Ireland's ports and the relatively lower level of alternative economic activity in these economies. In addition, as economic and employment growth is increasingly driven by office-based activity, which favours urban areas, the seafood sector's role in providing labour market opportunities, wages and local demand in these coastal areas is arguably rising.

Against this backdrop, Bord Iascaigh Mhara (BIM) commissioned Oxford Economics and Perceptive Insight to estimate the economic contribution of the seafood sector in ten of Ireland's ports.

1.2 The seafood sector at the port

Greencastle is a fishing port located in county Donegal on the north coast. Sitting on Lough Foyle, the town is just over 30 kms from Derry and is home to the National Fisheries College. In this report, we define the local port economy as the District Electoral Divisions (DED) of Moville and those surrounding it, which constitute its hinterland – informed by BIM and shown in the below figure.

Fig. 2. Map of port area within the study



To inform the analysis, a comprehensive seafood-related survey exercise was carried out across Ireland's main ports. We worked closely with BIM in order to, firstly, understand the seafood population at each of the 10 ports. Following this, the market research firm Perceptive Insight collected information concerning the characteristics of the local seafood sector through both telephone and electronic surveys.

In total, there were close to 470 individual responses from seafood-related businesses across Ireland. Of this total, close to 330 unique responses were recorded from seafood operators based in the 10 port areas – a response rate of close to 40%, relative to the known seafood population.

1.3 The key elements of the local seafood sector

In this paper we present our estimates of the size of the local seafood sector and how it impacts the regional economy. Our analysis, therefore, estimates the direct activity associated with the commercial fishing, aquaculture and fish processing sub-sectors at the port by drawing on the survey findings and information held by BIM. We then estimate their wider impacts within the local NUTS3 region. These wider impacts include those associated with the seafood sector's supply chain and the consumer spending of those employed as a result of the direct and indirect activity – see Box 1 for more detail of our methodology.

Our analysis is also careful to identify where the three different seafood sub-sectors appear in the supply chains of the other sub-sectors. The most obvious example is commercial fishing appearing within the supply chain of fish processing. Our analysis has isolated the benefits to avoid instances of double counting (**see Appendix 2** for further information concerning the model approach).

BOX 1: INTRODUCING ECONOMIC IMPACT ANALYSIS

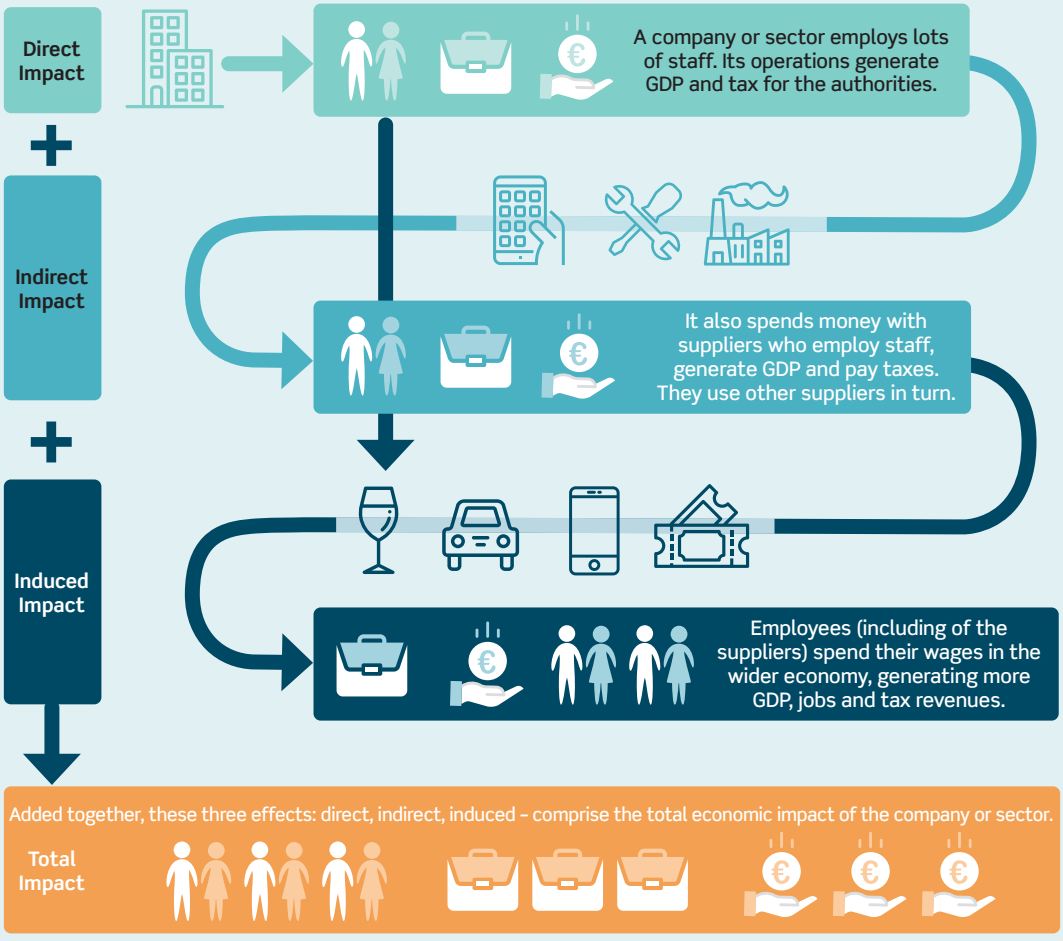
The economic impact of a sector is measured using a standard means of analysis called an economic impact assessment. The report quantifies the three 'core' channels of impact that comprise an organisation/sector's 'economic footprint':

- **Direct impact,** which is the economic activity the seafood sector generates because of its operations;
- **Indirect impact,** or supply chain impact, that occurs because the sector buys inputs of goods and services from Irish businesses; and the
- **Induced impact,** which relates to the wider economic benefits that arise when employees of the local seafood sector and its supply chain spend their wages in the consumer economy, for example, in local retail establishments.

We analyse these channels of impact using three core metrics:

- **Employment,** measured on a Full-Time Equivalent (FTE) headcount basis. This is comprised of both full-time employment and a proportion of part-time working component – where two part-time roles equate to a full-time position;
- **Gross value added** contribution to GDP; and
- **Tax receipts** generated by the Irish activity and employment supported by the seafood sector.

Fig. 3. Economic impact assessment



1.4 Report structure

This report breaks down the characteristics of the collective seafood sector within the port area. It then goes on to show the economic impact this activity creates across the Border economy.

The report takes the following structure:

- An analysis of the seafood sector within the local port economy;
- A breakdown of the economic benefits associated with the port's seafood sector across the regional economy;
- A summary of the overall benefit associated with the port's seafood sector at the regional level; and
- Finally, we present the report's conclusions.

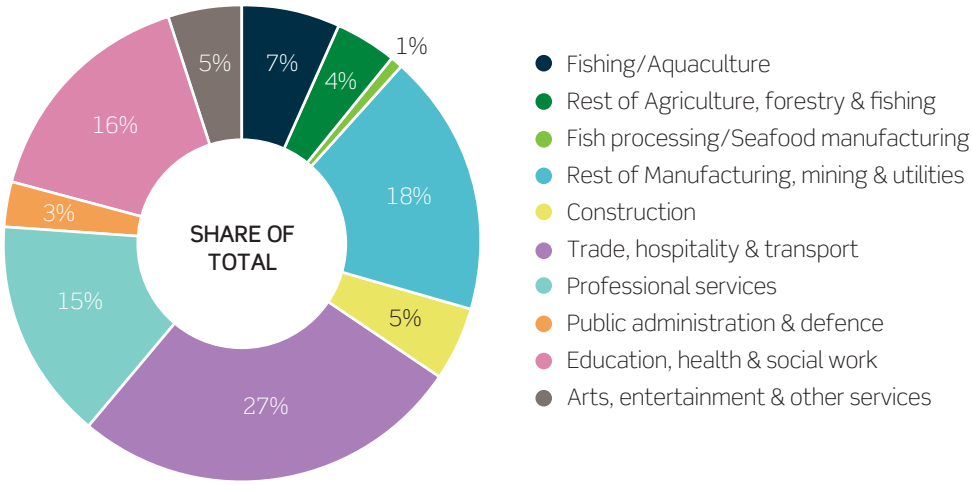
2. The seafood sector at the port

2.1 The importance of the local seafood sector

Before we present the total benefits associated with the port's seafood sector, it is important to first understand the size and characteristics of the sector at the port level – the direct activity.

Unsurprisingly, the seafood sector forms a significant component of Greencastle's economy. The latest Census (2016) provided workplace employment data at a sectoral level for small area District Electoral Divisions (DEDs) across Ireland. By combining this employment data with our regional productivity estimates we can quantify the economic footprint of the port economy. We therefore estimate that Greencastle's economy made a GVA contribution to GDP of €330 million in 2018.[2] We estimate that the seafood sector within the port represented €26 million of this GVA total. Seafood therefore represented 8% of the port economy.

Fig. 4. GVA by sector, Greencastle, 2018



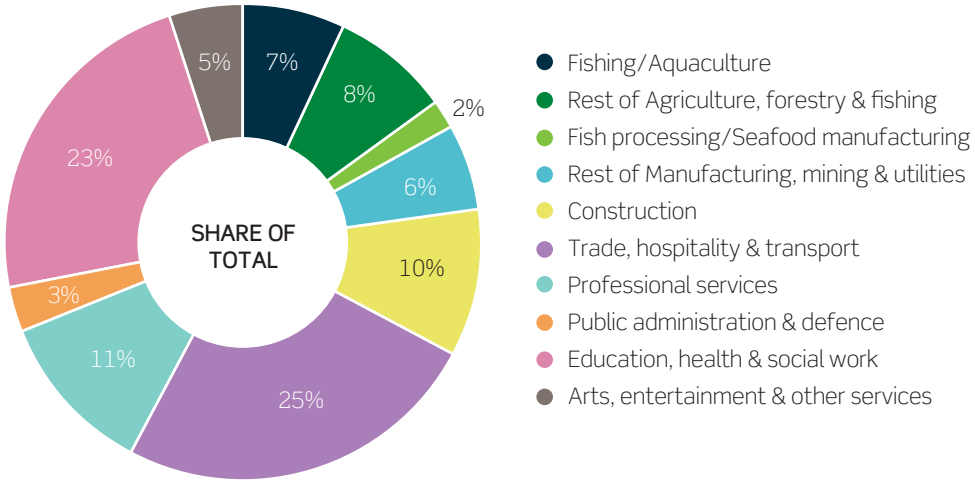
Source: *Oxford Economics, Perceptive Inisght, CSO*

In employment terms, seafood is more important within the port economy. Combined commercial fishing, aquaculture and fish processing are estimated to directly sustain approximately 9% of workplace employment across the port area in 2018.[3] Commercial fishing and aquaculture represented close to half of local agriculture, forestry & fishing related employment and fish processing accounted for close to a quarter of local manufacturing, mining & utilities jobs.

2 When estimating the size of the port economies we use the most recent workplace sectoral employment data from the 2016 Census. This employment data relates to workplace zones, which are slightly smaller than DEDs. The workplace zones are therefore mapped across to closely represent the DEDs which cover to the port areas. We then supplement this data with the current snapshot of the local seafood sector as estimated through the survey exercise. Finally, we subtract the commercial fishing and aquaculture activity from the broader 'Agriculture, forestry & fishing' sector to get an indication of its prominence locally. A similar approach is adopted with fish processing in relation to the 'Manufacturing, mining & utilities' sector.

3 The latest available sectoral employment data for the port area economies was for 2016. Therefore, both the GVA and employment estimates shown for the port economies combine this data with the current snapshot of the seafood sector.

Fig. 5. Employment by sector, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight, CSO*

2.2 Characteristics of the seafood sector

The largest sub-sector within the Greencastle seafood industry is commercial fishing. In 2018 it generated €31 million in turnover for local firms, feeding through to €18.3 million in GVA for the Border economy. Fish processing is the second largest with value added of €4.1 million, closely followed by fish aquaculture which contributed €3.7 million in 2018.

Commercial fishing is also estimated to have the largest direct employment impact, supporting 200 full-time equivalent (FTE) jobs, 61% of the local seafood total, across 75 separate fishing businesses. By contrast, aquaculture supported 65 jobs, whilst fish processing employed 60 people in 2018.

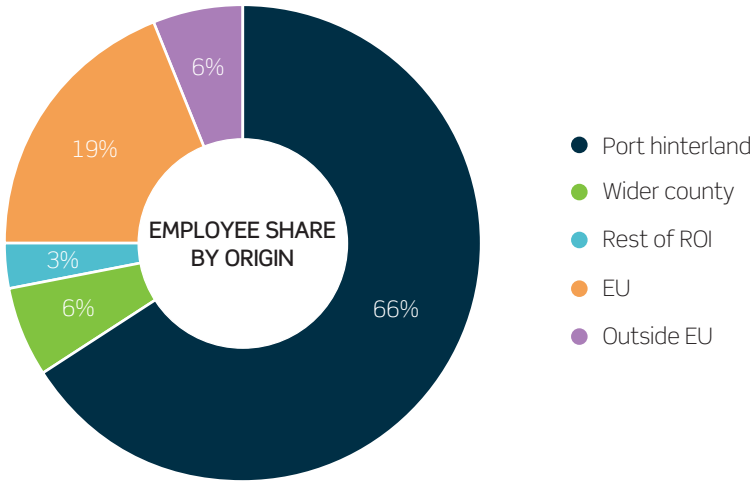
Fig. 6. Headline direct economic contribution of the seafood sector, Greencastle, 2018

	Turnover (€m)	Jobs	Wages (€m)	Seafood operators
Commercial fishing	31.0	200	8.8	75
Aquaculture	6.7	65	1.2	17
Fish processing	8.5	60	1.0	3
Total	**46.2**	**330**	**11.0**	**95**

Source: *Oxford Economics, Perceptive Insight, BIM*
Note: *May not sum due to rounding*

Our survey of local port operators allows us to examine in more detail the profile and outlook for local seafood firms in Greencastle. Our survey asked respondents about the composition of their workforce. We found that two-thirds of employees originally hailed from the port hinterland as defined in this report. This reiterates the importance of the seafood sector for local people and the local economy for supplying labour for port operators. Nearly one in five employees (19%) originate in other parts of the EU; proximity to the Northern Irish border and good transport links may play a factor in this. In addition, 6% of workers come from outside the EU.

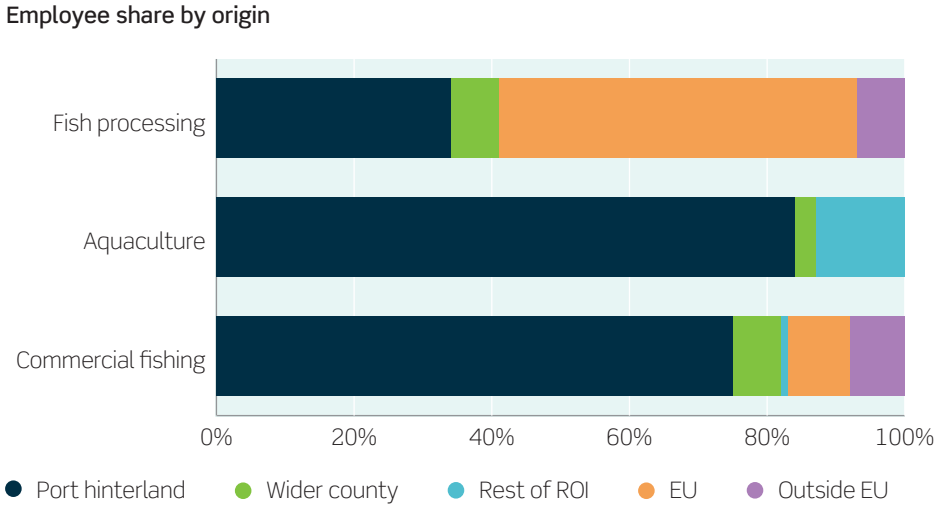
Fig. 7. Workforce origin, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight*

EU workers made up 52% of employees in fish processing, with the hinterland providing just over a third (34%) of workers. By contrast, the aquaculture sector has drawn much more on the local labour supply with all employees originating in Ireland, 84% of whom are from the port hinterland.

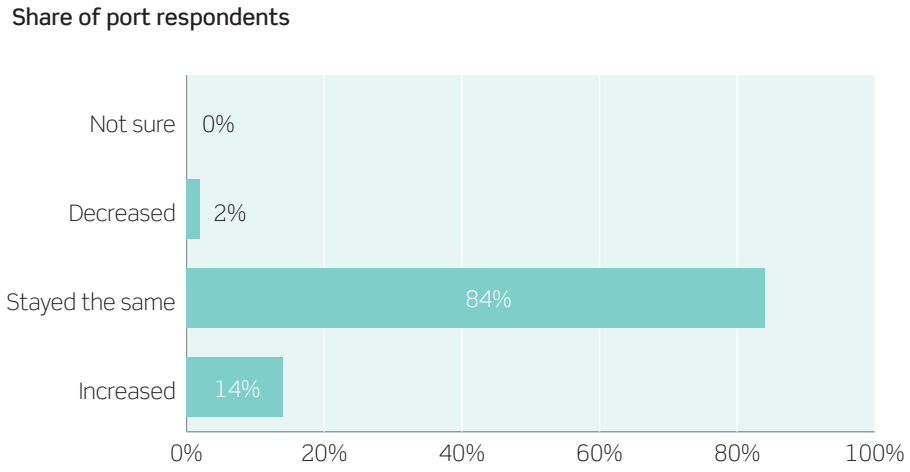
Fig. 8. Workforce origin by sub-sector, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight*

When questioned about the size of their workforce over the previous 12 months, 84% of respondents in Greencastle noted it had remained unchanged on the year before. 14% reported that their number of employees had increased, with half of these being in the fish processing sub-sector. This reflects the picture seen across most of the other ports in our sample, with the majority seeing stability in their workforce size in 2018.

Fig. 9. Change in workforce size, Greencastle, 2018

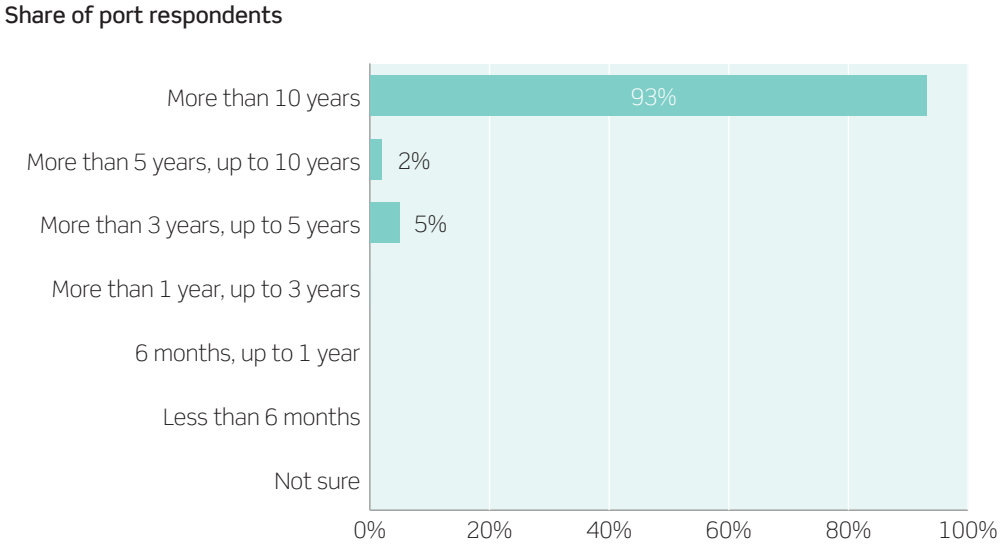


Source: *Oxford Economics, Perceptive Insight*

Of those employed in the seafood industry at Greencastle, 88% lived in the port hinterland with another 10% living elsewhere in County Donegal. Greencastle had the highest share of workers living within the county of any port in the study in 2018. The highly local workforce and low rates of commuting for seafood employees reflects the key role the industry plays for local people. All aquaculture employees reported as living in the Greencastle hinterland.

With a high reliance on local workers it is no surprise that the seafood industry at Greencastle is well established. In examining the current state of the seafood industry, our survey looked at the maturity of firms operating from the port. Business longevity is high in Greencastle, 93% of firms have been established for at least ten years, and all business respondents had been operating for at least the past three years. The sample sizes when broken down to the sub-sectoral level are small, but they show a similar degree of maturity across all three industries in 2018.

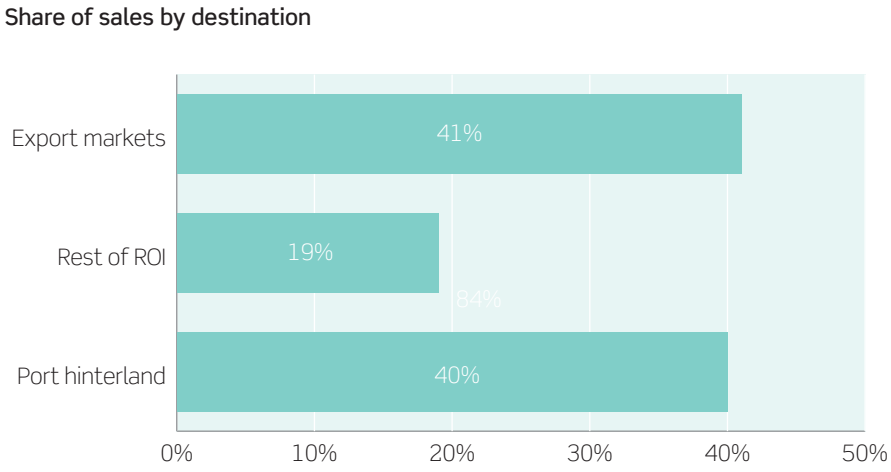
Fig. 10. Seafood sector maturity, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight*

Whilst the hinterland remains the key location for the workforce the survey also explored the key markets for sale of goods. Sales to the immediate hinterland made up 40% of total Greencastle sales; above the average for all ports by seven percentage points. Whilst the rest of Ireland took 19% of sales, the export market made up 41% of total seafood sales. This is slightly behind the all ports average.

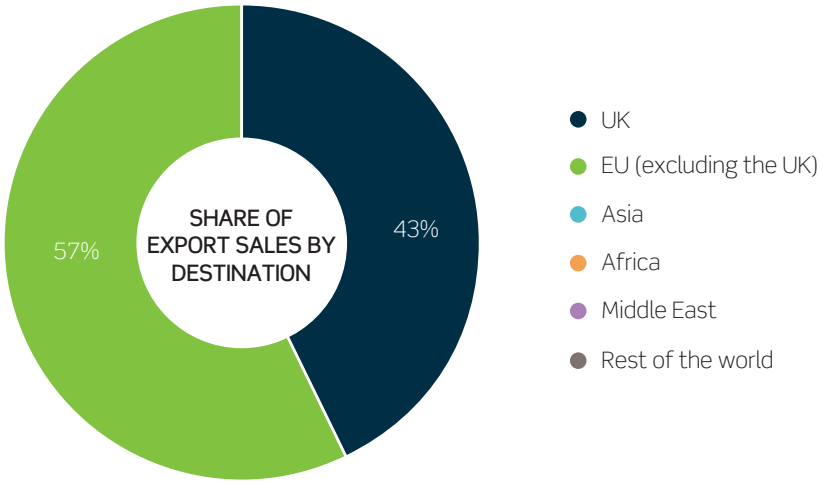
Fig. 11. Sales by destination, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight*

The export market is largest for aquaculture where 88% of sales are abroad compared to just 29% for fish processing. The export market for Greencastle produce is the European Union. We find that 43% of sales go to the UK, with the remainder going elsewhere in the EU.

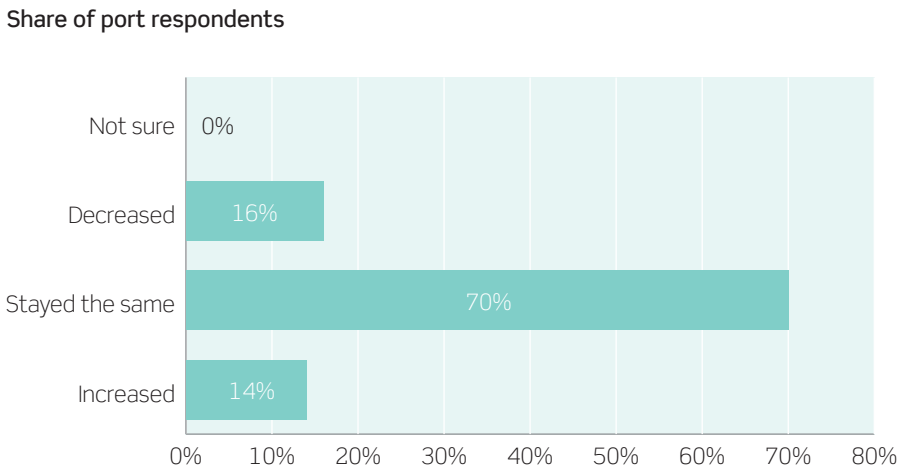
Fig. 12. Export sales by destination, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight*

Overall, the industry appears to be performing well at Greencastle; turnover was reported to have neither increased nor decreased over the last 12 months for 70% of respondents in 2018. For 14% of respondents turnover had reportedly increased over the previous 12 months. By contrast, it decreased for 16% of seafood operators (in line with the average for all ports).

Fig. 13. Turnover in the past 12 months, Greencastle, 2018

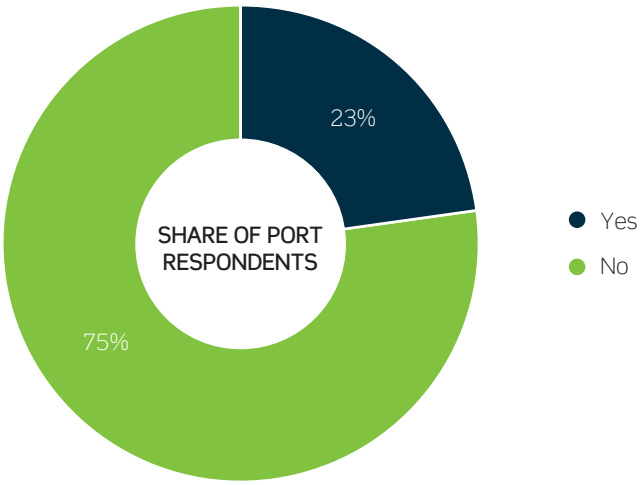


Source: *Oxford Economics, Perceptive Insight*

Looking forward, eight out of ten respondents believed their turnover would stay unchanged over the next year. Only 14% thought it would increase.

Increases in turnover are often linked to business investment: increased productivity and turnover as a result of improvements to the stock of capital at a firm's disposal. However, investment can reflect either a positive outlook for future growth or a result of deteriorations to existing capital stock requiring additional spending. Our survey results suggest the latter predominates investment decision making. Despite only 14% of respondents expecting turnover to increase, 23% have already spent money on capital investment in the last financial year. Annual investment averaged €115,000 for Greencastle operators, the second lowest of all ports, though spending was higher in the fish processing sub-sector. Of total investment, just 15% was spent locally. 85% of investment spend in 2018 went outside of Ireland.

Fig. 14. Capital investment in the previous year, Greencastle, 2018

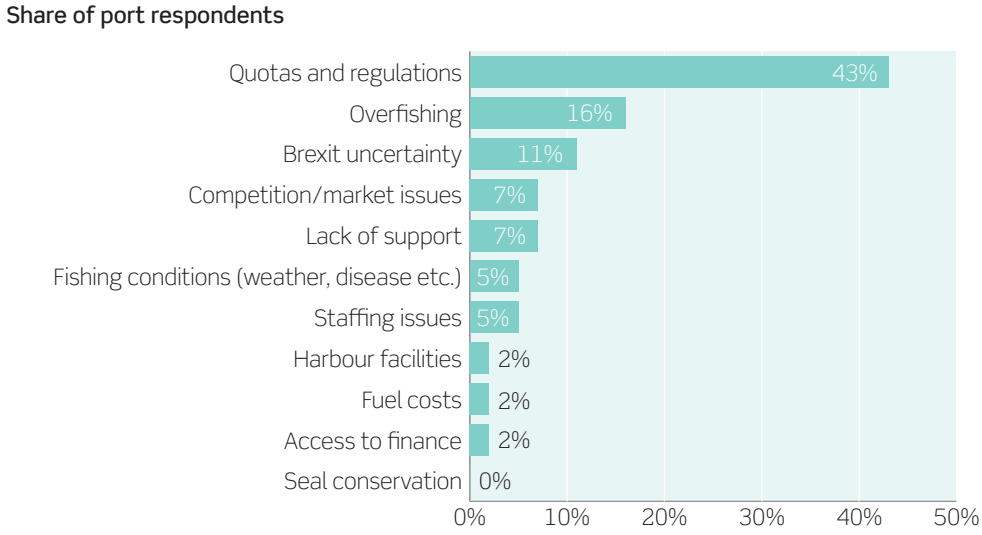


Source: *Oxford Economics, Perceptive Insight*

To better understand the decision making behind these investment decisions our survey also explored the perceived constraints on growth within the seafood sector. The biggest cap on growth was reported as quotas and regulations (43% of respondents). However, when asked whether an increase in quotas by 20% would lead operators to hire more staff, 57% of respondents said it would not, in line with the national average.

Overfishing was the second most prominent concern amongst the Greencastle seafood operators, with 16% of survey respondents highlighting this as their primary constraint going forward.

Fig. 15. Main constraint on growth, Greencastle, 2018



Source: *Oxford Economics, Perceptive Insight*

2.3 Conclusion

The seafood sector directly employs an estimated 320 people with two thirds originally from the port hinterland and 88% living locally (with a further 10% in the wider county). Despite the high level of jobs taken by residents, the survey found that EU workers made up 52% of employees in fish processing.

In 2018, the sector generated €46 million in turnover with 41% coming from export markets (in the EU). Exports are significantly important to aquaculture where 88% of sales are made abroad compared to just 29% for fish processing.

The majority of survey respondents felt turnover would remain unchanged over the next 12 months. The biggest cap on growth was reported as quotas and regulations (43% of respondents). Overfishing was the second most prominent concern amongst the Greencastle seafood operators (16% of survey respondents).

3. The impact of seafood's sub-sectors

3.1 Commercial fishing

Greencastle's commercial fishing activity contributed €27.3 million in GVA to the Border region economy in 2018; of which almost two thirds (€18.3 million) was associated with the sector's direct activity taking place at the port itself. Commercial fishing's direct GVA impact represented 70% of the seafood total throughout the port. The sub-sector supported a further €4.8m in indirect GVA through supply chain linkages within the Border region, in addition to €4.2 million in induced consumer spending related benefits.

We estimate that the port's commercial fishing sub-sector supported a total of 290 jobs throughout the Border region, just over two-thirds of which were directly employed within the sub-sector. This direct activity supported 40 jobs throughout the regional supply chain. These jobs generally take place in more productive sectors, generating almost a third more GVA per job than the direct fishing-based employment. Together the combined direct and indirect employment supports an additional 50 jobs across the regional economy via the spending of earnings on goods and services.

Fig. 16. Benefits of the commercial fishing sub-sector, Border, 2018

Port commercial fishing	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	18.3	200	8.8
Indirect	4.8	40	1.5
Induced	4.2	50	1.7
Total	**27.3**	**290**	**11.9**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

Breaking the economic benefits down to the sectoral level allows us to understand how these impacts are spread across the economy. The agriculture, forestry & fishing sector reaped the majority of the benefits in 2018, accounting for €18.5 million of the total GVA benefit. This represented a €0.2 million increase over and above the direct impacts within the port area. The agriculture, forestry & fishing sector is also the major beneficiary in employment terms, sustaining as estimated 210 jobs throughout the region, or 71% of the employment total supported by local commercial fishing.

Wholesale & retail is the next largest beneficiary of commercial fishing, experiencing a boost to value added of €2.6 million, supporting 30 jobs, as well as €0.9 million in wages in 2018. Real estate GVA was also boosted by €1.8 million mainly via induced impacts, and the regional manufacturing sector also benefited to the tune of €1.2 million.

Fig. 17. Total benefits of commercial fishing by sector, Border, 2018

Port commercial fishing	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	18.5	210	8.9
Mining & quarrying	0.0	0	0.0
Manufacturing	1.2	5	0.1
Electricity, gas, steam	0.1	0	0.0
Water supply	0.0	0	0.0
Construction	0.0	<5	0.0
Wholesale & retail	2.6	30	0.9
Transportation & storage	0.6	5	0.2
Accommodation & food	0.4	10	0.3
Information & communications	0.1	0	0.0
Financial & insurance	0.4	<5	0.1
Real estate	1.8	10	0.6
Professional, scientific & technical	0.5	5	0.2
Administration & support	0.1	0	0.0
Public administration	0.1	<5	0.0
Education	0.2	5	0.2
Human health	0.3	5	0.2
Arts, entertainment & recreation	0.1	<5	0.0
Other service activities	0.1	<5	0.1
Total	**27.3**	**290**	**11.9**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

3.2 Aquaculture

Aquaculture was the smallest of the port's seafood sub-sectors in turnover terms. It generated an estimated turnover of €6.7 million in 2018, trailing both commercial fishing and fish processing with turnovers of €31 million and €8.5 million respectively. This translates to a €3.7 million direct GVA contribution to regional GVA, with significant multiplier effects in terms of indirect and induced impacts, adding an additional €2.2 million. In total, aquaculture supported 85 jobs across the Border region economy, thereby sustaining €1.9 million in associated wages across a range of sectors. Again, it is notable that the indirect employment supported by aquaculture tended to belong to more highly productive sectors, with GVA per job more than double that of the direct employment.

Fig. 18. Benefits of the aquaculture sub-sector, Border, 2018

Port aquaculture	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	3.7	65	1.2
Indirect	1.5	10	0.4
Induced	0.7	10	0.3
Total	**5.9**	**85**	**1.9**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

Most of the total impacts resulting from aquaculture tended to belong to the agriculture, forestry & fishing sector. This sector alone accounted for 70 jobs and €3.8 million of the respective employment and GVA benefits generated through the combined direct, indirect and induced activity. Whilst agriculture, forestry & fishing accounted for 78% of the employment benefits, over a third of the value added belonged to other sectors. Wholesale & retail was the next biggest beneficiary, with 10 jobs supported across the Border region and €0.7 million in GVA. Manufacturing and real estate also saw notable value added resulting from the port's aquaculture activity in 2018.

Fig. 19. Total benefits of aquaculture by sector, Border, 2018

Port aquaculture	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	3.8	70	1.3
Mining & quarrying	0.0	0	0.0
Manufacturing	0.4	<5	0.0
Electricity, gas, steam	0.0	0	0.0
Water supply	0.0	0	0.0
Construction	0.0	0	0.0
Wholesale & retail	0.7	10	0.3
Transportation & storage	0.1	<5	0.0
Accommodation & food	0.1	<5	0.0
Information & communications	0.0	0	0.0
Financial & insurance	0.1	<5	0.0
Real estate	0.3	<5	0.1
Professional, scientific & technical	0.2	<5	0.1
Administration & support	0.0	0	0.0
Public administration	0.0	0	0.0
Education	0.0	<5	0.0
Human health	0.1	<5	0.0
Arts, entertainment & recreation	0.0	0	0.0
Other service activities	0.0	0	0.0
Total	**5.9**	**85**	**1.9**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

3.3 Fish processing

Fish processing was estimated to have the smallest economic impact of Greencastle's three seafood related sub-sectors. The sub-sector's employment multiplier was estimated at 1.25, meaning that every four of the port's processing jobs sustained one additional job somewhere else in the wider regional economy. This multiplier effect was weaker than that of both the aquaculture (1.31) and commercial fishing (1.45) activities.

We estimate that fish processing's direct activity supported 60 full-time equivalent jobs, which in turn generated close to €1 million in direct earnings and represented €4 million of GVA within the local economy. The GVA impact increases to €5.3 million throughout the regional economy after we consider the indirect and induced effects. Similarly to employment, the GVA multiplier was the weakest of the three seafood sub-sector at 1.25, compared to 1.5 and 1.6 in commercial fishing and aquaculture respectively. This in turn influences the sector's ability to generate further economic benefits within the local economy.

Fig. 20. Benefits of the fish processing sub-sector, Border, 2018

Port fish processing	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	4.05	60	1.03
Indirect	0.71	10	0.26
Induced	0.53	5	0.21
Total	**5.3**	**75**	**1.5**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

Unlike the other two seafood sub-sectors, the largest beneficiary sector is not the agriculture, forestry & fishing sector, but manufacturing which benefited from €4.2 million in GVA, €1 million in wages and supported 60 jobs in 2018. The manufacturing sector therefore accounts for almost 80% of fish processing's total GVA benefit across the Border region economy. This large share of the total is partially attributed to the sector's relatively high productivity (generating close to €70,000 in GVA per job), in addition to the processors' procurement patterns across the wider region. After this, the agriculture, forestry & fishing and wholesale & retail sectors enjoyed the most prominent benefits, collectively accounting for a tenth of both the total employment and GVA impacts. The remaining benefits were more evenly spread across the remaining sectors.

Fig. 21. Total benefits of fish processing by sector, Border, 2018

Port fish processing	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	0.2	5	0.1
Mining & quarrying	0.0	0	0.0
Manufacturing	4.2	60	1.0
Electricity, gas, steam	0.0	0	0.0
Water supply	0.0	0	0.0
Construction	0.0	0	0.0
Wholesale & retail	0.3	5	0.1
Transportation & storage	0.1	<5	0.0
Accommodation & food	0.1	<5	0.0
Information & communications	0.0	0	0.0
Financial & insurance	0.0	0	0.0
Real estate	0.2	<5	0.1
Professional, scientific & technical	0.0	0	0.0
Administration & support	0.0	0	0.0
Public administration	0.0	0	0.0
Education	0.0	0	0.0
Human health	0.0	<5	0.0
Arts, entertainment & recreation	0.0	0	0.0
Other service activities	0.0	0	0.0
Total	**5.3**	**75**	**1.5**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

3.4 Conclusion

In conclusion, Greencastle's commercial fishing sector provides the largest economic contribution, providing 290 jobs and €27.3 million of GVA. Local aquaculture had the strongest GVA multiplier of the three seafood sub-sectors. We estimate it provided 85 jobs and €5.9 million of GVA across the regional economy. Finally, fishing processing was estimated to have supported a total of 75 jobs and €5.3 million of value added in 2018.

4. Total impact of the overall port seafood sector

4.1 Seafood sector activity at the port

This section takes the estimates presented in the preceding sections of the report and calculates the total economic impact resulting from the activities of the seafood sector within the port area.

Simply summing the respective benefits of all three elements (commercial fishing, aquaculture and fish processing) will inevitably overestimate the indirect, induced and as a result, total impacts. This is because the supply chains of the fish processing element contain a proportion of the commercial fishing/aquaculture sub-sectors and their supply chains. We have therefore laid out the following approach to calculate total impacts for GVA, employment, wages and tax (see Appendix 2 for further detail on our approach):

Direct impacts

- Calculated by summing the direct impacts from the three elements of the seafood sector for GVA, employment, wages and tax.

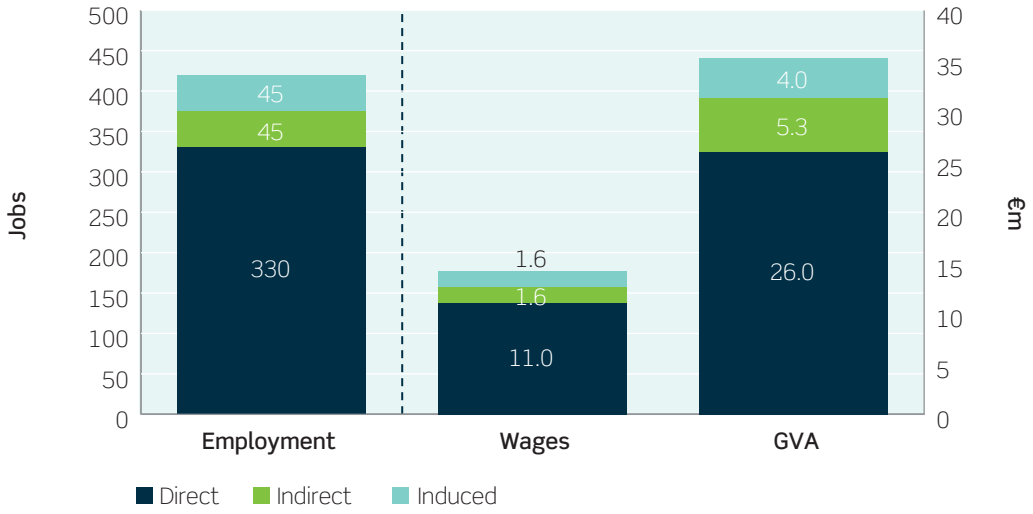
Indirect and induced impacts

- For GVA, employment, wages and taxes, the total indirect and induced impacts are calculated by summing the indirect and induced impacts of fish processing and a 100% and 65% share of the indirect and induced impacts from the respective aquaculture and commercial fishing sub-sectors (as information from the survey interviewees suggest that exports and domestic sales outside the port areas own processors account for 100% and 65% of the respective aquaculture and fishing production). The remainder of the commercial fishing/aquaculture sub-sectors' indirect and induced impacts will already be accounted for in the indirect and induced impacts from the fish processing sub-sector.

4.2 Regional estimates

Overall, we estimate that the Greencastle seafood industry generated €35.3 million in GVA for the Border region's economy in 2018. This activity supported 420 jobs across a range of sectors and generated €14.3 million in earnings.

Fig. 22. Benefits of the seafood sector, Border, 2018



Source: *Oxford Economics, Perceptive Insight, CSO*

Most of the local seafood industry's economic impacts are associated with the direct seafood activity taking place in the local port economy. Seafood's direct GVA impact (€26 million) represented 74% of total GVA benefit to the Border economy. The remaining 26% was from seafood's supply chain linkages and the induced consumer spending impacts, adding an extra €9.3 million in regional GVA and 90 jobs in 2018. The bulk of wage benefits came directly from the seafood industry, representing €11 million or three quarters of the total sustained throughout the region.

Fig. 23. Total seafood sector benefits, Border, 2018

Port seafood sector	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	26.0	330	11.0
Indirect	5.3	45	1.6
Induced	4.0	45	1.6
Total	**35.3**	**420**	**14.3**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

The agriculture, forestry & fishing sector is the largest benefactor from Greencastle's seafood industry. With 275 full-time equivalent jobs, the sector accounts for two-thirds of the total employment impact across the region. Wholesale & retail and manufacturing were the next largest beneficiaries of the seafood sector, with 30 and 65 jobs supported respectively, indicative of their roles within the seafood regional supply chain.

Seafood activity at the port supported €5.3 million in GVA within the Border's manufacturing sector, accounting for 15% of the total, though just 8% of total wages, reflecting the manufacturing relatively high output per job. Wholesale & retail was just behind in GVA terms, contributing €2.8 million in GVA within the Border economy (8% of total supported by seafood). The real estate sector also benefited greatly with a €1.7 million boost in GVA mainly due to the impact of spending on property via induced effects.

Fig. 24. Total benefits by sector, Border, 2018

Port seafood sector	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	22.4	275	10.2
Mining & quarrying	0.0	0	0.0
Manufacturing	5.3	65	1.2
Electricity, gas, steam	0.1	0	0.0
Water supply	0.0	0	0.0
Construction	0.0	<5	0.0
Wholesale & retail	2.8	30	1.0
Transportation & storage	0.6	5	0.2
Accommodation & food	0.4	10	0.3
Information & communications	0.1	0	0.0
Financial & insurance	0.4	<5	0.1
Real estate	1.7	10	0.5
Professional, scientific & technical	0.6	5	0.2
Administration & support	0.1	0	0.0
Public administration	0.1	<5	0.0
Education	0.2	5	0.2
Human health	0.3	5	0.2
Arts, entertainment & recreation	0.1	<5	0.0
Other service activities	0.1	<5	0.1
Total	**35.3**	**420**	**14.3**

Source: *Oxford Economics, Perceptive Insight, CSO*
Note: *May not sum due to rounding*

4.3 Taxation estimates

Seafood activity at the port provides further benefits through the generation of tax revenues to the Revenue Commissioners. These fiscal impacts can again be split into their direct, indirect and induced components depending on what channel of activity they originate from. We estimate that port seafood sector's direct tax contribution equated to €2.4 million in 2018, consisting of both the labour-based tax paid by the sector's employees (income tax, PRSI etc) and corporation tax receipts.

The indirect fiscal benefits represent the same taxation components as above but are generated within the sector's wider supply chain, in addition to net taxes on input purchases and sectoral taxation on production less subsidies. Combined, these represent a net fiscal contribution of €0.7 million. As those employed in the sector and within its supply chain spend their wages, this supports further jobs and activity within the Irish economy. We estimate this induced activity supported a further €2.3 million in tax revenue.

Therefore, in total, Greencastle's seafood sector is estimated to have supported €5.4 million in fiscal benefits in 2018. This total was made up of €2.9 million in employment/labour related tax, €0.8 million in corporation tax, €1.4 million in taxation associated with the spending of wages, and a net tax contribution of €0.2 million through taxation on inputs and production.[4]

4 Net tax position refers to taxes less subsidies.

Fig. 25. Fiscal impacts by taxation type, Ireland, 2018

Ports seafood sector	Total tax estimates (€m)				
	Labour tax	Corporation tax	Production tax	Input purchases tax	Tax on consumption
Agriculture, forestry & fishing	1.4	0.4	-0.4	0.0	0.0
Mining & quarrying	0.0	0.0	0.0	0.0	0.0
Manufacturing	0.7	0.1	0.0	0.0	1.1
Electricity, gas, steam	0.0	0.0	0.0	0.0	0.0
Water supply	0.0	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0	0.0
Wholesale & retail	0.2	0.1	0.0	0.0	0.0
Transportation & storage	0.1	0.0	0.0	0.1	0.0
Accommodation & food	0.1	0.0	0.0	0.0	0.1
Information & communications	0.0	0.0	0.0	0.0	0.1
Financial & insurance	0.1	0.1	0.0	0.1	0.0
Real estate	0.1	0.0	0.1	0.1	0.0
Professional, scientific & technical	0.1	0.0	0.0	0.0	0.0
Administration & support	0.0	0.0	0.0	0.0	0.0
Public administration	0.0	0.0	0.0	0.0	0.0
Education	0.1	0.0	0.0	0.0	-0.1
Human health	0.1	0.0	0.0	0.0	0.0
Arts, entertainment & recreation	0.0	0.0	0.0	0.0	0.0
Other service activities	0.0	0.0	0.0	0.0	0.0
Total	**2.9**	**0.8**	**-0.2**	**0.4**	**1.4**

Source: *Oxford Economics, Perceptive Insight, CSO*

4.4 Conclusion

Overall, we estimate that the Greencastle seafood industry generated €35.3 million in GVA for the Border region's economy in 2018. This activity supported 420 jobs across a range of sectors and generated €14.3 million in earnings.

5. Conclusions

5.1 The seafood sector in Greencastle

Greencastle's seafood industry has a significant role within the local port economy. The port's 95 seafood related businesses saw total turnover of €46 million in 2018.The direct GVA impact of the combined commercial fishing, aquaculture and fish processing was estimated at €26 million. The sector directly supported 330 full-time equivalent jobs within the port area, alongside €11 million in earnings.

Our survey also identified the key characteristics of the local seafood industry and the business environment for Greencastle operators. The industry is well established, with most firms established over ten years ago. Turnover also appears to be stable or increasing for most local businesses, and 23% of operators had made capital investments in 2018. Though average investments were low compared to some other ports it still reflects a degree of confidence in the local seafood sector.

Most of the workforce (66%) originated in the Greencastle hinterland, with others drawn from further afield, nearly one in five (19%) of employees originally come from elsewhere in the EU. There were also healthy hinterland and international markets for seafood products in 2018 with around 40% going to each.

5.2 The commercial fishing sub-sector is the main contributor

The commercial fishing sub-sector makes the strongest contribution to the Border economy. In 2018, it alone generated €27.3 million of GVA, of which €9 million is linked to indirect (€4.8 million) and induced (€4.2 million) effects. The commercial fishing sub-sector is estimated to provide benefits of the following size:

- 200 direct jobs and €8.8 million of wages, producing €18.3 million of GVA;
- 40 indirect jobs and €1.5 million of wages, producing €4.8 million of GVA; and
- 50 induced jobs and €1.7 million of wages, producing €4.2 million of GVA.

5.3 Though the remaining components remain significant

Although the aquaculture sub-sector's economic footprint is smaller than that of the local commercial fishing sector, its GVA multiplier was just as strong within the regional economy. Accordingly, our analysis shows the economic impact of the aquaculture element was of the following size in 2018:

- 65 direct jobs and €1.2 million of wages, producing €3.7 million of GVA;
- 10 indirect jobs and €0.4 million of wages, producing €1.5 million of GVA; and
- 10 induced jobs and €0.3 million of wages, producing €0.7 million of GVA.

Furthermore, our analysis shows that the economic impact of the port's fish processing sub-sector equates to the following benefits across the Border economy:

- 60 direct jobs and €1 million of wages, producing €4 million of GVA;
- 10 indirect jobs and €0.26 million of wages, producing €0.7 million of GVA; and
- 5 induced jobs and €0.21 million of wages, producing €0.53 million of GVA.

Therefore, we estimate that the port's collective seafood sector supported 420 jobs, €14.3 million in wages and €35.3 million in GVA within the regional economy in 2018. This activity was enough to sustain €5.4 million in tax revenues towards the public accounts.

5.4 Findings from the socio-economic analysis

The seafood industry plays a key role in the Greencastle economy. Nearly 22% of jobs in the local port economy belong to either the agriculture, forestry & fishing or the manufacturing, mining & utilities sector. Analysis of Census data shows faster growing private service sectors are generally underrepresented. Unsurprisingly therefore, the local economy experiences net out-commuting as residents travel elsewhere for employment and a number of economic indicators underperform the national and regional benchmarks.

Greencastle has an ageing population, with above average shares of those aged 65 and over. Furthermore, the educational profile is notably weaker than the national average, with 23% of residents identified as having only primary education or lower as their highest level of attainment. The accessibility to occupations in the agriculture, forestry & fishing sector is therefore an important source of employment for a sizeable share of the population with lower qualification levels.

As a result, the seafood sector is likely to be play a significant role in the local port economy through its provision of direct jobs, supply chain spending in local businesses and the consumer spending it supports. Looking forward, a vibrant and growing local seafood sector will be important for the economic and demographic health of the local area.

Appendix 1: Greencastle's economic challenges

Economic activity and structure

The latest available data indicates that Greencastle's labour market is underperforming the broader regional area. The rate of unemployment within the port's region and hinterland was 17.8% in 2016. This is above both the Border region (15.7%) and the national equivalent (12.9%).[5] The local employment rate of 45.5% was also relatively weaker than both the regional and national averages **(see Fig. 26)**. Furthermore, Census data reveals that the economic inactivity rate[6] among those residents aged 15 and over was close to 45%; higher than the regional (41.1%) and national (38.8%) averages in 2016. These findings therefore suggest that the local area faces a number of economic headwinds.

Fig. 26. Headline economic indicator comparisons, 2016

	Unemployment rate	Employment rate	Economic inactivity
Greencastle	17.8%	45.5%	44.7%
Border	15.7%	49.6%	41.1%
Ireland	**12.9%**	**53.3%**	**38.8%**

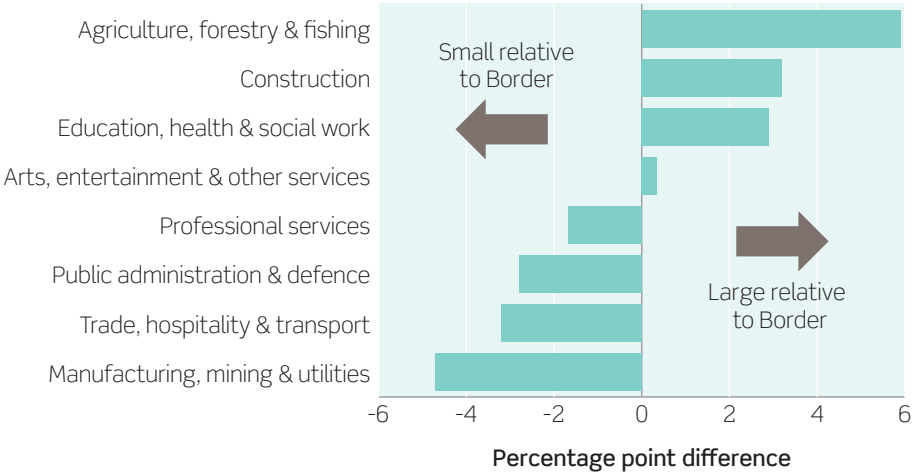
Source: *CSO*

The latest Census in 2016 showed there were nearly 4,100 people employed within the port area and its hinterland. Meanwhile, there were over 5,100 residents of the area employed in jobs based either in the local economy or elsewhere. The difference represents the degree of net out-commuting of local people from the port area to take up employment opportunities elsewhere.

A sectoral breakdown of workplace employment within the port area and its hinterland points to the significance of the local seafood sector. The data shows that workplace employment in the agriculture, forestry & fishing, and the manufacturing, mining & utilities sectors collectively accounted for over a fifth (22%) of total jobs.[7] However, agriculture, forestry & fishing in particular is relatively strongly concentrated within the local economy when compared to the region overall. Indeed, agriculture's share of local employment was nearly six percentage points larger than the respective share found in the Border region **(see Fig. 27)**. The local economy is also relatively underrepresented in faster growing sectors such as the professional services.

5 Defined as a share of the labour force aged 15 years and over.
6 Economic inactivity represents the share of the population aged 15 and over who were neither employed nor looking for employment.
7 Commercial fishing and aquaculture fall within the 'Agriculture, forestry & fishing' sector. Fish processing related activity is classified within the industry grouping of 'Manufacturing, mining & utilities'.

Fig. 27. Employment share differences, Greencastle vs Border, 2016



Source: *Oxford Economics, CSO*

Demographics

The port area and its hinterland's population contracted by 1.6% in the five years between 2011 and 2016. Recent population growth has therefore significantly underperformed the national average which grew by 3.8% over the same period. Furthermore, the working age component of the population (60.8%) is below average relative to both the regional and national averages, contributed to with a recent contraction in the number of residents of working age. Census data shows that residents within the port area aged between 16 and 64 years old declined by 4.8% between the years of 2011 and 2016.

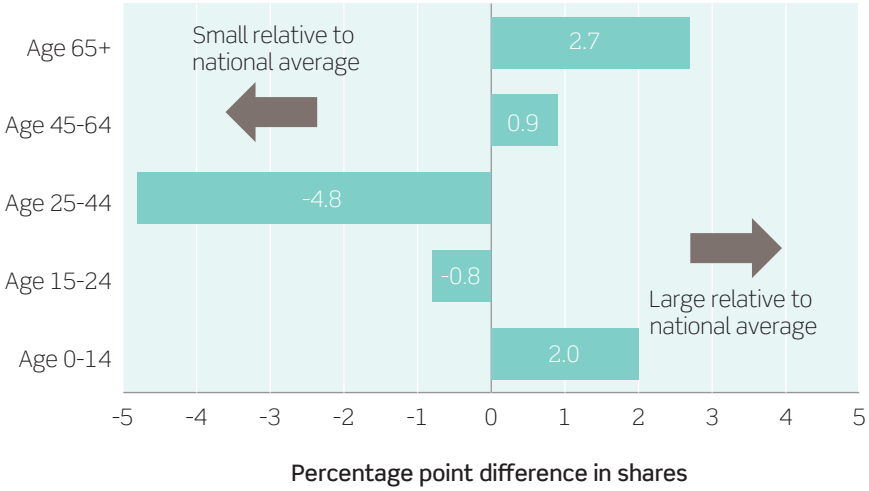
Fig. 28. Population indicators, 2016

	Growth (2011-16)		2016	
	Population	Working age	Population	Working age share
Greencastle	-1.6%	-4.8%	14,600	60.8%
Border	1.2%	-1.6%	520,900	63.3%
Ireland	3.8%	1.4%	4,761,900	**65.5%**

Source: *CSO*
Note: *Working age is defined as those aged between 15 and 64*

An analysis of the local port economy's population by age cohorts relative to the national picture shows that the distribution is skewed at both the younger and older ends. Those aged 65 and over accounted for 16% of the population – three percentage points above the national average in 2016. Meanwhile, younger working age people (aged 25-44) were more significantly underrepresented within the local population.

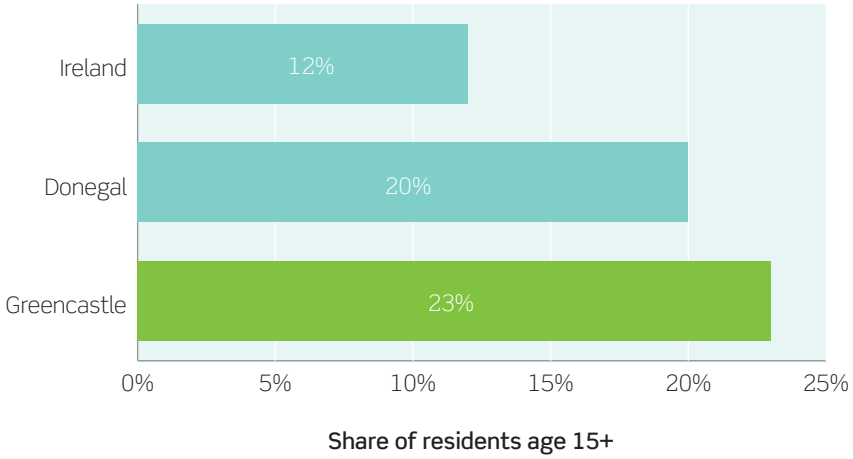
Fig. 29. Age group comparisons, Greencastle vs Ireland, 2016



Source: *CSO Ireland*

Qualification attainment within the port area tends to be weaker than the pattern observed at the national level. Those with no formal qualifications or at most primary level education represented 23% of residents aged 15 and over in 2016, compared to 12% across Ireland. Similarly, higher level attainment among the port hinterland's residents was lower than the national average. Those educated to degree level or above accounted for 21% of those age 15 and over in Greencastle, compared to 28% across Ireland.

Fig. 30. No formal qualifications or primary level attainment, 2016



Source: *CSO*

Summary

The seafood industry plays a key role in the Greencastle economy. Nearly 22% of jobs in the local port economy belong to either the agriculture, forestry & fishing or the manufacturing, mining & utilities sector. Analysis of Census data shows faster growing private service sectors are generally underrepresented. Unsurprisingly therefore, the local economy experiences net out-commuting as residents travel elsewhere for employment and a number of economic indicators underperform the national and regional benchmarks.

Greencastle has an ageing population, with above average shares of those aged 65 and over. Furthermore, the educational profile is notably weaker than the national average, with 23% of residents identified as having only primary education or lower as their highest level of attainment. The accessibility to occupations in the agriculture, forestry & fishing sector is therefore an important source of employment for a sizeable share of the population with lower qualification levels.

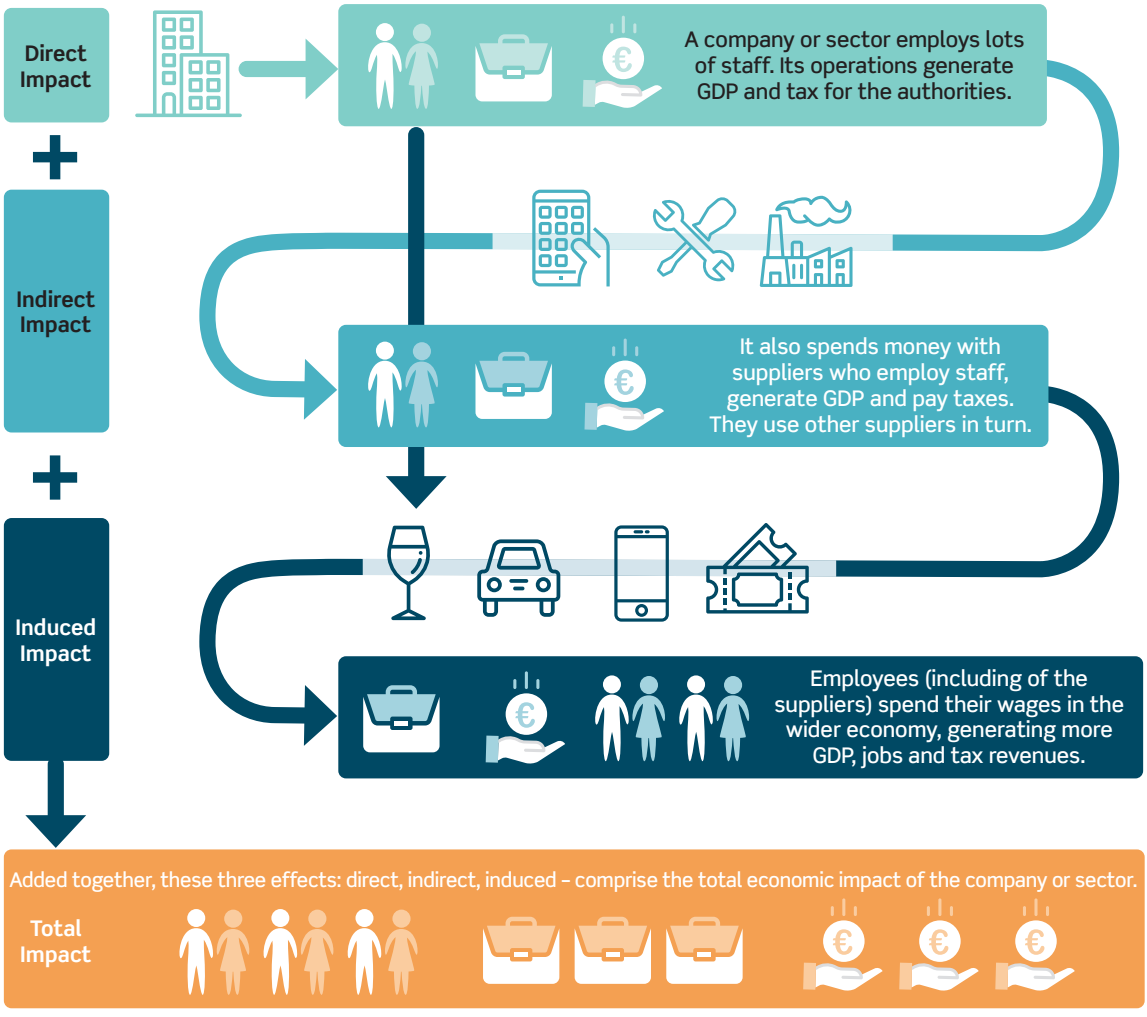
As a result, the seafood sector is likely to be play a significant role in the local port economy through its provision of direct jobs, supply chain spending in local businesses and the consumer spending it supports. Looking forward, a vibrant and growing local seafood sector will be important for the economic and demographic health of the local area.

Appendix 2: Model approach

Understanding economic impact assessments

An economic impact assessment quantifies the total economic benefit created by a sector through a range of different channels. For the seafood sector at the ports this arises in four main ways. The first three are the standard channels through which economic impact is usually quantified: direct operational effects, supply chain effects, and the impact of employees spending their wages in the wider consumer economy. The fourth channel, known as 'catalytic' or 'dynamic' benefits represent the wider benefits that society and/or other industries derive from the original economic activity.

Fig. 31. Overview of economic impact methodology



Our report uses three main metrics to quantify each of the channels by which the seafood sector could contribute to the regional[8] and national economy:

- **Gross value-added** contribution to Gross Domestic Product (GDP)[9]: This measured the value of goods and services produced in an area, industry or sector of an economy and is equal to output minus intermediate consumption;
- **Employment:** Employment is presented in terms of full-time equivalent jobs as defined in the report, the combination of workplace employment by full-time and part time status; and
- **Wages** is the total value of remuneration offered to the workers associated with the local seafood sector.

All the data used was either provided by BIM (for example recent seafood operator registrations/industry data), the seafood sector survey carried out by Perceptive Insight or published government website data and industry standards from the likes of CSO Ireland and Oxford's own economic databases. Finally, in the absence of data, reasonable assumptions based on best judgement are clearly rationalised in the study. For example, in the absence of port specific data we will use published sources for comparator geographies as a proxy estimates were appropriate.

Estimating the direct economic contribution

The first step was to understand the **direct** activity associated with the local seafood sector at each of the 10 ports in 2018.

The survey

The seafood survey was designed to provide the evidence base from which to estimate the local seafood sector's contribution to the regional/national economy. Responses from the sector were analysed according to common characteristics (sub-sector, turnover band, main port area etc) and cross-referenced with the most recent full snapshot of the local seafood sector population.[10]

Sample estimates were then 'grossed' up to that of the total population. This was done by drawing on the BIM database of the seafood sector population in each port which contained fields on sector and turnover bands. Knowing indicative turnover levels for seafood businesses not captured in the survey, we were able to apply the average ratio of jobs to turnover level in that sector and apply average sectoral wages, etc. In other words, we utilised knowledge of the sectors and turnover of the missing companies and applied the ratios and averages of those covered in the survey to estimate their activity. The resulting total seafood related turnover estimate is then split into the different sectors of the economy ('Agriculture, forestry & fishing' and 'Manufacture of food products').

This turnover figure is essentially the value of output within the local seafood sector and encompasses intermediary demand, wages and profits. Using the sectoral ratios of output to GVA in the Irish input-output tables we estimated the direct sectoral GVA contributions to GDP in the local economy. Both direct employment and gross wages paid within the local port seafood sector are again informed by the survey findings and grossed to the population total based on shared characteristics.

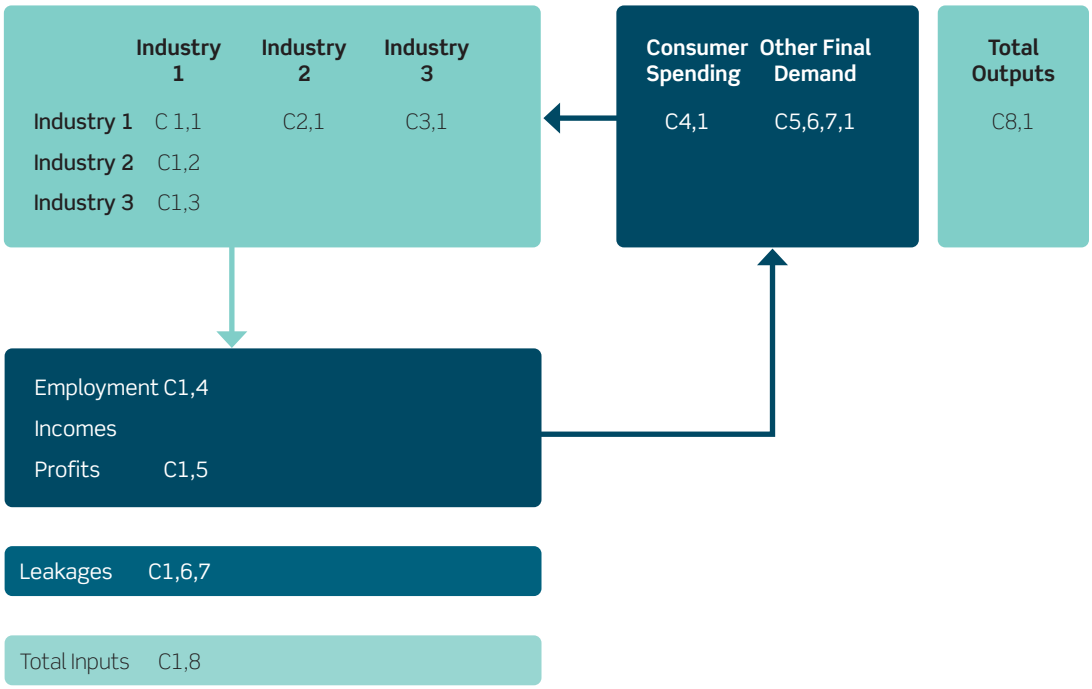
With our estimate of direct output and wages, we then applied sectoral taxation assumptions and calculated the resulting fiscal benefits that would likely be collected by the Revenue Commissioners.

8 Ideally, we would quantify the impacts of the seafood sector on the port area, however, there is not enough published sectoral employment, GDP and wage data. Sufficient data is only available at regional level to produce sub-national impacts.
9 GDP is the main summary indicator of economic activity in Ireland. GDP can be defined as GVA plus taxes on products less subsidies on products. References to economic growth (or when the economy enters recession) typically relate to the rate of change of GDP. All references in this report relate to GVA; also known as GDP at 'basic prices'; and they exclude taxes and subsidies.
10 Provided by BIM and informed by the most recent fishery registrations and activity listings in the aquaculture and processing sectors. Turnover bands were also assigned to the local seafood population based on returns when available, and when not, estimated by BIM based on shared characteristics.

Estimating indirect and induced impacts

To estimate the indirect and induced impacts we have built an input-output model. **Figure 32** presents a stylised version (showing just three sectors for presentation purposes) of our input-output model which is a model that traces how economic activity flows through an economy as one sector makes purchases from another sector.

Fig. 32. Stylised input-output model



We have used the latest Irish input-output tables for the analysis, but have adjusted these in line with academic guidelines (Flegg, A. T. and Tohmo, T. (2013) "Regional input-output tables and the FLQ formula: A case study of Finland") to account for the size and structure of the local economy.[11] The technique involves constructing sub-national input-output models by applying Location Quotients (LQs) and sub-national size adjustments to the standard Ireland input-output tables. The result is that geographies with higher concentrations of industries receiving procurement or household expenditure have larger impacts. In addition, we have used information gathered from the survey to further isolate the procurement spend locally, thereby strengthening the overall modelling assumptions.

MODELLING SUPPLY CHAIN IMPACTS

The survey provided us with information on the size of supply chain spending relative to turnover, its allocation to specific parts of the economy/goods/services and its location (local/national/international). Using this information, we were able to construct a more detailed picture of the first round of supply chain spending than the published input-output tables would otherwise provide.

11 Due to data availability, the local seafood sector's economic impact can only be localised to the regional level (NUTS 3).

We then used the impact model to estimate all the **rounds of supply chain or indirect spending** of the local seafood sector. The input-output tables provide us with an estimate of indirect output by sector. We then convert this output back into sectoral GVA and into sectoral jobs to provide a range of sectoral impact measurements. Applying average sectoral salaries allowed us to estimate the income effect.

The induced impact is economic activity and employment supported by those directly or indirectly employed spending their income on goods and services in the wider economy. This helps to support jobs in the industries that supply these purchases, and typically includes jobs in retail and leisure outlets, companies producing consumer goods and in a range of service industries. Again, our input-output model was used to estimate the induced impacts.

Overcoming double-counting

Throughout the analysis the impact estimates are presented for the core elements of the seafood sector – commercial fishing, aquaculture and fish processing. However, when estimating the total impact of the overall ports seafood sector, simply summing the respective benefits of all three sub-sectors will inevitably over-estimate the indirect and induced and as a result, total impacts. This is because the supply chains of the processing element contain a proportion of the fishing/aquaculture sub-sectors and their supply chains. Therefore, adding everything together would result in the double counting some of the impacts.

We have, therefor, the following approach to calculate total impacts for GVA, employment, wages and tax:

Direct impacts:

- Calculated by summing the direct impacts from the three elements of the seafood sector for GVA, employment and wages.

Indirect impacts:

- For GVA, employment and wages, total indirect impacts are calculated by summing the indirect impacts of processing and a share of the indirect impacts from the fishing and aquaculture sub-sectors (as indicated by survey responses showing the extent to which local processors account for their total sales). The remainder of the fishing/aquaculture sub-sectors' indirect impacts will already be accounted for in the indirect impacts from the processing sub-sector.

Induced impacts:

- For GVA, employment and wages, total induced impacts are calculated by summing the induced impacts of the local processing sector and a share of the induced impacts from the commercial fishing and aquaculture sub-sectors (as indicated by survey responses showing the extent to which local processors account for their total sales). The remainder of the fishing and aquaculture sub-sectors' induced impacts will already be accounted for within the induced impacts from the fish processing sub-sector.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