The Economic Impact of the Seafood Sector: Killybegs

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To discuss the report further please contact:

Neil McCullough: **nmccullough@oxfordeconomics.com**
Oxford Economics, Lagan House, Sackville Street, Lisburn, BT27 4AB, UK
Tel: **+44 28 9263 5400**

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Foreword

The Economic Impact of the Seafood Sector: Killybegs

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 Killybegs and its hinterland. Killybegs is Ireland's biggest seafood port with the highest volume and value of seafood landed here annually.

Killybegs is located in the south-west corner of county Donegal, adjacent to the Slieve League mountain range. Agricultural land in this area would be described as poor given the mountainous terrain and the types of soils present. The port is located at significant distances from major urban settlements being 254km from Dublin (Derry, in Northern Ireland is the closest major urban area at a distance of 98km). Given these geographical factors the seafood sector is the main driver of the Killybegs economy.

In this report, it is shown how the impact of the seafood sector in Killybegs radiates across the entire Border region and beyond. In total, 27% of the hinterland economy can be attributed to the seafood sector encompassing direct, indirect and induced effects. It contributes €94 million in gross value added directly each year which in turn generates €40 million indirectly and a further €16.5 million through induced effects across the region. Over 1,000 full-time employees are employed in the sector directly while over 800 jobs are generated by the sector downstream at the regional level. Further downstream effects occur outside the region at the national level.

Participation in this survey by seafood producers in Killybegs was very high with 55% of seafood producers in the port hinterland participating in the survey. Special thanks goes to Sean O'Donoghue (Killybegs Fishermen's Organisation), Francis O'Donnell (Irish Fish Producers Organisation) and Jim Parkinson (Sinbad Marine Services Ltd) 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 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 sector makes an important contribution to the Killybegs economy. In 2018, we estimate that the sector directly generated €254 million in turnover, supporting over 1,000 direct jobs. Fish processing is the largest of the three seafood sub-sectors, generating an estimated €163 million in turnover, followed by commercial fishing (€73 million) and aquaculture (€19 million). When translated into GVA, the seafood sector directly contributes an estimated €94 million to the local port economy.[1]

Our survey explores the characteristics of businesses operating in this sector. In general, they are typically well-established, having operated for more than 10 years, and turnover tends to be relatively stable year-on-year. Seafood operations at Killybegs typically invest more in capital relative to the other ports included in the study and their workforce tends to originate from the local area. Furthermore, over three quarters of the fish processing produce is exported, while aquaculture exports 98% of its produce.

Analysing the survey results allows us to quantify the port seafood sector's 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 Killybegs equated to €150 million of GVA across the Border economy in 2018. The port's seafood sector supported an estimated 1,835 jobs across the region and generated €9.3 million in tax revenues.

€94m

Direct GVA in 2018

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

€150m

Total GVA contribution to the Border economy in 2018

The seafood sector makes an even larger contribution to the wider regional economy.

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

Port seafood sector	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	94.3	1,005	36.4
Indirect	39.6	640	18.0
Induced	16.5	190	6.6
Total	**150.3**	**1,835**	**61.0**

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

1 Gross Value Added (GVA) is the difference between the value of goods and services produced by a business or a sector, and the cost of raw materials and other inputs which are used in production. It is essentially a measure of the value added to the services or products provided by a sector or firm.

The role of the individual seafood sub-sectors

Our analysis of the seafood sector at the port provides the following headline findings throughout the region (which again will include the combined direct, indirect and induced impacts).[2]

- Activity in the commercial fishing sub-sector has been estimated to sustain 615 jobs, €23.1 million of wages and €64.5 million of GVA;
- Activity in the aquaculture sub-sector has been estimated to sustain 185 jobs, €5.8 million of wages and €13.2 million of GVA;
- The fish processing sub-sector has been estimated to 1,225 jobs, €38.5 million of wages and €91.6 million of GVA.

Socio-economic characteristics

The Killybegs economy exhibits a relatively older population structure. Working age population levels have declined significantly in recent years and the local employment opportunities are limited. The structure of the economy also presents challenges, given its over reliance on manufacturing, and its relatively small professional services sector (which is typically the fastest growing in employment terms), the local economy is likely to experience limited job creation in the short-term. Finally, qualification attainment levels among residents are notably weaker than the national average.

As a result, the seafood sector is likely to be play a significant role in the local economy through its provision of direct jobs, supply chain spending in local businesses and the consumer spending it supports. Furthermore, local skill levels more closely match those offered by seafood employers. Looking forward, a vibrant and growing local seafood sector will be important for the economic and demographic health of the area.

2 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

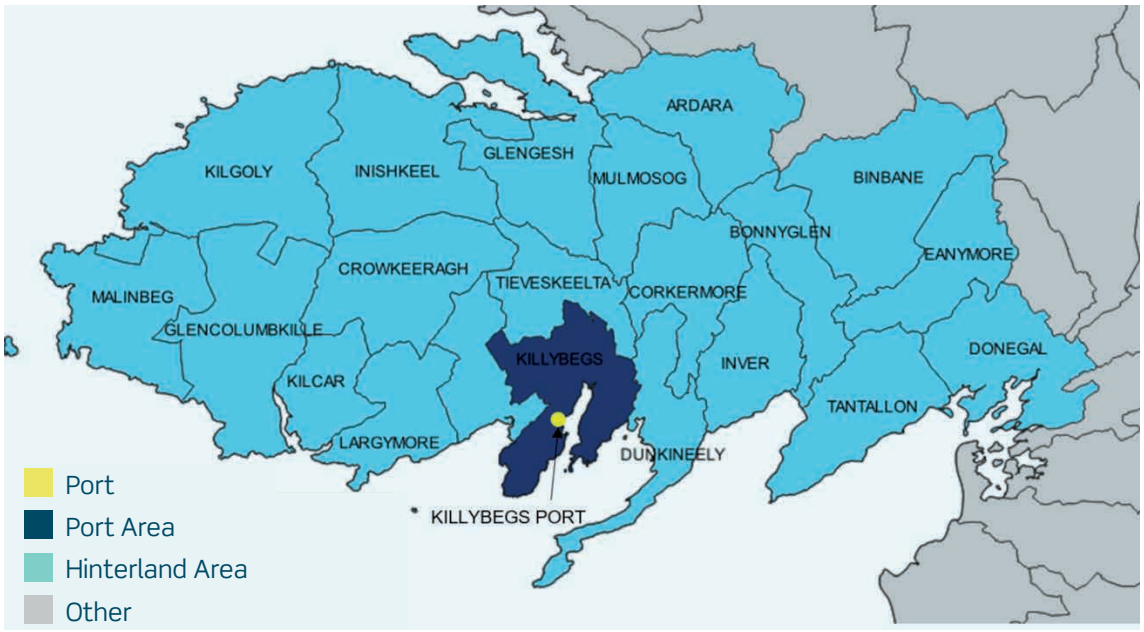
The Irish seafood sector is an important component of the Irish economy. It is, however, more important to coastal communities around the country given its concentration at Ireland's ports and the relatively lower level of alternative economic activity in these economies. In addition, as economic and 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 local 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 port area

Killybegs is one of the largest fishing ports in Ireland. It is located in the North-West, close to Donegal town. In this report we define the local port economy as the District Electoral Divisions (DED) of Killybegs 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. The study also draws on published data were available to better understand the sectoral composition of coastal areas within the country. Peripheral economies tend to face significant challenges from which Killybegs is not exempt. **Appendix 1** of this report includes a summary discussion of the pertinent issues facing the local port economy.

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 concerning 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

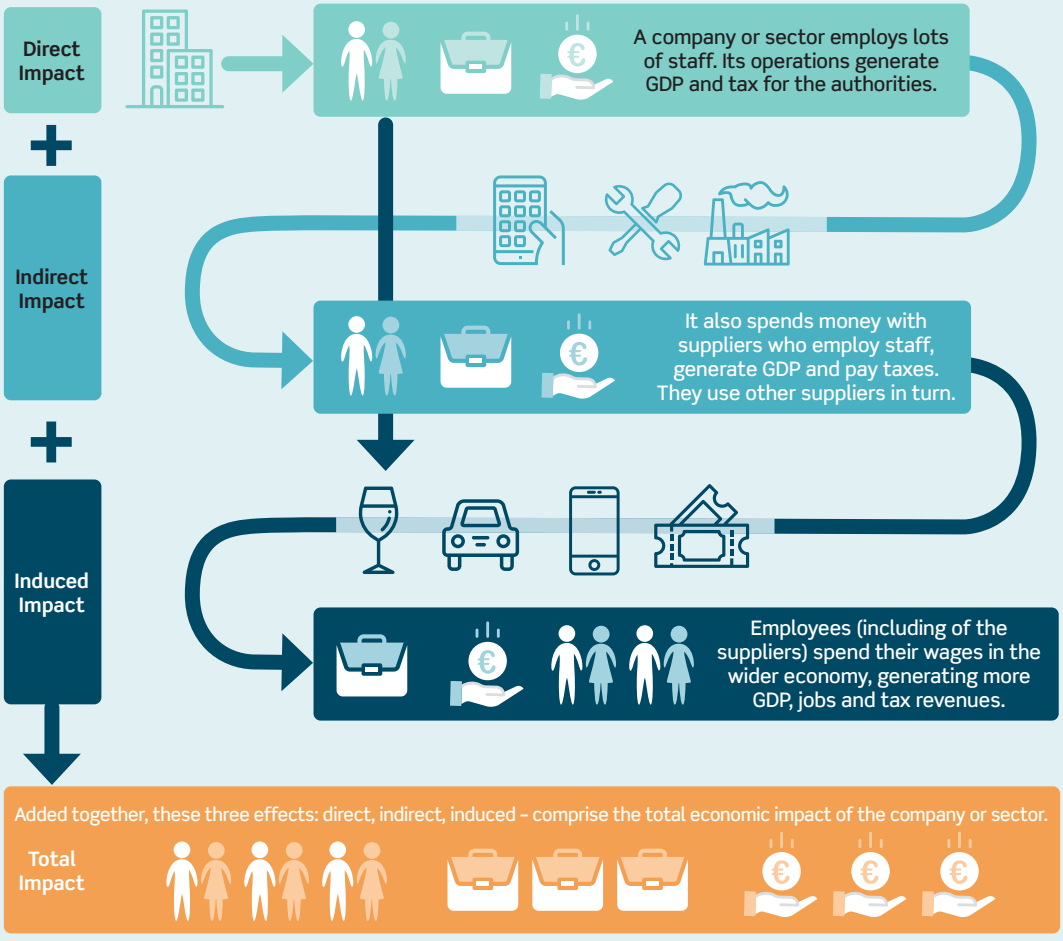
The economic impact of a sector is measured using a standard means of analysis called an economic impact assessment. The report quantifies the three 'core' channels of impact that comprise an organisation/sector's 'economic footprint':

- **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.

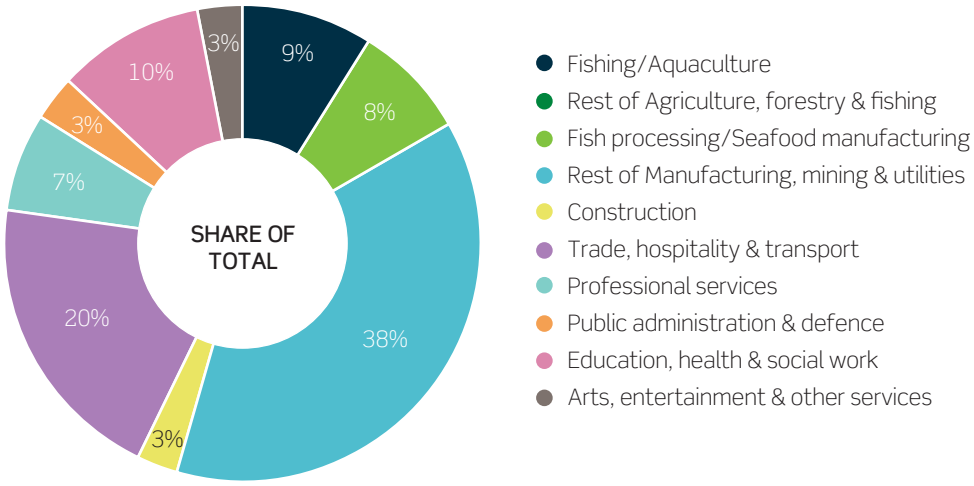
2. The seafood sector at the port

2.1 The importance of the local seafood sector

Before we present the total benefits associated with the 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 Killybegs' 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 Killybegs' economy made a GVA contribution to GDP of €555 million in 2018.[3] We estimate that the port's seafood sector represented €94 million of this GVA total. Seafood therefore represented 17% of the local port economy – the third largest sector, behind 'manufacturing, mining & utilities' and 'trade, hospitality & transport'.

Fig. 4. GVA by sector, Killybegs, 2018

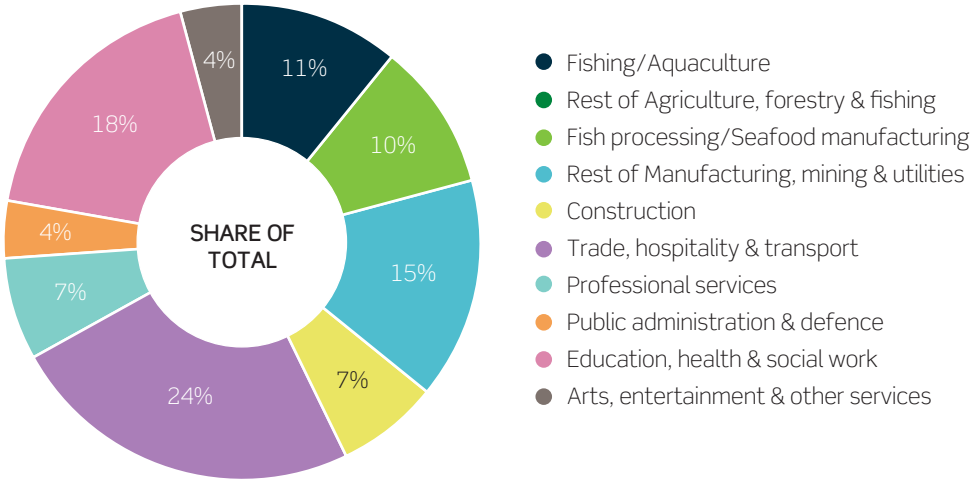


Source: *Oxford Economics, Perceptive Inisght, CSO*

In employment terms, seafood is even more important within the port economy. Combined commercial fishing, aquaculture and fish processing is estimated to represent 21% of workplace employment across the port area in 2018. Furthermore, fishing and aquaculture represented nearly all of local agriculture, forestry & fishing related employment and fish processing accounted for 40% of local manufacturing, mining & utilities jobs.

3 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.

Fig. 5. Employment by sector, Killybegs, 2018



Source: *Oxford Economics, Perceptive Insight, CSO*

2.2 Characteristics of the Seafood sector

Fish processing provides the largest direct contribution to the local port economy. In 2018, it accounted for 64% of all seafood turnover (€254 million) and supported an estimated 480 jobs, demanding almost €17 million of wages. The study has found that fish processors tend to be notably larger than businesses in fishing or aquaculture. On average, each fish processing business at the port provided 37 jobs compared to 15 in aquaculture and only four in commercial fishing. However, average wages in the fish processing sector (€35,100) were lower than that of commercial fishing (€39,500) and only slightly stronger than those in aquaculture (€30,700).

Commercial fishing in Killybegs is significantly smaller than fish processing in turnover terms, generating an estimated €73 million of direct turnover and 380 jobs in 2018. However, given their higher wages, commercial fishing accounts for a relatively high share of the seafood sector's wages locally (€14.9 million). Although aquaculture is the smallest of the three seafood sub-sectors, it still accounts for close to 10% of the local sector's turnover and provides 145 jobs and €4.5 million in wages.

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

	Turnover (€m)	Jobs	Wages (€m)	Seafood operators
Commercial fishing	72.7	380	14.9	98
Aquaculture	19.0	145	4.5	10
Fish processing	162.6	480	16.9	13
Total	**254.3**	**1,005**	**36.4**	**121**

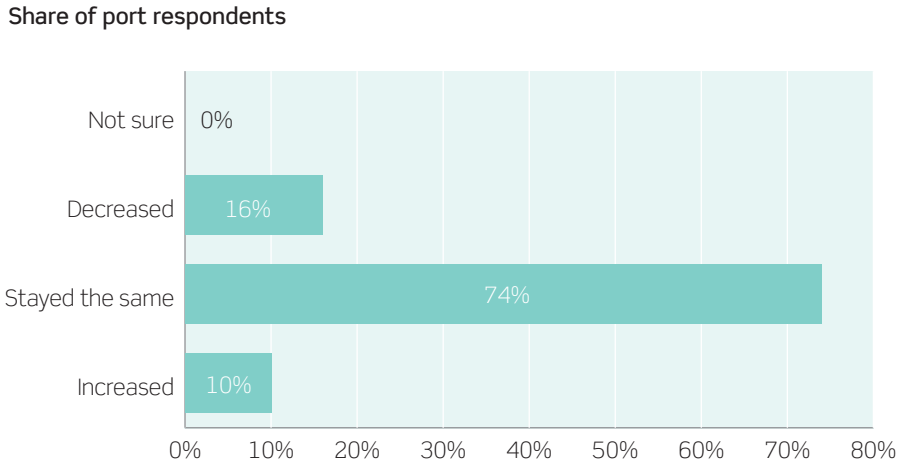
Source: *Oxford Economics, Perceptive Insight, BIM*
Note: *May not sum due to rounding*

Our survey also provides insight into the profile of seafood businesses operating at the port. We surveyed 52 seafood businesses in Killybegs, 43% of the population of local seafood businesses. The survey results suggest that seafood businesses within the port tend to be relatively well established/mature. A significant majority (95%) identified as having operated for more than 10 years in the port area, a rate above the aggregate figure for the ten ports covered in the study (89%).

The survey also explored the recent performance of firms operating in the seafood sector. On balance, turnover levels have been relatively unchanged over the past 12 months; nearly three in every four respondents indicated that turnover had neither increased nor decreased over this period (compared to 72% for all 10 ports). Of the remainder, more had experienced a decrease in turnover (16% of total) than those experiencing an increase (10% of total).

Analysis at sub-sectoral level shows that on balance, commercial fishing had the most downbeat responses with 19% fishing businesses reporting a decrease in turnover compared to only 5% reporting an increase. For reference, only 1 other business (a fish processing company) outside of commercial fishing reported a decrease in turnover over the past 12 months.

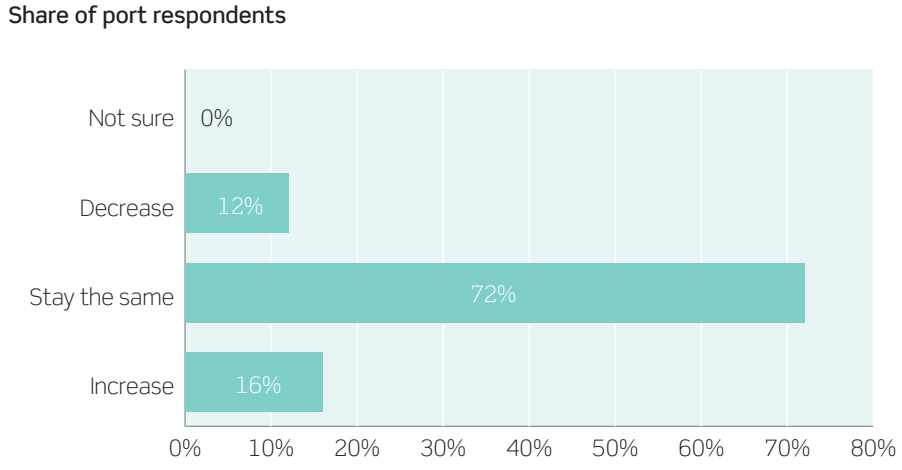
Fig. 7. Turnover change over the last 12 months, Killybegs, 2018



Source: *Oxford Economics, Perceptive Insight*

The outlook for seafood businesses over the next 12 months is broadly similar to historic performance. A similar share of firms (72%) expected turnover levels to remain unchanged over the next 12 months. However, a higher share of firms expect turnover to increase over the next 12 months (16%) than the share that experienced growth over the preceding year (10%). At a sub-sectoral level, fish processing firms were the most optimistic with 56% expecting growth.

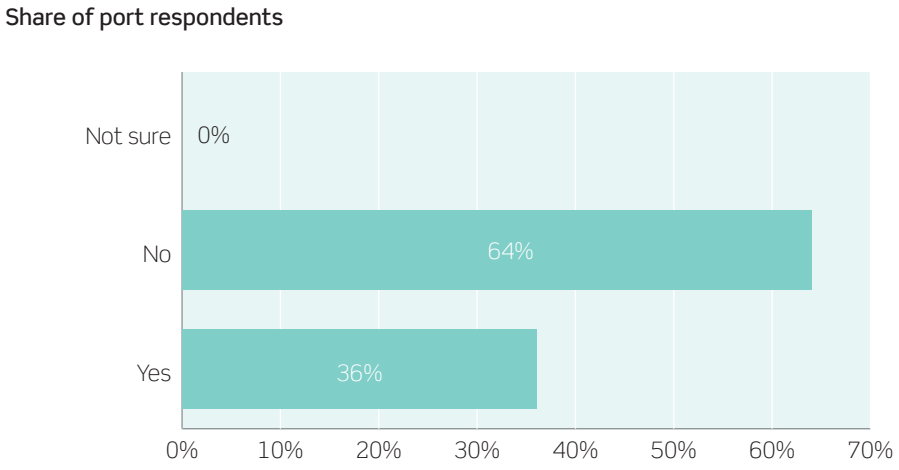
Fig. 8. Anticipated change in turnover, Killybegs, 2018



Source: *Oxford Economics, Perceptive Insight*

Improving turnover is often linked to investment: improving the quantity and/or quality of capital available to the workforce can enable improved productivity and thereby turnover. On one hand, the willingness of firms to engage in capital investment may in itself signal a positive outlook for the future; on the other, it may reflect the deterioration of existing capital stocks. Our survey results hint at the predominance of the latter factor – while 16% of respondents expect turnover to increase over the next year, over a third (36%) have spent money on capital investment in the last financial year (this was slightly higher than the overall survey average of 33%). Indeed, only one of the six aquaculture respondents surveyed reported not having invested in capital in the last year.

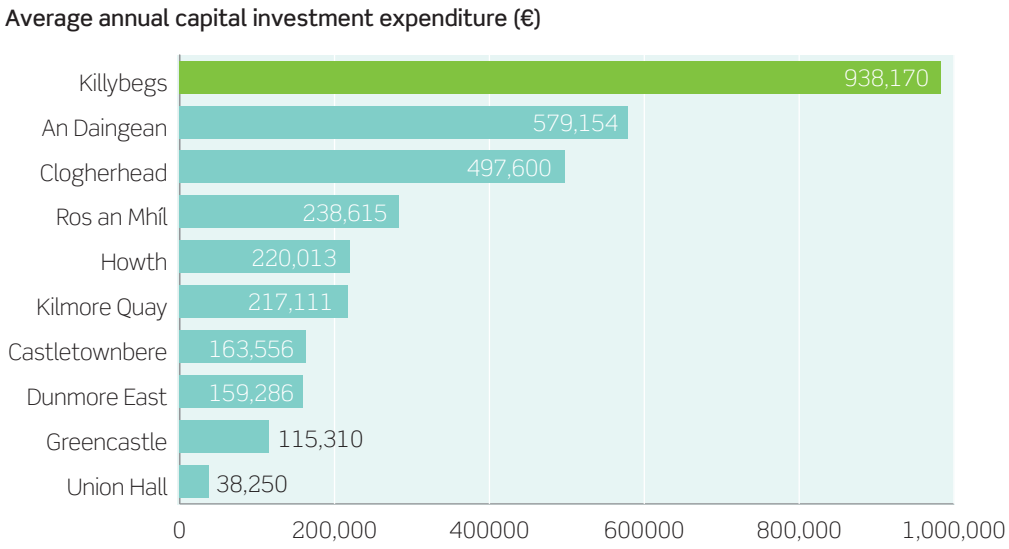
Fig. 9. Capital investment spend over the last year, Killybegs, 2018



Source: *Oxford Economics, Perceptive Insight*

Interestingly, across the ten ports covered in the survey, average levels of capital investment expenditure were the highest in Killybegs. Across those who invested, the average capital investment was just over €983,000 (driven mainly by commercial fisheries whose average capital investment was €1.3 million). This was notably above the second largest average annual capital investment expenditure recorded in An Daingean at €579,000.

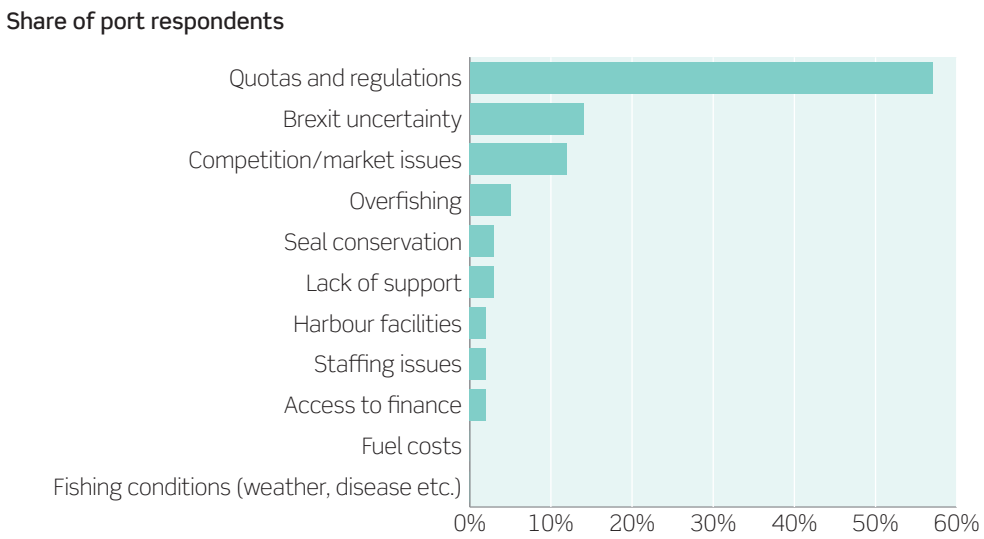
Fig. 10. Average annual capital investment, 2018



Source: *Oxford Economics, Perceptive Insight*

Given that a majority of firms were not expanding or investing in capital over the past year, our survey also explored the constraints to growth within the local seafood sector. The "greatest constraint to future growth" stated by respondents to the survey was quotas and regulations, identified by 57% of respondents in Killybegs compared to 43% across all the ports covered in the survey. A smaller proportion, 14%, reported Brexit uncertainty, while 12% reported competition/market issues as the main constraint to growth.

Fig. 11. Main constraint on growth, Killybegs, 2018

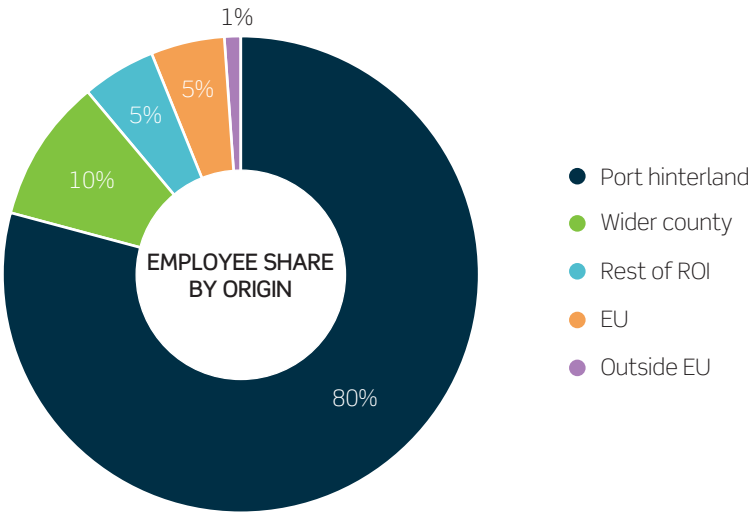


Source: *Oxford Economics, Perceptive Insight*

Alongside demonstrating the importance of the seafood sector in providing local job opportunities, our survey also sought to further understand the characteristics of its workforce – namely where the seafood sector's employees originate from. The survey results highlight that the overwhelming majority of seafood employees, 80%, originate from within the wider port area. This is notably higher than the survey average across all the ports which suggested 63% of seafood employee jobs were filled by local people. Only Kilmore Quay had a larger share of seafood jobs taken by people from the port area.

A further 10% of the seafood employee jobs are taken by people from the wider county, while 5% were filled by people from the rest of Ireland. Interestingly, 5% of workers were from the EU and a further 1% from outside the EU.

Fig. 12. Origins of the workforce, Killybegs, 2018

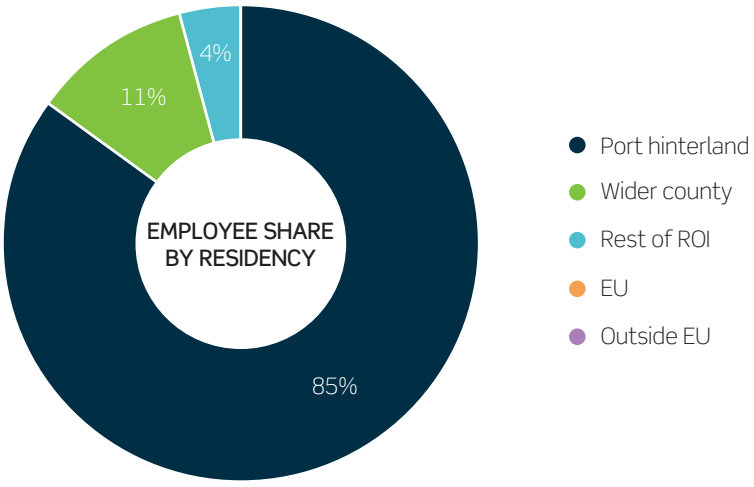


Source: *Oxford Economics, Perceptive Insight*

At a sub-sectoral level, fish processing jobs were more likely to be filled by people from the port area (93% of jobs). This compares to only 52% within aquaculture and 75% within commercial fishing. Despite the relatively lower share of aquaculture jobs filled by local people, there is a significant share filled by people from the wider county (37%).

The local importance of the sector rises further when we consider where the labour force resides (rather than where they are from). Under this measure we find 85% of jobs are taken by residents of the port area. Consequently, the seafood sector attracts people to live in the area.

Fig. 13. Employee share by residency, Killybegs, 2018

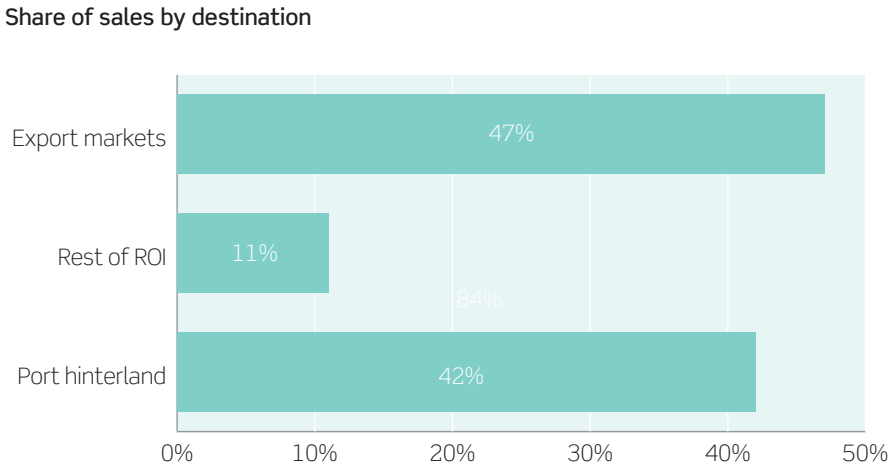


Source: *Oxford Economics, Perceptive Insight*

In exploring the destinations of sales, our survey highlights the ability of firms operating in the seafood sector to export produce abroad. Sales abroad accounted for nearly half (47%) of the total, the third highest share of the ten ports covered in the survey. By contrast, only 42% of sales went to the port hinterland.

The above averages can be slightly misleading as the destination of sales are dictated by the structure of the local seafood sector. For example, the commercial fishing sector in Killybegs sold 92% of their produce in the port hinterland (probably to the processing sector) and had no exports. The local fish processing sector, however, sold 77% of their produce in export markets meaning the combined output of the two sub-sectors was largely destined for export. Interestingly, aquaculture was even more export orientated having sold 98% of their produce in export markets.

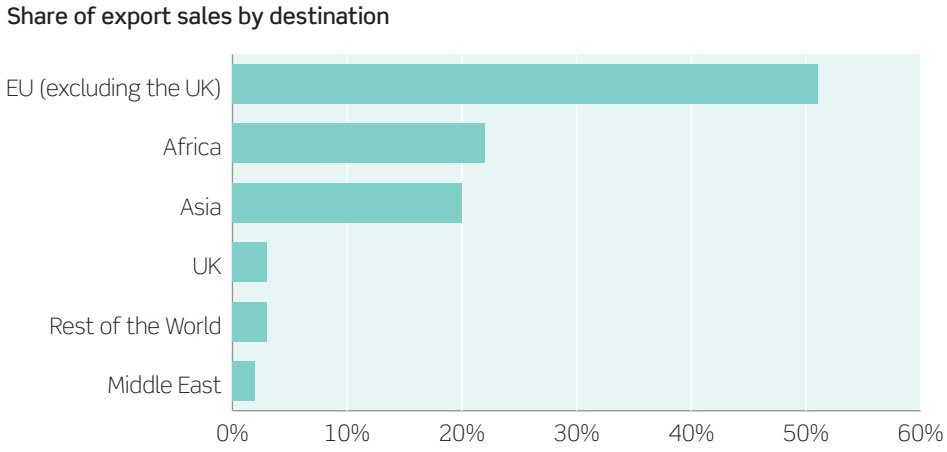
Fig. 14. Seafood sales by destination, Killybegs, 2018



Source: *Oxford Economics, Perceptive Insight*

The survey found that across all the ports covered, just over three quarters of export sales went to the EU (64%) and the UK (12%). The seafood sector in Killybegs was by comparison more international. The EU (excluding the UK) was the largest export market accounting for 51% of external sales, however the UK, perhaps surprisingly accounted for only 3% of Killybegs sales. Interestingly, Africa and Asia accounted for 22% and 20% of exports sales by the Killybegs seafood sector.

Fig. 15. Seafood export sales by market, Killybegs, 2018



Source: *Oxford Economics, Perceptive Insight*

2.3 Conclusion

Our survey explores the characteristics of firms operating in this sector. In general, firms are typically well-established, having operated for more than 10 years, and turnover tends to be relatively stable year-on-year. Firms at Killybegs typically invest more in capital relative to the other ports included within the study.

The workforce of the sector is mainly from the local area, and a large share of sales are made in export markets. The sector is also less reliant on the EU and the UK for exports, having over 40% of exports destined for Asian and African markets.

3. The impact of seafood's sub-sectors

In this section, we estimate the wider economic footprint of Killybegs' seafood sector on the regional economy.

3.1 Commercial fishing

The commercial fishing sub-sector at Killybegs generated €64.5 million of GVA across the Border economy in 2018. Almost a third of this GVA total (€24 million) was separate from the direct commercial fishing activity taking place at the port; €15.9 million of which was associated with economic activity supported throughout the regional supply chain and a further €8.2 million was derived from the wider consumer spending the direct activity supports.

Commercial fishing directly supported an estimated 380 jobs, alongside €14.9 million of associated wages. However, this rises to nearly 615 jobs and €23.1 million of wages when we account for the indirect and induced activity in the Border economy. The indirect and induced effects tend to occur in relatively higher value-added sectors, generating more GVA per worker on average than the direct activities at the port. This sub-sector enjoys a GVA multiplier of 1.6, meaning that every €1 of direct value added generates an additional €0.60 elsewhere within the regional economy.

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

Port commercial fishing	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	40.3	380	14.9
Indirect	15.9	140	4.9
Induced	8.2	95	3.3
Total	**64.5**	**615**	**23.1**

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

The port's commercial fishing sub-sector impacts on most areas of the regional economy. For example, wholesale & retail benefits from the resulting consumer spending. Such demand is estimated to be enough to support 95 wholesale & retail related jobs and €3.2 million in wages which would generate €9.1 million in GVA contributions to the regional economy. In addition, the manufacturing sector benefits from supply chain spending of the fishing companies. We estimate demand is enough to support €4 million in GVA contributions, 15 jobs and €0.5 million in wages.

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

Port commercial fishing	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	41.4	400	15.5
Mining & quarrying	0.0	0	0.0
Manufacturing	4.0	15	0.51
Electricity, gas, steam	0.1	0	0.0
Water supply	0.0	0	0.0
Construction	0.1	<5	0.1
Wholesale & retail	9.1	95	3.2
Transportation & storage	0.7	10	0.3
Accommodation & food	0.8	25	0.6
Information & communications	0.1	<5	0.0
Financial & insurance	1.2	5	0.3
Real estate	2.9	20	0.9
Professional, scientific & technical	1.9	15	0.7
Administration & support	0.2	<5	0.0
Public administration	0.1	<5	0.1
Education	0.5	10	0.3
Human health	0.7	10	0.3
Arts, entertainment & recreation	0.2	5	0.1
Other service activities	0.2	5	0.1
Total	**64.5**	**615**	**23.1**

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

3.2 Aquaculture

Killybegs' aquaculture sub-sector alone supported €13.2 million of GVA and €5.8 million of wages across the regional economy in 2018. Alongside the estimated 145 direct jobs at the port, this sector supports over a further 40 jobs elsewhere in the Border economy. As with commercial fishing, the multiplier effects tend to occur in higher value-added sectors. For every €1 of GVA generated by aquaculture activities at Killybegs, a further €0.38 is created, either at the port or elsewhere in the region.

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

Port aquaculture	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	9.5	145	4.5
Indirect	1.6	15	0.5
Induced	2.1	25	0.8
Total	**13.2**	**185**	**5.8**

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

Employment supported by aquaculture at the port is almost entirely concentrated in the agriculture, forestry & fishing sector (accounting for 81% of the total employment impact).

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

Port aquaculture	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	9.7	150	4.6
Mining & quarrying	0.0	0	0.0
Manufacturing	0.4	<5	0.1
Electricity, gas, steam	0.0	0	0.0
Water supply	0.0	0	0.0
Construction	0.0	0	0.0
Wholesale & retail	1.0	10	0.4
Transportation & storage	0.2	<5	0.1
Accommodation & food	0.2	5	0.1
Information & communications	0.0	0	0.0
Financial & insurance	0.1	<5	0.0
Real estate	0.8	5	0.3
Professional, scientific & technical	0.2	<5	0.1
Administration & support	0.0	0	0.0
Public administration	0.0	0	0.0
Education	0.1	<5	0.1
Human health	0.2	<5	0.1
Arts, entertainment & recreation	0.1	<5	0.0
Other service activities	0.0	<5	0.0
Total	**13.2**	**185**	**5.8**

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

3.3 Fish processing

The fish processing sub-sector supported an estimated 1,225 jobs, €91.6 million of GVA and €38.5 million in wages in 2018. Of this employment total, an estimated 595 jobs are sustained along the supply chain, while a further 145 are as a result of spending supported by this employment. Fish processing has the strongest employment multiplier of the three seafood elements, with every one processing job typically supporting 1.5 jobs elsewhere within the regional economy.

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

Port fish processing	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	44.5	480	16.9
Indirect	34.6	595	16.5
Induced	12.6	145	5.1
Total	**91.6**	**1,225**	**38.5**

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

Food processing is part of the manufacturing sector and consequently, we find manufacturing enjoys the largest GVA and wage impacts in the Border region. However, the agriculture, forestry & fishing sector enjoy significant benefits given its importance in processing's supply chain. The agriculture, forestry & fishing sector is actually estimated to have the strongest employment benefit (520 jobs) from fish processing at the port – mainly due to lower average productivity levels within the sector. However, the manufacturing sector records the strongest earnings impacts due to relatively higher average salaries.

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

Port fish processing	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	24.7	520	13.6
Mining & quarrying	0.1	<5	0.0
Manufacturing	47.7	495	17.3
Electricity, gas, steam	0.3	<5	0.0
Water supply	0.1	0	0.0
Construction	0.2	5	0.2
Wholesale & retail	5.7	60	2.0
Transportation & storage	1.8	20	0.7
Accommodation & food	1.3	35	0.9
Information & communications	0.2	<5	0.1
Financial & insurance	0.9	5	0.2
Real estate	4.3	25	1.3
Professional, scientific & technical	1.4	10	0.5
Administration & support	0.3	<5	0.0
Public administration	0.2	5	0.1
Education	0.7	10	0.5
Human health	1.0	15	0.5
Arts, entertainment & recreation	0.4	5	0.1
Other service activities	0.3	10	0.3
Total	**91.6**	**1,225**	**38.5**

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

3.4 Conclusion

In conclusion, Killybegs' fish processing sector has the largest economic footprint of the three seafood related sub-sectors. We estimate that it supported 1,225 jobs, €38.5 million in wages and over €91.6 million in GVA throughout the Border economy 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.

However, 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. Therefore, adding everything together would result in double counting some of the impacts. See **Appendix 2** for further detail on our approach.

We have therefore laid out 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, wages and tax.

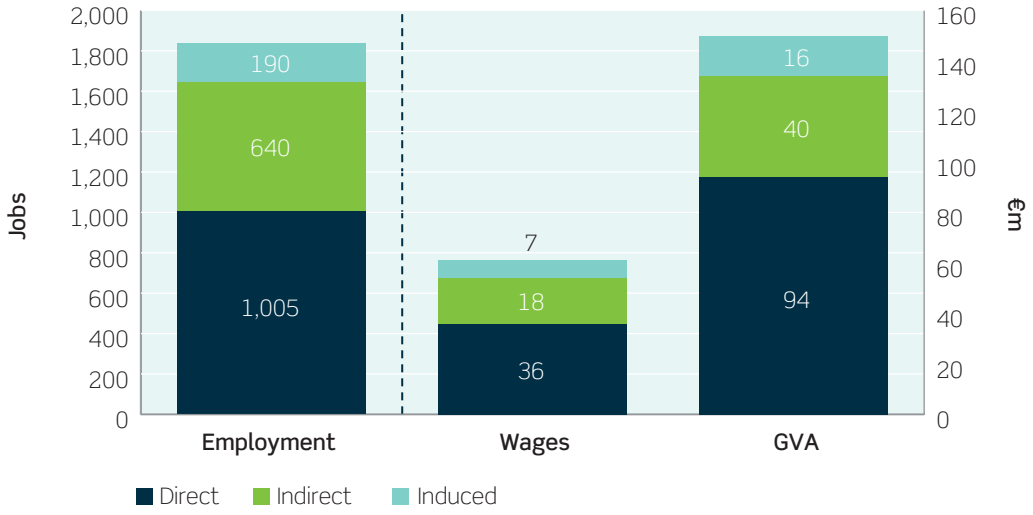
Indirect and induced impacts

- 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 22% 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 22% 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

We estimate that the seafood sector at Killybegs contributed €150 million of GVA to the Border region economy in 2018. The sector also supported 1,835 full-time equivalent jobs across the region, generating €61 million in wages for employees (**see Fig. 22**).

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



Source: *Oxford Economics, Perceptive Insight, CSO*

Almost one third of the total regional GVA benefit was generated either indirectly via seafood's wider supply chain (€39.6 million) or through the induced spending that comes about as those employed within the sector and within its supply chain spend their earnings (€16.5 million). These wider impacts also accounted for over 40% of both the employment and wage impacts. With an employment multiplier of 1.8, every direct seafood related job within Killybegs is estimated to support close to one additional job within the rest of the regional economy.

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

Port seafood sector	Border		
	GVA (€m)	Employment	Wages (€m)
Direct	94.3	1,005	36.4
Indirect	39.6	640	18.0
Induced	16.5	190	6.6
Total	**150.3**	**1,835**	**61.0**

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

Given the size of the commercial fishing sub-sector, the agriculture, forestry and fishing sector benefits most from Killybegs' seafood sector. It accounts for €74.9 million of GVA across the Border region in 2018, equivalent to half of the regional total. It also accounted for 57% of total jobs and 55% of the total wage impacts. The agriculture sector is further buoyed by the fish processing sector's demand for seafood produce within its own supply chain. Manufacturing (which contains fish processing) enjoys the next largest benefit with €49 million of GVA, 500 jobs and €17.5 million of wages.

Importantly however, the presence and activity of the seafood sector in Killybegs has benefits for every sector of the Border economy, and for every €1 of value added, the economy benefits from an additional €0.59 in the supply chain and in consumer spending sectors.

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

Port seafood sector	Border		
	GVA (€m)	Employment	Wages (€m)
Agriculture, forestry & fishing	74.9	1,050	33.3
Mining & quarrying	0.1	<5	0.0
Manufacturing	49.0	500	17.5
Electricity, gas, steam	0.3	<5	0.0
Water supply	0.1	0	0.0
Construction	0.3	5	0.2
Wholesale & retail	8.6	90	3.1
Transportation & storage	2.1	25	0.9
Accommodation & food	1.7	50	1.1
Information & communications	0.3	<5	0.1
Financial & insurance	1.3	5	0.3
Real estate	5.8	35	1.7
Professional, scientific & technical	1.9	15	0.7
Administration & support	0.4	<5	0.0
Public administration	0.3	5	0.1
Education	0.9	15	0.7
Human health	1.3	20	0.7
Arts, entertainment & recreation	0.5	5	0.2
Other service activities	0.4	10	0.3
Total	**150.3**	**1,835**	**61.0**

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 €9.5 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 deficit of €10.7 million, mainly because of agriculture's prominence within the fish processing supply chain. However, the indirect deficit is almost compensated for by the consumption related tax the sector supports across the economy. 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 €10.5 million in tax revenue.

Therefore, in total, Killybegs' seafood sector is estimated to have supported €9.3 million in fiscal benefits in 2018. This total was made up of €14.9 million in employment/labour related tax, €3.9 million in corporation tax, €6.8 million in taxation associated with the spending of wages, and a net tax deficit of €16.2 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

Port seafood sector	Total tax estimates (€m)				
	Labour tax	Corporation tax	Production tax	Input purchases tax	Tax on consumption
Agriculture, forestry & fishing	5.8	1.4	-21.2	2.4	0.0
Mining & quarrying	0.0	0.0	0.0	0.0	0.0
Manufacturing	5.5	1.1	0.0	0.1	5.4
Electricity, gas, steam	0.1	0.0	0.1	0.1	0.2
Water supply	0.0	0.0	0.1	0.0	0.1
Construction	0.1	0.0	0.0	0.0	0.1
Wholesale & retail	0.7	0.5	0.1	0.1	0.0
Transportation & storage	0.3	0.2	0.2	0.6	0.0
Accommodation & food	0.3	0.1	0.0	0.1	0.7
Information & communications	0.1	0.1	0.0	0.0	0.3
Financial & insurance	0.2	0.4	0.1	0.3	0.1
Real estate	0.5	0.0	0.3	0.2	0.1
Professional, scientific & technical	0.3	0.1	0.0	0.1	0.0
Administration & support	0.0	0.0	0.0	0.0	0.1
Public administration	0.1	0.0	0.0	0.0	0.0
Education	0.3	0.0	0.0	0.0	-0.3
Human health	0.3	0.0	0.0	0.0	-0.2
Arts, entertainment & recreation	0.1	0.0	0.0	0.0	0.0
Other service activities	0.1	0.0	0.0	0.0	0.1
Total	**14.9**	**3.9**	**-20.3**	**4.0**	**6.8**

Source: *Oxford Economics, Perceptive Insight, CSO*

4.4 Conclusion

In calculating the overall impact of the local seafood sector, we consider the degree to which output from aquaculture and commercial fishing can appear in the supply chain of local fish processors.

Therefore, our analysis shows the Killybegs' overall seafood sector supports 1,835 jobs and €150.3 million in GVA throughout the regional economy. Furthermore, the sector generates €9.3 million in tax revenues towards the public purse.

5. Conclusions

5.1 The seafood sector in Killybegs

The seafood sector makes an important contribution to Killybegs' economy. In 2018, the direct seafood sector at the port generated an estimated €254 million in turnover, supporting over 1,000 direct jobs and represented 17% of local port economy in GVA terms. Fish processing is the largest seafood related activity at the port, generating €163 million in turnover, followed by commercial fishing (€73 million) and aquaculture (€19 million). When translated into GVA, the seafood sector directly contributes €94 million to the local port economy.

Our survey explores the characteristics of firms operating in this sector. In general, firms are typically well-established, having operated for more than 10 years, and turnover tends to be relatively stable year-on-year. Firms at Killybegs typically invest more in capital relative to the other ports included within the study.

The workforce of the sector is mainly from the local area, and a large share of sales are made in export markets. The sector is also less reliant on the EU and the UK for exports, having over 40% of exports destined for Asian and African markets.

5.2 The fish processing sub-sector is the main contributor

The fish processing sub-sector makes the strongest contribution to the Border economy. In 2018, it alone generated €92 million of GVA, of which €47 million is linked to indirect (€34.6 million) and induced (€12.6 million) effects. The fish processing sector also enjoys the strongest employment multiplier of the three seafood sub-sectors, with every direct job supporting a further 1.5 jobs within the Border region. The fish processing sub-sector is estimated to provide benefits of the following size:

- 480 direct jobs and €16.9 million of wages, producing €44.5 million of GVA;
- 595 indirect jobs and €16.5 million of wages, producing €34.6 million of GVA; and
- 145 induced jobs and €5.1 million of wages, producing €12.6 million of GVA.

5.3 Though the remaining components remain significant

Although the commercial fishing sub-sector's economic footprint is smaller than that of the fish processing sector, its economic multipliers remain significant. Accordingly, our analysis shows the economic impact of commercial fishing was of the following size in 2018:

- 380 direct jobs and €14.9 million of wages, producing €40.3 million of GVA;
- 140 indirect jobs and €4.9 million of wages, producing €15.9 million of GVA; and
- 95 induced jobs and €3.3 million of wages, producing €8.2 million of GVA.

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

- 145 direct jobs and €4.5 million of wages, producing €9.5 million of GVA;
- 15 indirect jobs and €0.5 million of wages, producing €1.6 million of GVA; and
- 25 induced jobs and €0.8 million of wages, producing €2.1 million of GVA.

Therefore, we estimate that the port's collective seafood sector supported 1,835 jobs, €61 million in wages and €150 million in GVA within the regional economy in 2018. This activity was enough to sustain €9.3 million in tax revenues towards the public accounts.

5.4 Seafood supporting peripheral economies

The Killybegs economy suffers from a relatively older population structure. Working age population levels have declined significantly in recent years and the local employment opportunities are limited. The structure of the economy also presents challenges, given its over reliance on manufacturing, and its relatively small professional services sector (which is typically the fastest growing in employment terms), the local economy is likely to experience limited job creation in the short-term. Finally, qualification attainment levels among residents are notably weaker than the national average.

As a result, the seafood sector is likely to play a significant role in the local economy through its provision of direct jobs, supply chain spending in local businesses and the consumer spending it supports. Furthermore, local skill levels more closely match those offered by seafood employers. Looking forward, a vibrant and growing local seafood sector will be important for the economic and demographic health of the area.

Appendix 1: Killybegs' economic challenges

Economic activity and structure

The latest available data indicates that Killybegs' labour market suffers from a relatively older population, which in turn impacts the wider economy. While the local unemployment rate within the port area and its hinterland was 14.0% in 2016, above the national rate[5], the local employment rate (49.2%) was notably lower than both the regional and national averages (**see Fig. 26**). These issues are compounded by relatively high rates of economic inactivity within the local area[6]. Among residents aged 15 and over, 42.8% were inactive in 2016 (notably higher than the national average of 38.8%).

Fig. 26. Headline economic indicator comparisons, 2016

	Unemployment rate	Employment rate	Economic inactivity
Killybegs	14.0%	49.2%	42.8%
Border	15.7%	49.6%	41.1%
Ireland	**12.9%**	**53.3%**	**38.8%**

Source: *CSO*

The latest Census in 2016 showed that workplace employment stood at close to 5,250 people in the port area. Resident based employment was, however, higher at just under 6,500. This suggests net out-commuting is commonplace with the local economy – with fewer jobs locally than there are resident workers.

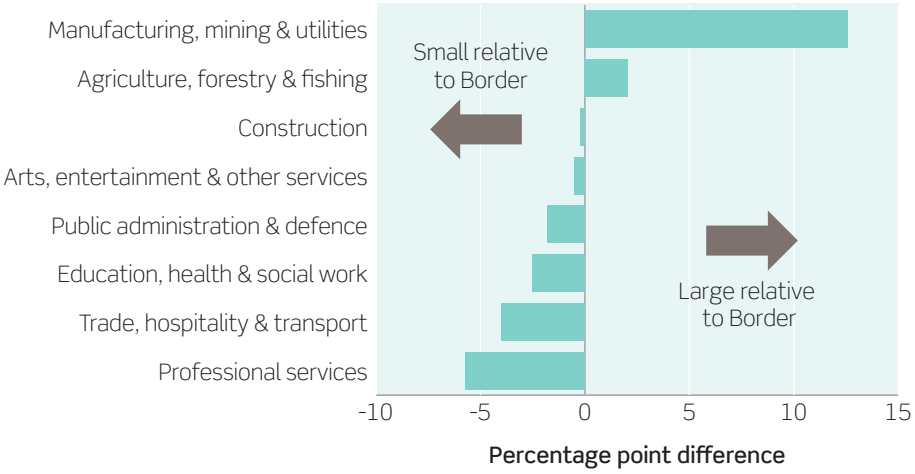
A sectoral breakdown of workplace-based employment within the port area and its hinterland points to the significance of the local manufacturing, mining and utilities sector. It supports employment of nearly 1,150 jobs or 24% of all jobs in the DEDs that make up the local economy (for comparison that is equivalent to 12.4 pps more than the Ireland average). The trade, hospitality and transport sector represents a similar share of local employment, accounting for just over one quarter of all jobs in the local economy (though this is slightly less than the equivalent share for Ireland – 28.5%). Education, health and social work provides over 870 jobs and accounts for 18% of all jobs in the local economy.

The agriculture, forestry & fishing sector accounts for just over 520 jobs (representing 11.1% of the total), a share almost twice that of the national average (5.5%).

As a consequence of this sectoral structure, the local economy may find job creation challenging. It is over reliant on manufacturing, which has been shedding jobs in recent decades as it transitions away from traditional sub-sectors to more capital-intensive activity. In addition, the education, health and social work sector will be reliant on future changes to demographics locally. Finally, professional services which has been experiencing significant growth across Ireland in recent times, is underrepresented locally accounting for only 7% of local workplace jobs.

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.

Fig. 27. Employment share differences, Killybegs vs region, 2016



Source: *Oxford Economics, CSO*

Demographics

The port area's population contracted by 0.9% in the five years between 2011 and 2016, despite overall population growth across the Border region (of 1.2%) and Ireland (3.8%). Therefore, as of 2016 there were 16,400 people living in Killybegs. Only 61.4% of these residents were of working age, notably below the national average of 65.5%. This is a consequence of a negative working age population growth throughout the area. Over the period 2011 to 2016, working age population levels grew in Ireland by 1.4%. However, in Killybegs, working age population fell by 5.8% over the same period. This was the second largest contraction experienced in the ten ports covered in the study.

Fig. 28. Population indicators, 2016

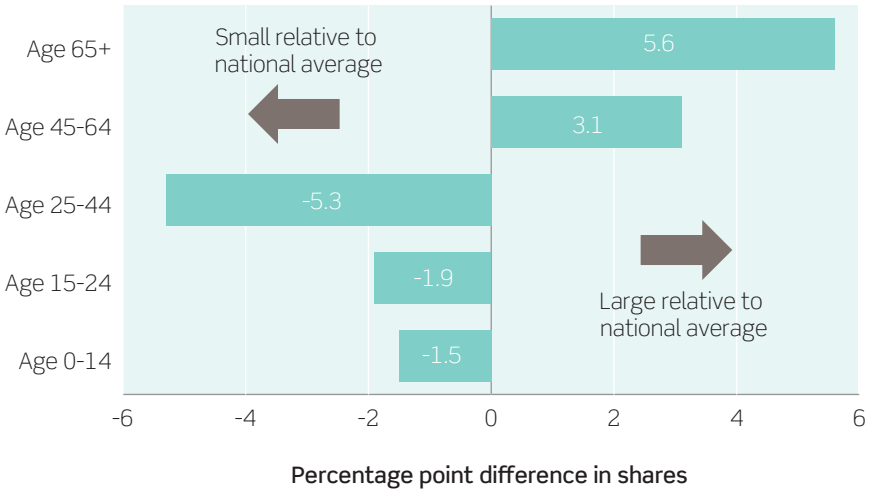
	Growth (2011-16)		2016	
	Population	Working age	Population	Working age share
Killybegs	-0.9%	-5.8%	16,400	61.4%
Border	1.2%	-1.6%	520,900	63.3%
Ireland	**3.8%**	**1.4%**	**4,761,900**	**65.5%**

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

An analysis of port area's population by age cohorts relative to the national picture shows that the population is notably older than the national average. Those aged 65 and over accounted for close to 20% of all residents, 6pps above the national average in 2016. On the other hand, younger working age people (aged 25-44) were under-represented by nearly 5 pps within the local population.

The falling supply of working age labour will have implications for local employers attempting to grow and source labour. As demonstrated by the net commuting trends, employment opportunities are more limited locally and therefore younger working age people are more likely to move in the search for employment opportunities.

Fig. 29. Age group comparisons, Port area vs Ireland, 2016

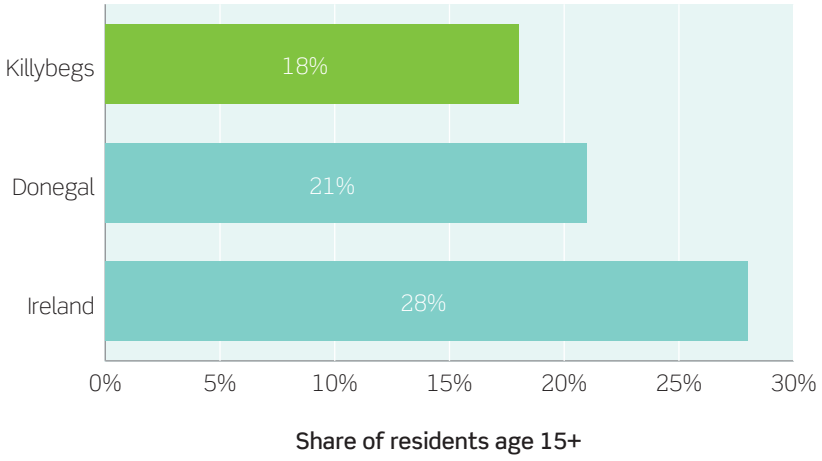


Source: *CSO Ireland*

Perhaps as a result of the elderly population, qualification attainment within the port area tends to be much weaker than at the national level. Those with a third level degree or above represented 18% of residents aged 15 and over in 2016. This was nearly half the average across Ireland (28%).

Equally, lower level attainment only among the port area's residents was much higher than the national average. Almost one in every five residents aged 15 or over had either no formal education or primary education as their highest level achieved in Killybegs, significantly higher than the national average of 12%.

Fig. 30. Third level degree or above attainment, 2016



Source: *CSO*

Summary

The Killybegs economy suffers from a relatively older population structure. Working age population levels have declined significantly in recent years and the local employment opportunities are limited. The structure of the economy also presents challenges, given its over reliance on manufacturing, and its relatively small professional services sector (which is typically the fastest growing in employment terms), the local economy is likely to experience limited job creation in the short-term. Finally, qualification attainment levels among residents are notably weaker than the national average.

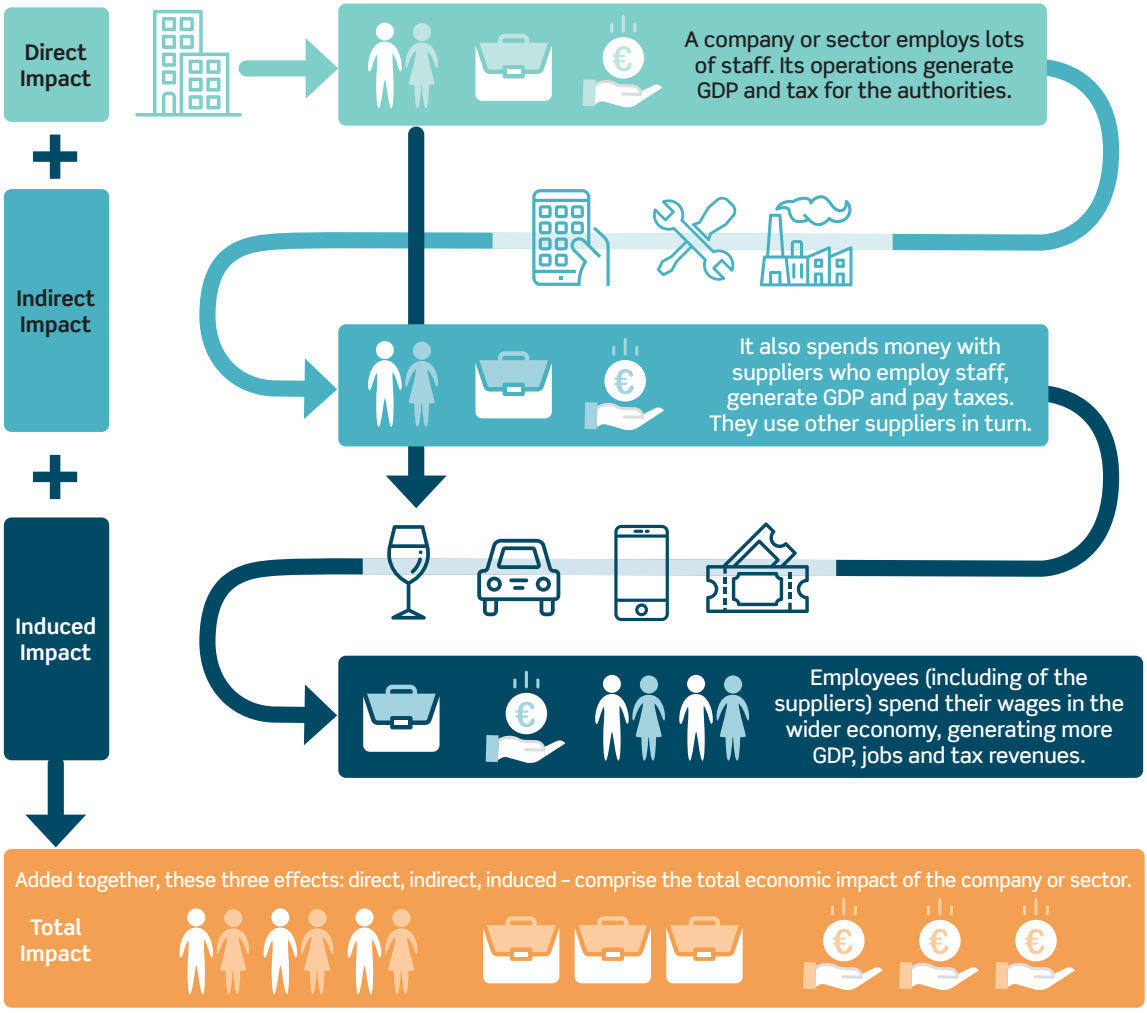
As a result, the seafood sector is likely to play a significant role in the local economy through its provision of direct jobs, supply chain spending in local businesses and the consumer spending it supports. Furthermore, local skill levels more closely match those offered by seafood employers. Looking forward, a vibrant and growing local seafood sector will be important for the economic and demographic health of the 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[7] and national economy:

- **Gross value-added** contribution to Gross Domestic Product (GDP)[8]: 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.[9]

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 ('Agri, 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.

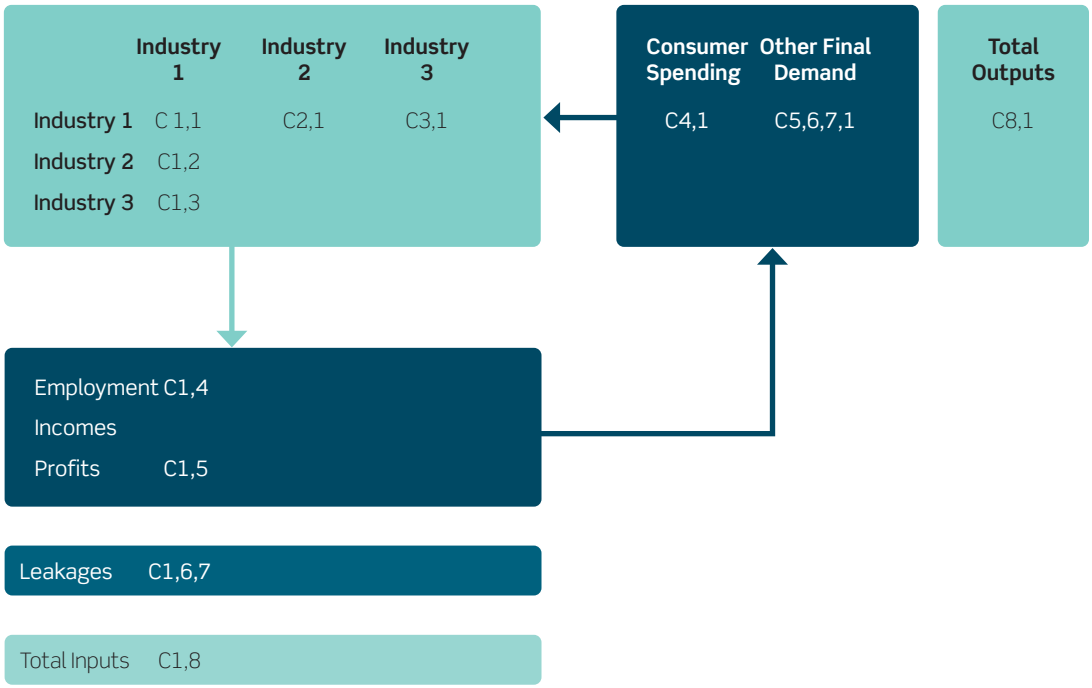
With our estimate of direct output and wages, we then applied sectoral taxation assumptions and calculated the resulting fiscal benefits that would likely be collected by the Revenue Commissioners.

7 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.
8 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.
9 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.[10] 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.

10 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, therefore, 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.


FSC

OXFORD ECONOMICS

Global headquarters
Oxford Economics Ltd
Abbey House
121 St Aldates
Oxford, OX1 1H B
UK
T +44 (0)1865 268900

London
Broadwall House
21 Broadwall
London, SE1 9PL
UK
T +44 (0)203 910 8000

New York
5 Hanover Square, 8th Floor
New York, NY 10004
USA
T +1 (646) 786 1879

Singapore
6 Battery Road
#38-05
Singapore 049909
T +65 6850 0110

E mailbox@oxfordeconomics.com
www.oxfordeconomics.com

Europe, Middle East and Africa
Oxford
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Asia Pacific
Singapore
Sydney
Melbourne
Hong Kong
Tokyo

BIM Ireland's Seafood Development Agency

Irish Sea Fisheries Board
Head Office, Crofton Road,
Dun Laoghaire, Co. Dublin, A96 E5A0

T +353 1 214 4100 | **E** info@bim.ie | **www.bim.ie**