Competitiveness and sustainability of the UK whitefish sector: links across the value chain
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Abstract
The European Common Fisheries Policy landing obligation has introduced significant uncertainty over quota uptake in the coming years. This year (2016) is the first year of the landing obligation for fleets targeting demersal stocks even though it will not be fully introduced across demersal quota stocks until 2019. A recent Seafish economic impact assessment of the landing obligation for UK fleets targeting demersal stocks highlights the challenges facing fleets in the face the landing obligation. Assuming imperfect allocation of quota, that does not reflect catch composition by fleets, in mixed fisheries fleets, quota uptake could be significantly lower than seen in recent history. Not only this, the landing obligation obliges vessels to land all catch. This will see fish not marketable for human consumption landed and sent for fishmeal or bait for example.

This paper considers UK whitefish fleets that predominantly target cod, haddock and whiting and presents an economic impact assessment of the effects of CFP policy on not only the fleets but the markets that they provide for. It also considers the conflict between core objectives of achieving MSY and the landing obligation. Bioeconomic modelling is linked to value chain analysis to evaluate a number of scenarios to inform on the impact of European regulation on the competitiveness and sustainability of the UK whitefish sector in the European context. Initial findings suggest that choke species in 2019 will impact supply of fish to markets significantly, impacting fleets and requiring markets to adjust.

Keywords: value chain analysis, competitiveness, bioeconomic modelling

INTRODUCTION
Approximately 70% of the UK retail market for seafood comprises the “big 5” species (Seafish Factsheet, 2015): salmon (29%), tuna (13%), prawns (13%), cod (12%), haddock (7%). Salmon is mostly sourced from aquaculture, prawns are a mix of cold and warm water species and tuna largely comes from the Indian ocean. Cod and haddock are by far the largest wild marine species on the UK market which for the most part are sourced from North East Atlantic waters and have significant input from UK producers, both fleets and processors. Seafish Factsheet (2015) reports that these two species account for over half a billion pounds sterling each year, one fifth of the UK seafood retail market. In addition, with the fish and chip foodservice sector worth over one billion pounds sterling per year, and largely providing cod and haddock, there is considerable value in these two species in the UK.

The landing obligation in the latest European Common Fisheries Policy (Regulation (EU) No 1380/2013 on the Common Fisheries Policy), has introduced some significant challenges to UK fishing fleets to maintain supply of key species. Recent studies have indicated that choke species could reduce catching opportunities for fleets if species for which there is low quota held cannot be avoided. Imports, which are considerable, will likely remain unaffected by the changes to the CFP however several EU countries import large quantities of cod in particular but also haddock and therefore compete for a limited supply of extra-EU sourced whitefish. It is the processing, retail and foodservice sectors that will be most affected should supply of cod and haddock reduce putting added pressure on margins but also on perhaps the need to offer alternative products to satisfy demand.

Balancing fleet capacity and catch composition with quota available is particularly important and may take time. “Considering the unclear linkages between MSY and the landing obligation, … achieving exploitation rates able to produce maximum sustainable yield is likely the most important objective and should be prioritised” (North Sea p.67 of PECH Committee, 2016).
The key question addressed in this paper is, “how are changing supplies and markets for whitefish, in particular cod and haddock, likely to impact on the competitiveness of UK producers?”. The key issues in understanding the impacts include:

- the landing obligation which most commentators have reported (e.g. Industry day at the IIFET 2016 Conference) is likely to have a negative impact on total supplies at least in the short term,
- sustainability which implies MSY targets are being met and production of fisheries maximised thereby having a positive impact on supplies,
- competition in international markets has a positive impact in the supply chain of which the effects should filter down to producers,
- fleet adjustment continues to happen in EU fleets and in general reduces pressure on stocks thus enabling the drive towards MSY and subsequently improves the economic performance of fleets but at the direct expense of reductions in numbers of vessels and the social cost that brings,
- total demand for fish continues to grow even though average consumption per 1000 population has decreased slightly in recent years and with that changing prices of fish maintain a healthy market for seafood, and
- BREXIT which brings with it a host of unknowns regarding the impact on the fishing industry.

An overview of whitefish production is given first, followed by an evaluation of the whitefish value chain, some modelled scenarios considering potential impacts on the UK whitefish market with some discussion and concluding comments.

**UK WHITEFISH**

**Whitefish production**

The UK whitefish fleet is for the most part concentrated in the Scottish ports of Peterhead and Fraserburgh although there are whitefish vessels registered in other ports in England, Wales and Northern Ireland. These vessels target cod, haddock, whiting and saithe predominantly using demersal trawl/seine, typically so-called TR1 gear (i.e. nets with a mesh >100mm). This analysis concentrates on those vessels that mainly catch whitefish split into two length classes: 12-24m and over 24m. The four whitefish species represent more than 50% of these vessels’ fishing income. There are many other vessels that catch whitefish in addition to other species, for example anglerfish, megrim, plaice, lemon sole etc, however these are not included in this analysis.

![Figure 1. Whitefish fleet segments 12-24m and over 24m vessels (source: estimated from AER, 2016)](image)

The number of vessels identified in the two whitefish fleet segments, 12-24m and over 24m, between 2008-14 are presented in Figure 1. Number of vessels for the over 24m segment have remained stable
at between 55-60 vessels across the period. Number of vessels for the 12-24m segment have fluctuated strongly mostly as a result of quota availability and the need to target other stocks to a greater extent for a time. This was evident in 2011-12 as the fishing opportunities for cod and haddock, as well as whiting and saithe, worsened. This is thought due to increasing fuel prices (approximately 34p in 2010 to 46p in 2011) and decreasing TAC particularly for North Sea cod from 40,000 tonnes in 2010 to 32,000 tonnes in 2011. From a level around 50 vessels in 2008-10, the 12-24m fleet segment has reduced to around 37 vessels in 2014.

The catch composition, by landings value, of the two fleet segments analysed are presented in Figure 2. As shown for both fleet segments, cod, haddock, whiting and saithe contribute over 60% to these fleets total landing value. The remaining 35-40% of landings value is made up from anglerfish and flatfish and small amounts of hake, cephalopods, ling, plaice and pollack. It is also shown that income in the most recent two year (i.e. 2013-14) are at their highest by a considerable margin. This indicates that fishing opportunities have increased with greater TACs, particularly North Sea haddock, but also that prices per kg have also increased. For example haddock (IV, IIIa and VIa) TAC in 2011-12 was on average 39,413 tonnes and between 2013-14 was on average 49,566 tonnes. Prices on the other hand saw haddock rise from an average of £1.14 per kg to £1.26 per kg over the same two periods.

Figure 2. Whitefish fleet segments 12-24m and over 24m landings in value, GBP (source: estimated from AER, 2016)

The total income for the two fleet segments presented and an indication of profit are given in Figure 3. It is clear for both fleets that both income and profit have risen in recent years. Income for the 12-24m fleet segment has increased by 50% between 2008-14 and for the over 24m fleet segment by 33% from its lowest in 2009 compared to 2014. Other income is indicated to have increased significantly in the most recent years (i.e. 2013-14) and represents about 10% of total income for both fleet segments. It is thought that this reflects the income gained from quota trading.

Average vessel profit has increased sharply since 2009 and even more so since 2012. For the 12-24m fleet segment this could partly be explained by less vessels with the same total income getting a greater share, however for the over 24m number of vessels has remained relatively constant. So, the increase in profitability is likely due to a mix of increased prices, increased TACs and non-increasing costs, mainly energy/fuel costs. These latter costs have on average for the larger vessels (over 24m) reduced
from £299,000 in 2012 to £269,000 in 2014. Conversely, all other costs appear to have increased by 10% year-on-year from 2012-14. Smaller vessels (12-24m) have seen costs increase significantly, however revenues have increased at a great rate on average.

**Whitefish value chain**

UK whitefish production is important to the UK fishing industry, with cod, haddock, whiting and saithe contributing 14.3% (at £122.9 million) to the total UK landings value (MMO, 2016). Even so, the demand for cod and haddock in particular by UK consumers means that imports of these species are considerable and a magnitude higher than UK production. Imports for cod and haddock are presented in Figure 4 along with the countries from which those imports are from in 2014. Iceland and Norway supplied 48% of the imports of cod in 2014 and 44% of haddock. China, Denmark, Germany and the Faroe Islands are also large suppliers (41% cod and 35% haddock). Most imports coming from China are processed products, companies taking advantage of Chinese lower costs to process raw material before shipping it back to the UK.
A view of the whitefish value chain is presented in Table 1. The majority of whitefish landings by UK registered vessels are at UK ports. The exceptions to this are cod, where 9,500 tonnes were landed in Norway in 2014 and 4,800 tonnes in Germany, and plaice where most landings are in the Netherlands by UK vessels. This appears mostly due to closeness to port, market and processing requirements. The imports of cod are significant at 116,400 tonnes and a value of over half a billion euros. This is far more than UK production, mostly from the North Sea and the Barents Sea. There are also sizeable imports of haddock at 35,900 tonnes which is slightly less than UK production, again mostly from the North Sea and the Barents Sea.

Apparent consumption of whitefish is significant in the UK. Cod and haddock lead but other species contribute quite strongly in the market. The seven other species presented in Table 1 make up approximately 106,000 tonnes, one third of which is pollack. Cod and haddock are part of the “big 5” supermarket fish along with salmon, tuna and prawns. In Seafish Factsheet (2015), retail sales for cod in 2014 were approx. 20% of the retail market (see Introduction). However, with the demand for cod and haddock through fish and chip shops and other “fast food” outlets, estimated to exceed one billion GBP per year, cod and haddock are the most important wild marine fish on the UK market. Therefore, any significant change in supply could affect the UK market and UK fish producers significantly.

Table 1. Whitefish value chain in the UK in 2014 (source: MMO, 2016)

<table>
<thead>
<tr>
<th>2014</th>
<th>Landings outside UK by UK vessels</th>
<th>Landings in UK by UK vessels</th>
<th>Imports</th>
<th>Exports</th>
<th>Apparent consumption*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cod</td>
<td>14.9 t (£25.1)</td>
<td>14.0 t (£34.7)</td>
<td>116.4 t (£510.8)</td>
<td>15.5 t (£65.4)</td>
<td>115.7 t</td>
</tr>
<tr>
<td>Haddock</td>
<td>0.7 t (£1.3)</td>
<td>35.4 t (£61.5)</td>
<td>35.9 t (£138.4)</td>
<td>1.0 t (£3.2)</td>
<td>72.1 t</td>
</tr>
<tr>
<td>Hake</td>
<td>2.8 t (£7.8)</td>
<td>8.5 t (£24.6)</td>
<td>4.7 t (£13.8)</td>
<td>3.9 t (£16.3)</td>
<td>16.4 t</td>
</tr>
<tr>
<td>Ling</td>
<td>0.4 t (£0.7)</td>
<td>4.4 t (£6.7)</td>
<td>1.2 t (£1.5)</td>
<td>2.3 t (£5.9)</td>
<td>5.0 t</td>
</tr>
<tr>
<td>Anglerfish</td>
<td>4.5 t (£17.9)</td>
<td>11.4 t (£39.2)</td>
<td>1.7 t (£7.8)</td>
<td>2.8 t (£17.6)</td>
<td>11.6 t</td>
</tr>
<tr>
<td>Plaice</td>
<td>15.6 t (£21.3)</td>
<td>3.5 t (£4.4)</td>
<td>4.2 t (£16.0)</td>
<td>0.3 t (£0.6)</td>
<td>8.1 t</td>
</tr>
<tr>
<td>Pollack</td>
<td>0.6 t (£0.8)</td>
<td>1.9 t (£4.3)</td>
<td>38.3 t (£89.5)</td>
<td>3.9 t (£12.9)</td>
<td>36.4 t</td>
</tr>
<tr>
<td>Saithe</td>
<td>1.6 t (£2.5)</td>
<td>11.1 t (£12.7)</td>
<td>3.2 t (£11.9)</td>
<td>4.7 t (£10.7)</td>
<td>15.9 t</td>
</tr>
<tr>
<td>Whiting</td>
<td>0.7 t (£0.8)</td>
<td>11.1 t (£14.8)</td>
<td>3.3 t (£3.2)</td>
<td>1.6 t (£1.5)</td>
<td>13.4 t</td>
</tr>
</tbody>
</table>

*Apparent consumption = [(total catches – industrial catches) + aquaculture + imports] – exports

**SCENARIOS**

Supply of whitefish to the UK market is dependent on UK production and imports. The biggest policy change in recent history in Europe has been to introduce the landing obligation under the latest CFP. This effectively implements a discard ban for all TAC based stocks and has the potential to disrupt the supply of key marine species significantly. A key foundation of the CFP, relative stability was introduced in its current form in the early 1980s. This was before the need to ensure quota available to fleets matched catch composition, even though the latter changes according to stock abundance and tactical fishing practices (i.e. where, when and how fishing is undertaken) on a regular basis.

The landing obligation for demersal stocks is being implemented from 2016 through a transition period to 2019 from when all demersal TAC stocks are subject to the landing obligation. The transition period is designed to introduce only key target stocks to fleets’ catch, so there is likely to be a small effect for most fleets. However, if the landing obligation is introduced with full compliance in 2019 then quota in the UK, based on current rules of allocation, will not necessarily be optimised to enable fleets to fish as many days as possible to maximise the use of that quota. Therefore supply of key stocks may be compromised, especially in the short term, as fleets adjust to quota for “choke” stocks not being readily available. If fleets don’t receive assistance, perhaps through quota adjustment or subsidies, then vessels may quickly go out of business if they cannot attain a level of income that enables them to covers essential costs, a so-called break-even level.
In this paper, we test two simulations for the landing obligation for UK fleets: the first (AS-IS) is a baseline which simulates the implementation of the landing obligation and is designed to allow for quota top-up to account for total catch and also allows for small limits of zero-TAC stocks; and the second (TO-BE) builds on this by also considering key mitigation tools (or policy levers) that are documented in the regulation (i.e. Article 15). The policy levers of the latter simulation include the simulation of,

- *de minimis* – an additional 5% of UK quota is available to alleviate the impact of choke stocks only where any catch identified as *de minimis* must be discarded,
- interspecies flexibility – unused quota of a fleet segment from any stock may be transferred to a “choke” stock if that “choke” stock is under safe biological limits up to a limit of 9%, and
- survivability – skate is assumed to have a good chance of surviving being discarded and is therefore exempt from the landing obligation.

Rest of the world imports are assumed to continue as in the base year, 2013. As key assumption is that quota allocations to fleet segments remain as in 2013 without further quota trade. Therefore, the results presented can be considered to be the worst case scenario.

**RESULTS**

Simulation results for the UK production of whitefish, in particular cod and haddock, under the landing obligation are presented in Figure 5 and Figure 6. During the transition period, 2016-18, as more stocks come under the landing obligation the total landings of cod and haddock are not affected considerably. In fact, with quota top-up, fleets are estimated to have more quota to access in the transition period. In 2019 however, as all quota stocks come under the landing obligation, the fleets are choked relatively early by the quota they are simulated to have available. In the As-Is simulation (Figure 5), this is estimated to result in cod and haddock quota utilisation of less than 40% of base year levels with a significant reduction in supply of cod and haddock versus 2013 levels.

![Figure 5. As-Is simulation results for cod and haddock production from 2013-22.](image)

![Figure 6. To-Be simulation results for cod and haddock production from 2013-22.](image)
In the To-Be simulation (Figure 6), the situation is marginally better with policy levers implemented (namely de minimis, quota flexibility and survivability). It is simulated that cod and haddock quota utilisation could be up to 50% of base year levels in 2022. However, this is still a significant reduction in supply of UK produced cod and haddock versus 2013 levels.

The amount of revenue to breakeven and the number of days fishing required to breakeven are presented in Figure 7. It is apparent that the amount of revenue required to breakeven for the over 24m whitefish fleet has reduced in recent years, mostly as a consequence of reduced costs and lower fuel prices. For the 12-24m whitefish fleet breakeven revenue has remained fairly stable increasing to a small degree in recent years. For both fleet segments, income per day has steadily increased. Similarly for both fleet segments, the number of days required to breakeven has decreased as income has increased (see Figure 2 and Figure 3) at a greater rate than costs. In 2014, the 12-24m whitefish fleet segment is estimated to have broken in 50% of the days fished and the over 24m fleet segment in approximately 43% of days. Scenarios presented above indicate that fleet segments may reduce to 35-50% of base year levels of effort, which brings the whitefish fleet segments considered down to breakeven levels. This suggests that in the short term, with quota trade, these fleets could continue to operate profits in the short term. However, supply from UK production may be affected as fleets adjust under the landing obligation.

Considering the effects that these changes could have on total supply of cod and haddock to UK markets, the simulation results are combined with imports of cod haddock to the UK in 2013-14 and potential total supply projected to 2022. These results are presented in balance sheets in Figure 8.

It is estimated that 115,000 tonnes of cod and 90,000 tonnes of haddock were supplied to the UK market in 2013. In 2019 it is estimated that between 100,000 to 105,000 tonnes of cod and 49,000 to 64,000 tonnes of haddock could be available (As-Is and To-Be simulations respectively). As proportionally more haddock is supplied from UK production, this is the species likely to be impacted the most. It suggests that there could be between 9-13% of cod and 29-46% of haddock less in market supply.
The UK has the largest and most competitive seafood processing industry in Europe (STECF, 2014; Seafish Processing, 2016), “the highest GVA in absolute terms in 2012 (27% of the EU total)” and “the highest net profit in absolute terms in 2012 (66% of the estimated total)”. In addition, the wholesale and processing sectors supply fish and chip shops that typically rely on cod and haddock. Total value to this part of the value chain is reported to amount to over £1 billion per year\(^1\). This implies that the processing/wholesale sectors will likely seek to make up any shortfall from UK production in imports. With significant competition in Europe for cod in particular this may be challenging in the short term.

DISCUSSION

It is reported that around 70% of all seafood sold in the UK are the “big 5” species, i.e. salmon, cod, haddock, tuna, prawns (Seafish Factsheet, 2015). Of these salmon is mostly farmed in Europe, prawns and tuna are mostly imported from outside Europe with only cod and haddock originating mostly from European and neighbouring seas. The UK’s share of North Sea cod EU TAC amounted to approximately 40% in 2015 and for North Sea haddock approximately 70% in 2015. In addition, quota was available to UK fleets fishing in Norwegian waters (ICES area II). Supply of cod and haddock from UK fleets is limited and with the introduction of the landing obligation will likely be reduced in the short term placing more reliance on imports, particularly from Iceland and Norway.

It is reported that the UK competes with Spain and other parts of Europe for cod and haddock supplies from Iceland (Seafish, 2010), particularly Spain’s demand for expensive Icelandic salt cod. Cod and haddock TACs in Iceland have been increasing in recent years\(^2\). The UK is historically a strong market for exporting unprocessed cod and haddock to. Conversely, in 2015, ICES published recommendations to reduce the TAC of Barents Sea cod in 2016 by 10%. However, Norway and Russia kept 2016 TAC the same as in 2015. Even so, TAC for Barents Sea cod has reduced from 1m tonnes in 2013 to 894 thousand tonnes in 2015 and 2016, with a further decrease to 805 thousand tonnes advised by ICES for 2017\(^3\). Haddock on the other hand was recommended to increase by 25%. Thus imports of cod, with such competition and reducing supplies may not be able to increase significantly in the short term. One website reported “Barents Sea cod quota cut will cause a fight for raw material” between the various processing sectors\(^4\). In their analysis, increases in fresh cod with higher prices, given recent increases in demand, appeared to be the conclusion.

Retail is apparently becoming more demanding on the need to provide sustainable fish products. This has resulted in the Marine Stewardship Council (MSC) label becoming the most commonly used. As a result for example, Icelandic cod and haddock has been certified under the MSC scheme. It is estimated that approximately 48% of UK cod supply is MSC and 23% of haddock. Supermarkets vary hugely with MSC labelled product lines with MSC.org reporting that Sainsbury’s have 76% seafood products labelled MSC with Waitrose and LIDL approximately 50% and other supermarkets from 2%-37%. Policy that could impact such labelling is the EU’s objective to ensure that all quota stocks are fished at maximum sustainable yield (MSY) by 2020. This would imply that stocks at this level are sustainable and may not necessarily require a label to indicate sustainability. In addition, the EC has recently completed a study considering the demand for a public sustainable label (DGMARE, 2015). Such labelling is less clearly used (or apparently required) in the fish and chips sector that has annual sales of fish and chips in the UK of around £1.2 billion (see footnote 1).

There are several risks that could impact the competitiveness of producers in the short term. These include the landing obligation, fishing to levels of MSY and fuel prices. The first two issues could have a direct impact on supply, particularly reduced supply in the short term as quotas reduce to achieve

\(^1\) http://www.federationoffishfriers.co.uk/pages/facts-and-figures-603.htm
\(^2\) see http://www.fiskistofa.is/
\(^3\) see http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2016/2016/cod-arct.pdf
MSY and the landing obligation (potentially) hinders the ability of fleets to land all of the quota allocated. Fuel prices will impact profit as costs in what is a high energy use business increase. In the medium term of course, as stocks reach MSY, quotas increase and quota trade enables more effective use of quota under the landing obligation fleets will be more resilient and likely to supply the markets with cod and haddock at current amounts or even greater. Sustainability and traceability are important issues and will like add to the competitiveness of producers, even though at present much of the cost of certification falls on producers and not on other parts of the value chain.

CONCLUSIONS

The demand for cod and haddock in the UK is strong and is likely to remain so given the importance of the retail market and fish and chip shop market for these species. Unless more cod and haddock can be sourced in the short term there will likely be a gap in supply at UK fleets adjust to the landing obligation. The UK is a strong position to compete for raw material from Iceland and Norway, in particular, for these species but even so it is possible that increased imports will be able to fill the gap. Other substitutes could appear. Pangasius and salmon appears to compete on the retail market with fresh/frozen cod and haddock fillets and pollack competes strongly with cod and haddock in processed seafood (e.g. fish fingers and other battered/breaded fish).

In the medium to long term, as the capacity of the fleets balance to the new regulations supply will likely return and if MSY is reached in 2020 then an increase in TACs from current levels is likely too. However, markets and industries can change in a 5-10 year period. Particularly, most processing companies are small to medium size enterprises (SMEs) with less than 25 employees. Those that concentrate on cod and haddock processing would not likely survive a shock to their supply. It appears that fleets could be resilient to such short term reductions in landings however this cannot be assumed. The competitiveness of producers will surely be affected in the short to medium term as a result as fleets adapt to supply the market.

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