

AHDB MILLING WHEAT, MALTING BARLEY, MALT AND FLOUR PROJECT

May 2018

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BACKGROUND TO STUDY

AHDB commissioned this study to examine the impact of Brexit post-farmgate on the malting and milling industries, following feedback from levy payers on their earlier study 'Brexit scenarios – an impact assessment'. This report considers the pressures brought on the milling and malting industries by potential changes in trade terms, domestic policy, labour availability and regulation. The crucial elements are imposition of tariffs and details on the Rules of Origin (RoO) in the event of reaching a free trade agreement (FTA).

Any differential impact on trade pre- and post-processing may have a large impact on the processing industries and crop premiums.

The trade position for the four components of the study (milling wheat, malting barley, malt and flour) is not the same. In addition, the tariffs are not equally applied to each commodity. There is inevitably a change in the processing margin with any change of terms or access.

Focus is on the market responses, understanding of behaviour and agronomic aspects.

EXECUTIVE SUMMARY

CURRENT SITUATION

Flour and malt provide interesting and contrasting examples of the impact of Brexit in the agricultural industry. UK flour is generally considered of average quality and traded almost entirely within the EU-28, while malt is a premium product traded mainly in non-EU export markets, such as Japan and the USA. UK flour is reliant on blending UK-produced wheat, with imported grains from the EU and particularly North America, while UK malt is made almost entirely from UK-grown barley. The use of imported wheat in flour means that trade, in particular flours and flour products, may be damaged by RoO even if an FTA is concluded. In contrast, barley-based products, such as malt, are unlikely to be affected by RoO. (See [Appendix 3 'Comparison of Milling and Malting Sectors'](#)).

Ireland represents a further challenge. The Republic of Ireland (RoI) is reliant almost entirely on flour milled in Northern Ireland (NI) and the UK, while the major maltsters supplying NI are in the RoI. Ireland is largely self-sufficient in malting barley but reliant on imported wheat.

But there are also similarities between flour and malt. They are both delivered in small volumes and are, consequently, relatively expensive to supply, compared with their grain precursors. While flour and malt are both considered as commodities, there are significant quality differences within the general classification. The differences are based both on quality attributes and branding. As a consequence, the transmission of price changes through the entire supply chain is less than if each product were homogenous; each product has a particular value and is either not, or only partially, interchangeable.

There are also several producers of flour and malt who convert their outputs into retailed goods. This provides these producers with some protection from the significant price disruption that might occur under some scenarios.

While all four products are relatively stable and do not deteriorate rapidly, malting barley can deteriorate as germination percentage falls. Averaged over the last five years, the UK has been a net exporter of wheat, barley, malt and flour. However, the averages hide quality and annual variations.

Malt and flour comprise only a small part of the retail value of the end products and, consequently, demand is relatively price insensitive. Thus, modest change in grain price is unlikely to affect demand. Millers and maltsters are conscious that any price change in the domestic market would apply to all processors and the low price elasticity would make it easier for any increase in price to be passed to the consumer. This would not be true for cross-border trade, such as in Ireland, where there are competitive providers not subject to tariffs.

While UK grain will be diverted to different markets under some scenarios, the additional UK supply is offset by lower supply from EU countries needed to replace grain previously supplied by the UK.

This analysis is based on an average of the five calendar years from 2013 to 2017 and any production data on the harvest within the calendar year, unless otherwise stated.

REPUBLIC OF IRELAND AND NORTHERN IRELAND

The proximity between Northern Ireland (NI) and the RoI and low cost of transport has helped to create an effective integrated supply chain between the two countries, with additional supplies provided from the UK mainland. The vast majority of both wheat and barley are produced in the RoI, although variation in quality for both grains, and generally low wheat quality, results in grain imports.

The processing capacity is unevenly divided. There are two commercial-scale maltings in the RoI, processing around 160,000 t of malt. There is a strong relationship between the maltsters and brewers, with dedicated supply chains from brewer to grower (for example, Guinness). While distillers are located throughout the north and south, there is considerable malt exported to distillers in the north, such as to Bushmills.

In contrast, there are three commercial flour mills in the island of Ireland. Two are in Belfast, with a combined capacity of about 120,000 t flour, and one mill is in the south, with a capacity in the order of 35,000 t. About one-third of RoI flour is supplied by NI and the remainder from the UK mainland. Baked goods move in both directions. Small quantities are also sent to Europe.

The flour trade between the UK and RoI accounts for most of the UK flour trade.

POST BREXIT SCENARIOS

The creation of a new FTA, with zero tariffs, potentially has significant implications for trade within the island of Ireland where the import of grain for some flours and some bakery products would be prevented through the imposition of new RoO. This would create overcapacity within the UK, leaving the RoI to import at least some of its flour and bakery goods from the EU. RoO are specific to each FTA and could be avoided. A zero tariff FTA would have only minor implications for either grain or malt.

If the UK retained tariff-free imports from the EU and extended this tariff-free access to non-EU countries, this would potentially lead to significant overcapacity in flour milling following loss of exports to the EU, largely in the RoI. This scenario would remove the incentive for UK growers to produce speciality wheat required by the milling industry for higher quality flour.

In contrast, the malting industry would be only marginally disadvantaged as continental maltsters continued to supply Scotland and to provide higher diastatic power malts for combining with other grains in the distilling industry. There would be a loss of the opportunistic export of malt to the EU, which would reduce the average price, but sales would continue initially to Far Eastern markets such as Thailand and Vietnam, although, over time, growth in exports to the US is likely to absorb the surplus. UK growers would lose the incentive to produce the higher diastatic malts.

The mutual imposition of tariffs would restrict trade in grain with the EU: i) to the respective shares of the Tariffs Rate Quotas (TRQs), ii) largely to grains with quality attributes. The share of the additional cost would be shared between the importer and exporter. Where the quality attribute was highly valued, the buyer would take the larger share of the loss and vice versa for less distinct grains. Trade with the EU in feed grains would fall, with North Africa becoming more important. This would increase the importance of the deeper UK ports able to take larger vessels and increase haulage cost for those growers located further from deeper ports.

Virtually all trade in flour and malt between the UK and EU-27 would cease, although some trade in goods containing malt or flour would continue. The overcapacity in the UK flour industry would be substantial until capacity were reduced. Past experience suggests that adjustment would take 2–3 years and during that time margins would be severely reduced. Miller-bakers would be less affected.

The mutual imposition of tariffs on malt would allow UK maltsters to replace exporters to Scotland and Northern Ireland and the monopoly position might allow prices to rise over current levels, increasing maltsters' return, while reducing distilling and brewing margins.

The increased price of imported grain (while up to the TRQ would be modest) would provide at least some incentive to encourage UK growers to cultivate more specialist grains that could no longer be obtained from the EU.

SCENARIOS

BREXIT OUTLOOK SCENARIOS

Essentially, there are two possible outcomes from Brexit: (i) the UK and EU reach a trade agreement, (ii) they fail to do so.

1. FREE TRADE AGREEMENT

The Prime Minister has been consistent and clear that the UK will leave the EU customs union and Single Market. An FTA is the only option available to minimise trade disruption. It is not clear what the FTA might include, but a few key elements can be anticipated:

- Tariffs will be eliminated¹
- RoO will apply to UK-EU trade
- Customs controls, such as inspections and certification, will be in place to ensure regulatory compliance, although they will be as light as possible

This would be the least disruptive outcome, but would still entail some commercial disruption to supply chains.

2. ADOPTION OF EU WTO TERMS

In the absence of an FTA or customs union agreement, WTO rules require the UK and EU to impose their MFN tariffs on their bilateral trade. The UK has already said that its MFN tariffs would mirror those of the EU, to the extent possible². However, some of the EU tariffs are based on EU-specific criteria, such as internal intervention prices and the Euro, and cannot be exactly the same so there will be some modification.

For most agrifood products, these tariffs are very high, and designed to protect domestic producers from competition. The UK is a net importer of most agrifood products. The imposition of high tariffs would lead to supply shortages and significant food price inflation. This may be politically unacceptable, and the UK would need to seek ways of facilitating imports. The main options available are:

- Unilaterally maintain trade preference on imports under current EU FTAs – maintenance of reciprocal preferences on UK exports to those countries would be a matter for separate negotiations
- Unilaterally reduce or eliminate MFN tariffs on affected products. This would be the simplest option
- Unilaterally reduce or eliminate tariffs within quotas (TRQs) on affected products

The failure to reach an FTA means that the political atmosphere between the UK and EU will be acrimonious. While the commercial pressure will be to maintain current supply chains, it can be expected that there will be political pressures in the UK to ensure the EU does not benefit from any unilateral market opening by the UK. The failure to negotiate an FTA would result in the UK facing the difficult trade policy challenge of improving domestic market access, without 'rewarding' the EU.

If the UK reduces or eliminates its MFN tariffs, the EU would most likely be the main beneficiary, given location and historic supply chains. It would also reduce the UK's negotiating capital when negotiating new trade agreements with the EU and other countries. This suggests the UK may look to the use of TRQs to facilitate increased domestic supplies. Detailed analysis of the use of current TRQs would be needed to determine the best options for particular products, but the UK:

¹ Although some tariffs are retained in some FTAs (e.g. CETA), it is clearly the objective in the EU UK negotiations to eliminate all tariffs

² See <https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Commons/2016-12-05/HCWS316/> and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/637748/Future_customs_arrangements_-_a_future_partnership_paper.pdf

- Could improve the terms of the existing country-specific and *erga omnes* (open to everyone) TRQs adopted by the UK. This could be done by increasing the quota and/or reducing the in-quota tariff.
- Open new TRQs. Most likely, these new TRQs would have to be available *erga omnes*. While they would be open to the EU, a positive in-quota tariff would be an increased tariff on imports from the EU, and a tariff reduction on imports from other suppliers. This may provide a way of addressing any domestic political demands to 'punish' the EU, while minimising commercial disruption.

This suggests the key trade elements of failing to achieve an FTA can be expected to be:

- EU and UK MFN tariffs imposed
- UK unilaterally improves market access, likely to be by the use of TRQs
- RoO would not be relevant

Customs controls, such as inspections and certification, will be in place to ensure regulatory compliance. These customs controls can be expected to be more restrictive and commercially burdensome than where agreement is reached.

MODELLING

There are a wide range of permutations stemming from the policy options. In order to estimate the extent of the economic impacts, the policy options, as if fully implemented, have been used and compared with the current situation. The four scenarios developed are:

1. Current situation (baseline).
2. FTA – full tariff elimination, along with imposition of RoO and custom controls
3. Unilateral – The UK retains tariff-free imports from the EU, but will also be open to tariff-free imports from other origins on an MFN basis. Exports are subject to tariffs that are in alignment with the WTO MFN tariffs currently in place for the EU.
4. Mutual imposition of MFN tariffs – Tariffs are placed on both UK imports and exports to the EU in alignment with the WTO MFN tariffs currently in place for the EU.

It is recognised that these scenarios may not be implemented as simply as described above. For example, the unilateral tariff scenario may be achieved via TRQs limiting the import volume or imposing more than a zero tariff. Similarly, the zero tariff FTA may not be possible. However, the analysis does define the boundaries for the most likely economic outcomes. There are even more extreme possibilities but these are considered unlikely.

OTHER POTENTIAL BREXIT IMPACTS

FARM SUBSIDY

The farm subsidy is decoupled from production, and change would not be expected to have a significant impact on production, although it may well influence farm structure, land occupation costs and farm employment. This does not mean that there would not potentially be considerable disruption, depending on the period allowed for phasing the removal of the subsidy. There may also be some land loss to more market-related production.

Removal or reduction of subsidy should have relatively little influence on relative crop production: all crops receive the same level of subsidy and thus removal of subsidy leaves relative profitability unchanged, albeit lower. The current Basic Payment Scheme (BPS) subsidy payment is transferred to land via the price of land or rent level. The removal of subsidy would be expected to have a direct impact on the rent paid. The rent is currently derived from the return from the subsidy, and share of the profit from production (the mechanism differs slightly between pre- and post-1996 tenancies). Landlords cannot maintain rents if the farm profit does not support high rent levels. The rent adjustment significantly reduces the impact of any

reduction in subsidy on 'active farmers'. Typical average rents are reported by the Farm Business Survey with an illustrative payment shown in [Appendix 6](#) for medium-sized cereal farms. This is the rent actually paid by the sample in the survey and not a notional rent.

In fact, the protection provided to the main farm business decision-maker is greater than the statistics suggest because arable land is frequently managed on contract farming arrangements³. The area involved is believed to be substantial but is recorded in the statistics as being farmed by the land supplier. The decision-maker and supplier of labour and machinery are recorded as contractors. The contractor is protected from the loss of the subsidy, with all or most of the impact falling on the land supplier. The return to land falls as it does where there is a rental arrangement but there is no impact on cropping choice.

The immediate impact of removing subsidy is to reduce land values and rents. Those currently highly geared following purchase of land may be forced to sell but the impact on production is likely to be small, since others will expand onto the area.

UK farms are on average also heavily diversified (Appendix 6). 'Other income' includes cottage rents, commercial lets of redundant buildings, contracting income and various other sundry incomes related to the farm asset. However, the income excludes non-agricultural income produced off the farm.

While relative crop profitability may not change as a result of subsidy changes, a point is reached where the optimum economic input is reduced and, consequently, yields are lowered. At the extreme, more marginal land may be removed from production. However, the marginal cost of farming is relatively low and, while the full cost of cropping, according to the Farm Business Survey (medium-sized farms classified as 'Mainly Cereals' 2016/17b averages), is in the order of £1,138/ha (variable costs £403.4/ha and fixed costs £734.4/ha) the marginal cost may be only £51.5/ha fuel, £62.8/ha repairs and say 50% of the labour cost (to reflect overtime or use of family labour) of £78.1/ha additional labour cost or a total of about £153/ha. This reduces the total cost to £556/ha, implying, in the short-term, a positive contribution to overheads even where potential yields are low. Similarly, contract farming agreements generally allow labour and machinery costs to fall to around £300/ha for combinable cropping⁴.

The Government proposal to increase reward for public goods further increases the incentive to take land out of production. However, under WTO, the compensation can generally only be based on income foregone in order to avoid cross-subsidisation of production. Current schemes have based the compensation on the national average production, which means that poorer farmers, or poorer areas of the farm are overcompensated. It is these areas that have been removed from production, which means that relatively little production has been lost. There is some scope to change the payment basis but there are a number of legal issues that would have to be dealt with.

A more subtle influence is the change in the exposure to risk and complication that farmers will often take in order to secure income if profitability falls. While the response can vary, farmers may be willing to self-insure or put in place more management to lower the risk. While if the price of the commodity fell, the return from insurance treatments (such as sprays for controlling Barley Yellow Dwarf Virus (BYDV)) would become less. While the removal of subsidy does not affect the return on the investment, the value of the income to the farmer increases and thus the input into management and risk assessment.

LABOUR

There is already a shortage of low cost labour within the EU and cost and availability is rising irrespective of Brexit. Reduction in the value of sterling has exacerbated the shortage in the UK. Casual labour on arable farms is supplied from within the UK, EU and elsewhere. Payment for full-time labour is already competitive, once housing is taken into account (this is not included consistently in the FBS data and has led to the suggestion that pay rates are below other competing industries⁵).

³ There are a number of permutations but in the most common form a farmer/contractor supplies contracting services and management for a fixed payment on a marginal cost basis allowing the land supplier to take a 'rent' (technically a first share of profit) with any remaining profit shared by the two parties. The land supplier is recorded as the farmer.

⁴ George Badger, Strutt and Parker

⁵ Personal communication from Mark Reader FBS Cambridge University

The milling and malting industries have a very low labour cost component although labour is one of the areas where there are economies of scale (see section '[Processing Margins](#)').

There is potentially a shortage of hauliers and Brexit is likely to aggravate the situation. The rise in haulage cost is likely to exert the biggest influence on the subject areas by increasing cost from farm to processor, farm to port or processor to port (see section '[Grain Haulage](#)').

KEY NON-TARIFF ISSUES

RULES OF ORIGIN

RoO are an essential part of all trade agreements, because they determine whether a product benefits from trade preferences between the signatory countries⁶. They are an often complex and detailed set of rules to determine if a product 'originates' in one of the signatory markets, and should benefit from whatever preferential trade provisions have been agreed. Goods that do not meet these 'tests' do not qualify for the trade preferences.

It is not yet clear if a trade agreement will be reached between the UK and EU, or what the RoO would be, but they will be a crucial part of whatever is agreed. Only products that are deemed to be originating can benefit from the trade preferences in the trade agreement, and there are two ways by which a product can acquire originating status.

A product is said to be originating, if: i) it is made wholly within one of the FTA markets; that it contains no inputs imported from outside the free trade area, ii) it needs to show there has been 'sufficient transformation' to confer originating status, and benefit from the trade preferences.

There are broadly three tests to determine if the products have undergone sufficient transformation:

- A change in tariff heading⁷
- Meeting specified domestic content requirements by value
- Meeting specified domestic content requirements by weight.

That means that UK products, like flour, that use imported grains, may not qualify for preferential access to the EU market. Similarly, EU products that use UK cereals and/or cereals products, may no longer qualify for preferential access to third country markets with which the EU has FTAs.

POTENTIAL RULES OF ORIGIN IN AN EU-UK FTA

One possibility is for the UK to adopt the Regional Convention on pan-Euro-Mediterranean preferential RoO (PEM). This convention provides a common set of rules for a network of more than 60 trade agreements among the EU, EFTA, the Balkans, and MENA (Middle East and North Africa) states. While this would provide an easy, off-the-shelf solution, it would also mean problems for companies making products that use non-originating imported cereals, because all inputs must be sourced from within the PEM area. If any imported cereals that are used are from outside the PEM network, such as Canadian wheat, the product will not qualify as originating in the domestic market, and will not qualify for any trade preferences.

Alternatively, it may be possible to agree terms similar to the RoO in the recently concluded agreement with Canada (Canada EU - Comprehensive Economic and Trade Agreement (CETA)). This approach would give the UK greater potential flexibility to negotiate more bespoke RoO, but they would need to be 'better' than those negotiated by Canada. In the CETA, to qualify as originating, all cereals used to make products such as flour and malt must be 'home grown'. Similarly, for products that use flour or malt, no more than 20% of the weight of the final product can be non-originating imported cereals. This would be of little use to flour millers and maltsters that use imported cereals.

⁶ https://www.fdf.org.uk/corporate_pubs/FDF-Rules-of-origin-report.pdf

⁷ A tariff code is a product-specific code as documented in the Harmonized System (HS) maintained by the World Customs Organization (WCO.) Tariff codes exist for almost every product involved in global commerce. Required on official shipping documents for tax assessment purposes, a tariff code ensures uniformity of product classification worldwide.

A solution that provides for greater flexibility in sourcing supplies, is to agree 'diagonal cumulation' between the EU, UK and other countries with which the EU has trade agreements. While most FTAs provide for bilateral cumulation of inputs originating within the FTA area, diagonal cumulation would allow inputs produced in any of the countries party to the diagonal cumulation agreement to count toward the final product qualifying as originating. Because the network of FTAs in the PEM zone use identical rules of origin, they provide for diagonal cumulation among members. However, diagonal cumulation agreements would still need to be reached with other countries with which the EU has FTAs outside the PEM area.

In addition to deciding whether the product benefits from any agreed import preferences, countries also need to ensure that imports are safe to use; that they meet all the domestic health and safety regulations of the importing country. When the UK is fully outside the EU, customs controls to ensure these conditions are met, will impose additional trade costs.

EU CUSTOMS CHECKS

Most cereals and other food not of animal origin (FNAO) imported from third countries are not subject to routine checks at the points of import. While there is a requirement that all products meet at least the required standards of European Law, in practice, cereals are not subject to most of the official controls conducted by ports.

Customs authorities will normally conduct three main types of checks on consignments.

Documentary checks: The document check involves checking any documents such as a manifest, packing note, invoice, bill of lading or air-way bill, etc. and, where appropriate, documents required under feed or food law that should accompany the consignment. Imports of cereals and cereal products, subject to tariff preferences in trade agreements, such as wheat and barley from Canada, need to provide customs authorities with a certificate of origin in order to benefit from the tariff preference⁸.

Identity Checks: This check involves a visual inspection of the product and its packaging to confirm that the consignment matches the information and/or guarantees given in the accompanying documentation (invoice/packing lists, etc.).

Physical Checks: The Food Standards Agency in the UK suggests that "it is not proportionate or achievable to examine all consignments entering ports. The decision to carry out a physical check should be taken appropriately taking into account any intelligence received and risk-based factors"⁹.

The administrative requirements imposed on importers of goods into the EU are detailed and complex. In addition to the normal shipping documents, additional administrative requirements and assurances concerning the products, must be provided.

IMPORT LICENCES

In order to import certain goods into the EU, including cereals and cereal products, the importer may need to apply to the appropriate government authority for an import licence. In the UK, that authority is the Rural Payments Agency (RPA).

Import licences are not required for imports of:

Common wheat and barley, unless they are imported under a TRQ and the consignment is over 5,000 kg

For flour and malt, unless the consignment is over 1,000 kg

Wheat flour and malt importers who wish to take advantage of the tariff rate quotas (TRQs) for importation of grain require a **TRQ import licence**. To apply for a TRQ licence, the importer must be VAT registered, and pay a security deposit of €30/tonne (see [Appendix 2 Tariff Summaries](#)).

⁸ Under the CETA importers do not require an origin certificate for shipments with a value less than €6,000

⁹ [Inland Enforcement of Imported Feed and Food Controls Resource Pack - England](#)

Generally, security deposits are fully refundable, provided the importer imports at least 95% of the volume of goods licensed for import.

In the case of malting barley, an additional security of €85/tonne must be paid at the time that the request for an import license is lodged. The importer must also make a written undertaking that barley will be processed into malt within six months of the date of entry and within 150 days from that point, the malt will be used in the manufacture of beer aged in vats containing beechwood.

In order to have the €85/tonne security refunded, the importer must demonstrate that:

- The quality as described on the appropriate certificate meets the quality standards described above
- The importer provides proof that the barley was processed into malt and then used in beer production within the specified time periods.

CONTROL OF CONTAMINANTS AND PESTICIDE RESIDUES

Of particular concern to importers of cereals and related food products are measures to control contaminants, and for residues of pesticides and other farm chemicals.

To export cereals and cereals products to the EU, the UK will need to ensure systems are in place to check for:

- *Contaminants* at levels that could threaten human health. When arriving at the EU border, consignments must be accompanied by a laboratory test document indicating the presence and amount of any contaminants. Regulation (EC) No 1881/2006 sets maximum levels for certain food contaminants. For cereals and cereal products, these include maximum permitted levels for six mycotoxins, lead, and cadmium
- *Residues of chemical substances* used in the production of the product, measured as maximum residue limits (MRLs). Regulation (EC) No 396/2005 explains the rules for pesticide residues and sets the EU pesticide maximum residue levels (MRLs) in food and feed. Only active substances detailed in the EU Pesticide Database may be used to protect plants to be sold as food in the EU. Once a substance is included in the list, individual EU countries must authorise products

CONTROL AND INSPECTION

EU national authorities are responsible for the control and enforcement of the [Sanitary and Phyto-Sanitary](#) (SPS) measures. Controls are organised in all EU countries by a coordinated multiannual EU control programme of pesticide residues in food of plant and animal origin established by the Regulation (EU) No 1274/2011).

Following this programme, national reference laboratories regularly take and analyse samples to detect residues in the EU countries. In the UK, there are three such laboratories: in Belfast, York, and Teddington. Once the UK is fully out of the EU, arrangements will need to be agreed to ensure UK laboratories are approved by the EU for inspecting and certifying goods. Likewise, with UK approval of laboratories in the EU.

LABELLING

With respect to cereals products destined for retail markets, eight EU members – Finland, France, Greece, Italy, Lithuania, Portugal, Romania, and Spain – are in the process of developing and implementing a variety of country of origin labelling (COOL) schemes that would require an indication of, among other things, the origin of wheat used as ingredients in certain processed foods. The measures are not being implemented consistently across EU Member States; they apply to different types of ingredients and finished products, have varying implementation times, and require different wording on labels. The information required on packaging varies according to each individual Member State and can include the country of cultivation and processing for wheat.

WTO RULES

All countries have the right, and a duty, to ensure that agrifood products in their territory are safe and wholesome. To meet this obligation, they impose a number of technical requirements on imports to ensure they meet all relevant standards. To ensure that these measures are not simply disguised protection for domestic producers, the World Trade Organisation (WTO) provides a number of rules.

Crucially, the basic rights of countries are affirmed in Article XX of the General Agreement on Tariffs and Trade (GATT), which allows governments to restrict trade that may endanger human, animal or plant life or health, provided they do not discriminate or use this as disguised protectionism. In addition, there are specific WTO agreements dealing with food safety, animal and plant health and safety and with product standards in general.

Of particular importance to agriculture and food products, is the Sanitary and Phytosanitary Measures (SPS) Agreement¹⁰, which sets out the basic rules on measures concerning food safety and animal and plant health standards. As the WTO says, "*The basic aim of the SPS Agreement is to maintain the sovereign right of any government to provide the level of health protection it deems appropriate, but to ensure that these sovereign rights are not misused for protectionist purposes and do not result in unnecessary barriers to international trade.*"

Another important agreement is the Agreement on Technical Barriers to Trade (TBT). The TBT covers all technical regulations, voluntary standards and the procedures to ensure that these are met, except when these are sanitary or phytosanitary measures as defined by the SPS Agreement. These TBT measures might include measures concerning packaging or labelling requirements. It is thus the type of measure that determines whether it is covered by the TBT Agreement, but the purpose of the measure which is relevant in determining whether a measure is subject to the SPS Agreement. The SPS and TBT are similar in many ways, but there are also some important differences¹¹.

SANITARY AND PHYTOSANITARY MEASURES (SPS) AGREEMENT

While the SPS affirms countries' rights to establish and enforce measures 'to the extent necessary to protect human, animal or plant life or health', it also contains a number of important conditions. SPS measures must:

- Be based on scientific principles
- Not be maintained without sufficient scientific evidence
- Follow a full risk assessment
- Not "arbitrarily or unjustifiably discriminate between countries where identical or similar conditions prevail"

Article 5.7 allows for those circumstances where the relevant scientific evidence is insufficient. It allows a Member to provisionally adopt sanitary or phytosanitary measures on the basis of available pertinent information, including that from the relevant international organisations as well as from sanitary or phytosanitary measures applied by other Members. In such circumstances, Members must, within a reasonable period of time:

- Seek to obtain the additional information necessary for a more objective assessment of risk
- Review the sanitary or phytosanitary measure accordingly

This provision reflects the precautionary principle¹². As to its status within the WTO, dispute settlement rulings¹⁴ suggest a certain flexibility and openness in order to take into consideration the complexities of scientific uncertainty and related precautionary measures. At the same time, that flexibility is clearly quite narrow, it does not accept the notion that trade restrictions could be justified by the precautionary

¹⁰ See AHDB Horizon report 'The WTO and its implications for UK Agriculture' https://ahdb.org.uk/documents/Horizon_june2017.pdf

¹¹ [Comparative Analysis of the SPS and the TBT Agreements](#)

¹² For general information about the precautionary principle, see <http://www.precautionaryprinciple.eu> and for a discussion of its use by the EU, see <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3A132042>

principle per se. Instead, it is clear that a proper risk evaluation must take into consideration the probability of the occurrence of a disease, of its propagation, and of the biological and economic consequences it may cause, and it must also assess the impact of the protective measures that the importing country decides to implement.

INTERNATIONAL STANDARDS

The SPS Agreement encourages countries to use international standards, guidelines and recommendations where they exist. When they do, the SPS measures that are based on them are deemed to be necessary to protect human, animal or plant life or health, and presumed to be consistent with the SPS rules.

EQUIVALENCE

The SPS Agreement also recognises that there may be many different ways of ensuring food safety or animal and plant protection in different countries. Given this, it encourages WTO members to accept each other's regulations as equivalent whenever the same level of human, animal or plant health protection is achieved.

Providing an exporting country that uses different standards and different methods of inspecting products can demonstrate that they achieve the same level of health protection as in the importing country, i.e. are equivalent, then the importing country is encouraged to accept the exporting country's standards and methods. Despite this encouragement, such mutual recognition agreements can be notoriously difficult to agree. The US, for example, believes that there are instances where the EU should – but does not – recognise their food safety measures as equivalent to those maintained by the EU, because they achieve the same level of protection.

DIVERGING UK STANDARDS

If it is agreed, during the Brexit transition period, all EU measures relating to the production and trade of cereals and related products are expected to continue to apply in the UK. This suggests that EU SPS and other non-tariff measures imposed on imports should not affect UK exports. After the end of the transition period on 31 December 2020, however, if the UK decides to implement different domestic regulations affecting the production of cereals and related products, the likelihood of trade restrictions will increase.

As the international competition faced by UK farmers increases, either in export markets or the domestic market, pressure will grow for access to new technologies, and to technologies that may be restricted by the EU. Access to GM technologies, and to various farm chemicals, for example, are issues about which the UK and EU may take different views. As this happens, trade restrictions and disputes can be expected to arise.¹³

AGRICULTURAL BIOTECHNOLOGY

Between 1998 and 2003, the EU applied a general de facto moratorium on the approval of genetically modified (GM) products. A WTO panel found this moratorium was inconsistent with the EU's obligations under the SPS Agreement because it led to undue delays in the completion of EU approval procedures. The WTO panel also found that various Member State safeguard measures were inconsistent with WTO obligations as they were not based on a risk assessment.

Moreover, the length of time taken for EU approvals of new GM crops appears to be increasing. The EU's prescribed approval time for biotechnology imports is approximately 12 months (six months for the review with the EFSA and six months for the political committee process (comitology)). However, in practice, at the end of 2016, total approval times were taking an average of 47 months.¹⁴

¹³ However, this needs to be considered in conjunction with the WTO restrictions. The fact that a pesticide has been banned for use in the EU does not necessarily mean that its use on imported grains is not permitted. It is necessary to demonstrate not only that the pesticide is present but also it is present at damaging levels. It is harder to exclude the use of pesticides where the concern is environmental. The EU has imported wheat from over 17 countries over the last five years and barley from 18 countries.

¹⁴ There are now over 30 GM traits included in crops that are now marketed in the EU, with the number of crops available for cultivation restricted to one or two. GM maize is the only crop cultivated in the EU to reach even a modest commercial area. There are very large volumes of GM soya and maize imported. There are at present no commercially available GM wheat or barley traits.

Of particular concern is the threat that the definition of GM techniques may be extended to include newer techniques not previously included in the GM definition (a case was brought to the European Court of Justice in May 2018).

AGRICULTURE BIOTECHNOLOGY CULTIVATION OPT-OUT

In March 2015, the EU adopted a directive that allows Member States to ban the cultivation of GM plants in their respective territories for non-scientific reasons. Seventeen Member States and four regions in two countries have opted out of cultivation using biotechnology seeds. The 17 Member States that requested their entire territory to be excluded from the geographical scope of biotechnology applications are Austria, Bulgaria, Croatia, Cyprus, Denmark, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Slovenia, and Poland. The four regions are Wallonia in Belgium and Northern Ireland, Scotland, and Wales in the United Kingdom (NB not England).

CROP PROTECTION PRODUCTS

Crop protection products are vital tools for farm businesses, but some may also pose important risks for human health and/or the environment. As a result, their approval for use is often very contentious, with various environmental interests emphasising the health and environmental risks, while farmers' interests emphasise the important commercial benefits. Aside from often being politically contentious, the EU approvals processes are also long and complex.

The Basic Regulation for plant protection products in the EU is Regulation (EC) No 1107/2009, which sets out the criteria for approval. As the following examples of approval for neonicotinoids and glyphosate show, the procedure can be contentious and take many years to complete, with approvals agreed only at the last minute.

Maximum residue levels (MRLs) of pesticides and other farm chemicals are harmonised across the EU, with a default level of 0.01mg/kg. Regulation (EC) No 396/2005 provides for a mechanism to review the existing MRLs of all approved and certain non-approved pesticides. This review process has been ongoing since 2008, and reviews of individual products can take from 2–4 years to complete.

The EU has a policy whereby EU MRLs can be aligned with the international standards agreed in the Codex Alimentarius. These Codex MRLs (CXLs) may be adopted if three conditions are fulfilled:

- The EU sets MRLs for the commodity under consideration
- The current EU MRL is lower than the CXL
- The CXL is acceptable to the EU with respect to areas such as consumer protection, supporting data, and extrapolations

The EU does not adopt the CXL in the cases where they consider the third criterion is not met. One of the CXLs that the EU have reservations about is the pesticide chlorpyrifos-methyl, used by cereals producers, because it is currently under review.

CXLs have not been agreed for all products for which the EU has set MRLs but, where they do exist, the procedures for adopting CXLs in place of MRLs is expected to take about 3 years.

The review process of the existing EU pesticide MRLs aims to set them as low as reasonably achievable. This means that MRLs may, in some cases, be lowered to a level that restricts exports from non-EU countries into the EU. To address such concerns, non-EU countries may submit an 'import tolerance' request.

Import tolerance requests normally concern MRLs of active substances approved in the EU, but they may also be introduced for active substances that are not approved in the EU, provided that all the required data on the active substance are submitted. More details on the procedure of the 'import tolerance' are given in Article 6.4 of Regulation (EC) No 396/2005.

If the review of the data submitted by the non-EU country is positive, amending the MRL may take one to two years from the submission of the request until the entering into force of the amended MRL.

METHODOLOGY

DISCUSSION

All the four products covered in this report may be assumed to have reached a price and production equilibrium under the current economic conditions. If Brexit should result in a change in the economic conditions, a new equilibrium will eventually be reached and it is this that is most important to the sector.

There are three phases to market adjustment:

1. Response to the initial shock of a market change. For example, the UK supplies in the order of 900,000 t of barley to the EU. The imposition of a €93/t tariff (the WTO EU MFN tariff) on these exports increases the potential price of these exports by $93 \times 900,000$ or €83,700,000. Over the total supply of 6,500,000 t, the impact would be $€83,700,000/6,500,000$ or €12.9/t. Many analyses record only this first order adjustment but this makes no allowance for a consumer or supplier response.
2. Following this shock, there are a number of potential adjustments. The €93/t tariff is deliberately prohibitive and is designed to prevent imports in order to protect domestic growers. If this were the only market, the options are: the price may fall for the supplier, the price may rise for the consumer or the response may be shared. Since the tariff is intended to be prohibitive, it is more likely that the exporter or trader would look for a new market and importers would look for a new supplier before the impact was actually experienced through any transaction. In this market, the response is unlikely to be instant, since there is likely to be warning and there will be forward contracts so there will be an ordered transfer of the supply. Identification of the alternative options, and thus impact on price, are a key part of this exercise.
3. The final adjustment is that the price of similar quality grain in all markets changes until a new price equilibrium is reached. If the export price fell by a more modest €10/t (too small to result in a supply response by the grower or a consumption response by the consumer), the market price would readjust to this new level in all markets. No doubt there would be some buffering of impact through stock changes but the new equilibrium would be reached relatively quickly and it is this new equilibrium that is of interest.

Conversely, where the country is an importer, any tariff applied by the UK on grain from any location would determine the national price. Some producers exporting to the UK might be prepared to lower their cost of supply if the price of supplying the UK after the application of tariff still made the market desirable. The tariff would raise the cost of all grain in the UK by the tariff and not, at least after the initial shock, by the tariff \times imported volume/total UK production.

For the products forming the core part of this study, it is assumed:

- Demand is relatively insensitive to price, over the range likely to be experienced, because the raw material makes up such a small proportion of the retail value
- The market functions effectively, with traders responding to relatively small changes in price to optimise return and their margins. It is perhaps significant that the UK trades grain, malt and flour at least occasionally with a very large number of countries presumably when these represent an opportunity for gain. The response is also extremely rapid

While there is readjustment to a new export price, this does not mean that all growers will receive the same price adjustment. For example, surplus grain may initially be exported in small volumes from ports unable to take larger vessels to small European ports adjacent to mills or maltings. If Europe should no longer be a suitable market, the next best buyer may want fewer, but larger volume, transactions that can only take place from larger ports. The price would not rise for the average grower adjacent to these ports (otherwise they would already be exporting) but the price might rise for the closest grower to the larger port and would fall more for the grower adjacent to the smaller port where internal haulage would rise.

An important aspect of this report is to identify where the processors' input and output prices/costs change relatively to each other. As a generality, EU tariffs are higher on processed goods than on raw materials. It is possible that grain supply may be little affected by tariff changes, while the price of the processed goods will change to a greater extent.

STEP 1 IMPORTER OR EXPORTER?

The first step is to determine whether the UK is a net importer or exporter of the product. Any trends have been examined and the likelihood of change. Where the UK exports goods, the imposition of a tariff by a buyer would tend to lower the UK domestic price, while if the UK were a net importer, the imposition of a tariff by the UK would tend to raise the domestic price. The immediate theoretical reaction is easy to quantify: price for the traded volume of goods goes up or down and this price change is averaged over the entire supply.

In fact, the full tariffs that would be applied to the four products are intended to prohibit trade. Furthermore, the price change is never actually experienced by the exporter, since sales are committed at a given price and if the market price fell, sales would be diverted to replacement markets. The consumer might experience the higher price, until new contracts were required and new, lower cost, suppliers would be looked for. If there was a perceived risk, forward purchases would reduce or protective clauses introduced (at least one miller has introduced a clause imposing the cost of any tariff on the buyer). It is also likely that contract break clauses would be exercised.

The four products are not perishable, with the exception of malting barley. This allows redirection of sales to the next most profitable markets following imposition of tariffs by the historic trading party, reducing the tariff impact.

As far as imports are concerned, the UK market price for the entire supply (imports and domestic production) would rise to meet the new import price, except where contracts had already been committed.

In practice, it is rare for there not to be two-way trade, i.e. import and export. In other sectors, this is usually related to quality differences within the tariff code band or seasonality. These aspects can be a factor in the sectors forming part of this study but are likely to be opportunistic resulting from local shortages stemming from logistical issues.

STEP 2 OTHER MARKETS FOR EXPORTS

In contrast to the statements reported in some other studies, the EU imports relatively little, subject to the WTO EU MFN tariff. Most goods are imported on the basis of specific agreements. These are generally TRQs where a specified tonnage may be imported at a low or even zero tonnage. Most of these are country specific and some are in response to trade disputes where the EU has banned import of goods produced in a particular way. However, in the grain sectors, but not malt and flour sectors, there are also a number of preferential arrangements that are open to all exporters.

The size of the preferential quotas retained by the EU is likely to be reduced when the UK leaves the EU (see [Appendix 4 'Comments on Tariff Rate Quotas'](#)) (they have often been increased when new members join) and the UK may have to adopt similar arrangements on a proportion of imports when it leaves. The division is currently unknowable because they depend not just on negotiation between the UK and EU but also negotiation with third-party trading partners. There is likely to be a relationship with a trade weighted split. However, the total quota might be higher to allow for the annual variation and change in recipient over time.

Nevertheless, the open, non-country specific agreements are likely to be important because the transport cost from the UK to EU (and vice versa) will be among the lowest, so the UK should be in a good position to fill these arrangements if it is desirable to do so. This is particularly true of trade between the ROI and Northern Ireland.

If the EU price should rise as a result of a reduction in supplies from the UK, the shortfall may be taken up by countries with country-specific preferential arrangements. If this meant that supply was diverted from other countries, this would potentially open up markets elsewhere for UK supplies.

Consequently, the arrangements are explored and, as importantly, whether they are already filled by other countries. This shows i) whether the UK has an opportunity to supply these arrangements, ii) whether other countries perceive the EU as an attractive market. Since the EU is generally a net exporter, it would be expected that prices in most areas, at least on port side, are close to globally traded prices.

OTHER BUYERS

Traders will always seek the highest price market for their goods after all costs associated with the trade. While shipping is perhaps the biggest cost, the difference in cost between destinations is not great. Thus the shipping cost from the Gulf to Rotterdam is under €20/t and the cost from the UK to the remainder of the EU is only a little lower than this, although dependent on vessel size. The difference is sufficient for traders to react but the difference, while negative, is unlikely to be devastating for most producers.

Total supply to other locations has been examined and particularly supply from the EU to these destinations. Since consumption is largely inelastic if UK supply to the EU is curtailed, it is most likely to be met from the EU (the price will rise slightly, allowing growers to transport a little further). EU exports are likely to decline by virtually the same amount, allowing the UK to substitute for other EU supply in the existing export markets.

GRAIN QUALITY PREMIUMS

An extremely important factor for both the wheat and barley grain markets is that quality is often specific. While there can be some substitution, the quality bandings as expressed by grain characteristics, country of origin and variety prevent the creation of a simple uniform commodity price. This may be further complicated by branding: a French baguette can only be made from French wheat.

In the extreme, milling wheat or malting barley cannot be devalued to a greater extent than the premium over the feed grain price although the corresponding feed grain price may also be put under pressure.

Feed grain prices might be put under pressure from the import of maize. Maize is subject to a variable rate tariff that is only applied if the price falls below a threshold (currently defined as 155% over the EU intervention price of €101). The tariff has rarely been applied and it is unclear how the Euro-based arrangements will change once the UK leaves the EU. Exchange rate might prove very important.

LOCAL FACTORS

The situation described in step two is a little more complex in practice because the price difference is disseminated via local supply and demand factors. Those more distant from a buyer receive a lower price than those closer, because the haulage cost to the buyer is higher (if the buyer is able to source the entire supply from closer buyers). To some extent, small changes can be absorbed in the short term by stock changes or in the longer term use in other markets which had previously been inaccessible because the price was not competitive. The interior factors are influenced by any change in the cost of haulage.

MARKET IMPERFECTION AND TRANSITION

In practice, because the market is unlikely to operate perfectly, there will be a number of distortions that mean the calculated price change differs to a small extent from that estimated. However, under constant conditions these will reduce as knowledge is gained.

DERIVATION OF NEW MARKET PRICES

In order to determine the new market price, it is assumed that non-EU premium export markets remain unaffected in terms of supply and price. These are identified by both consistency of supply and by the price relative to the commodity average. If supply to these markets could be increased, it would already have been. Additional exports are taken up at the lowest price currently achieved on the export market and the UK supply price adapts to the new average export price.

For disposal of other surpluses, it is necessary to identify whether the remaining EU is a competing supplier. If the increased UK surplus is due to the EU becoming an uncompetitive buyer of UK surpluses, will the reduced supply from the UK reduce the EU exportable surplus, allowing the UK export to the markets previously supplied by other EU countries?

Where the EU price was higher than the competing buyer, it is assumed that the surplus will be taken at this lower price, net of any additional shipping cost. Where the competing price is higher than the EU price, it is assumed that the surplus will be disposed of in the next lower market or markets.

This price reduction will be reflected in the price for the commodity in all markets for the product, other than the identified premium markets.

Where the additional supply is a consequence of the EU no longer being a favourable market (e.g. because of the application of tariffs), supply from the EU to third-party buyers may be reduced and it is assumed that the UK would receive the price paid to other suppliers. The volume supplied to premium buyers is assumed to be unaffected.

This does not solve all the quality impacts and the UK is invariably both an importer and exporter with the two-way flow, largely due to differences in qualities and temporary opportunities in an imperfect market.

ELASTICITY EXPORTS AND IMPORTS

In both import and export situations, the relative response of consumption and production to price change (elasticities) is important. As a crude generalisation, this response is likely to be less significant on exports, where other markets are available and price change is within a smaller range, than imports where any tariff may be substantial and cannot be avoided.

There are three elasticities to consider:

1. **Demand elasticity to price.** If supply increases, the price will generally fall because other buyers will need to be found. Since the replacement buyers are not already recipients, the likelihood is that the price they are willing to pay will be less than currently achieved. Conversely, if the increased production substitutes for imports, it will replace the highest cost exporter reducing the price in the entire pool. Conversely, if supply reduces, the price would be expected to increase.

The cost of the malt and flour in the retailed product is very small and demand is effectively inelastic over the price range likely to be experienced. The value of the grains used for manufacture makes an even smaller contribution to the consumer price.

2. **Supply elasticity to price.** If the market price falls, those marginal producers, who are only just surviving, cease to produce and there is a partial price recovery. Conversely, if price rises, production would be expected to increase as producers replace other production with a more profitable crop.

This can only take place at the start of the next production cycle which, for grain, could be as long as 12 months after the change occurred, although it would be surprising if forward prices did not provide greater warning. Producers (farmers or processors) are likely to react more slowly if a reversal, or new agreement, was expected within a relatively short period because there is usually a cost associated with change. Thus, a processor may decide to continue production if operating costs are covered and upturn a reasonable expectation (Scenario 2, for example, may be seen as an intermediate step between reaching an FTA agreement with the EU or other parties, or reducing internal tariffs). In practice, farmers are subject to agronomic, husbandry and storage constraints, making a significant supply response unlikely over a large price range.

3. **Price elasticity of substitution or cross-price elasticity.** If the price rises for flour, and thus bread, but falls for rice, the expectation would be that consumption of flour would fall and consumption of rice would increase. This is most likely to be significant under scenario 2 where high tariffs would be applied on imports.

In the milling sector, the tariff might result in the increased sale of (say) bread rolls made from UK wheat in preference to croissants made from imported wheat. There is a more complex substitution where the variable rate tariff currently applied to maize, would potentially increase use of maize in animal feed in preference to wheat or barley.

An important factor is the speed of adjustment (see Step 4).

IMPORT AND EXPORT PARITY

In a perfect market, commodity prices reflect:

1. **Export parity.** Where a country exports a commodity, the price needed to compete with cheapest alternative supplier in order to dispose of the surplus eventually determines the price for the entire supply, i.e. no buyer wishes to pay more than is necessary.

2. **Import parity.** Where a country is an importer of a commodity, the price is determined by the highest price that has to be paid to secure the supply needed, i.e. each vendor seeks to maximise return. (Internally, import parity prices are higher than export parity prices).

In practice, this simple rule is confounded by imperfect market knowledge and differences in quality making up the commodity average. Furthermore, the quality differences may be based on perception that is difficult, or even impossible, to quantify. For example, for some markets, UK malt, with its association with UK-style beer or Scotch whisky is regarded as an essential input in order to provide authenticity but it is not fundamentally different from other sources of supply.

STEP 3 PROCESSING MARGIN

An important part of the study is that in each supply chain either the grain can be imported or exported or the processed product may be imported or exported. Each component would be subject to different tariffs (or in practice different new market price as a result of change in market as a consequence of the tariff). This potentially changes the price of grain relative to flour or malt, increasing or decreasing the processors' margin (see '[Processing margins](#)'). Change is unlikely to be rapid but over time the number of processors may change and, as importantly, so too might their location.

STEP 4 SPEED OF MARKET RESPONSE AND INTERVAL BEFORE REACHING A NEW EQUILIBRIUM

As discussed, subject to market imperfections, ultimately the entire market adjusts to reflect the lowest price that has to be accepted to dispose of the surplus, or the highest price necessary to secure the tonnage required where there is a deficit.

Market prices are available for up to about two years ahead and known to all those in the sector, although this far ahead, the volume of trades are extremely small. As the need for supply approaches, an increasing percentage of the requirement is fixed within a contract stating quantity (plus or minus 5%, which may be significant) and a fixed price. Grain is also sold 'spot' for delivery that month. Stock changes further soften short-term supply or price impacts.

As a consequence of forward pricing: i) there may be a supply response before significant production has been produced, ii) price change resulting from Brexit is likely to be known in advance of the imposition of any new pricing structure (weather events such as frost or sudden policy change, such as imposition of sanctions, may be more abrupt), iii) all participants in the market are aware of strength or weakness in any specific market almost immediately and respond accordingly.

Redirection to new buyers and from new suppliers is expected to be virtually instantaneous, although speed will be dampened by the presence of longer-term contracts and reluctance to build new relationships. Some insight into the ease of finding new buyers is provided by the trade statistics, which show that, for example, while over the last five years more than 60% of UK malt exports have gone to only two countries, some malt has been sent to over 90 countries.

In the lead-up to the new situation, volumes traded further forward are likely to decrease and prices fall.

The impact on growers is unlikely to be greater than the price change experienced between years, over the last 10 years but, if it were more significant, the balance between the supply of feed and quality grains will also adjust at the next opportunity after the price information has been made available. With modern varieties partial adjustment (application of nitrogen fertiliser to achieve milling or malting quality rather than feed quality) may be made in the April prior to harvest.

Processors face a larger challenge and a longer period of adjustment. For example, if profitability should fall, but there remains a margin over operating costs, processors may continue to convert crop to malt or flour until plant renewal becomes necessary. Where conditions change so that a new processing plant is justified, the time taken to make a decision and build the plant may also involve several years.

Lack of confidence that the new conditions will be sustained will provide a further damping effect on the period of response. If, for example, a new trade deal with the EU was thought likely within, say, five years of exiting, capital investment is unlikely in the intermediate period, even if it meant profit was foregone.

Given the uncertainty independent of Brexit, it is assumed that most of the price adjustment will be complete within three years of exiting the EU. There may well be investment in new manufacturing plant after that or plant closures but the impact is likely to be small overall, albeit significant for some regions (such as the Rol and Northern Ireland).

SUMMARY

In summary, the immediate response is considered and the longer-term market response to the new price signals. Thus, the analysis adopts the following steps (for each scenario):

1. Is the UK a net importer or exporter of the commodity?
2. Where an FTA is agreed, what are the RoO that would apply on exported goods?
3. What is the applied EU MFN tariff?
4. Is there a preferential TRQ available that might be used to export UK goods to the EU or allow imports from other parties to the UK at below the MFN tariff, and is it filled?
5. What is the price that the UK supplier may obtain from the next most valuable buyer on export or next cheapest supplier on import?
6. Is the buyer offering more than the feed grain price?
7. If the EU is no longer the favoured buyer, will EU exports to other buyers be reduced, increasing potential demand for the UK product?
8. Does the estimated change in relative price of malting barley and malt, and milling wheat and flour, change processing margin and thus size of the processing industry?
9. How important is the change in catchment area and cost of haulage?
10. Do these influences differ for trade with the Rol?

ANALYSIS OF TRADE ASPECTS

In this section, we show the current trade situation destinations, volumes and prices achieved for each of the four products and analyse in detail the outcomes of the three scenarios. All data is based on the trade pattern over the five years from 2013 to 2017. Data is taken from HMRC, Defra, AHDB and EU sources.

See [Appendix 2 Tariff Summaries](#) and [Appendix 4 Comments on Tariff Rate Quotas](#)

WHEAT

CURRENT SITUATION

WHEAT TRADE – FIVE-YEAR AVERAGE 2013 TO 2017

	'000 tonnes	£/t	%	£ '000
UK exports				
Spain	425.5	135	31%	57,326
Ireland	122.2	148	9%	18,026
Other exports EU	489.3	139	35%	67,980
Exports to EU	1,037.0	138	75%	143,331
Exports to non-EU	347.3	140	25%	48,530
Total Exports	1,384.2	139	100%	191,862
UK exports to EU as % production	7%			
Exports as % production	10%			
UK imports				
France	237.4	178	14%	42,315
Germany	408.2	189	24%	76,956
Ireland	17.9	177	1%	3,178
Other EU	524.7	160	31%	83,823
Total UK imports from EU	1,188.2	174	70%	206,271
Ukraine	31.0	182	2%	5,626
North America	425.9	219	25%	93,097
Other non-EU	44.6	248	3%	11,059
Total UK imports	1,689.7	187	100%	316,053
UK imports from EU as % production	8%			
UK Imports as % production	12%			
				Flow of cash
Net UK imports from EU	151.3			62,940
Net UK imports from non-EU	154.1			61,251
Net UK imports	305.4			124,191

Derived from HMRC trade data

The difference in export price between North America and the EU reflects quality differences between milling wheat supplies.

Non-EU trade tends to rely on larger vessels than most of the EU trade and, consequently, has a lower shipping cost but also fewer ports to load or unload.

In a perfect market, over time the market prices converge for similar goods as the supply of goods increases to the higher priced markets and prices fall and vice versa. The lowest export price determines the internal UK price for a particular wheat quality. In practice, export price largely determines the UK

wheat price while the import price determines the milling premium, although both prices are confused by differences in wheat qualities making up the imports and exports.

FREE TRADE AGREEMENT

While a free trade agreement is expected, retaining the status quo in terms of tariff free access between the UK and EU, there are changes resulting from new RoO. The RoO only indirectly impact on wheat through new constraints imposed on flour exports containing non-EU/UK produced grain. Since it is higher quality grain that would be needed to replace the imported grain, this might impose greater value on some of the wheat quality components. However, the ability to produce these qualities would be largely limited by climatic differences.

Supply chains would potentially have to be further segregated for exports where a significant part of the output to ensure exported flour and bakery goods contained less than the agreed percentage of non-UK or EU wheat. This would be of greatest importance for the NI mills.

However, for the wheat crop, disruption for most producers would be negligible.

UNILATERAL TARIFFS

- Exports to the EU are limited, as described in the following section
- The UK retains tariff-free imports from the EU, but will also be open to tariff-free imports from other origins on an MFN basis. Exports are subject to tariffs that are accepted by the WTO for the EU
- The volume of exports are as described in the following section but would need to be exported to North African countries
- UK feed wheat export value is reduced by additional cost of transport to deeper water ports in order to supply more distant importing countries at a lower shipping cost

TABLE ILLUSTRATING POSSIBLE CHANGES IN WHEAT EXPORTS FOLLOWING MUTUAL IMPOSITION OF TARIFFS

	'000 tonnes	£/t	%	£ '000	
UK exports					
Spain and EU	325.0	129	47%	41,838	TRQ is not limiting but additional cost experienced. UK continues to export premium 'feed' wheat. Tonnage shown is determined by lowest tonnage exported to the EU in the last five years when UK supply was low and was priced out of the market. TRQ cost shared equally. Share of TRQ tariff absorbed largely by UK producer
Ireland	85.0	138	12%	11,690	
Exports to EU	410.0	131	60%	53,528	
Exports to non-EU	974.2	137	40%	133,470	Supply to non-EU market to maintain historic market balance. Additional cost of transport to deeper water ports and additional supply.
Total Exports	1,384.2	135	100%	186,998	
UK exports to EU as % production	3%				Feed wheat price falls 3%
All exports as % production	10%				
UK imports					
Total UK imports from EU	1,188.2	174	70%	206,271	Historic pricing would suggest that there would not be a change in origin of grain. However, at zero tariff the Ukraine has generally met its TRQ tariff quota and there is at least a chance that imports from the
Total Non-EU imports	501.4	219	30%	109,782	

Ukraine would increase at the expense of those from Europe and from any out of tariff low and medium quality wheat from US and Canada.

Total UK imports	1,689.7	187	100%	316,053
UK imports from EU as % production	8%			
All imports as % production	12%			
Net EU	-778.2			-152,744
Net non-EU	472.8			23,689
Net all	-305.4			-129,055

Milling wheat price increase 0%

MUTUAL IMPOSITION OF TARIFFS

- Zero tariff applied to top quality wheat
- EU unlikely to be able to supply wheat of sufficient quality to qualify for the zero tariff
- Supply available from third countries such as Canada and potentially newer suppliers in the FSU
- UK exports to the EU constrained by tonnage. Proposed EU share of TRQ is 2,285,665 t at €12/t
- €12/t is likely to reduce UK exports to the EU of feed wheat with no significant quality attributes (UK exports to EU destinations are likely to have some quality merit at the destination (e.g. group 3 high HFN soft wheat))
- Proposed UK share of TRQs available for imports:
 - 85,935 t at €12/t from any destination
 - 37,390 t at €0/t from Canada
 - An undefined tonnage from the Ukraine at 0 tariff. The estimated retained tonnage is in the order of 31,000 t (current five-year average)

Expected impacts:

- Reduced wheat exports to the EU with cost of tariff shared where UK wheat provides valued characteristics
- Very small quantities of UK wheat from NI to RoI
- Other UK feed wheat previously shipped to the EU would be diverted to North Africa via larger UK ports
- UK would import up to the retained TRQ from the EU
- Reduced availability of quality UK wheat increasing percentage of imports of high quality wheat
- Average UK wheat imports reduced as a consequence of higher price, with increase in UK milling premiums to secure supply
- All millers in similar situation and additional cost passed to consumer

Clearly, the complexities are such that a conclusive position cannot be supplied. The following illustrates a possible outcome with justifications. It is assumed that imports reduce to the minimum level imported in recent years and that exports are determined by the consequent change in supply.

TABLE SHOWING POSSIBLE SCENARIO FOLLOWING MUTUAL IMPOSITION OF TARIFFS

	'000 tonnes	£/t	%	£ '000	Explanation
UK exports					
Spain and EU (excl. Ireland)	325.0	129	47%	41,838	TRQ is not limiting but additional cost experienced. UK continues to export some premium 'feed' wheat largely to Spain. Tonnage shown is the lowest tonnage exported to the EU in the last five years when UK supply was low and priced high, as it would be following application of the tariff. Tonnage may be less but cost implications are negligible. TRQ cost shared equally. Share of TRQ tariff absorbed largely by UK producer
Ireland	85.0	138	12%	11,690	
Exports to EU	410.0	131	60%	53,528	Minimum export to EU in last five years when higher price (low volume) constrained export. Export tonnage increased by volume previously exported to the EU but reduced by fall in availability as a result of reduced imports.
Exports to non-EU	274.2	140	40%	38,393	
Total Exports	684.2	134	100%	91,921	New export price determines % change in UK feed wheat price UK Feed wheat price falls 3%
UK exports to EU as % production	3%				
All exports as % production	5%				
UK imports					
Germany (and rest of EU)	85.0	195	8%	16,536	UK share of TRQ. Import of quality wheat largely from Germany. Cost shared. EU unable to supply top quality zero tariff milling wheat
Total UK imports from EU	85.0	195	8%	16,536	
Ukraine	31.0	182	3%	5,626	Ukraine specific TRQ Quantity top-up (combination of US and Canadian TRQ at €12 and zero tariff top quality wheat.) Tonnage represents the lowest UK imports in last 5 years assumed to be required to enhance UK milling quality. Price change determines % change in milling wheat premium
North America and other	918.2	219	89%	200,734	
Total UK imports	1,034.2	216	100%	222,896	
UK imports from EU as % production	1%				Milling wheat price increases 15%
All imports as % production	7%				
					Flow of cash
Net UK exports to EU	325.0			36,992	
Net UK imports from non-EU imports	-675.0			-167,967	
Net UK imports	-350.0			-130,975	

The model depends on ability to secure milling wheat from the UK. There is considerably greater pressure to make most of UK produced grain and it is assumed that the proportion of UK wheat production with milling wheat potential is increased in line with the premium. The biggest risk is when weather limits quality even where the potential supply is greater. In this situation, more quality wheat would be imported with more low quality wheat consequently exported.

If demand for UK wheat proves greater than anticipated – i.e. the quality is valued on a greater proportion than suggested, UK feed wheat would be replaced by maize.

While the price received for feed grain would be expected to fall, the premium increases for milling wheat.

FLOUR

CURRENT SITUATION

The trade situation for flour differs significantly from the other commodities in this report; virtually all trade is with the EU and external non-EU, trade is insignificant. Quality aspects again feature strongly in terms of trade origins and destinations.

WHEAT FLOUR TRADE – FIVE-YEAR AVERAGE 2013 TO 2017 (EXCLUDES DURUM)

	'000 tonnes	£/t	%	£ '000
UK exports				
France	13.7	753	6%	10,300
Belgium	14.4	287	6%	4,124
Ireland	187.1	308	78%	57,689
Other EU	19.3	735	8%	14,178
EU total	234.4	368	98%	86,292
Exports to non-EU	5.6	490	2%	2,729
Total Exports	240.0	371	100%	89,021
Imports				
France	29.3	352	46%	10,341
Germany	4.9	424	8%	2,087
Poland	12.2	238	19%	2,903
Italy	5.8	531	9%	3,102
Ireland	2.9	407	4%	1,173
Other EU	7.6	433	12%	3,304
EU total	61.3	363	95%	22,911
Non-EU	3.1	603	5%	1,869
	64.4	375	100%	24,780
				Cash flow
Net UK import from EU (excl Ireland)	-12.6			-6,865*
Net UK export to Ireland	184.2			-56,516
Net UK export to non-EU	2.5			-860
Net UK export	174.1			64,241

*Note value of UK imports from EU excluding Ireland is higher lower than exports so net outflow of cash despite net imports in terms of tonnage

While data is taken directly from the HMRC database, some concern has been expressed about the apparent variation in price. Having checked the data, the differences between the prices are consistent across all years and not a consequence of anomalies. However, these may well be due to differences in packaging as well as quality.

Exports represent just under 5% of production.

There are also flours other than wheat flour. However, these represent even smaller volumes.

The most significant is durum flour used in coatings.

It is estimated that there are approximately 31 commercial mills in the UK, with a capacity of about 4 Mt of flour. Ten of the mills are on or close to ports.

The significance of the RoI in terms of trade in wheat flour is particularly stark. Without Ireland, the UK would be a net importer of flour.

Durum flour is also significant for the UK. It is largely made from imported wheat, although it has been grown in the UK in the past. The varieties trialled were particularly prone to sprouting and ergot. Reintroduction following breeding development in the most appropriate areas remains a possibility if imports were excluded.

DURUM FLOUR TRADE – FIVE-YEAR AVERAGE 2013 TO 2017

	'000 tonnes	£/t	%	£ '000
UK exports				
Ireland	1.0	532	28%	545
Other exports EU	2.1	349	56%	723
Exports to EU	3.1	409	84%	1,267
Exports to non-EU	0.6	659	16%	385
Total Exports	3.7	449	100%	1,653
UK imports				
Ireland	0.4	351	2%	138
Imports EU excl Ireland	17.5	283	78%	4,962
Total UK imports from EU	17.9	284	79%	5,100
Non-EU	4.7	471	21%	2,195
Total UK imports	22.6	323	100%	7,295
				Cash flow
Net UK imports from EU	-14.8			-3,832.7
Net UK imports from non-EU	-4.1			-1,809.6
Net imports	-18.9			-5,642.3

A number of respondents highlighted the importance of bakery products. These are a far from cohesive mix of products and contain varying percentages of flour.

TRADE IN BAKERY GOODS – FIVE-YEAR AVERAGE 2013 – 2017

	'000 tonnes	£/t	%	£ '000
UK exports				
Ireland	138.0	2,163	37%	298,466
Other exports EU	142.5	1,789	38%	255,013
Exports to EU	280.5	1,973	75%	553,479
Exports to non-EU	92.5	2,922	25%	270,292
Total Exports	373.0	2,208	100%	823,771
UK imports				
Ireland	122.6	1,546	15%	189,512
Imports EU excl Ireland	647.8	2,030	78%	1,315,081
Total UK imports from EU	770.4	1,953	93%	1,504,593
Non-EU	60.0	2,180	7%	130,845
Total UK imports	830.4	1,969	100%	1,635,438
Net UK exports to RoI	15.4			108,954

Net UK imports from EU	-489.9	-951,114
Net UK exports to non-EU	32.5	139,446
Net all	-457.4	-811,667

Bakery goods are similar to flour in terms of tonnage but of much higher value. The value in the prepared products dwarfs the trade in other products.

It is perhaps surprising that the UK bakery industry has not replaced more of the imported goods. The inclusion of other ingredients means that the tonnage of flour is much less than the tonnage of goods, although it is estimated that about 70% will be flour.

An important point is that, while not directly comparable, the tariffs applied to the baked goods are relatively small as a percentage of the value.

FREE TRADE AGREEMENT

As discussed, the RoO are specific to each trade agreement (see [Rules of Origin](#)). The RoO have more potential to upset the trade in flour than any other commodity included in this report.

It is particularly likely to impede the flow in Ireland where at least some flours or goods would include higher levels of non-EU and UK flour than is likely to be permitted. Supply chain traceability would have to increase and segregation would need to be more carefully controlled and could even include separate processing for the UK and export market.

In NI the competitive advantage for exports to the RoI could easily move to the remainder of the EU even if tariffs were not applied.

It has not been possible to define the cost in this report and further investigation is required.

UNILATERAL TARIFFS

(The UK retains tariff-free imports from the EU, but will also be open to tariff-free imports from other origins on an MFN basis. Exports are subject to tariffs that are in alignment with the WTO MFN tariffs currently in place for the EU.)

Impact:

- Exports to RoI from NI and rest of UK are inhibited by the tariff as described in the next section, leading to large overcapacity in the UK and particularly NI
- Imports of wheat are not inhibited, allowing production of all flour types, albeit at additional cost, particularly where volumes are small, with possibility of some substitution of imported flours
- Import of flour from the EU continues but fall in volume as UK prices fall in response to the overcapacity
- The flexibility to buy any wheat type without additional tariff could provide opportunity to develop more overseas markets

The outcome is similar to the situation where tariffs are mutually applied. The overcapacity is likely to be marginally higher as a result of some flour imports. However, the availability of wheat and other grains would enable millers to substitute flour types that have historically been imported. While non-EU exports have traditionally been small, over the last five years, UK wheat flour has been sent to 49 non-EU countries. The freedom to import wheat would at least provide opportunity to develop the export market, particularly for the ten port side mills.

As described, overcapacity is likely to adjust over a period of two or three years.

MUTUAL IMPOSITION OF TARIFFS

The imposition of tariffs would effectively prevent any UK – EU trade in flour. There are no alternative markets that would be likely to take the surplus production, given:

- Cost of transport

- Perceived/actual flour quality
- Lack of development of existing non-EU markets

The best that could be hoped for is that flour, rather than grain, might be supplied to some of the existing North African markets where UK flour is considered valuable or more flour could be converted into bakery goods and therefore be subject to a percentage lower tariff.

LOSS OF TONNES AND VALUE FOLLOWING MUTUAL IMPOSITION OF TARIFFS ON WHEAT FLOUR

	Flour '000 t	£ '000	Wheat equivalent '000 t
Reduction in net UK imports excluding RoI*	-13	6,865*	17
Reduction in net UK exports to RoI	184	56,516	252
Reduction in total net UK exports to EU	172	63,381	239

	Bakery Products	
	'000 t	£ '000
Reduction in net UK imports excluding RoI	-367.2	-761,602
Approximate UK net reduction in exports to RoI	15.4	108,954
Reduction in net UK imports from EU net of RoI Ireland	-457.4	-811,667

*Difference in import export value means that there is a greater value exported despite lower tonnage

Without the RoI trade, there is a net deficit in flour that would push up flour prices (subject to grain availability). While tariffs are lower on bakery goods than flour, they are still an impediment to trade. Speciality products might still enter the UK but the incentive to develop an alternative would be high.

Milling capacity would inevitably have to be reduced, although those with linked bakery businesses would be less exposed than those retailing flour.

Until milling capacity were reduced, the oversupply would reduce price and profitability (probably dramatically) for all those selling flour. There is a suggestion (from some of the respondents) that the milling industry is controlled as much by sentiment as commercial judgement. If so this would mean that the reduction would take place over several years. However, judging from changes in other sectors, this is unlikely. Arguably, in a similar situation, the EU finalised reform of the EU sugar regime on 22 June 2005. By July 2006, British Sugar announced closure of mills in York and Alscott. The mills were closed by summer 2007. Other European sugar mills were closed in a similar period in response to the policy change.

There are a number of minor differences: British Sugar owned all the UK mills and was able to make a controlled readjustment to capacity to benefit the entire sector and thus its own business. In addition, the policy change was unlikely to be reversed.

The different ownerships in the milling industry, and the recognition that, once capacity is reduced, the supply and demand equilibrium will be re-established means there is a risk that production will continue for longer, with a large proportion of the industry producing at a loss, in the expectation of recovery, until capital reserves are exhausted. Brexit is also likely to be seen as being final but the possibility of a new FTA being reached might remain a consideration.

The mill capacity in NI would be most at risk.

While the excess capacity is the main outcome, the change in cost in different types of wheat is likely to result in changes in the relative pricing of different bakery goods. Although the sector as a whole is insensitive to price, sales of different baked goods are reported to be very sensitive to price.

MALTING BARLEY

CURRENT SITUATION

BARLEY TRADE – FIVE-YEAR AVERAGE 2013 TO 2017

UK barley production	7,030,000	T		
Estimated malting	1,787			
Estimated feed	5,243			
	'000			
	tonnes	£/t	%	£ '000
UK exports				
Germany	105.1	159	8%	16,726
Belgium	104.2	162	8%	16,906
Netherlands	190.3	140	15%	26,720
Ireland	70.2	144	6%	10,140
EU other	427.5	134	34%	57,153
Total EU*	897.3	142	71%	127,644
Middle East and N Africa	322.4	129	26%	41,661
Other	40.8	134	3%	5,487
Total non-EU	363.2	130	29%	47,149
Total Exports	1,260.5	139	100%	174,793
UK Imports				
Ireland	57.9	157	52%	9,076
Denmark	11.5	204	10%	2,351
France	4.1	190	4%	783
Germany	12.8	202	11%	2,580
Other EU	22.3	152	20%	3,380
Total EU	108.6	167	98%	18,171
Non-EU	2.6	226	2%	591
Total imports	111.2	169	198%	18,761.4
Net UK EXPORTS to Ireland	12.3			1,064
Net UK IMPORTS from EU	788.7			109,474
Net non-EU EXPORTS	360.6			46,558
Net all	1149.3			156,032

Sources: HMRC, Defra, AHDB

*of which about 130,000 t is malting barley

The averages hide a considerable range. While, for example, on average 71% of UK exports have gone to the EU, the range has been from 55% to 95%.

Scottish-grown barley supplies around 80% to 90% of the demand from the Scotch whisky sector and Scottish produced malt around 60% of the needs of the Scotch whisky sector¹⁵. The report does not attempt to distinguish barley or malt imported from England against imports from northern Europe and RoI. The cost of transport is similar.

Discussion suggested that exports of high grade malting quality barley were in the order of 300,000 t, largely from the south and southwest. Simultaneous equations based on a feed price of £130/t (the average price to non-EU countries) and UK premium malt import price of £200/t suggests premium exports could be as low as 160,000 t. It is, however, difficult to justify trade in either direction of non-premium grains, given the mutual surplus, and there may be a disconnect between UK perception of quality and market perception.

The trade with the EU is via small vessels (under 5,000 t) allowing supply from a number of ports to a number of ports (in some cases for transshipment) that may not be available to larger vessels.

FREE TRADE AGREEMENT

In this sector, an FTA is likely to result in little disruption. The RoO have no direct impact and virtually no indirect impact. The additional customs costs are likely to be small, given the large volumes traded.

UNILATERAL TARIFFS

Under this scenario, the UK would allow imports to continue but would still impede exports.

- The export tariff is a disincentive to export feed grain to the EU
- The surplus to be exported to N Africa would increase compared to the other scenarios, with a potentially greater discount on the feed price as a greater volume has to be transported to the deeper water ports
- In contrast to the mutual imposition of tariffs, the maltster loses the incentive to produce more malt from UK grain. However, the grower has a greater incentive to supply barley for malting in the UK because malting barley export markets are lost
- However, in absolute terms the change is small

	'000 tonnes	£/t	%	£ '000	
UK exports					
Total EU*	30.0	138	2%	4,143	
Total non-EU	1,230.5	127	98%	155,666	Exports to non-EU countries increase to remove increased surplus
Total Exports	1,260.5	127	100%	159,809	
UK Imports					
Total EU	108.6	167	98%	18,171	
Total non-EU	2.6	226	2%	591	
Total imports	111.2	169	100%	18,761	Imports remain at baseline
Net UK imports from Ireland	-45.6			-7,298	
Net UK imports from EU	-78.6			-14,028	
Net UK non-EU exports	1,227.9			155,076	
Net exports	1,149.3			141,048	

¹⁵ https://www.sruc.ac.uk/downloads/file/3716/malting_barley_trade_%E2%80%93uk_and_scotland

MUTUAL IMPOSITION OF TARIFFS

- The UK is capable of supplying all internal malting barley needs
- Proposed EU shares of TRQs:
 - Any barley (other than as described below) 306,812 t at €16/t
 - Malting barley (for specific use) 20,789 t at €8/t
- The malting barley TRQ has been unused for the last five years and the general barley TRQ on average 5% filled.
- Proposed UK share of TRQs available for import:
 - 293 t of any barley at €16/t
 - 30,101 t of specific malting barley at €8/t
 - There is also an EU TRQ for imports from Ukraine for 325,000 t at €0 tariff. This is not covered in the proposals and it is assumed that imports would remain as at present

Expected impacts:

- The tariffs are likely to make exports of feed barley to the EU largely uneconomic, forcing sales further afield to North Africa. The estimated 300,000 t of malting barley would not be inhibited by the tariff but would reduce as there would be fewer opportunities to benefit from a lower price. It is assumed there would be a 20% reduction, with additional cost shared between the two parties
- While exports to the EU would be subject to two tariff rates, the net price received in the UK would be the same as exporters' maximised price
- UK imports would be constrained to a greater extent, with imports of quality barley limited to the UK share of the TRQ. Again, the two tariff rates would result in the same price for imports where they are of the same quality. The difference would be reflected in the trading margin
- UK producers would fill the gap provided by the fall in imports
- The net balance between imports and exports would be maintained in the RoI but the volume would reduce as RoI adjusted production to meet its own needs
- Volume of feed exports to N Africa would increase with consequent increase in discounts to deeper water ports further from some growers
- Malting barley previously imported would be replaced by UK supplies
- UK growers have quite a lot of flexibility to protect margins by moving between malting and feed production, potentially even after planting

TABLE ILLUSTRATING POSSIBLE CHANGES IN BARLEY EXPORTS FOLLOWING MUTUAL IMPOSITION OF TARIFFS

	'000 tonnes	£/t	%	£ '000	
UK exports					
Ireland	12.3	188	1%	2,314	Net trade balance retained but average price increases as percentage of top quality malting barley which is exported rises. Tariff shared on smaller volume. Malting barley exports to EU maintained with tariff shared. Price rises as described above.
EU other	17.7	195	1%	3,449	

Total EU*	30.0	192	2%	5,763	
Middle East and N Africa	1,060.8	126	84%	133,910	Volume increased by quantity previously exported to the EU, less volume imported from the EU as malting barley use in UK increases
Other	40.8	134	3%	5,487	
Total non-EU	1,101.6	127	87%	139,398	
Total Exports	1,131.6	128	100%	145,161	
UK Imports					
Total EU	30.4	195	92%	5,926	UK to supply Scotland, some quality imports remain with tariff shared, and some UK production changes
Non-EU	2.6	226	8%	591	
Total imports	33.0	197	100%	6,516.8	
Net UK EXPORTS to Ireland	12.3			2,314	
Net UK IMPORTS from EU	-0.4			-163	
Net non-EU EXPORTS	1099.0			138,807	
Net all	1098.6			138,644	

The lack of data to distinguish malting barley from feed barley makes it difficult to estimate the separate impacts on feed and malting barley. In contrast to milling wheat, UK malting barley is more often a premium product. It is not so easy to assume (as it is for wheat) that UK exports are feed grain and UK imports are quality grain: both trades are likely to involve predominantly quality attributes. However, given the relatively small difference in price between the barley exported to the EU against non-EU destinations and the large difference between imported barley (which given the UK surplus) is likely to be on the basis of quality attributes an estimate can be made.

The increased demand for UK malting barley would raise barley premiums by a modest amount to secure an additional 75–8,000 t of malting barley from the UK. This is a modest additional 4–5% and would not require a significant extra premium and may in any case be achieved through the increasing area of spring barley and narrowing of yield difference between malting and feed barley types.

The feed barley price is already determined by the supply to the least valuable export market (North Africa) and, while there is likely to be some additional cost for producers more distant from deep water ports, the extra supply from the UK is likely to be offset by lower supply from the remainder of the UK. A fall in price is unlikely to be greater than £2–3/t.

MALT

The malt industry is vibrant and benefits from reliance on non-EU markets. The US market in particular shows strong growth. The cost of the malt in distilling or brewing is only a small part of the retail value so there is unlikely to be any change in consumption with change in malt price. UK Malt production is reported as 1,396,100 t against a reported capacity of around 1.6 Mt.

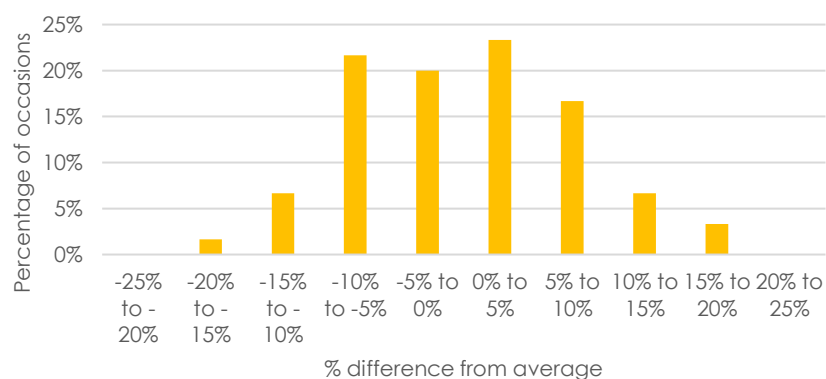
	'000 tonnes	£/t	%	£ '000
UK exports				
Total non-EU	190.6	411	91%	78,298
EU (excl. Ireland)	16.3	530	8%	8,653
Ireland	3.0	452	1%	1,371
Total EU	19.4	518	9%	10,024
Japan	79.8	399	38%	31,812
North America	43.1	532	21%	22,930
Vietnam	14.0	301	7%	4,196
Thailand	15.6	301	7%	4,698
Other non-EU	38.2	384	18%	14,662
Total non-EU	190.6	411	91%	78,298
Total	210.0	421	100%	88,322

UK Imports				
EU (excl. Ireland)	51.5	354.0	72%	18,242
Ireland	20.0	330.8	28%	6,621
EU Total	71.5	347.5	100%	24,862
Non-EU	0.0	347.8	0%	14
Total	71.6	347.5	100%	24,876

Net EXPORTS EU	-52.2			-14,838
Net IMPORTS Ireland	17.0			5,250
Net EXPORTS non-EU	190.6			78,284

The malt price is relatively constant with even 20% variation in price over the last five years being unusual.

PERCENTAGE OF OCCASIONS WHEN THE EXPORT PRICE DIFFERED FROM THE AVERAGE BY THE STATED PERCENTAGE RANGE



Source: TPG HMRC

FREE TRADE AGREEMENT

Malting barley blends are not generally considered to be premium products and thus RoO constraints are likely to have no material impact. The smaller size of shipment than for grain would make customs procedures more expensive per unit but they are unlikely to be significant. Trade with the RoI would be little affected.

UNILATERAL TARIFFS

- The tightening of supply in the UK would not occur as described following mutual imposition of tariffs and a surplus supply of about 19,400 t would develop. In all probability, this would be exported on to the Asian market with a resulting fall in price of around 5%. Overall, there would be a very small negative impact on maltsters and growers but this would be negligible compared with volatility from other causes
- The import of barley without impediment would prevent the introduction of additional barley varieties for specialist malts
- The oversupply of malt in RoI would be relieved and the RoI would have a slight tightening of supply because imports would be lost. The tightening of supply would have a small negative impact on growers but malting margins would improve with less competition

MUTUAL IMPOSITION OF TARIFFS

There are no TRQs for malt so UK-EU trade would effectively end.

- 71,500 t of imported malt would be lost and 19,400 t of exports leaving, with a net reduction in supply of about 52,200 t or about 65,000 t of malting barley. However, barley supply would also be reduced by about 75,000 t. This would be an increase of about 7% of total malting barley supply but only 2% of the total barley production
- The existing malting capacity of around 1.62 M t in over 34 locations is estimated to be operating below capacity and could absorb the additional production required
- There is no fundamental reason why UK growers could not produce similar barley types to those grown in the rest of the EU. Branding might prove to be the main constraint
- Malting barley production in the UK is not limited by area but by the premium necessary to make it a viable alternative to feed barley in more situations. However, the growth in malting barley supply required is small and is unlikely to need a material change in premium to ensure supply
- The RoI has a harder task, with loss of about 20,000 t of exports to the UK (e.g. to Bushmills in NI) or net 17,000 t. However, UK exports to the EU other than the RoI were 16,300 t and, while the cost would be marginally higher, the additional cost would be small and the RoI could supply similarly branded products to the UK (as the British Isles). The RoI would potentially compete with UK maltsters in global markets. Historically, the price differential has been small. Guinness remains globally the strongest branded beer from the British Isles
- The UK would be the most cost-effective supplier of malt to NI. The price may rise slightly

Overall demand for UK barley would increase

Net reduction in UK malt availability: 52,200 t

Net increase in R of Ireland malt availability: 16,300 t

	'000 tonnes	£/t	%	£ '000
Total non-EU exports	190.6	411	100%	78,298
Total EU exports	0.0		0%	0
Total exports	190.6	411	100%	78,298

Total UK Imports	0.0	347.8	0%	14
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CONCLUSIONS

TRADE IMPACTS

The trade scenarios described below map out the most likely economic boundaries post-Brexit.

Failure to remove all tariffs in an FTA, or the Unilateral tariff scenario, would move the economic conclusion to an intermediate position. Under an FTA, the RoO (the rules that determine if a product benefits from the trade preferences in the agreement) is generally specific to the agreement. These rules could be as difficult to manage in the flour industry as imposition of tariffs. (See [Key non-tariff issues –Rules of Origin](#))¹⁶.

1. NEGOTIATION OF A NEW FREE TRADE AGREEMENT - SUMMARY

A key objective of Brexit is to agree a new FTA with zero tariffs between the UK and EU. While this removes the impact of tariffs, there remain other impacts. The most important non-tariff impact for the sectors covered here, is the restrictions under the RoO limiting the percentage of imported third-party products that may be incorporated in exported products (See [Key non-tariff issues –Rules of Origin](#)).

RoO may restrict trade where products are made from grain imported from outside the FTA (i.e. EU and UK, such as from North America). While there are minor issues for malt, there are potentially significant issues for flour. These are likely to be greatest in years when the quality of domestic production is poor and the quantity of imported grain increases.

On average, the inclusion of non-EU wheat in UK flour production is estimated at 6–10 per cent, based on the reported domestic production, imports of wheat, and the proportion of wheat imported from the EU and from outside of the EU. Furthermore, when UK wheat imports increase, to manage low domestic wheat quality, the shortfall appears to be met largely from the EU.

Since, on average, it is estimated that around 6–10 per cent of the wheat used to make flour in the UK is from Canada or the USA (see section '[Milling wheat and flour](#)' for assumptions), RoO could mean that trade in flour, and products using flour, might only partially benefit from tariff reductions in a UK-EU FTA. In fact, the inclusion of non-EU wheat in exports to RoI from both mainland UK and NI are higher than the UK average. With some 75 per cent of UK flour exports going to RoI, this would be particularly important for intra-Irish trade.

There are also small volumes of specialist trade with the remainder of the EU (see section '[Milling wheat and flour](#)'). In addition, the inclusion rate is not constant across all flour production, and some flours and branded products have a much higher content of imported wheat than others.

Problems created by the imposition of RoO would need to be managed. For example, the volume of grain from North America may need to be reduced, or even removed, if the flour was to be exported into the EU. It is unlikely that sufficient grain with similar characteristics could be found from within the EU, even at a higher cost. It is as likely that the types of flour would also have to change with consequent loss of export market. Additional segregation and traceability would also increase cost.

It is suggested that the RoO in any UK-EU FTA may allow for up to 10% non-EU cereals in originating flour. If that was achieved, it is only those products containing a higher percentage of non-EU wheat that would be affected by the RoO.

Data on inclusion rates is not freely available, and varies between millers even for the similar products. Extrapolation from the comments made by millers interviewed, tentatively suggests that as much as 25%-30% of flour exports could breach the RoO threshold if it were set at 10% inclusion.

Consequently, there is likely to be a trade-off between price and flour type. Flour of the appropriate, traditional type could be supplied to the RoI from the remainder of the EU or a slightly different product at

¹⁶ https://www.wto.org/english/tratop_e/roi_e/roi_e.htm

a lower price from the UK. The cost implication for the consumers is small, while the impact on flour margins is potentially significant.

The consequence is unlikely to be devastating but would impact on cost and consumer choice.

The RoO are likely to have far less of an impact on malt exports since there is no significant inclusion of third-party crop in the malt exported either from RoI to NI or from UK to EU or EU to UK.

2. UNILATERAL TARIFFS

The UK retains tariff-free imports from the EU, but will also be open to tariff-free imports from other origins on an MFN basis. Exports are subject to tariffs that are in alignment with the WTO MFN tariffs currently in place for the EU.

While this scenario protects consumers against a rise in prices, it has potentially negative impacts for processors where export markets remain out of reach, while the internal market is available to competitors.

<p>Milling wheat</p>	<p>Under the unilateral tariff scenario, there would be no significant increase in the cost of importing milling wheat. It would allow millers to produce all the speciality flours required in the UK market. Consumers would be unaffected with the range of goods and cost unchanged. Feed wheat price would be expected to fall by about 3%.</p> <p>Feed wheat prices would fall more in exporting years as the cost of export increased. The price fall would be limited by the €12/t TRQ tariff. This is most likely to benefit soft wheat where the UK offers a distinct quality. Most wheat would be shipped to other non-EU destinations and in practice needs to be shipped from deeper ports, reducing the price received by the producer. There is a risk this might lead to increased price competition in some years with other exporters to the EU – such as the Ukraine and Russia.</p>
<p>Flour</p>	<p>Millers would find it easier to meet internal demand for speciality flours but, ultimately, the loss of export markets, and the loss of barriers to import, would still result in a greater oversupply than even where mutual tariffs were imposed. The oversupply would be in the order of 240,000 t, equivalent to two mills. The biggest impact would be in NI although there would be strains elsewhere. The initial price collapse would be deeper than under the scenario of mutual tariff application and remain until production capacity was reduced. The price fall could be significant, falling to the point when return was sufficient only to cover operating costs and not capital replacement. The greatest impact would be for mills not associated with bakeries, although these would not be entirely immune.</p> <p>Previous experience of the impact of a change in policy resulting in processing over capacity, suggests that adjustment would take 2–3 years.</p> <p>The RoI/NI situation would not be relieved since the pressure is from reduced flour exports from NI and mainland UK to RoI.</p>
<p>Malting Barley</p>	<p>There is likely to be a modest increase in supply of malting barley suitable for specialist malts and brands. The export market remains constrained (reducing export price and internal price by 7–8%), particularly for feed grain and there would be slightly fewer occasions when there is opportunity to ship malting barley to the EU profitably). However, the low TRQ tariff of €8/t on specific malting barleys and brewing processes would be sufficient for most UK malting barley exports. The cost of the tariff is likely to be shared between the supplier and buyer, given the exports are likely to be for particular uses.</p> <p>Feed barley remains in surplus and is less likely to be able to make use of the TRQs since the feed grain market is far more competitive. Even the €16/t would be sufficient to allow other EU producers to supply traditional UK outlets. The grain would be shipped to North Africa (where supply from other EU states would be reduced to supply those EU markets vacated by the UK). The cost for most UK feed barley producers would be small but, for others, higher haulage cost to deeper water ports</p>

	<p>would reduce price. There would be a small (negligible) fall in feed barley prices and thus premium for malting barley to secure supply.</p> <p>However, the volume of supply to the UK is maintained so the total loss in the value of exports is smaller, also at around 7%. Malting barley prices fall.</p>
Malt	<p>A greater proportion would need to be exported onto the lowest value markets, reducing exports price by 4.8%.</p> <p>However, the maintenance of exports to NI from the RoI would leave the RoI malting industry secure. Although there would be a small increase in malting barley secured from the NI and rest of the UK, this is likely to be insignificant.</p>

3. MUTUAL APPLICATION OF TARIFFS - SUMMARY

In this scenario, the UK and EU apply the current EU WTO applied tariffs and EU Tariff Rate Quotas (TRQs) are shared between the two parties. (See Appendix 2 '[Tariff Summaries](#)')

The feed grain, malt and flour tariffs are intended to restrict the import of competing production.

Milling wheat	<p>Even though the EU is a major wheat producer, it does not produce top quality wheat and thus a zero tariff is imposed on its import.</p> <p>High quality wheat imports, to date, largely from Canada and the US, will continue to enter the UK tariff-free. Similarly, some wheat may continue to enter the UK from Ukraine through the Ukraine's country-specific TRQs and from the US and Canadian TRQs for lower quality wheat (see Appendix 2 Tariff Summaries).</p> <p>There is an additional 45,000 t imported into the UK from outside the EU, USA, Canada and the Ukraine. This is a relatively trivial volume and may be assumed to enter tariff-free as high quality wheat or through the TRQ at €12/t. Regardless of which tariff regime, the price of this grain is unlikely to change following the mutual imposition of tariffs.</p> <p>Since very little EU wheat meets the protein specification required to qualify as top quality wheat, the zero tariff is unlikely to be applied to significant wheat imports to the UK from the EU. However, it is likely that EU quality wheat would enter the UK subject to the non-country specific €12/t TRQ for all wheat.</p> <p>The proposed division of the TRQs between the EU and UK has yet to be agreed but the non-country specific quota tonnages are small. UK use of the EU total has also been a surprisingly small fraction. The UK is likely to take up any share of the TRQ that is available for imports. The non-country specific TRQ is on average only 33% filled and, of this, the UK receives about 5% (based on tonnage). This suggests a potential UK share of around 120,000–130,000 t as is now proposed (see Appendix 4 Comments on Tariff Rate Quotas). This would allow some imports (likely to be of quality wheat) from the EU at a relatively small tariff.</p> <p>Once the TRQs are filled, import of low and medium quality wheat is subject to the applied tariff of €95/t and becomes prohibitive.</p> <p>Of the total current EU imports of 1,188,000 t, the UK would potentially apply the full €95/t tariff to a little over 1 Mt.</p> <p>However, the cheapest means of maintaining supply would be to import high quality wheat at the zero tariff and to take up the full country specific tariff from Canada and USA (it is assumed that the Ukraine tariff is already taken up). This would increase cost. It would also be expected to increase UK milling premiums where quality wheat was available (wheat premiums are currently limited by the ability to import from Europe and in particular Germany) and might lower the quality standards that would be acceptable. It would be hoped that higher premiums</p>
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	<p>would be paid for higher quality grains and this may fuel the development of higher quality varieties in the UK.</p> <p>Imports would continue to be received as a share of the country specific TRQs and via tariff-free access for top quality wheat. It is likely that the wheat import price would rise by around 15% as a result of changing source. This does not take into account any reduction in flour production. If this is taken into account, imports required would be some 200,000 t lower and the additional cost falls very slightly. In those years when the UK had a below-average wheat quality, the price would rise more.</p> <p>With a rise in the price of milling wheat, there is a potential for considerably higher milling premiums (of up to 15%) if the appropriate quality could be produced.</p> <p>While the TRQ remaining with the EU is sufficient to absorb all likely UK wheat exports (in most years over 2 Mt are likely to be available), the competition for feed wheat is likely to prevent most UK wheat exports to EU markets (where there are no quality attributes). However, the €12/t puts an effective limit on the price fall.</p> <p>The export price achieved will determine internal UK feed wheat prices. However, even allowing for an increase in transport cost to deeper water ports, net price is unlikely to fall by more than 3%.</p> <p>It is assumed that some feed wheat will continue to be exported from NI to RoI with the additional cost shared. Some imports of high Hagberg Falling Number (HFN) group three wheat is likely to continue to go to countries such as Spain where there is a demand for the particular UK grain type. However, the additional cost is likely to be shared, eroding the current price.</p>
<p>Flour</p>	<p>Flour manufacture would be severely hit, with the loss of 235,000 t of exports to the EU. However, of this total, 188,000 tonnes are currently exported to the Republic of Ireland.</p> <p>It is likely that one or two mills would be forced to close with at least one of these being in Northern Ireland. Closure of two mills would potentially reduce supply to below demand (depending on the size of mills closed) but this production shortfall would be met through bringing the remaining mills up to full capacity.</p> <p>Until the mills shut, overcapacity is likely to cause major problems across the industry as the overcapacity intensifies competition. Those mills linked to bakeries would be more protected than those producing flour for unaligned bakers.</p> <p>Potentially, there are some positive developments with the replacement of bakery products from the UK market – although the loss of these adds to the pressure on the NI mills.</p>
<p>Malting Barley</p>	<p>Imposition of the full tariff would prevent trade in barley between the UK and EU. The preferential TRQs at €16/t (£14/t) for any barley and €8/t (£7/t) for particular malting processes would allow the export of quality grains and even opportunistic exports of some feed grains. In general, UK feed barley exports would be outpriced by other EU suppliers.</p> <p>The TRQ volumes are small, capable of absorbing only about one-third of current UK barley exports to the EU if all the TRQ were retained. In fact, the latest proposal is that the EU would retain only 40.9% of the malting barley tariff and 99.9% of the barley tariff (See Appendix 4 Comments on Tariff Rate Quotas). However, they are significant in terms of malting barley exports. The proposal suggests that the EU would retain 306,812 t of the (non-specific) barley TRQ (leaving the UK with 293 t for imports) and 20,789 t of the specific malting barley TRQ (leaving the UK with 30,101 t for imports). On average, over the last five years, only 5% of the barley TRQ has been filled (leaving in the order of 290,000 t for potential UK exports) and the malting barley TRQ has been unused. These quotas are likely to enable UK malting barley</p>

	<p>exports to continue for speciality malts. In this circumstance, where unique barley characteristics are required, the tariff cost is likely to be shared between the buyer and seller. Exports of malting barley from NI to the ROI would probably also benefit, although exports from mainland UK to ROI would tend to be outcompeted by other suppliers from the EU.</p> <p>ROI malting barley requirement is slightly below 250,000 t, with ROI barley production at about 1.5 Mt. The UK malting barley supply is about 27% of production, suggesting that the ROI could supply sufficient malting barley to increase malt production by about 60%.</p> <p>Only in the order of 200,000 to 300,000 t of malting barley is exported from the UK, largely from the south coast, and a small quantity from NI to the ROI. The remaining barley exported is largely feed barley. Following imposition of tariffs, the options for malting barley producers that currently export: i) sell as feed barley with an average penalty of £18/t but with a yield increase from higher nitrogen rates¹⁷, ii) use of the non-country specific TRQs to the EU, noting that most would be subject to the higher (general) barley tariff, iii) increased transport to maltsters in East Anglia potentially also costing about £8-10/t, iv) transport to Scotland to replace supplies from the EU that would be less profitable following imposition of a tariff. The small TRQ would increase cost to Scotland from EU suppliers, making UK producers more profitable in this market. Brand is important and, while most Scottish distilleries would prefer supply of malt from Scottish maltsters and Scottish barley, English barley and malt would be acceptable if Scottish supplies were unavailable.</p> <p>Even in the South of England, loss of the tariff-free access to the EU is unlikely to reduce price of malting barley by more than £5/t.</p> <p>While net barley exports to the EU (of largely feed barley) are substantial at around 790,000 t bigger than the TRQ, the loss of this market would be replaced by increasing exports to North Africa. Grain previously supplied to North Africa by the remainder of the EU would replace the UK exports previously supplied to the EU. The price obtained would be slightly lower than now but the most significant impact is the need to supply via larger vessels to keep shipping costs low.</p> <p>While feed barley is largely exported to the EU, the choice of destination (whether EU or not) is determined by very small changes in price. (Within the last five years, as much as 45% of barley exports have been to non-EU countries). The cost of haulage to a deep water port looks likely to be the main determinant of price and hence destination. Price will fall for those growers supplying vessels under (say) 20,000 t since supply will need to be diverted to other ports or consumers. However, very few growers would suffer more than £5/t on feed barley prices.</p> <p>Barley imports into the UK are small and would also largely cease once the small share of the TRQs were filled with non-feed varieties. For example, some of the imported six-row barley has a higher enzyme content than the UK two-row varieties, making the six-row barley more suitable for combining with wheat for grain distillation. There is no climatic reason why six-row malting barley varieties should not be grown for this purpose in the UK. The UK share of any TRQ is unlikely to be sufficient to maintain supply and any rise in cost would be dissuasive.</p> <p>The impact on supply of barley from within the UK is likely to be negligible (price of barley relative to competing crops has differed by as much from changing the crop balance), and adequate supplies are likely to continue to be supplied with no adjustment to the premium.</p> <p>There would appear to be an opportunity to build a new large-scale maltings in the South of England close to Southampton. Malting barley prices in the area are likely</p>
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¹⁷ HGCA PROJECT REPORT No. 320 BARLEY QUALITY AND GRAIN SIZE HOMOGENEITY FOR MALTING found that "As fertiliser nitrogen rate increased yield increased, for every 1 kg/ha of applied nitrogen there was an increase of 15 kg of grain".

	<p>to be depressed by the reduced trade to the EU and the region is highly suited to malting barley production. The large container port would enable export to the increasingly valuable markets in USA and Japan. Further investigation is recommended.</p> <p>It is estimated that (feed) barley prices would fall by around 1%, although this would be greater in the south and less elsewhere. Total export value would fall by 18% (as a consequence of lower price and lower volume as some export is diverted to internal markets). There is scope to broaden barley types to substitute for barley imports from the EU. While the impact is negative, this is a small price reduction compared with the impacts of currency and global volatility. However, in contrast to these two factors, which may raise or lower prices, the impact of this change can only be negative.</p>
<p>Malt</p>	<p>Most malt (200,000 t) is exported outside of the EU and is thus not affected by the imposition of tariffs. The main export markets are Japan, USA, Thailand and Vietnam. However, just under 20,000 t is exported to mainland EU. But about 70,000 t of malt is imported from the rest of the EU (Ireland contributes 17,000t of this with other imports being to Scotland, where the cost of transport from mainland Europe or the UK is similar). Specialist malts are also imported for reasons of quality or branding. The trade with the EU would almost entirely cease, following the imposition of the €152/t tariff on malt.</p> <p>While the US market provides a premium over other malt buyers, and the market is growing, increased sales over those demanded by natural growth is unlikely to be possible. As a consequence, growth in supply (following loss of EU markets) would be to less valuable markets such as Thailand or Vietnam.</p> <p>The price obtained, and volume exported to the EU from the UK is volatile, with a negative correlation between price and volume. Nevertheless, the EU market is a premium to other markets, with the exception of the USA.</p> <p>The imposition of tariffs would reduce the malting barley price by about 5%. Removal of imports and exports to and from the EU would leave a net additional supply of 250,000 t. Most of this supply would go to Northern Ireland to replace supplies from the Republic, with the small additional surplus exported to the lowest priced sustained buyers, Vietnam or Thailand.</p> <p>However, the UK would also replace the non-specialist malts sent to Scotland at slightly higher cost. The removal of competition is likely to mean that the additional cost incurred would be absorbed by the buyer rather than supplier. It might also mean that lack of competition would allow the market price to rise more, increasing maltsters' profits.</p> <p>In contrast to the EU as a whole, Ireland loses an export market of 19,800 t from a malting capacity of around 160,000 t. The two Irish maltsters are relatively small but have strong relationships with the Irish brewing industry. Branding is strong and export from Dublin to the remainder of Europe at an additional transport cost of £25/t would replace supplies previously sent by the UK. Ireland has the potential to compete with the UK in export markets through supply of a similar product with a strong brand. Boormalt, with capacity in Europe and Ireland, is in a good position to protect the Irish industry and maximise opportunities.</p>

DATA CAVEAT

A number of different data sources have been used for this project. There are often differences in data collection methods or differences in the period the data relates to. There are also a number of recognised data issues. For example, reported exports are rarely identical to the reported imports by the receiving

country. Timing of sale and scale of transaction have a significant impact on the reported traded price. Differences in quality are not always apparent. The HMRC and Eurostat trade data frequently shows possible pricing anomalies, particularly for the smaller trades although these may also be for special purposes and represent unusually high premiums.

Extraction rates for flour and conversion rates to malt also vary. There are differences in standards used to define wheat qualities.

Price and quantity averages often include a substantial range of values.

For all these reasons, it is important to consider the trends rather than the absolute values reported.

GLOSSARY

Most Favoured Nation (MFN): Is a key WTO principle that all Members are treated equally. This means that trade measures must be applied equally to all trading partners.

Bound tariffs: The maximum tariff rate that each WTO member commits to. They are specific to each Member and cannot be increased, but can be reduced.

Applied Tariffs: Tariffs actually applied, which can be lower than the bound rate.

Tariff Rate Quotas (TRQs): A tariff applied on a fixed quantity of commodity. These may be introduced in recognition of historic trading patterns, as part of FTAs or in dispute resolution. Most EU trade in practice is controlled by these arrangements and not the MFN tariffs. These may be specific to a country.

Free Trade Agreement (FTA): An agreement between two trading parties that reduces the barriers to trade.

Variable rate tariffs: A particular tariff arrangement important in the cereal sector where tariffs are only applied where the price falls below a threshold to maintain the price at that threshold up to a maximum tariff (the MFN tariff).

Erga omnes: Arrangements open to all.

Advalorem: Tariff based on a percentage of value.

Rules of Origin (RoO): Rules of origin are the criteria used to determine the national source of a product (e.g. percentage of a component originating elsewhere or extent of the alteration) and are part of each FTA. Duties and restrictions can depend upon the source of imports.

APPENDIX 1 – TRADE SUMMARIES

UK TRADE SUMMARY

WHEAT (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production (harvest in year)	13,261,000	11,808,312	16,450,107	16,506,000	14,347,000	14,474,484
Estimated milling supply	4,436,000	5,534,000	5,594,000	5,979,000	6,144,000	5,537,400
Import from EU	1,889,186	1,071,103	973,695	852,897	1,154,329	1,188,242
Import from non-EU	468,074	453,091	450,834	563,831	571,237	501,413
Total imports	2,357,259	1,524,194	1,424,529	1,416,727	1,725,566	1,689,655
Export to EU	376,039	742,739	1,429,543	2,062,488	574,006	1,036,963
Export NON-EU	34,510	365,095	483,009	835,319	18,429	347,272
Total Exports	410,549	1,107,833	1,912,552	2,897,807	592,435	1,384,235
Net exports(-ve imports)	-1,946,710	-416,360	488,023	1,481,079	-1,133,131	-305,420
Net EU exports(-ve imports)	-1,513,147	-328,364	455,848	1,209,591	-580,323	-151,279
% production imported*	18%	13%	9%	9%	12%	12%
% production exported*	3%	9%	12%	18%	4%	10%

Source: Eurostat *note production period and trade period do not align although trend is valid

FLOUR (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production UK wheat*	3,237,956	4,039,416	4,083,212	4,364,234	4,484,672	4,041,898
Production imported wheat*	1,494,891	869,343	727,737	654,745	697,080	888,759
Total production*	4,732,847	4,908,759	4,810,949	5,018,979	5,181,752	4,930,657
Import from EU	44,883	70,772	63,509	85,700	49,109	62,795
Import from non-EU	3,079	3,197	3,173	3,088	2,974	3,102
Total imports	47,962	73,970	66,682	88,788	52,082	65,897
Export to EU	278,796	214,243	219,210	227,969	231,731	234,390
Export non-EU	5,695	4,620	5,874	5,438	6,234	5,572
Total Exports	284,492	218,863	225,085	233,407	237,965	239,962
Net exports(-ve imports)	236,530	144,893	158,403	144,619	185,883	174,066
Net EU exports(-ve imports)	233,913	143,470	155,702	142,269	182,622	171,595
% production imported	2%	2%	2%	2%	1%	2%
% production exported	6%	5%	5%	5%	5%	5%

Source: Eurostat & Defra *conversion factor 1.37 wheat = 1 † flour (code 11010015 only)

BARLEY (ALL) (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production (harvest in year)	7,092,000	6,911,000	7,370,000	6,607,000	7,169,000	7,029,800
Estimated malting use (period)	1,797,100	1,859,300	1,754,300	1,743,400	1,781,100	1,787,040
Import from EU	178,046	89,120	113,885	84,951	76,876	108,576
Import from non-EU	1,632	11,121	5,357	2,010	4,070	2,616
Total imports	179,677	89,132	119,242	86,960	80,945	111,191
Export to EU	452,451	771,024	1,038,632	1,240,849	983,571	897,305
Export non-EU	385,122	335,314	535,406	508,593	51,595	363,206
Total Exports	837,574	1,106,338	1,574,038	1,749,442	1,035,166	1,260,512
Net exports(-ve imports)	657,896	1,017,206	1,454,796	1,662,482	954,221	1,149,320
Net EU exports(-ve imports)	274,406	681,903	924,747	1,155,898	906,696	788,730
% production imported	9%	15%	20%	25%	13%	16%
% production exported	12%	16%	21%	26%	14%	18%

Source: Eurostat and Defra

MALT (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production – barley*	1,403,984	1,452,578	1,370,547	1,362,031	1,391,484	1,396,125
Production – wheat*	20,703	19,375	20,469	13,359	12,344	17,250
Total production*	1,424,688	1,471,953	1,391,016	1,375,391	1,403,828	1,413,375
Import from EU	101,286	79,213	58,940	56,619	61,667	71,545
Import from non-EU	63	44	48	32	9	39
Total imports	61,731	56,664	58,989	79,245	101,295	71,585
Export to EU	18,109	15,378	13,825	20,940	28,560	19,362
Export non-EU	159,039	185,915	181,287	202,303	224,565	190,622
Total Exports	177,148	201,293	195,112	223,243	253,125	209,984
Net exports(-ve imports)	115,417	144,629	136,123	143,998	151,830	138,399
Net EU exports(-ve imports)	-83,177	-63,835	-45,115	-35,679	-33,107	-52,183
% production imported	4%	4%	4%	6%	7%	5%
% production exported	12%	14%	14%	16%	18%	15%

Source: Eurostat and Defra *extraction rate assumed to be 1 t malt = 1.28 t barley

REPUBLIC OF IRELAND TRADE SUMMARY

REPUBLIC OF IRELAND - WHEAT (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production	524,840	678,550	653,410	610,250	635,470	620,504
Imports from UK	32,523	120,576	62,403	181,727	203,450	120,136
EU excl. UK	121,349	48,130	28,703	30,012	101,073	65,853
Total imports from EU	153,872	168,706	91,107	211,740	304,523	185,990
Imports from non-EU	0	0	0	0	0	0
Exports to UK	40,903	14,104	15,652	10,401	10,880	18,388
Exports to EU excl. UK	0	0	0	1	2	1
Total exports to EU	40,903	14,104	15,652	10,402	10,882	18,389
Exports non-EU	33,937	0	0	1	0	6,788
Irish Trade balance UK (import) export	8,380	-106,472	-46,752	-171,327	-192,570	-101,748
Net (imports) exports	-79,032	-154,602	-75,455	-201,337	-293,641	-160,813
% production imported	29%	25%	14%	35%	48%	30%
% production exported	14%	2%	2%	2%	2%	4%

Source: Eurostat

REPUBLIC OF IRELAND - FLOUR (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Estimated						35,000
Imports from UK	118,039	119,866	146,730	176,922	180,403	148,392
EU excl. UK	34,106	30,283	25,747	22,279	21,147	26,712
Total imports from EU	152,145	150,148	172,477	199,201	201,549	175,104
Imports from non-EU	101	73	300	267	317	212
Exports to UK	2,231	2,507	3,801	8,295	3,312	4,029
Exports to EU excl UK	42	15	12	13	10	18
Total exports to EU	2,273	2,522	3,813	8,308	3,322	4,048
Exports non-EU	11	10	7	3	3	7
Irish Trade balance UK (import) export	-115,809	-117,358	-142,930	-168,628	-177,091	-144,363
Net (imports) exports	-149,962	-147,689	-168,958	-191,157	-198,542	-171,262

Source: Eurostat

REPUBLIC OF IRELAND - BARLEY (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production	1,599,290	1,668,900	1,655,660	1,400,120	1,411,480	1,547,090
Imports from UK	77,772	29,347	33,931	86,615	172,587	80,050
EU excl. UK	165,646	15,848	49	3,948	8,459	38,790
Total imports from EU	243,419	45,194	33,980	90,563	181,046	118,840
Imports from non-EU	0	0	0	1	0	0
Exports to UK	31,101	31,579	60,288	29,593	27,569	36,026
Exports to EU excl UK	3,359	2,954	13,259	7	0	3,916
Total exports to EU	34,460	34,533	73,547	29,600	27,569	39,942
Exports non-EU	0	0	0	5	0	1
Implied consumption						
Irish Trade balance UK (-ve import) export	-46,671	2,232	26,357	-57,023	-145,018	-44,025
Net (-ve imports) exports	-208,959	-10,662	39,568	-60,959	-153,477	-78,898
% production imported	15%	3%	2%	6%	13%	8%
% production exported	2%	2%	4%	2%	2%	3%

Source: Eurostat *note production period and trade period do not align although trend is valid

REPUBLIC OF IRELAND - MALT (TONNES)

	Jan.-Dec. 2013	Jan.-Dec. 2014	Jan.-Dec. 2015	Jan.-Dec. 2016	Jan.-Dec. 2017	Average
Production (estimated)						192,000
Imports from UK	6,715	6,492	10,420	12,603	28,299	12,906
EU excl. UK	6,043	7,536	5,798	4,650	12,893	7,384
Total imports from EU	12,757	14,028	16,218	17,253	41,191	20,289
Imports from non-EU	0	0	0.2	0	0	0
Exports to UK	23,152	13,945	22,532	14,300	13,410	17,468
Exports to EU excl UK	2,729	3,124	1,803	2,871	2	2,106
Total exports to EU	25,881	17,069	24,335	17,171	13,412	19,574
Exports non-EU	613	2,884	652	770	853	1,154
Irish Trade balance UK (import) export	16,437	7,453	12,112	1,697	-14,888	4,562
Net (imports) exports	13,736	5,924	8,769	688	-26,925	438
Implied domestic consumption						
% production imported				9%	21%	26%
% production exported				9%	7%	27%

Source: Eurostat

IRELAND - CROP PRODUCTION ('000T)

		2013	2014	2015	2016	2017
Barley	Republic of Ireland	1,663	1,731	1,739	1,480	1,506
	N. Ireland*	140	136	140	125	114
Wheat	Republic of Ireland	545	717	697	648	682
	N. Ireland	58	64	64	60	67

Source: Defra and Republic of Ireland Central Statistics Office

Note: Both parties grow 60% or more spring barley but with the percentage declining.

APPENDIX 2 - TARIFF SUMMARIES

While the basic tariffs applied to cereals are relatively straightforward, these are often set at trade prohibitive levels. It is the additional non-country specific TRQ arrangements that are most important to the UK, since there is at least a chance that the low transport cost to Western Europe will allow the UK to take advantage and replace other suppliers. The tariff share may also allow imports of some premium grains.

WHEAT

The most significant tariff arrangements for wheat are:

<p>High Quality Wheat CN Code: 1001990013</p>	<p>Defined as having: a specific weight in kg/hl greater than or equal to 78; a maximum of 10.0% of matter that is not quality wheat grains of unimpaired quality, of which a maximum of 7.0% of broken and/or shrivelled grains, a maximum of 2.0% grains damaged by pests, a maximum of 0.5% sprouted grains; a maximum of 1.0% of miscellaneous impurities (Schwarzbesatz); a HFN of a minimum of 230; a protein content (13.5% moisture content) of a minimum of 14.6%</p> <p>This is aimed at top quality wheat not grown in the EU.</p> <p>A variable tariff ensuring a minimum import price of 55% over the intervention price of €101.31/t, i.e. €157/t (£138/t at €1= 88p) on importation to Rotterdam, less the CIF import price, subject to a maximum tariff of €95/t. (EU 642/2010)</p> <p>A tariff is rarely applied.</p>
<p>Medium and low quality wheat CN Code: 10019900 other than above</p>	<p>All wheat other than high quality wheat defined above, and durum</p> <p>A fixed tariff of €95/t</p> <p>A non-country specific (erga omnes) TRQ for 2,378,387 tonnes at a tariff of €12/t (EU 1067/2008)</p> <p>A US specific TRQ of 572,000 t at €12/t</p> <p>A Canada specific TRQ of 38,853 t at €12/t</p> <p>A Canada specific TRQ of 27,778 t at €0/t</p> <p>A Ukraine specific TRQ for 65000 t at €0 tariff (includes flour, other wheat types and pellets) (EU 2017/2200)</p> <p>A Ukraine specific TRQ rising to 1,000,000 t in 2021 at €0 tariff (includes flour, other wheat types and pellets) (EU 2015/2081)</p> <p>A Moldova specific TRQ 75,000 t at €0 tariff (association agreement L 260/7 and L260/1)</p> <p>There are many other 0 tariff agreements but most of these are not with significant exporters</p>
<p>Medium quality durum wheat</p>	<p>Variable rate tariff. Fixed tariff with similar mechanism to that applied to high quality wheat. The maximum tariff is €148/t but is rarely applied</p> <p>11 July to 30 June 50,000 t TRQ at 0 duty open to all third countries (erga omnes) – MFN</p> <p>11 January to 30 December 300,000 t TRQ at 0 duty open to all third countries (erga omnes) – MFN</p>

EU FULFILMENT OF SELECTED PREFERENCE AGREEMENTS (5 YEARS 2013 TO 2017)

	Quota tonnes	Average utilisation	Range
Canada	27,778	23%	0% to 78%
USA	572,000	14%	0% to 72%
Ukraine	950,000 (960,000 2017)	100%	
Other third countries	2,378,387	33%	4% to 97%

Source: EU Commission

Moldovia exports in excess of its zero tariff quota presumably taking up the open TRQ at €12/t.

FLOUR

Wheat flour CN Code: 1101001500	<p>Wheat flour not subject to a specific agreement is subject to a fixed tariff of €172/t (MFN tariff) (EU 2204/1999)</p> <p>There are a number of country specific and trade group specific preferential agreements at 0% tariff not linked to a quota.</p> <p>A Ukraine specific TRQ for 65,000 t at €0 tariff (includes wheat grains and wheat pellets) (EU 2017/2200)</p> <p>A Ukraine specific TRQ rising to 1,000,000 t in 2021 at €0 tariff (includes wheat grains and wheat pellets) (EU 2015/2081)</p>
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BARLEY

The most significant tariff arrangements for barley, are:

Malting Barley CN Code: 1003900020 (End use order malting barley)	<p>Defined as having (among other characteristics) a specific weight of at least 60.5 kg/hl, moisture content of 13.5% or less and to be used for the manufacture of beer aged in vats containing beechwood.</p> <p>Non-preferential tariff quota under end-use order 50,890t at a tariff of €8/t (EU 1253/2011 modifying 2305/2003)</p>
Barley CN Code: 1003900090	<p>Barley not subject to a specific agreement is subject to a fixed tariff of €93/t (MFN tariff)</p> <p>Non-preferential (erga omnes) tariff rate quota (TRQ) for 307,105 tonnes at a tariff of €16/t (EU 970/2006 quota amended EU 1253/2011)</p> <p>A Ukraine specific TRQ for 325,00 t at €0 tariff (includes flour and barley pellets) (EU 2017/2200)</p> <p>A Ukraine specific TRQ rising to 350,000 t in 2021 at €0 tariff (includes flour and barley pellets) (EU 2015/2081)</p> <p>A Moldova specific TRQ 70,000 t at €0 tariff (association agreement L260/7 and L260/1)</p> <p>There are many other 0 tariff agreements but most of these are not with significant exporters</p>

EU FULFILMENT OF SELECTED PREFERENCE AGREEMENTS (5 YEARS 2013 TO 2017)

	Quota tonnes	Average utilisation	Range
Malting Barley	50,890	0%	
Barley	307,105	5%	0% to 12%
Ukraine*	270,000	55%	9% to 100%

*Four years only.

MALT

The most significant tariff arrangements for malt, are:

Roasted Malt CN Code: 1107200000	Roasted malt not subject to a specific agreement is subject to a fixed tariff of €152/t (MFN tariff) (EU 2204/2009) Canada tariff preference agreement 0% (EU 0037/2017) A Ukraine specific TRQ for 7,000 t at €0 tariff (EU 2405/2015) Serbia 0% tariff (decision 29/4/2008) There are many other 0% tariff preference agreements (with no associated quota) but most of these are not with significant exporters
Malt not roasted CN Code: 1107109900	Unroasted malt not subject to a specific agreement is subject to a fixed tariff of €131/t (MFN tariff) (EU 2204/2009) Other as for roasted malt

MAIZE

Maize CN Code: 1005900090 (other than seed or flint maize) CN Code: 1005900020 (Flint maize)	A variable tariff ensuring a minimum import price of 55% over the intervention price of €101.31/t i.e. €157/t (£138/t at €1= 88p) on importation to Rotterdam, less the CIF import price, subject to a maximum tariff of €94/t. (EU 642/2010) A tariff is rarely applied. Non-preferential tariff quota for 277,998 t at €0/t A Canada specific TRQ of 27,778 tonnes at €0/t A Ukraine specific TRQ for 625,000 t at €0 tariff (includes flour and pellets) (EU 2017/2200) A Ukraine specific TRQ rising to 650,000 t in 2021 at €0 tariff (includes flour and pellets)(EU 2015/2081) There are many other 0 tariff agreements but most of these are not with significant exporters
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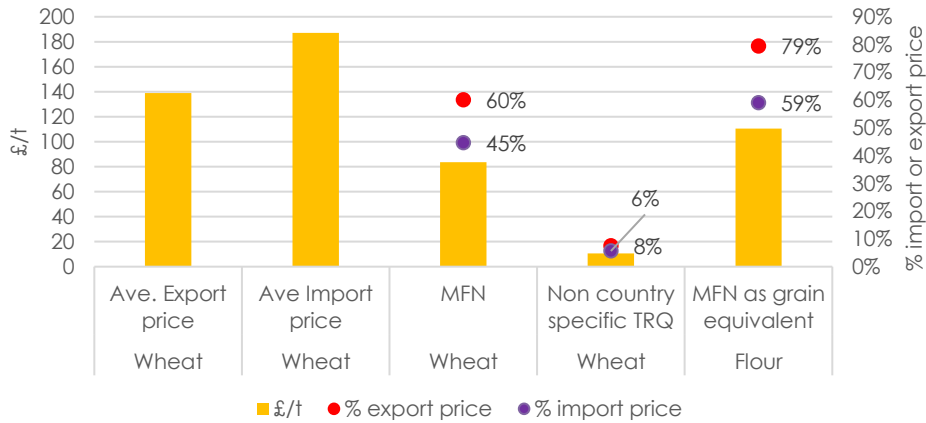
	Quota	Average	Range
Non-preferential TRQ	277,988	100%	na

TARIFFS ON BAKERY PRODUCTS

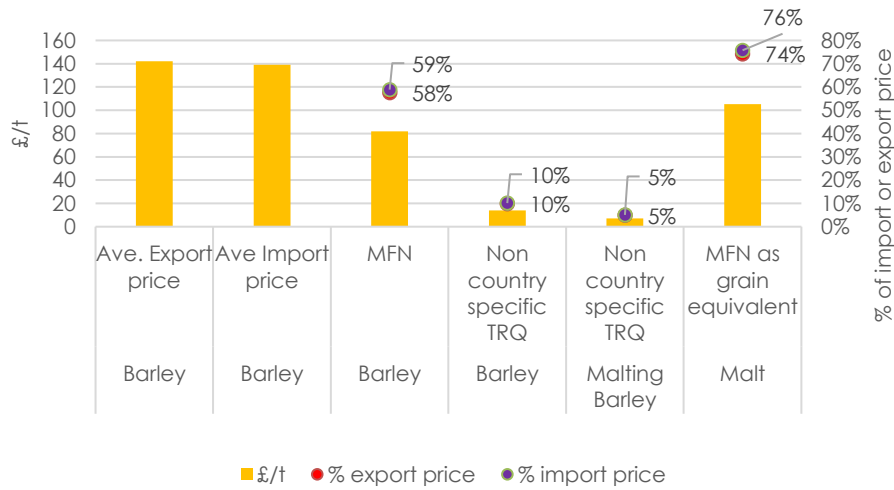
	% of value	Plus fixed element
Crispbread	5.8%	plus €13 per 100 kg
Sweet biscuits	9.0%	
Waffles and wafers	9.0%	
Bread, not containing added honey	9.7%	
Biscuits (excluding sweet biscuits)	9.0%	

TARIFFS IN PERSPECTIVE

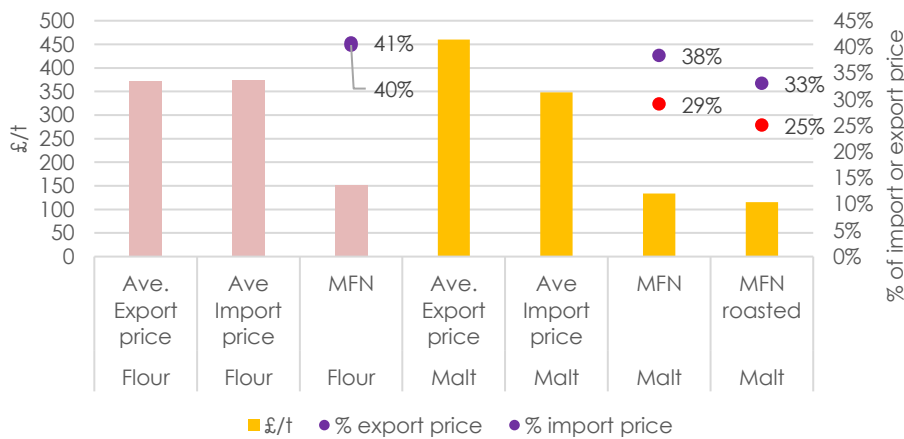
WHEAT TARIFFS AND PRICES



BARLEY TARIFFS AND PRICES



MALT AND FLOUR TARIFFS



APPENDIX 3

COMPARISON OF THE MILLING AND MALTING SECTORS

	FLOUR	MALT
Perception	Medium to low quality	High quality premium brand
Exports	Only within the EU	Main markets Japan and USA
Production	Reliant on imported wheat from Europe and North America to add to UK wheat	Largely based on UK produced barley
Ireland	Mills largely in the north	Maltings largely in the south
MFN tariff	€172/t	€152/t
Approximate number of mills/maltsters	Over 31	Over 38
Approximate UK capacity	Over 4 Mt	Over 1.6 Mt
	Artisan millers	Artisan maltsters
	WHEAT	BARLEY
UK area	Static	Increasing
Type	Mainly winter types	Winter and spring types
UK quality consistency	Medium-low	Medium high
UK v mainland Europe	UK quality poorer	UK quality usually higher
Quality varieties	Yield potential lower	Yield potential winter varieties lower. Yield potential spring varieties similar
Husbandry for quality production	No yield discount	Sometime significant yield discount
Cost of quality production	Higher	Lower
Supply and demand	Moving into deficit	Moving into surplus
Exports	Largely feed grains	Largely feed grains
Irish quality grain	Largely imported	Largely self sufficient
MFN tariff	€95/t low and medium quality €0/t high quality	€93/t
Erga omnes (non-country specific) TRQs	€12/t Wheat on 2,378,387 tonnes	€16/t Feed barley 307,105 tonne €8/t malting barley 50,890 tonnes

APPENDIX 4

COMMENTS ON TARIFF RATE QUOTAS (TRQ)

TRQs, (as a result of FTAs, historic trading relationships, dispute resolution or the flexibility provided for trade with the poorest countries) are usually predominantly country specific but there are also, usually smaller, non-country specific TRQs. There are two aspects to TRQs: a low or zero tariff and a defined tonnage to which it applies (preferential access may include other arrangements).

Existing TRQs need to be divided between the UK and EU. Both shares have importance for the UK since the EU share will determine the tariff applied to UK exports to the EU, and the UK share the volume of imports into the UK that would be at a low tariff, at least in the short term. As discussed, the UK might open new erga omnes TRQs, although this would not apply to exports or, in the event of agreeing a new FTA with the EU, a component might be a UK-EU TRQ.

The EU and UK have agreed a potential division of the TRQs¹⁸. For the purposes of this report, the relevant proposed divisions are:

Product Description	Unit	EU28 scheduled quantity	Country	Order number	EU27 share in quota usage ²	EU27-TRQ	UK TRQ
Durum wheat	†	50,000	EO	090074	100%	50,000	0
Quality wheat	†	300,000	EO	090075	100%	300,000	0
Common wheat (medium and low quality)	†	572,000	USA	094123	99.99%	571,943	57
Common wheat (medium and low quality)	†	38,853	CAN	094124	3.8%	1,463	37,390
Common wheat (medium and low quality)	†	2,371,600	OTH	094125	96.4%	2,285,665	85,935
Common wheat (medium and low quality)	†	129,577	EO	094133	100%	129,577	0
Barley	†	307,105	EO	094126	99.9%	306,812	293
Malting barley	†	50,890	EO	090076	40.9%	20,789	30,101
Maize	†	277,988	EO	None	96.8%	269,214	8,774
Maize	†	500,000	EO	None	100%	500,000	0
Maize	†	2,000,000	EO	None	100%	2,000,000	0
Corn gluten	†	10,000	USA	090090	100%	10,000	0
Grain sorghum	†	300,000	EO	None	100%	300,000	0
Millet	†	1,300	EO	090071	68.3%	888	412
Maize	†	277,988	EO	094131	96.8%	269,214	8,774
Maize	†	500,000	EO	None	100%	500,000	0
Maize	†	2,000,000	EO	None	100%	2,000,000	0
Corn gluten	†	10,000	USA	090090	100%	10,000	0
Grain sorghum	†	300,000	EO	None	100%	300,000	0
Millet	†	1,300	EO	090071	68.3%	888	412

Source: Commission

There are also TRQs for preparations consisting of a mixture of malt sprouts and of barley screenings before the malting process (possibly including other seeds) with barley cleanings after the malting process, and containing, by weight, 12.5% and 15.5 % or more of protein. The proposal is that the EU will retain these TRQs entirely.

¹⁸ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018PC0312&from=EN>

The EU WTO schedules do not include the significant Ukraine TRQs, or others agreed within FTAs. These bilateral TRQs are subject to separate negotiations. They may (or may not) be shared on the same basis as those in the WTO schedules.

The WTO requires: "In order to ensure compatibility of this exercise [division of TRQs] with the EU's obligations under the WTO Agreement...this apportionment should be based on the existing trade flows under each TRQ for a recent representative time period. A consistent approach to all TRQs, inter alia with respect to data and methodology, should be followed. Importantly, the existing overall levels of market access to the EU and UK available to other WTO Members should be maintained."

Soon after the proposal was initially announced, the USA, Brazil, Argentina, Canada, New Zealand, Thailand and Uruguay (but not Australia) sent a warning letter: "*We are aware of media reports suggesting the possibility of a bilateral agreement between the United Kingdom and the European Union 27 countries about splitting Tariff Rate Quotas (TRQs) based on historical averages. We would like to record that such an outcome would not be consistent with the principle of leaving other World Trade Organization Members no worse off, nor fully honour the existing TRQ access commitments. Thus, we cannot accept such an agreement.*"

A split, as agreed between the EU and UK, can leave the exporter worse off. For example, if the five-year share of the quota was 95% to 5%, the expected division would be within these proportions. However, it is quite possible that within one of those years the share of the imports was 50% to 50%. Post-division, the part taking the 5% share would not be able to take the additional tonnage, leaving the exporter worse off. To appease the exporting countries for some goods, the total TRQ volume may need to be increased.

The TRQ share may also be detrimental by limiting imports. For example, while a primary producer may welcome a tariff preventing import at a lower price, the manufacturer of that product might lose market share if access to product is lost as a result of the tariff. In the extreme case, loss of the economy of scale by the processor might result in the processing business becoming unprofitable, with loss to both the processor and the primary producer.

For this report, we have based the TRQ division on the schedule above and made a similar estimate of the division of bilateral TRQs.

TRQs were created following the WTO Uruguay round and were aimed at maintaining existing trading relationships (such as with New Zealand for sheep and butter), as part of FTA and in dispute resolution. The EU parties initially benefiting from the Uruguay TRQs may no longer be the major beneficiary within the EU.

It is anticipated that if the UK fails to create an FTA with the EU on exit, that a number of new erga omnes TRQs would be created.

APPENDIX 5

SPECIFIC EXAMPLES OF POTENTIAL NON-TRADE BARRIERS

Two crop protection products that are particularly contentious, and that the UK and EU may differ about, are neonicotinoids and glyphosate.

NEONICOTINOIDS

Neonicotinoids are systemic pesticides, which means they are taken up and distributed throughout the whole plant. Five neonicotinoid insecticides are currently approved as active substances in the EU for use in plant protection products, namely clothianidin, imidacloprid, thiamethoxam, thiacloprid and acetamiprid.

Since 2013, the use of clothianidin, imidacloprid and thiamethoxam have been severely restricted, primarily due to concerns about their impact on bees. Following extensive evaluations by the European Food Safety Authority (EFSA), the Commission is currently considering whether or not to further restrict or ban the use of these pesticides. At the end of February 2018, EFSA published their assessment of some 1,500 studies, and concluded that these chemicals do pose a risk to bees. On 17 April 2018, the EU decided to ban the outdoor use of these chemicals, while allowing continued use in glasshouses.

Similarly, approval for the use of thiacloprid expires at the end of April 2019, and its renewal is currently under review. Because of concerns about its endocrine disruption properties, if it is renewed, the approval could not be for more than 7 years.

Acetamiprid was found to pose a low risk to bees, and has been approved for use until 28 February 2033. The EU MRL for acetamiprid for wheat is 0.1 mg/kg, and for barley 0.01 mg/kg. Use of neonicotinoids has not been restricted on crops imported into the EU.

GLYPHOSATE

Glyphosate is a herbicide that has been widely used in the EU and throughout the world for many decades.

Between 2012 and 2015, a comprehensive scientific assessment was carried out by the member states and EFSA to confirm that glyphosate complies with the new approval criteria laid down in the 2009 EU pesticides legislation. In light of this review, in 2016, the Commission proposed that glyphosate be renewed, but there was insufficient support from member states. In response, a temporary approval was agreed, which expired at the end of 2017. Alongside this, a further review, by the European Chemicals Agency (ECA), was undertaken.

The ECA review supported the conclusions of the EFSA review, as did reviews by the relevant authorities in 27 EU member states, as well as by a number of countries and international organisations outside the EU.

On 12 December 2017, glyphosate was approved for 5 years.

The EU MRL for glyphosate for wheat is 10 mg/kg, and for barley 20 mg/kg.

It would be unlikely that the use on imported crops would be prevented even if use were banned in the EU, provided international standards were met.

APPENDIX 6

FARM BUSINESS SURVEY DATA

Profitability: England: Cereals (conventional): Medium: All Performers

Profitability Measures (£ per farm unless stated otherwise)	FBS values	FBS values (per Ha)
Number of farms	65	
Total farmed area (hectares)	256.2	-
Cereals output (£) [a]	149,560	583.8
Oilseed rape output (£) [b]	43,478	169.7
Other crops output (£) [c]	34,977	136.5
Milk output (incl. subsidies - £) [d]	0	0
Other livestock output (£) [e]	14,502	56.6
Other incomes [f]	89,263	348.4
Agri-Environment & BPS [g]	57,745	225.4
Gross Farm Output [a+b+c+d+e+f+g] {GFO}	389,525	1,520.40
Crops direct costs [h]	103,354	403.4
Livestock direct costs [i]	7,209	28.1
Products valuation change/net livestock purchases [j]	15,759	61.5
Gross profit [GFO-h-i-j] {GP}	263,203	1,027.30
Wages and salaries	19,999	78.1
Machinery repairs	16,100	62.8
Machinery fuel and oil	13,187	51.5
Contract work	15,532	60.6
Other machinery and motor expenses	2,273	8.9
Rent [m]	22,373	87.3
Rates	705	2.8
Power: electricity and heat	4,767	18.6
Property repairs	11,471	44.8
Professional fees	7,486	29.2
Bank interest and charges [n]	9,424	36.8
Insurance costs (excluding labour)	9,782	38.2
Depreciation:	48,370	188.8
Machinery	38,089	148.7

AHDB MILLING WHEAT, MALTING BARLEY, MALT AND FLOUR PROJECT

Buildings and works	10,162	39.7
Glasshouses	0	0
Permanent crops	120	0.5
Other overheads	6,682	26.1
Total overheads {OH}	188,152	734.4
Net profit [GP-OH]	75,051	292.9

FBS Farm Business Benchmarking

Created: 24/04/2018 09:39:12

Rural Business Research @ Cambridge

APPENDIX 7

COMMODITY DESCRIPTION

Feed grain	The underlying price for wheat and barley is determined by the feed grain component. Maize imports increased following the poor 2012/13 UK harvest and have remained high since then, averaging just under 2 Mt per year or nearly double that of the five years prior to that.
Wheat	The UK wheat production has been virtually static over the last 20 years, while consumption has risen. As a consequence, consumption and production trends converged around 2016/17. In future, the UK is likely to become a more frequent net importer of wheat, although this might reverse if maize became a consistently cheaper source for ethanol and starch production. The five-year average shows the UK as a net exporter, although in three out of five years it has been a net importer. Fifty per cent of UK wheat is used for animal feed.
Milling wheat	About 38% of UK wheat is used for flour production. However, UK wheat is supplemented with quality wheat from the EU and wider afield. UK wheat imports average around 12% of production but imports are double this as a percentage of the milling wheat requirement. Seventy per cent of imports are from the EU. Milling varieties of wheat are lower yielding than their feed counterparts but there is no additional yield penalty where they are managed to maximise quality, although there is a small increase in cost. On average, group 1 and 2 wheat varieties have occupied about 30% of the crop area. The percentage was higher in 2016 and 2017, largely as a consequence of a narrowing of the yield penalty compared with feed varieties. Millers also use some group 3 and even group 4 varieties for milling. Wheat quality is dependent on weather conditions. Premiums have averaged around £20/t (15%) over feed variety prices. Both North American wheat and German wheat are considered to have particularly beneficial, but different, properties for milling. German wheat, for example, is used in pizza grists. The cost of German wheat imports limits UK milling wheat premiums.
Flour	About 5% of the UK flour produced is exported, with 98% of exports going to the EU. On average, about 18% of the wheat used in UK flour is imported, with roughly 50% to 60% coming from the EU. Variable UK quality is a vulnerability. Thus, for the year ending December 2013, the average inclusion of imported wheat rose to over 30%. Some bread producers use flour containing over 50% imported flour for particular products. According to the European Flour Millers Association, EU mills are at 65% capacity. ¹⁹ Shipping is in relatively small volumes in containers and, consequently, at much higher cost than wheat.
Barley	UK barley production has been increasing over the last 10 years, following a period of decline. The increase is largely for agronomic reasons to maximise return over the rotation, despite providing a relatively low gross margin in isolation. There are strong regional differences, with most growth in production occurring in England and particularly the Eastern region. A substantial 18% is exported, with an average of 70% going to the EU. Shipments outside of the EU are, on average, in larger vessels with consequently lower shipping cost per tonne. There are negligible imports. Global barley production has fallen from the peak in the late 1980s.
Malting barley	It is estimated that around 25% of the barley produced is used for malting. However, over 50% of the barley production is spring barley and virtually all spring barley varieties grown have malting potential. AHDB records between 50% and 60% of the varieties of the total barley grown in GB have malting potential (this

¹⁹ European Flour Millers' Annual Report 2015/2016

	<p>includes only those varieties with full approval from the Malting Barley Committee). Not all suitable varieties grown achieve malting quality due to management or adverse weather. To maximise the quality potential, yield has to be sacrificed, although, in some years, malting quality may still be achieved, increasing volatility in malting barley premiums. Nonetheless, there is a surplus over malting capacity in the south of the country and a small malting barley tonnage of around 200,000 to 300,000 t is exported to mainland Europe annually in small vessels of under 5,000t. The premium for malting barley is modest at about £18/t (16%) over feed values.</p>
<p>Malt</p>	<p>Approximately 15% of UK malt is exported, with 91% exported outside of the EU. The export trend is upwards. The malting barley feedstock is almost entirely sourced from within the UK. There is excess malting capacity within Europe²⁰. In contrast to grain, shipping is in containers and thus at higher cost per tonne. Malt production is concentrated in the Midlands and East Anglia. There are few maltsters in the South of England, despite good malting barley-producing areas. Scotland is a deficit area for malt, particularly following the recent growth in the distilling market. UK malt is described as 'well modified' and is preferred by the smaller regional brewers and craft sector because it converts relatively easily in the brewing process.</p> <p>However, continental 'export quality' malts, made from six-row barley, provide a higher diastatic power (DP), with higher amylase enzyme content. This allows higher inclusions of unmalted starches ('adjuncts'). High DP malts are also important for distilling, where up to 90% unmalted starch sources can be included.</p>

²⁰ Emalt.com

APPENDIX 8

PROCESSING MARGINS

Any difference in tariff imposed on the grain and the processed good potentially changes the relative input and output prices and thus processor's margin (see [Appendix 2 'Tariffs in perspective'](#)). For both flour and malt production, the grain is the largest cost component, with energy the next most significant direct cost.

A detailed analysis of the processing margin is beyond the scope of this report but some insight can be obtained by examining the relationship between the flour or malt throughput or turnover and the costs as shown in the published financial accounts. The accounts presentation for the various businesses may not be identical (i.e. some costs may be allocated to different headings or different year ends may indicate different stock levels and valuations) and the sample is relatively small. However, the consistency of the relationship (which is extremely strong for malt and flour production) suggests only modest economies of scale with increasing turnover. This does not mean that profit does not increase with scale, it does in absolute terms.

The cost of sales (mainly grain and a little energy) in the last reported accounts year, show that, for every £1 increase in turnover, the cost of sales increased for flour millers by £0.80 and for maltsters by about £0.84. There is no indication in this study that the cost falls per unit as scale increases. There are balancing factors: grain has to be sourced from further away, increasing the cost of transport, while marketing is likely to improve as well as the efficiency of processing. The cost of sales is equal to just under 81% of the costs incurred for millers and 83% of the costs for maltsters on average (in this sample). It is likely that the energy efficiency is higher with newer plants and increases with scale but this was not evident from this analysis.

There are economies of scale for labour. The wage and directors' remuneration costs are considered in the analysis. For the smaller operators, there may also be lack of clarity between directors' remuneration and shareholder dividends, where directors are also shareholders but this has been ignored. However, allowing for these caveats, the labour cost rises by £0.10 for every £1 increase in turnover in flour milling and by only £0.05 for every £1 increase in the malting industry. The cost represents about 10% of the turnover for both processors, on average. However, the increase in cost with turnover is less consistent than the increase in the cost of sales and there is a small indication that the rate of increase declines with scale.

The capital cost (as shown by the depreciation provision) also increases relatively slowly with scale and is erratic. There are examples of below trend investment with increase in scale but it is far from consistent. Interest and dividends, the investors' reward for the use of capital, is also erratic.

Despite the more erratic relationship between scale and labour and capital costs, the milling sector does show a weak relationship between turnover and profit in absolute terms.

Other costs are more variable in both sectors. While small, the range in audit cost stands out as not relating to any other discernible cost. Interest charges and dividends are also plant specific.

The average operating profit and pre-tax profit is greater for maltsters as a percentage of turnover, and in absolute terms, than it is for millers, despite smaller turnover.

While the data does not show overwhelming economies of scale, newer plants may be more efficient or the potential economies greater than those actually realised.

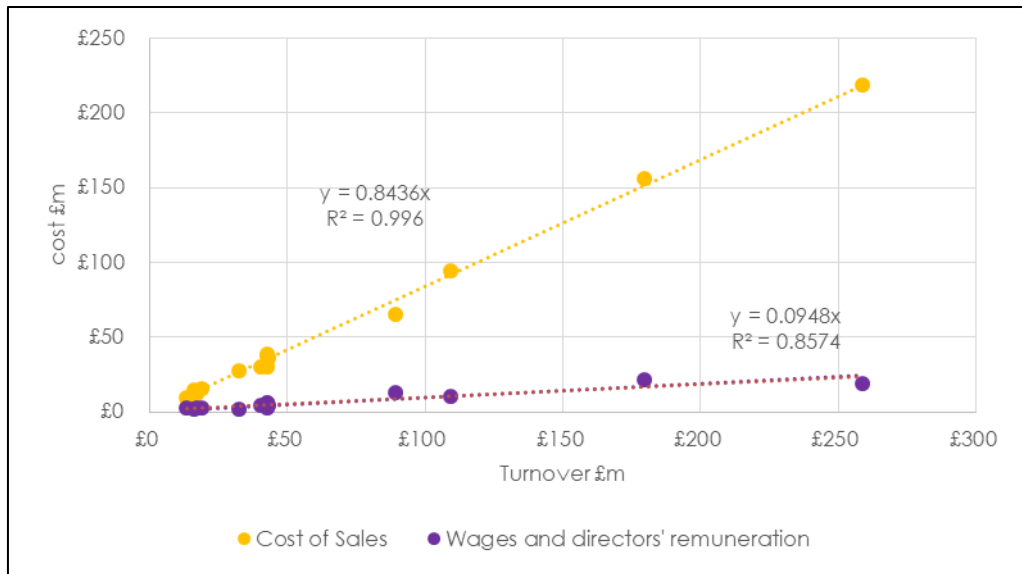
Where margins are squeezed, production is likely to continue even if the capital cost is not covered until new investment is required. The opportunity cost for the sites is highly variable depending on location.

FLOUR PRODUCTION

Despite low profitability at all scales of operation and no consistency of profit generation with scale, the suggestion is that there are economies of scale, particularly in terms of labour and capital investment.

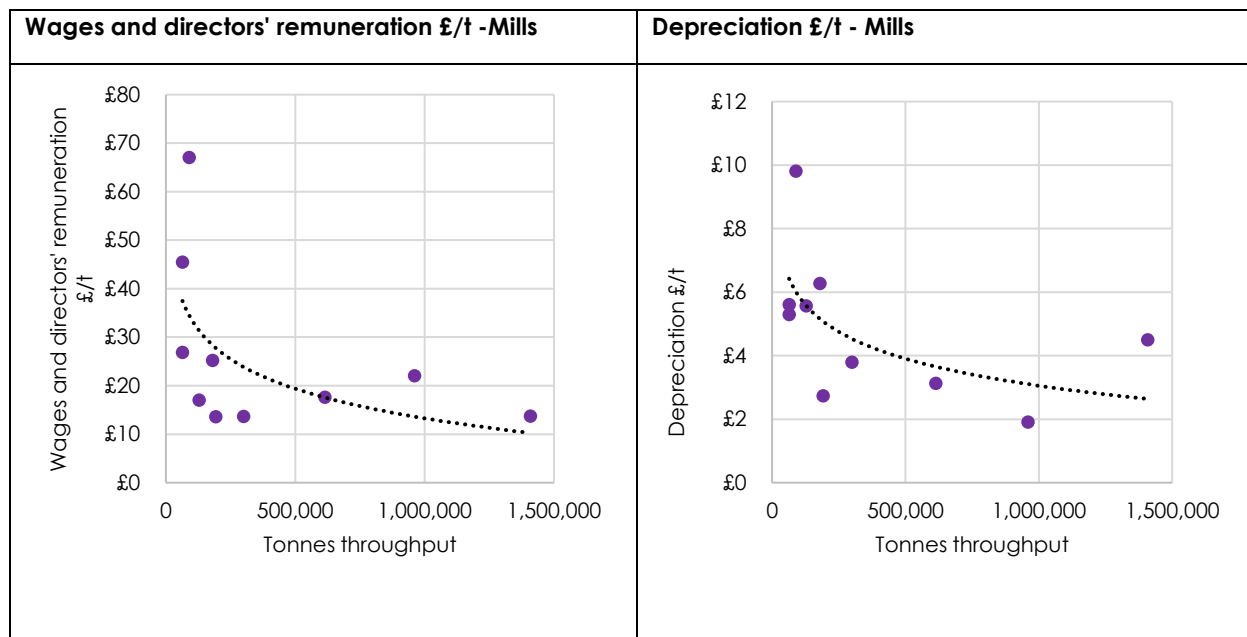
The graph following is based on the most recent accounts year available but there is no material change when based on the most recent two years.

TURNOVER VERSUS 1) COST OF SALES AND 2) WAGES AND DIRECTORS' REMUNERATION – FLOUR MILLS



Source: Companies House

Examined on the basis of cost per tonne the savings are more dramatic:



Source: Companies House and TPG

There appears to be no significant increase in profit in terms of £/t or in absolute terms with increasing tonnage or turnover.

MALT PRODUCTION

In order to estimate grain equivalents from malt, the EU Commission uses a conversion of 1.27 t barley equals one tonne of malt (MAGB use a factor of 1.30). There is clearly considerable variation between varieties and between years.

The major operating cost input is energy. There are a number of different sources but the MAGB quote 750 kWh of gas and 150 kWh electricity per tonne of malt. The Carbon Trust in a detailed study²¹ shows an

²¹ <https://www.carbontrust.com/media/206488/ctg053-maltings-industrial-energy-efficiency.pdf>

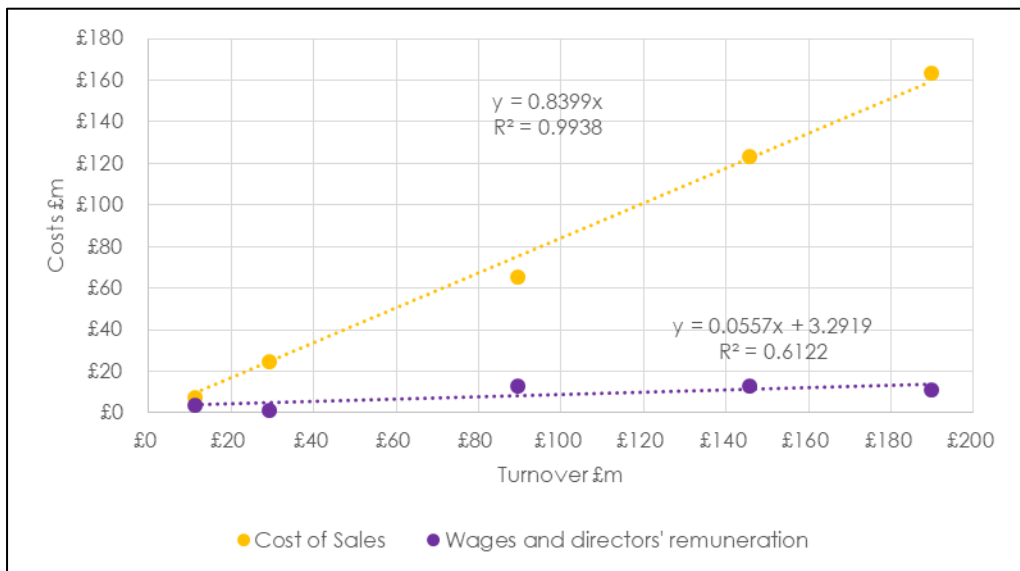
energy input of 961 kWh per tonne of malt. However, it also reports considerable variation, with newer plants requiring less energy and economies of scale. The Carbon Trust also identifies the potential to save considerable energy with introduction of energy-saving techniques. By way of contrast, a Canadian project²² estimates a significantly lower energy consumption for a proposed new plant consuming 87.4 kWh electricity and 398.6 kWh gas per tonne of malt.

The only other major operating cost is the malting barley. Labour cost is low in large mechanised plants.

An analysis of accounts demonstrates the relationship between some of the components and scale.

There appears to be economies of scale for all inputs but the economies of scale for labour are dramatic. The cost of sales is largely barley and energy and it would appear that the larger processors are not disadvantaged by the need for a larger catchment area to secure crop (the cost may be absorbed by the grower or buyer depending on whether supply or demand is subject to most competition) and, for whatever reason, are still able to reduce operating costs. The capital investment as represented by the annual depreciation shows a similar reduction with scale, as shown by the wages and directors' remuneration. The sample is not large but the trends are sufficiently strong to suggest the general finding is meaningful.

TURNOVER VERSUS COST OF SALES, AND WAGES AND DIRECTORS' REMUNERATION - MALTSTERS



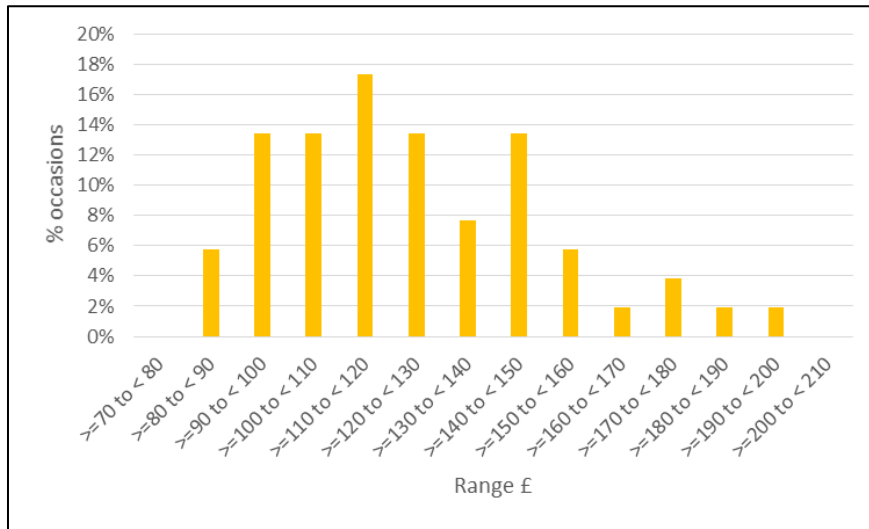
Source: Companies House

Whatever happens, the industry is being driven towards large plants and, with the benefit of investment, adapt to new circumstances. Investment in the sector is justified in securing economies of scale to substitute for the higher priced producers.

Based on the EU conversion of barley to malt, malting barley prices from AHDB and the lowest monthly FOB malt price recorded for the major trading parties from the HMRC, the average margin over grain price is about £90/t malt. The range is actually large.

²² <http://files.constantcontact.com/3e765937001/964aac2-6679-4efe-b197-66d16a4d7305.pdf?ver=1469213332000>

% OCCASIONS WHEN THE MALT MARGIN OVER BARLEY IS WITHIN STATED RANGE (MONTHLY DATA FIVE YEARS)



Source: HMRC and AHDB

APPENDIX 9

GRAIN QUALITY

GRAIN PREMIUMS

Premiums are paid for malting barley and milling wheat. Both malting barley and milling wheat quality are determined primarily by growing specific varieties, secondly by the weather conditions, particularly at harvesting, and thirdly by management practice.

For both crops, the premiums are important in determining supply. However, the size of the premium is ultimately limited by the cost of importing equivalent grain. This is particularly important for wheat, where the cost of German wheat imports currently limits UK milling wheat premiums.

Yields are one of the main determinants of the cost of production and tend to relate largely to climate and soil types. Yields are similar across Europe, although note the particularly high yield in the RoI.

YIELD AVERAGE 2013 TO 2017 T/HA

	Wheat	W. Barley	S. Barley*
UK	8.17	6.90	5.68
Ireland	9.31	8.95	7.17
France	7.03	6.45	5.73
Germany	8.01	7.35	5.59

*data set incomplete for spring barley and average is for fewer years
Source: Eurostat

Based on AHDB corn return data over a 10-year period, UK milling wheat premiums have averaged about £20/t, with most premiums being around £15–£20/t. The percentage premium is around 15% and shows a similar distribution to the absolute premium. There is a small second premium peak around £40–£45/t, which largely appears to relate to the 2008 calendar year.

A similar picture is shown for malting barley where the average premium is about £18/t (16%), with most premiums falling in the £10 to 15/t range.

Based on the AHDB data, there are not large regional differences in terms of premium or distribution.

Some caution is needed because the samples are simple averages and not weighted by month.

DISTRIBUTION UK MILLING AND MALTING PREMIUMS OVER FEED WHEAT AND FEED BARLEY £/T FROM JANUARY 2008 TO JANUARY 2018



Source: AHDB taken from 'Corn returns' ex-farm prices analysed TPG

The premium provides the incentive to grow milling or malting varieties, taking into account yield discount and risk of not obtaining the expected grain quality. Risk is higher for milling wheat, although yield penalty tends to be less. Since potential milling and malting crops as determined by variety selection represent only a small area of the crop, there is scope to increase production if UK supplies increased in value.

Where malting or milling prices fell, the grower price for the grain is unlikely to fall below the feed grain price. UK barley used for UK-style ale and particularly distilling has to have a lower nitrogen content than for the lager export beer markets, where high nitrogen levels are required to produce an excess enzyme level that allows for unmalted starch 'adjuncts' (such as rice, maize grits, etc.) to be used in the process. For distilling purposes, where spirit yield is important, very low nitrogen levels are preferred, with a corresponding higher starch content that maximises spirit yield per tonne of malt.

VARIETY CHOICE

The higher grain qualities required for milling and malting result in a lower yield than their feed counterparts, even when managed under the same conditions. However, the yield penalty has varied as new varieties have been added to the National Recommended List.

WINTER WHEAT FUNGICIDE TREATED YIELDS REPORTED IN UK NATIONAL RECOMMENDED LIST 2017/18

	Variety	% control yield*	% group 4 average yield
Group 1 average (milling)		99	97
Group 2 average (milling)		100	98
Group 3 average		100	98
Group 4 average		102	100
Best group 1 variety	Zyatt	102	100
Best group 2 variety	Siskin	103	101
Best group 3 variety	Barrel	103	101
Best group 4 variety	Kerrin	106	104

*Control yield 10.7 t/ha

Source AHDB Recommended Lists for cereals and oilseed 2017/18.

There are also regional and drilling date differences but the overall picture is that the yield difference, based purely on choice of variety, is much smaller than the premium available.

Millers commented that, while milling varieties had improved in terms of yield, if anything, quality of the protein had deteriorated. Contracts for older varieties, such as Hereward, with the provision of a higher premium, have occasionally been offered to growers to secure desirable wheat traits.

There was some interest in developing specialist wheat varieties for the UK in the past. For example, red wheat had previously been grown with a view to producing 100% British branded products. The trials were reported to have been successful but the project failed, due to lack of significant consumer interest. It was suggested that uptake might reach the necessary scale for commercial production, if imports were restricted.

WINTER BARLEY FUNGICIDE TREATED YIELDS REPORTED IN UK NATIONAL RECOMMENDED LIST 2017/18

	Variety	% control yield*	% two-row feed average yield
Two-row malting		96	94
Two-row feed		102	100
Six-row feed		108	106
Best two-row malting	Craft	98	96

*Control yield 9.4 t/ha

Source AHDB Recommended Lists for cereals and oilseed 2017/18.

There is no yield discount for spring malting varieties compared with feed varieties. Most growers would select a malting variety irrespective of whether the management was intended to be for malting or feed. In practice, this will often result in high volumes of grain suitable for malting in favourable seasons.

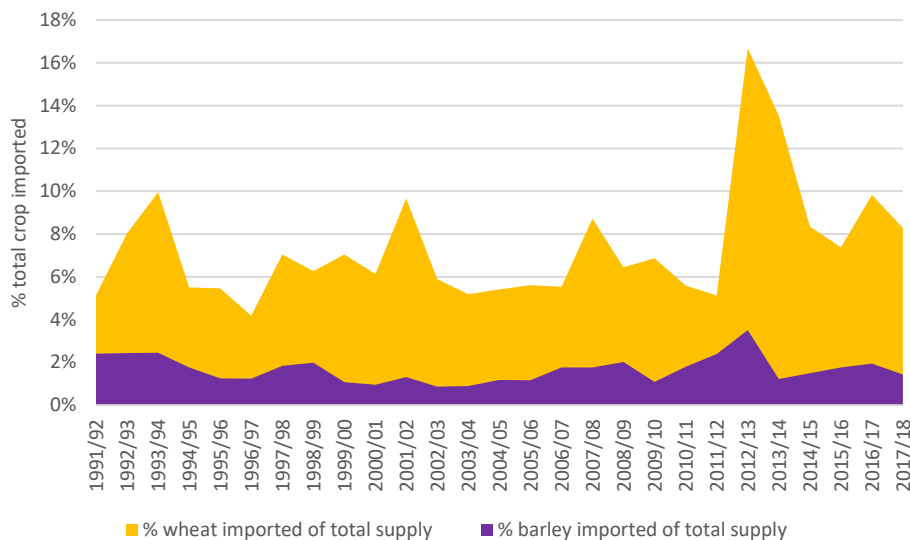
Maltsters also offer higher premiums for particular barley varieties such as Maris Otter, where there is a particularly strong branded market. Maris Otter is said to be easier to use by brewers and often provides the malt in competition winning beers.

While winter barley is recognised as a major source of malting barley in the UK, it is largely spring barley, which is used for malting in the rest of the EU.

INFLUENCE OF WEATHER

Although survey data is available, showing the variation in quality attributes for malting barley and milling wheat, the ability to diverge from those standards if supply is short means that the better test of the variation due to climate is reflected in import behaviour. The graph below shows the percentage of the total supply for imported barley and wheat. It is reasonable to assume that the imports are of grains with at least some quality attributes.

% TOTAL SUPPLY OF WHEAT AND BARLEY IMPORTED



Source: AHDB/Defra analysed TPG

Wheat imports are clearly more volatile than barley imports. Significant wheat imports occur even when UK supply is high, emphasising the shortage of quality grain. The higher variation in imports compared with barley also suggests that wheat is more prone to variation with weather events.

Both crops showed increased imports in 2012/13, a year with an unusually wet harvest, but barley imports were still modest.

Drier climates tend to result in better quality wheat, where lower yields result in higher protein content and drier harvest conditions will usually result in higher Hagberg Falling Numbers. AHDB quality survey data shows that the chance of achieving milling quality is significantly higher in the East and South East regions of the UK, no doubt a result of the drier conditions.

Generally wetter conditions such as experienced in the UK are beneficial for barley, although wet weather at harvest can result in germination and lower quality.

MANAGEMENT

There is no yield sacrifice where wheat is managed to produce milling quality. The key additional input is more nitrogen, involving an additional cost in the order of £30–40/ha or £4–5/tonne. Other inputs may also be increased such as growth regulator and fungicide but the difference is usually small. Contamination with other varieties or weeds, such as wild oats, has to be avoided and for some growers this also increases cost. Areas with high yields are less likely to achieve nitrogen targets.

Concern was expressed by one miller that restriction on nitrogen use would force an increase in the gluten inclusion or use of North American spring wheat. To date, the UK has been less supportive of the introduction of nitrate sensitive zones than the EU. Implementation of nitrogen restrictions has generally been in response to EU pressure and that water quality is now thought to be improving²³.

Production of malting barley tends to reduce cost compared with feed barley production. Nitrogen applications are reduced by around 20 kg/ha, with a saving of around £12/ha. ²⁴

²³ In its 2012 consultation, the Government reports: 'The Government considers that since water quality in England was improving, and key elements of the existing action programme have only just come into effect (and we therefore hadn't seen the benefit of them yet), any changes to the action programme should only be where the evidence clearly showed they were necessary.' Nonetheless NVZ (nitrate vulnerable zones) and introduction of measures to reduce risk of nitrate pollution have increased.

²⁴ HGCA PROJECT REPORT No. 320 BARLEY QUALITY AND GRAIN SIZE HOMOGENEITY FOR MALTING found that 'As fertiliser nitrogen rate increased yield increased, for every 1 kg/ha of applied nitrogen there was an increase of 15 kg of grain'.

UK CROP AREAS

There are a number of trends that may indirectly influence supply and demand. While these trends are independent of Brexit, they will potentially influence the Brexit response.

A repeated concern is the impact of blackgrass resistance to herbicide and consequent effect on winter cropping and particularly winter wheat. Neither nationally, nor in Eastern England (where the problem is thought to be most severe and the first resistance cases found) is there a valid trend towards a reduction in wheat area. However, in both areas, wheat area has declined to a small extent over the last three years.

Wheat is largely grown after a non-cereal crop. In this position, of the combinable crops, it is invariably the most profitable choice²⁵. The only times when wheat would not be considered the first choice of crop after a break, is when harvest of the previous crop is late, as can occur after sugar beet or potatoes.

An additional threat is the introduction of maize into the rotation, where the risk of fusarium diseases are increased.

Production of wheat is also influenced by the fall in oilseed rape area in the last years, assumed to result from the moratorium, or restriction, on the use of neonicotinoid seed treatments for oilseed rape. The reduction in oilseed rape area was greater in Eastern England where the impact of the seed treatment loss was greater. Secretary of State Gove announced a UK ban on neonicotinoid seed treatments in the UK before the EU Commission announced the permanent withdrawal and it is therefore unlikely that Brexit would lift the ban on neonicotinoids and thus allow the OSR area to expand and, in doing so, increase the area of wheat.

While the trend is not significant, the spring barley area and, thus, supply of malting barley, has increased. Spring cropping is used to help manage blackgrass populations. Spring barley is one of relatively few spring crops that is both profitable and does not require specialist equipment. Its disadvantage is that, compared with a non-cereal crop, it is a less effective disease break for wheat.

The major threat to spring barley would be additional support for pulse crops to address the UK protein shortage and increased provision of flowering plants for pollinators.

There is a statistical inverse relationship between area of winter wheat and spring barley but this takes into account both planned and forced cropping changes (e. g. where planting in the autumn is held up).

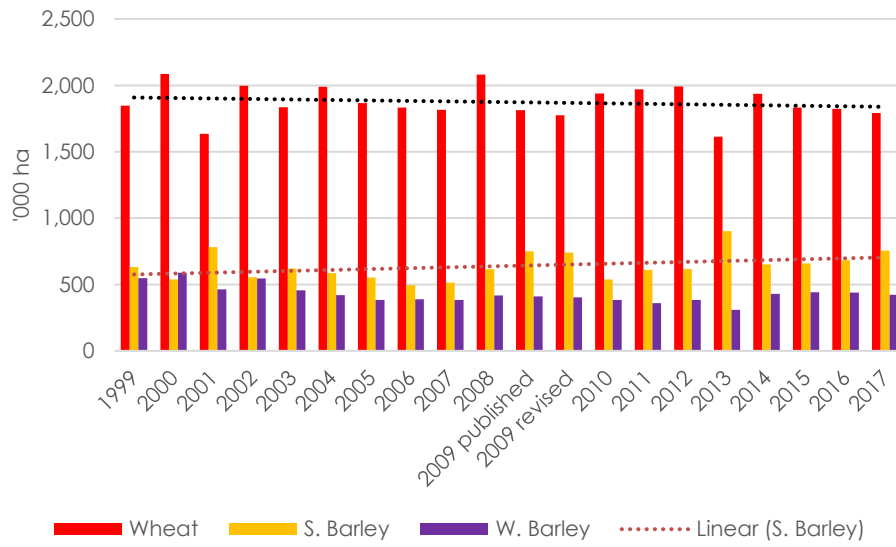
Replacement of land with environmental crops has been discussed under the section '[Farm Subsidy](#)'. Removal of land through payment for environmental goods is least likely to impact the area of wheat or barley because both crops tend to be more profitable than other crops in the rotation. Land take for environmental purposes also tends to be low yielding.

In conclusion, a reduction in wheat area is not expected to result in a major squeeze on supply, particularly of milling wheat (see also below). Spring barley is also likely to maintain its modest increase in area.

Rol production is shown in [Appendix 1](#)

²⁵ Farm Business Survey

UK CROP AREAS



Source: Defra

APPENDIX 10

SHIPPING AND ROAD HAULAGE COSTS

SHIPPING COSTS

Shipping costs and, in particular, vessel size have a potentially dominant influence on price changes in particular areas, following any change in tariffs. For example, while the HMRC price for barley exported from the UK differs relatively little with destination, the size of vessel and thus cost per tonne, varies significantly. Vessel size is a key element in enabling more distant locations to compete with closer destinations on price. Should EU locations be no longer available, many UK growers would have to transport grain further within the UK to deeper water ports. Feed grains and, in particular, feed barley, is most likely to be affected.

The minimum monthly volumes vary considerably with destination. Larger minimum and average monthly volumes are sent to North Africa than closer venues, even where the traded annual volume is similar. This suggests larger shipments to the more distant locations. The same picture is presented where very occasional trades are made with more distant non-EU parties.

AVERAGE AND MINIMUM MONTHLY BARLEY SHIPMENTS PER MONTH EXCLUDING MONTHS WITH ZERO TRADE ('000 TONNES) (FIVE YEARS TO DECEMBER 2017)

Main trading partners Non-EU	Average per traded month	Minimum monthly transaction (above zero)	Main trading partners Non-EU	Average per traded month	Minimum monthly transaction (above zero)
Algeria	36.27	24.61	Spain	22.77	<1.00
Saudi Arabia	61.88	48.80	Netherlands	16.70	<1.00
Tunisia	30.67	24.36	Portugal	13.87	<1.00

Source: HMRC

This is not conclusive, lots of small vessels might have been used each month to take grain to the African countries, but it is unlikely. As might be expected, where there were one-off trades, these also tended to be larger transactions where the destination was more distant (e.g. UAE, Kuwait and Israel).

Shipping cost data for different destinations demonstrates the impact of vessel size and distance on cost:

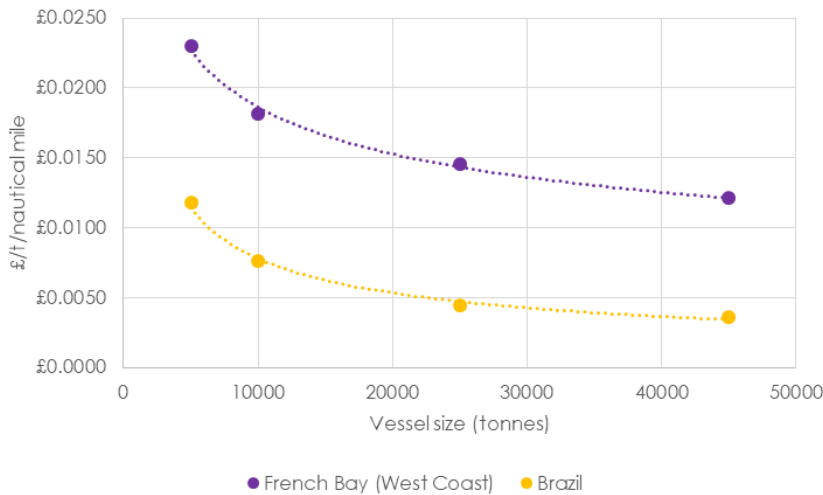
EXAMPLES OF GRAIN SHIPPING COSTS TO UK FROM VARIOUS DESTINATIONS (MAY 2018) (£/TONNE)

	Vessel size (tonnes)			
	5,000	10,000	25,000	45,000
French Bay (Bay of Biscay)	€19	€15	€12	€10
Black Sea	€38	€32	€22	€19
Argentina	\$110	\$70	\$40	\$30
Brazil	\$85	\$55	\$32	\$26
USA (E. Coast)	\$65	\$47	\$27	\$21

Source: TPG

Reanalysis of the data presenting all the prices in Sterling shows a consistent pricing picture with destination.

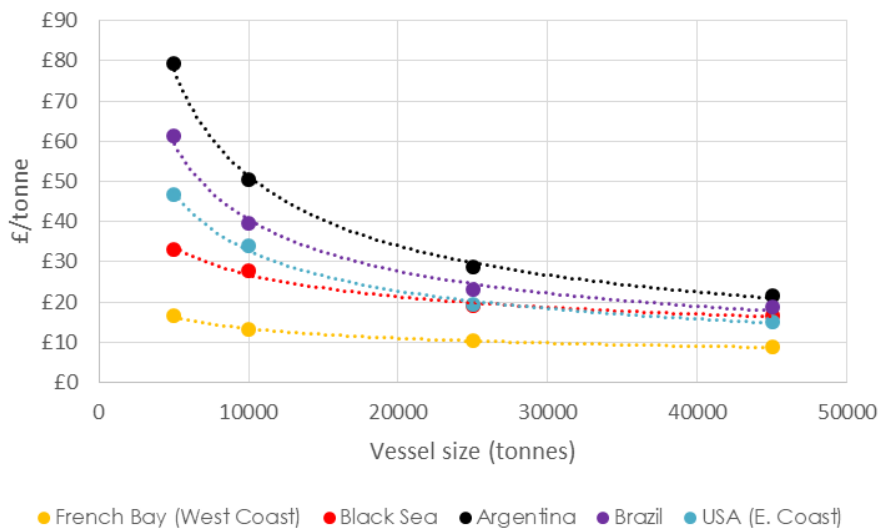
COST OF SHIPPING GRAIN BY VESSEL SIZE TO UK FROM SPECIFIC DESTINATIONS £/T



Source: TPG

While more tentative, an approximate cost can be calculated per nautical mile. This shows that the shorter journeys cost more, irrespective of vessel size, presumably because the idle time increases as a proportion of the hire.

COST OF SHIPPING GRAIN BY VESSEL SIZE TO UK FROM SPECIFIC DESTINATIONS PER NAUTICAL MILE £/T/NAUTICAL MILE



Source: TPG

To put into perspective, the difference in cost of delivering grain in a 5,000 t vessel or 45,000 t vessel to the Bay of Biscay is about £8/t. Furthermore, delivery of a 5,000 t consignment to France would be more expensive than taking a larger vessel to North Africa.

The most significant implication would be that there is a relative change in the UK regional price. The price will remain similar in those catchments close to ports capable of handling large vessels but fall elsewhere.

Eighty-two per cent of dry bulk volumes in the RoI are primarily accounted for by Shannon Foynes, Port of Cork, and Dublin Port Company. Dublin imports around 2,000,000 t of bulk solids per year.

ROAD HAULAGE COSTS

Grain haulage exerts a large influence on the price differentials for different regions. It has also been mooted that post-Brexit lorry driver earnings, and thus cost, may rise.

Based on TPG survey information for East Anglia, typical grain haulage costs per tonne for 2017/18 are about £4.70 plus £0.045 per mile per tonne. This is very similar to the last published AHDB survey in 2014. While oil prices have fallen, the figures also suggest there has been an efficiency improvement that might not be available to all operators. In previous surveys, the running cost has tended to be lower in East Anglia than other areas of the country, although the difference has been small.

Grain haulage is less regulated (reducing the cost for hauliers) than haulage of aggregates, making grain haulage attractive, although this is expected to change. A comment was made that there are already fewer European drivers (which may well have contributed to the apparent shortage). Rates are seasonal, with rates rising in East Anglia during the peak sugar beet harvest. The average driver age is estimated as at least 55 and this, more than Brexit, is likely to impact on the future cost. It would appear that the demand created by central crop storage and the sugar beet harvest will drive supply of hauliers, leaving lower cost haulage outside of the period from the end of July to end of December. However, this impact is regional.

Given an anticipated annual mileage per lorry of around 55,000 miles²⁶, an increase in pay of a substantial £10,000 per annum would only increase the cost per journey by about 18p per mile.

The £8/t price difference for shipping to the Bay of Biscay between a 5,000 t vessel and 45,000 t vessel would allow additional haulage of well over 100 miles. Grain already in store at portside in East Anglia is likely to cost a similar amount to ship or haul to Liverpool, although there are additional costs associated with shipping that would favour road haulage within the UK, up to a 200-mile radius.

Bulk flour transport tends to be one way only in specialist tankers so is more expensive, while bagged trade utilises multi-purpose 'curtain siders', where costs depend on distance. Malt, on the other hand, can be transported by standard bulk transport, or bags, for domestic purposes or exported globally within large polythene bags inside standard containers. The availability of cheap containers returning to Asia has at times meant that export rates to Asia become highly cost-efficient, more recently, though, a shortage of container operators has meant that export costs have risen.

²⁶ Road Haulage Association

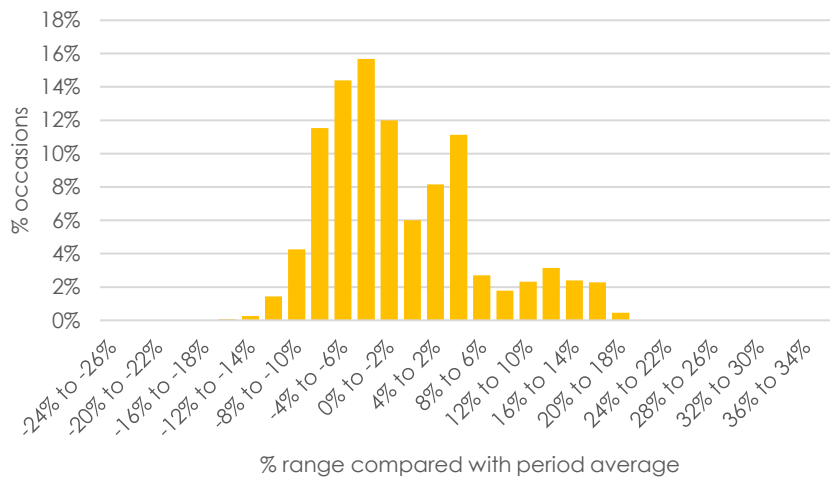
APPENDIX 11

EXCHANGE RATE

Between May 2008 and April 2018, there has been a reduction in exchange rate against the Euro of 9% and against the US Dollar of 28%. Most traded goods are traded in Dollars so the weakening Sterling has boosted most agricultural prices. Weakening currency has also had the impact of increasing the Euro-defined tariffs in Sterling terms.

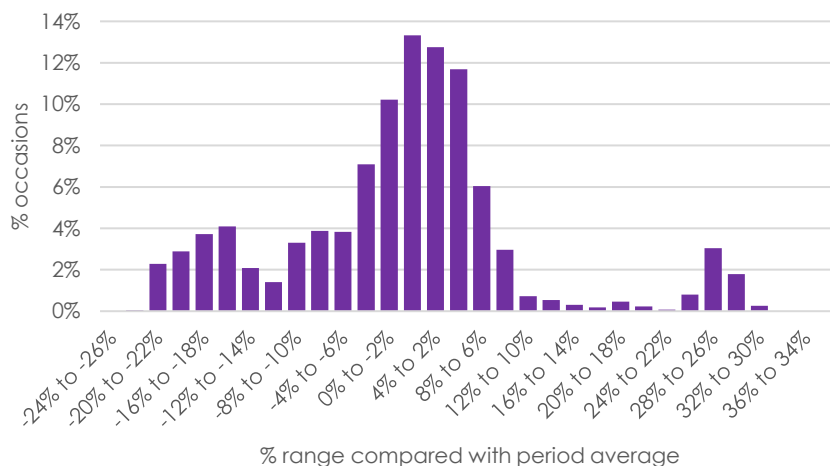
The next two graphs show the impact of Sterling exchange rate on goods priced in Euros and Dollars. The data is the daily closing cross exchange rate since January 2008. The range (horizontal axis) describes the percentage by which Sterling differs from the average (0%). Thus, a positive percentage indicates Sterling is stronger than the average and, consequently, Sterling-based prices are lower before any other changes. The percentage occasions (vertical axis) show the percentage of occasions for each of the ranges.

FREQUENCY DIAGRAM FOR STERLING VERSUS THE EURO (DAILY CLOSING, MAY 2008 TO APRIL 2018) (PERIOD AVERAGE = 0%)



Source: European Central Bank analysed TPG

FREQUENCY DIAGRAM FOR STERLING VERSUS THE US DOLLAR (DAILY CLOSING, MAY 2008 TO APRIL 2018) (PERIOD AVERAGE = 0%)



Source: European Central Bank analysed TPG

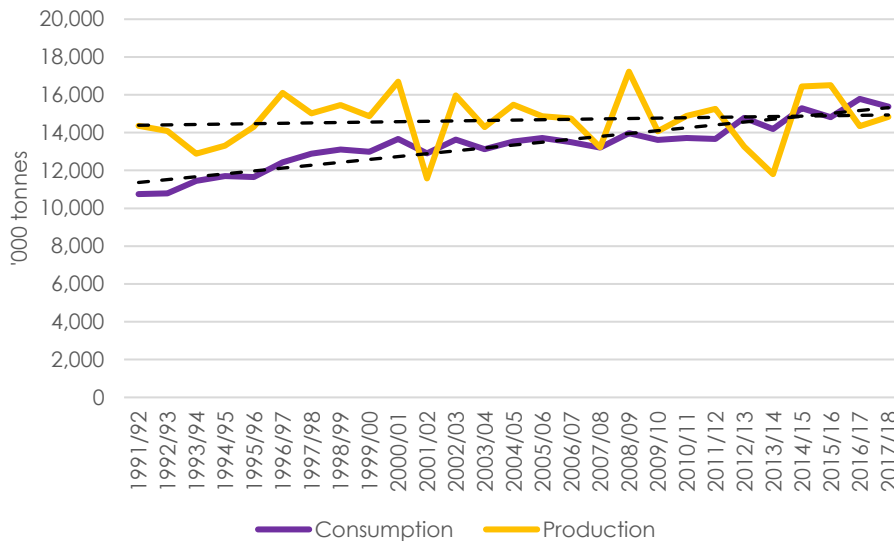
For the four commodities under discussion, the applied MFN tariffs are significant, even compared with currency movement, although not compared with the price changes likely to occur as a result of the TRQ tariffs.

APPENDIX 12

MILLING WHEAT AND FLOUR

The historic UK balance sheet shows that production and consumption trends for all wheat have converged. While, historically, the UK has tended to be a net exporter of wheat, this is no longer the case.

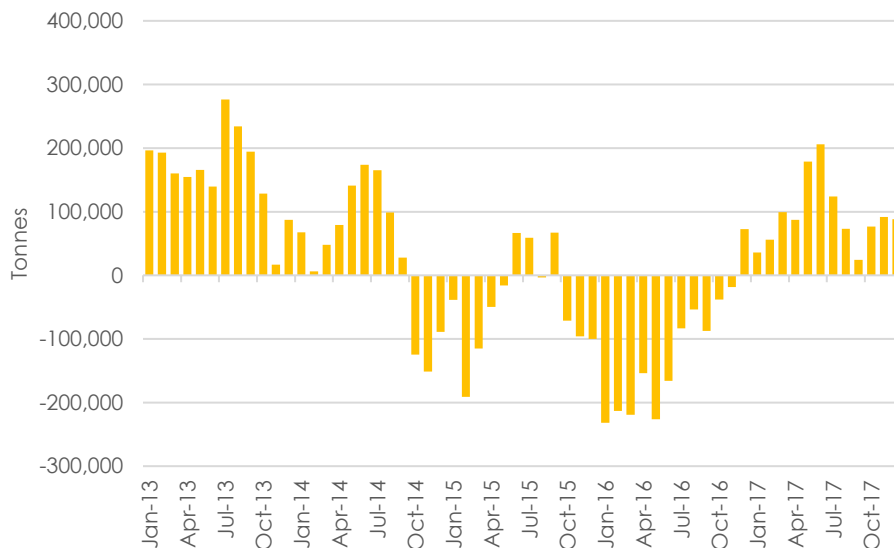
UK WHEAT PRODUCTION AND CONSUMPTION ('000T)



Source: Defra

This is an important development because prices change from export parity, which lowers the domestic price, to import parity which raises the domestic price. Any imposition of tariffs will increase the price swing.

UK NET WHEAT TRADE (MONTHLY)



Source: HMRC

While maize does not form one of the four commodities examined under this report, it is the crop most likely to undermine UK base prices for feed grain. Around 50% of UK wheat is used for animal feed and about 65% of UK barley consumption is as animal feed.

While the EU has erratic maize yields and can be self-sufficient in a high yielding year, it is more usually a net importer. This has tended to mean that maize has traded at, or above, the wheat price (in contrast to the US where it usually trades at a deficit). Maize production and consumption are rising and there is no clear indication whether the EU will move to a position of being a net exporter. However, the Ukraine is showing a dramatic increase in production. In the last two years, production has been over six times greater than consumption. This is likely to mean that the Ukraine will increasingly be a supplier of the lowest priced grain to the UK.

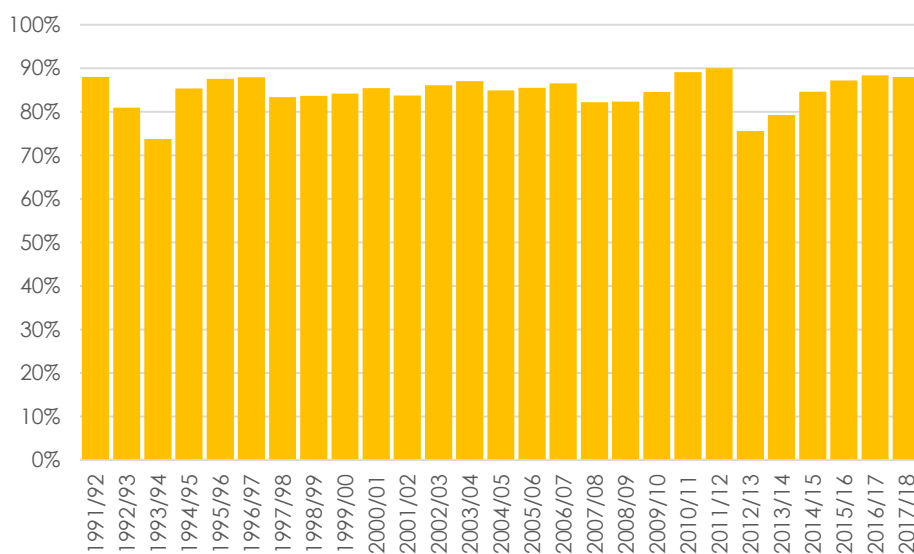
Maize is subject to the application of a variable tariff (See [Appendix 2 'Tariff Summaries'](#)) which on most occasions is zero.

The maize price is likely to limit any increase in wheat price that might occur if tariffs were imposed on wheat (or barley) imports. It is also likely to maintain wheat imports on the cusp of being a net importer or exporter. The rise in price when wheat is below historic consumption would be taken up by maize.

It is also likely that the Ensus ethanol plant (which has already on occasion swapped from wheat to maize for ethanol production) will do so more consistently. Vivergo would have to undertake more investment to make the switch or shut down. The Manchester starch plant, which converted from using maize to wheat, would almost certainly reverse the process. Maize is not only likely to be a cheaper substrate but also a more efficient substrate per tonne.

While maize affects the supply of feed grains, milling wheat supply depends on the proportion of wheat grown with milling potential and is thus dependent on the premium (incentive). However, UK supply does not have suitable quality attributes to replace imported wheat.

% HUMAN AND INDUSTRIAL CONSUMPTION THAT IS FROM HOME-GROWN WHEAT



Source: Defra

The percentage supply of UK wheat for human consumption has remained remarkably constant. While the consumption does not include only the use of wheat in flour, it suggests that a similar situation for inclusion in flour is likely to exist. Over this period, human and industrial consumption has risen but total wheat production has remained constant. Thus, the percentage used has increased, as determined by the premium paid for the particular use.

Flour-specific statistics show an average inclusion of non-UK wheat at 17% over the last 10 years. The proportion of non-EU wheat in the imported total is more speculative. Assuming all the North American wheat is used in flour production, over the last 5 years, this would have supplied on average of about 38% of the imported requirement or around 7–8% of the total. Millers report approximate milling wheat imports from France of 120,000 t, with much of this used in French branded goods (e.g. Deli France). Germany was thought to supply around 400,000 t, and 400,000 t from North America. This shows reasonable agreement with the estimate made from the imported wheat used in flour, the wheat from N. America assumed to be for milling and the balance needed to supply the remaining milled wheat.

The premiums paid for wheat with particular quality attributes have been sufficient to maintain supply. There is no indication that the price premium has risen over this period, although it has changed dramatically in response to supply shortfalls brought about by adverse weather.

Supply of UK quality wheat looks likely to be maintained at current levels of premium.

UK imports from the EU tend to be low value basic flour purchased opportunistically and specialist flours containing 100% wheat derived from the EU, such as French flour for branded baguettes, etc.

In contrast, exports to the EU are of specialist soft flours, i.e. viscosity controlled (heat treated) Group 3 flours for sauces, batters and specialist food applications. The UK can be cost-effective in supplying these compared to, for example, German millers.

The UK including NI imports very little flour from the RoI but there are some imports of baked goods.

Exports to RoI are from both mainland UK and NI. This is the only significant trade where non-EU wheat would be supplied within blends. It is more of an issue for NI. Irish millers who tend to have higher inclusions of non-domestic wheat and supply into markets that look for higher quality flour, but also applies to mainland millers. Some trade would be 100% group 3 soft wheat for specialist cake manufacture.

% UK FLOUR FROM IMPORTED WHEAT BY MONTH



Source: Defra

The peaks show the impact of the wet harvest in 2012.

However, on over 50% of occasions, 100% of UK flour contains less than 15% imported wheat and on 90% of occasions less than 25% imported wheat. Nonetheless, there have been occasions when average inclusion of imported wheat has reached just under 40%.

Inclusion of imported wheat is not consistent for all bakery products and for some the inclusion is up to 40–50%.

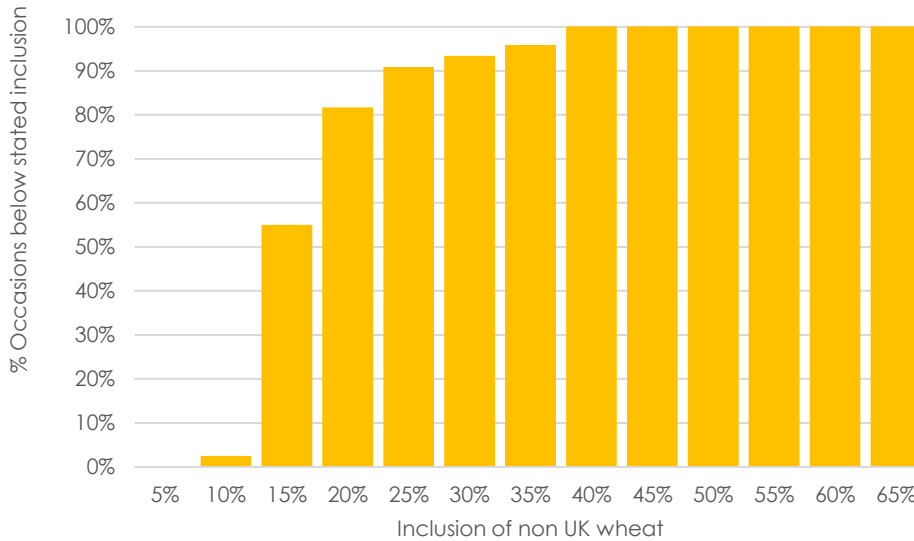
While the top quality wheat is not subject to tariff, the specification is high ([See Appendix 2](#)). The major constraint for European growers is the protein content. The 14.6% protein at 13.5% moisture content is equivalent to 16.9% protein on a dry matter basis. Top quality French and German ‘E’ class wheat has a minimum specification of 12% protein on a dry matter basis. Less than 3% of French wheat is generally in this category (representing around 1-2 Mt) and only 1% had a protein content of over 13.5% in the period from 2011 to 2015, although a staggering 16% achieved this content in the poor yield 2016 year²⁷.

German wheat generally has a higher protein content than France, with the UK intermediate between the two. Top quality German varieties will generally have a protein on a dry matter basis of over 14% and

²⁷ FranceAgriMer

around 10% of the crop suggesting 4–5 Mt. However, very little wheat is likely to have in excess of 16% protein and thus be free of tariff.

% UK FLOUR FROM IMPORTED WHEAT BY % OCCASIONS (MONTHLY JANUARY 2008 TO DECEMBER 2017)

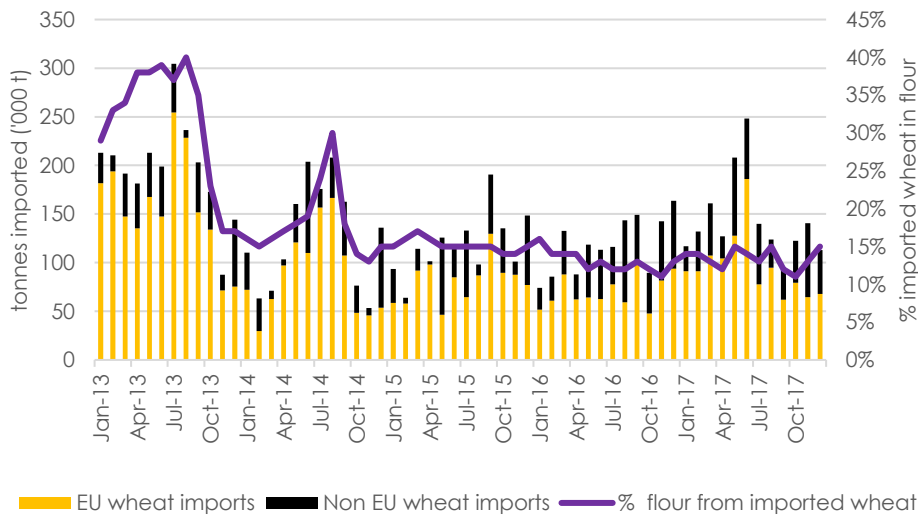


Source: Defra

The main importance of the inclusion rate is due to the RoO and impact on exports. Domestic consumption is unaffected, provided grain can be sourced. The graph shows that UK flour contains more than 15% imported flour on about 45% of occasions. For individual products, the inclusion rate is consistently higher.

In general, UK wheat shortages are made up for by increased imports from Europe rather than the US.

RELATIONSHIP BETWEEN % IMPORTED WHEAT IN FLOUR AND WHEAT IMPORTS

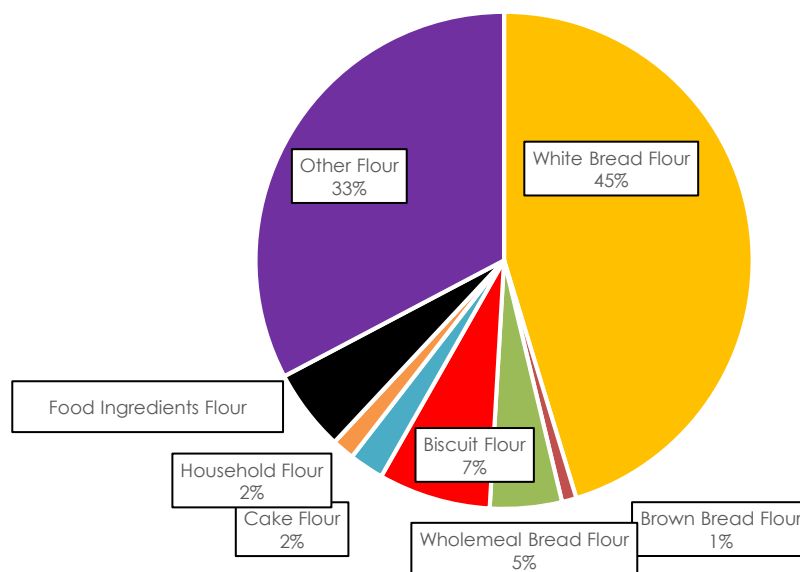


Source: Defra and HMRC

Millers are not averse to seeking new suppliers of wheat, although quality assurance/due diligence add to the cost, at least initially. The statistics show wheat imports from 17 non-EU countries, including milling wheat from Kazakhstan.

It is significant that at least one flour vendor puts the liability for additional cost due to the imposition of tariffs on forward contracts on the buyer.

% UK FLOUR 2017



Source: Defra

There are weak trends over the last 10 years. White bread flour is tending to rise, while biscuit flour is falling. This may mask the fact that consumption of standard white bread is in decline, with an increase in other replacement goods (e.g. pizza, wraps, thins, etc.) Both wholemeal and brown flour showed a large increase in production, although is now falling as a percentage.

The different flour types tend to contain different percentages of imported wheat. Thus, the inclusion of North American wheat tends to be highest in high quality bread products, burger buns, etc.

The flour industry tends to be increasingly partisan, reflecting a changing population. It was suggested by one respondent that, of the 80,000 tonnes of flour imported into the UK, approximately half was Polish flour for Polish bakers.

Millers and bakers frequently brand their production (e.g. French Baguettes), which further restricts the ability to substitute wheat from other origins. US fast-food franchises (such as McDonalds) also specify flour blends for their miller suppliers.

IRELAND

It is estimated there is a requirement for around 140,000 t of wheat for the two mills in NI (Andrews and Neils). There is a small third mill in the Republic under the Odlum brand. The NI mills provide flour for all of Ireland and use both imported wheat and some wheat grown in Ireland, including grain from the Republic. The mills also export a little flour to the rest of the EU. Ireland also imports bulk flour from Manchester and bagged flour from Southampton.

There are a number of bakeries in the Republic with strong brands such as Brennans, Irish Pride and Pat the Baker. Some high quality goods are also exported back to the UK.

Therefore, RoO (see [Key non-tariff issues – Rules of Origin](#)) are potentially an important issue for the Irish industry.

APPENDIX 13

MALTING BARLEY AND MALT

While export malts are often commoditised (particularly for developing markets, where price is the key determinant), mature markets such as Asia have individually defined specifications for malt, particular to their brewing process and product range. The UK style of malt is strongly branded and attracts a premium, particularly in the small regional brewers and craft sector, domestically and abroad. The malt requirement for traditional, single temperature UK-style brewing is typified by higher levels of malt modification than that of continental-style brewing, where temperature programmed mashing is frequently employed to optimise the performance of less well modified malt produced from continental barley varieties. These ‘well modified’ 100% malts are preferred by these traditional brewers and convert easily in the brewing process.

UK malt also offers a risk management (contingency) benefit in the Asian market protecting against quality and price risk.

The premium sectors are for distilling where the requirement is for low nitrogen and high malt extract (to give good spirit yield) and the craft beer sector. The craft sector is increasing in significance and allows additional premiums to be obtained via packaging and promoting aspects such as variety and provenance.

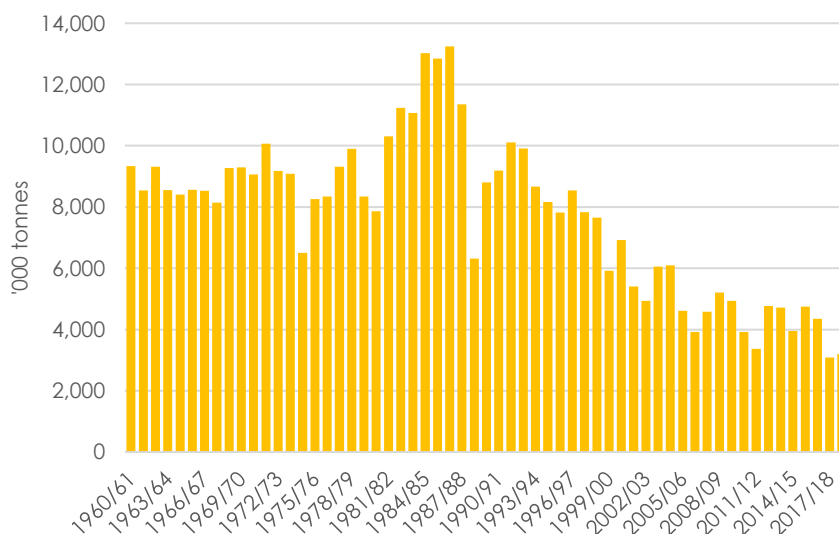
According to the respondents, the 2-row versus 6-row differentiation is not clear-cut. France and Belgium produce 6-row malt, which the Chinese buy to mix with cheaper grains and enzymes to produce (very average) beer but 6-row barley, although tending to have higher DP levels, is not intrinsically better suited to this than 2-row.

The US market is focused on the growing craft sector where there is a desire to produce British-style beers from British style malts (lower nitrogen). There is a particularly strong demand for UK ‘heritage’ varieties (e.g. Maris Otter), such as supplied from the Warminster maltings, one of the very few maltsters in the south.

US malthouses are geared up for the large-scale US lager brewers and thus higher nitrogen barley. Branding is important in both directions. Anheuser Busch, brewers of Budweiser, imported US malt to the London Mortlake Brewery in the 1990s to ensure that the beer was consistent globally.

US barley production has shown a large decline (as maize has expanded in area) and internal transport costs are likely to be high to US east coast brewers and distillers. Put in perspective, US barley production is now lower than UK production.

USA BARLEY PRODUCTION (‘000T)



Source: USDA

To a lesser extent, global barley production has also fallen from the 1980s/1990s, despite consistently increasing yields. EU production has also levelled off since the mid-1980s. Barley is increasingly an inferior, and lower yielding feed grain than maize. The future for barley is in uses where barley is, or is considered to be, the only grain suited to the task, such as for malt used for brewing and distilling. The tightening global supply looks likely to maintain malting barley and malt premiums in the UK. UK production has also declined since the 1980s but has shown some growth in the last 10 years, in contrast to other parts of the world.

Apart from the distilling and craft sectors, UK malt would be considered equally, alongside European produced malt. The large Asian importer-brewers buy largely on the basis of price, while avoiding over-reliance on a single supplier. As a consequence, UK suppliers often considered the market to be of last resort and used to take up surplus capacity on the basis of marginal, rather than full cost, recovery. However, particular customers will have been supplied over many years and developed strong relationships.

Within the island of Ireland, the Republic is the major grower of barley and producer of malt. Irish malting capacity is centred at Boortmalt (Athy) producing around 130,000 t per annum and the Malting Barley Company of Ireland (Cork) producing 32,000 tonnes, providing a total production capacity of 162,000 tonnes.

Growth in distillers and craft brewers has meant that demand for malt in the RoI has been strong. However, lack of scale is reported to make the Republic less competitive in the export market than other larger European producers. However, the trade statistics (confirmed by those interviewed) suggest exports of around 10,000 to 20,000 tonnes. Imports are similar, with the Republic switching from net importer to exporter, depending on year.

The UK is an important exporter of malt to the Republic but over the last seven years on average it has contributed only about 60% of the RoI's imported supply. Non-EU supplies are negligible. The suggestion is that price determines the import source.

In contrast, nearly all the RoI's malt exports are to the UK, largely to Northern Ireland distilleries, such as Bushmills, with a little exported to Scotland. There is also some export trade to the US, although the statistics suggest this is minimal (several hundred to a few thousand tonnes).

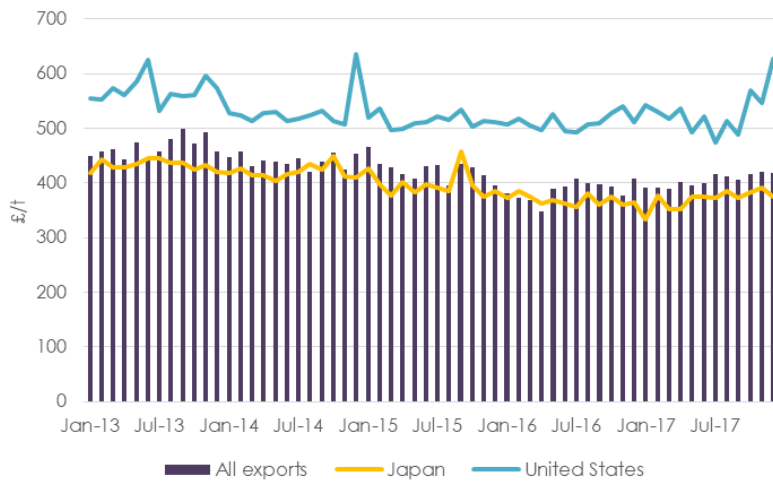
Guinness Dublin is the major Irish brewer, taking around 75,000 t of output from Boortmalt, the largest maltster in the RoI.

Research has shown that the RoI is self-sufficient in malting barley, with most barley imports being for animal feed except in those years when there is a problem with malting quality. Local provenance barley for malt is considered an important part of the brand. Long-term contracts are in place between growers and Boortmalt/Guinness, based on the futures price for wheat.

MALT PRICE RELATIONSHIPS

There are a number of consistent market differences in the price of malt to different destinations. These reflect differentiation not just in terms of quality but also in size of transaction. The importance of the US craft market is shown below. However, it is also likely that the UK and Europe are among the closest suppliers.

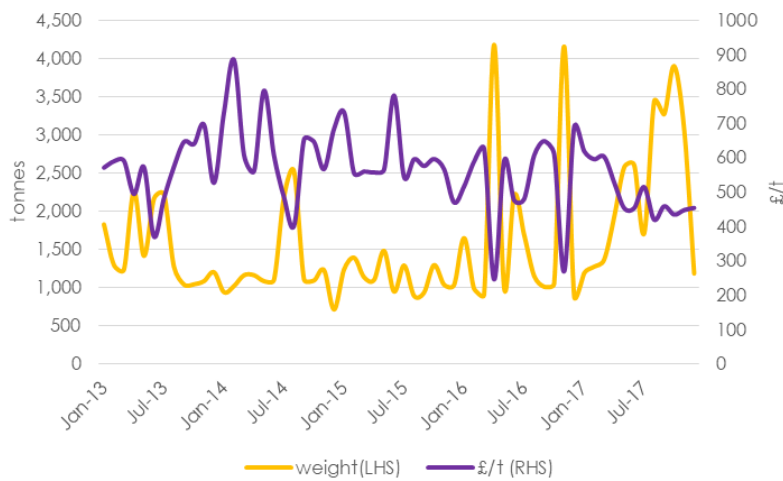
MALT PRICE (£/T MAJOR TWO RECIPIENTS OF UK MALT AND AVERAGE OF ALL UK EXPORTS)



Source: HMRC analysed TPG

The second observation is that, while the EU is a premium market, purchases appear opportunistic, with an inverse relationship between volume and price.

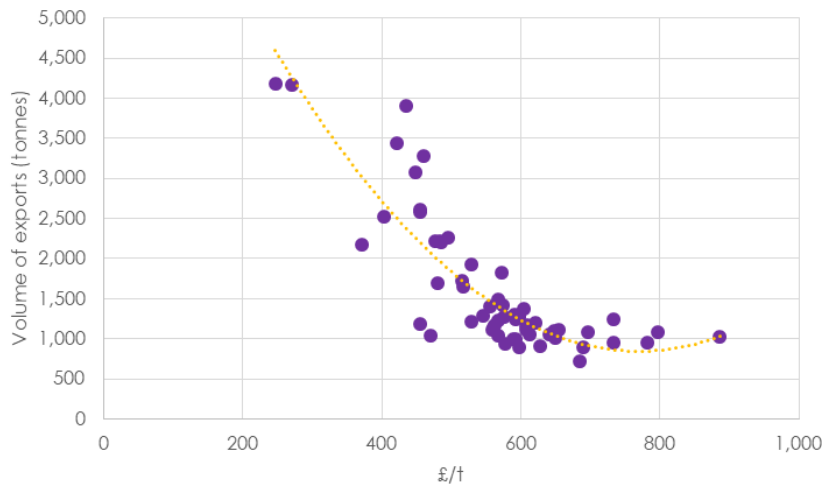
EU MALT PRICE (£/T) AND VOLUME (TONNES) EXCLUDING REPUBLIC OF IRELAND



Source: HMRC

Some care should be taken in case of a data error (e.g. an overstatement of weight would automatically lead to a reduction in price) but at least at face value the EU appears largely to buy when price is low. In fact, reanalysis of the data further adds to the confidence in the relationship:

EU MALT EXPORT VOLUME AND PRICE (MONTHLY DATA, FIVE YEARS)



Source: HMRC analysed TPG

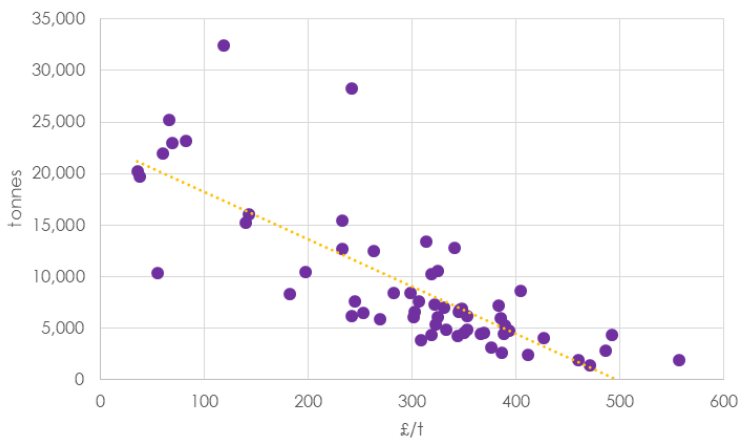
The suggestion is that there is a fixed export volume that is insensitive to price of about 1,000 tonnes per month or 12,000 t per year. It is reasonable to assume that this demand is for specific UK malt (with properties perceived or actual).

At an average of 1.7% of total UK exports by value, the Irish situation is unlikely to have a major impact on the overall UK situation. The exports to Ireland are a fairly consistent 100 tonnes per month or 1,000 t per year. This has been insensitive to price, with the price reflecting a smoothed EU price, i.e. not opportunistic. This may be for particular branded products.

MALT IMPORTS

There is some indication that the volume changes with price:

UK MALT IMPORT VOLUME AND PRICE (MONTHLY DATA, FIVE YEARS)

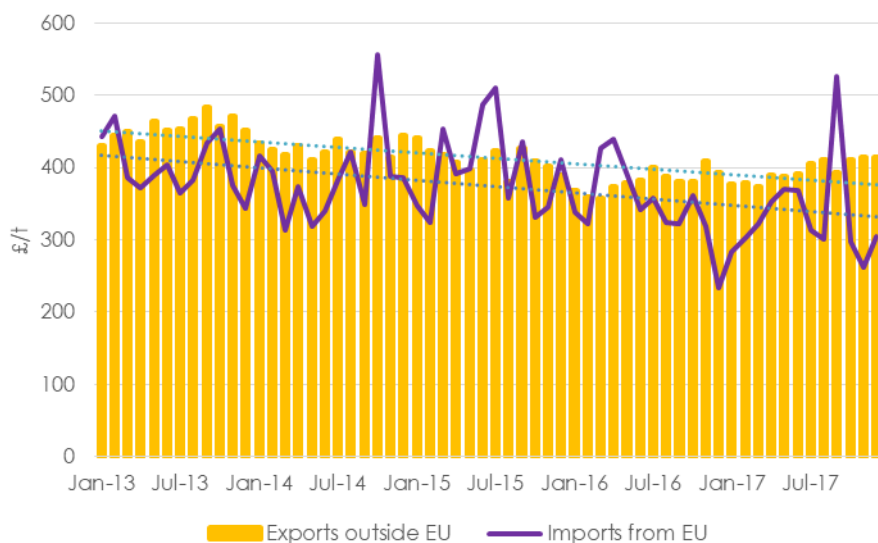


Source: HMRC analysed TPG

The correlation is about 0.61 and the suggestion is that, for each £1 increase in price, imports fell by about 46 t. The reduction in imports with rising price does not obviously tail off with price, suggesting there is no characteristic that is uniquely valued.

According to HMRC data, movement in import price of malt corresponds approximately to the change in export price for any one period, but is on average about £40/t lower. Based on this data, there is no relationship between the two prices. The higher export volume removes some of the price volatility experienced.

EU MALT IMPORTS £/T AND UK EXPORTS TO NON-EU COUNTRIES (AND TREND LINES)



Source: HMRC

BARLEY PRICES

AHDB provides both UK feed barley and malting barley prices. Both the absolute price and premium are important, since the premium is determined by the profitability of malt.

There is no indication that the underlying price of barley or the premium offered for malting barley is changing. Area is increasing for agronomic reasons and the percentage of malting barley is relatively easily controlled by varying the premium.