RED MEAT ROUTE TO MARKET PROJECT REPORT

FOR:

BY

THE ANDERSONS CENTRE

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ACRONYMS AND ABBREVIATIONS

ABAC	APEC Business Advisory Council
ACP	Africa, Caribbean and Pacific countries
AEO	Authorised Economic Operator *(a quality mark that shows your role in the international supply chain is secure and your customs controls and procedures are efficient and meet EU standards)*
AFBI	Agri-Food and Biosciences Institute
AHDB	Agriculture and Horticulture Development Board
AMS	Aggregate Measures of Support
APEC	Asia-Pacific Economic Co-operation
AVE	*Ad-Valorem* Equivalence
BIP	Border Inspection Post
BTI	Binding Tariff Information
CDS	Customs Declaration Service *(launched in August 2018)*
CET	Common External Tariff
CETA	Canadian, European Trade Agreement
CFP	Common Fisheries Policy (of the EU)
CGE	Computable General Equilibrium (economic model)
CHIEF	Customs Handling of Import and Export Freight of UK *(Phasing out from 08-2018)*
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSS	Countryside Stewardship Scheme
CVED	Common Veterinarian Entrance Document
DEFRA	Department of Environment, Food and Rural Affairs
DPE	Designated Port of Entry
ECB	European Central Bank
EEA	European Economic Area
EEC	European Economic Community
EHC	Export Health Certificate
EU	European Union
EORI	European Operator Registration and Identification Scheme *(an EORI number is required to trade goods with countries outside the EU)*
ESRC	Economic and Social Research Council
FAPRI	Food and Agricultural Policy Research Institute (economic model)
FTA	Free Trade Agreement
GB	Great Britain
GDP	Gross Domestic Product
GTIS	Global Trade Atlas
GVA	Gross Value Added

HCC	Hybu Cig Cymru – Meat Promotion Wales
HMRC	Her Majesty's Revenue and Customs government-department
HS	Harmonised System
HTS	Harmonized Tariff Schedule (used by the US)
IMTA	International Meat Trade Association
ITC	International Trade Centre
ITAHC	Intra Trade Animal Health Certificates
JIT	Just-in-Time
LoLo	Lift-on, Lift-off
MFN	Most Favoured Nation
MRA	Mutual Recognition Agreement
NI	Northern Ireland
NCH	National Clearance Hub
NTB	Non-Tariff Barrier
NTM	Non-Tariff Measure
OECD	Organisation for Economic Cooperation and Development
PHA	Port Health Authorities
POAO	Products of Animal Origin
QMS	Quality Meat Scotland
ROI	Republic of Ireland
RoO	Rules of Origin
RoRo	Roll-on, Roll-off
RPA	Rural Payments Agency
SPS	Sanitary and Phytosanitary (Measures)
SSG	Special Safe-Guard
TBT	Technical Barriers to Trade
ToR	Terms of Reference
TRACES	Trade Control and Expert System (*vet certification tool used by the EU to control the import and export of live animals and animal products within and without its borders*)
TRQ	Tariff Rate Quota
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
US	United States (of America)
USITC	United States International Trade Commission
UTL	Unilateral Trade Liberalisation
VBS	Vehicle Booking System
WTO	World Trade Organisation

EXECUTIVE SUMMARY

Output from the UK beef and sheep livestock sector exceeds £5 billion equating to 20% of gross output. The UK imports and exports large volumes of both beef and lamb with trade taking place in both directions as a result of seasonal variations, states of product and carcase balancing activities. The type of Brexit that the UK pursues will have a major influence on the future development of the industry. This study quantifies the potential impacts of Brexit on British beef and sheepmeat trade and the implications thereof for the supply-chain, particularly farm-level. Its objectives are:

1. Present a detailed understanding of Non-Tariff Measures (NTMs) that businesses must cope with when trading with the EU and third countries and how these might change post-Brexit.
2. Set-out what 'frictionless trade' actually means, how close two countries can get to it and how close trade could potentially come to 'frictionless' in terms of 'government imposed' friction between the UK and the EU.
3. Describe in detail what the impact of trading based on WTO rules would mean for trade between the UK and EU, and UK and selected third countries that currently have preferential arrangements with the EU. This was done by examining trade with three third countries for beef and sheep meat products.
4. Detail the basis for trading through Tariff Rate Quotas (TRQs) with the EU, the method by which they can be used, how they might be allocated to the UK for use, and other considerations.
5. Measure the impact of each of the scenarios on the total amount of the beef and lamb goods traded and how it might affect the UK domestic beef and lamb supply chains. This includes the possible impact of carcase balance.

SCENARIOS

Based on the scenarios put forward by the AHDB, the study assessed Brexit in the following situations:

1. **Brexit Deal:** the UK is outside the Customs Union and Single Market, but with a meaningful Free Trade Agreement including agriculture, and a customs arrangement. Linked with this scenario, the following assumptions (specified by the AHDB) are also noted;
    - **Policy:** Direct payments reduced by £150 million; public good type payments increased by the same amount globally to leave overall support unchanged.
    - **Labour:** Seasonal non-UK labour: possible under an expanded SAWS-type scheme. Permanent non-UK labour: restricted to 50% of current levels.
    - **Trade facilitation:** costs for crops of 2%. For livestock, the NTM costs estimated in this study (see Chapter 6) are used. WTO rules are assumed to apply for third countries.
2. **No Deal:** the UK will apply its recently announced import tariffs (i.e. its proposed applied tariff schedule) on all imported beef and sheepmeat produce from the EU27 and third countries which do not enjoy enhanced access via free trade agreements or TRQs. This includes the newly announced 230Kt TRQ for beef products. UK exports to the EU will be subject to the EU Common External Tariff (CET). The assumptions concerning policy and labour outlined above also apply. Trade facilitation costs for crops of 4%. For livestock, the findings of this study are used.

For the NTM analysis (Chapter 6), two additional scenarios, "Low" and "Current" have also been included. **"Low"** outlines the minimum NTMs that the UK would face when trading with the EU as a third country brought about by an all-inclusive Regulatory Equivalence agreement akin to New Zealand's veterinary agreement with the EU for red meat. The level of NTMs is lower than in the Brexit Deal scenario because

some industry professionals believe that the most favourable access terms will not be granted to the UK immediately and would need to be earned over time (i.e. verify its new systems are robust). "**Current**" refers to current UK-EU (i.e. UK still an EU Member State) or third country (non-EU) to UK trade processes.

REPORT METHODOLOGY

The methodology consisted of the following key steps which also illustrates the report's structure:

- **Meat-Analysis and Literature review (Chapter 3):** explores previous studies on the impact of Brexit and provides further scrutiny of the trade-related implications for the UK. It also examines frictions to trade, tariffs, tariff rate quotas (TRQs) and NTMs in the red meat sector. This provides a basis for a more in-depth exploration later on in the study.
- **Map-Out Trade Flows and Trade-Related Processes (Chapter 4):** gives a top-level summary of output and trade by product category, based primarily on official trade statistics from the HMRC with the focus on UK trade with both EU27 and non-EU countries. Process maps which have been compiled to illustrate the procedures that must be followed when trading with the EU as a third country are illustrated as these were used to inform the NTM estimates.
- **Primary Research:** interview discussions with 10 beef and sheepmeat industry experts were combined with input obtained from more than 30 interviews undertaken during previous studies in the last two years. Following each interview, the feedback was analysed and key points meriting further exploration were identified and examined further. Key data points were also captured and were inputted as preliminary estimates into the NTMs and trade impact models.
- **Model Development:** a two-stage approach was used to quantify the impact of trade barriers on red-meat trade. Firstly, an NTMs model to assess projected non-tariff impacts on key commodities. Then, these findings were combined with input from previous studies on quantifying the impact of trade barriers in Brexit scenarios to conduct a volume-based assessment on the impact on cross-border trade and associated output at a UK level.
- **Report Development:** drawing upon the previous stages which were incorporated into the narrative, the following outputs were also developed:
    - **Tariff and Tariff Rate Quota Impacts (Chapter 5):** arising from the imposition of the UK's proposed tariffs on imports as well as the tariffs put in place by other countries/regions (including the EU27) on UK exports. It also set-out how the proposed allocation of existing EU28 TRQs between the UK and the EU27 could affect future trade.
    - **NTM Impacts (Chapters 6):** summarises projected NTM costs and underlying assumptions and caveats. Projected NTM costs are presented on a product-by-product basis for both **"checked loads"** (subject to the full range of NTMs quantified in this study) and **"probability-based" estimates** (which consider the check-rates for some NTM categories). The results are presented by scenario on a cost per load (£), ad-valorem equivalent (AVE (%)) and on a cost per tonne (£) basis.
    - **Overall Trade Barrier Impacts (Chapter 7):** drawing upon the projected tariff, TRQ and NTM impacts, the overall impact on the UK beef and sheepmeat industry was estimated.
    - **Implications (Chapter 8):** examines the farm-level implications using Andersons' Meadow Farm Model and considers the consequences for other parts of the supply-chain.

KEY FINDINGS

1. **Trade impact under a Brexit Deal scenario is relatively small:** overall exports would decline by about 1% in volume terms (imports 0.8% lower), driven by EU27 declines. Minimal changes are

projected for non-EU trade. Within this, sheepmeat exports to EU27 are forecast to decline by 1.5% whilst corresponding imports would be 3% lower. These declines are chiefly due to NTMs.

2. **A No Deal Brexit would cause significant upheaval for beef and sheepmeat:** trade with the EU27 would plummet due to the imposition of tariffs, TRQs and higher incidence of NTMs. Combined beef and sheepmeat exports to the EU would decline by 92.5%, with sheepmeat export trade almost completely wiped out. Sheepmeat imports in the opposite direction would similarly suffer as the UK mirrors the EU CET. Substantial declines in trade with the EU27 would also ensue for beef – exports down by 87%, imports declining by 92%. Somewhat better market access due to TRQs would permit some trade to continue. The introduction of a new 230Kt TRQ for UK beef imports would cause non-EU imports to soar by over 1,300%. This would lower prices and drive-up UK consumption by approximately 7%. Sheepmeat imports from non-EU countries are not anticipated to change whilst consumption is projected to rise by 14% due to declining prices.
3. **Price impacts:** declines would be small in a Brexit Deal (-1 to -3% respectively), the threat of more severe price declines increases under a No Deal Brexit. Sheepmeat is particularly exposed with the projections of this study suggesting a 24% decline under No Deal. Downward price pressure for beef (-4%) under No Deal arises due to competition from lower priced imports. This would be exacerbated if significant volumes of Irish beef enter the UK barrier-free via NI.
4. **Value of carcase meat output:** combining the price and quantity effects, the overall impact on the value of domestically produced carcase meat output is summarised below. Under a Brexit Deal, output would decline by an estimated 1.7% whilst under a No Deal the decline would increase by nearly ten-fold (-11.7%) with sheepmeat output nearly 31% lower which would be devastating.

Table I – Projected Impact on Domestically-Produced Beef and Sheepmeat (Farm-Gate Level)

Sector	Baseline*		Brexit Deal			No Deal		
	2017 (£M)	2017 (Kt)	£M	Kt	%Ch (Sales (£))	£M	Kt	%Ch (Sales (£))
Beef	2,989.5	901.0	2,965.5	902.8	-0.8%	2,869.9	901.0	-4.0%
Sheepmeat	1,196.7	307.5	1,149.2	304.4	-4.0%	827.6	279.8	-30.8%
Total	**4,186.2**	**1,208.5**	**4,114.7**	**1,207.2**	**-1.7%**	**3,697.5**	**1,180.8**	**-11.7%**

Sources: Defra (2018) and The Andersons Centre (2019)

* These figures are derived from Defra data.

5. **Impacts at farm-level would be similar:** Andersons' Meadow Farm model projects a 27% decline in profitability (£68/ha versus the current £93/Ha) under a Brexit Deal, but the farm would still be profitable provided it can maintain its current support levels. Even with support unchanged, Meadow Farm starts to generate significant losses under No Deal with a projected deficit of £45/Ha, equating to a £7,000 loss which is unsustainable.
6. **Uncertainty about future border arrangements:** particularly under a No Deal Brexit and much of this centres on trade on the island of Ireland which the UK Government has claimed would remain frictionless, even under a No Deal. Coupled with no checks on NI-GB trade whilst any trade routed from Dublin to Holyhead would be subject to tariffs and regulatory checks, the potential for re-routing meat from the Republic of Ireland via NI and onwards to GB without any checks, could result in substantial volumes of beef being placed on the UK market, beyond the 230Kt TRQ. If significant volumes enter the UK in this fashion, this will mean substantial price declines for UK beef

farmers and further pressure on beef production (than those projected above). Industry participants are calling for further guidance from regulatory authorities to set-out in detail how such issues will be mitigated, otherwise it could endanger the sector's integrity from both a UK consumer and overseas market development perspective.

7. **Non-EU exports insufficient to replace EU27 sales:** negligible increases in exports to non-EU markets are forecast under a Brexit Deal. Whilst a 5% increase is projected under No Deal, this will be from a low base and would offer scant consolation if the EU27 market is lost. Although markets such as China will not compensate, their development should be a priority for the long-term.
8. **Domestic market opportunities:** could arise for domestic producers if trade barriers reduce the competitiveness of imports. That said, with the uncertainties mentioned above and increased price competition will impinge upon this. There are also fears that future changes to standards might make imports more competitive, thus limiting domestic market opportunities even further.
9. **Frictionless trade with the EU27 as a third country is not currently possible:** and looks set to remain so for at least a decade as the required technology has not yet been developed, let alone tested. Long-term, technology can contribute to reducing this via e-certification systems, but friction cannot be reduced completely. Post-Brexit increases in trade friction are inevitable.
10. **SPS-related issues and value deterioration:** dominate when it comes to assessing NTM impacts in beef and sheepmeat. Value deterioration (especially fresh meat) arising from border-related delays associated with physical checks and sampling emerged is of most concern to industry and is the biggest contributor to NTM costs generally. Its impact on frozen products is much lower but still a factor in terms of potential penalties imposed on delayed consignments.
11. **Disproportionate impact on SMEs:** due to higher operating costs and the dispatch of fewer loads than their largescale peers. Due to the time burden involved with getting authorisations such as AEO status, which has poor uptake by UK SMEs, such firms are likely to be seen as a higher risk by regulatory authorities. This would subject them to additional checks which would be spread across a fewer number of loads dispatched, thus having a more negative bottom-line impact. With decreased margins, the attractiveness of trading internationally would diminish. Similar impacts are also possible for EU27 SMEs exporting to the UK and could result in reduced choice for consumers.
12. **Inflationary pressures:** particularly for farm-level imported inputs from the EU27 (e.g. fertiliser, medicines etc.) but also elsewhere. These costs are unlikely to be absorbed by the trade and would be passed on to consumers and/or to primary producers (i.e. farmers). Any price rises are likely to cause consumers to increase their propensity to substitute with cheaper sources of protein, thereby making it more likely that beef and sheep farmers would beat the brunt of price pressures.

FINAL REMARKS

It is also clear that a Brexit Deal based on a comprehensive FTA and close customs and regulatory arrangements with the EU would be much more favourable than a No Deal Brexit, which could have a devastating impact on the sector, especially sheepmeat. That said, a Brexit Deal is also likely to bring (small) declines in overall industry output – at least in the short-term. Whilst developing overseas markets will be crucial to the long-term success of British beef and sheepmeat, close attention must be paid to protecting existing markets, specifically the domestic UK market and the EU27 export market. Even if the UK had never entered the EU (or EEC) in the first place, it is highly likely that markets such as France would still be vital to the British sheepmeat industry. To minimise any upheaval post-Brexit, having a comprehensive mutual recognition agreement between the UK and the EU is crucial to addressing many of the challenges posed.

1 INTRODUCTION

1.1 BACKGROUND AND CONTEXT

The output of the UK beef and sheep livestock sector is just over £5 billion which equates to 20% of gross sales of domestic agriculture[1]. An even larger proportion of UK farmers have beef or sheep as part of their farm systems. The potential impacts of Brexit on this sector could therefore have a greater personal and agricultural impact than the economics alone imply.

The EU27 is by far the largest marketplace for exports from the UK for both beef and sheep meat. Exports of beef and other bovine products to the EU27 accounted for an average of 82% of the total for the period 2013-2017. And as the main destination for UK sheep meat exports, the EU27 accounted for an average of 89% of total exports for the same period. With regard to imports, the EU27 accounted for an average of 86% of the total beef imported into the UK with the Republic of Ireland being the main supplier. The picture for sheep meat is unsurprisingly different, with New Zealand accounting for 74% of all imports over the last five years (AHDB, 2019). Within this, carcase balancing and seasonality are particularly important. As an animal carcase contains different joints and types of meat; those that are more favoured by UK consumers attract additional imports, whilst those less favoured are exported elsewhere. For sheepmeat products in particularly, there are periods of the year when the UK produces an excess supply (which is exported) and at other times is in deficit (and imports). It is too simplistic to conclude the UK could be self-sufficient by netting off imports with exports because they are different goods and serve different markets.

At the time of writing, the UK is scheduled to leave the EU on the 31st October 2019 (unless the Withdrawal Agreement gets ratified in the interim). As the EU27 is by far the largest marketplace for exports from the UK, Brexit and the potential trade frictions associated with it, could result in major changes for UK's red meat industry. The UK's participation in the European Single Market and joint Customs' Union with the other 27 Member States has facilitated the movement of beef and sheepmeat throughout the region for many years. From a current UK Government perspective, departure from the political union (EU) would also mean departure from the Customs' Union and Single Market. This would lead to considerable changes to the way the UK can trade beef and sheepmeat goods. Tariffs and charges might be imposed, quotas and restrictions could limit volumes and government checks, measures and paperwork may be required, each incurring a cost, delay and administrative burden to the transit of goods each way across the region.

The purpose of this project is to provide the AHDB, HCC and QMS and their stakeholders with a clear assessment of how Brexit is likely to affect the British beef and lamb supply chains, encompassing trade, non-tariff measures and the implications for carcase balance.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/741062/AUK-2017-18sep18.pdf

1.2 AIMS AND OBJECTIVES

This study aims to provide stakeholders with a detailed understanding of the potential impacts of Brexit on British beef and sheepmeat trade, the implications thereof for supply-chain operations and grazing livestock farming systems. The following objectives are specified;

1. Present a detailed understanding of Non-Tariff Measures (NTMs) and Barriers (NTBs) that businesses must overcome when trading with the EU and third countries and how these might change under certain types of Brexit.
    a. Assess timeframes to achieve compliance.
    b. Identify the preferred length of any transition period.
2. Set-out what 'frictionless trade' actually means, how close two countries can get to it and how close trade could potentially come to 'frictionless' in terms of 'government imposed' friction between UK & EU.
3. Describe in detail what the impact of trading based on WTO rules would mean for trade between the UK and EU, and UK and selected third countries that currently have preferential arrangements with the EU. This was undertaken by examining three third countries for beef and sheep meat products. These have been agreed with the AHDB to be;
    a. **Beef:** US (import and export), Mercosur (Brazil import) and China (export).
    b. **Lamb:** New Zealand (import), Australia (import) and US (export).
4. Detail the basis for trading through Tariff Rate Quotas (TRQs) with the EU, the method by which they can be used, how they might be allocated to the UK for use, and other considerations.
5. Measure the impact of each of the scenarios on the total amount of the beef and lamb goods traded and how it might affect the UK domestic beef and lamb supply chains. This will include the possible impact on domestic demand affecting the trade balance of carcase components.

1.3 SCENARIOS

Following discussion with AHDB and other stakeholders, this assessment focusses on two different trading scenarios for the UK and assesses their impact on the British beef and lamb supply chains. The assessment of each scenario is clearly subject to ongoing negotiation and discussion at a number of different levels within the EU and UK. However, so that clear advice based on detailed analyses can be provided, the key assumptions that have been made with regard to each scenario and how this potentially impacts on trade with Europe and the Rest of the World are set-out below. Section 3.5 considers the current trading arrangements within the red meat sector.

1.3.1 Brexit Deal Scenario

Under this scenario, the UK leaves the EU under the negotiated Withdrawal Agreement and then, under the terms of the "Political declaration setting out the framework for the future relationship between the European Union and the United Kingdom", agrees a meaningful Free Trade Agreement (FTA). It is assumed that the FTA is negotiated within the Transition period and the Backstop provisions applying to Northern Ireland do not apply. In effect, this means the new FTA is in place by end Dec 2020 (subject to further negotiation). It is noteworthy, that it is a stated UK position that the UK desires the ability to negotiate trade deals with other countries (Rest of the World) whilst having a meaningful FTA with the EU. It is assumed that this position will ultimately be achieved.

- **In trade with the EU,** the UK is outside of the Single Market and the Customs Union but operates within a comprehensive FTA that is accompanied by a Customs Arrangement which would involve deep levels of integration with EU regulation concerning customs procedures (e.g. rules of origin). As a result:
    - Trade between the UK and EU is tariff free.
    - Trade between the UK and EU is not limited by TRQs.
    - Goods can move freely between the UK and the EU, but they will be subject to a number of non-tariff barriers/ measures not covered by the Customs Arrangement (e.g. SPS). For the purposes of this study, customs declarations will be required on UK-EU trade.
    - There are some increases in trade costs with the EU as market access has to be gained (rather than assumed) as the UK has left the Single Market.
    - There would be no regulatory checks on cross-border trade on the island of Ireland; however, beef from the Republic of Ireland exported to GB would be subject to regulatory checks not covered by the Customs Arrangement.
- **For trade with the Rest of the World:**
    - Trade will take place on MFN terms except where preferential agreements apply. Tariffs apply to many countries but where the EU has a preferential trade deal, it has been assumed that the UK would take advantage of this (because of its alignment through the Customs Agreement above).
    - The UK will be free to negotiate its own trade deals with other countries.
    - The UK would impose its own TRQ's on imports based on a negotiated share of the current EU TRQ's and others it may wish to develop. However, provision for these other TRQs has not been included in the results as they are highly speculative at this juncture.
    - The UK would impose its own tariffs on imports which may or may not be in alignment with the EU's tariff schedule (known as the Common External Tariff (CET)).
    - UK exporters will have to pay import tariffs to access other markets unless they have access to lower tariffs through agreed TRQ's.
    - Goods will be subject to a number of non-tariff measures/barriers.
    - There will be an increase in trade costs as market access has to be gained.
- **Other assumptions:** linked with this scenario, the following assumptions (specified by the AHDB) are also noteworthy;
    - **Policy:** Direct payments reduced by £150 million; public good-type payments increased by the same amount to leave overall support unchanged. This assumption becomes relevant in the context of the farm-level analysis considered later on.
    - **Labour:** Seasonal non-UK labour: possible under an expanded SAWS-type scheme. Permanent non-UK labour: restricted to 50% of current levels.
    - **Trade facilitation:** Free Trade Agreement with the EU means that trade-facilitation costs for crops of 2%. However, as the examination of trade facilitation costs (a proxy for NTBs/NTMs) are the focus of this study, these costs are set out in Chapter 6. MFN treatment is assumed to apply for third countries.

1.3.2 No Deal Scenario

Under this scenario, the UK leaves the EU with "No Deal" in place and reverts to trade on MFN basis and regulations for all international trade including with the EU and the Rest of the World. As this study

compares the situation 9-12 months after a No Deal (short-term upheavals are considered to be too speculative to model robustly), it has been assumed that the UK has negotiated temporary bilateral roll-over trade agreements to supplant existing agreements it accessed whilst being an EU Member State. Arguably, this task would be very difficult to complete within such a timeframe, but the UK is already undertaking such work. Otherwise, WTO rules would be used for all trade until such time as new bilateral trade agreements have been negotiated.

- **In trade with the EU**, the UK is outside of the EU's Single Market and Customs Union and the UK is recognised as any other third country where the EU has no trading arrangement (until such time as a trading agreement can be negotiated and implemented).
    - WTO rules would apply
    - The UK would apply its own published tariffs[2] to imports. These would apply equally to the EU27 and non-EU countries which are WTO members.
    - The UK would set its own TRQ's on imports where it felt necessary (using both its negotiated share of EU TRQ's and others it may wish to develop).
    - Trade between the UK and the EU would involve EU CET being applied to UK exports.
    - The UK has obtained country and plant approval for the export of meat products to the EU and reciprocal access has been granted for EU Member States and operators exporting to the UK.
    - UK export trade would be able to avail of EU27 TRQ concessions, subject to meeting the allocation rules.
    - Goods will be subject to a number of non-tariff barriers/ measures.
    - There will be some increase in trade costs as there would be a greater burden on ensuring that the requisite market access permissions have been achieved. These would be higher than in the Brexit Deal scenario presented above.
    - Whilst the authors note that both the UK and Irish Governments seek to ensure that there would be no hard border on the island of Ireland under No Deal, it remains to be seen how this could be achieved in practical terms. This study has assumed that trade between the Republic of Ireland and GB would be subject to tariffs and trade barriers as set-out above for the EU27, trade between Northern Ireland and GB would not be subject to tariffs.
- **For trade with the Rest of the World:**
    - Trade will again take place on MFN terms except where preferential agreements would apply to the UK. This MFN treatment would be subject to WTO rules. WTO rules apply.
    - The UK could negotiate its own preferential trade deals.
    - As above, the UK would apply its own tariffs and TRQs for imports into the UK.
    - UK exports would be subject to MFN tariffs as notified and applied by each WTO member and TRQs in the destination market, unless separate bilateral trade deals (or roll-over of existing agreements) had been negotiated.
    - Goods will be subject to a number of non-tariff barriers/ measures.
- **Other assumptions:** again, specified in conjunction with the AHDB include;

[2] See: https://www.gov.uk/guidance/check-temporary-rates-of-customs-duty-on-imports-after-eu-exit

- **Policy:** Direct payments reduced by £150 million; public good type payments increased by the same amount to leave overall support unchanged. Again, this assumption becomes relevant for the farm-level analysis considered later on.
- **Labour:** Seasonal non-UK labour: possible under an expanded SAWS-type scheme. Permanent non-UK labour: restricted to 50% of current levels.
- **Trade facilitation:** Free Trade Agreement with the EU Trade facilitation costs for crops of 4%. However, as the examination of trade facilitation costs (a proxy for NTBs/NTMs) are the focus of this study, these costs are set out in Chapter 6.

1.3.3 Additional Scenarios for the NTMs' Analysis

For the NTMs analysis undertaken in Chapter 6, two additional scenarios, "Low" and "Current" have also been included. These scenarios are summarised briefly below. The rationale for their inclusion is that for red meat in particular, New Zealand (which trades with the UK/EU on an MFN basis) enjoys a lower (preferential) rate of physical checks (1%) than countries which have agreed a comprehensive FTA with the EU/UK (e.g. Canada). Some research participants consulted during this study have expressed doubt as to whether the UK would immediately enjoy such preferential check rates and is likely to be offered something more akin to Canada, at least initially. The Current scenario is included because it facilitates a comparison between current NTM costs, particularly between the UK and the EU27, and how these could change in the future.

- **Low:** outlines the minimum NTMs that the UK would face when trading with the EU as a third country post-Brexit. It is assumed that UK-EU trade would be governed by an all-inclusive Regulatory Equivalence agreement effectively transposing all EU standards into UK law, thus keeping the UK in broadly the same position as present but being subject to the EU's minimum level of official controls (e.g. similar to New Zealand's veterinary agreement with the EU for red meat).
- **Current (status quo):** refers to current UK-EU (i.e. UK is still an EU Member State) and third country to UK trade processes, whilst trade barriers are generally minimal, some instances of NTMs still exist (e.g. for live animals). In most cases, for third country to UK trade, the Current scenario estimates are very similar to the future "Brexit Deal" scenario.

1.4 Scope

The AHDB, HCC and QMS require clarity over what the changes are likely to be for the British beef and sheep sector. This encompasses carcases, the balance of their sales, the offal supply chain, and wastage. It also covers trades of live animals and how these might change. The total costs of NTMs are laid out in detail as these are a crucial barrier to trade but are often difficult to quantify accurately. Changes to third country trade flows will also become relevant, especially with those countries which currently enjoy preferential trade relationships with the UK by virtue of being within the EU.

Only the beef and sheep sectors are included. The project primarily concentrates on finished carcases and associated cuts but also encompasses live animals. Impacts to the supply of inputs of beef and sheep farms might be relevant as secondary observations but are not be the focal point of this study.

This study makes use of existing models that Andersons has used for similar projects in recent years, particularly concerning non-tariff barriers and measures. The Intellectual property of these models belongs to The Andersons Centre and will remain so, although the outputs of the model are included in

this report. The study also draws upon models by other parties to inform its analysis, particularly with respect to the trade impact assessment covered in Chapter 7.

1.4.1 Products of Interest

Based on HMRC trade data which is segmented by 8-digit commodity code under the Harmonised System (HS), Table 1-1 summarises the beef and sheepmeat product codes which were examined during this study. These HS codes helped to derive an aggregated overview of UK beef and sheepmeat trade with both EU and non-EU countries and also informed the trade impact assessment. Whilst it was noted that beef and sheepmeat products (e.g. corned beef) are also traded internationally and covered under HS Chapter 16, these were deemed to be of relatively low importance from a UK perspective and were therefore not considered.

Table 1-1 – Beef and Sheepmeat Products Analysed in this Study

Product Category	HS Code	Product Description
Beef and Veal	02011000	Fresh/chilled beef carcases or half-carcases
Beef and Veal	02011001	Fresh/chilled beef carcases or half-carcases
Beef and Veal	02012020	Fresh/chilled beef "compensated" quarters
Beef and Veal	02012030	Fresh/chilled beef forequarters (bone-in)
Beef and Veal	02012050	Fresh/chilled beef hindquarters (bone-in)
Beef and Veal	02012090	Other fresh/chilled beef cuts (bone-in)
Beef and Veal	02013000	Fresh/chilled boneless beef
Beef and Veal	02021000	Frozen beef carcases/half-carcases
Beef and Veal	02022010	Frozen beef quarters (bone-in)
Beef and Veal	02022030	Frozen beef forequarters (bone-in)
Beef and Veal	02022050	Frozen beef hindquarters (bone-in)
Beef and Veal	02022090	Other frozen beef cuts (bone-in)
Beef and Veal	02023010	Frozen boneless beef forequarter cuts (≤5 pcs)
Beef and Veal	02023050	Frozen boneless beef chuck/blade/brisket cuts
Beef and Veal	02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)
Beef offal	02061095	Fresh/chilled edible beef offal thick/thin skirt
Beef offal	02061098	Fresh/chilled edible beef offal (excl. thick/thin skirt)
Beef offal	02062100	Frozen edible beef tongues
Beef offal	02062200	Frozen edible beef livers
Beef offal	02062910	Frozen edible beef offal (excl. tongues and livers)
Beef offal	02062991	Frozen edible beef offal thick/think skirt
Beef offal	02062999	Other frozen edible beef offal
Sheepmeat	02041000	Fresh or chilled lamb carcases and half-carcases
Sheepmeat	02042100	Fresh or chilled sheep carcases and half-carcases (excl. lambs)
Sheepmeat	02042210	Fresh or chilled sheep short forequarters
Sheepmeat	02042230	Fresh or chilled sheep chines and/or best ends
Sheepmeat	02042250	Fresh or chilled sheep legs
Sheepmeat	02042290	Other fresh/chilled sheep cuts, with bone in
Sheepmeat	02042300	Fresh/chilled boneless sheep cuts
Sheepmeat	02043000	Frozen lamb carcases and half-carcases
Sheepmeat	02044100	Frozen sheep carcases and half-carcases (excl. lambs)
Sheepmeat	02044210	Frozen sheep short forequarters
Sheepmeat	02044230	Frozen sheep chines and/or best ends
Sheepmeat	02044250	Frozen sheep legs
Sheepmeat	02044290	Other frozen sheep cuts, with bone in
Sheepmeat	02044310	Frozen meat of lambs, boneless, frozen
Sheepmeat	02044390	Frozen meat of sheep, boneless (excl. lamb)
Sheepmeat offal	02068010	Fresh/chilled sheep/goat offal for pharma products
Sheepmeat offal	02068099	Fresh/chilled sheep/goat offal not for pharma products

Source: The Andersons Centre (2019)

1.4.2 Geographic Definitions

Throughout this report, there are numerous geographical terms used sometimes interchangeably. It is therefore important to define these terms at the outset:

- **United Kingdom (UK):** includes England, Scotland, Wales and Northern Ireland (NI).
- **Great Britain (GB):** consists of England, Scotland and Wales.
- **Ireland:** refers to the Republic of Ireland and is part of the EU27.
- **Island of Ireland:** includes both Northern Ireland and the Republic of Ireland.
- **The European Union (EU):** currently all 28 EU member states; also referred to as EU28.
- **EU27:** EU member states excluding the UK.
- **EU26:** EU Member States excluding the Irish Republic as well as the UK. Sometimes referred to as Rest of EU or "Continental EU".
- **Non-EU:** all countries outside of the EU28; periodically referred to as Rest of World (ROW) or "third countries".
- **Extra-EU**: refers to non-EU (third countries) and in a post-Brexit context.
- **Intra-EU:** denotes current trade between EU Member States including the UK to the point of Brexit. Thereafter, the UK becomes extra-EU and intra-EU trade then refers to trade between the EU27 Member States.

1.5 Report Structure

The structure of this Summary Report is as follows:

- **Methodology (Chapter 2):** details the various research techniques, modelling tools, data and information sources that were used to fulfil the study's aims and objectives. This also includes a top-level overview of how the modelling works.
- **Literature review (Chapter 3):** explores previous studies examining the impact of Brexit on the UK's agri-food trade with EU and non-EU countries. It also provides further scrutiny of the trade-related implications of the future trading scenarios for the UK. Thereafter, this Chapter examines frictions to trade, tariffs, tariff rate quotas (TRQs) and NTMs in the red meat sector. These issues are developed further in subsequent chapters where each is explored in-depth.
- **Trade Flows and Trade-Related Processes (Chapter 4):** provides a top-level summary of output and trade by product category, based primarily on official trade statistics from the HMRC with the focus on UK to/from EU27 trade as well as UK trade with non-EU countries. It also includes examples of the process maps which have been compiled to illustrate the procedures that must be followed when trading with the EU as a third country which have been used to inform the NTM estimates compiled for this study.
- **Tariff and Tariff Rate Quota Impacts (Chapter 5):** assess the impact of the imposition of the UK's proposed tariffs on imports as well as the tariffs put in place by other countries/regions (including the EU27) on UK exports. This assessment is also complemented by additional information in Annex I. It also sets-out how the proposed allocation of existing EU28 TRQs between the UK and the EU27 could affect future trade.
- **NTM Impacts (Chapters 6):** summarises the key assumptions and frameworks used to develop the NTMs Model as well as key caveats to consider when interpreting its results. Projected NTM costs for six products chosen for a detailed examination (see section 4.5) are presented on a product-by-product basis for both "checked loads" (subject to the full range of NTMs quantified in this study) and "probability-based" estimates (which consider

the check-rates for some NTM categories). The results are presented across four scenarios and are set-out on a cost per load (£), ad-valorem equivalent (AVE (%)) and on a cost per tonne (£) basis. A brief interpretation of the results is also provided.

- **Overall Trade Barrier Impacts (Chapter 7):** drawing upon the projected tariff, TRQ and NTM impacts, this Chapter quantifies the impact on beef and sheepmeat trade in both Brexit scenarios.
- **Implications (Chapter 8):** examines the farm-level implications using Andersons' Meadow Farm Model. It also considers the implications for other parts of the supply-chain, encompassing industry views on the required transition period. The question of whether frictionless trade can be achieved is also discussed.
- **Conclusions and Recommendations (Chapter 9):** highlights key points for consideration by policy-makers and industry participants based on the research undertaken during this study. It also outlines key recommendations to address the challenges posed as well as areas for future research.

2 METHODOLOGY

In this Chapter, the key methodological steps undertaken to fulfil this study's objectives are outlined. The methodological approach used a combination of quantitative and qualitative research techniques to address the project's requirements. This encompassed a literature review, interview discussions with industry participants as well as MS Excel-based economic modelling and culminated in the estimation of the potential impact of trade barriers (tariffs, TRQs and NTMs) on UK beef and sheepmeat trade.

2.1 DESK-BASED META-ANALYSIS AND LITERATURE REVIEW

A literature review introduces the study, summarising recent studies on the topic with the intention of preventing repetition of effort and resources whilst providing ideas and new contacts for the research.

The review encompassed a detailed examination of over 25 studies that had previously investigated the issue of trade barriers in agri-food trade generally and the beef and sheepmeat sector specifically. These primarily focused on current UK to EU trade and on exporting into the EU28 (including the UK) from third countries. Where appropriate, consideration was also given to trade barriers to agri-food trade conducted elsewhere in the world to determine if any additional insights could be gained.

It had multiple aims including;

- Introduce readers to key studies on estimating trade barriers to agri-food trade
- Elaborate further on the key scenarios introduced in Chapter 1.
- Provide an overview of the key barriers ('frictions') which impinge upon agri-food trade
- Establish the best working definition of NTMs, and a framework for assessing NTMs (and NTBs), based on previous work.
- Summarise the key methodologies used in other studies to estimate NTMs, to see if any lessons could be learnt.
- To scope-out data sources that could be deployed in the modelling component of the project (some of these are referenced elsewhere in this report).

2.2 MAP-OUT TRADING PROCEDURES

The studies identified in the Literature Review also provided the basis for the development of a series of process maps which outlined the key steps in the importation of meat products into the EU (and UK) from third countries which typically trade with the EU on a Most-Favoured Nation (MFN) basis. These process maps attempt to depict when each step takes place in terms of how far in advance of, or after, the shipment it typically occurs. These process maps also set-out some of the key stakeholders involved with each regulatory step and provided a basis for a number of discussions with industry experts carried out during this research.

It must be emphasised that the NTM process maps shown in this report were developed on the basis of being peer-reviewed only and should not be considered as exhaustive. They were compiled based on the existing knowledge of the authors in relation to trade practices, supplemented by the findings of the Literature Review and additional web-based research.

The process maps also provide a useful assessment framework throughout the duration of the project.

2.3 PRIMARY RESEARCH – INDUSTRY INTERVIEWS

During the study, interview discussions were held with 10 industry participants from across the UK beef and sheepmeat sectors. This input built upon knowledge gained during previous studies when more than 30 in-depth interviews were undertaken on the impact of various Brexit scenarios on beef and

sheepmeat. Where appropriate, consent was obtained from participants in previous studies for input to be utilised in this study. Furthermore, participant consent was also obtained for any new input obtained for this study which straddled both UK-EU and UK-third country trade. Table 2-1 summarises the interviews undertaken for this specific study. Each discussion, which consisted of a mix between telephone and face-to-face interviews, generally took around 45 minutes to undertake but a number of conversations lasted significantly longer than this. The interviews were based on a series of questionnaires which were adapted depending on the type of organisation being interviewed.

Following each interview, the feedback was analysed and key points meriting further exploration were identified and examined further. Key data points were also captured and were inputted as preliminary estimates into the NTMs model.

Table 2-1 – Summary of Primary Research Interviews

Stakeholder Type	No. of interview discussions
Trading businesses (e.g. processors and producers)	5
Trade associations, agents and retailers	4
Port Health and Local Authorities	1
Total No. of Interviews	**10**

Source: The Andersons Centre (2019)

2.4 Model Development Summary

This study used a two-stage approach to quantify the impact of trade barriers on red-meat trade. It firstly focused on developing an NTM model to assess projected non-tariff impacts on key commodities. The findings from this NTM analysis were then combined with input from previous studies on quantifying the impact of trade barriers in Brexit scenarios to conduct a volume-based assessment on the projected impact on cross-border trade and associated output at a UK level. The methodology employed for both model development stages is briefly summarised below.

2.4.1 Tariff Impact Modelling

Tariffs are relatively straightforward to model as they have defined costs. During this study, an analysis of tariffs that would be applicable under a No Deal scenario was undertaken with respect to UK exports to the EU and the imposition of the UK's proposed tariffs on imports from the EU27 and non-EU countries. These impacts are summarised in section 5.2 with additional information contained in Annex I. Whilst undertaking this analysis, estimated tariff impacts on UK beef and sheepmeat product exports to selected third countries (e.g. US and China) were also incorporated into the modelling. As the impact of tariffs are quite well understood, the influence of NTMs are less clear. Accordingly, and bearing in mind the time constraints of this study, the most focus of the modelling and research was on quantifying the impact of NTMs (see section 2.4.3).

2.4.2 Tariff Rate Quota (TRQ) Impacts

For beef and sheepmeat, the projected impact of the reallocation of existing EU28 TRQs based on historic import trade between third countries with the UK and the EU27 was assessed. This involved an examination of TRQ volumes which would be potentially available for the UK exporters post-Brexit as some TRQs are open to everyone (i.e. not allocated to specific countries). A similar exercise was also conducted for EU27 exports seeking markets in the UK. Added to this, consideration was also given to

the impact of the new 230Kt beef TRQ that the UK proposed to make available to imports from all countries in a No Deal scenario, provided they could meet the UK's regulatory standards.

2.4.3 NTMs Model

Using the insights and data captured from the industry interviews process in conjunction with the knowledge obtained from previous studies, a bottom-up model was deployed to quantify the impact of non-tariff measures for six key products selected for a detailed examination during this study. These products were assessed on a per load basis for both 'checked loads' (subject to the full range of regulatory checks, sampling and accompanying NTMs that were applicable) and on 'probability-based' considerations reflecting the differing check rates (e.g. physical checks ranging from 1% to 20% for red meat) that are potentially applicable. These probability-based estimates calculated the AVE impact of NTMs when averaged out over 100 loads.

For each product under examination, the model sought to estimate the cost of each NTM at the production and processing (plant level), during the cross-border journey (at the border) and at the destination of the shipment. The resultant AVE estimates were then incorporated into a wider assessment of the impact of trade barriers on beef and sheepmeat trade.

During the research estimates were sought in relation to the following trade flows;

- **Third country to UK trade** – relates to imports from Non-EU countries with a particular focus on major importers such as Australia, New Zealand, Brazil and the US.
- **EU to UK trade** – concerns imports from the EU27.
- **UK to EU trade** – focusing on exports to the EU27.
- **UK to third country trade** – particularly concerning exports to key non-EU markets with an emphasis, where possible, on markets such as China and the US.

During the research, it became apparent that, due to the limited insights obtainable within the study's timeframe on future regulatory procedures on exports from the UK to third countries, that the associated NTM estimates would have to be omitted from the results. This is because of the variability that exists when exporting to different third countries with divergent, and sometimes opaque, systems. The process was also hindered by several stakeholders from these countries being unwilling to comment on what they perceive to be the speculative nature of the UK's position post-Brexit. Accordingly, the NTM estimates presented in Chapter 6 omits UK to third country trade.

Further information on the processes used to compile the NTM estimates as well as the key assumptions is provided in sections 6.1 and 6.2.

2.4.4 Trade Impact Modelling

Drawing upon the estimates derived from the NTM modelling as well as input from previous studies, a top-level trade impact model was developed to estimate the potential impact of tariffs and non-tariff barriers on post-Brexit trade under a Brexit Deal and No Deal scenario. This exercise consisted of the following steps;

1. **Assessment of previous studies gauging the impact of Brexit on beef and sheepmeat trade:** was undertaken to show the overall direction of post-Brexit trade flows under each scenario. These studies utilised a series of econometric modelling techniques and are commented on in further detail in section 7.1. The insights obtained from these studies was used to inform the modelling.
2. **Integrate findings from the TRQ assessment and NTM modelling into the trade barrier model:** based on reallocation of existing EU28 TRQs between the UK and the EU27 as well as an analysis of

the likely future TRQs that the UK could gain access to when exporting to the EU27 (and vice versa), a preliminary assessment was undertaken to ascertain the TRQ volumes potentially available under a No Deal Brexit. Based on the NTM estimates, expressed in AVE terms, in conjunction with import elasticity[3] estimates from a previous study by Ghodsi et. al. (2016), calculations were made on the extent to which TRQ traded volumes would be eroded as a result of increased prices brought about by tariffs and NTMs. These calculations also considered the competitiveness of UK/EU27 produce vis-à-vis competing third country produce as well as the proposed 230Kt of new beef TRQ that the UK would grant on an Erga Omnes basis (i.e. to Everyone) post-Brexit.

Under a Brexit Deal scenario, the impact of NTM costs only were considered as trade between the UK and the EU in this scenario is assumed to be both tariff and quota free. Trade between the UK and third countries was also assumed not to be affected, at least initially. This is because the existing market access that the UK has obtained whilst being part of the EU are assumed to be rolled-over and NTMs are already a factor in UK to third country trade and would essentially remain unchanged. *Notably, the impact of no hard border on the island of Ireland in a No Deal scenario has not been considered in the results. If significant volumes of beef from Ireland get routed to the GB market via Northern Ireland, and do not fall within a TRQ, then this could have a major impact on the UK beef and sheepmeat sector. That said, the following counter arguments should also be noted. Firstly, it is the intention of HMRC that tariffs would be paid on Irish beef exported to GB through NI. Secondly, beef and sheepmeat are now products with traceability par excellence. Third, Irish industry sources say that no reputable retailer or purchaser would risk their reputation effectively trying to smuggle Irish beef into GB. Whilst it remains speculative as to how the Irish border issue would be addressed under a No Deal, concerns around smuggling remain, despite the authorities' intentions to minimise such activities.*

3. **Calculation impact on traded volumes:** having calculated the percentage impact on traded volumes using import elasticities and projected TRQ and tariff impacts, the resultant absolute impact on export and import trade with the EU27 and non-EU countries was conducted. This also included top-level estimates on the potential changes in domestic production and overall consumption in the UK market for beef, sheepmeat and their associated offal. A commentary on the results is also provided.
4. **Price effects and impact on value of beef and sheepmeat output:** these effects were gauged drawing upon insights from previous studies as well as the projections of the authors developed during this and previous studies. The focus on the impact on output value was primarily assessed from the perspective of domestically produced beef and sheepmeat produce only.

[3] Import elasticity concerns the percentage change in imports as a result of a 1% increase in the price of those imports brought about as a result of the imposition of tariffs and NTMs.

3 LITERATURE REVIEW

3.1 INTRODUCTION AND CONTEXT

This Chapter summarises the key findings from the Literature Review which was undertaken in the early stages of this study. It firstly sets out the background to the potential impact of Brexit on agricultural trade within the UK. There is little doubt that this sector will be one of the most seriously affected.

This review introduces and assesses previous studies that have considered the impact of Brexit on the UK's agricultural trade. The key results of some of these studies are examined in more detail in Chapter 7 because they are used to inform the trade impact assessment. As the Brexit negotiations have developed there remains a high level of uncertainty regarding the future trading relationship between the UK and the EU. Whatever form of trade agreement is finally reached there will be new barriers and associated costs to trade. This review is undertaken in the context of two possible future trading scenarios for the UK, introduced in Chapter 1. It provides a brief outline of the key "frictions to trade" before considering how tariffs, Tariff Rate Quotas (TRQs), non-tariff measures (NTMs) (and non-tariff barriers (NTBs)) may operate following the UK's departure from the EU. Finally, whilst the costs and impact of tariffs and TRQ's are relatively straightforward to model the literature on the qualification and quantification of NTMs (and NTBs) will be reviewed in more detail because there is much less certainty around how these would apply and their potential impact under each scenario.

3.2 IMPACT OF BREXIT ON UK AGRICULTURAL TRADE

Ever since the decision to call a referendum on the UK's membership of the EU there has been much speculation of the impact that staying "in" or getting "out" will have on agriculture. The first scholarly article, and much cited since, was that produced by Boulanger and Philippidis (2015) who attempted to quantify the financial impact of the UK's exit from the EU. Since that publication there has been a significant amount of speculation, commentary and academic work to examine this issue in more detail in both the UK and the EU. In addition to the academic and journalism work carried out, there has been an increasing emphasis on translating the outputs of these studies into practical advice for the farming community and supply trade. The key outputs from this body of evidence are summarised below.

In the run-up to the referendum van Berkum *et. al.* (2016) published their assessment of the implications for agriculture of a UK exit from the EU. The report produced by LEI-Wageningen in April 2016 was commissioned by the National Farmers Union and is often referred to as the "LEI/ NFU study". It remains to this day a key piece of academic work as it attempted to model the impact of Brexit by taking account of possible changes in domestic agricultural support policy and trade arrangements and then, using farm-level models, assessing this impact at the farm level. In common with many of the studies completed since, it did not attempt to model the costs of supply of labour (particularly migrant labour) to the UK agricultural industry nor the impact of a changing regulatory burden on farmers.

During 2016, the AHDB released a series of Horizon reports for their Levy payers that provided guidance on the potential impact of Brexit on a number of different agricultural sectors. Many of these "market intelligence" reports have since been updated as the Brexit negotiations have developed, for example Beef and Lamb (AHDB, 2019). These documents remain key tools for farmers and producers to understand the implications of what are complex, and often convoluted, developments in the Brexit story.

At the same time as the sector guides, the AHDB published information about what possible future UK-EU trading arrangements might look like (AHDB, 2016) and the implications for agriculture if the UK trades under World Trade Organisation (WTO) rules (AHDB, 2017a). Following the commissioning of a

study by AHDB, Bradley and Hill (2017) produced the second key assessment of the implications of Brexit on UK agricultural trade. This report, often called the "AHDB study", assessed the impact of future domestic agricultural and trade policy on farm incomes. Unlike the LEI/ NFU study, the AHDB study attempted to model the impact of changing labour costs and regulatory burdens. The report was subsequently used as the evidence base for AHDB's publication on "Brexit scenarios: an impact assessment" (AHDB, 2017b).

Independently, the FAPRI-UK modelling system, was also being used to estimate the potential impact of Brexit on different sectors within UK agriculture. The FAPRI model captures the dynamic interrelationships between the variables affecting supply and demand in the main agricultural sectors of England, Wales, Scotland and Northern Ireland. The results of this work were published by Davis *et. al.* (2017) and is commonly referred to as the "AFBI study", as this is where the authors are based, and focussed on the sectoral impact of three different UK-EU trading arrangements.

These three studies have provided the evidence base for the majority of impact assessments on UK agriculture following Brexit. In addition to these studies there have been a number of other notable reports and publications that have assessed the impact of Brexit on different geographical locations within the UK or on specific farming systems. These include for example:

- Impact on agriculture in Scotland – AHDB, 2017c and Shrestha *et. al.* (2018).
- Impact on agriculture in Wales – AHDB, 2018.
- Impact on grazing farms in the Lake District National Park (Agra CEAS Consulting, 2018; Wallace and Scott, 2018).
- Impact of WTO trading on the Northern Ireland beef and sheep meat industry (Haverty, 2017).
- Possible impacts of a hard Brexit on UK sheep meat production (AHDB, 2019).

The EU has also been considering these issues and there have been several notable, and much cited, studies carried out that have assessed the impact of Brexit on EU-UK trade relations from an EU perspective. These include:

- Lawless and Morgenroth (2016) The Product and Sector Level Impact of a Hard Brexit across the EU.
- Matthews (2017) Brexit Impacts on Irish Agri-food Exports to the UK.
- Boulanger *et. al.* (2017) Cumulative economic assessment of future trade agreements on the EU agriculture.
- Bellora *et. al.* (2017) Research for AGRI Committee – EU-UK agricultural trade: State of play and possible impacts of Brexit.
- Haas and Rubio (2017) Research for AGRI Committee – Possible impact of Brexit on the EU budget and, in particular, CAP funding.
- Matthews (2017) Research for AGRI Committee – Possible transitional arrangements related to agriculture in the light of the future EU-UK relationship.
- Van Berkum *et. al.* (2018) Brexit's Agri-trade Impacts on the Netherlands.

Until recently, there have been few developments since the plethora of studies and reports published in 2017. However, a new piece of research has recently been completed in the UK by Hubbard et. al. (2019) and was funded by the Economic and Social Research Council (ESRC). This 'ESRC study' is a collaborative work involving a number of researchers who have previously written in this area (Hubbard *et. al.* 2018; Davis *et. al.* 2019). In this ESRC study, the authors took two economic equilibrium models (one of which included the FAPRI-UK model mentioned above) and linked them to a series of representative farm models. The aim was to estimate the possible macro, sector and farm-level effects of selected trade and

domestic policy scenarios for UK agriculture. Three trade policies were explored which included a UK-EU Free Trade Agreement, Unilateral Trade Liberalization and WTO rules.

Furthermore, a Bradley and Hill (2019) study has been recently published which updates previous work and includes consideration of the recently published applied tariffs that the UK is proposing to apply (at least for one year) in the event of a No Deal scenario. The key trade impact-related results of both Hubbard et. al. (2019) and Bradley and Hill (2019) are examined in more detail in Chapter 7.

The farm-level modelling conducted by the ESRC study comprised detailed financial simulations for 2,803 businesses in the Farm Business Surveys of England, Wales, Scotland and Northern Ireland over the three-year period 2013/4-2015/16. The conclusions drawn across different sector commodities are broadly in line with those from the LEI/ NFU, AFBI and AHDB studies (van Berkum *et. al.* (2016), Davis *et. al.* (2017) and Bradley and Hill (2017) respectively). In their conclusions the authors clearly show that Brexit will have significant implications for UK agriculture, which is a sector with strong trade links to the EU and reliance on direct payment support. Under the trading scenarios modelled these impacts will be different for the commodity sectors and geographical regions of the UK. Whilst they recognised that tariffs and additional trade costs would vary under the trade scenarios explored, they also concluded that these trade effects could be overshadowed by foreign currency exchange rates, possible labour market changes and other NTBs. The impact of these other NTB's were not addressed in their study. The authors also recognised that whilst they tried to assess the impact at farm level, they were not able to address the economic impacts of Brexit on the supply chain *per se*. Further discussion of the farm-level impacts put forward by both the ESRC study and by Bradley and Hill (2019) are discussed in Chapter 8.

The impact of Brexit (with the consequent introduction of various frictions to trade under a number of different trading conditions) on farm gate prices, farm incomes and the supply chain are the critical elements of this study. The future trading scenarios that are considered in this study are outlined below. These are broadly in line with those used previously by Hubbard *et. al.* (2018; Davis *et. al.* 2019) but reduced to two as outlined in section 1.3.

3.3 FRICTIONS TO TRADE

At its simplest level, 'free trade' means that goods can be exported and imported between countries without tariffs. Nonetheless, those goods, even though tariff free, still have to go through customs and may be subject to other regulatory checks that often cause delays. In addition to customs checks, there are other barriers such as regulations, restrictions, compliance requirements and complex certification, which together mean that trade is never completely frictionless. This section briefly summarises the main sources of friction that can impact on trade between nations, providing background context, to a more in-depth review of these issues later in this literature review. The issue of achieving frictionless trade post-Brexit is also discussed further in Chapter 8.

Tariffs — When goods are imported into a country, the government charges a tariff (customs tax or duty). The most common type of import tariff is '*ad valorem*', where a percentage of the price is paid. Tariffs can also be a fixed amount in monetary terms or a mix of the two. For example, most beef imports into the EU are subject to *ad valorem tariffs* of 12.8%, plus a fixed amount ranging from €1,414 to €3,041 per tonne, depending on the cut (AHDB, 2019). As part of a customs union, EU Member States collect the tax on behalf of the EU, keeping approximately 20% to cover administrative costs.

Discussion about the imposition of trade tariffs has been widespread and the implications comparatively straightforward to work through for most goods under various scenarios using some relatively straight forward assumptions. For example, analysis undertaken by Kee and Nicita (2017) suggested that tariffs

could cause UK goods' exports to fall by approximately 2% following Brexit without a trade agreement. This study will examine and quantify the impact of tariffs on the two main red meat supply chains.

Tariff-rate quotas (TRQs) —are limits on the quantities of goods that can be imported or exported. That said, when viewed from the perspective of trading under MFN terms and being subject to tariffs, TRQs actually serve as a liberalisation mechanism relative to a situation where imports are restricted by high MFN tariffs, thus opening potential market access rather than closing it. When a Tariff Rate Quota applies to imports; within the quota, the tariff rate is zero or very low; and outside the quota the tariff rate is much higher. While importing outside a TRQ is not impossible, the percentage tariff applicable would likely make it unprofitable for the exporter in the context of UK-EU trade.

Within the red meat sector, TRQ's specify the volume of product that can be brought into the EU (or other countries) in a fixed 12-month period. The majority of TRQ's tend to run from 1 July to 30 June. TRQs are managed through the issuing of import and export licences and can be specific to one exporting country, a group of specified countries or can be open to all suppliers ('Erga Omnes'). Having secured a TRQ, the national allocation for a country is usually allocated on a first-come-first-served basis by the authority issuing the relevant licences.

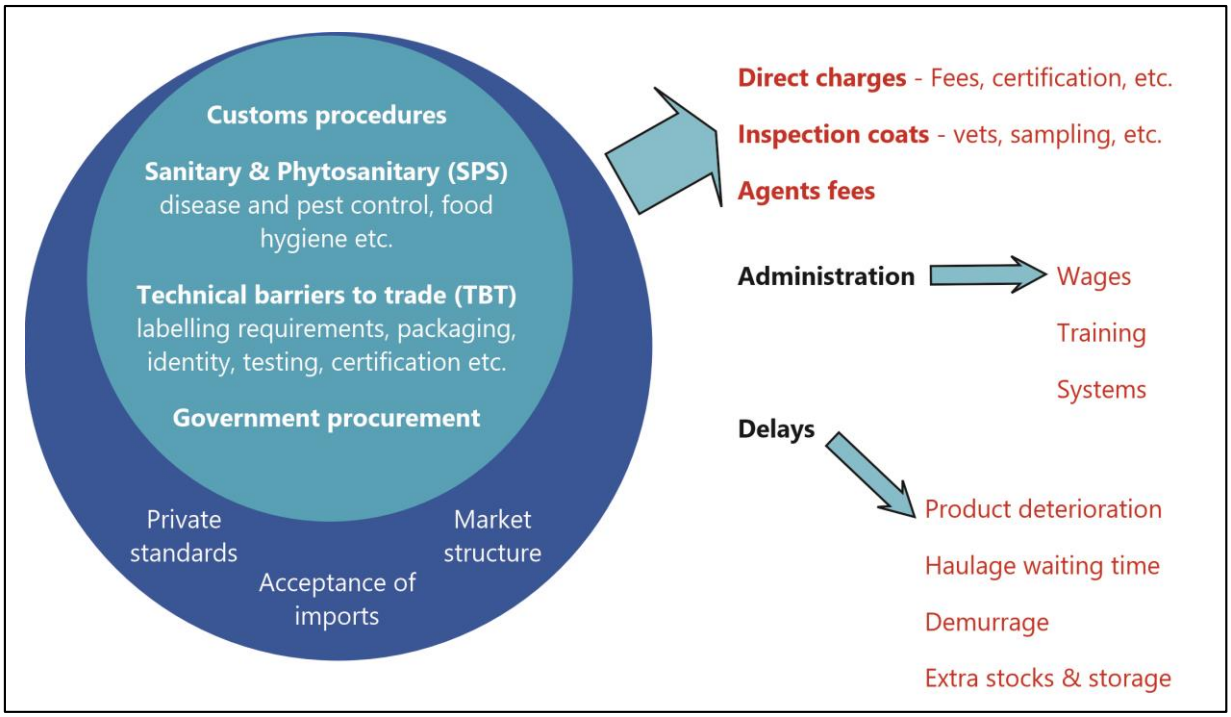
Non-tariff measures (NTMs)—Non-tariff measures are Government-imposed requirements, unrelated to tariffs, but that are faced by trading businesses. NTMs include customs procedures, sanitary and phytosanitary regulations, labelling, packaging, and testing requirements and certification, together with rules governing product origins and Government procurement (UNCTAD, 2012). They are used to overcome or reduce the impacts of perceived product risks, including risks to human, animal or plant health or product descriptions and standards. NTMs tend to increase production costs and can lead to delays, wastage, and added trading costs. They are, therefore, often a barrier to trade, particularly in the agri-food sector where risks to environmental quality and human, animal, and plant health need to be managed.

NTMs are much more difficult to identify and quantify (Cadot, *et.al.*, 2018) than tariffs because they are not always published, are difficult to calculate, and vary across the region. As a consequence, the likely impact of NTMs on trade is more difficult to assess with high degrees of confidence. That said, whilst it is difficult to quantify the costs associated with NTMs, their impact in certain food supply chains can be significant where perishable goods are easily damaged or lost as a result of delays (Haverty, 2017). The literature that has explored the quantification of the costs of NTMs is considered in more detail below.

Non-tariff barriers (NTBs)— Non-tariff barriers easily confused with NTMs, are additional barriers that are unrelated to Government-imposed regulations (e.g. private standards) which are discriminatory. In 2016 the International Trade Centre (2016) classified non-tariff barriers (NTBs) as a subset of NTMs and defined them as *"measures that have a protectionist and discriminatory intent, for example when they are excessive, dissimilar and not justifiably related to equivalent measures elsewhere."* (ITC, 2016). Figure 3-1 illustrates the relationship between NTMs and NTBs and their potential effects on trade.

Because NTBs are considered to have "protectionist and discriminatory intent" (ITC, 2016) they are prohibited under the EU Single Market. Despite this, some NTBs persist as a result of the enforcement of EU legislation at national level (European Parliament, 2017). The practice of imposing *"additional requirements, obligations or standards that go beyond what was foreseen or intended in the EU legislation"*, known as "gold-plating", is an area that increases trading costs, creates unnecessary regulatory burdens and competitive disadvantages.

Figure 3-1 – Potential impacts of non-tariff measures and barriers



Source: The Andersons Centre (2019)

Other trade-related impacts — Influences such as multilateral trade resistance and the presence of internal trade barriers add layers of complexity to bilateral trade relationships. These factors are not considered in detail in this report but are outlined here for completeness.

Research has demonstrated (Anderson and Wincop 2003) that trade is not only limited by the barriers set up between the importing and exporting nations (i.e. UK and EU), but also by the overall trade restrictions with other countries (i.e. trade restrictions the UK faces when exporting to China and South East Asian countries etc.). This is referred to as ***'Multilateral Resistance'*** (Chen and Novy, 2009). The impact of multilateral trade resistance is likely to increase if the UK departs the EU and then changes its standards. Under these conditions, importers from Third Countries, which previously traded with the UK on the basis of EU standards, could become reluctant to import UK produce until they are satisfied that the new UK standards still conform to their requirements.

Due to the Good Friday Agreement and the specific circumstances with regard to its open land border with the Irish Republic, many experts believe that the Brexit arrangements applicable to Northern Ireland could differ from the rest of the UK (Haverty, 2017; Matthews, 2017). The possibility that this could give rise to some form of **internal trade barrier** that could affect domestic UK trade flows has been central to much of the discourse surrounding Brexit. While these considerations are outside the scope of this report, lessons may be learned by examining internal trade barriers and divergences that exist in other countries, for example between the Republic of Cyprus (Southern Cyprus) which is part of the EU and the Turkish Republic of Northern Cyprus which operates as a separate state outside of the EU. However, it must be emphasised that none of these arrangements will result in frictionless trade. A recent report prepared for the Livestock and Meat Commission (LMC) examines in detail the key issues around internal trade barriers and their likely impact on the beef and sheep meat industry in Northern Ireland (Haverty, 2017).

3.4 Tariff Barriers and Tariff Rate Quotas in the Red Meat Sector

3.4.1 Current tariffs and TRQ's for beef and sheep

Owing to factors such as seasonality in production and markets, together with consumer preferences, goods are often both imported and exported—for example, Defra figures for 2017 were 101,000 tonnes of lamb imports to the UK and 104,000 tonnes of exports (Andersons Centre, 2019). Depending on the balance of trade for any particular commodity, the tariffs that are imposed on imports and those that are paid on exports can have a significant impact on patterns of domestic production and consumption.

Currently, the UK is part of the EU's Customs Union and consequently there are no tariffs applied to imports from EU countries. In the case of beef, the main imports are from Ireland (accounting for the significant amount of trade at circa 196,000 tonnes per annum averaged over 2016-2018, HMRC data), Poland (17,096 tonnes) and the Netherlands (19,852 tonnes). In the case of sheepmeat, Ireland again accounts for the majority of trade (7,616 tonnes), with smaller amounts imported from Spain (1,301 tonnes).

Where such imports into the UK arise from a third country, the EU's Common External Tariff (CET) is applied, where those products either do not enjoy a TRQ or enter under a free trade or preferential agreement (if they exceed the TRQ, then by definition the MFN tariff is applied. In the case of beef, due to the tariffs imposed, the levels of imports into the UK are relatively low with the majority of trade coming from Australia (3,256 tonnes), Brazil (3,219 tonnes) and Botswana (3,611 tonnes). In the case of sheep meat, the largest imports from third countries to the UK are from New Zealand (56,605 tonnes) and Australia (10,759 tonnes).

As mentioned previously, tariffs are applied against the individual product being imported using a combination of both '*ad valorem*' tariff (where a percentage of the price is paid) and a fixed amount in monetary terms per tonne. The tariffs are applied to products categorised by 4- and 8-digit codes (table 3-1). A full list of the EU tariffs (CET) for imports from third countries (based on the UK being a third country) is provided in Annex I which accompanies this report. In addition to meat-based products, it is also worth noting that skins and hides which are ancillary products of beef and sheepmeat production have a 0% tariff on imports into the EU.

Table 3-1 – Beef and Sheepmeat EU Common External Tariff (CET) Measures Summary

Type	HS 4-digit code	Description	Typical Tariff
Beef	0201	Fresh or chilled beef/ veal	12.8% ad valorem plus variable fixed amount/ kg
	0202	Frozen beef/ veal	12.8% ad valorem plus variable fixed amount/ kg
	0206	Edible offal	Some tariff free Others 12.8% ad valorem plus variable fixed amount/ kg
Sheepmeat	0204	Fresh/ frozen sheep meat	12.8% ad valorem plus variable fixed amount/ kg
	0206	Edible offal	All tariff free

Source: European Commission

For sheep meat, third countries already having an agreed TRQ with the EU for the import of fresh/ frozen sheep meat (HS four digit code 0204), with zero % ad valorem and zero specific duty, include New Zealand (228,254 tonnes), Australia (19,186 tonnes), Argentina (23,000 tonnes), Chile (8,000 tonnes), Uruguay (5,800 tonnes) and all other countries (820 tonnes).

The 200-tonne "Erga Omnes" sheepmeat quota can be accessed by Australia, Argentina, New Zealand, Uruguay, Chile, Norway, Greenland, Faeroes, Turkey and other WTO members not listed at a zero-tariff rate. Whilst Australia has used the majority of its TRQ over the past three years, New Zealand has used closer to 65% of its quota (averaged across the last three years). The "Erga Omnes" quota is almost fully utilised year on year[4].

For beef, the current situation is more complex than for sheep meat, as there are a number of different TRQ's for beef or beef products being imported into the EU dependent upon the product being imported and in some cases the exporting nation. Although there are many quotas available, including WTO-notified quotas, TRQs within EU free trade agreements (e.g. CETA) which now or in the future could be important, there are four that are most commonly used in a WTO-notified context:

- The high quality (hormone-free) beef quota, sometimes referred to as the "autonomous grain fed beef" quota that originates from 2009 following a WTO dispute settlement arising from a trade war between the EU and USA concerning the (EU) banning imports of hormone-treated beef in 1989. From 1 July 2018, the quota was set at 45,000 tonnes (reduced from a high of 48,200 between 2013 and 2017) and is open to all countries (Erga Omnes) on a first-come first-served basis. The tariff duty is zero, so this quota tends to be filled quickly in each trading quarter year.
- The high-quality beef quota, often referred to as the Hilton Quota, established in the late 1970's following the Tokyo round of GATT trade talks covering the import of grass-fed bovine animals (beef and buffalo). The beef quota is currently set at 66,826 tonnes with a 20% tariff. The Hilton quota has specific tonnage allocations to Argentina (29,500 tonnes), Australia, Uruguay, Brazil (10,000 tonnes), New Zealand, Paraguay and USA/Canada. The latter two countries share an allocation of 11,500 tonnes although Canada's imports now benefit from a zero-tariff due to CETA.
- The quota concerning the import of frozen beef intended for processing within the EU established under EU Implementing Regulation 412/2008. Two rates exist, one for 50,000 tonnes of beef for processing into class A products and the second for 13,703 tonnes for processing into class B products. The quotas, managed on an annual Erga Omnes basis, are for boneless equivalent weights. The tariffs are 20% import duty and 20% import duty plus specific duty respectively on beef for class A and B products.
- The quota for the import of frozen meat of bovine animals established under Implementing Regulation 431/2008. This quota concerns the import of boneless meat and is subject to a 20% tariff ad valorem, with a 53,000-tonne limit per annum, offered on an Erga Omnes basis.

The importance of these Tariff Rate Quotas will be expanded upon in subsequent sections of this report as UK beef and sheep farmers/ supply chains look to access export markets, either in the EU or the Rest of the World, and are forced to compete with other exporting nations. The impact on UK farm production will be clearly influenced by the trading scenario that is ultimately negotiated.

[4] http://beefandlamb.ahdb.org.uk/market-intelligence-news/eu-sheep-meat-quota-usage/

3.4.2 Recent developments in tariffs and TRQ's for beef and sheep

Import tariffs and TRQs have been under discussion as Brexit preparations have developed, as part of the UK's need to re-establish itself as an independent WTO member post-Brexit. Every member of the WTO has a schedule of concessions for trade in goods which set out the "bound rate of duty" i.e. the maximum rate of duty that could be applied at the border to imports of that specific good. The UK's draft schedule was submitted to the WTO in July 2017[5]. The schedule document effectively sets out the baseline of the (post Brexit) UK's multi-lateral trade policy and will be the starting point for future trade discussions with other countries. Issues addressed in the schedule of concessions include:

- Bound tariff levels; or the maximum amount of duty that can be charged on goods entering the country. They may also publish "applied" tariffs that are lower and more closely reflect market conditions.
- Tariff Rate Quotas (TRQs) for specific products.
- Special Safe-Guard (SSG) - temporary restrictions that a country can take if there is a sudden surge in imports.
- Aggregate Measures of Support (AMS) – the maximum amount of trade-distorting aid that will be paid to farmers.

According to the NFU article cited above, the UK has sought to "replicate" as far as possible the EU's schedule of concessions. This has included using the same bound tariff levels and identifying the same products that can benefit from Special Safeguards, as well as the methodology for implementing those safeguards. In doing this, the UK has made no political decisions or policy changes on whether the EU's approach to trade policy is too liberal or too protectionist. It has been suggested that the replication of these issues has been done to "minimise any trade disruption as a result of Brexit".

However, the matter of the TRQ schedule is more complicated, as the UK will have to separate its own TRQs from those of the EU's. A method has been negotiated (November 2018) between London and Brussels to do this, involving an agreed percentage split of the present tariff quotas of the 28 EU member states[6]. Needless to say, a number of other WTO members have promised tough negotiations to produce something different. Already, Australia, New Zealand, Brazil and many other countries have been critical about the methodology, timing and the basis of the proposals. Russia and several other WTO members, including China and USA, have now formally sought to block this process at the WTO[7].

In a more recent move, as the UK government prepares for both Brexit Deal and No Deal scenarios, they have confirmed (13th March 2019) the temporary tariff rates that would apply should a "No Deal" Brexit arise[8]. This regime (of Applied Tariffs) is temporary, and the Government would closely monitor the effects of these tariffs. The UK Government has said that the proposed regime would apply for up to 12 months whilst a full consultation and review on a permanent approach is undertaken. Under the temporary tariff arrangements, approximately 87% of total imports to the UK by value would be eligible

[5] See: https://www.nfuonline.com/news/brexit-news/eu-referendum-news/uk-takes-a-big-step-forward-at-the-wto/

[6] http://beefandlamb.ahdb.org.uk/market-intelligence-news/much-existing-trqs-might-uk-receive-post-brexit/

[7] https://www.independent.co.uk/news/uk/politics/brexit-trade-deal-wto-liam-fox-no-deal-international-trade-a8603811.html

[8] https://www.gov.uk/government/news/temporary-tariff-regime-for-no-deal-brexit-published

for tariff free access. Tariffs would still apply to 13% of all goods imported into the UK which would include a mixture of tariffs and quotas on beef, lamb and other sensitive commodities.

Following the publication of these temporary tariff rates their potential impact on agricultural trade has been assessed by AHDB[9] and commented upon by various trade bodies (such as The International Meat Trade Association, the Freight Transport Association, the National Farmers Union, the Irish Farmers' Association, Ulster Farmer's Union and NFU Scotland) and political organisations including the Irish Government and the EU Commission.

In the sheep sector, the proposed UK tariff rates for a "No Deal" situation are identical to the current EU common external tariffs and whilst it is proposed that existing EU28 TRQs would be shared-out between the UK and the EU27 based on historic trade.

In the beef sector, the newly proposed UK tariffs would be just over half the value of the current EU tariffs (Table 3-2).

Table 3-2 – Proposed UK Beef and Sheepmeat Tariff Measures Summary

Type	HS 4-digit code	Description	Typical Tariff
Beef	0201	Fresh or chilled beef/ veal	6.8% ad valorem plus variable fixed amount/ kg
	0202	Frozen beef/ veal	6.8% ad valorem plus variable fixed amount/ kg
	0206	Edible offal	Some tariff free Others 6.8% ad valorem plus variable fixed amount/ kg

Source: UK Government

Other details released along with the proposed "no-deal" tariff rates included[10]:

- There will be a TRQ of 230,000 tonnes, for which the tariff rate will be 0%. This TRQ will be open to all countries (including EU Member States) and will be allocated on a first-come-first-served basis.
- Any volumes imported outside of this quota, or outside the UK's share of pre-existing EU28 TRQs that it will inherit post-Brexit, will be subject to full tariffs.
- There will be tariff free trade between the Republic of Ireland and Northern Ireland.

The implications of these proposals on trade will be considered in later sections of this report, particularly on the impact on imports to the UK but also the consequent implication for UK production and export. For example, it is almost inconceivable to believe that other sheep and beef exporting nations would happily accept the division of TRQ's between the EU and UK. Different third countries have different dependencies on the UK vs EU27 markets. Regardless of how the quota was divided, it is likely that one or several countries would feel that access to the UK or EU27 markets would be affected. For example, New Zealand have already suggested that the approach proposed by the EU does not preserve the flexibility to trade into the EU and UK markets according to changes in consumer demand and domestic production.

[9] https://ahdb.org.uk/news/no-deal-tariff-announcement

[10] See: http://beefandlamb.ahdb.org.uk/market-intelligence-news/beef-tariffs-and-quotas-in-a-no-deal-brexit/

Finally, a major concern on the island of Ireland is the possibility of an increase in tariff avoidance through illegal smuggling across the border between the Irish Republic and Northern Ireland dependent upon the Brexit Deal or No Deal outcome. This includes instances of avoiding import tariffs if beef and sheepmeat products were moved through the Single Market (specifically the Irish Republic), into Northern Ireland and then into Great Britain. In such cases, the impact of NTMs would also be significantly reduced compared to a direct import into Great Britain.

3.5 NON-TARIFF MEASURES (NTMS) IN THE RED MEAT SECTOR

3.5.1 Terminology

The focus of this section is on the types of NTMs that affect the red meat sector and their impacts on trade. However, it recognises that many of the studies cited below often use the terms NTB and NTM interchangeably.

According to the World Trade Report (WTO, 2012), non-tariff measures refer to *"policy measures, other than tariffs, that can potentially affect trade in goods"*. Considering it slightly differently, Berden *et. al.* (2009) defined NTMs as; *'all non-price and non-quantity restrictions on trade in goods, services and investment. This includes border measures (customs procedures, etc.) as well as behind-the border measures flowing from domestic laws, regulations and practices"*. And, in a recent study on behalf of the OECD, Cadot, *et. al.*, (2018) state that NTMs *"comprise all policy measures other than tariffs and tariff rate quotas that have an impact on international trade as they affect the price of traded products, the quantity traded, or both."*

NTMs are, therefore, measures that are used to overcome or reduce the impacts of perceived product risks, such as risks to human, animal or plant health or product descriptions and standards. As a rule, NTMs tend to increase production and trade costs and, therefore, act as a barrier to trade. That being said, an APEC Business Advisory Council (ABAC) study (ABAC, 2016) have suggested that not all NTMs are bad and that most are *"necessary for consumer safety, and environmental, animal, and plant protection." Thus, not all NTMs are NTBs*

For the purposes of this study, NTMs are defined as; *"**government-imposed trade regulations, faced by trading businesses, which are unrelated to tariffs or quotas and which place non-price and non-quantity restrictions on cross-border red meat trade**."*

The definition of NTMs used here excludes restrictions placed on cross-border trade by the private sector (e.g. private standards). These can be particularly difficult to identify, measure and predict with certainty.

While trade tariffs have progressively reduced globally since 1948 to facilitate trade, evidence suggests that the same does not hold for NTMs, and in many instances they have become more burdensome. Academic reports have identified an increase in the number of locally-implemented NTMs as a response to falling trade tariffs that have been agreed globally (Pace, 2011), and while NTMs may be justified in terms of protecting health, welfare and the environment, they are sometimes used as a form of industry protection by governments (ABPmer, Interanalysis & Vivid Economics, 2018; Cadot *et. al.*, 2018)).

Currently, as part of the Single Market, the UK faces few NTMs when exporting to the EU and are not subject to sanitary or phytosanitary measures (SPS), technical barriers to trade (TBT) or rules of origin (RoO) checks. Should the UK leave the Single Market, as we have outlined in the two trading scenarios that we have already presented, then these NTMs will become increasingly significant.

3.5.2 Types of NTMs

In 2009, the United Nations Conference on Trade and Development (UNCTAD) proposed an updated classification of NTMs using 16 categories (UNCTAD, 2010). They were explicitly defined in 2012 (UNCTAD, 2012) and categorised into 'chapters'. These are set out in Table 3-3 and serve as the basis for the classifications used by the UNCTAD TRAINS database (see footnote). This is widely cited as being the most complete dataset on NTMs as it provides information on the Harmonised System (HS) which distinguish six core categories of NTMs (WTO, 2012). The Harmonised System is "an international nomenclature for the classification of products, allowing countries to classify traded goods on a common basis for customs purposes" (UN Trade Statistics, 2017). Each category of good is assigned a 6-digit code, each code then being grouped into 4-digit groups of similar goods. They can be treated at 4-digit or 6-digit levels.

Table 3-3 – Non-Tariff Measure Classification by Chapter (UNCTAD, 2012)

Trade		Chapter	NTM description
Imports	Technical Measures	A	Sanitary & Phytosanitary Measures (SPS)
		B	Technical Barriers to Trade (TBT)
		C	Pre-shipment inspection and other formalities
	Non-technical Measures	D	Contingent trade-protective measures
		E	Non-automatic licensing, quotas, prohibitions and quantity control measures other than SPS and TBT reasons.
		F	Price control measures including additional taxes and charges
		G	Finance measures
		H	Measures affecting competition
		I	Trade-related investment measures
		J	Distribution restrictions
		K	Restrictions on post-sales services
		L	Subsidies (excluding export subsidies)
		M	Government procurement restrictions
		N	Intellectual property
		O	Rules of origin
Exports		P	Export-related measures

Source: UNCTAD (2012)[11]

The various classifications of NTM can be physically differentiated into;

- *those that affect the production of the good, for example the use of 'threshold' ingredients including veterinarian drugs or additives,*
- *those that affect the product composition meeting the definition of the good in question*
- *those associated with the administration of the trade, such as SPS inspections. These cannot be detected in the good, so relevant certification is required.*

[11] https://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf?user=46

Standards that affect how something is produced or what it contains (process standards), are treated as 'before the border' measures—taking place before the border is reached (Mellado *et. al.* 2010). In addition to the classification set-out by UNCTAD and the ITC, there is also the concept of procedural obstacles which are defined as "*issues related to the process of application of an NTM, rather than to the measure itself*" (UNCTAD, 2010).

Cadot *et. al.* (2018) suggest that 60% of food related products are affected by at least one 'Sanitary and Phytosanitary' (SPS) measure, and of the NTMs listed above, the main ones limiting access to the EU market for both beef and sheep are SPS measures. Perhaps the most significant of which is the ban on beef from animals treated with growth hormones, a widespread practice in some major exporting countries (AHDB, 2016b). Given that UK and EU will have the same standards in place immediately post Brexit, and assuming relevant recognition of such standards is in place, then the impact of these NTMs should be relatively low; however, official controls at the border will still have to be applied. The authors have used this standards' harmonisation (between the UK and the EU27) as the basis for the analyses presented in this report. It should, however, be acknowledged that future costs are likely to increase if standards diverge.

Issues around Rules of Origin (RoO) requirements are also worthy of comment at this point. The RoOs determine in which country a product and its components have to be produced to benefit from preferential tariffs. Bellora *et. al.* (2017) argue that even if the EU and the UK reach a trade agreement, many UK exports to the EU would not be eligible anymore to preferential access (if value chains remain unchanged) because not enough value added is being produced in the UK. This would primarily be an issue for HS16 processed meat products which use beef and Sheepmeat raw materials, but is not considered to be a major direct issue for HS02 trade considered here. This would especially be the case where in the case of agri-food where UK and EU agri-food supply chains are closely integrated, as compliance with European RoO requirements potentially could increase administrative costs for exports to the EU (AHDB, 2017a; UK House of Lords, 2017).

3.5.3 Estimating the Impacts and Costs of NTMs

While tariffs and TRQs are measurable and predictable, the NTMs that trading businesses have to overcome can be considerable, amounting to large costs and delays. Because time costs money the delivery of goods has become tailored to specific orders, leading to 'just-in-time' food supply. Frictions to trade that result in delays are, therefore, particularly critical to rapidly perishable food. Indeed, before the UK joined the EEC, the majority of meat traded was frozen for that reason. Nowadays, meat consumers are considerably more sophisticated and the demand for fresh (chilled) meats is much greater. Delays in shipments caused by checks, administrations, inspections, border controls, and so on could cause problems with this trade, and potentially lead to wastage of fresh meat in transit (Haverty, 2017). The OECD suggests that non-tariff frictions, particularly at the border, can, for many commodities and trade routes, be larger than the costs of the tariffs themselves. It states that customs compliance costs add 2% to 24% to the value of traded goods with smaller businesses being disproportionately affected (Moïse and Le Bris, 2013). It also notes that the additional time taken to cross borders often adds up to even more, especially if it makes the goods valueless.

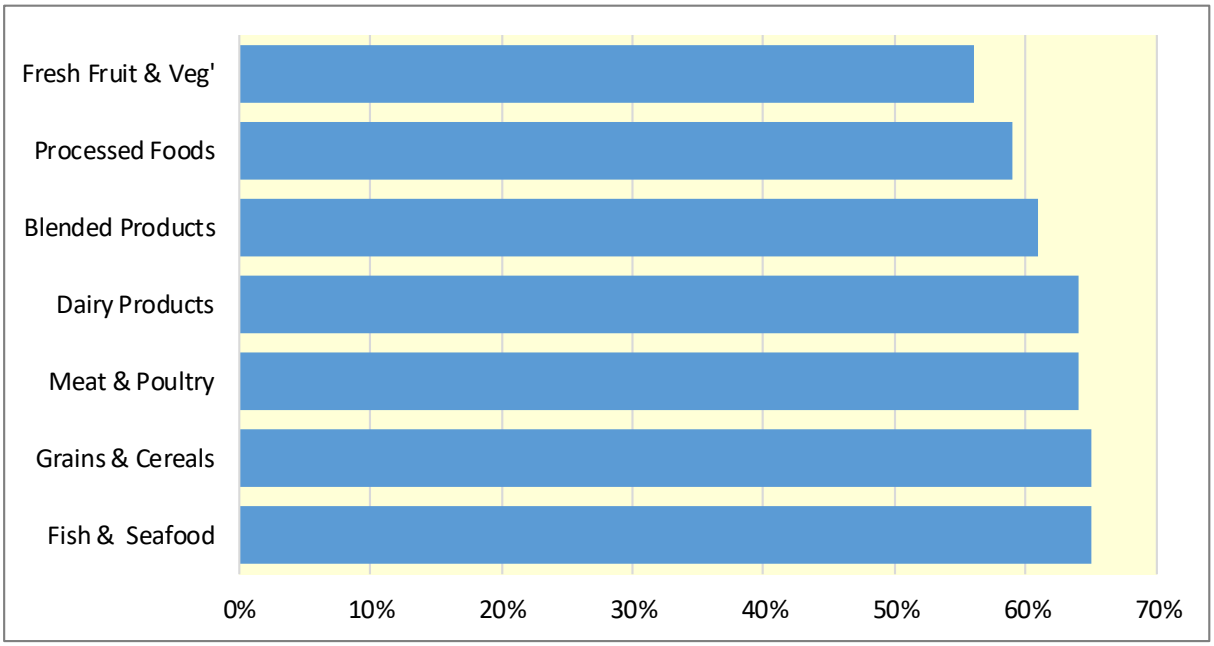
In an analysis of the impact of Brexit on the red meat sector in Northern Ireland, Haverty (2017) reported that deterioration in product value was frequently cited as a key concern amongst processors of beef and sheep meat. Continental retailers often stipulate stringent specifications (e.g. use-by date of packing date plus 8 days), and if these are not met, product value can decrease significantly. It was found that the costs associated with a deterioration in product value arising from delays in customs checks and

transportation made up a significant proportion of the total NTBs considered in the study. This is further compounded if sampling is required because samples take three days to be completed and can result in substantial deterioration (25-30%) in the value of a load. The overall estimated NTB effect is approximately double that of the average industry net margin (1.5%), so it is significant. Haverty (2017) estimated that the costs associated with deterioration of product value were £2,543,901 (operating under a WTO Equivalence scenario) and £6,701,507 (operating under a WTO Liberal Trade scenario) for the NI beef and sheepmeat sector. This represented 43% and 60% of the estimated total NTB costs for each scenario respectively.

As illustrated by Figure 3-2 below, ABAC (2016) have shown that NTMs have a significant reported impact on the product margins achieved in the meat and poultry sector. Whilst it is noted that this study concentrates on Asia-Pacific economies, the principle holds, across other regions of the world as evidenced by Galvao de Miranda and Barros (2009). Using Brazil as an example, their analysis identified trade frictions, particularly NTMs (e.g. sanitary and technical standards), as being especially significant in the meat trade. Galvao de Miranda and Barros (2009) also point out the trade vulnerabilities that arise when a part of a country has succumbed to a notifiable livestock disease such as Foot and Mouth. Even when the disease has been controlled, trade restrictions remain in place in many countries for a considerable length of time.

Gauging the impact of NTMs is very difficult, particularly for perishable products such as chilled meat. In a recent report, InterTradeIreland (2017) show that studies into the impact of NTMs (Kee *et. al.*, 2009; Swati *et. al.*, 2016) point to an average *ad valorem* equivalent ranging from 3% to 12%. Although originating from other parts of the world where applicability to the UK situation may not be directly comparable, additional costs to trade arising from NTMs have also been identified. Analysis by the New Zealand Institute of Economic Research (Ballingall and Pambudi, 2016) concludes that the cost of non-tariff frictions are equivalent to a 58% trade barrier to New Zealand dairy farmers, costing a total of US$2.7 billion each year and US$768 million for beef farmers. Based on USDA (Lee-Jones, 2011) export estimates for NZ beef in 2010/11 of $1,967.5 million, this implies that beef NTBs are equivalent to a 39% trade barrier. The Australian Meat Industry Council calculates the impact NTBs to be AS$3.4 billion each year (US$2.6bn) which is equivalent to about 15% of the red meat processing sector's gross domestic product (Condon, 2016). While the estimates described here provide an insight into the potential impact of non-tariff frictions on the red meat trade, it is worth a note of caution that they represent the views of various trade and political interests. The review of the literature presented in this report shows that the academic studies conducted in this regard have tended towards much lower estimates.

Figure 3-2 – Percentage of survey respondents who agree NTMs decrease product margins (APEG countries)



Source: (ABAC, 2016)

As formal trade tariffs are negotiated down between trading regions, the less formal NTMs tend to rise—these are more difficult to regulate at a WTO level as they are difficult to quantify and their implementation is not always possible to predict. Furthermore, because many of these regulations are in place to protect human health, such as meat sanitary regulations, they are hard to legislate against. Legitimate trade controls such as mandatory inspections of lorries can be prohibitively expensive, and this is the kind of NTM that the UK is likely to encounter with the EU even if a close trading relationship is negotiated.

The research literature identifies two broad approaches to quantifying NTMs in the agri-food sector namely, top-down and bottom-up. Within these broad approaches, there are several methodologies which have been employed.

- The "top down" approaches primarily use macroeconomic data on trade and seek to provide insightful estimates on the costs of the trade restrictions implied by NTMs. Within this, three main methodologies are identified:
    - Gravity model estimates encompassing quantity-based equations.
    - Price-based methodologies.
    - Time-cost methodologies.

- The "bottom-up" methodologies use stakeholder surveys and related techniques (e.g. workshops, field-trips and case-studies) to gain a better understanding of the prevalence of NTMs for a variety of analytical purposes. These include information about the frequency of NTMs and relative importance of different measures such as their trade restrictiveness or trade impact (Fugazza, 2013).

The use of "bottom-up" business surveys or case studies has become more frequent in recent years to address the shortcomings of the top-down methods and to gain a more granular understanding of how NTMs affect business supply chains. Examples using business surveys include Grainger (2013), ABAC (2016), Haverty (2017) and the International Trade Centre (ITC) (2016). Examples employing a case-study methodology include Orden *et. al.* (2012) and Grainger (2018). The bottom-up approaches have the potential to address many of the problems of top-down methodologies, but caution needs to be employed in solely relying on perceptions-based inputs from any one group of stakeholders (e.g. businesses, port health officials etc.) as it can lead to biases. What is required is a balanced approach which considers the perspectives of all stakeholders and based as factually robust data as possible.

Taking one of these examples, in a recent study commissioned by the NI Livestock and Meat Commission (Haverty, 2017) the potential impact of NTBs on the beef and sheep meat industry in Northern Ireland were assessed using business surveys. The study focussed on four key areas—*official controls, customs checks & transport delays, administrative costs* and *deterioration in product value*. Under two trading scenarios it was assumed that WTO Equivalence would have minimal official controls (e.g. 1% physical checks) but under an Open-Door trade policy the EU's standard official controls would apply (e.g. 20% physical checks). Based on WTO Equivalence, it was estimated that total NTB costs would be around 3% AVE whilst under an Open-Door trade policy the total would be around 5.7% AVE.

Trade restrictions can also hamper the value of goods in convoluted ways, especially those where bi-products are produced. The meat industry faces a unique challenge: how to achieve 'carcase balance'. Demand for finished products or cuts never equate exactly to what is available from the carcase and a certain amount of waste is an inevitable by-product of the sector. The key to profitability is in finding a good market for all of the cuts from a carcase with each cut having its own profit margin and costs associated with the production and trading processes. Because carcasses amount to a series of several cuts of meat, with varying demand by the home market, exports are necessary to maximise their value (International Meat Trade Association (IMTA), 2017). The importance of achieving 'carcase balance' is a key reason why the UK meat industry has integrated closely with the European Single Market. Even when net trade figures are small, gross trade can be important for this reason.

In summary, the trade restrictiveness of NTMs currently faced by the red meat sector in the EU is fairly limited, since many of these measures are common to all Member States. After Brexit, however, any new NTM adopted without coordination between the EU and the UK will probably have a negative impact on bilateral trade. In the absence of any agreement between the EU and the UK after Brexit, any new technical and non-technical measures applied by the two regions will probably diverge in the mid-term, reflecting different consumer preferences and trade policies (Bellora *et. al.*, 2017). This will result in NTMs whose trade restrictiveness will increase over time. It is difficult to quantify the extent of this increase, but it is important to take it into account since NTMs represent a significant cost to trade. Furthermore, the UK's exit from the EU will inevitably bring more border and custom controls, leading to increased trading costs.

3.6 CONCLUDING REMARKS

This literature review has highlighted the main academic studies that have investigated the impact of the UK's departure from the EU on agricultural trade. The four main studies concerned have examined this from the perspective of a number of different trading scenarios and in some cases, modelled the impact at the farm level. The authors note that the most recent study by Hubbard *et. al.* (2019) included the (increased) cost of trade facilitation in their impact assessment (via different % applied under the different trading scenarios). It is assumed that this took into account some of the verifiable tariff costs, but they were not able to estimate the costs of other Non-Tariff Measures nor where they able to assess

the impact on the wider supply chain. The impact of NTMs in the agri-food sector has been widely recognised in the literature and the different approaches to quantifying their impact identified. The studies reviewed show that there is significant variation in the NTM estimates which have been compiled over the years. It also highlights the danger in applying the findings from one NTM study into other contexts. Reassuringly, for meat products, the bottom-up estimates appear to be relatively consistent. In this study on the British beef and lamb supply chains these issues will be addressed more rigorously.

4 TRADE FLOWS AND TRADE-RELATED PROCESSES

4.1 INTRODUCTION

This Chapter commences with an overview of UK beef and sheepmeat output based on previously published datasets. This sets the scene for a more detailed consideration of beef and sheepmeat trade encompassing their associated offal using HMRC trade data. In section 4.6, a summary of the key regulatory processes associated with red-meat and live animals' trade is provided from the perspective of a third country trading with the EU. These assessments provide a basis for the results presented in Chapter 7.

4.2 UK BEEF AND SHEEPMEAT OUTPUT OVERVIEW

Table 4-1 provides an overview, in volume terms, of UK beef and veal as well as sheep meat output, trade and consumption averaged over the 2016-18 period. The estimates are based on Defra data on consumption[12] and AHDB estimates on UK beef and sheep meat trade and slaughterings[13]. It shows that the UK is 83% self-sufficient in terms of beef and veal and when exports to overseas markets are omitted, approximately 74% of beef purchased by UK consumers is domestically produced. Meanwhile for sheepmeat, the UK achieves a higher level of self-sufficiency (100%), due to the highly seasonal nature of British production. There are periods during the year when the UK relies heavily on imports (particularly from New Zealand). At other times, especially from summer towards the end of the year, the UK produces a surplus which is exported, particularly to the EU (95% share of total exports).

Across red meat generally, about 26% of the meat consumed in the UK originates from overseas with the EU accounting for just over three-quarters of this amount. This potentially presents an opportunity to the UK for import substitution, particularly if friction arises on trade with the EU. However, given seasonality in production, UK consumers' tastes and preferences and the potential trade policies introduced as a result of Brexit, a more nuanced approach is required to assess the overall impact on beef and sheepmeat trade. Additionally, the data presented in Table 4-1 relates to carcase meat only and trade in offal also needs a more detailed consideration.

[12] See: https://www.gov.uk/government/collections/agriculture-in-the-united-kingdom
[13] See: http://beefandlamb.ahdb.org.uk/markets/industry-reports/uk-statistics/

Table 4-1 – UK Carcase Beef & Sheepmeat Output, Trade & Consumption – Average 2016 to 2018

	Beef and Veal		Sheepmeat		Total Beef & Sheepmeat	
Measure	**Tonnes**	**%**	**Tonnes**	**%**	**Tonnes**	**%**
UK Production	**914,280**		**292,923**		**1,207,203**	
Exports	**108,846**		**83,698**		**192,544**	
To EU	95,930	88%	79,448	95%	175,378	91%
To Non-EU	12,915	12%	4,250	5%	17,165	9%
Imports	**276,172**		**82,393**		**358,565**	
EU	258,584	94%	12,939	16%	271,523	76%
Non-EU	17,588	6%	69,454	84%	87,042	24%
Estimated Consumption	**1,081,606**		**291,618**		**1,373,224**	
% Self-Sufficiency	**85%**		**100%**		**88%**	
% UK Consumption Produced Domestically	**74%**		**72%**		**74%**	

Sources: AHDB and Defra * Based on Defra data for 2016 and 2017 only.

4.3 BEEF PRODUCTS TRADE

As alluded to above, carcase meat trade only provides a partial picture of trade in red meat. It is also necessary to assess trade patterns for beef and sheepmeat offal. To provide a more comprehensive overview of such trade, HMRC trade data was used as it permits an analysis down to the HS 8-digit level.

4.3.1 Breakdown by Market

Table 4-2 summarises the UK's beef products' trade (encompassing beef and beef offal) during the 2016-18 period in terms of both value (£m) and volume (Kt) for both EU and Non-EU trade whilst also providing segmentations for selected countries.

With regards to UK beef products' exports to the EU, approximately one-third are to Ireland whilst the Netherlands (23%) and France (15%) are also important in monetary terms. Italy and Germany are also noteworthy with shares approaching 8% and 6% respectively.

As Table 4-2 also shows, beef and veal (£362m) dominates accounting for over 92% of total EU exports. Although beef offal (£30m) has a low share in value terms, it accounts for 16% of volume-based exports to the EU, thus illustrating that beef offal exports are lower-priced.

From a non-EU export perspective, although carcase meat exports remain dominant (86% share), offal features more prominently and accounts for just over a quarter of exports in volume terms. Across beef products generally, exports to Hong Kong are of most importance with a 43% share of exports to non-EU markets generally. Other countries of note include Switzerland with a 12% share which consists almost entirely of beef and veal. Whilst exports to China (2.4% share) are relatively small, since early 2019 the UK has gained access for beef to Chinese markets, and as a market with significant potential, this merits close attention in the years ahead, particularly as the UK progresses its efforts to gain greater access to the Chinese market.

Table 4-2 – UK Beef and Beef Offal Trade Overview – Average 2016 to 2018

	Beef and Veal		Beef Offal		Total Beef Products	
Measure	**Value (£M)**	**('000) Tonnes**	**Value (£M)**	**('000) Tonnes**	**Value (£M)**	**('000) Tonnes**
EU Exports	**362.2**	**109.9**	**30.4**	**21.2**	**392.6**	**131.2**
Ireland	122.9	35.4	7.7	8.3	130.6	43.7
Netherlands	87.5	25.6	2.1	2.2	89.5	27.8
France	46.1	8.6	12.2	3.6	58.3	12.2
Italy	29.3	5.3	0.4	0.2	29.7	5.5
Germany	20.1	4.2	2.9	3.7	23.0	7.8
Non-EU Exports	**41.6**	**15.0**	**32.3**	**21.9**	**73.9**	**36.9**
Hong Kong	17.2	6.1	14.6	6.9	31.8	13.0
China	0.6	0.3	1.2	0.5	1.8	0.7
Switzerland	8.7	0.6	0.0	0.0	8.7	0.6
US	2.0	0.5	3.4	0.8	5.4	1.3
Vietnam	2.3	0.9	2.8	1.5	5.1	2.4
Total Exports	**403.8**	**124.9**	**62.7**	**43.1**	**466.5**	**168.1**
EU Imports	**1,010.0**	**257.0**	**16.6**	**11.8**	**1,026.6**	**268.8**
Ireland	707.3	184.9	7.1	6.4	714.4	191.3
Netherlands	69.2	16.5	2.4	1.3	71.6	17.8
Poland	57.3	14.9	0.3	0.2	57.6	15.1
Germany	28.6	9.4	2.6	1.6	31.2	11.0
Belgium	6.9	2.0	1.3	0.8	8.2	2.8
Non-EU Imports	**103.2**	**17.9**	**0.2**	**0.1**	**103.4**	**17.9**
Australia	23.1	3.4	0.0	0.0	23.1	3.4
Botswana	15.9	3.6	0.0	0.0	15.9	3.6
Brazil	16.0	3.3	0.0	0.0	16.0	3.3
Uruguay	19.3	2.7	0.0	0.0	19.3	2.7
Canada	0.1	0.0	0.0	0.0	0.1	0.0
US	0.5	0.1	0.0	0.0	0.5	0.1
Total Imports	**1,113.2**	**274.9**	**16.7**	**11.8**	**1,130.0**	**286.7**
Total Trade	**1,517.1**	**399.8**	**79.4**	**55.0**	**1,596.5**	**454.8**
% EU	**90%**	**92%**	**59%**	**60%**	**89%**	**88%**
% Non-EU	**10%**	**8%**	**41%**	**40%**	**11%**	**12%**

Sources: HMRC and The Andersons Centre

In terms of beef products imports, Table 4-2 highlights the dominant role played by the Irish Republic, which accounts for nearly 70% of EU imports and over 63% of total imports. The extent to which imports from Ireland are subject to friction in terms of accessing the UK market will exert a major influence on future UK beef production and associated prices at both farm and processing levels. Whilst cross-border trade with Northern Ireland is a notable component of both imports into the UK as well as exports to the Irish Republic, there is also a close degree of linkage between supply-chains in Great Britain and

Ireland. This means that a significant proportion of trade flows also relate to processing operations and in some instances, products criss-cross the border multiple times before entering into the retail or food service markets. Trade related to processing is also an important feature of trade with the Netherlands which has a 7% share of imports. Imports from Poland (£58m) are also notable with a 6% share and have seen significant growth in recent years.

From a non-EU perspective, Australia (£23m) exerts the most influence with Uruguay (£19m), Brazil and Botswana (both circa £16m) are also of note. However, when expressed as a proportion of total imports (including EU), these countries' shares are between 1-2%. As Canada and the US are also of interest, Table 4-2 shows that imports from these countries are currently negligible. However, in the event of future free trade deals (including a potential roll-over of a CETA-type agreement to facilitate UK-Canada trade), the influence of these markets could increase significantly. In contrast to exports, imports of beef offal are negligible in a non-EU context and account for less than 2% of total imports from the EU in monetary terms. This reflects UK consumers' preferences for carcase meat but also indicates the challenges that could arise in future if international market outlets for UK beef offal are not found as opportunities for import substitution appear to be minimal.

4.3.2 Breakdown of UK Exports Commodity Code

Table 4-3 shows the top-5 beef products exported to the EU during 2016 to 2018 based on value and expressed in terms of HS-8 commodity codes. It is evident that fresh/chilled boneless beef is by far the most valuable, accounting for 68% of sales. Chilled carcases and half carcases as well as frozen boneless beef cuts are also of some importance and both have an 8% share of sales. Beef offal products (excluding thick and thin skirts) are of lower importance with a 5% share.

Table 4-3 – Top-5 Beef Products Exported to the EU – 2016-2018

EU Exports						
HS Code	**Description**	**(£m)**	**%**	**(Kt)**	**%**	**(£/Tonne)**
02013000	Fresh/chilled boneless beef	268	68%	55.2	42%	4,854
02011000	Fresh/chilled beef carcases or half-carcases	31	8%	15.4	12%	2,043
02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	30	8%	10.7	8%	2,794
02061098	Fresh/chilled edible beef offal (excl. thick/thin skirt)	19	5%	12.7	10%	1,464
02012050	Fresh/chilled beef hindquarters (bone-in)	13	3%	4.4	3%	3,076
Top-5 Sub Total		**361**	**92%**	**98.2**	**75%**	**3,675**
Others		32	8%	32.9	25%	**961**
Total EU Exports		**393**	**100%**	**131**	**100%**	**2,994**

Sources: HMRC and The Andersons Centre (2019)

Table 4-4 reveals the top-5 beef products' exports to non-EU markets and shows that (other) frozen beef offal (£21m) is most prominent, accounting for 28% of sales in value terms; however, it has a 38% share of tonnage which illustrates its lower value. This highlights the importance of beef offal exports to these markets as they perform a vital market clearing function and enable additional value to be derived from output which would otherwise receive a lower price in domestic or EU markets, or potentially be classified as a waste product which could incur a disposal cost. Beef cuts, encompassing both frozen (14%) and fresh/chilled (10%) are also notable. Overall, the top-5 products account for nearly two-thirds of sales which, when compared with EU exports above, implies a lower degree of concentration.

Table 4-4 – Top-5 Beef Products Exported to Non-EU Markets – 2016-2018

HS Code	Description	(£m)	%	(Kt)	%	(£/Tonne)
02062999	Other frozen edible beef offal	20.7	28%	14.0	38%	1,481
02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	10.1	14%	5.1	14%	1,991
02012090	Other fresh/chilled beef cuts (bone-in)	7.3	10%	1.2	3%	6,307
02013000	Fresh/chilled boneless beef	4.4	6%	0.8	2%	5,673
02022090	Other frozen beef cuts (bone-in)	4.4	6%	2.7	7%	1,613
Top-5 Sub Total		**47.0**	**64%**	**23.7**	**64%**	**1,980**
Others		**26.9**	**36%**	**13.2**	**36%**	**2,039**
Total Non-EU Exports		**73.9**	**100%**	**36.9**	**100%**	**2,001**

Sources: HMRC and The Andersons Centre (2019)

4.3.3 Breakdown of UK Imports Commodity Code

As demonstrated in section 4.2, the UK is not self-sufficient in beef, and imports, particularly from Ireland, play a major role. Table 4-5 shows that fresh/chilled boneless beef also plays a dominant role in imports from the EU, accounting for 55% of EU imports in monetary terms. Frozen boneless beef cuts (excluding forequarters) are also of importance representing 11% of imports while fresh/chilled carcases and half-carcases have a 10% share. Taken together, these three products represent over three-quarters of imported trade with other forms of boneless cuts (e.g. forequarters) and fresh/chilled bone-in beef cuts playing minor roles.

With regards to non-EU imports, depicted in Table 4-6, fresh/chilled boneless beef is once again dominant, accounting for 72% of trade. Frozen boneless beef cuts (26%) are also notable, accounting for the majority of the remainder of imports. The prices per tonne are also quite high and in the case of fresh/chilled boneless beef cuts (£6,742/t), the prices are substantially higher than the EU equivalent (£4,622/t). This partly reflects the high-end niches (e.g. Latin American steak) that such imports are often used for and also reflect British consumers' preferences for high-end imported meat. However, it must be noted that non-EU imports (£103m) on aggregate represent about 10% of beef product imports from the EU (£1,027m). On the one hand, it reveals a substantial exposure to the EU, however, it also alludes to potential opportunities for both domestic produce and non-EU imports post-Brexit.

Table 4-5 – Top-5 Beef Products Imported from the EU – 2016-2018

HS Code	Description	(£m)	%	(Kt)	%	(£/Tonne)
02013000	Fresh/chilled boneless beef	564	55%	122.1	45%	4,622
02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	108	11%	34.2	13%	3,166
02011000	Fresh/chilled beef carcases or half-carcases	103	10%	32.2	12%	3,210
02023010	Frozen boneless beef forequarter cuts (≤5 pcs)	42	4%	28.6	11%	1,454
02012090	Other fresh/chilled beef cuts (bone-in)	41	4%	6.8	3%	5,990
Top-5 Sub Total		**858**	**84%**	**223.9**	**83%**	**3,834**
Others		**168**	**16%**	**44.9**	**17%**	**3,746**
Total EU Imports		**1,027**	**100%**	**268.8**	**100%**	**3,820**

Sources: HMRC and The Andersons Centre (2019)

Table 4-6 – Top-5 Products Imported from Non-EU Markets – 2016-2018

HS Code	Description	(£m)	%	(Kt)	%	(£/Tonne)
02013000	Fresh/chilled boneless beef	74.5	72%	11.1	62%	6,742
02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	27.0	26%	6.4	35%	4,245
02023010	Frozen boneless beef forequarter cuts (≤5 pcs)	1.1	1%	0.3	2%	3,087
02023050	Frozen boneless beef chuck/blade/brisket cuts	0.26	0%	0.1	0%	3,596
02022090	Other frozen beef cuts (bone-in)	0.18	0%	0.0	0%	6,185
Top-5 Sub Total		**103.0**	**100%**	**17.9**	**100%**	**5,768**
Others		**0.3**	**0%**	**0.1**	**0%**	**4,804**
Total Non-EU Imports		**103.4**	**100%**	**17.9**	**100%**	**5,764**

Sources: HMRC and The Andersons Centre (2019)

4.4 SHEEPMEAT PRODUCTS' TRADE

4.4.1 Breakdown by Market

Table 4-7 segments UK sheepmeat products' trade for both EU and non-EU markets in terms of value and volume. It shows that France (48% share) accounts for nearly half exports to the EU whilst Germany has a share of nearly 17%. Traditionally, France has accounted for approximately 60% of export trade but its dominance has been diluted by the growth of Germany where a significant increase in its Muslim population has driven demand in recent years. Of the remaining EU countries, Belgium (12%), Ireland (8%) and Italy (6%) are of most significance. Once again, sheepmeat offal's share of exports to the EU are small, estimated at just over 1% in monetary terms and in volume terms represents approximately 4% of EU exports.

However, offal exports are much more influential in terms of non-EU exports (2.6Kt) where they account for almost 90% of total exports in volume terms. Admittedly, in monetary terms, sheepmeat exports to

non-EU markets (£20m) remains dominant, representing over 80% of sales. Within this, Hong Kong is the largest market and accounts for nearly 37% of sheepmeat product exports to non-EU markets. Closer to home, Switzerland is also notable, with a 13% share, again predominantly sheepmeat. Meanwhile, Jordan is the most significant Middle East market with a 9% share of non-EU exports. However, it must be highlighted that when expressed as a proportion of total sheepmeat export sales, the shares of non-EU countries are small and only Hong Kong surpasses 2%.

Table 4-7 also highlights the substantial influence of sheepmeat imports in the UK market with total imports (£360m) only slightly below exports (£379m). New Zealand is the dominant player and accounts for three-quarters of imports from all markets (EU and non-EU). This reflects long-established trading between New Zealand and the UK which dates back decades and as alluded to previously, is closely linked with seasonality. The influence of Australia is also worth mentioning as it accounts for 13% of total imports. Some industry professionals believe that Australia could feature more prominently post-Brexit, and is seen by many as being particularly keen to increase its sales to the UK. Other non-EU countries such as Iceland, Chile and the US also feature but their market shares are generally less than 1%.

Unlike beef, sheepmeat imports from the EU account for less than 10% of the UK's imports. Again, the Irish Republic is the largest contributor, accounting for nearly two-thirds of the EU total, although as noted previously for beef, some of this trade is likely to be linked to processing operations within company supply-chains across the UK and Ireland.

Table 4-7 – UK Sheepmeat and Sheepmeat Offal Trade Overview – Average 2016 to 2018

	Sheepmeat		Sheepmeat Offal		Total Sheepmeat Products	
Measure	**Value (£M)**	**('000) Tonnes**	**Value (£M)**	**('000) Tonnes**	**Value (£M)**	**('000) Tonnes**
EU Exports	**349.1**	**79.5**	**5.0**	**3.6**	**354.1**	**83.1**
France	168.9	38.7	1.6	1.1	170.6	39.9
Germany	58.0	13.4	0.9	0.6	58.9	14.0
Belgium	41.0	7.2	0.4	0.3	41.4	7.5
Irish Republic	27.5	8.7	1.2	0.7	28.7	9.3
Italy	19.9	3.5	0.1	0.1	20.0	3.6
Non-EU Exports	**19.9**	**6.5**	**4.6**	**2.601**	**24.5**	**9.1**
Hong Kong	5.5	2.9	3.5	1.8	9.0	4.7
China	0.3	0.1	0.2	0.1	0.5	0.2
New Zealand	5.0	0.9	0.0	0.0	5.0	0.9
Switzerland	3.2	0.3	0.1	0.0	3.3	0.3
Jordan	2.2	0.4	0.0	0.0	2.2	0.4
Total Exports	**369.0**	**86.0**	**9.6**	**6.2**	**378.6**	**92.2**
EU Imports	**32.5**	**9.4**	**0.9**	**1.0**	**33.5**	**10.4**
Irish Republic	19.9	5.8	0.8	0.9	20.7	6.8
Netherlands	4.8	1.3	0.0	0.0	4.8	1.3
Spain	3.4	0.8	0.0	0.0	3.4	0.8
France	1.8	0.6	0.0	0.0	1.8	0.6
Germany	1.2	0.3	0.0	0.0	1.2	0.3
Non-EU Imports	**313.6**	**68.8**	**12.6**	**6.9**	**326.2**	**75.7**
New Zealand	258.3	55.8	11.4	6.4	269.7	62.1
Australia	46.4	10.5	0.9	0.4	47.3	10.9
Iceland	3.4	1.1	0.2	0.1	3.6	1.2
Chile	1.0	0.3	0.0	0.0	1.1	0.3
United States	1.0	0.1	2.3	0.6	3.3	0.8
Canada	0.1	0.0	0.1	0.0	0.2	0.0
Total Imports	**346.1**	**78.2**	**13.5**	**7.9**	**359.6**	**86.1**
Total Trade	**715.1**	**164.2**	**23.1**	**14.1**	**738.2**	**178.3**
% EU	**53%**	**54%**	**26%**	**33%**	**52%**	**52%**
% Non-EU	**47%**	**46%**	**74%**	**67%**	**48%**	**48%**

Sources: HMRC and The Andersons Centre

4.4.2 Breakdown of UK Exports by Commodity Code

Similar to the analysis provided for beef products, this section examines the top-5 exported and imported products, based on commodity code, for both EU and non-EU markets. Table 4-8 shows that, for sheepmeat exports to the EU, fresh/chilled carcases and half-carcases categories are dominant with lambs accounting for 49% of sales (£175m). Adult sheep sales have a 14% share which equates to nearly

£50 million in sales. Other fresh/chilled categories such as bone-in chilled cuts (9%), short forequarters (6%) and boneless sheep cuts (6%) are also of some significance. Taken together, the top-5 categories account for 85% of exports to the EU and 83% of exported tonnage.

Table 4-8 – Top-5 Sheepmeat Products Exported to the EU – 2016-2018

HS Code	Description	(£m)	%	(Kt)	%	(£/Tonne)
02041000	Fresh or chilled lamb carcases and half-carcases	175.1	49%	41.3	50%	4,243
02042100	Fresh or chilled sheep carcases and half-carcases (excl. lambs)	49.5	14%	11.1	13%	4,444
02042290	Other fresh/chilled sheep cuts, with bone in	31.8	9%	7.2	9%	4,392
02042210	Fresh or chilled sheep short forequarters	23.0	6%	5.5	7%	4,141
02042300	Fresh/chilled boneless sheep cuts	21.9	6%	4.0	5%	5,442
Top-5 Sub Total		**301.3**	**85%**	**69.2**	**83%**	**4,352**
Others		**53**	**15%**	**13.9**	**17%**	**3,808**
Total EU Exports		**354.1**	**100%**	**83.1**	**100%**	**4,261**

Sources: HMRC and The Andersons Centre (2019)

With regards to non-EU exports, Table 4-9 sets out the estimated sales averaged over the 2016-2018 period. Total exports (£24.5 million) are small and equate to 7% of exports to the EU. Within this, frozen sheep chines (a joint of meat from the backbone) are most prevalent with a 25% share. Other frozen cuts with bone-in as well as frozen offal are also of importance in percentage terms with both having a 17% share. Fresh/chilled carcases and half-carcases (13%) is the only non-frozen category to make the top-5. This illustrates the importance of frozen exports to distant markets beyond the EU and suggests that the freezing down of products might have to become more prevalent post-Brexit.

Table 4-9 – Top-5 Sheepmeat Products Exported to Non-EU – 2016-2018

Non-EU Exports						
HS Code	**Description**	**(£m)**	**%**	**(Kt)**	**%**	**(£/Tonne)**
02044230	Frozen sheep chines and/or best ends	6.2	25%	1.7	19%	3,589.9
02044290	Other frozen sheep cuts, with bone in	4.2	17%	2.6	29%	1,591.2
02069099	Frozen sheep/goat offal not for pharma products	4.2	17%	2.3	25%	1,853.8
02041000	Fresh or chilled lamb carcases and half-carcases	3.2	13%	0.7	7%	4,844.9
02044310	Frozen meat of lambs, boneless, frozen	2.0	8%	0.7	8%	2,749.6
Top-5 Sub Total		**19.7**	**80%**	**8.0**	**88%**	**2,466**
Others		**4.8**	**20%**	**1.1**	**12%**	**4,435**
Total EU Exports		**24.5**	**100%**	**9.1**	**100%**	**2,702**

Sources: HMRC and The Andersons Centre (2019)

4.4.3 Breakdown of UK Imports by Commodity Code

In reverse to the situation for exports, sheepmeat imports from the EU are relatively small and are valued at £33.5 million. Frozen products feature more prominently, occupying 3 of the top-5 products which together take a 41% share. Here frozen boneless lamb meat (£6.3 million) is the most significant. Fresh/chilled products such as sheep cuts (15%) and sheep legs (14%) are also significant in percentage terms. However, when analysed in absolute terms and compared to the total imports from non-EU (£326 million), imports from the EU are small and reflect the fact that when sheepmeat production peaks across Europe, the UK is already producing an excess supply.

As previously mentioned, there are periods of the year when the UK (and Europe generally) is producing low volumes of sheepmeat and this is when imports from non-EU countries (especially New Zealand and Australia) play a major role. Table 4-10 shows the top-5 imported products from non-EU. Given UK consumers' preferences for legs of lamb, especially around Easter, it is unsurprising that fresh/chilled sheep legs and frozen sheep legs are highly influential and together account for about half of imports. Boneless cuts are also of importance with fresh/chilled (£41m) accounting for 13% of sales and frozen boneless lamb taking an 11% share. Overall, the top-5 categories account for just over 80% of sales whilst their share of tonnage is slightly lower at 75% which reflects the fact that the average selling prices of legs of lamb and boneless cuts tend to be much higher than other products.

Table 4-10 – Top-5 Sheepmeat Products Imported from the EU – 2016-2018

HS Code	Description	(£m)	%	(Kt)	%	(£/Tonne)
02044310	Frozen meat of lambs, boneless, frozen	6.3	19%	2.2	21%	2,909
02042300	Fresh/chilled boneless sheep cuts	4.9	15%	1.6	16%	3,000
02042250	Fresh or chilled sheep legs	4.7	14%	0.7	7%	6,650
02044390	Frozen meat of sheep, boneless (excl. lamb)	4.1	12%	1.1	10%	3,735
02044290	Other frozen sheep cuts, with bone in	3.5	10%	0.8	8%	4,278
Top-5 Sub Total		**23.4**	**70%**	**6.4**	**62%**	**3,659**
Others		**10.1**	**30%**	**4.0**	**38%**	**2,521**
Total EU Imports		**33.5**	**100%**	**10.4**	**100%**	**3,222**

Sources: HMRC and The Andersons Centre (2019)

Table 4-11 – Top-5 Sheepmeat Products Imported from Non-EU Markets – 2016-2018

Non-EU Imports						
HS Code	**Description**	**(£m)**	**%**	**(Kt)**	**%**	**(£/Tonne)**
02042250	Fresh or chilled sheep legs	93.6	29%	17.3	23%	5,424
02044250	Frozen sheep legs	68.9	21%	16.2	21%	4,246
02042300	Fresh/chilled boneless sheep cuts	41.0	13%	6.1	8%	6,686
02044310	Frozen meat of lambs, boneless, frozen	35.0	11%	10.5	14%	3,322
02044290	Other frozen sheep cuts, with bone in	25.5	8%	6.7	9%	3,820
Top-5 Sub Total		**264.0**	**81%**	**56.8**	**75%**	**4,645**
Others		**62.1**	**19%**	**18.9**	**25%**	**3,287**
Total Non-EU Imports		**326.2**	**100%**	**75.7**	**100%**	**4,306**

Sources: HMRC and The Andersons Centre (2019)

4.5 Selection of Top-Six Products for Detailed Analysis

Based on the analysis for beef and sheepmeat products above and the study's terms of reference to analyse the top-six most financially important product categories in detail (including at least two for beef and two for sheepmeat), Table 4-12 outlines the products that will be examined in detail in Chapter 6. The values shown below relate to all trade undertaken for each product over the 2016-2018 period, including exports and imports to/from EU and non-EU markets. Overall, fresh/chilled boneless beef emerges as the financially most important product (£911m) accounting for 39% of trade. There is then a substantial gap to the remaining categories in the top-six whose shares range from 3% to 8% of total trade. As the top-six categories together represent two-thirds of trade, the detailed analysis associated with these products will be taken as a proxy for the beef and sheepmeat sector generally.

Table 4-12 – Top-6 Categories Chosen for Detailed Analysis

Rank	HS Code	Description	Total Trade (£m)	%	Total Tonnage (Kt)	%
1	02013000	Fresh/chilled boneless beef	911.1	39%	189.1	30%
2	02041000	Fresh or chilled lamb carcases and half-carcases	178.3	8%	41.9	7%
3	02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	175.2	8%	56.3	9%
4	02011000	Fresh/chilled beef carcases or half-carcases	134.7	6%	47.5	8%
5	02042250	Fresh or chilled sheep legs	98.3	4%	18.0	3%
6	02044250	Frozen sheep legs	73.6	3%	16.9	3%
	Top-5 Sub Total		**1,571.1**	**67%**	**369.8**	**58%**
	Others		**763.6**	**33%**	**263.3**	**42%**
	Total Trade		**2,334.7**	**100%**	**633.1**	**100%**

Sources: HMRC and The Andersons Centre (2019)

4.6 Cross-Border Regulatory Processes for Red Meat Trade

Before analysing the trade impacts on each of the above products, it is firstly worth examining the regulatory processes associated with red meat trade.

This is done via the compilation of a series of process maps which builds upon the Literature Review as well as previous studies and current knowledge in order to map-out the trading procedures and associated with NTMs for the importation of meat into the UK (EU) from third countries. This provides detailed insights on the roles that key stakeholders (e.g. Port Health Authorities, Competent Authorities, HMRC etc.) play in the regulatory environment, concerning the application of NTMs. The objective of these process maps was to use this current understanding as a basis to obtain industry opinions during the primary research interviews on what regulatory procedures are involved and, as a result, what NTMs (or barriers to trade) affect EU trade with third countries.

Figure 4-1 uses meat products as an example of the process-maps which were compiled during this and previous studies and primarily draws inspiration from a study conducted by Dr. Andrew Grainger in 2013. In addition, Dr. Grainger (Trade Facilitation Consulting Ltd.) has also compiled an alternative Use Case and Activity Maps which set-out the involvement of each stakeholder in the process. In terms of status-quo imports of beef and sheepmeat products from third countries into the UK (EU), Figure 4-2 deploys a Use Case diagram to set-out the key stakeholders involved and the key procedures that need to be undertaken in order to achieve clearance into free circulation. For UK exports to the EU27, Figure 4-3 sets out a likely scenario that could arise as a result of Brexit with the UK being outside the EU Single Market and Customs Union. It shows that in general, the procedures underpinning current third country to UK trade would essentially be replicated for future UK exports and this would represent a significant increase paperwork.

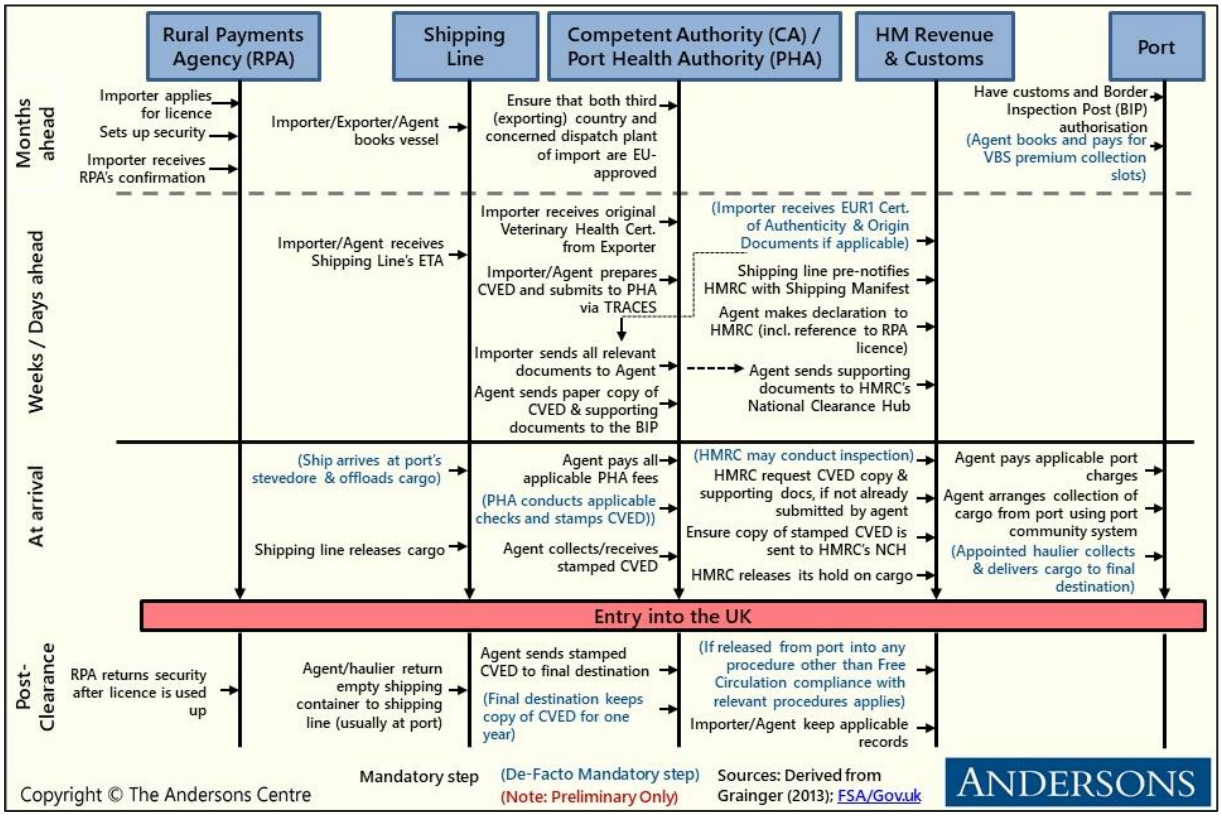
This point is further illustrated in Figure 4-4 and Figure 4-5 which depict, using Activity Maps, the additional regulatory steps which would need to be deployed for the processing of Export Health Certificates and CVED entry documents respectively. Although these charts are preliminary and caution is urged when reviewing the contents, the diagrams show that for red meat cross-border trade, there will be significant increases in bureaucracy (and NTMs) post-Brexit and these have the potential to add significant costs to the affected loads.

The process map depicted in Figure 4-1 served as a basis for the development of an additional process map concerning live animals which is outlined in Figure 4-6 below. Again, it shows that there are multiple regulatory procedures which need to be taken into consideration when importing or exporting live animals. However, it should be noted that even under the status quo situation within the EU, regulatory procedures already exist with regards to live animals trade. Some of these are even enforced within the UK, for instance on live animal trades between Great Britain and Northern Ireland.

All of these process maps were shared with primary research interviewees to seek additional feedback on the trade barriers which have the most impact on their businesses. It must be emphasised that these process maps are intended for peer-review only and whilst all reasonable steps have been taken to ensure their accuracy, relevant governmental stakeholders (departments and associated bodies) have not been asked to review them. Accordingly, the authors urge that readers of this report treat these process maps with the appropriate caution.

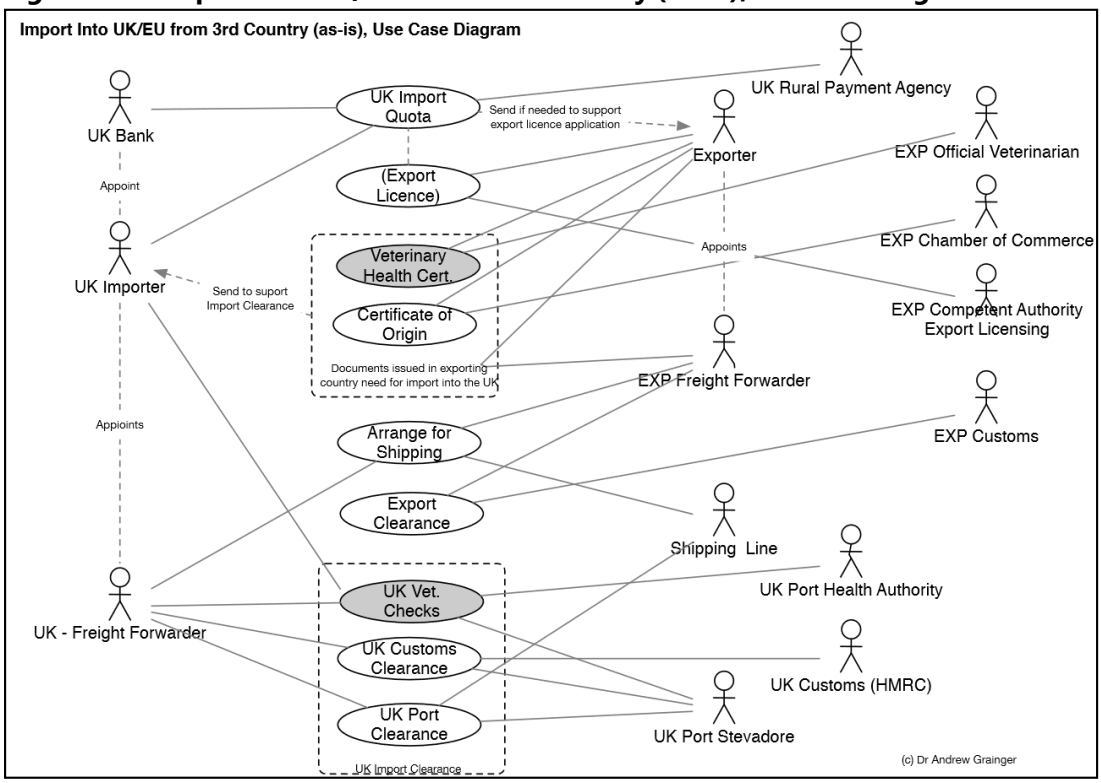
Despite the above comments, these process mapping exercises formed a key basis to establish a framework to assess NTM costs and were cited by interview participants as a very useful means to understand how non-tariff trade barriers affect the beef and sheepmeat sector.

Figure 4-1 – Meat Import Process Map (Third Country to UK/EU)



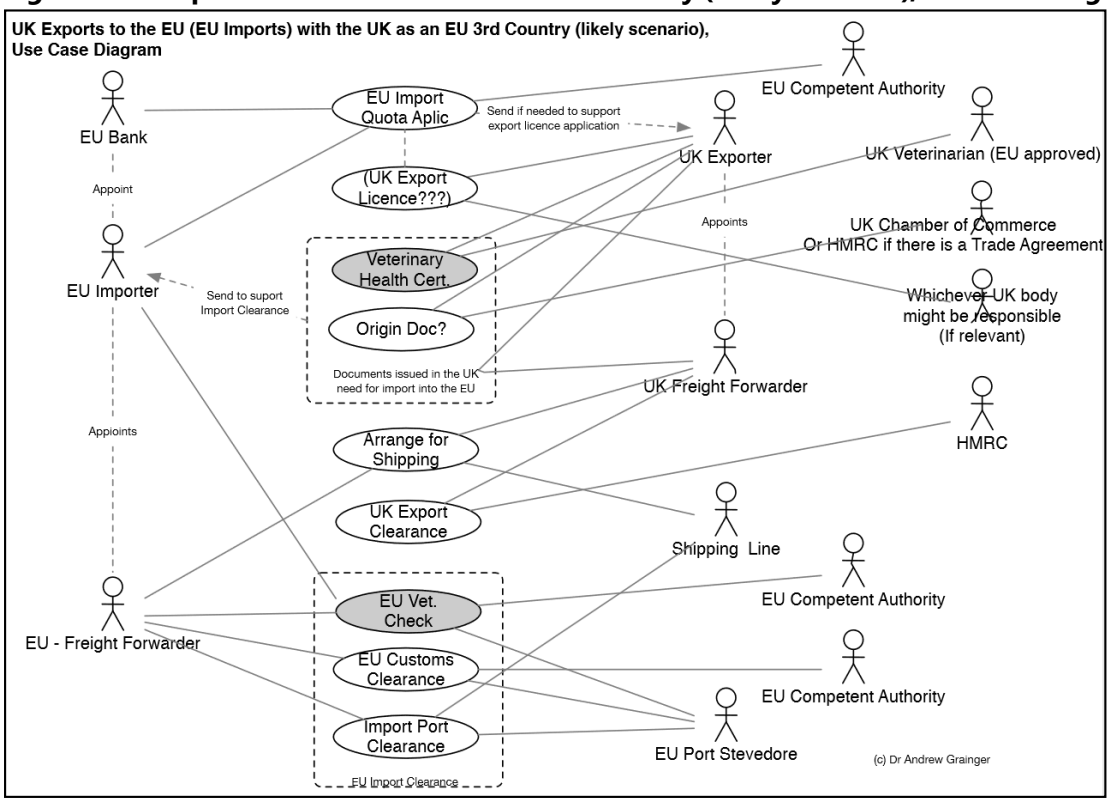
Sources: Derived from Grainger (2013) and the FSA; compiled by The Andersons Centre
Note: CVED = Common Veterinary Entry Document; NCH = National Clearance Hub; RPA = Rural Payments Agency; VBS = Vehicle Booking System

Figure 4-2 – Import into UK/EU from Third Country (As-Is), Use Case Diagram



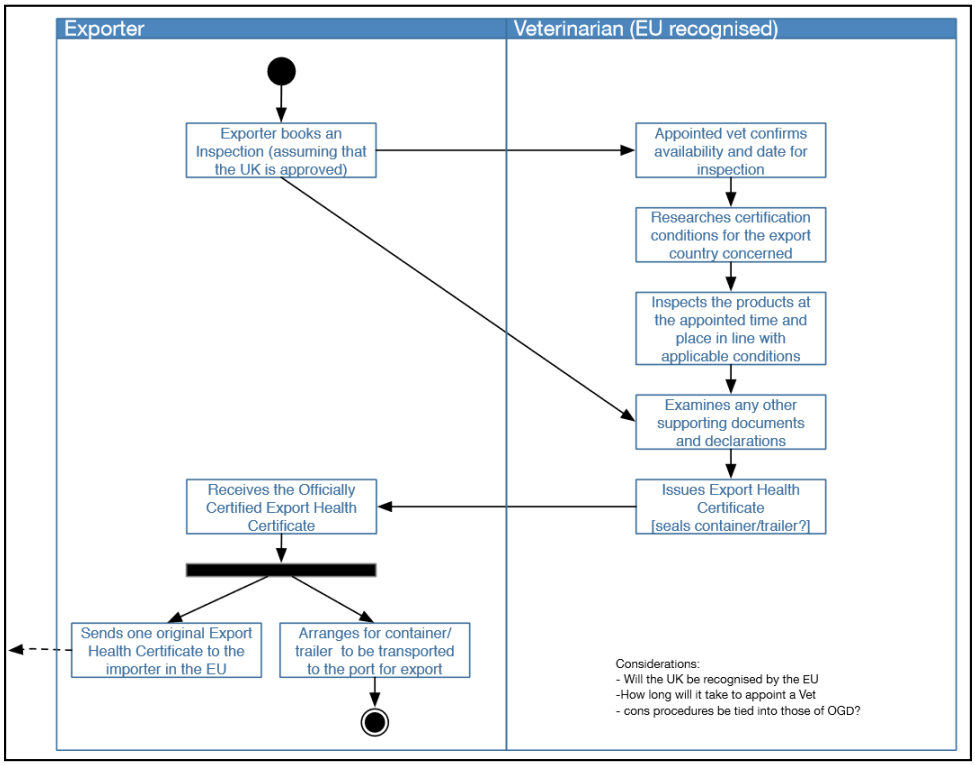
Source: Dr. Andrew Grainger (Trade Facilitation Consulting Ltd.) Note: for peer-review only.

Figure 4-3 – Export from UK into EU as a Third Country (Likely Scenario), Use Case Diagram



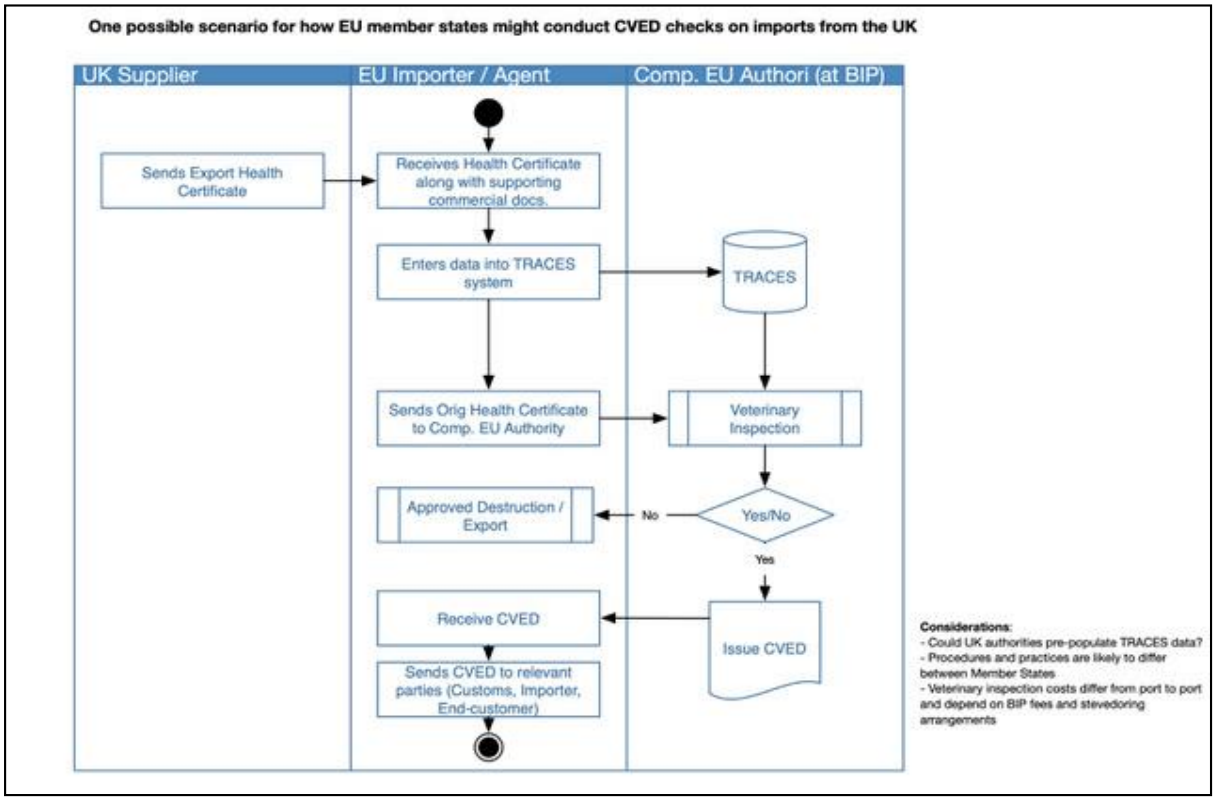
Source: Dr. Andrew Grainger (Trade Facilitation Consulting Ltd.)
Note: for peer-review only.

Figure 4-4 – Activity Map Depicting Potential EU Export Health Certification Procedures



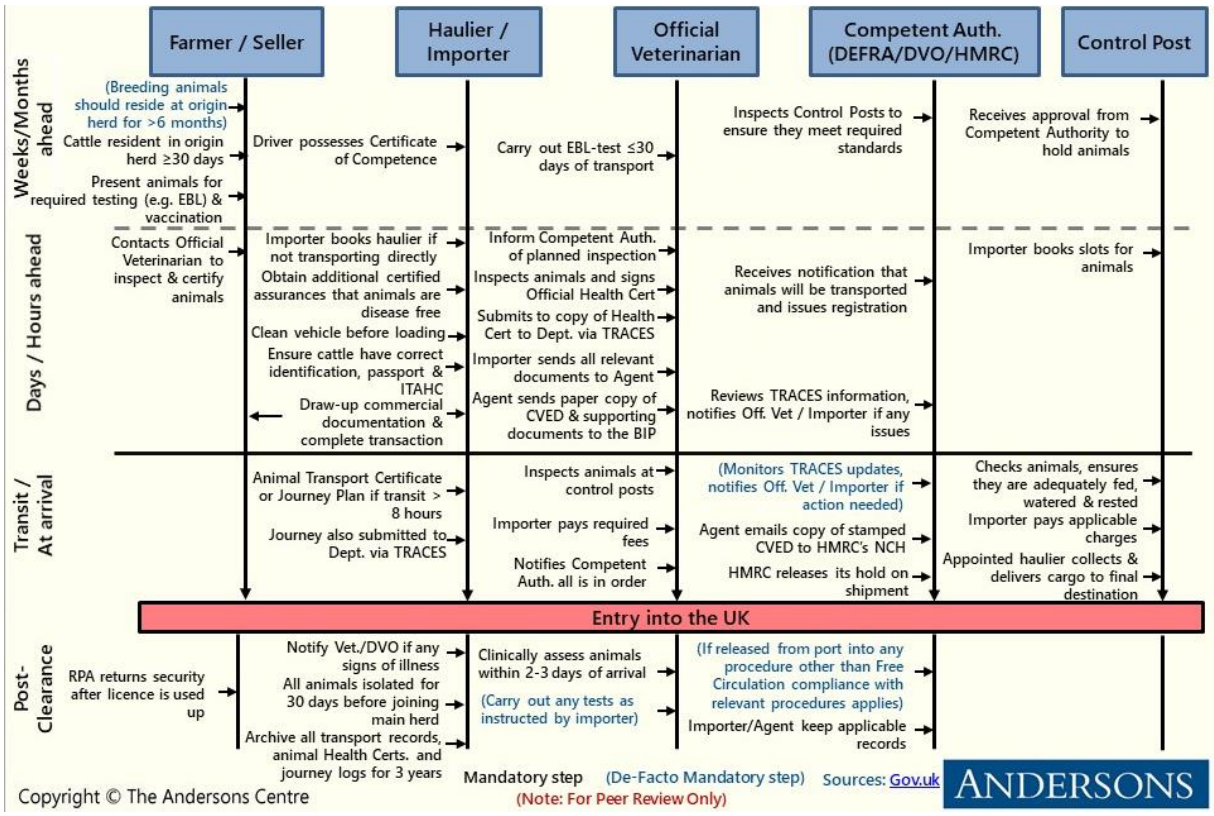
Source: Dr. Andrew Grainger
Note: for peer-review only

Figure 4-5 – Activity Map Depicting Potential Conduct of CVED Checks on Imports from UK



Source: Dr. Andrew Grainger
Note: for peer-review only

Figure 4-6 – Live Breeding Animals Import Process Map (Third Country to UK/EU)



Sources: The Andersons Centre (2019) based on Gov.uk information

5 TARIFF AND TARIFF RATE QUOTA (TRQ) IMPACTS

5.1 OVERVIEW

This Chapter outlines the impact of tariffs and tariff rate quotas (TRQs) on British beef and sheepmeat for both imports and exports originating from, and sold to, the EU27 and selected non-EU markets. It firstly examines the tariff-related impacts, and quantifies the overall impact of tariffs in percentage terms for the six commodities and geographical markets that were selected for a detailed examination in this study. Thereafter, consideration is also given to the impact of TRQs on UK trade with selected markets.

5.2 TARIFF-RELATED IMPACTS

Before assessing in detail how tariffs are likely to affect the UK's trade with EU and selected non-EU countries, it is firstly useful to undertake a basic analysis of the percentage impact of EU CET and UK import tariffs being applied to British beef and sheepmeat products. Annex I provides further detail on the potential impact of tariffs on UK exports to the EU and also contains a summary table setting out the UK's import tariffs to be applied in a No Deal scenario.

5.2.1 UK Imports

The percentage impact of the UK's No Deal import tariffs for the top-six products are shown in Table 5-1. In general, it shows the import tariffs have a greater percentage effect on imports from the EU27 than from other geographies. This is primarily because prices for EU imports tend to be lower. Take for example, fresh/chilled boneless beef. The AVE for EU imports is 37%, which is 10-15 percentage points higher than other countries. This is primarily because the price per tonne of EU imports (£4,622) is lower than for other countries (e.g. Australia: £6,866; Brazil £7,363), so when the fixed component of the UK tariff (€933/t) is applied, it has a smaller impact on the higher value products.

Similar trends are also evident across other commodities and illustrates that imports from the EU will be disadvantaged if tariffs become applicable. For some product categories (e.g. chilled lamb carcases and half-carcases), imports do not come in from non-EU countries, partly due to the distances involved which make it more economical to import value added products which contain less waste (e.g. unwanted bone, fat trimmings etc.) whilst also bearing in mind the influence of TRQs (see section 5.3).

Table 5-1 – Impact of UK Tariffs (in AVE terms) on Imported Trade for Selected Commodities

HS Code	Description	UK Tariff	EU	Non-EU*	AUS	NZ	BR	US
02013000	Fresh/chilled boneless beef	6.8% + €1,601/t	37%	27%	27%	22%	26%	28%
02041000	Fresh or chilled lamb carcases and half-carcases	12.8% + €1,288/t	75%	n/a	n/a	n/a	n/a	n/a
02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	6.8% + €1,605/t	50%	39%	37%	43%	45%	n/a
02011000	Fresh/chilled beef carcases or half-carcases	6.8% + €933/t	32%	n/a	n/a	n/a	n/a	n/a
02042250	Fresh or chilled sheep legs	12.8% + €2,227/t	41%	47%	48%	47%	n/a	40%
02044250	Frozen sheep legs	12.8% + €1,675/t	49%	46%	45%	46%	n/a	n/a

Sources: HMRC and The Andersons Centre (2019)
***** Refers to all non-EU countries on aggregate.
Note: AVEs have been calculated based on 2016-2018 average price per unit values.
n/a: refers to insufficient trade taking place for the commodity code during 2016-18 to give a tariff value.

5.2.2 UK Exports

Table 5-2 shows that for exports, the impact of tariffs would have the most effect on sales to the EU where projected tariffs of between 37% and 92% would apply. Here, the fact that EU tariffs include both a percentage component (12.8%) and a fixed component, which ranges from between €1,670 to €3,041 per tonne across the commodities selected, it means that the overall impact is significantly more than for other selected countries. For instance, Chinese tariffs, which are based on applied tariff estimates reported by the WTO range between 12% and 20%. For the US, the MFN tariff rates are usually quite low and where specified in percentage terms are usually at 4% whilst in instances where produce has a fixed tariff, this ranges from 0.7 US cents to 4.4 cents per kilogramme, which when converted to AVE first time this abbreviation is used, spell out terms usually works out to be less than 1%. However, it should be noted that for the US in particular, the commodity codes (HTS code) used tend to be slightly different than the HS codes used in the UK/EU27. This is important to bear in mind as the HTS code selected can have an impact on the tariff level.

Annex I shows the detailed impact of tariffs on exports to the EU for all of the commodities examined in this study. For beef and veal products, tariffs on UK exports as a result of the EU CET with a No Deal generally fall within the 40% to 92% range. However, for frozen boneless beef forequarter cuts (≤5 pcs), the estimated tariff stands at 216%. This is due to the low price of £799/t which when subject to a tariff of 12.8% + €2,211/t means that the tariff becomes enormous. For beef offal products, the estimated tariffs are 68% to 110% with the highest tariff occurring for Frozen edible beef offal for thick/thin skirt products.

Table 5-2 – Impact of Selected Country Tariffs on UK Exports for Selected Commodities

Rank	HS Code	Description	Exports to the EU	Exports to China	Exports to the US
1	02013000	Fresh/chilled boneless beef	57%	12%	4%
2	02041000	Fresh or chilled lamb carcases and half-carcases	41%	15%	n/a (normally 0.7 US cents/kg)
3	02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	92%	12%	4%*
4	02011000	Fresh/chilled beef carcases or half-carcases	75%	20%	0.4% (based on fixed tariff of 4.4 US cents/kg)
5	02042250	Fresh or chilled sheep legs	37%	15%	n/a (normally 2.8 US cents/kg)~
6	02044250	Frozen sheep legs	39%	12%	n/a (normally 2.8 US cents/kg)#

Sources: HMRC, The Andersons Centre (2019), WTO and USITC

* Based on HTS code 02023002 (high quality frozen beef cuts)

~ Based on HTS code (02042240 (other frozen sheepmeat cuts with bone-in)

Based on HTS code 02044240 (other frozen sheepmeat cuts with bone-in)

5.3 TARIFF RATE QUOTA (TRQ) IMPACTS

Whilst a basic assessment of tariff impacts on both imports from, and exports to, selected markets are insightful, they only form part of the picture with respect to trade barriers. Tariff rate quotas (TRQs) are also a major issue. In Chapter 3, an overview was provided on the TRQs currently available on imports of beef and sheepmeat into the EU28. Whilst the EU28 has access to TRQs on exports, these allocations refer to milk and milk products only and are therefore not considered applicable to red meat[14].

5.3.1 Beef Products

With regards to the import of beef products into the EU28, there are approximately 157,470 tonnes available via WTO-notified TRQs (this excludes FTA TRQs such as the recent 50,000t hormone-free TRQ for Canada under CETA). Some of these are allocated to individual countries (e.g. Australia) or groups of countries (e.g. 11,500 tonnes of 'Hilton' beef quota available to the US and Canada). In terms of Erga Omnes availability, there are just 119,378 tonnes which the UK could potentially access. However, as Chapter 3 points out, there are restrictions in terms of the types of beef (e.g. frozen) and the types of cuts/products (e.g. thin skirt) which could be potentially exported from the UK.

As Table 5-3 depicts, on the face of it, when the existing EU28 TRQ tonnage was considered, the amount of beef TRQ available on an Erga Omnes basis to the UK (119,378t) appeared to be sufficient to cover the UK's average annual exports to the EU (116,170t). However, in December 2018, the UK and the EU agreed proposals for splitting out existing EU28 quota between the UK and the EU27. This would mean that in future, the volume potentially open to the UK would be reduced to the EU27's share in the current total. In this event, 64,280 tonnes would be available; however, this includes 800 tonnes of frozen thin skirts which is classified in this study as offal (as its HS code commences with '0206'). Accordingly, 63,480 tonnes of beef are assumed to be potentially available to the UK. Furthermore, there are specifications

[14] https://circabc.europa.eu/sd/a/9ddddc78-65bd-4134-9a94-ad16eae40180/Allocation%20coefficients%20TRQs-Export

which beef exported under TRQ to the EU27 would have to adhere to. Based on the conditions laid out under EU Commission regulations, beef exported to the EU under TRQ would have to be frozen, and a significant proportion (19,748 tonnes) would have to be used for processing. Presently, just over 16,600 tonnes of UK beef are exported to the EU as frozen product, the majority (circa 60%) is exported as fresh/chilled beef and veal. This implies a reorientation towards frozen exports for processing and could potentially exclude the UK from high-end markets in the likes of Italy and France where fresh/chilled trade is more prevalent. In such instances, it would be likely that these previously exported tonnages are used domestically to substitute imports coming in from the Irish Republic for example.

In assessing potential for future market access under TRQs, as well as size of TRQ and in quota tariff, the method of allocation is also important. In principle, Erga Omnes TRQs can be administered in different ways. In the EU, TRQs tend to be set for an annual period (e.g. having a July-June year period or an April-March year period). From there applications for licenses tend to be open to eligible applicants each quarter on a first-come-first-served basis. To be eligible for TRQs, applicants' plants must be EC-approved and are also required to have been active in the production of processed products containing beef throughout the 12-month period prior to application and the 12 months prior to that. They can only apply in the EU Member State in which they are VAT registered and are required to lodge a security (€6/100kg) which would be forfeited if their TRQ allocations are not used. Each application must not exceed 10% of each quantity available and meat brought in under the TRQ must be processed within 3 months of import at a designated establishment. These rules would curtail the extent to which businesses could trade freely with the EU, in comparison with the status quo and it would require a greater planning of production activities throughout the year. Processors would also need to pay close attention to ensuring that all administration relating to TRQs is undertaken diligently, because a loss of TRQ allocations due administrative errors could have a major bearing on operations.

Table 5-3 – Comparison of EU Beef Products TRQs Available to UK versus UK Exports to EU

Product / Quota	Commission Regulation	Order No.	Total TRQ Tonnage (EU28)	EU27 Share (Available to UK)	UK Share (Available to EU)	UK Exports to EU	Duty / Tariff
Frozen beef for processing	412/2008	09.4057	50,000	15,500	34,500	16,627*	20%
		09.4058	13,703	4,248	9,455		20% + specific duty
Frozen beef (GATT)	431/2008	09.4003	54,875	43,732	11,143		20%
Frozen thin skirt ('hampe')	748/2008	09.4020	800	800	0	207~	4%
Sub-Total	TRQ Available		**119,378**	**64,280**	**55,098**	**16,834**	
UK Fresh/chilled beef exports						78,325	
UK Other beef and beef offal exports						35,994	
UK Total UK beef product exports to EU						**131,153**	

Sources: The European Commission (2018) and The Andersons Centre (2019)

* This figure refers to total frozen beef exports to the EU27 per annum averaged over 2016-18.

~ Includes thick and thin skirt products.

From a beef import perspective, the proposed divisions set-out in Table 5-3 would also mean that there would be 55,098t available to EU27 Member States such as Ireland, based on existing TRQs alone. Added to this, the 230,000t of new beef TRQ would also be potentially available to EU27 Member States as well

as other countries. Combined, this would mean that over 285,000 tonnes would be available. The vast majority (230,000t) would have a zero tariff whilst the remainder would have tariffs varying from 4% to 20%. If these tonnages are compared with the annual imports from the EU during 2016-18 (268,771t), it would indicate that most EU27 beef will be able to arrive into the UK at low or zero tariff levels; however, this needs to be balanced against the fact that it would be extremely difficult for the EU27 to compete with the likes of Latin American suppliers on price. *It also needs to be emphasised that, in addition, the latest UK proposals on No Deal trade on the Island of Ireland suggest that there would be potentially no tariffs imposed on imports from the Irish Republic into Northern Ireland*[15]*. If there are no regulatory checks between Northern Ireland and GB, then it is possible that significant volumes of Irish beef, estimated at 191,300 tonnes, could enter the UK tariff-free via Northern Ireland as tariffs between Dublin and Holyhead (GB) would be prohibitive.*

5.3.2 Sheepmeat Products

For sheepmeat, between 2015 and 2017, the AHDB estimated just over 285,260 tonnes of sheepmeat could be imported per annum via a TRQ, with New Zealand accounting for 80% of this[16]. Importantly, from a UK perspective, the AHDB noted that only 200 tonnes (primarily boneless lamb) were available to import into the EU on an Erga Omnes basis. This is miniscule in comparison with current UK sheepmeat exports to the EU (circa 83,000 tonnes). Post-Brexit, sheepmeat imports via TRQs would still take place as the existing EU28 TRQs would be divided up between the proportion that the UK would take on and the proportion to be taken on by the EU27 (i.e. available to UK exporters) as Table 5-4 illustrates.

Table 5-4 – Proposed Division of EU28 Sheepmeat Import TRQs between EU27 and UK

Description	Country	Order No.	EU28 (t)	EU27 (t)	EU27 Share (%)	UK (t)	UK Share (%)
Meat of sheep or goats, fresh, chilled or frozen	Argentina	09.2011	23,000	17,006	74%	5,994	26%
As above	Iceland	09.0790	600	349	58%	251	42%
As above	Bosnia & Herzegovina		850	410	48%	440	52%
As above	Australia	09.2012	19,186	3,837	20%	15,349	80%
As above	Chile	09.1922	3,000	2,628	88%	372	12%
As above	Greenland	09.0693	100	48	48%	52	52%
As above	New Zealand	09.2013	228,389	114,184	50%	114,205	50%
As above	Uruguay	09.2014	5,800	4,759	82%	1,041	18%
As above	Other	09.2015	200	200	100%	0	0%
As above	Erga Omnes	09.2016	200	178	89%	22	11%
	Total		**281,325**	**143,599**	**51%**	**137,726**	**49%**

Source: Council of the European Union (2018)

[15] See: https://www.gov.uk/guidance/eu-exit-avoiding-a-hard-border-in-northern-ireland-in-a-no-deal-scenario

[16] See: http://beefandlamb.ahdb.org.uk/market-intelligence-news/eu-sheep-meat-quota-usage/

These allocations are based on a Council of the European Union note in December 2018[17] and is based over a three-year representative period (although it is unclear what this reference period is) and it is important to note that allocations can change year-by-year[18]. In any case, it shows that the existing sheepmeat TRQs are to be allocated evenly between the UK (49%) and the EU (51%) meaning that up to 137,326t of sheepmeat could be imported into the UK from elsewhere post-Brexit, of which, New Zealand would have an 83% share. As a result of the allocation of TRQs which the EU27 would take-on and taking account of an additional 200t of TRQs which is allocated to "Others (WTO members excluding Argentina, Australia, New Zealand, Uruguay, Chile, Greenland and Iceland), UK exporters could theoretically access 378t of TRQ, which is pitifully miniscule in comparison with current exports to the EU27.

5.3.3 TRQs – Concluding Remarks

Overall, the TRQ analysis suggests that market access for imports of beef into the UK will increase for non-EU countries if a No Deal Brexit comes to pass. At the same time, exports of beef to the EU would be severely curtailed as the TRQs available would be insufficient and specification restrictions could also inhibit value adding opportunities. Under a Brexit Deal scenario meanwhile, with trade to the EU being tariff and quota free, it would suggest that market access would remain broadly similar to present levels, although non-tariff considerations (see next Section) would exert an influence. For sheepmeat, the situation is much more serious. Under a No Deal, market access to the EU would collapse almost totally whilst imports from non-EU would remain at broadly similar levels to present.

[17] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018PC0312&from=EN
[18] See: https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32011R1354

6 NON-TARIFF MEASURE IMPACTS

As highlighted in Chapter 3, non-tariff measures (and barriers) could have a major impact on cross-border trade, as the UK exits the European Union. Below, the impacts of NTMs for the selected beef and sheepmeat products are examined in detail. Unlike tariffs and TRQs, NTMs would be applicable irrespective of whether there is a Brexit Deal or No Deal. That said, there is still scope for the cost of NTMs to vary under each scenario. This Chapter also discusses what the results mean and the implications for beef and sheepmeat trading businesses. Where appropriate, comparisons are made against the findings of previous studies (outlined in the Literature Review Chapter).

In terms of the input obtained during this study, the vast majority concerns NTMs and where input was provided on NTBs, it was much more qualitative in nature (e.g. focusing on issues such as the acceptance of UK products in overseas markets and the strength of business relationships within the trade to bring about new market opportunities). The discussions yielded limited quantitative input on the cost impact of NTBs specifically. Where such input was provided, e.g. impact of delays on product value, it tended to be associated with delays incurred due to regulatory checks and is, therefore, closely aligned with what is already encompassed within NTM costs. Accordingly, it was decided to base the assessment of non-tariff impacts primarily on NTM cost estimates. Where specific points relating to NTBs were raised, these are highlighted in the narrative in section 6.5.

This analysis of NTMs focuses on the six commodities selected in Chapter 4 (Section 4.5) for a detailed examination. For each product, an assessment is provided both in terms of "checked loads" (i.e. loads subject to the full range of regulatory checks and associated NTMs) and on a probability basis (thus reflecting the likely impact at a national level). Before assessing the results of this analysis, it is firstly necessary to briefly set out how the NTM estimates were arrived at. This overview builds upon the top-level scenarios set out in earlier. The modelling process developed estimates of the NTM costs on a line-by-line basis. Due to confidentiality and intellectual property constraints, the model's contents are not publicly available.

As some NTMs are extremely challenging to quantify and require a degree of conjecture to arrive at a considered estimate of what might be typical for a UK trading business, several caveats are highlighted. These need to be borne in mind given the evolving policy environment during which this research was conducted, particularly in the context of the proposed UK No Deal tariffs published by the Government in March.

6.1 MODEL FRAMEWORK AND STRUCTURE

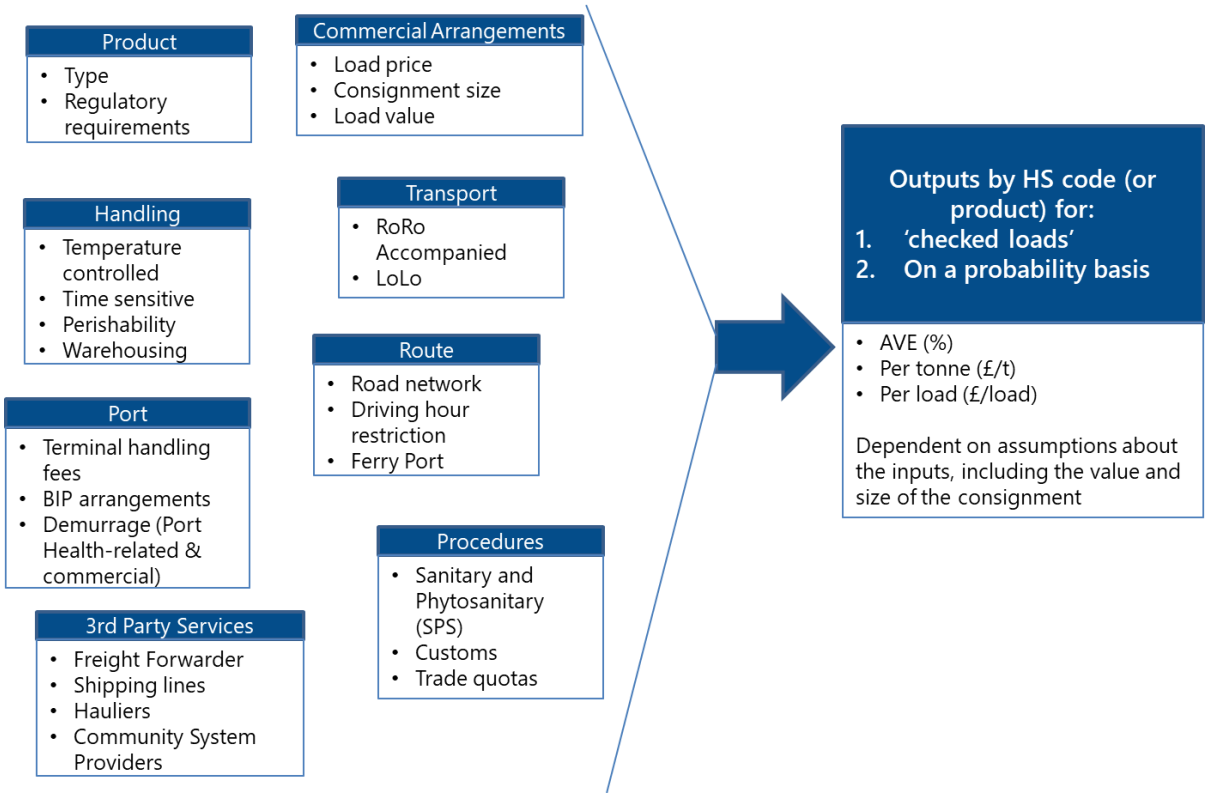
Numerous forms of inputs were considered in the compilation of the NTMs model. These are summarised in Figure 5.1. The modelling process focused on a few key transport modes deemed to be of particular importance to the beef and sheepmeat sectors. In view of this and due to the limited data available for some transport modes, estimates have been compiled for Lift-on, Lift-off (LoLo) and Roll-on, Roll-off (RoRo – driver-accompanied only).

The model development process also led to some NTM considerations such as the administration concerning trade (and tariff rate) quotas and the compilation of official documentation to accompany loads being grouped together under an *'administrative processing time'* parameter in the model. This eventually resulted in the development of the NTMs Model based around the inputs and cost categories summarised in Figure 6-1 and Figure 6-2 respectively.

Traders cannot simply import meat products from any country in the world. First, the country has to be an approved exporter. This list of approved countries is documented by the EU Commission. It is not

detailed here, not being an NTM, but is a consideration of traders. In addition, for companies undertaking processing activities, individual plants also have to be approved for export to the EU. This also needs consideration by traders when importing from non-EU countries. It is foreseen that post-Brexit, the UK will have a similar approvals process both for imports from the EU and from non-EU countries.

Figure 6-1 – Summary of the Inputs Considered in the Construction of the NTM Model



Sources: Trade Facilitation Consulting Ltd. and The Andersons Centre (2019)

Figure 6-2 summarises the main NTM cost categories examined during this study and sets-out whether each category has been;

- **Directly quantified:** that there are specific costs applicable to that category which have been applied in the model without any additional modelling or imputation.
- **Indirectly quantified:** the NTM costs have been derived using additional imputation or modelling. For example, administration and training time costs have used shipping clerk payment rates (i.e. £13.50/hour) in order to approximate the costs involved.
- **Not Quantifiable:** despite best-efforts, there are additional NTMs which are highly variable (e.g. depending on the size of business) or speculative in nature (e.g. impact of exceptional delays etc.) that it was not possible to quantify with a robust degree of accuracy during the time and resource confines of this study. Where possible, further commentary is provided on their potential impact in the results section below.
- **General costs**: this category of costs is generically applied all stages of the supply-chain and principally relates to the opportunity cost of tied-up capital associated with the imposition of NTMs which businesses should take into consideration when quantifying costs.

Figure 6-2 – Summary of NTM Model Quantified and Unquantified Costs

Stage	Directly Quantified	Indirectly Quantified	Not Quantified
At Origin	Customs declarations Country of origin certs Export health certs Official controls costs Transportation certs – vehicles Transportation certs – drivers Organic certification (where applicable)	Training time Administrative processing time (ind. EUR1, TRACES, CHIEFS, etc.) Security / Licensing fees & interest Labelling cost increases Import licensing (where applicable) Packaging & content requirements	New IT systems (additional modules) Cost of non-conformance Cost of future divergence (UK-EU) Re-registering seed varieties in EU (where currently on UK National List only) Farm-level NTMs (e.g. inputs)
At Border	Port health fees encompassing; - Documentary checks - Identity checks - Physical (seal) check Sampling (Basic & Advanced) Infrastructure and associated charges (DTI and UCN fees)	Haulage delays (RoRo) Demurrage delays (LoLo) Doc/ID check times Physical check times Miscellaneous queuing NTM-related terminal handling fees	IT systems (e.g. Customs, UK TRACES) Government resourcing (port health, customs officials etc.) Exceptional delays (incl. initial No Deal upheavals)
At Destination		Value deterioration Waste disposal (in Extremes only) Warehouse storage Training time (UK importers)	Additional IT systems Exceptional delays (incl. initial No Deal upheavals)
General Costs	Opportunity cost of tied-up capital (Applicable to both direct and indirectly quantified costs		

Source: The Andersons Centre (2019)

6.2 Key Modelling Assumptions

Building upon the framework presented in the previous section, the key modelling assumptions underpinning the NTM estimates from origin (plant level) to the destination are set-out in Annex II accompanying this report. Readers are encouraged to review this supplementary information if they seek more detail on how the NTM costs were calculated. Generic assumptions, of relevance to all supply-chain stages, and probability-based assumptions are summarised below.

6.2.1 Generic Assumptions – Applicable to All Supply-Chain Stages

- **Opportunity cost of capital:** all of the NTM costs for each load are assumed to necessitate additional capital being tied-up which could be used elsewhere. Accordingly, an opportunity cost of capital (3.5% applicable in all scenarios) has been applied. This seeks to capture the preference for value now (i.e. disposable capital) as opposed to being available later (i.e. tied-

up in NTMs). This estimate is based on UK Civil Service Green Book (STPR) - Social Time Preference Rate[19].

- **Exchange rates:** are based on the European Central Bank (ECB) rates and as 2016-2018 is the base period, the following Euro-Sterling exchange rates have been used in the NTMs modelling;
    - €1 = £0.84808
    - £1 = €1.17914

6.2.2 Probability-Based Assumptions

For some of the cost categories listed above and particularly those associated with regulatory checks, it is important to note that not all loads are subject to the full array of checks that could take place. Accordingly, check rates are applied and vary by scenario. The following cost categories are most directly associated with varying check rates;

- **Physical (seal) checks:** vary in accordance with EU Official Controls as well as regulatory agreements currently in place with other third countries. For example, New Zealand lamb has a reduced physical check rate of 1% according to industry experts consulted during this study whilst imports of Canadian beef are subject to 10% physical check rates based on the provisions of the CETA agreement[20]. These reduced check rates are significantly lower than the default 20% for red meat which the EU applies to standard third country imports. For agri-food products assessed in this study, the Low scenario takes account of the lowest check rate available to a third country (e.g. 1%) and the Best Estimate tends to have check rates associated with a comprehensive free trade deal (e.g. 10%) whilst the High scenario assumes a default check rate (e.g. 20%). In some instances, where reduced checks are not applicable assumed check rates across scenarios can be the same (e.g. for seeds, a 5% check rate is assumed in both the Best Estimate and High scenarios). Table 6-1 summarises the physical (seal) check rates which are assumed to apply.

Table 6-1– Assumed Phyiscal (Seal) Check Rates by Scenario – Selected Product Categories

Parameter*	Low	Brexit Deal	No Deal
Red Meat (incl. applicable offal products)	1%	10%	20%

Source: The Andersons Centre (2019)

*For As-Is, check rate assumed to be 0% for UK to EU27 and Best Est. applies for third country to EU28.

- **Physical checks (HMRC related):** as noted above, these are separate to physical (seal) checks administered under the auspices of PHAs. Across all product categories, these are assumed to range from 2.5% to 5% with a Brexit Deal check rate of 3% assumed.

- **Sampling:** are assumed to apply to a subset of the physically (seal) checked loads above. In a Low scenario, 1% of physically checked loads are assumed to be sampled whilst for the Brexit Deal and No Deal scenarios, the rates rise (e.g. to 5% or 10% depending on the product). When applied across all loads, sampling is assumed to affect a very low proportion of loads (e.g. 0.01%

[19] See: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/685903/The_Green_Book.pdf

[20] See: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22017A0114(01)&from=EN

of loads in a Low scenario (i.e. 1% of 1%)). In the Brexit Deal scenario, the sampling rate (as a proportion of all loads) is usually below 1% (e.g. 0.5% for fresh/chilled boneless beef). In the No Deal scenario, it can rise to 2% (of all loads).

- **Onward impacts of probability assumptions:** primarily affect two areas namely;
    - **Value deterioration**: when probability is applied the impact of value deterioration tends to reduce considerably and primarily affects the proportion of loads subject to sampling.
    - **Terminal handling fees associated with NTMs:** for RoRo, these are reduced by the proportion of loads subject to sampling as drivers no longer accompany loads. For LoLo loads, terminal handling fees are assumed to apply to all loads as it is anticipated that for most ports some form of shunting is required to move containers for regulatory checks.

6.3 PRESENTATION OF RESULTS

The results are based on two sets of estimates;

1. **Checked Loads:** this could be thought of as the "unlucky load" that is subject to the full range of regulatory checks as well as sampling. Accordingly, the NTM estimates become substantial, especially in the "No Deal" scenario.
2. **Probability-Based:** shaded in light blue, these estimates project the NTM costs averaged out over 100 loads. Therefore, they are much lower than the checked loads and could be taken as a more realistic assessment of what NTMs are likely to be at a national level.

Both sets of estimates should be taken into consideration when assessing the overall impact of NTMs, particularly as some companies will have products subject to the full range of regulatory checks and the cost impact, therefore, becomes significant, as illustrated below.

6.4 KEY CAVEATS

Although the assumptions outlined above give a good overview of the points meriting consideration when reviewing the NTM estimates, additional caveats also need to be highlighted. These include;

1. **Dynamic nature of estimating NTMs**: the research undertaken is based on engagement with key stakeholders who volunteered their time to participate, and the authors' understanding of possible scenarios for UK-EU trade after the UK's decision to exit from the EU. Inevitably, the subject is dynamic in nature and can change significantly, particularly if delays under a No Deal scenario become more/less pronounced over time.
2. **Industry participation:** whilst every effort was made to include as many industry participants as possible, it was not possible to include stakeholders representing every part of the UK beef and sheepmeat sector.
3. **Using probability-based estimates to gauge impact on SMEs:** probability-based estimates are assumed to apply to the national level. As many SMEs ship significantly less than 100 loads of a given product per annum, some will be subject to regulatory checks (and sampling) and are therefore likely to be subject to much higher levels of NTMs. These would be more akin to the checked loads' NTM estimates. As such, it is arguable that NTMs would affect SMEs disproportionately, especially when they are less favourably positioned to avail of special economic authorisations such as AEO status.
4. **Influence of load values and sizes on NTM estimates:** for many products, load price and size, and therefore load values, are heavily reliant on the prices derived from trade statistics data. For

some products (e.g. chilled boneless beef) only very high-value products tend to be imported into the UK. This results in load values much larger than if a standard beef price were applied. This has the effect of reducing the size of the NTMs when assessed on an AVE basis. Accordingly, caution needs to be adopted when reviewing the NTM estimates provided and a combination of AVE, cost per tonne and cost per load considerations should be used, particularly if readers are applying the estimates provided to individual business contexts.

5. **Standards equivalence:** whilst efforts were made during the primary research to reflect the impact of varying product equivalence (e.g. differences between third country and EU standards) and their contribution to NTM costs, it quickly became apparent that using the methodology employed by this study, it would not be possible to get sufficiently reliable input for such estimates. This is partly due to a reluctance amongst some businesses to provide details of cost differences due to commercial sensitivities. Furthermore, as most of the research interviewees were UK-based, many were not in a position to offer detailed insights on how production costs differed according to varying product standards. In view of this and the fact that UK and EU standards will start off being essentially the same post-Brexit, it was decided to compile the estimates on the basis of standards equivalence.

   When comparing the results presented below with previous studies, this standards equivalence assumption is one of the key reasons for the differences in estimated NTM costs, particularly for third countries trading with the EU. Where possible, additional input has been provided based on discussions with third country participants and this is an area where further research is advised, particularly as the UK seeks to build new overseas markets.
6. **Exchange rates:** the potential impact of exchange rate swings has not been considered in this study. Whilst it is arguable that potential exchange rate impacts (e.g. brought about by a further weakening of Sterling) could mitigate cost increases in a post-Brexit scenario, these need to be balanced against the potential for increased inflationary pressures on input costs (notably feed) as well as issues surrounding the availability of labour (drivers for RoRo) which could push up prices significantly. Furthermore, it is possible for Sterling to strengthen particularly if a soft-Brexit emerges which results in minimal regulatory change from the status quo. Given the volatile and often speculative nature of exchange rate movements, it was decided to omit such issues from consideration. However, in an attempt to mitigate some of the volatility associated with exchange rates, three-year averages have been used where possible in this study.
7. **Differences between EU Member States:** there were occasional examples cited during the study where the application of NTMs in one EU Member State differed from others. However, such instances were rare and were deemed as being unlikely to exert a major impact.
8. **Extreme circumstances:** as alluded to above, an extreme scenario was not formally included in the analysis. That said, references are made to extreme (or exceptional) circumstances in the results. These are anticipated to apply primarily in the short-run (e.g. within the first 6 months following a chaotic Brexit), although some lingering issues might apply on a longer-term basis. However, over time and once businesses reconfigure their operational practices and commercial arrangements, it is anticipated that the more extreme impacts should dissipate significantly. That said, it was emphasised by several that in an extreme scenario, if they were not able to change their operational practices and commercial arrangements in the short to mid-term (i.e. have an adequate notice period to adapt), their businesses models would quickly become unviable.
9. **Complex special customs procedures:** such as Outward Processing Relief and Inward Processing Relief (IPR and OPR) arrangements, which are used by some businesses to manage customs duty liabilities where goods cross borders multiple times before they are fully

processed, were not considered during this study. This is because such administrative arrangements can become highly complex, can be very specialised (i.e. to individual businesses) and would require a substantial degree of conjecture to arrive at an estimate of their national-level impact. Other specific customs arrangements such as the application for a Binding Tariff Information (BTI) to avoid tariff classification challenges at the point of import for products where tariff classification is not straight forward (for example, mixed meat products or meat-based pies), were not explored in detail, other than the fact that there would be costs for a customs consultant to put such procedures in place.

6.5 NTM Cost Estimates

Bearing in mind the assumptions and caveats above (and in Annex II), this section gives an overview of the NTM costs for each of the six products selected for a detailed examination during this study. Accompanying each set of estimates, the commentary and analysis give further background and context as well as points to consider when interpreting the data with a focus on assessing the implications for trading businesses. Where appropriate, comparisons are made against the findings of previous studies.

As explained in Chapter 1, in addition to the two scenarios primarily focused on in this study, it was decided to introduce two other scenarios when assessing NTM costs – the "Low" and "Status Quo" (referred to as "Current" in Tables below) scenarios – both set-out in dark-blue text in the Tables below. The "Low" scenario has been included to reflect the favourable physical check rates that New Zealand (which trades with the UK on an MFN basis) enjoys in comparison with countries that have FTAs with the UK and EU (e.g. Canada). The Status Quo provides a benchmark to assess how NTM costs are likely to change post-Brexit.

6.5.1 Beef Products

As outlined in Section 4.5, the beef products chosen for a detailed analysis with respect to NTM costs were chilled boneless beef cuts, frozen boneless beef cuts and chilled beef carcases and half carcases. The projected NTM costs under each scenario for these products are summarised below in Table 6-2, for both LoLo and RoRo transport modes. The results are firstly presented on a "checked load" basis (i.e. subject to the full range of regulatory checks) and thereafter, the probability-based estimates are provided. Below is a brief commentary on the results with respect to each product.

Chilled Boneless Beef

NTM AVEs range from 1.2% to 26.2% across the post-Brexit scenarios listed. Current AVEs for intra-EU shipments are estimated at 0.2% and reflect the minimal levels of regulatory restrictions on trade within the EU. As no consignment value deterioration has been assumed in the Low scenario, this is the principal reason for the difference vis-à-vis the Current or Brexit Deal scenarios, where value deterioration equating to 5% of load value has been assumed, which accounts for more than two-thirds of the estimated NTM costs. In the No Deal scenario, value deterioration rises to 20% of load value which equates to 82% of projected NTM costs. This reflects the main thrust of input obtained during the primary research. In some more exceptional circumstances, value deterioration could rise further and in the worst circumstances could result in the product being rejected – leading to a 100% decrease in product value and potential waste disposal costs being incurred.

In terms of other fees, terminal handling fees associated with NTMs (£147.50 - £448.50 per load) also account for a significant proportion of variation by scenario as do sampling related costs encompassing

basic (£148 - £200) and advanced sampling (£300- £500) as well as time associated with waiting for sampling (£240 - £1,100). These fees are applicable for both RoRo and LoLo shipments.

It is noteworthy that whilst RoRo loads have lower AVEs than their LoLo counterparts, this is chiefly due to the higher tonnage assumed for RoRo (18t versus 14t). When assessed on a monetary cost per load basis, RoRo costs work out to be higher. Whilst the official control costs and port health costs which are levied on a cost per tonne basis contribute to this increased amount, the additional costs associated with delays incurred by driver-accompanied RoRo loads are also an important factor. The extent to which RoRo loads will be subject to delays post-Brexit will be monitored closely by industry participants and could lead to some modal changes (to unaccompanied RoRo (not assessed in this study) or LoLo) if such delays become prohibitive (i.e. greater than one day).

When probabilistic parameters are applied, the projected NTM costs decline significantly and range from 0.4% to 2.7% across the post-Brexit scenarios estimated. The chief contributor to this reduction is the decline in the influence of value deterioration which only accounts for just over 2% of NTM costs in a Brexit Deal scenario. For LoLo loads, costs such as terminal handling fees, port health fees and official controls at plant-level become more prevalent equating to 31%, 12% and 11% of estimated NTM costs in a Brexit Deal scenario for UK to EU27 exports.

For RoRo shipments, terminal handling fees account for only a small proportion of NTM costs. This is because these loads are assumed to be driver-accompanied throughout the journey unless the load undergoes sampling and it is only in these rare instances that terminal handling fees would apply. This is a key reason why RoRo probability-based estimates are lower than their LoLo equivalents. Admittedly, delay-related costs for RoRo loads associated with documentary/ID and physical checks tend to be higher than their LoLo equivalents, however, on balance RoRo works out cheaper.

Table 6-2 – Estimated NTM Costs for Chilled Boneless Beef (HS code: 02013000)

Trade Flow and Load Type	NTM Cost	Current	Low	Brex. Deal	No Deal
Third Country to UK *(Price per tonne: £6,742)*					
LoLo – Checked load (14t)	£/load	£6,877	£1,337	£6,877	£23,138
	AVE (%)	7.3%	1.4%	7.3%	24.5%
	£/tonne	£491	£95	£491	£1,653
LoLo – Probability-based (14t)	**£/load**	**£999**	**£610**	**£999**	**£2,105**
	AVE (%)	**1.1%**	**0.6%**	**1.1%**	**2.2%**
	£/tonne	**£71**	**£44**	**£71**	**£150**
RoRo – Checked load (18t)	£/load	£8,631	£1,504	£8,631	£29,330
	AVE (%)	7.1%	1.2%	7.1%	24.2%
	£/tonne	£479	£84	£479	£1,629
RoRo – Probability-based (18t)	**£/load**	**£831**	**£545**	**£831**	**£1,990**
	AVE (%)	**0.7%**	**0.4%**	**0.7%**	**1.6%**
	£/tonne	**£46**	**£30**	**£46**	**£111**
EU27 to UK *(Price per tonne: £4,622)*					
LoLo – Checked load (14t)	£/load	£125	£1,324	£5,322	£16,969
	AVE (%)	0.2%	2.0%	8.2%	26.2%
	£/tonne	£9	£95	£380	£1,212
LoLo – Probability-based (14t)	**£/load**	**£125**	**£597**	**£971**	**£1,955**
	AVE (%)	**0.2%**	**0.9%**	**1.5%**	**3.0%**
	£/tonne	**£9**	**£43**	**£69**	**£140**
RoRo – Checked load (18t)	£/load	£157	£1,487	£6,631	£21,399
	AVE (%)	0.2%	1.8%	8.0%	25.7%
	£/tonne	£9	£83	£368	£1,189
RoRo – Probability-based (18t)	**£/load**	**£157**	**£527**	**£795**	**£1,797**
	AVE (%)	**0.2%**	**0.6%**	**1.0%**	**2.2%**
	£/tonne	**£9**	**£29**	**£44**	**£100**
UK to EU27 *(Price per tonne: £4,854)*					
LoLo – Checked load (14t)	£/load	£125	£1,325	£5,492	£17,510
	AVE (%)	0.2%	1.9%	8.1%	25.8%
	£/tonne	£8.92	£95	£392	£1,251
LoLo – Probability-based (14t)	**£/load**	**£125**	**£598**	**£974**	**£1,837**
	AVE (%)	**0.2%**	**0.9%**	**1.4%**	**2.7%**
	£/tonne	**£9**	**£43**	**£70**	**£131**
RoRo – Checked load (18t)	£/load	£157	£1,489	£6,850	£22,133
	AVE (%)	0.2%	1.7%	7.8%	25.3%
	£/tonne	£8.70	£83	£381	£1,230
RoRo – Probability-based (18t)	**£/load**	**£157**	**£529**	**£799**	**£1,684**
	AVE (%)	**0.2%**	**0.6%**	**0.9%**	**1.9%**
	£/tonne	**£9**	**£29**	**£44**	**£94**

Source: The Andersons Centre (2019)

Frozen Boneless Beef

In contrast to chilled boneless beef, the estimated NTM costs for frozen boneless beef are lower as depicted in Table 6-3.

For checked loads, post-Brexit AVEs range from 1.9% to 10.8% with the monetary cost per tonne ranging from £82 to £343. Unsurprisingly, value deterioration is much less of a factor with frozen beef, and is not assumed to apply in a Low scenario and ranges from 1-2% in the Brexit Deal and No Deal scenarios respectively. Under a Brexit Deal scenario, value deterioration accounts for approximately 17-22% of NTM costs per load across the trade flows assessed; however, under No Deal this rises to 19-25%. These value deterioration considerations primarily relate to the potential for penalties to be imposed of significant delays occur in transit but are relatively minor when compared with the risk exposure for perishable products.

As with chilled boneless beef, AVEs associated with LoLo are slightly higher than RoRo across all trade flows and scenarios, but work out to be lower on a per load basis due to the 4-tonne weight difference assumed.

When probability is factored into the equation, NTM AVEs vary from 1% to 4% for LoLo and 0.7% to 2.6% for RoRo. These estimates are generally higher than their chilled beef equivalents and this is chiefly due to the lower prices associated with frozen loads; £2,794-£4,245 per tonne as opposed to £4,622-£6,742 per tonne for chilled boneless beef. When assessed on a cost per load basis, frozen boneless beef NTM costs work out to be slightly lower.

Taking UK to EU27 exports as an example, terminal handling fees associated with NTMs is the largest contributor to LoLo NTMs, representing almost 32% of costs. Contrastingly for RoRo, these fees account for just 0.2% of costs. This is because for LoLo, in order to undertake the documentary and ID checks (applicable to 100% of loads), terminal handling will be required to move the container from the stack to the inspections areas. Whereas for RoRo, the driver can simply drive the load to the inspection area and terminal handling fees are only assumed to apply when the load is subject to sampling.

As with chilled boneless beef, time delay costs associated with queuing and undergoing documentary and physical checks are higher for RoRo (14% of total costs) than for LoLo (6.3%) due to the additional costs associated with delays in transit (assumed to average at £60/hour as opposed to approximately £2/hour for LoLo).

Overall, the results suggest that whilst AVEs work out to be lower for frozen boneless beef with respect to 'unlucky loads', when considered on a probabilistic basis, they are projected to be higher. As demonstrated above, this is principally because of the higher prices associated with chilled loads which means that NTM costs are spread across a higher load value. That said, any delays at the border above those projected in this study would have an exacerbated impact on the more perishable chilled products. This once again underlines the perceived heightened risk associated with chilled meat products.

Table 6-3 – Estimated NTM Costs for Frozen Boneless Beef Cuts (HS code: 02023090)

Trade Flow and Load Type	NTM Cost	Current	Low	Brex. Deal	No Deal
Third Country to UK *(Price per tonne: £4,245)*					
LoLo – Checked load (14t)	£/load	£2,585	£1,321	£2,585	£4,799
	AVE (%)	4.3%	2.2%	4.3%	8.1%
	£/tonne	£185	£94	£185	£343
LoLo – Probability-based (14t)	**£/load**	**£953**	**£595**	**£953**	**£1,707**
	AVE (%)	**1.6%**	**1.0%**	**1.6%**	**2.9%**
	£/tonne	**£68**	**£42**	**£68**	**£122**
RoRo – Checked load (18t)	£/load	£3,111	£1,484	£3,111	£5,751
	AVE (%)	4.1%	1.9%	4.1%	7.5%
	£/tonne	£173	£82	£173	£320
RoRo – Probability-based (18t)	**£/load**	**£773**	**£524**	**£773**	**£1,478**
	AVE (%)	**1.0%**	**0.7%**	**1.0%**	**1.9%**
	£/tonne	**£43**	**£29**	**£43**	**£82**
EU27 to UK *(Price per tonne: £3,166)*					
LoLo – Checked load (14t)	£/load	£125	£1,314	£2,418	£4,472
	AVE (%)	0.3%	3.0%	5.5%	10.1%
	£/tonne	£9	£94	£173	£319
LoLo – Probability-based (14t)	**£/load**	**£125**	**£588**	**£942**	**£1,687**
	AVE (%)	**0.3%**	**1.3%**	**2.1%**	**3.8%**
	£/tonne	**£9**	**£42**	**£67**	**£120**
RoRo – Checked load (18t)	£/load	£157	£1,475	£2,897	£5,331
	AVE (%)	0.3%	2.6%	5.1%	9.4%
	£/tonne	£9	£82	£161	£296
RoRo – Probability-based (18t)	**£/load**	**£157**	**£516**	**£759**	**£1,452**
	AVE (%)	**0.3%**	**0.9%**	**1.3%**	**2.5%**
	£/tonne	**£9**	**£29**	**£42**	**£81**
UK to EU27 *(Price per tonne: £2,794)*					
LoLo – Checked load (14t)	£/load	£125	£1,312	£2,360	£4,225
	AVE (%)	0.3%	3.4%	6.0%	10.8%
	£/tonne	£8.92	£94	£169	£302
LoLo – Probability-based (14t)	**£/load**	**£125**	**£585**	**£939**	**£1,545**
	AVE (%)	**0.3%**	**1.5%**	**2.4%**	**4.0%**
	£/tonne	**£9**	**£42**	**£67**	**£110**
RoRo – Checked load (18t)	£/load	£157	£1,472	£2,823	£5,052
	AVE (%)	0.3%	2.9%	5.6%	10.0%
	£/tonne	£8.70	£82	£157	£281
RoRo – Probability-based (18t)	**£/load**	**£157**	**£513**	**£754**	**£1,309**
	AVE (%)	**0.3%**	**1.0%**	**1.5%**	**2.6%**
	£/tonne	**£9**	**£28**	**£42**	**£73**

Source: The Andersons Centre (2019)

Chilled Beef Carcases and Half-Carcases

Based on the trade data derived from the HMRC during this study, imports of beef carcases and half-carcases from third countries are minimal and are, therefore, excluded from the estimates provided in Table 6-4.

Table 6-4– Estimated NTM Costs for Chilled Beef Carcases (HS code: 02011000)

Trade Flow and Load Type	NTM Cost	Current	Low	Brex. Deal	No Deal
EU27 to UK *(Price per tonne: £3,210)*					
LoLo – Checked load (14t)	£/load	£125	£1,315	£4,285	£12,858
	AVE (%)	0.3%	2.9%	9.5%	28.6%
	£/tonne	£9	£94	£306	£918
LoLo – Probability-based (14t)	**£/load**	**£125**	**£588**	**£952**	**£1,855**
	AVE (%)	**0.3%**	**1.3%**	**2.1%**	**4.1%**
	£/tonne	**£9**	**£42**	**£68**	**£133**
RoRo – Checked load (18t)	£/load	£157	£1,476	£5,298	£16,113
	AVE (%)	0.3%	2.6%	9.2%	27.9%
	£/tonne	£9	£82	£294	£895
RoRo – Probability-based (18t)	**£/load**	**£157**	**£516**	**£771**	**£1,669**
	AVE (%)	**0.3%**	**0.9%**	**1.3%**	**2.9%**
	£/tonne	**£9**	**£29**	**£43**	**£93**
UK to EU27 *(Price per tonne: £2,043)*					
LoLo – Checked load (14t)	£/load	£125	£1,307	£3,429	£9,328
	AVE (%)	0.4%	4.6%	12.0%	32.6%
	£/tonne	£8.92	£93	£245	£666
LoLo – Probability-based (14t)	**£/load**	**£125**	**£581**	**£937**	**£1,638**
	AVE (%)	**0.4%**	**2.0%**	**3.3%**	**5.7%**
	£/tonne	**£9**	**£41**	**£67**	**£117**
RoRo – Checked load (18t)	£/load	£157	£1,466	£4,197	£11,613
	AVE (%)	0.4%	4.0%	11.4%	31.6%
	£/tonne	£8.70	£81	£233	£645
RoRo – Probability-based (18t)	**£/load**	**£157**	**£507**	**£752**	**£1,428**
	AVE (%)	**0.4%**	**1.4%**	**2.0%**	**3.9%**
	£/tonne	**£9**	**£28**	**£42**	**£79**

Source: The Andersons Centre (2019)

In terms of the UK's trade with the EU, checked load AVEs for this product are category currently minimal, estimated at 0.3-0.4% and primarily relate to official controls costs. Post-Brexit, NTM costs are projected to rise, ranging from 2.6% to 32.6% across the scenarios listed which corresponds to monetary costs of £82 to £918 per tonne. As with chilled boneless beef, value deterioration is again the most influential factor, accounting for just over half of estimated NTM costs for EU27-origin imports using LoLo. For exports to the EU27, its share lowers to around 42% in a Brexit Deal scenario with the lower price per tonne on UK exports (£2,043 as opposed to £3,210) being the key reason for this. In a No Deal scenario however, value deterioration (assumed at 20% of load value) becomes even more influential with a 70-72% share of NTM costs for imports and 61-63% for exports to the EU.

As with chilled boneless beef, terminal handling fees (£298/load) and sampling related costs, including waiting times, (£960/load) are the other major contributors to NTM costs. For LoLo, the former accounts for about 8% of Brexit Deal NTMs and the combined contribution of the latter equating to 32% of total NTM costs. For RoRo, the monetary contributions of these two categories are similar but as the costs

are spread across a larger tonnage, their percentage contributions are lower; circa 23% for sampling-related costs and 7% for terminal handling fees.

The estimates also show that there is significant variation in the impact of NTMs by scenario, whilst value deterioration, ranging from 0% to 20% is the primary driver, variations in terminal handling fees associated with the imposition of NTMs such as physical checks and sampling also make a key contribution to the cost differences. Variations in sampling costs and associated time delays (e.g. 3 days under Low scenario to 10 days in the High scenario) are also influential. As with other red meat categories, there are also differences in the amount of administration time required (1.5 – 4 hours per load) also contribute to the NTM cost differences by scenario.

On a probability-basis, the projected NTM costs again decline and vary from 1.3% to 5.7% for LoLo and 0.9% to 3.9% for RoRo. As with other products, the lower tonnages and increased instances of terminal handling fees associated with NTMs are influential in the higher AVEs for LoLo. Once again, driver-related delay fees are also more evident for RoRo, when probability is considered. Taken together, the delay-related costs associated with documentary, ID and physical checks account (£106/load) for 14% of projected NTM costs for UK exports to the EU27.

Although the NTM AVEs might appear to be low, it must be emphasised that in an industry where processing margins are frequently cited as being less than 5%, the scope for the supply chain to absorb such costs is extremely limited. As Chapter 8 illustrates, the challenges associated with absorbing additional costs become even more pronounced at the farm level.

It must also be emphasised that the scenarios presented, do not consider potential extremes which could occur as a result of major short-term delays potentially brought about as a result of the UK leaving the EU under No Deal. For chilled beef loads subject to sampling, the associated delays (circa 10 days) and sampling techniques could result in the entire load being rejected. In addition to the 100% value deterioration in load value, industry experts consulted during this research also stated that there would be costs associated with waste disposal and these could vary anywhere between £30/tonne to £250/tonne depending on the nature of the products (e.g. whether there is packaging that requires separate and complex disposal processes). Whilst it is difficult to put a precise value on such extreme circumstances, it is obvious that in scenarios where the entire load is rejected, that the NTM costs would easily surpass 100% AVE.

6.5.2 Sheepmeat Products

This section provides an overview of NTM costs for chilled lamb carcases (and half-carcases), chilled and frozen lamb legs which are the dominant product categories when it comes to sheepmeat trade. Results are again first presented on checked load basis and then probabilistic estimates are given.

Chilled Lamb Carcases and Half-Carcases

As with its beef equivalent, imports from non-EU third countries are minimal and are therefore removed from the estimates shown in Table 6-5 which focus on UK-EU trade. Similar to beef, the current intra-EU NTM costs are minimal and are estimated to range from 0.2-0.4% in AVE terms, with official controls again the main contributor.

Post-Brexit NTM costs are projected to rise and are estimated to vary from 1.9% to 31.4% for checked loads across the scenarios listed. In monetary terms, this equates to a range of £1,309 to £15,729 per load for LoLo and £1,469 to £19,843 for RoRo. In what is by now a familiar trend, value deterioration is the primary driver. For imports from the EU, it represents almost half of total NTM costs under a Brexit Deal and two-thirds of quantified costs under a No Deal scenario. For UK exports to the EU27, the

influence of value deterioration rises further and accounts for about 60% of NTM costs under a Brexit Deal, rising to over 75% under a No Deal. Once more, the higher price associated with UK exports to the EU is the driver of this increased influence.

As previously explained for beef, terminal handling fees associated with NTMs as well as sampling related costs (both direct sampling and costs associated with waiting for sampling) are also significant contributors to the overall NTMs cost for sheepmeat carcases.

Table 6-5 – Estimated NTM Costs for Chilled Lamb Carcases & Half-Carcases (HS code: 02041000)

Trade Flow and Load Type	NTM Cost	Current	Low	Brex. Deal	No Deal
EU27 to UK *(Price per tonne: £2,356)*					
LoLo – Checked load (14t)	£/load	£125	£1,309	£3,658	£10,371
	AVE (%)	0.4%	4.0%	11.1%	31.4%
	£/tonne	£9	£94	£261	£741
LoLo – Probability-based (14t)	**£/load**	**£125**	**£583**	**£941**	**£1,794**
	AVE (%)	**0.4%**	**1.8%**	**2.9%**	**5.4%**
	£/tonne	**£9**	**£42**	**£67**	**£128**
RoRo – Checked load (18t)	£/load	£157	£1,469	£4,492	£12,915
	AVE (%)	0.4%	3.5%	10.6%	30.5%
	£/tonne	£9	£82	£250	£718
RoRo – Probability-based (18t)	**£/load**	**£157**	**£509**	**£757**	**£1,591**
	AVE (%)	**0.4%**	**1.2%**	**1.8%**	**3.8%**
	£/tonne	**£9**	**£28**	**£42**	**£88**
UK to EU27 *(Price per tonne: £4,243)*					
LoLo – Checked load (14t)	£/load	£125	£1,321	£5,043	£15,729
	AVE (%)	0.2%	2.2%	8.5%	26.5%
	£/tonne	£9	£94	£360	£1,123
LoLo – Probability-based (14t)	**£/load**	**£125**	**£595**	**£966**	**£1,794**
	AVE (%)	**0.2%**	**1.0%**	**1.6%**	**3.0%**
	£/tonne	**£9**	**£42**	**£69**	**£128**
RoRo – Checked load (18t)	£/load	£157	£1,484	£6,272	£19,843
	AVE (%)	0.2%	1.9%	8.2%	26.0%
	£/tonne	£9	£82	£348	£1,102
RoRo – Probability-based (18t)	**£/load**	**£157**	**£524**	**£789**	**£1,628**
	AVE (%)	**0.2%**	**0.7%**	**1.0%**	**2.1%**
	£/tonne	**£9**	**£29**	**£44**	**£90**

Source: The Andersons Centre (2019)

When viewed from a probability-based perspective, NTM costs unsurprisingly decline, ranging from 0.7% to 5.4% across all post-Brexit scenarios and trade flows for the same reasons as discussed previously for beef. It is also evident that the AVEs in the Low scenario (0.7-1.8%) are significantly below a Brexit Deal (1.0-2.9%) and illustrate the improved competitive position which can be achieved by having a robust regulatory equivalence agreement with the EU, as is the case for New Zealand. However, expert input suggests that it may take some time for the UK to achieve such favourable terms as it requires a high degree of trust from EU stakeholders that the systems put in place are sufficiently robust. This is of crucial importance for sheepmeat exports in particular and there will be a lot of scrutiny on the ability of any newly introduced UK systems or regulatory regimes to cope with the demands that they will be placed under. According to several industry participants, if the UK's standards remain the same as the EUs, in terms of both the outcomes that the standards achieve and the processes (methodologies)

underpinning those outcomes, the greater its chances of coping. This would also heighten its prospects of achieving the most favourable terms possible (i.e. similar to New Zealand).

As with other products assessed in this study, the scope for cost increases under a more Extreme No-Deal scenario, are substantial and industry experts believe that these would be similar to those for the beef sector with respect to value deterioration, waste disposal and delay issues.

The added risk for the sheep meat sector of course is that most of the trade is concentrated during the latter part of the calendar year and if exceptional delays occur during these periods, then the resultant impact of NTMs would be even more severe. Given that the UK sheep meat sector is amongst the most dependent on exports to the EU (see Chapter 4), it is crucial that any NTM costs are minimised as far as possible post-Brexit, particularly given the level of competition which could emanate from other global players, most notably Australia and New Zealand.

Chilled Lamb Legs

In contrast to carcases, lamb leg imports from third (non-EU) countries, especially New Zealand, play a major role. Accordingly, Table 6-6 also includes third country to UK NTM estimates.

Across all extra-EU (including post-Brexit) scenarios, projected NTM costs on a checked load basis vary from 1.3% to 25.4% which corresponds to £83 to £1,634 when expressed in monetary costs per tonne. Being a chilled product, value deterioration is yet again the primary driver of this variation. When compared to chilled carcases, the AVEs are slightly lower for chilled lamb legs, due to the higher prices associated with the latter. Once again, checked load AVEs for RoRo are also lower due to costs being spread across a higher load tonnage.

Similar to other product categories, costs associated with terminal handling fees, sampling and time-related delays also play a significant role.

Applying probability to the estimates unsurprisingly lowers the AVEs considerably, varying from 0.5% to 2.6% across all scenarios and trade flows. It is evident that even when physical checking and sampling rates are considered, there is a notable difference in costs between the Low and the No Deal scenarios which is greater than 1% in all instances and is close to 2% for third country to UK LoLo trade. When compared to the current situation for UK-EU trade, this difference becomes even more pronounced. With low profit margins, such variances can become the difference between success and failure particularly on major export markets. Admittedly, variations in exchange rates do lead to larger swings in terms of price competitiveness, but an unfavourable exchange rate move coupled with increased NTM costs could have a detrimental impact.

Frozen Lamb Legs

As Table 6-7 shows, NTM costs associated with frozen lamb legs decline vis-à-vis their chilled counterparts, particularly as far as checked loads are concerned in the Brexit Deal and No Deal scenarios. As discussed for frozen beef products, reduced value deterioration impacts are the key reason for this. In the Low scenario, frozen AVEs work out to be higher in percentage terms, as value deterioration is not assumed to apply in this scenario for chilled lamb legs.

For the scenarios listed, extra-EU AVEs are projected to range from 1.9 to 8.6% for checked loads of frozen lamb legs. AVEs are slightly higher for EU to UK shipments due to the lower prices and load values when compared to UK exports or imports from third countries. Despite its reduced influence, value deterioration still accounts for more than 20% of estimated NTM costs for UK-EU trade under a Brexit Deal scenario and rises towards 25% share under a No Deal.

When probability is considered, the estimated NTM costs are again small and range from 0.7% to 3.1% across the scenarios listed for both transport modes. On a monetary basis, NTM costs work out to be slightly higher for LoLo, again due to the lower tonnages.

As highlighted for other products, costs associated with exceptional border-related delays have not been modelled but would add substantially to the NTM costs shown.

Table 6-6 – Estimated NTM Costs for Chilled Lamb Legs (HS code: 02042250)

Trade Flow and Load Type	NTM Cost	Current	Low	Brex. Deal	No Deal
Third Country to UK *(Price per tonne: £5,424)*					
LoLo – Checked load (14t)	£/load	£5,910	£1,329	£5,910	£19,302
	AVE (%)	7.8%	1.7%	7.8%	25.4%
	£/tonne	£422	£95	£422	£1,379
LoLo – Probability-based (14t)	**£/load**	**£974**	**£598**	**£974**	**£2,003**
	AVE (%)	**1.3%**	**0.8%**	**1.3%**	**2.6%**
	£/tonne	**£70**	**£43**	**£70**	**£143**
RoRo – Checked load (18t)	£/load	£7,387	£1,493	£7,387	£24,399
	AVE (%)	7.6%	1.5%	7.6%	25.0%
	£/tonne	£410	£83	£410	£1,355
RoRo – Probability-based (18t)	**£/load**	**£801**	**£530**	**£801**	**£1,861**
	AVE (%)	**0.8%**	**0.5%**	**0.8%**	**1.9%**
	£/tonne	**£45**	**£29**	**£45**	**£103**
EU27 to UK *(Price per tonne: £6,650)*					
LoLo – Checked load (14t)	£/load	£125	£1,336	£6,810	£22,870
	AVE (%)	0.1%	1.4%	7.3%	24.6%
	£/tonne	£9	£95	£486	£1,634
LoLo – Probability-based (14t)	**£/load**	**£125**	**£605**	**£990**	**£2,090**
	AVE (%)	**0.1%**	**0.7%**	**1.1%**	**2.2%**
	£/tonne	**£9**	**£43**	**£71**	**£149**
RoRo – Checked load (18t)	£/load	£157	£1,503	£8,544	£28,986
	AVE (%)	0.1%	1.3%	7.1%	24.2%
	£/tonne	£9	£84	£475	£1,610
RoRo – Probability-based (18t)	**£/load**	**£157**	**£539**	**£822**	**£1,973**
	AVE (%)	**0.1%**	**0.5%**	**0.7%**	**1.6%**
	£/tonne	**£9**	**£30**	**£46**	**£110**
UK to EU27 *(Price per tonne: £6,385)*					
LoLo – Checked load (14t)	£/load	£125	£1,335	£6,616	£21,966
	AVE (%)	0.1%	1.5%	7.4%	24.6%
	£/tonne	£8.92	£95	£473	£1,569
LoLo – Probability-based (14t)	**£/load**	**£125**	**£604**	**£986**	**£1,937**
	AVE (%)	**0.1%**	**0.7%**	**1.1%**	**2.2%**
	£/tonne	**£9**	**£43**	**£70**	**£138**
RoRo – Checked load (18t)	£/load	£157	£1,501	£8,294	£27,862
	AVE (%)	0.1%	1.3%	7.2%	24.2%
	£/tonne	£8.70	£83	£461	£1,548
RoRo – Probability-based (18t)	**£/load**	**£157**	**£537**	**£817**	**£1,814**
	AVE (%)	**0.1%**	**0.5%**	**0.7%**	**1.6%**
	£/tonne	**£9**	**£30**	**£45**	**£101**

Source: The Andersons Centre (2019)

Table 6-7 – Estimated NTM Costs for Frozen Lamb Legs (HS code: 02044250)

Trade Flow and Load Type	NTM Cost	Current	Low	Brex. Deal	No Deal
Third Country to UK *(Price per tonne: £4,246)*					
LoLo – Checked load (14t)	£/load	£2,585	£1,321	£2,585	£4,799
	AVE (%)	4.3%	2.2%	4.3%	8.1%
	£/tonne	£185	£94	£185	£343
LoLo – Probability-based (14t)	**£/load**	**£953**	**£595**	**£953**	**£1,707**
	AVE (%)	**1.6%**	**1.0%**	**1.6%**	**2.9%**
	£/tonne	**£68**	**£42**	**£68**	**£122**
RoRo – Checked load (18t)	£/load	£3,111	£1,484	£3,111	£5,752
	AVE (%)	4.1%	1.9%	4.1%	7.5%
	£/tonne	£173	£82	£173	£320
RoRo – Probability-based (18t)	**£/load**	**£773**	**£524**	**£773**	**£1,478**
	AVE (%)	**1.0%**	**0.7%**	**1.0%**	**1.9%**
	£/tonne	**£43**	**£29**	**£43**	**£82**
EU27 to UK *(Price per tonne: £3,924)*					
LoLo – Checked load (14t)	£/load	£125	£1,319	£2,535	£4,701
	AVE (%)	0.2%	2.4%	4.6%	8.6%
	£/tonne	£9	£94	£181	£336
LoLo – Probability-based (14t)	**£/load**	**£125**	**£593**	**£950**	**£1,701**
	AVE (%)	**0.2%**	**1.1%**	**1.7%**	**3.1%**
	£/tonne	**£9**	**£42**	**£68**	**£121**
RoRo – Checked load (18t)	£/load	£157	£1,481	£3,047	£5,626
	AVE (%)	0.2%	2.1%	4.3%	8.0%
	£/tonne	£9	£82	£169	£313
RoRo – Probability-based (18t)	**£/load**	**£157**	**£522**	**£769**	**£1,470**
	AVE (%)	**0.2%**	**0.7%**	**1.1%**	**2.1%**
	£/tonne	**£9**	**£29**	**£43**	**£82**
UK to EU27 *(Price per tonne: £4,459)*					
LoLo – Checked load (14t)	£/load	£125	£1,323	£2,618	£4,729
	AVE (%)	0.2%	2.1%	4.2%	7.6%
	£/tonne	£8.92	£94	£187	£338
LoLo – Probability-based (14t)	**£/load**	**£125**	**£596**	**£956**	**£1,576**
	AVE (%)	**0.2%**	**1.0%**	**1.5%**	**2.5%**
	£/tonne	**£9**	**£43**	**£68**	**£113**
RoRo – Checked load (18t)	£/load	£157	£1,486	£3,154	£5,700
	AVE (%)	0.2%	1.9%	3.9%	7.1%
	£/tonne	£8.70	£83	£175	£317
RoRo – Probability-based (18t)	**£/load**	**£157**	**£526**	**£776**	**£1,349**
	AVE (%)	**0.2%**	**0.7%**	**1.0%**	**1.7%**
	£/tonne	**£9**	**£29**	**£43**	**£75**

Source: The Andersons Centre (2019)

6.6 Concluding Remarks on NTMs

The NTM costs examined above reveal a high degree of variation from the Low scenario to the No Deal scenario. This is most evident for the unlucky loads but is also apparent when probability is considered.

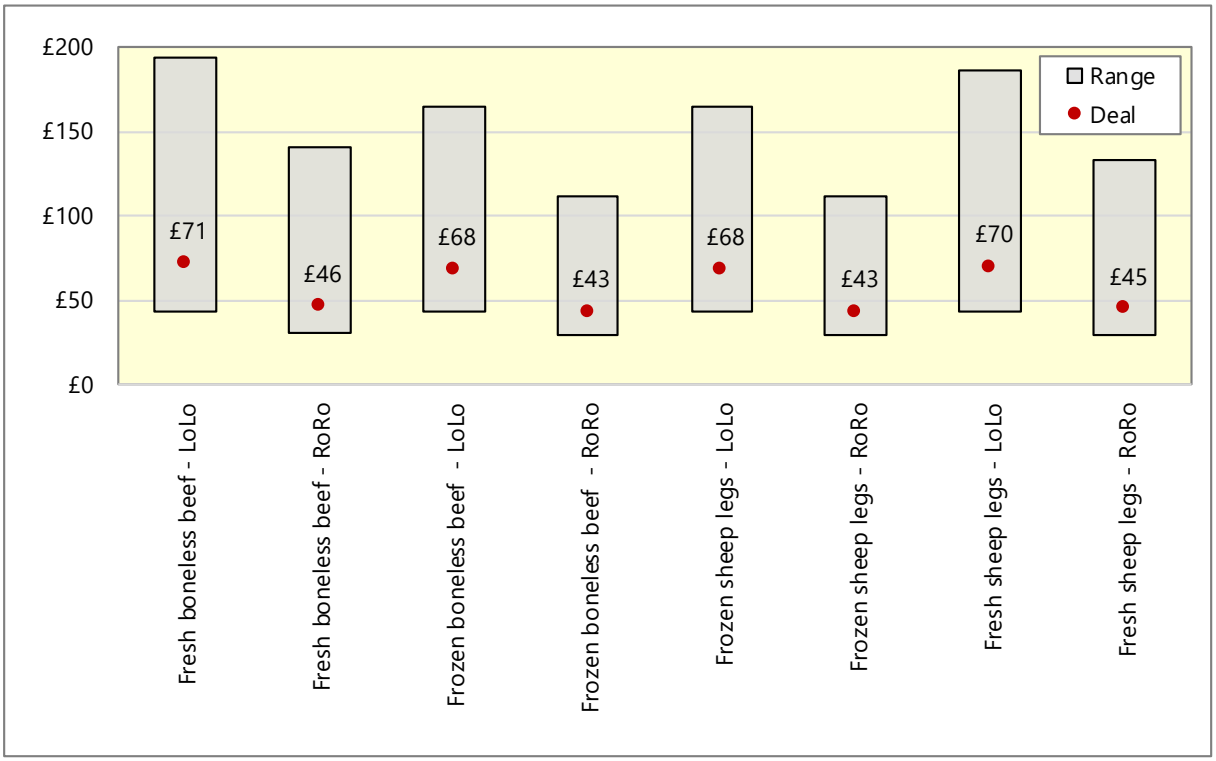
Although the analysis above included a variety of NTM parameters, it concentrated mainly on expressing NTM costs in AVE terms. However, caution is urged when interpreting the NTM results. One should not use an NTM measure in isolation (e.g. AVEs) but should also consider other elements, particularly cost per tonne and cost per load. With this in mind, the charts below depict the projected NTM costs in £ per tonne terms for third country to UK (Figure 6-3), and EU27 to UK (Figure 6-4) and UK to EU27 (Figure 6-5) shipments respectively.

These charts suggest that, in terms of probability, NTM costs for RoRo are somewhat lower than their LoLo counterparts. A key contributory factor to this is that load sizes tend to be smaller for LoLo, meaning that the NTM costs incurred were spread across a smaller tonnage. Therefore, whilst delay-related costs may be more pronounced with RoRo when calculated on a £ per minute basis, driver-accompanied RoRo has an advantage when consignments arrive at the dockside insofar that loads can be quickly moved to the regulatory checking areas and tend not incur terminal handling fees associated with NTMs such as shunting costs, unless the load is selected for sampling.

That said, the potential impact of delays coupled with possible issues around driver permits in the event of an end to free-movement may necessitate a shift from driver-accompanied RoRo to unaccompanied RoRo post-Brexit. Whilst some industry experts suggest that indications of this shift are starting to emerge across trade generally, there is insufficient evidence to definitely state that this is occurring for beef and sheepmeat specifically.

It is noteworthy that the NTM costs are only slightly lower for frozen shipments versus their chilled counterparts when assessed on a probabilistic basis. For checked loads, however, chilled meat NTM costs are roughly two to three-times that of their frozen load equivalents given the influence of delay times and product value deterioration. For businesses shipping just a few loads per month (i.e. SMEs), such cost differences could exert a major influence in how they ship in the future. Some could focus more on frozen products or procure the services of a freight forwarder or another supplier to consolidate bulk and avail of special economic authorisations (e.g. AEO status) to reduce the impact of NTMs. There is some evidence that New Zealand suppliers work together to consolidate loads when exporting to the EU/UK. However, such practices would introduce inefficiencies into their operations when compared with the status quo, thus eroding margins. This could potentially mean that such businesses would be no longer competitive in certain export markets. Over time, this could lead to fewer suppliers in the market place or a re-focusing of efforts amongst some companies on the domestic UK market.

Figure 6-3 – Probability-Based NTM Costs for Third Country to UK Shipments (£/Tonne)

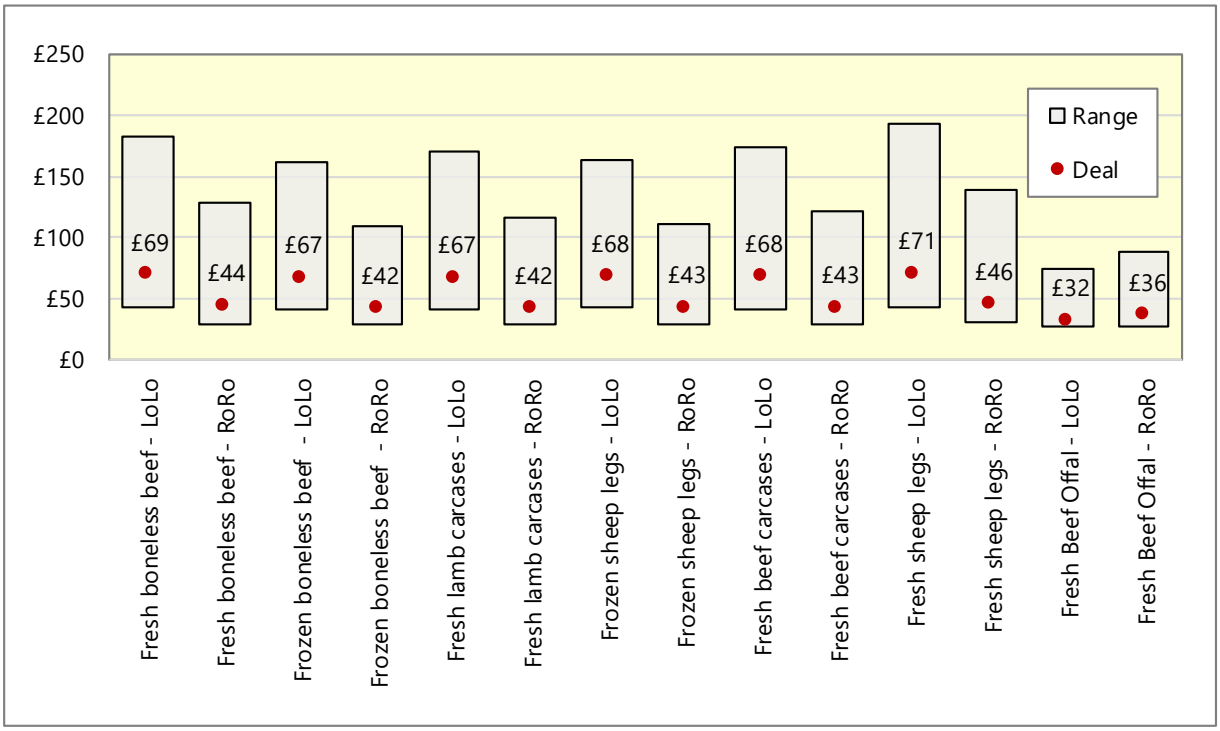


Source: The Andersons Centre (2019)

There is also a close degree of alignment in the projected NTM costs under a Brexit Deal (Deal) scenario across the various trade flows with respect to boneless beef and sheepmeat. NTM costs for UK exports to the EU27 are slightly higher (e.g. lamb carcases, beef offal) than for imports coming in the opposite direction although this is primarily due to the higher prices achieved by UK exports. However, the charts also suggest that if the UK takes a different attitude to its imports, than the EU does, then this would have significant implications for competitiveness. For instance, if the UK were to adopt a minimalist (Low scenario) approach to inspecting imports under a No Deal, whilst the EU adopted a stringent (default) regime then the disparity in terms of NTM costs would become substantial and would approach £100/tonne in a number of instances.

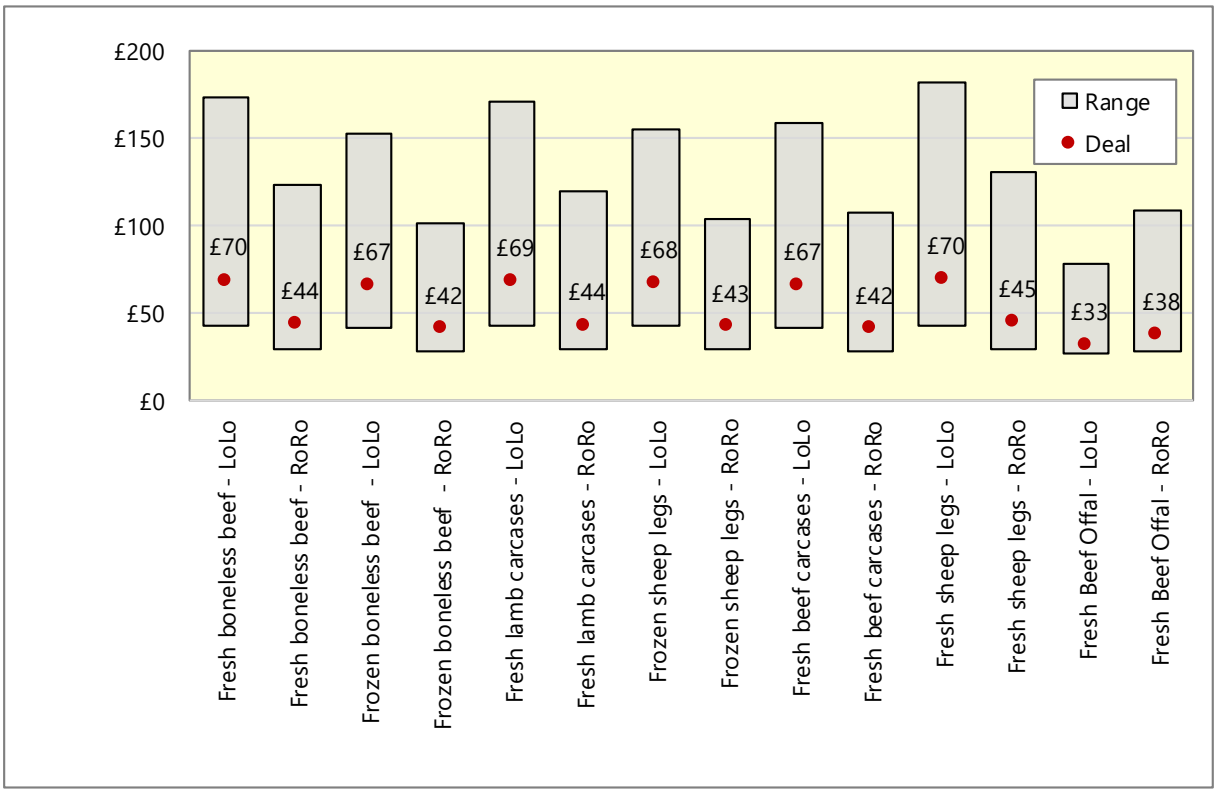
In addition to the six products that were covered in detail with respect to the NTMs analysis (where data were available), the UK-EU charts also include beef offal. There was insufficient trade data to conduct a similar assessment for third country to UK shipment. Whilst the cost per tonne estimates, ranging from £27-81 per tonne across all scenarios, suggest a lower degree of impact, as offal loads tend to be of lower value, prices range from £984/tonne (EU27 to UK) and £1,464/tonne (UK to EU27), the NTM costs in AVE term become more pronounced. Checked load NTM costs vary from 4.8% to 51.8%. When probability is considered, the AVEs range from 1.9% to 6.2%. This makes the impact of NTMs notably higher than the corresponding estimates for meat. It also underscores the importance of price when calculating NTM costs as well as assessing NTM costs from multiple perspectives (i.e. in monetary and AVE terms).

Figure 6-4 – Probability-Based NTM Costs for EU27 to UK Shipments (£/Tonne)



Source: The Andersons Centre (2019)

Figure 6-5 – Probability-Based NTM Costs for UK to EU27 Shipments (£/Tonne)



Source: The Andersons Centre (2019)

The pricing issue is also of relevance, when comparing the above NTM estimates with the NTB estimates, set-out in the Haverty (2017) study concerning the NI beef industry. NTM AVEs in that study which focused on No Deal, ranged from 3% to 5.7% in AVE terms, based on an average price per tonne of just under £3,830. Furthermore, the NTB estimates in that study also included input-related costs such as the cost of conducting official controls on beef inputs coming into NI from the Irish Republic as well as the impact on costs related to other key inputs used in the NI beef processing sector such as packaging and labour which added to the overall NTM costs projected.

Given the products selected for a detailed examination in this study and associated resources, it was not possible to include a detailed examination of inputs-related NTMs with the exception of administration time and a consideration for haulage-related delays. Furthermore, given the specific circumstances relating to NI where a significant proportion of shipments transit via the Irish Republic when being exported to the EU, there were additional cost impacts which would not be anticipated for UK (particularly GB) to EU trade generally. If such factors were considered, there would be much closer alignment between the NTM estimates provided above and the NTB estimates for NI beef set-out in the Haverty (2017) study.

Overall, the NTM estimates presented suggest that costs will rise across the beef and sheepmeat sectors. In an industry with wafer-thin margins this would place significant pressure on stakeholders, particularly as the extent to which these costs could be passed on to consumers is limited. Furthermore, for red-meat, there would be the added pressure exerted by alternative forms of protein being significantly cheaper. The overall impact of NTMs can be mitigated to a great extent by having a strong regulatory equivalence agreement in place with the EU which limits the extent of regulatory checks and gives the domestic food and farming sector time to adapt to the changes afoot.

6.7 FRICTIONLESS TRADE

As one of the project's objectives was to assess how close counties could get to so-called 'frictionless' trade post-Brexit, this section considers how such trade could be achieved, given the NTM results presented above.

Firstly, it is necessary to clarify that frictionless trade actually means. Essentially, it relates to traded goods being able to go through border-related controls (i.e. customs and official controls) without being subject to any regulatory checks, tariffs or quotas.

In an intra-EU trading context, frictionless trade is said to be achieved by being part of both the Single Market and the Customs Union. The Customs Union element ensures that a Common External Tariff (CET) is levied on all imports arriving into the EU from outside which are not covered by an FTA or a preference agreement (e.g. Africa, Caribbean and Pacific (ACP) agreement). As part of these arrangements, EU Member States must agree to a common governance structure and a mutually acceptable court which could intervene if these rules are breached. It was these structures that underpinned the European Common Market from 1958 to 1993.

However, the Common Market alone was deemed to be insufficient to achieve truly frictionless trade. This was brought about by the onset of the European Single Market in 1993. The 'Single Market' also guaranteed the free movement of goods, services, capital and labour. Conceptually, this resulted in the removal of internal borders or other regulatory obstacles to the free movement of goods and services within the EU.

In essence, it means that meat produced in Scotland and sold in Cornwall is subject to the same regulatory procedures as meat produced in Scotland and sold in the Rungis meat market in France. It, therefore, constitutes a level playing field between countries with respect to the movement of goods.

Importantly, as highlighted in the Literature Review, frictionless trade should not be confused with 'free-trade' which centres on goods being internationally traded on a tariff-free basis and mostly on a quota-free basis as well; however, agri-food goods in particular are often subject to quota restrictions even under a free-trade agreement (e.g. beef exports from Canada to the EU under the CETA agreement).

As the research presented above indicates, whilst regulatory barriers on intra-EU trade have been reduced to a minimal level, some regulatory barriers remain. An allowance for this has been made in the 'Current' UK-EU27 NTM costs listed above through the inclusion of official controls costs as well as a consideration for training to ensure that shipping staff remain abreast of regulatory developments at the EU level which the EU Commission[21] concedes can result in trade barriers materialising from time-to-time if Single Market rules are not properly understood nor implemented.

Across most meat categories such instances are minimal; however, the area where NTMs are most prevalent with respect to the beef and sheepmeat sector concern live animals' trade. Here, NTMs are already a feature of intra-UK trade. For instance, regulatory checks are required on movements of cattle and sheep from GB to NI because under the Good Friday Agreement (and subsequent accords), the island of Ireland is treated as a separate epidemiological area.

Based on work undertaken in previous studies, including Haverty (2017), projected NTM costs for live cattle range from approximately 2% to nearly 5%. For live sheep, the range would be similar but in a more stringent regulatory environment, could surpass 6% in AVE terms. Although NTMs currently exist on intra-EU trade for live animals, the costs are anticipated to be at the lower end of the ranges listed for cattle and live lambs. A Brexit Deal is likely to bring about increases in these costs whilst a No Deal would raise the NTM costs to the higher echelons of the ranges set-out above.

Chapter 8 provides further discussion on the extent to which frictionless trade is achievable post-Brexit which encompasses a consideration of the extent to which new technologies can help to achieve frictionless trade, based on the input obtained during this study.

[21] See: https://ec.europa.eu/growth/single-market/strategy_en

7 OVERALL TRADE BARRIER IMPACTS

Considering both the tariff and non-tariff impacts, as well as previous studies introduced by the Literature Review, this Chapter assesses the overall impact of Brexit on the UK's beef and sheepmeat trade. It firstly examines, from a trade-impact perspective, the results of selected previous studies under various Brexit scenarios. This is principally considered from the perspective of their applicability to the current situation and specifically the publication of the UK's proposed applied tariffs in the event of a No Deal Brexit in March 2019. Having identified the changes deemed most likely to take place in terms of output, exports and imports, a trade-impact assessment is then provided on how these changes are likely to affect UK trade, production and consumption. This provides a basis to consider the farm-level impacts and implications for the wider supply-chain in Chapter 8.

7.1 Assessment of Previous Studies on Trade Barriers to UK Beef and Sheepmeat Trade

The following three studies have been selected to inform the trade impact assessment presented in Section 7.2;

1. Hubbard et. al. (2019) study entitled "Brexit: How might UK Agriculture Thrive or Survive?"[22]
2. Bradley and Hill (2019) – quantitative Modelling of Post-Brexit Scenarios: Technical Report 2019 Update[23]
3. Haverty (2017) – Impact of WTO Trading on the Northern Ireland Beef and Sheepmeat Sector.[24]

These were then combined with the additional insights uncovered during this study, concerning tariffs, TRQs and NTMs, to quantify the estimated impact of Brexit under both a Deal and No Deal scenario.

7.1.1 Hubbard et. al. (2019) Study

This study, which was led by Newcastle University, incorporates the findings of two key modelling exercises to assess the impact of Brexit across several UK agri-food sectors from a trading perspective. These modelling approaches were;

a. **CGE Model** – a general equilibrium model assessing impacts on wider economy and at a sector level.
b. **UK-FAPRI modelling** – a partial equilibrium model demonstrating the sector level impacts. (This model is similar to that used by AFBI, 2017) and is considered to be an update of this work.

As the CGE model primarily focused on trade balances at a macroeconomic level, it was decided to concentrate on the outputs from the FAPRI model which provided more detailed information for the beef and sheepmeat sectors relating to production, prices and trade both in terms of imports and exports. The results from this study are presented in the context of three scenarios summarised in Table 7-1.

[22] See: https://research.ncl.ac.uk/esrcbrexitproject/outputs/Final%20Report%20Brexit%20and%20Agriculture%20March2019.pdf
[23] See: https://projectblue.blob.core.windows.net/media/Default/Imported%20Publication%20Docs/Horizon/Brexit%20Scenarios_Final%20Report_11April2019.pdf
[24] See: https://www.lmcni.com/site/wp-content/uploads/2017/09/LMC-Final-Report_31_Aug_17.pdf

Table 7-1 – Summary of Scenarios used by Hubbard et. al. Study

Free Trade Agreement (FTA) (Akin to Brexit Deal)	Unilateral Trade Liberalisation (UTL)	World Trade Organisation (WTO)
• Comprehensive UK/EU Free Trade Agreement with UK/EU tariffs at zero • UK adopts the EU common tariff schedule on Rest of World imports • UK maintains share of EU Tariff Rate Quotas applying to Rest of World imports. • Additional trade costs of 5% (livestock) and 2% (crops) for UK↔EU trade flows	• An extreme free-trade scenario. • Elimination of all UK import tariffs for Rest of World including imports from the EU. • UK-EU exports subject to EU Common Custom Tariffs (CCT) • TRQs on UK-EU exports (limiting exports to Baseline flows) • Additional trade facilitation costs of 10% (livestock) and 5% (crops) for UK↔EU trade flow	• No agreement upon Brexit, hence a fall back to WTO rules and current EU tariff schedules • UK trading with EU and Rest of World under Most Favoured Nation (MFN) tariffs • Requires a UK allocation of a share of the current EU tariff rate quotas with Rest of the World • Additional trade facilitation costs of 8 per cent (livestock) and 4 per cent (crops) for UK↔EU trade flows
Comment: this scenario is akin to Brexit Deal scenario used in this study.	**Comment**: given recent UK announcement on tariffs, tariffs on sheepmeat imports will be applicable. With a 230Kt beef TRQ with a zero tariff, imports under a No-Deal scenario would have some similar tendencies to UTL.	**Comment:** projections in this WTO scenario of relevance to Brexit No Deal. Allocations of TRQs also applicable. Imports of sheepmeat into UK likely to be similar to this scenario under No Deal. Beef imports will be more akin to UTL.

Source: Hubbard et. al. (2019)

Table 7-2 outlines the FAPRI modelling outputs with respect to the beef and sheep sector. As mentioned in Chapter 1, given that support is assumed to remain unchanged overall, the scenario results of the Hubbard et. al. study are presented on the basis that there is no change in support (hence the denotation "+" after each scenario). Overall, the results show that under a Brexit Deal-type scenario (denoted as FTA+), there is relatively little change with respect to domestic output and trade and any changes that do take place are brought about as a result of trade frictions principally created by non-tariff barriers.

In general, the impact on trade in a Brexit Deal scenario is projected to be relatively small. Admittedly, from a farm-level perspective increases in trade frictions are likely to have an impact on imported inputs and this issue is considered further in Chapter 8.

The more significant impacts on trade are associated with the No Deal scenarios. Under UTL, UK producers are forced to compete with cheaper prices from non-EU producers and this results in price declines of approximately 42% for beef – a reflection of the significant price differential that exists between the UK and cheaper markets such as Brazil for instance. The Hubbard study suggests that this in turn will lead to a 12% decline in UK production. In the WTO scenario, beef production is projected to rise by 11% as domestic UK production is protected by the EU Common External Tariff which as Annex I points out results in ad-valorem tariff equivalents ranging from 40% to over 90%. Given this level of tariff protection and the fact that competition from EU27 imports decreases significantly, cattle prices are projected to rise by 17% and this helps to drive an output value increase of 30%. Higher domestic prices also result in reduced consumption which is estimated to be 3% lower when compared with the baseline.

Unsurprisingly, given the high levels of tariffs imposed, exports to the EU decline by 100%, however, exports to non-EU also decline completely. *Given the TRQ arrangements which are anticipated to continue even under a No Deal scenario, it is perhaps surprising to some that UK export trade is completely wiped out; however, as the UK is uncompetitive vis-à-vis Latin America on price, its prospects for competing with such suppliers would become very limited. The UK could still potentially export nearly 64,000 tonnes of frozen beef to the EU via TRQs (on an Erga Omnes basis), albeit at significantly lower prices to cope with circa 20% tariffs under the TRQs and international competitors. Its exports of frozen beef during 2016-18 were just over 16,600 tonnes, thus suggesting the possibility of some trade continuing, particularly for the parts of the carcase not consumed domestically by British consumers.*

From an import perspective, trade with the EU once again gets wiped out. Whilst, it would be anticipated to decline substantially under No Deal, particularly given the relatively higher prices in the EU, there is TRQ availability of over 55,000 tonnes for frozen beef (albeit with a circa 20% tariff), and it is again arguable that some residual trade would continue with the EU, albeit at much lower prices.

Table 7-2 – FAPRI Modelling Outputs for Beef and Sheepmeat (% change versus Baseline)

Description	FTA+ (akin to Brexit Deal)	UTL+	WTO+
Beef			
Production	+1%	-12%	+11%
Domestic Use	0%	+16%	-3%
Exports	-1%	+1%	-100%
UK-EU	-1%	-6%	-100%
UK-Non-EU	-1%	+55%	-100%
Imports	-2%	+69%	-68%
EU-UK	-2%	-100%	-100%
Non-EU-UK	-3%	+1481%	+199%
Cattle Price	+1%	-42%	+17%
Output Value	+1%	-44%	+30%
Sheep			
Production	0%	-5%	-9%
Domestic Use	0%	+11%	+7%
Exports	-1%	-8%	-75%
UK-EU	-1%	-4%	-74%
UK-Non-EU	0%	-78%	-82%
Imports	0%	+41%	-15%
EU-UK	-1%	-100%	-100%
Non-EU-UK	0%	+59%	-4%
Sheepmeat Price	0%	-19%	-23%
Output Value	0%	-18%	-31%

Source: Hubbard et. al. (2019)

For sheepmeat under No Deal, production is anticipated to decline by 9% under the WTO scenario. This is unsurprising given that each year between 25-40% of the UK lamb crop is exported, and the EU accounts for around 95% of total exports. Under the WTO scenario, exports to the EU are projected to decline by 74%. With the limited TRQs available for the UK (circa 378 tonnes), it is perhaps puzzling that more pronounced declines did not occur. From an import standpoint, given that the UK would be potentially awash with sheepmeat, imports from the EU are predictably wiped out.

Although the UK's sheepmeat trade with non-EU countries is low, a decline in exports of 82% is projected under WTO as Britain is assumed to be trading with these countries on MFN terms. Over time, one would anticipate that new FTAs would be set-up which would help to develop new overseas markets. Imports from non-EU countries rise by a relatively small amount (4%).

Under UTL, as domestic producers face competition from lower cost producers on the world market, prices are estimated to decline by 19%. As a result, production is projected to fall by 5% whilst consumption rises by 11% as a result of the lower prices. To compensate for the decreased domestic production, imports from non-EU countries are estimated to increase by 59%, supported by TRQs, and EU imports are priced out of the market (thus falling by 100%).

Exports to the EU under UTL, are projected to decline by only 4% and this is a reflection of the TRQ that is assumed to be introduced to facilitate trade. Based on recent announcements and the EU's preparations under a No Deal scenario, the availability of a UK-EU TRQ to continue to support sheepmeat exports is arguably unlikely to occur. Therefore, the projections that exports of sheepmeat (and beef) to the EU continue under a WTO scenario, need to be treated with caution.

Overall, the Hubbard et. al. study, provides very useful insights into the potential impact of trade barriers and illustrates the likely modest impacts on trade if a Brexit deal can be reached. From a No Deal perspective, when the initial FAPRI modelling was undertaken (during 2018), there was a lot of uncertainty surrounding the UK's likely trade policy positions under a No Deal scenario. Developments since then have provided some clarity on a number of areas (e.g. UK's proposed applied tariffs under a No Deal scenario) which need to be considered further.

7.1.2 Bradley & Hill (2019)

This recently published Bradley and Hill study is an update of a similar report published in 2017 and uses a combination of a gravity model and a farm-level model to assess the impact of Brexit. Notably, the Bradley and Hill study considers the impact of the UK Government's recently announced import tariffs under a No Deal scenario. As the Bradley and Hill study was also commissioned by the AHDB, it uses the same basic scenarios as set out in Chapter 1 of this report.

Although much of the modelling focuses on the farm level (as opposed to trade generally or the wider supply-chain), it offers useful insights on the potential impact of Brexit on beef and sheepmeat sectors. It uses a gravity model to assess the impact of price changes and the resultant impact on domestic production and also incorporates FAPRI modelling analysis undertaken by Davis et. al (2017), a precursor to the FAPRI modelling work undertaken in the Hubbard et. al. (2019) study. However, it should be noted that for the gravity modelling, one commodity at a time is examined, so there is no account of the cross-effects between different commodities. A series of farm-level modelling exercises are also undertaken to assess the impact of various scenarios on farm business income.

As the trade impact component of this study drew upon a previous iteration of the FAPRI modelling discussed above and that the gravity modelling incorporating the UK's new proposed tariff schedule was primarily focused on price impacts, it was decided to focus on the projected price changes of selected

products as presented in Table 7-3 which also takes account of some slight amendments to the original Bradley and Hill (2019) projections as set-out recently by the AHDB[25].

Table 7-3 – Projected Price Changes on the Domestic Market – Selected Products (2022)

Sector	UK-EU FTA	WTO: UK Tariff Schedule
Wheat	+2.3%	+3.6%
Barley	-2.0%	-12.1%
Oats	+0.1%	-3.0%
Milk	+2.6%	+3.8%
Beef	+4.3%	-4.6%
Sheep	-5.0%	-25.0%
Pigs	+3.4%	-4.8%
Poultry	+1.5%	+2.3%
Livestock feed	+0.7%	-0.8%
Poultry feed	+1.3%	+1.1%
Fertilisers	+0.9%	+4.9%

Sources: Bradley and Hill (2019) and AHDB (2019)

For beef, prices are projected to rise by 4.3% under a UK-EU FTA and are projected to decrease by 4.6% under the WTO scenario, encompassing the UK's tariff schedule. Given that the UK is not self-sufficient in beef throughout that year and with the introduction of non-tariff measures under a UK-EU FTA, one would anticipate price increases to take account of the added trade facilitation requirements. However, the extent of the price increase is somewhat larger than the price increase reported by Hubbard et. al. (+1%). Under the WTO scenario, prices are projected to fall by 4.6% because although the UK would have MFN tariffs in place, there would also be a 230Kt TRQ which would be accessible by all countries, thereby subjecting the UK to increased competition from third countries. However, this competition would not be as pronounced as that envisaged by the UTL scenario presented by Hubbard et. al., where price declines of 42% were projected. That said, one must remember that there are questions about how the UK would treat imports from Ireland entering the UK via Northern Ireland in a No Deal scenario[26]. Some believe that whilst there is a 230Kt limit on TRQ imports, additional volumes of beef are likely to enter beyond this from a market (Ireland) where there would be an excess of supply, thus raising the potential for further downward pressure on UK prices.

For sheepmeat, as the UK produces a surplus for significant periods of the year and is heavily reliant on export markets in the EU, the projected price declines under both the FTA (-5%) and WTO (-25%) scenarios do not come as a surprise. That said, the FTA price decline is more pronounced than the Hubbard et. al. projections which forecasted no change. Under a No Deal scenario both the Bradley and Hill and Hubbard et. al. (-23%) projections are closely aligned.

The Bradley and Hill study also provided price projections for key inputs and for livestock feed projected slight price rises (0.7%) under a UK-EU FTA but a 0.8% fall under the WTO scenario, which reflects the

[25] See: https://projectblue.blob.core.windows.net/media/Default/Imported%20Publication%20Docs/Horizon/Understanding%20Brexit%20an%20impact%20assessment_final11April2019.pdf

[26] See: https://www.gov.uk/guidance/eu-exit-avoiding-a-hard-border-in-northern-ireland-in-a-no-deal-scenario

lower tariffs under the UK's proposed applied tariff schedule and different movements in respect to the prices of feed ingredients.

Fertiliser costs are also forecast to rise by 0.9% in the FTA scenario and by 4.9% under WTO. As the UK is a net importer of fertiliser, additional trade facilitation costs (e.g. customs declarations etc.) would lead to some price rises even under an FTA. Under WTO, the Bradley and Hill study mentioned that imports from the EU would be subject to a 6.5% tariff, thus leading to more pronounced price increases.

The Bradley and Hill research provides helpful projections on the direction of prices under both a Brexit Deal and a No Deal (based on UK tariffs) scenario. A key driver for many of the changes arises from the introduction of trade facilitation costs (5% for livestock products under FTA and 8% under WTO) and these costs are based on assumptions used in studies compiled some time ago. It is arguable that it is time for more scrutiny on these trade facilitation (or NTM) costs to get a more accurate understanding of their impact.

7.1.3 Haverty (2017)

This study, conducted in collaboration with Oxford Economics used the GTAP trade model (a top-down computable general equilibrium model) to assess the impact of WTO trading conditions on the UK and Northern Irish beef and sheep meat sector under two No Deal scenarios;

1. **WTO Equivalence:** reflects the imposition of the Common External Tariff (CET) by both the UK and the EU with respect to cross-border trade. The scenario is broadly similar to the WTO scenario presented in the Hubbard et. al. study above.
2. **WTO Open Door Trade Policy:** concerns the unilateral abolition of UK tariffs, however, tariffs on UK exports to the EU remain in place. This scenario is somewhat similar to the UTL scenario presented above, although there is no allowance for trade conducted via TRQs (and therefore subject to low or zero tariffs) on exports from the UK to the EU27.

The modelling process itself was run at a UK level, reflecting the constraints of the available modelling frameworks and Table 7-4 presents the key results from both a NI and UK perspective against the 2016 baseline.

The findings were presented on the sectoral impact in terms of groups of headline metrics related to economic activity including trade amounts (both exports and imports presented in £ terms) and consumer spending. To assess the impact on the output of the sector the change in Gross Value Added (GVA) was estimated. GVA is the metric used by statisticians and economists to measure a sector's contribution to GDP. This measure can be most easily understood as equal to an industry's turnover less the cost of bought-in goods or services or intermediate consumption. For the purposes of the Haverty study, the percentage changes to GVA were also assumed to apply to the output of the UK beef and sheep meat sector.

The following were the key conclusions under each scenario:

WTO Equivalence

- **Output:** projected to rise slightly (by 0.7%) in the short-run following Brexit. Despite this positive, it was highlighted that consideration needed to be given to the extent to which UK consumers would tolerate price rises that would come about under such a scenario and the long-term commitment of UK Government to continue such a policy, given the need to pursue free trade deals with other countries (who would likely demand more access for food products).

- **Exports:** to foreign (non-UK) markets were forecast to fall by 82% on aggregate with EU-bound exports projected to shrink by 93%. Exports to non-EU were projected to offset this only every slightly.
- **Imports:** from the EU into the UK were estimated to fall by 85%, due to domestic (NI and GB) produce displacing imports because of the UK imposing the CET.

Open-Door Trade Policy:

- **Output:** forecast to decline by almost 21% which would have a devastating impact as UK producers would struggle to compete with imports from around the world. Total imports were forecast to rise by 11.7% and would have serious repercussions for processors and the wider rural economy.
- **Exports:** aggregate 78.8% decline projected with EU exports to decline by 91.5%. Exports to non-EU would only slightly offset this.
- **Imports:** from the EU forecast to decline by 62%. Although some EU imports were expected to continue to gain access to the UK under an Open-Door trade policy they would be mostly replaced by more competitive non-EU imports which were projected to soar by 166%.

Table 7-4 – Summary Impact of WTO Trading on NI and UK Beef and Sheepmeat Sectors

	Baseline	WTO Equivalence		Open-Door Trade Policy	
Indicator	**2016 – (£m)**	**% Change**	**Forecast (£m)**	**% Change**	**Forecast (£m)**
NI exports to the EU	205.7	-92.9%	14.6	-91.5%	17.5
NI exports to the ROW	25.3	5.1%	26.6	24.2%	31.4
Total value of NI exports	231.0	-82.2%	41.2	-78.8%	48.9
UK imports from the EU	1,101.4	-85.2%	162.5	-62.1%	416.9
UK imports from the ROW	525.0	30.9%	687.1	166.6%	1,399.7
Total value of UK imports	1,626.4	-47.8%	849.6	11.7%	1,816.6
UK consumption of domestically produced (UK) beef and sheep meat products	5,023.6	14.7%	5,759.6	-4.0%	4,822.1
UK consumption of NI produced beef and sheep	869.0	22.8%	1,066.9	-5.5%	821.1
NI beef and sheep meat turnover	**1,100.0**	**0.7%**	**1,108.1**	**-20.9%**	**870.0**

Sources: Oxford Economics and The Andersons Centre (2017)

When compared with other studies, the Haverty study also reveals substantial declines in exports to the EU (surpassing 90% for NI). This is somewhat lower than the FAPRI projections (-100%) and relates to the fact that edible offal was also included. Imports from the EU also drop substantially (by 62-85%) whilst imports from non-EU rise, particularly under an Open-Door trade policy as world prices out-compete both EU imports and domestic producers.

The Haverty study also conducted a bottom-up assessment of non-tariff barrier costs focusing on four key areas – official controls, customs and transport, administrative costs and value deterioration. These costs impacts were applied to the Northern Irish beef and sheepmeat industry and are summarised in Table 7-5. Total NTB costs were projected at 3.0% under a WTO Equivalence (Default) scenario and would rise to 5.7% under an Open-Door trade policy when expressed as a proportion of sales to the EU27 (circa

£195 million). This was primarily due to increased value deterioration arising from higher sampling rates as well as higher official controls costs.

Table 7-5 – Summary of NTB Costs for Northern Ireland Beef and Sheepmeat Sector

NTBs on Inputs	WTO Equivalence	Open-Door Trade Policy
Official controls	£430,601	£683,145
Customs and transport	£316,541	£786,742
Other	£251,578	-£251,578
Sub-Total (Inputs)	**£998,720**	**£1,218,308**
NTBs on Outputs		
Official controls	£1,479,914	£2,170,886
Customs and transport	£726,141	£890,795
Administrative	£104,395	£139,193
Value deterioration	£2,543,901	£6,701,507
Sub-Total (Outputs)	**£4,854,351**	**£9,902,380**
Overall Total	**£5,853,072**	**£11,120,688**
NTBs as % of Industry Costs	**3.0%**	**5.7%**

Source: The Andersons Centre (2017)

The Haverty study suggests that whilst the projected NTB impacts are in the same ballpark as the studies presented above, the projected costs under a WTO default scenario could be somewhat lower than the 8-10% assumptions presented previously. Even under WTO default, its 3% projection is lower than the 5% assumed under an FTA by others. Admittedly, the Haverty study did not exhaustively cover all potential aspects of non-tariff costs, however, it is believed that the key cost categories were covered. The results revealed the need for a more thorough assessment of the impact of non-tariff costs as opposed to top-level assumptions surrounding their impact.

7.2 Trade Impact Analysis by Scenario

Drawing upon the results of previous studies, as well as the analysis of NTM costs undertaken in Chapter 6, this section quantifies how UK beef and sheepmeat and their associated offal would be affected under both scenarios. The supply-chain implications (including farm-level) are assessed in Chapter 8.

7.2.1 Beef and Sheepmeat – Brexit Deal

Similar to previous studies, the projected impacts on beef and sheepmeat output (in volume terms) and trade under a Brexit Deal scenario are projected to be relatively minor as depicted in Table 7-6.

Beef – Trade

For beef, the main impact will be the influence of non-tariff measures (NTMs) which are projected to lead to an increase in the costs of conducting trade with the EU which equates to approximately a 0.9% tariff equivalent cost increase for exports and a 1% increase on imports. For modelling purposes, it was assumed that the full extent of the increase in NTM costs would be passed on to the consumer. In reality, as other studies have pointed out[27], it is likely that some of the cost impacts would be borne by other stakeholders, most notably producers. However, given that the overall extent of the increase in NTM

[27] See: http://www.uecbv.eu/UECBV/documents/BrexitMeatreport12373.pdf

costs is relatively small and that industry profit margins are tight (less than 5%), it is believed that a full allocation to consumers is permissible.

Having estimated the extent to which NTMs would affect consumer prices of internationally traded products, six-digit import elasticity data derived from Ghodsi et. al. (2016)[28] were then applied to gauge the impact of NTMs on the volumes of imports and exports traded with the EU27. For UK exports to the EU, the import elasticity scores of selected beef commodities (i.e. 020110, 020120, 020130, 020230) were combined with the weighted average of exports to France, Ireland, Germany, Belgium and the Netherlands to derive a weighted average elasticity score of -1.09%.

Although import elasticities have been used in this study to gauge the potential impact of trade barriers with respect to UK-EU trade post-Brexit, there are shortcomings relating to their use which must be acknowledged. In particular, import elasticity estimates capture competition between domestic production and imports in general (imports from all sources treated as an imported good). It can be argued that the estimates are too low for a specific importer facing specific increased costs because, in addition to the UK's exports becoming more expensive relative to EU domestic production, they also become more expensive relative to other exporters. Thus, in addition to the import elasticity effects (circa -1%) cited here, there will be a substitution effect away from the UK to other exporters, which would greatly magnify the low 1% elasticity estimates used in this study. It is believed that these substitution effects are a key explanatory factor in the larger trade differences shown by other (more complex) models and the estimates derived in this study. Despite this shortcoming and bearing in mind the time and resource constraints of this study, import elasticities are still of some assistance in providing guidance on the overall direction of travel of trade as a result of trade barriers being imposed.

As a result, UK beef exports to EU markets are projected to decline by 0.9%. Trade with non-EU markets is not anticipated to change. This is because any existing agreements that the EU28 has struck with other countries are anticipated to be rolled over whilst NTM effects are already a factor in the UK's trade with third countries. In total, exports of beef and sheepmeat products combined are forecast to fall by 1.1% due to additional friction on UK-EU trade.

Whilst exports to the EU are also likely to be curtailed, as trade with non-EU countries is not anticipated to be subject to any additional regulatory barriers in the event of a Brexit Deal, the projected impact on trade flows to these countries is believed to be negligible. However, it must be noted that the influence of exchange rates has not been considered in this analysis and any strengthening of Sterling brought about by a Brexit Deal would make UK exports less competitive on international markets, thereby reducing the prospects for exporting (but such a move would encourage imports *ceteris paribus*).

For imports into the UK from the EU, the weighted averages of selected beef commodities (i.e. 020110, 020120, 020130, 020230) were used to derive a weighted average import elasticity score of -1.04%. As a result, imports from the EU are forecast to decline by 1%, again principally driven by NTM impacts. With imports from non-EU countries once again not anticipated to change significantly.

[28] See: https://wiiw.ac.at/import-demand-elasticities-revisited-dlp-4075.pdf

Table 7-6 – Projected Impacts on Beef and Sheepmeat Output under a Brexit Deal ('000 Tones)

	Beef			Sheepmeat			Total Beef & Sheepmeat		
Measure	**Base**	**Deal**	**% ch**	**Base**	**Deal**	**% ch**	**Base**	**Deal**	**% ch**
UK Production	**914.3**	**916.9**	**0.2**	**292.9**	**290.0**	**-1.0**	**1,207.2**	**1,206.1**	**-0.1**
Exports	**108.8**	**108.0**	**-0.8**	**83.7**	**82.4**	**-1.5**	**192.5**	**190.4**	**-1.1**
To EU	95.9	95.1	-0.9	79.4	78.2	-1.6	175.4	173.3	-1.2
To Non-EU	12.9	12.9	0.0	4.3	4.2	0.0	17.2	17.2	0.0
Imports	**276.2**	**273.6**	**-0.9**	**82.4**	**82.0**	**-0.5**	**358.6**	**355.6**	**-0.8**
EU	258.6	256.0	-1.0	12.9	12.6	-2.9	271.5	268.6	-1.1
Non-EU	17.6	17.6	0.0	69.5	69.5	0.0	87.0	87.0	0.0
Estimated Consumption	**1,081.6**	**1,081.7**	**0.0**	**291.6**	**289.6**	**-0.7**	**1,373.2**	**1,371.3**	**0.1**

Sources: The Andersons Centre (2019), AHDB, HMRC and Defra

Beef – Domestic Production and Consumption

Under a Brexit Deal, a minimal rise (0.2%) of UK beef output is projected. Although the imposition of NTMs will make EU imports less competitive and should encourage some domestic production, the response is not anticipated to be proportional. Higher prices would lead to an increased propensity amongst consumers to consider substitute (and often cheaper) forms of protein. Furthermore, input from the primary research shows that, as the UK is not self-sufficient in beef production, markets will be found domestically for these previously exported volumes, however, prices would not be as lucrative as on EU markets. Therefore, the scope for domestic producers to avail of price increases brought about by the imposition of NTMs would be limited. Accordingly, overall consumption is forecast to remain relatively unchanged under a Brexit Deal scenario.

Sheepmeat – Trade

A similar process was undertaken for assessing the impact on sheepmeat trade. Firstly, a weighted import elasticity score (using HS codes 020410 and 02442) of -0.81% was derived for exports to the EU and taken in conjunction with the price rises forecast due to the imposition of NTMs, exports to the EU are projected to decline by 1.6%.

For imports into the UK, the same methodology was used. This incorporated an import elasticity score of -0.81% and additional NTM costs of 2.9%. As a result, imports from the EU are forecast to decline by 2.9%. Once again, imports from non-EU markets were not projected to change significantly as existing NTM barriers and TRQs (apportioned to the UK) would remain in place.

Sheepmeat – Domestic Production and Consumption

Sheepmeat production is much more heavily reliant on exports to the EU and the opportunities to supplant imported produce with domestic production are more limited. This is mainly due to seasonality and consumer preferences (lamb preferred to mutton throughout the year). Accordingly, any increase in trade friction with the EU is expected to lead to some decreased production. As Table 7-6 depicts, sheepmeat production is estimated to decline by 1% which is in line with previous studies, particularly Hubbard et. al. (2019).

Beef and Sheepmeat – Overall Impact

Taken together, production of beef and sheepmeat combined is estimated to decline by 0.1% under a Brexit Deal scenario. A similar decline is also projected for consumption. These projections reflect the influence of additional regulatory frictions being imposed on UK-EU trade post-Brexit.

Overall exports in a Brexit Deal scenario are projected to reduce by 1.1% whilst imports are forecast to decline by 0.8%. One could therefore conclude that the overall impact on beef and sheep carcase meat trade is relatively minor.

7.2.2 Offal – Brexit Deal

Table 7-7 shows the projected impacts of a Brexit Deal for beef and sheepmeat offal. Once again, the overall impacts are projected to be relatively minor. Following on from the beef and sheepmeat section above, below are additional noteworthy points concerning offal.

- **Production:** these estimates have been derived based on an analysis of the relationship between carcase meat production and edible offal production. For beef offal, edible offal production is estimated to equate to 6% of beef carcase meat production whilst for sheepmeat offal, it is estimated to equate to 6.5% of carcase production under a Brexit Deal scenario.
- **Trade with EU27:** similar to the previous section, trade impacts are primarily focused on shipments to and from the EU27 as there is assumed to be minimal impact on non-EU trade. As outlined in Chapter 6, the NTM costs for offal are estimated at 2.6% AVE for exports to the EU27 with a corresponding AVE of 3.9% for imports. These were assumed to lead to a proportionate increase in prices and based on the weighted elasticity scores derived from the Ghodsi et. al study of -0.31% for exports to the EU27 and -0.05% for imports into the UK, (relating to HS code: 020610 which was assumed to apply to both beef and sheepmeat offal), this lead to decreases in UK exports to the EU27 of 0.8% and corresponding imports declined by 0.2%.
- **Trade with non-EU:** as offal is a subsidiary product whose output is primarily determined by the amount of carcase meat produced, it is projected that any decrease in trade with the EU will primarily be substituted by an increase in trade with non-EU markets, as consumers in these markets have a higher propensity to consume these products as opposed to British consumers. Accordingly, it is anticipated that the majority of any decrease in exports to the European Union would be compensated for by increased exports to non-EU regions.
- **Consumption:** as consumption is derived from domestic and trade (plus imports, minus exports), the resultant impact leads to a 0.5% increase in beef offal consumption in the UK and a 0.9% decline in sheepmeat offal consumption. In the case of beef, this is a relatively minor increase and a reflection of the fact that despite more domestically produced offal being potentially available, due to a decrease in exports to the EU27, demand is projected to stay at a relatively consistent level. Overall, total offal consumption is projected to be marginally (0.2%) lower and is primarily a function of the decline in the availability of sheepmeat as discussed in the previous section.

Table 7-7 – Projected Impacts on Beef and Sheepmeat Offal under Brexit Deal

	Beef Offal			Sheepmeat Offal			Total Offal		
Measure	**Base**	**Deal**	**% ch**	**Base**	**Deal**	**% ch**	**Base**	**Deal**	**% ch**
UK Production	**54.9**	**55.0**	**0.2**	**19.0**	**18.9**	**-1.0**	**73.9**	**73.8**	**-0.1**
Exports	**43.1**	**43.1**	**-0.1**	**6.1**	**6.1**	**-0.5**	**49.3**	**49.3**	**-0.1**
To EU	21.2	21.0	-0.8	3.5	3.5	-0.8	24.8	24.6	-0.8
To Non-EU	21.9	22.1	0.7	2.6	2.6	0.9	24.5	24.7	0.7
Imports	**11.8**	**11.8**	**-0.2**	**7.9**	**7.9**	**0.0**	**19.8**	**19.8**	**-0.1**
EU	11.8	11.8	-0.2	1.0	1.0	-0.2	12.8	12.8	-0.2
Non-EU	0.1	0.1	0.0	6.9	6.9	0.0	7.0	7.0	0.0
Estimated Consumption	**23.6**	**23.6**	**0.5**	**20.8**	**20.6**	**-0.9**	**44.4**	**44.3**	**-0.2**

Sources: The Andersons Centre (2019), AHDB, HMRC and Defra.

7.2.3 Beef and Sheepmeat – No Deal

Similar to previous studies, this study found that a No Deal Brexit would have a substantial impact on trade with the EU27, as depicted in Table 7-8 for beef and sheepmeat.

Beef – Trade

Exports to the EU27 are projected to decrease by 87%, primarily due to the imposition of the EU Common External Tariff (CET). As alluded to in section 5.3, whilst the UK would potentially have access to 63,480 tonnes of beef via a TRQ, there are restrictions in terms of the types of meat that could be exported as only frozen meat would be eligible. Looking at historic exports of frozen beef to the EU27, this averages at 16,627 tonnes over the 2016-18 period. As primary research feedback suggests that any previously exported volumes of chilled beef exported to the EU would be used domestically, it has been assumed that only frozen beef would be exported to the EU via TRQ. These exports would be subject to a 20% tariff and added to this, there would be an NTM impact of 1.9% in AVE terms. In effect, this would mean a 21.9% tariff-equivalent increase in the price of UK exports. Taking account of the weighted elasticity score on beef imports into the EU (1.04%), this would mean that 12,850 tonnes would be exported to the EU in a No Deal scenario equating an 87% decrease on the baseline.

Exports to non-EU markets are projected to increase by 5% which is similar to the findings of previous studies (e.g. Haverty (2017)); however, this increase will not replace the lost trade with the EU because UK prices are significantly higher than world market prices.

With regards to imports, a severe (92%) decline in trade with the EU27 is projected. Conversely, imports from non-EU countries are projected to rise dramatically by 1,329%. The key reason for this is the imposition of a 230Kt TRQ by the UK which would be available to **all** beef suppliers, provided they can meet the UK's sanitary standards. In addition to the new 230Kt TRQ, it is also noteworthy that there would be an additional 55,098 tonnes of existing EU28 TRQ which would be allocated to the UK (subject to a 20% tariff) and would be also be available to all countries. For the purposes of this study, it has been assumed that the EU27 would access half of this 55Kt TRQ which would also be subject to NTMs, estimated at 2%, thereby resulting in a tariff-equivalent price increase of 22% for EU imports. Taking account of the UK's import elasticity score of 1.09% on beef imports, imports from the EU are projected at 21,254 tonnes.

It must be highlighted that these estimates do not consider the prospect of beef from the Irish Republic entering the UK via Northern Ireland where there would be no hard border imposed. At present, beef prices in the Irish Republic are significantly higher than their global counterparts but 90% of Ireland's beef produce is exported, with the UK accounting for half of this amount. With the prospect of losing 45% of its market under a No Deal scenario, Irish prices could plummet, thus creating a large divergence between its prices and those in the UK which would continue to be somewhat insulated for any out-of-quota imports. If there is no hard border on the island of Ireland, nor on the Irish Sea between NI and GB, this produce could easily find its way into the British market, particularly if significant arbitrage opportunities emerged. The scope for such 'backdooring' is very difficult to quantify at this juncture, but it could exert a significant influence on UK beef trade.

Beef – Domestic Production and Consumption

Based on the above assumptions around the imposition of TRQs, UK production is not anticipated to change under a No Deal scenario as it would be relatively insulated beyond current import levels. That said, the prospect of price pressure being exerted by non-EU imports (via TRQs) is noteworthy and such pressure could be exacerbated by imports from the Irish Republic finding their way into the UK via Northern Ireland.

UK beef consumption in a No Deal scenario is forecast to rise by 7%. Lower prices on imports from non-EU countries would be anticipated to increase consumers' propensity to consume beef whilst previously exported volumes to the EU would be sold on the UK domestic market, albeit at lower prices. Therefore, from a volumetric perspective, it would appear that demand for beef would increase; however, the extent to which the UK could benefit from this is questionable as prices are likely to be driven lower.

Sheepmeat – Trade

As Table 7-8 shows, exports to the EU27 would almost be completely wiped-out in a No Deal scenario, falling by 99.7%. Any exports that would take place would be via a TRQ which would be less than 400 tonnes once the NTM impacts (5%) are considered. Whilst exports to non-EU markets would increase, these again would be relatively small (circa 5%), meaning that there would be a significant gap with respect to finding markets for UK produce.

Reduced imports, projected to decline by 15%, could help to partially mitigate this issue as imports from the EU (-98.5%) would also be nearly completely wiped out. Imports from non-EU markets are not projected to decline. This is due to a combination of seasonality and internationally competitive prices. Imports from New Zealand which account for the vast majority of sheepmeat imports tend to peak in February to April (in advance of Easter) and are also noticeable in the lead-up to Christmas. Primary research feedback suggests that this trend is unlikely to change significantly, particularly because UK consumers prefer young (spring) prime lamb, coming from New Zealand, as opposed to older prime lamb which tends to be supplied by British producers during the late autumn/winter period. In addition, there are quantities of mutton (from ewes and rams) which are also produced during this period but are generally not accepted by UK consumers due to their stronger flavour.

Whilst research participants suggested that there could be some scope for the UK to deploy advanced packaging techniques for example to supply more of the prime lamb market on a year-round basis, the price incentives are not currently in-place to achieve this.

Sheepmeat – Domestic Production and Consumption

UK consumption is projected to increase by around 14% in a No Deal scenario, primarily driven by lower-priced lamb becoming more attractive to consumers. That said, domestic production would also experience declines, forecast to be approximately 9%. This decline is similar to that projected by Hubbard et. al. (2019).

Table 7-8 – Projected No Deal Impacts on Beef and Sheepmeat Output and Trade ('000 Tones)

	Beef			Sheepmeat			Total Beef & Sheepmeat		
Measure	**Base**	**No Deal**	**% ch**	**Base**	**No Deal**	**% ch**	**Base**	**No Deal**	**% ch**
UK Production	**914.3**	**914.3**	**0**	**292.9**	**266.6**	**-9**	**1,207.2**	**1,180.8**	**-2.2**
Exports	**108.8**	**26.4**	**-76**	**83.7**	**4.8**	**-94**	**192.5**	**31.2**	**-83.8**
To EU	95.9	12,8	-87	79.4	0.4	-99.7	175.4	13.2	-92.5
To Non-EU	12,9	13.6	5	4.3	4.4	5	17.2	18.0	5.1
Imports	**276.2**	**272.5**	**-1**	**82.4**	**69.7**	**-15**	**358.6**	**342.2**	**-4.6**
EU	258.6	21.3	-92	12.9	0.2	-98.5	271.5	21.5	-92.1
Non-EU	17.6	251.3	1,329	69.5	69.5	0	87.0	320.7	268.5
Estimated Consumption	**1,081.6**	**1,160.4**	**7**	**291.6**	**331.4**	**14**	**1,373.2**	**1,491.8**	**8.6**

Sources: The Andersons Centre (2019), AHDB, HMRC and Defra

Beef and Sheepmeat – Overall Impact

Taking both sectors combined suggests that whilst consumption is projected to increase by 8.6%, production is forecast to decline by 2.2%. Any increase in the use of domestic produce by British consumers would be due to previously exported volumes being sold on the domestic market. Overall, the results suggest that there would be a contraction in the combined UK beef and sheepmeat sector post-Brexit with sheepmeat being the most severely affected.

7.2.4 Offal – No Deal

Table 7-9 reveals that in contrast to beef and sheepmeat, the impact of a No Deal Brexit on offal trade is substantially less pronounced. This is primarily because the impact of tariffs is much less severe, with only beef thin skirts subject to significant tariffs.

- **Production:** as is the case under a Brexit Deal, offal production is derived from beef and sheepmeat carcase output. Accordingly, beef offal production is projected to be unchanged whilst sheepmeat offal production is forecast to decline by 9%.
- **Trade with EU27:** is projected to decrease with beef offal exports an estimated 6.5% lower whilst imports would decline by 25%. The key driver for this is the fact that beef thin skirts have been classified as offal and are subject to prohibitive tariffs. The remaining beef offal trade which would only be subject to NTM costs (5.5% for exports and 8.2% for imports) are projected to experience minimal declines once the import elasticity estimates (-0.31% for imports into EU27; -0.05% for imports into UK) have been factored into the calculations. Small declines are also projected for sheepmeat offal although the decline (2.6%) in imports from the EU is slightly more pronounced than for exports (-0.2%) due to NTM costs being higher for the former.
- **Trade with non-EU:** is projected to increase for exports by 8.1% and 5.1% for beef and sheepmeat offal respectively. Again, these increases reflect the rises estimated by previous

studies. Imports of beef offal are forecast to rise by 167%, but as this is from a very low base, it still works out to be small in absolute terms.

- **Consumption:** would decline by an estimated 13.8% for beef offal and 8.3% for sheepmeat offal. Reduced processing activities utilising imports from the EU would exert a significant influence. It is also anticipated that increased consumption of beef and sheepmeat (available at lower prices) would be a driver of the projected declines. As a result, combined offal consumption is forecast to fall by just over 11%.

Table 7-9 – Projected No Deal Impacts on Beef and Sheepmeat Offal ('000 Tones)

	Beef Offal			Sheepmeat Offal			Total Offal		
Measure	**Base**	**No Deal**	**% ch**	**Base**	**No Deal**	**% ch**	**Base**	**No Deal**	**% ch**
UK Production	**54.9**	**54.9**	**0.0**	**19.0**	**17.3**	**-9.0**	**73.9**	**72.2**	**-2.3**
Exports	**43.1**	**43.5**	**0.9**	**6.1**	**6.2**	**-0.2**	**49.3**	**49.7**	**0.8**
To EU	21.2	19.8	-6.5	3.5	3.6	-0.3	24.8	23.4	-5.6
To Non-EU	21.9	23.7	8.1	2.6	2.6	5.1	24.5	27.3	7.2
Imports	**11.8**	**9.0**	**-24.2**	**7.9**	**7.9**	**-0.3**	**19.8**	**16.9**	**-14.6**
EU	11.8	8.8	-25.0	1.0	1.0	-2.6	12.8	9.8	-23.3
Non-EU	0.1	0.1	166.6	6.9	6.9	0.0	7.0	7.1	1.3
Estimated Consumption	**23.6**	**20.3**	**-13.8**	**20.8**	**19.1**	**-8.3**	**44.4**	**39.4**	**-11.2**

Sources: The Andersons Centre (2019), AHDB, HMRC and Defra

7.3 Price and Output Impacts

As the trade impact modelling approach of this study has chiefly focused on traded volumes of beef and sheepmeat and has estimated the impact on future quantity demanded under each Brexit scenario using import elasticities, there was limited scope to quantify the impact on prices across the entire UK market (i.e. encompassing both the domestic market and exports and imports). This is because to conduct a thorough assessment of price across the entire market would have required a more in-depth study which would have required significant additional resources to quantify issues such as;

- Cross-price elasticities of demand, particularly for substitute protein sources (e.g. poultry meat and pig meat) which have not been assessed in terms of a No Deal scenario incorporating the UK's proposed WTO tariffs.
- Projected production and consumption trends for substitute products under both Brexit scenarios.
- Consideration of wider economic impacts under each scenario and implications thereof for consumer spending of food encompassing meat.
- Breakdown of UK beef and sheepmeat consumption by individual product (e.g. fresh boneless beef, frozen boneless beef etc.).
- Influence of exchange rate changes which are likely to exert major influences on future prices, consumption and production.
- Farmers' reactions to all of the above as well as potential changes to input prices.

7.3.1 Price Impacts

That said, the potential price impacts have been considered in this study and factored into the farm-level analysis undertaken in the next Chapter. The projections are presented in Table 7-10 for beef and

sheepmeat. These draw upon the insights gained from previous studies, industry and expert analysis on the likely impact of tariffs and NTMs as well as general consumption trends.

Table 7-10 – Projected Price Impacts Under Each Brexit Scenario

Sector	Brexit Deal	No Deal
Beef	-1%	-4%
Sheepmeat	-3%	-24%

Source: The Andersons Centre (2019)

Beef prices, particularly at the farm-level, are projected to decline by approximately 1% under a Brexit Deal scenario. Whilst this may sound counter-intuitive to some, especially as EU27 imports are subject to NTM costs, it must be balanced against the fact that prices achieved for exports to the EU27 tend to be higher than for corresponding cuts on the UK market based on the industry input provided during this study. Coupled with this, beef (and sheepmeat) consumption is stagnant in the UK and any declines in consumers' purchasing power, which the imposition of NTMs are likely to impose, would lead to dynamic effects across the supply-chain. Accordingly, there will be a reluctance to pass-on such increases to consumers and as farmers are price-takers, they are more likely to be subject to price pressures.

For sheepmeat, as a greater proportion of output is exported, this may lead to more pronounced price declines as the UK industry strives to grow the domestic market. In this context, a 3% price decline is projected under a Brexit Deal scenario.

Under No Deal, the price declines are more evident, especially for sheepmeat as around 20% of annual kills are severely exposed to the EU27 export market being almost wiped out. Added to this, there will also be pressure on some more marginal sheepmeat cuts which were also exported to the EU27. With a significant increase in domestically produced volumes on the UK market struggling to find a home, the scope for significant price erosion becomes more likely. Based on this, the authors have calculated a 24% price decline which is similar to the price declines of other studies.

For beef, price declines for most carcases are projected to be in the region of 4%. Whilst the UK will be somewhat insulated as a result of import TRQs, it will be exposed to more non-EU volumes entering the market at a lower price. This is likely to lead to more pressure on the lower-end market in particular. Once again, it must be emphasised that an open (backdoor) border via Ireland has not been factored into these estimates. If that happens price declines could be much more pronounced.

7.3.2 Output Impacts

To give an indication of the likely impact on domestically produced output, 2017 production figures (home-fed production (dressed carcase weight) and monetary value of production) from Defra's Agriculture in the UK publication[29] were used to provide a top-level comparison under each scenario. The results are presented in Table 7-11. It shows the projected absolute changes in sales taking account of the volume changes for beef and sheepmeat outlined above in sections 7.2.1 (Brexit Deal) and 7.2.3 (No Deal) and price changes (see Table 7-10) to derive estimates of percentage change in sales under each scenario.

Under a Brexit Deal, total revenues are forecast to decline by 1.6% which equates to a monetary decline of £71.5 million. Sheepmeat is the main contributor to this amount with a 4% decline in sales revenues projected which equates to £47.5m. The decline for beef is estimated at 0.8%, or £24 million in value

[29] See: https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2017

terms. Whilst the overall decline is relatively modest in percentage terms, it must be borne in mind that processing industry profit margins within beef and sheepmeat supply-chains are frequently cited as being significantly less than 5%. When viewed in this context, declining revenues under a Brexit Deal scenario will still pose challenges for the industry.

Table 7-11 – Projected Impact on Domestically-Produced Beef and Sheepmeat (Farm-Gate Level)

	Baseline*		Brexit Deal			No Deal		
Sector	**2017 (£M)**	**2017 (Kt)**	**£M**	**Kt**	**%Ch (Sales (£))**	**£M**	**Kt**	**%Ch (Sales (£))**
Beef	2,989.5	901.0	2,965.5	902.8	-0.8%	2,869.9	901.0	-4.0%
Sheepmeat	1,196.7	307.5	1,149.2	304.4	-4.0%	827.6	279.8	-30.8%
Total	**4,186.2**	**1,208.5**	**4,114.7**	**1,207.2**	**-1.7%**	**3,697.5**	**1,180.8**	**-11.7%**

Sources: Defra (2018) and The Andersons Centre (2019)

* These figures are derived from Defra data

However, the implications of a No Deal Brexit are much more severe, especially for sheepmeat where revenue declines of more than 30% are forecast. Beef revenues are also estimated to decline by 4% which is also significant. Combined, carcase meat sales for the beef and sheepmeat industry would decline by 11.7% which equates to nearly £489 million when expressed in monetary terms. Such declines would have stark consequences for many operators, at both farm and processing levels, across the UK beef and sheepmeat sectors. Some of the key implications for these stakeholders are examined in the next Chapter.

8 IMPLICATIONS

The analysis undertaken above gives rise to a number of important implications for UK beef and sheepmeat. These are examined further below and encompass additional analyses concerning carcase balance and farm level impacts, with the latter being examined using Andersons' Meadow Farm Model.

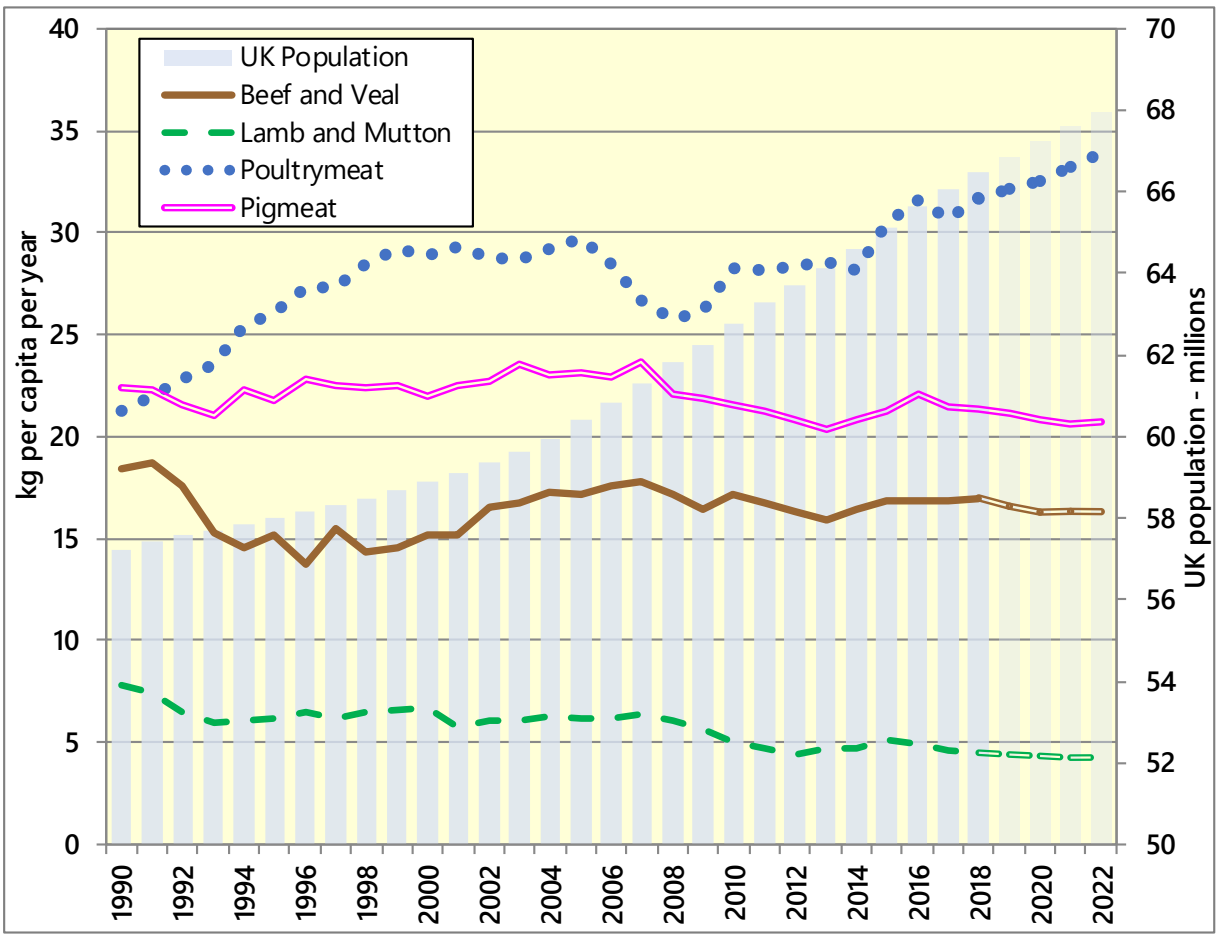
8.1 DOMESTIC DEMAND

As the primary focus of beef and sheepmeat consumption in the UK concerns carcase meat and associated cuts, with only limited demand for offal, the analysis below focuses on beef and sheepmeat.

8.1.1 Brexit Deal

Whilst the trade impact analysis undertaken in section 7.2 projected limited impacts on consumption under a Brexit Deal scenario, this analysis was conducted in isolation insofar that impacts of substitution of beef and sheepmeat with cheaper forms of protein was not considered in detail due to limitations of the model used. Admittedly, the UK leaving the Single Market and the Customs Union will also have implications for these sectors in terms of NTM costs; however, as poultry and pig-meat are cheaper forms of protein, the threat of substitution merits consideration. This is particularly so in the context of the per capita consumption trends (see Figure 8-1) which show declines for both beef and sheepmeat in the last decade, especially when compared to poultry.

Figure 8-1 – UK Meat Consumption Per Capita 1990 - 2020



Sources: Defra / ONS / Andersons

In the last decade, poultry meat consumption has risen by nearly 23% and in 2018 stood at almost 31.7kg/capita. Over the same period, beef and veal production has stagnated (estimated in 2018 at just under 17kg/capita) while sheepmeat consumption has declined slightly. When compared to 1990, beef consumption has declined by 7.9% while sheepmeat consumption has declined by more than 40%. Poultry meat's growth since 2008, has in part been driven by the Financial Crisis, with consumers switching to buy more poultry meat in reaction to a squeeze in their incomes. Furthermore, consumer perceptions around convenience and health have also fuelled its growth.

The implication of this suggests that if beef and sheepmeat prices were to rise further due to trade friction, even under a Brexit Deal, then there would be an increased consumer propensity to switch to cheaper sources of protein, especially if incomes come under pressure due to a wider economic slowdown. This presents a challenge to the industry to address this trend. In the past, such pressures have led to price declines at the farm and processing levels in a bid to adhere to key consumer price points. It has also been associated with changes (decreases) in pack-sizes which also lower demand. It is evident that more needs to be done with respect to boosting consumer perceptions of beef and sheepmeat with respect to convenience as well as in terms of how consuming red meat as part of a balanced diet has health benefits.

8.1.2 No Deal

In volume terms, the trade impact analysis suggests that UK consumption of beef and sheepmeat would collectively rise by 8.6% in a No Deal scenario. This is chiefly because prices are projected to decline. For beef, this would be driven by increased competition from global imports which would largely replace EU imports, except that prices would be significantly lower, thus reducing the overall value of the UK market in value terms.

With regards to sheepmeat, increased consumption would come about due to market price declines brought about as a result of UK producers no longer being able to export to the EU. This is a particularly important consideration with respect to carcase balance which is examined in further detail in section 8.2. Once again, this would mean that the overall value of the UK market would decline, and this would have negative implication on the farm-level in particular as detailed in section 8.3.

8.2 Carcase Balance

The implications of trade barriers for the UK beef and sheepmeat industry present unique challenges, particularly because as a 2018 IMTA paper points out[30], the meat sector is unique in that it disassembles meat from carcasses into cuts, associated offal and by-products. Therefore, UK demand is not in direct proportion to the cuts from the carcase. Taking sheepmeat for example, legs of lamb are in high demand by UK consumers, yet there are many forequarter cuts which are not in demand domestically and need to be exported. Admittedly, the picture with sheepmeat is complicated by the fact that UK production is seasonal, insofar that there are certain periods of the year (e.g. January to April) when the UK is deficient in spring lamb production and imports are required from New Zealand and Australia to compensate.

When this project was commissioned (in February 2019), carcase balance was a major concern across both the beef and sheepmeat sectors. With the publication of the UK's proposed tariff schedule in March and the associated 230Kt TRQ for beef which would enable the UK to continue to procure the beef required to sustain domestic demand whilst placing some limits on imported volumes, some of the

[30] See: https://www.imta-uk.org/images/stories/pdf_docs/2018/IMTA_The_Self-Sufficiency_Myth.pdf

concerns around carcase balance have dissipated. This is especially so because of the limited trade barriers which would be imposed on offal exports. Expert input obtained during the primary research substantiated this view. This is because as the UK is not self-sufficient in beef, high-value carcase meat previously exported to the EU, will instead be utilised in the UK. And for the products (e.g. beef thin skirts) where there might be a surplus which was previously exported to the EU, alternative markets could be found within the UK for producing products such as Cornish pasties for example. Therefore, the overall concern amongst industry participants is relatively low for beef products.

8.2.1 Beef Products

Table 8-1 shows the net trade position for selected beef products based by HS code, based on an analysis of HMRC trade data. Here, a negative figure signifies that imports exceed exports (i.e. the UK is in deficit), whilst a positive number indicates that the UK currently has an exportable surplus. It can be seen that for the EU27, with the exception of some fresh beef hindquarters (with bone-in) and beef offal, the UK is in deficit. Whilst the UK has net trade surplus with non-EU countries for most product categories, the majority of this relates to beef offal. When the overall (EU and non-EU) net trade position is considered, the UK has a deficit of 115,745 tonnes.

Even under a No Deal, it will be possible to continue to export offal to the EU as zero tariff levels, and although NTMs will inhibit trade, it is not anticipated to be detrimental as section 7.2 has previously demonstrated. Considering primary research input that other carcase meat surpluses can be absorbed by the UK market, the overall impact on carcase balance is not anticipated to be insurmountable.

Table 8-1 – Overview of Net Trade Position for Selected Beef Products (Tonnes)

Code	Description	EU27 Net Trade*	Non-EU Net Trade*	Overall Net Trade*
02011000	Fresh beef carcases or half-carcases	- 16,838	93	- 16,745
02012020	Fresh beef "compensated" quarters	- 1,439	1,133	- 306
02012030	Fresh/chilled beef forequarters (bone-in)	- 397	35	- 363
02012050	Fresh/chilled beef hindquarters (bone-in)	261	7	268
02012090	Other fresh/chilled beef cuts (bone-in)	- 4,535	1,155	- 3,380
02013000	Fresh/chilled boneless beef	- 66,932	- 10,272	- 77,204
02021000	Frozen beef carcases/half-carcases	- 397	586	189
02022010	Frozen beef quarters (bone-in)	- 276	994	718
02022030	Frozen beef forequarters (bone-in)	- 312	64	- 249
02022050	Frozen beef hindquarters (bone-in)	- 57	176	120
02022090	Other frozen beef cuts (bone-in)	- 2,729	2,708	- 21
02023010	Frozen boneless beef forequarter cuts	- 23,308	804	- 22,504
02023050	Frozen boneless beef chuck/blade/brisket cuts	- 3,721	908	- 2,813
02023090	Frozen boneless beef cuts (excl. forequarters) (≤5 pcs)	- 23,473	- 1,287	- 24,759
02061095	Fresh edible beef offal thick/thin skirt	- 1,036	0	- 1,036
	Other beef offal	*10,466*	*21,873*	*32,340*
	Total Selected Beef	**-134,723**	**18,978**	**-115,745**

Source: The Andersons Centre (2019)

* Net Trade shows Exports minus Imports for each region, (negative denotes a deficit; positive denotes surplus).

8.2.2 Sheepmeat Products

In contrast to beef, the challenges posed for sheepmeat are significant under a No Deal as illustrated by Table 8-2. This clearly illustrates that whilst overall (EU and non-EU) net trade position is relatively low (6,049 tonnes), it hides the fact that the UK has a net trade surplus with the EU of just over 72,700 tonnes.

As already explained, seasonality and consumer preferences are the major drivers of the 66,652 tonnes' deficit with non-EU countries. For this reason, simply substituting non-EU imports with previously exported tonnages to the EU for domestic use is not considered viable. Indeed, all UK-based industry participants agreed that imports from the likes of New Zealand and Australia will continue to be a major feature of the UK market; a view shared by participants from the Australasian region.

Therefore, the challenge for the UK under a No Deal scenario would be to find alternative markets if the EU27 becomes unviable due to tariffs. As Table 8-2 illustrates, the majority of the UK's exports to the EU27 relate to carcases. Taken together, lamb and sheep carcases (50,915 tonnes) account for 70% of exported volumes based on the 2016-2018 average. The ability of the UK to find alternative markets for these products and/or their constituent parts (i.e. individual cuts of meat) will be a critical determinant of how the sheepmeat industry would cope.

Table 8-2 – Overview of Net Trade Position for Selected Sheepmeat Products (Tonnes)

Code	Description	EU27 Net Trade*	Non-EU Net Trade*	Overall Net Trade*
02041000	Fresh lamb carcases/half-carcases	39,947	651	40,598
02042100	Fresh sheep carcases/half-carcases (excl. lambs)	10,968	18	10,985
02042210	Fresh sheep short forequarters	5,145	-1,170	3,976
02042230	Fresh sheep chines and/or best ends	2,023	-2,146	-123
02042250	Fresh or chilled sheep legs	324	-17,250	-16,927
02042290	Other fresh sheep cuts, bone-in	6,874	-325	6,549
02042300	Fresh boneless sheep cuts	2,400	-6,033	-3,633
02043000	Frozen lamb carcases/half-carcases	164	-1,028	-864
02044100	Frozen sheep carcases/half-carcases (excl. lambs)	-32	33	2
02044210	Frozen sheep short forequarters	846	-1,146	-300
02044230	Frozen sheep chines and/or best ends	1,046	1,730	2,776
02044250	Frozen sheep legs	177	-16,155	-15,978
02044290	Other frozen sheep cuts, with bone in	768	-4,033	-3,264
02044310	Frozen meat of lambs, boneless, frozen	-216	-9,828	-10,044
02044390	Frozen sheepmeat, boneless (excl. lamb)	-271	-5,662	-5,933
	Other sheepmeat offal	2,538	-4,310	-1,772
	Total Selected Sheepmeat	**72,701**	**-66,652**	**6,049**

Source: The Andersons Centre (2019)

* Net Trade shows Exports minus Imports for each region, (negative denotes a deficit; positive denotes surplus).

Looking at carcases in more detail, primary research input suggests that the vast majority of exports to the likes of France are full carcases. Accordingly, for the purposes of this study, it has been assumed that all of the exported tonnages relate to full carcases. Furthermore, in the event of a No Deal Brexit, industry experts believe that of the previously exported carcases to the EU, the cuts most likely to be used domestically would be legs of lamb and possibly the shoulders. Whilst there has been some success in

selling more forequarter cuts to the UK Muslim community in particular, this will not compensate for the likely surplus that would still need to be sold. Furthermore, whilst it is also suggested that developing markets in Asia, especially China, and in the Middle East (e.g. Saudi Arabia) would help, these markets would be growing from a very low base, as illustrated in section 4.4. Distance would also be a challenge.

Looking firstly at UK market opportunities to help mitigate the carcase balance issue, it was decided to concentrate solely on the net trade surplus of carcase meat to discern what proportions of full carcases could be used domestically. Based on industry input, legs of lamb were identified as the cuts that industry participants would be most confident in finding alternative domestic markets. However, shoulders were also cited by several participants as offering good potential.

In view of this feedback and in conjunction with the estimated breakdown of an R3L lamb carcase published by the AHDB[31], estimates of the potential volume of carcase meat that could be consumed domestically were derived. These are summarised in Table 8-3. It shows that for the carcase meat codes where the UK has a net trade surplus with the EU27, 46.8% of this meat could potentially be used in the UK market. However, much of this would need to be frozen down meaning that the prices achieved would decline significantly. In compiling these estimates, it was assumed that the legs of lamb would also include the chump, a versatile cut from just above the leg which could be converted into steaks, pavés, or diced. Whilst some of the forequarter meat could also be used domestically (e.g. by the growing Muslim community market), it was not possible to put definitive estimates on these volumes based on the feedback received.

Looking at carcase meat alone, there would still be a surplus of 27,164 tonnes of meat which would need to find an outlet. When converted into numbers of carcases, this would affect over 2.54 million lambs/sheep. This equates to 18% of the number of lambs/sheep slaughtered based on the 2016-18 average. In addition to this, there would also be challenges finding alternative markets for 5,145 tonnes of short forequarters, previously exported to the EU27 which equates to another 0.6 million carcases, assuming each (short forequarter) carcase weighs 8.5kg. Taken together, this implies that more than 3.1 million sheep/lambs could be affected which would equate to 22% of slaughtered lambs.

Whilst the calculations undertaken are somewhat crude, the estimates still reveal that there would be a major challenge facing the UK sheepmeat sector under a No Deal Brexit, particularly considering that approximately one-third of the UK lamb crop is exported to the EU each year.

Table 8-3 – Analysis of Sheepmeat Carcases Potentially Usable Domestically (Tonnes)

Code	Description	EU27 Net Trade*	% UK Usable	UK Usable	Remaining Surplus*
02041000	Fresh lamb carcases/half-carcases	39,947	46.8%	18,703	21,244
02042100	Fresh sheep carcases/half-carcases (excl. lambs)	10,968	46.8%	5,135	5,833
02043000	Frozen lamb carcases/half-carcases	164	46.8%	77	87
	Total Selected Sheepmeat	**51,079**	**46.8%**	**23,915**	**27,164**
	Estimated Number of Carcases Affected				**2,537,742**

Source: The Andersons Centre (2019)

* Calculated based on 53.2% (10.7kg) of an average carcase (20.12kg) being unusable in the UK.

[31] See: http://www.qsmbeefandlamb.co.uk/books/lamb-yield-guide/files/assets/common/downloads/lamb-yield-guide%20.pdf

8.3 FARM-LEVEL

Based on the results presented above, the farm-level impact is demonstrated using Andersons' Meadow Farm Model. The projections are based on the scenarios set-out in section 1.3 of this study which are aligned with the scenarios which the AHDB has been using in its Brexit assessments to date.

8.3.1 Andersons' Meadow Farm – Introduction

Andersons' 'Meadow Farm' is a notional 154-hectare (380 acre) beef and sheep holding in the English Midlands. Of this, 114 Ha is owned, and the remaining 40ha is rented via a Farm-Business Tenancy (FBT). The farm consists mostly of grassland, with some wheat (13ha) and barley (16ha) grown mainly for livestock feed. There is a 60-cow spring-calving suckler herd with all progeny being finished, a dairy bull beef enterprise (35 animals) and a 500-ewe breeding flock. It is run by the proprietor and employs one full-time family worker as well as casual labour during peak periods (e.g. lambing season).

The farm is run on a real-time basis by Andersons' Farm Business Consultancy department and is based on the trends witnessed at farm level; however, it is not based on any particular farm's data. Whilst this is a 'model' farm, it is not considered to be a model (benchmark) in terms of performance. It is significantly behind the top-performing livestock farms; however, it is reflective of an average grazing livestock farm across England and the UK generally. Therefore, it offers useful insights on how the impact of Brexit could affect beef and sheep farmers generally.

A summary of the Farm's recent and current performance is summarised in Table 8-4. This is based on estimates compiled in February 2019. In recent years, the so-called 'Brexit boost' which, through a weaker Sterling, helped raise prices for beef, sheep and cereals in 2016/17. The most recent 2018/19 financial year witnessed a decline in profits. The drought in 18/19 affected yields and grass growth, contributing to lower income and higher costs. Beef prices also declined significantly towards the end of 2018 also exerted a negative impact. Overheads have increased, and this trend is forecast to continue. The business is dependent on the Basic Payment and the additional income resulting from a successful application to the Countryside Stewardship Scheme (CSS) in 2017/18 for profitability. Looking to 2019/20 the gross margin improves slightly because of better beef values and a reduction in drought-related costs, but higher overheads leave the business in a very similar position to 2018/19 overall.

Table 8-4 – Meadow Farm – Performance Overview (£ per Hectare)

Parameter	16/17 (1)	17/18 (1)	18/19 (2)	19/20 (3)
Livestock Gross Margin	646	734	655	676
Crop Area Gross Margin	649	624	768	726
Total Gross Margin	648	709	677	686
Overheads	480	496	505	513
Rent, Finance and Drawings	317	315	318	321
Margin from Production	(149)	(102)	(146)	(149)
Basic Payment & Countryside Stewardship	213	250	250	241
Business Surplus	**64**	**148**	**105**	**92**

Source: The Andersons Centre (2019)

Notes: (1) Result; (2) Estimated; (3) Budget

8.3.2 Meadow Farm – Brexit Impact

To examine the potential impact of Brexit, the budget figures for 2019/20 have been used for comparison purposes. The assessment is conducted on the basis of a "Before" and "After" impact, although short-term upheavals are not considered in the analysis. Table 8-5 summarises the results.

Table 8-5 – Meadow Farm – Brexit Impacts (£ per Hectare)

Parameter	19/20 (Budget)	Brexit Deal	No Deal
Livestock Output	1,259	1,237	1,101
Livestock Variable Costs	583	581	568
Livestock Gross Margin	**676**	**656**	**533**
Crop Area Gross Margin	726	698	599
Total Gross Margin	**686**	**665**	**562**
Overheads	513	516	517
Rent, Finance and Drawings	321	321	315
Margin from Production	(148)	(173)	(286)
Support	241	241	241
Business Surplus (Deficit)	**93**	**68**	**(45)**

Source: The Andersons Centre (2019)

Brexit Deal Impacts – Key Points

- **Livestock Output:** limited declines in a Brexit Deal scenario with cattle prices approximately 1% lower and sheep prices 3% lower (see Table 7-10), mainly due to NTM impacts on parts of the carcase which are exported.
- **Livestock Variable Costs:** slight decrease brought about by cost decreases for wheat, barley and concentrates as a result of NTMs on exports leading to more domestically produced feed remaining in the UK (i.e. supply increases, demand remains steady => slight price decrease).
- **Livestock Gross Margin:** declines by 3% vis-à-vis current levels.
- **Overheads:** rise by just 0.6% on current levels, chiefly driven by a 1% increase in paid labour costs. It is noteworthy that because most of this farm's labour is provided by family-members (including the proprietor), the extent to which labour costs increase may not be as pronounced where dependence on non-family employed labour is much higher.
- **Rent, Finance and Drawings:** rent is assumed to stay the same as current levels as support is unchanged and any market price declines are limited. This could change if future support entitlements to farmers are no longer linked to occupying land as it could lead to more farmers considering renting their land, thus increasing availability (supply) and may have a downward impact on prices.
- **Margin from Production:** deteriorates versus the current situation by approximately £25 per Hectare.
- **Support:** assumed to remain unchanged as per AHDB scenarios. Specific changes to the nature of future support are not considered here. It is conceivable that although support at the national level remains the same, some sectors might be more favourably positioned to provide public goods. This may present opportunities for beef and sheep farms, particularly those in the uplands in the future.
- **Business Surplus:** whilst a 27% decline is projected, this farm would still be profitable, albeit heavily reliant on support. It is noteworthy that the projected business surplus under a Brexit Deal is similar to that of 2016/17 (see Table 8-4).

No Deal Impacts – Key Points

- **Livestock Output:** farm-level cattle prices are projected to fall by 4% for suckled calves. For young bulls, an 8% decline is forecast, as there is likely to be a smaller benefit from manufacturing bull-beef due to pressure from non-EU imports brought into the UK via TRQs. Whilst these TRQs are not designed to supplant UK production, they will exert negative price pressures. For sheepmeat, a 24% price decline is projected as the UK struggles to find alternative markets for carcases and cuts previously exported to the EU.
- **Livestock Variable Costs:** estimated to decline by 2.6% as a result of further price falls (circa 7%) for cereals and concentrated feed.
- **Livestock Gross Margin:** set to decline by 18% under a No Deal scenario.
- **Overheads:** paid Labour is forecast to rise by 9% under a No Deal. This is more pronounced than the Brexit Deal scenario which also assumes that permanent labour is restricted to 50% of current levels. This is partly because a No Deal Brexit is likely to lead to an increased propensity for pre-existing EU27 migrants to depart the UK under No Deal. This would have a further impact on labour availability, thus increasing costs by 9%.
- **Rent, Finance and Drawings:** whilst the latter two categories are not projected to change, a 10% decrease is projected for rent. This is partly due to the price declines for livestock which is likely to cause more farmers to exit the industry.
- **Margin from Production:** deteriorates to a loss of £288 per Hectare, a £140 decrease on the current situation. This shows the extent to which a No Deal Brexit could damage the grazing livestock sector.
- **Support:** assumed to remain the same as current levels but the comments on the potential changing nature of future support under a Brexit Deal are also applicable.
- **Business Surplus (Deficit):** despite unchanged support, a loss of £45 per Hectare is projected which equates to nearly £7,000 for the entire farm. Although losses have historically been absorbed by the farm, these would become unsustainable in the medium-term.

Overall, the results show that although there is a performance decline across both scenarios, the impact under a Brexit Deal would be limited and could be further mitigated if an eventual regulatory equivalence agreement with the EU results in a further reduction of NTMs. That said, the projected impact under a No Deal Brexit would have grave consequences for this farm and for the beef and sheepmeat sectors generally. Even if current support levels are upheld, the viability of such farms would quickly become unsustainable. This could lead to drastic changes in the number of livestock carried by UK farms for example as the analysis on carcase balance implies (see section 8.2). It is also worth highlighting that this model did not consider any longer-term farmer reaction to the changes such as having less sheep, striving for further efficiency improvements etc. Taken together, these effects could result in significant changes to the appearance of the countryside, particularly in the uplands in the long-term.

The results strongly suggest that a No Deal Brexit needs to be avoided if this traditionally important UK farming sector is to continue to make a substantial contribution to UK farming and the rural communities associated with grazing livestock production.

8.4 FRICTIONLESS TRADE

As alluded to in Chapter 6, having a deep regulatory equivalence agreement with the EU can go a long way towards ensuring that the UK's trade with the EU27 is as frictionless as possible post-Brexit. However, if the UK is outside the Single Market and the Customs Union, then some form of friction above and beyond the status quo is inevitable.

Even as part of the UK's current membership with the European Union, NTMs apply. The analyses presented in Chapter 6 illustrates that whilst intra-EU NTMs are minimal (0.4% or less) for beef and sheepmeat, slight differences with some EU countries can be an issue. That said, it must be acknowledged that as official controls costs were included in the NTM analysis, these are as applicable to selling loads within the UK as they are to selling into the French market.

Although the UK could potentially adopt a more relaxed regime in terms of the frequency of checks imposed on live animals coming in from the EU27 to make trade more frictionless, this must be balanced against biosecurity concerns. Industry participants agree that upholding the biosecurity of the UK livestock sector is of paramount importance and the official controls on live animals are a key aspect of this. Therefore, some trade friction for live animals looks set to continue.

For beef and sheepmeat products generally, the projections presented in the Low scenario in Chapter 6 pointed towards how the UK could reduce friction on its imports. However, for exports, the UK would still be subject to the levels of regulatory checks deemed appropriate by EU Member States' competent authorities. As mentioned previously, several industry participants believe that the most favourable levels of access (e.g. 1% physical checks as opposed to the default 20% rate) is not attainable by the UK initially at least. (This would be particularly pertinent if there is a febrile political atmosphere between the UK and the EU post-Brexit, especially under No Deal.) The view is that the UK will have to earn recognition over time and that its regulatory regime is eligible to avail of such favourable access outside of the EU.

To maximise the possibility of being granted such favourable access, it is seen as crucially important that the UK's regulatory standards are not lowered in any way. This does not just relate to the outcomes of the standards themselves but also to the processes (methodologies) that underpin them.

Looking towards the longer term, trade facilitation experts tend to believe that given present practices, it would take at least a decade before the technology available to satisfactorily assess SPS risks that would enable regulatory checks to be removed. Several believe that much of what is needed is a long way from being developed, let alone deployed on a test basis.

One area of particular promise is that of e-certification which is being increasingly deployed by New Zealand. That said, New Zealand based stakeholders contributing to this study also cautioned that having regulatory checks and random sampling is still very important in helping to provide the assurance necessary that internationally traded beef and sheepmeat products are safe to eat.

Therefore, whilst most industry experts acknowledge that technology has a role to play and can help reduce the impact of trade friction in the long-term, it is unlikely to obviate the need for regulatory checks altogether.

8.5 SUPPLY-CHAIN

The consensus view amongst participants is that Brexit will lead to decreased efficiencies in supply-chain operations which are conducted on a just-in-time (JIT) basis. Whilst these impacts would be relatively low under a Brexit Deal, they would become highly problematic in a No Deal scenario.

In addition to delays, additional stocks would need to be carried throughout the year and some of the cost efficiencies achieved in recent years will be negated. Although some commentators argue that there would be opportunities post-Brexit to reduce the regulatory burden, the majority of industry participants believe that effective regulation is key towards safe-guarding quality assurance, particularly in a sector which has endured food-safety issues in recent decades. Most believe that because of increased regulatory checks that will be required by law which were previously obviated under the Single Market will lead to an increased regulatory burden. Industry participants caution that any undermining of UK

regulatory standards has the potential to result in the loss of markets both domestically (due to consumer confidence questions) and internationally (EU and elsewhere) if confidence in regulatory standards were undermined.

Some also argue that the imposition of trade frictions post-Brexit would have a disproportionate impact on SMEs. This is because smaller businesses are likely to have higher operating costs and as they tend to dispatch fewer loads than their largescale peers, the risk of one of their loads being subject to regulatory checks is more pronounced. Due to the time burden involved with getting special economic authorisations such as AEO status, SMEs are less likely to have such accreditation and are therefore likely to be seen as a higher risk by regulatory authorities. Therefore, it is more likely that such businesses would be subject to checks which would exert a higher toll as the costs involved would be spread across fewer loads on a yearly basis. If such trade barriers have a greater impact on the bottom-line, then it is more likely that such businesses would stop trading internationally. If alternative markets cannot be found domestically, they could exit the industry. In future, this could mean less competition and reduced choice.

Haulage delays were also cited as being a significant issue for the supply-chain, particularly because having driver-accompanied loads held up at the border would lead to costs mounting-up quickly. Haulage delays don't just affect the loads being transported to or from the EU27 but can have onward impacts on back-loads as well as the amount of administration that shipping staff need to take on if delays arise. Furthermore, given that there is already a scarcity of drivers across the UK, which is already leading to increased labour costs according to some, an end to Free Movement is likely to exacerbate this trend.

The risk of value deterioration arising from border-related delays is the issue that causes most concern to the supply-chain trade in fresh products. Even if meat products manage to avoid the more punitive impacts of severe delays (assumed to be 20% in the more severe cases), there are also concerns around the potential impact of penalties if deliveries are not made on-time. Under a Brexit Deal scenario, the risk of such value deterioration is relatively minor. Many companies have buffer stocks in order to mitigate such impacts (as discussed above, these carry a cost). Where loads are selected for sampling, they can be frozen down, if there is a risk to the entire value of the load being severely written-down (or written-off altogether). However, in such instances, the act of freezing down a product also results in significant value deterioration and administration in terms of changing documentation due to the new HS code required for example.

8.6 RETAIL-LEVEL

The concerns listed above for the supply-chain and at farm-level are also of concern to retailers. There is an acknowledgement that JIT systems will become less efficient and that trade barriers will increase the bureaucratic burden for all stakeholders.

There are also some concerns that for large conglomerates where the UK market only accounts for a few percent of operations, that they might choose not to bother supplying the UK if there is a notable increase in bureaucracy. Again, this could reduce consumer choice.

8.7 TRANSITION PERIOD

During the study, participants were asked about how much transition time would be required for new regulatory arrangements to be put in place to address post-Brexit challenges.

Under a Brexit Deal, several expressed the view that transition arrangements would need to go beyond the end of 2020 timeframe envisaged by the Withdrawal Agreement negotiations with the EU. Instead,

they believe that the transition period would be extended into 2021 as a minimum, but most likely into 2022.

Some acknowledged that steps are already underway to ensure that the UK is ready for a post-transition Brexit (e.g. getting the new UK organic labels and a successor to the TRACES system in place), there are additional challenges that need to be considered – particularly at farm-level. For beef farming in particular, production cycles are in the region of three-years (when gestation and adult cattle production are considered). Furthermore, pre-breeding planning is also required. If significant change takes place post-Brexit, particularly under a No Deal, then such sectors would struggle to adapt.

There were some participants who believed that completing the transition by the end of 2020 is possible, assuming a Brexit by end-October 2019. Such views tend to come from the sheepmeat industry where production cycles are shorter, and producers typically need a season and a half (i.e. 18 months) to adapt if the changes are relatively straightforward. If a more major change were to take place, then the risk of the loss of export markets in Europe would create a major challenge. In these circumstances, the industry is likely to require additional time to develop new markets elsewhere or grow their share of the UK internal market; however, it remains difficult to envisage how an export market such as the EU27 could be supplanted, even in a three-year period.

In light of such challenges, the general industry view was that a transition period of approximately two to three years would be required. Within this, if some changes could be brought forward and seamlessly integrated at minimal costs, then these should be considered. Examples here would relate to labelling changes. However, competent authorities in key export markets, be that in the EU or elsewhere, would need to be made fully aware of such changes and accept them at an operational level. During the research, there were examples cited of regulatory changes being agreed at a high-level but insufficient attention was paid to the operational level impacts (e.g. at dockside). Then, when the change was implemented, the ground-level inspectors were unaware, held back the shipment and caused delays. Industry participants also called for these issues to be addressed during any transition period.

9 CONCLUSIONS AND RECOMMENDATIONS

This study shows that the potential impacts of Brexit are complex and require a nuanced analysis. This is especially the case concerning a No Deal where the ramifications for beef and sheepmeat are stark. The report has demonstrated that modelling the impact of Brexit does not just concern tariffs but spans much wider and encompasses complex NTM and TRQ considerations.

Quantifying the impacts of these issues is not as simple as applying a tariff (or a tariff equivalent) rate. Questions concerning the eligibility to trade in the first place, in terms of plants approved to export and products which can be trade by TRQs, need to be factored into consideration. With respect to NTMs, close attention needs to be paid to the prices used as these have a major bearing on the resultant NTMs. It is not sufficient to simply calculate an AVE and then apply this rate to future contexts where the prices involved might be very different. As a minimum, an assessment of NTMs requires consideration of both cost per tonne and cost per load evaluations whilst bearing in mind that the projected cost impact on a load subject to the full array of regulatory checks and delays is likely to be very different to probability-based estimates applied at a UK level. This is especially pertinent to SMEs whose exported loads are unlucky enough to be selected for regulatory checks.

Below is a summary of this study's key conclusions as well as key recommendations, some of which were put forward by industry whilst others set-out areas for future research. This is followed by some final remarks on the study.

9.1 KEY CONCLUSIONS

1. **Trade impact under a Brexit Deal scenario is relatively small:** as Chapter 7 has shown, a Brexit Deal would result in only small changes to UK production, consumption and trade for beef and sheepmeat generally. Projected exports would decline by 1.1% in total, driven primarily by the decreases in EU27 volumes. Imports would also decrease (by 0.8%) again chiefly due to declines associated with EU27 trade. Minimal changes are projected in terms of non-EU trade. Within this, the most significant changes are forecast for sheepmeat where exports to the EU27 decline by 1.5% whilst imports in the opposite direction decrease by 2.9%. These changes are principally driven by the imposition of NTMs which will add inefficiencies to the Just-in-Time (JIT) systems in operation throughout large parts of the UK and European supply-chains.
2. **A No Deal Brexit would cause significant upheaval for beef and sheepmeat:** trade with the EU27 would plummet due to the imposition of tariffs, TRQs and higher incidence of NTMs. Combined beef and sheepmeat exports to the EU would decline by 92.5%, with sheepmeat export trade (-99.7%) almost completely wiped out. Sheepmeat imports in the opposite direction would similarly suffer as the UK mirrors the EU CET. Substantial declines in trade with the EU27 would also be projected for beef – exports down by 87% and imports declining by 92%. Somewhat better market access as a result of TRQs would permit some trade to continue. The introduction of a new 230Kt TRQ for UK beef imports would be open to all countries causing non-EU imports to soar by over 1,300%. This would lead to lower prices and drive-up UK consumption by approximately 7%. Imports of sheepmeat from non-EU countries are not anticipated to change whilst consumption is projected to rise by 14% due to declining prices.
3. **Price impacts:** the imposition of trade frictions, pressure on consumers' purchasing power and continued competition from substitute proteins is forecast to exert downward pressure on beef and sheepmeat prices. Whilst declines would be small in a Brexit Deal (-1 to -3%), the threat of more severe price declines increases under a No Deal Brexit. Sheepmeat is particularly exposed with the projections of this study suggesting a 24% decline under No Deal. Downward pressure

is also forecast for beef (-4%) in a No Deal scenario as competition from lower priced imports exerts a significant influence. This could be exacerbated if significant volumes of Irish beef enter the UK barrier-free via Northern Ireland.

4. **Impacts at farm-level would be similar:** the Meadow Farm model projects a 27% decline in profitability (£68/ha versus the current £93/Ha) under a Brexit Deal, but the farm would still be profitable provided it can maintain its current support levels. Even with support unchanged, Meadow Farm starts to generate significant losses with a projected deficit of £45/Ha. This equates to a loss of nearly £7,000 which is unsustainable in the long-term. This finding underscores the exposure of beef and sheepmeat farms in a No Deal Brexit.
5. **Uncertainty about future border arrangements:** significant uncertainty was also observed about future border related requirements, particularly under a No Deal Brexit. Much of this concerns trade on the island of Ireland which the UK Government has claimed would remain frictionless, even under a No Deal. When this is coupled with no checks on NI-GB trade whilst any trade routed from Dublin to Holyhead would be subject to tariffs and regulatory checks, the potential for re-routing meat from the Republic of Ireland via Northern Ireland and onwards to GB without any checks, could result in substantial volumes of beef being placed on the UK market, beyond the 230Kt TRQ proposed by the UK Government. It remains to be seen how this issue could be addressed and if significant volumes of beef enter the UK in this fashion, this will mean substantial price declines for UK farmers as well as downward pressure on domestic UK production. Industry participants are calling for further guidance from regulatory authorities, including the HMRC, to set-out in detail how such issues will be mitigated. Some express concern that if these issues are not addressed, then the overall integrity of UK beef and sheepmeat would be compromised, thus limiting the prospects for building new markets in the future.
6. **Non-EU markets are not going to sufficiently replace EU export markets:** negligible increases in exports to non-EU markets are forecast under a Brexit Deal. Whilst a 5% increase is projected under a No Deal scenario, this will be from a very small base and would offer scant consolation if large swathes of the EU27 market is lost. The industry view is that although such markets will not compensate, key markets such as China need to be developed as a priority but are likely to be a long-term play.
7. **Domestic market opportunities:** trade barriers would also erode the competitiveness of imported beef from the EU27 and this could present opportunities for domestic producers to serve a greater proportion of the UK market. That said, with the uncertainties surrounding the Irish border situation and the introduction of the 230Kt TRQ leading to increased price competition, there are concerns over the extent to which British farmers as a whole would benefit. There are also fears that future changes to standards might make imports more competitive, thus limiting domestic market opportunities even further.
8. **Frictionless trade with the EU27 outside of the Single Market and Customs Union is not currently possible:** and looks set to remain so for at least a decade as the required technology has not yet been developed, let alone tested, according to the industry experts contributing to this study. Over the long-run technology can contribute to reducing this by introducing e-certification systems for instance as New Zealand has been doing, but friction cannot be reduced completely. With the UK leaving the Single Market and the Customs Union, some increases in trade friction are inevitable.
9. **SPS-related issues and value deterioration:** tend to dominate when it comes to assessing the impact of NTMs in beef and sheepmeat. Frequently, whilst the procedural obstacles (e.g. administrative burdens) associated with such NTM measures are problematic, it is the resultant implications for value deterioration (especially fresh meat), which most frequently exercises the

minds of trading businesses and their representatives. Indeed, value deterioration arising from border-related delays associated with physical checks and sampling emerged as the biggest contributor to NTM costs across the beef and sheepmeat industry generally. In many cases, these costs accounted for more than 60% of the checked load NTM costs. Even when probability was taken into consideration it still accounted for a significant proportion of costs, especially for fresh meat. Its impact on frozen red-meat is much lower. That said, the potential impact of penalties if deliveries are not made on-time remains a consideration as customers are not willing to pay as much for products which require additional paperwork (versus the status quo).

10. **Lower supply-chain efficiency and potential loss of markets:** across most sectors there was a consensus that the imposition of trade barriers following the UK's exit from the EU Customs Union and Single Market will make current supply-chains less lean than present. As well as delays, additional stocks would need to be carried throughout the year. For those hoping for a 'bonfire of regulations' upon Brexit, many industry experts believe that these people are likely to be disappointed. When it comes to exports to the EU27, increased regulatory checks will be required by law which were previously obviated under the Single Market. If wholesale reductions of current standards, underpinned by existing regulation, were to take place, there would be significant potential for loss of markets both domestically (due to consumer confidence concerns) and internationally (EU and elsewhere), especially if such policies were pursued recklessly.
11. **Disproportionate impact on SMEs:** smaller businesses are likely to have higher operating costs and dispatch fewer loads than their large-scale peers. Due to the time burden involved with getting special economic authorisations such as AEO status, which has not been taken-up at all by the UK SMEs, such firms are likely to be seen as a higher risk by regulatory authorities. Therefore, they would be subject to additional checks which would exert a higher toll as their risk would be spread across fewer loads on a yearly basis. As such, trade barriers would have a greater impact on the bottom-line, meaning that it is more likely that such businesses would stop trading internationally. If alternative markets cannot be found domestically, they could exit the industry. In future, this could mean less competition and reduced choice.
12. **Inflationary pressures on inputs:** for imported inputs from the EU27, trade barriers will exert inflationary pressures, particularly on inputs used at the farm-level as it takes time for supply-chains to adapt to regulatory changes. With tight industry profit margins, the degree to which the UK beef and sheepmeat sector could absorb such costs is limited. Therefore, it is likely that much of the additional costs will be passed on to consumers and/or to primary producers (i.e. farmers). Any price rises are likely to cause consumers to increase their propensity to use cheaper sources of protein than British beef and sheepmeat. This would therefore hamper demand further and make it more likely that farmers would beat the brunt of price pressures.

9.2 RECOMMENDATIONS

Drawing upon the discussions with industry professionals on how the UK beef and sheepmeat industry could mitigate the challenges posed by Brexit, below is a summary of the key recommendations of this study.

9.2.1 Recommendations to Assist the Industry

1. **A Brexit Deal, with an adequate transition, is much better than No Deal:** there was a strong consensus amongst all of the industry participants in this study that a Brexit Deal would be a much better outcome than trading with the EU on WTO terms. This study's findings corroborate this view. Whilst Brexit will inevitably cause upheaval and cost, business will eventually adapt. In this

regard, a 2-3-year transition is seen as necessary for the industry to ensure a smooth and orderly adaptation to the post-Brexit market environment. This is especially important in the beef sector, where production cycles are in the region of three years.

2. **Agree Comprehensive Mutual Recognition Agreement with the EU:** there were several calls for the UK and the EU to reach a robust mutual recognition agreement that substantially reduces the need for official controls and makes minimal friction trade more attainable. The more closely harmonised that the UK is to EU standards as they evolve, the more manageable the task would become. Although the example of Canada having lower levels of physical checks (10%), was sometimes cited, others believe that an even closer arrangement with the EU, similar to New Zealand's veterinary agreement with the EU, is possible in-time. Admittedly, this would mean the UK closely following the Single Market rules and for the EU and its Member States to have trust in the UK's regulatory institutions and procedures. Some opined that close alignment with EU requirements and subsequent low exposure to control related business risks is the most pragmatic way to proceed. Several mentioned that Port Health staff shortages are already affecting border control operations, and if the volume of regulatory controls increases several-fold, then the UK's border control arrangements would be significantly compromised. Therefore, a robust mutual recognition agreement (MRA) is deemed by most as essential. Additional benefits would include;
    a. **Reduced storage requirements:** which emerged as a significant issue in the industry. Added regulatory controls would exacerbate this pressure further. A comprehensive MRA would substantially mitigate this, thus making Brexit more manageable via existing structures. It would also minimise the need for additional border control infrastructure (e.g. the construction of new BIPs) to be constructed.
    b. **Protect integrity of UK produce:** seen as crucial towards upholding consumers' expectations on the quality and safety of UK produce but is also vital for the UK in opening-up new markets (e.g. the US, China and the Middle East) as well as safeguarding existing export markets where possible, most notably in the EU27.
3. **Fast-track AEO accreditation**: special economic authorisations such as AEO status were sometimes cited by industry participants as a means to obviate some (but not all) customs and security related control measures. Many perceive that the burdensome amount of time and administration involved with getting AEO accreditation, makes it only feasible for large-scale businesses. A fast-track AEO accreditation system merits further exploration.
   It is also noteworthy that the UK/EU's AEO regime does not currently extend to SPS type regimes, and is only available to businesses who have been trading with third countries for at least 3 years. That said, there were some suggestions that if a fast-track or lighter-touch AEO accreditation system could be provided to at least help SMEs to deal with VAT-related issues or availing of deferred duties, it would help. Again, there was concern that there is insufficient time available to implement such systems, unless an appropriate transition period is in place.
4. **e-Certification:** is being embraced by other countries (e.g. New Zealand) as a means to reduce the burden of border controls. For instance, procedures such as e-certification and residue sampling at source could be undertaken and then communicated to relevant stakeholders as the produce is in transit. This greatly reduces the administration time involved and the risk of losing documents in transit. Some suggested that the UK should play a greater role in this initiative post-Brexit. Longer-term, it could help to reduce the regulatory burden of cross-border meat trade with both third countries and the EU. The potential of electronic declarations whilst meat products are in-transit could play a significant role in reducing the pressures involved. It would also make the prospect of serving new overseas market more viable, especially for chilled products.

5. **Clear communication between UK and foreign regulatory authorities:** linked with several of the points above, a number of industry participants called for close communication between UK governmental agencies and on-the-ground representatives of competent authorities in third countries (including the EU27 in future). Some emphasised that it is insufficient to just speak at policy-making level. Inspectors on the ground need to understand how regulatory arrangements are evolving. If port-level inspectors are confused, then inevitably, shipments would be delayed until any confusion is resolved. This is particularly pertinent in the context of differing practices between ports and port authorities involved in cross-border trade. It would also be a key issue to manage when official labels or certifications get changed.
6. **Developing overseas markets:** should be prioritised, particularly in Asia, where most believe there are significant growth opportunities in the long-term. Short-term opportunities could also present themselves as the current African Swine Flu (ASF) epidemic amongst pigs, particularly in China, is demonstrating. In the future, the UK arguably has the opportunity to be more agile in taking advantage of such opportunities; however, the groundwork which is currently underway for beef and sheepmeat needs to be completed first. At times, this is going to need involvement from the highest levels of Government to finalise agreements with overseas markets, as Governments in many of these countries such expectations when formalising such arrangements.
7. **Training on new regulatory control procedures:** was highlighted on several occasions, particularly for SMEs, as many will have to undertake customs declarations and other regulatory procedures for the first time. Examples were cited in other countries such as the Republic of Ireland where short courses on understanding customs procedures have been made available to businesses by the Irish Government's export development agency (Enterprise Ireland)[32]. The availability of similar courses, not just covering customs, but other regulatory procedures such as SPS would be of benefit to the industry. Linked with this point, there were calls for ongoing support to be made available by regulatory authorities to businesses as they adapt to the changes. Some pointed out that whilst some beef and sheepmeat businesses may be considered small in a national-level context, they can play an important role in a given regional/local economy. If such businesses don't have the necessary expertise to compete in future and cease trading, there could be significant economic implications for their localities.

9.3 FINAL REMARKS

This study's focus was on quantifying the impact of trade barriers on the UK beef and sheepmeat sector. It was initiated before the UK had published its proposed tariff schedule in the event of a No Deal. Whilst quantifying the impact of Brexit-related trade barriers due to the UK's proposed tariff schedule was not in the terms of reference, consideration of their impact has been incorporated into the study on a best-effort basis within the timeframe available.

Despite proposing to keep sheepmeat tariffs the same as the EU's CET and placing a 230Kt limit on the third country imports of beef which could be brought into the UK post-Brexit, it is evident that a No Deal Brexit would result in significant losses for the UK beef and sheepmeat industry. Exports to the EU27 market would plummet. Domestic producers, particularly beef, would come under more pressure from imports from world markets, which have much lower prices. Whilst consumption may increase due to those lower prices, the overall value of industry output would decrease. There are also major concerns about how the Irish border would be managed in such a scenario as the technology to do this seamlessly

[32] See: https://www.prepareforbrexit.com/customs-insights-course/

whilst protecting the integrity of the beef and sheepmeat industry has not been developed yet, let alone tested to ensure its robustness. Given all of these added risks, it is abundantly clear that a No Deal Brexit would be disastrous for the UK beef and sheepmeat industry.

It is also clear that a Brexit Deal based on a comprehensive FTA and close customs and regulatory arrangements with the EU would be much more favourable, even though that is also likely to bring about declines in overall industry output – at least in the short-term.

Whilst developing overseas markets will be crucial to the long-term success of the British beef and sheepmeat industry, close attention must also be paid to protecting existing markets, specifically the domestic UK market and the EU27 export market, which this study has demonstrated accounts for the vast majority of industry sales. Even if the UK had never entered the EU (or EEC) in the first place, it is highly likely that the key export markets such as France would still be vital to the British sheepmeat industry. To minimise any upheaval post-Brexit, having a comprehensive mutual recognition agreement between the UK and the EU is crucial to address many of the challenges posed.

Whilst fully acknowledging and respecting the fact that the UK intends to exit the Single Market and the Customs Union whilst striving for a comprehensive FTA with the EU27, it is apparent that NTMs will pose a significant burden to all beef and sheepmeat industry stakeholders, particularly those most exposed to the risk of severe product value deterioration. Without proper support to assist them in adapting to the new challenges ahead, the competitiveness of many businesses could be severely eroded. Whilst opportunities are also likely to arise in the longer-term, a smooth and orderly transition to a new regulatory regime is seen as crucial.

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