

RESEARCH REPORT

**“IMPACT OF WTO TRADING ON THE
NORTHERN IRELAND BEEF AND SHEEP
MEAT INDUSTRY”**

PRESENTED TO:



BY:



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Please Note:

This report, prepared for the Livestock and Meat Commission (LMC), in collaboration with the Northern Ireland Meat Exporters Association (NIMEA) presents the findings from an in-depth research project. The report has been prepared independently, and the views, opinions and conclusions expressed are those of the authors, and do not necessarily reflect those of the commissioning organisations. The authors have taken all reasonable steps to ensure that the information in this report is correct. However, we do not guarantee that the material within the report is free of errors or omissions. We shall not be liable or responsible for any kind of loss or damage that may result as a consequence of the use of this report.



EXECUTIVE SUMMARY

Background

Brexit is unprecedented and has the potential to cause major upheaval to the UK and Northern Irish agricultural industry if it is not handled properly. Given industry concerns about Brexit and the realistic possibility that the UK and the EU fail to agree a free trade deal, this study gauged the impact of WTO trading conditions on the Northern Irish beef and sheep meat industry and assessed the implications thereof for the sector's future development. This analysis covered an assessment of the impact of WTO tariffs, non-tariff barriers (NTBs) and other impacts arising from Brexit which were cited as causing concern to the sector. The study has also set-out recommendations on how to mitigate the impacts of WTO trading to help support the long-term competitiveness of the Northern Irish beef and sheep meat sector.

The study combined primary and desk-based research techniques. This included detailed data input and discussions with major processing companies, conversations with industry experts throughout the supply chain both nationally and internationally as well as a literature review to explore what precedents exist for a reversion to WTO trading conditions and to examine previous studies' assessments of the potential impacts of WTO including both tariff and non-tariff effects.

This formed the basis for an advanced trade modelling simulation (GTAP analysis) conducted by Oxford Economics to quantify the impact of WTO trading under two scenarios – **WTO Equivalence** and **WTO Liberal Trade (Open-Door trade policy)**. In the former scenario, the UK and the EU impose reciprocal tariffs on each other's imports based on the current EU Common External Tariff (CET) as well as an assumption that there would be mutual recognition of veterinary and other technical standards between both parties. In the latter scenario, the UK reduces its tariffs on imports from major agricultural producers but UK exports to the EU continue to face the EU's CET and would also be subject to the EU's standard rules on physical checks (i.e. 20% of beef and sheep meat consignments).

Literature Review Findings

The literature review confirms that there are no real precedents to Brexit which are applicable to the UK-EU context. Territories have left the EU in the past and the process has been arduous, even where only a small population is concerned. Where trading relationships have reverted to WTO trading conditions, there was a considerable impact on agricultural trade. Although NTBs are frequently cited

as an impediment to agricultural trade, it is difficult to draw inferences that would be appropriate for the UK-EU situation. Whilst there are variations in trading regulations within territories (e.g. Canada), caution needs to be exercised to ensure that no internal trade barriers are created between Northern Ireland and the rest of the UK post-Brexit. This need, however, must be balanced against the terms set out in the Good Friday Agreement. Whilst the example of Cyprus offers some insights as to how a trading relationship across two jurisdictions on one island could be handled post-Brexit, it is far from ideal and will leave numerous challenges to overcome.

NI Beef and Sheep Meat Industry Output

The estimated output of the Northern Irish beef and sheep meat sector for 2016 is valued at £1.1 billion, up 6.1% on 2015. Edible beef and sheep meat (£1.05 billion) account for the clear majority of this with sales up 6.4% on 2015 which was a relatively poor year in comparison with 2014 and 2016. In volume terms, just over 276,000 tonnes of edible beef and sheep meat were produced in NI during 2016, a rise of 1.8% on 2015. As can be seen from the Table 1 below, beef cuts (including boneless and bone-in beef) account for 86% of total output, with sales of lamb cuts (£59.2 million) representing just over 5% of total. Edible beef offal whilst small in value terms (2.4% of sales) accounts for 12.5% of tonnage.

Table 1 – Breakdown of Northern Ireland Beef and Sheep Meat Output 2016

Product Category	£ million	% Sales
Beef carcasses	5.7	0.5%
Beef cuts	949.2	86.3%
Edible beef offal	26.2	2.4%
Lamb carcasses	10.0	0.9%
Lamb cuts	59.2	5.4%
Edible lamb offal	2.7	0.2%
Total edible meat output	1,053.0	95.7%
Miscellaneous* (incl. hides, inedible offal)	47.0	4.3%
Total output (£)	1,100.0	

* Note: miscellaneous categories do not include weights Source: The Andersons Centre (2017)

From a geographic sales perspective, Table 2 segments NI beef and sheep meat sales (2016) by both immediate customer and end-customer. It shows very little difference between both categories as some processors found it difficult to ascertain sales by end-customer. Where they were unsure, they advised the project team to use the same immediate customer sales breakdown for end-customers. Great Britain, with more than 70% of sales, is the dominant market whilst the local Northern Irish

market is relatively small. On an end-customer basis, total sales to the EU (including EU-26 and ROI) is estimated at £194.7 million. The Non-EU end-customer market (£28.0 million) whilst relatively small in value terms performs an important market clearing/carcase balance function and is a critical outlet for the parts of the carcase that UK or EU consumers do not utilise.

Table 2 - NI Beef and Sheep Meat Sales by Geography and Customer Type (2016)

Geographic Region	Immediate Customer		End Customer	
	£ million	% Total	£ million	% Total
UK (NI and GB)	869.0	79.0%	877.3	79.8%
Republic of Ireland	81.0	7.4%	71.1	6.5%
EU-26	124.7	11.3%	123.6	11.2%
Non-EU	25.3	2.3%	28.0	2.5%
Total sales	1,100.0	100.0%	1,100.0	100.0%

Source: The Andersons Centre (2017)

Impact of Tariffs and NTBs

As Table 3 shows, the projected impact of tariffs on the Northern Irish beef and sheep meat industry reveal a wider degree of variation in tariff rates vis-à-vis the 40-60% range cited in previous studies. There is also potential for variation between the tariffs for ROI consignments versus the EU-26. This occurs due to the variation in average selling prices between both markets and illustrates the significant challenge in dealing with tariffs which have an *ad valorem* component (i.e. 12.8%) and a weight-based (fixed) component. This may appear to some as being academic because no matter which EU CET rates are used, NI exports to EU would be rendered uncompetitive. However, it does highlight that consideration of the impact of future tariffs needs to take account of prevailing prices within Northern Ireland and not just across the UK generally.

Furthermore, the Northern Ireland processing sector will also have to contend with tariffs on inputs which, as reported in Chapter 4, are significant. If the UK was to apply an equivalent tariff to the EU CET on imports from the Republic of Ireland, then the effective tariff rate for live animals, in value terms, would range from 33% to 78%. The tariff rates for meat inputs would be similar to those shown below for the EU-27 although it should be noted that if the prices for inputs are lower, then the overall tariff rate will work out higher in percentage terms because the fixed component of the tariff (e.g. €176.80/100 kg for chilled beef carcasses) will account for a higher proportion of the price charged. Similarly, for meat outputs exported to the EU, the overall percentage tariff rate will vary depending on prices charged.

Table 3- EU Tariff Rates for Selected Beef and Sheep Commodities Based on N.I. Prices - 2016

CN Code	Description	Total Tariff EU-27 (%)
02011000	Fresh/chilled beef carcasses and half carcasses	96%
02013000	Fresh/chilled boneless beef	86%
02041000	Fresh/chilled lamb/sheep meat carcasses/half carcasses	48%
02042230	Fresh Chilled Lamb Cuts	49%
02042300	Fresh/chilled boneless lamb/sheep meat	69%
02044310	Frozen lamb/sheep meat cuts	75%
02061098	Fresh/chilled beef offal (other)	0%

Sources: The Andersons Centre, Gov.uk and EU Commission

The study also assessed the potential impact of NTBs, focusing on four key areas, namely *official controls, customs checks & transport delays, administrative costs* and *deterioration in product value*. The results are summarised in Table 4. For this report, it is assumed that WTO Equivalence will have minimal official controls (e.g. 1% physical checks) but under an Open-Door trade policy the EU's standard official controls apply (e.g. 20% physical checks). Based on 2016 data, under WTO Equivalence, total NTB costs are estimated at £5.85 million whilst under an Open-Door trade policy the total is £11.12 million. As a percentage of the value of output for EU-27 consignments (£194.7 million), these NTBs amount to a tariff equivalent of 3.0% under WTO Equivalence and 5.7% under an Open-Door trade policy. These figures were used as the basis for estimating the NTB costs included within the GTAP analysis.

Table 4 – Summary of NTB Costs for Northern Irish Beef and Sheep Meat 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

Effect of WTO Rules on Output and Trade

Table 5 summarises the projected short-run (1-2 years) impact of WTO trading on the Northern Irish beef and sheep meat sector. The following are the key conclusions under each scenario:

WTO Equivalence

- **Output:** rises slightly (by 0.7%) in the short-run following Brexit. Based on UK-level modelling, UK consumption of Northern Irish produced beef and sheep meat is forecast to rise by nearly 23% (£198 million). Despite this positive, consideration needs to be given to the extent to which UK consumers will tolerate price rises that would come about under such a scenario and the long-term commitment of Government to continue such a policy, given the need to pursue free trade deals with other countries (who will likely demand more access for food products).
- **Exports:** from Northern Ireland to foreign (non-UK) markets are forecast to fall by 82% (£190 million) on aggregate with EU-bound exports projected to shrink to under £15 million (a 93% decline). Exports to non-EU (£1.3 million increase) will offset this only every slightly.
- **Imports:** from the EU into the UK are estimated to fall by £939 million (85%). This occurs due to domestic (NI and GB) produce displacing imports because of the UK imposing the CET.

Open-Door Trade Policy:

- **Output:** is expected to decline by almost 21% (£230 million) which will have a devastating impact on the sector as UK producers struggle to compete with imports from around the world. Within this, UK consumption of NI-produced meat is forecast to decline by 5.5% as total imports rise by 11.7%. This will have serious repercussions for the processing industry and the wider rural economy.
- **Exports:** aggregate 78.8% decline is projected (£182 million) with EU exports to decline by 91.5% (£188 million) to £17.5 million. Exports to non-EU (up £6.1 million) will slightly offset this.
- **Imports:** from the EU are forecast to decline by 62%. Although some EU imports will continue to gain access to the UK under an Open-Door trade policy they will be mostly replaced by more competitive non-EU imports which will soar by 166% (£875 million).

Table 5 – Summary Short-Term Impact of WTO Trading on NI Beef and Sheep Meat Sector

Indicator	Baseline	WTO Equivalence		Open-Door Trade Policy	
	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

Implications of WTO Trading for Northern Irish Farming

The impact of WTO trading on farming was illustrated using Andersons' Meadow Farm model, a notional 60-hectare livestock farm situated in Northern Ireland. The results are summarised in Table 6 under both WTO Equivalence and Open-Door trade policy scenarios. Consideration was also given to the impact of changes to support by comparing the status quo levels of support with a 33% and a 66% reduction under each WTO trading scenario. Whilst this farm does not necessarily represent the average Northern Irish livestock farm, it does reflect the position of a significant proportion of farms across the province today.

Under WTO Equivalence, although beef prices improve slightly (circa 4%) due to a more protected domestic market, lamb prices are assumed to fall by approximately 10%. This fall is because of trade with the EU costing more, whilst New Zealand imports are expected to continue. Variable costs are forecast to show some increases as inflation has an impact. Overhead cost increases are expected to be more pronounced with power, machinery, and labour all rising due to inflation. Drawings also increase to take account of inflationary pressures in the general economy. As a result, even with support levels remaining the same, this farm's performance declines slightly and as support is reduced, losses accumulate. If support is reduced by 66%, then this farm would generate a loss of £10,500 and this would require tough decisions on future farming activities.

Table 6 - NI Meadow Farm Performance under WTO Trading Conditions

Current Performance		WTO Equivalence – 2025/26			Open-Door Trade Policy – 2025/26		
£ per Ha	2017/18	Same Support	-33%	-66%	Same Support	-33%	-66%
Livestock Output	1,007	1,002	1,002	1,002	799	799	799
Livestock Variable Costs	399	404	404	404	391	391	391
Gross Margin	608	598	598	598	408	408	408
Overheads	493	510	510	510	510	510	510
Rent, Finance and Drawings	376	383	378	374	378	376	369
Margin from Production	(261)	(295)	(290)	(286)	(481)	(478)	(472)
Support	325	325	218	111	325	218	111
Business Surplus	64	30	(73)	(175)	(156)	(260)	(361)

Source: The Andersons Centre

As depicted in Table 6, the introduction of an Open-Door trade policy by the UK would have a devastating impact on the profitability of livestock farming in Northern Ireland, especially if support payments also decline. Even if support remains the same as now, Meadow Farm generates a loss of £156/ha (£9,360 for the farm). If support reduces, these losses rise to £15,600 with a 33% reduction and to over £21,000 if support is reduced by two-thirds. Clearly such losses are unsustainable for any length of time and would require major changes to operations or a discontinuation of production. The wider farming industry would also be affected in a number of ways including:

- **Productivity:** NI farmers will be competing with low-cost producers from across the globe and over the longer term, only the most competitive will survive. Such a move will entail achieving greater economies of scale for the industry generally with a much sharper focus on inputs to outputs usage.
- **Farm structures:** the sharp decrease in output under an Open-Door trade policy and the substantial deterioration in profitability outlined above would lead to a major restructuring of beef and sheep meat farming, particularly if support is reduced. The precise nature of such changes is difficult to predict at this point, however, for a farm to survive, its cost base would need to alter substantially. This could be achieved through economies of scale which suggests a major rationalisation of farming with numerous farmers exiting the industry. In some areas, it is likely to entail a movement towards much less intensively managed systems meaning that sheep being raised on the hills for example will not be inspected by the farmer as frequently and feed inputs etc. could be reduced. This is likely to have negative implications for mortality rates and

potentially animal welfare. For other farms, this may mean curtailing agri-environmental improvements which have been made in recent years, thus leading to environmental degradation in some instances. However, farmers will be forced to consider such dramatic changes in addition to part-time farming as an Open-Door trade policy scenario plays out. All the while, the industry will have to contend with a more volatile world market and all of the uncertainties that brings in terms of prices and cashflow challenges.

Recommendations

In the light of previous Government statements regarding the type of Brexit that it wishes to pursue as well as the pressing need to give greater certainty to businesses, the following recommendations are put forward:

1. **Interim Single Market (EEA) and Customs Union membership:** should be the framework to underpin the UK-EU trading relationship for at least 5 years post-Brexit. This agreement should also include mutual recognition of existing official controls (i.e. veterinary standards, etc.). Interim Single Market (EEA) membership is the best available means to ensure a continued 'open' border and access to skilled labour whilst the details of how a frictionless Irish border would operate post-Brexit are clarified. However, as existing EEA arrangements exclude agriculture, an interim Customs Union arrangement is also needed. This approach would permit a smoother transition, facilitate a better long-term trading arrangement and enable suitable cross-border management systems to be established. During this interim period, it would also be helpful to have a mid-way review to examine progress in implementing arrangements (e.g. technology to facilitate frictionless cross-border trade) for the finalised post-Brexit relationship with the EU-27. This would enable timelines to be adjusted as required (i.e. brought forward or delayed).
2. **Labour:** resolve the current impasse on the status of EU and UK citizens as quickly as possible. Continuing to be part of the Single Market, for an interim period, will provide temporary security to those already employed in the Northern Irish agri-food sector. In the longer term, set-up an Agri-Food Workers' Scheme (encompassing agri-food processing) to permit continued access to labour for NI processors. This should be coupled with incentives for locally-based staff, including training placements for young farmers and subsidised study schemes for veterinary graduates. Provide at least 12 months' notice to industry ahead of any proposed change.
3. **Opening new Third Country markets:** even before exiting the Customs Union, or even the EU, there is plenty that Government Departments (e.g. DEFRA and Dept. for International Trade) could do in terms of getting Northern Irish product approved for sale in non-EU countries. This

includes getting mutual recognition and acceptance of veterinary standards, premises approval etc.

4. **Long-term strategy for food and farming:** needs to be initiated immediately and involve multiple departments to ensure better alignment so that the industry is as prepared as possible for the opportunities and challenges arising from Brexit. The Food Harvest 2020 strategy in the Republic of Ireland is a prime example of how strategy should be formulated.
5. **Agricultural policy:** needs to be developed which permits Northern Irish farmers to compete on a level playing field with EU counterparts and non-EU imports. This includes ensuring that any food imported from elsewhere is subject to the same rigorous standards as domestic produce.
6. **Adopt EU Official Controls regulations to permit frictionless cross-border trade:** seek a derogation to permit official controls of animals and meat products to take place at slaughter houses, meat plants and at collection centres for live cattle within the UK and ROI. Central to achieving this will be the need to maintain existing EU official controls standards.

If WTO trading conditions did come to pass, this study also recommends a number of other steps to be taken to mitigate such an impact. These are actions that local government and industry need to work together on. Briefly, these include:

1. **Set-up TRQs based on historic volumes** to mirror both existing current UK-EU trade and UK/EU-27 trade with non-EU countries.
2. **Capture more of the domestic UK market** by optimising NI's major comparative advantages (e.g. ability to grow grass, 65 million affluent consumers on doorstep, strong track-record concerning traceability, animal welfare and adherence to retailers' specifications) and its efficient producers.
3. **Open-up new markets to help with carcass balancing:** this accompanies the above point and priority should be given to markets which are fast-growing, easy to enter (e.g. South-East Asia) and maximise the value of each carcass produced.
4. **Consider Cyprus-type model for cross-border trade if no other agreement is possible:** whilst not ideal, this would at least permit some semblance of low-friction trade across the island of Ireland. Under such a model, Northern Irish/UK beef and sheep meat could only be sold in the Irish Republic and not elsewhere in the EU. A reciprocal arrangement would work in the opposite direction, meaning that only beef and sheep meat originating in the Irish Republic could be sold in the UK (i.e. no goods from EU-26 would be permitted tariff-free under this arrangement). Such arrangements would require additional documentation demonstrating the requisite Country of Origin and would likely be subject to TRQs, but it would at least help to facilitate trade reasonably close to existing levels in such a scenario.

Overall, this study shows that WTO trading would have a devastating impact on Northern Irish trade with the EU for beef and sheep meat. Whilst displacement within the UK market may mitigate this under WTO Equivalence, it would lead to increased prices, reduced consumption (in volume terms) and an increased propensity amongst consumers to switch to cheaper protein sources. An Open-Door trade policy would seriously damage the industry both domestically and internationally. It is clear that such scenarios need to be avoided.

Whilst fully acknowledging and respecting the June 2016 Referendum outcome, an alternative approach needs to be found so that UK and EU farmers, businesses and citizens can have some certainty and a relatively smooth transition to the post-Brexit relationship. Such an approach requires compromise and realism from all sides in terms of desired destinations and the terrain that must be traversed to get there. Hopefully, this report and its findings have brought clarity on the potential routes ahead for the Northern Irish beef and sheep meat industry as well as the road that should be taken.

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ACRONYMS AND ABBREVIATIONS

AFWS	Agri-Food Workers' Scheme
AHDB	Agriculture and Horticulture Development Board
BORD BIA	Irish Food Board
CET	Common External Tariff
COMEXT	Eurostat's reference database for detailed statistics on international trade in goods
CSO	Central Statistics Office
DAERA	Department of Agriculture, Environment and Rural Affairs
DEFRA	Department of Environment, Food and Rural Affairs
EEA	European Economic Area
EEC	European Economic Community
EU	European Union
FTA	Free-Trade Agreement
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
GEM	Global Economic Model
GLR	Green Line Regulation
GTAP	Global Trade Analysis Project
GVA	Gross Value Added
HMRC	Her Majesty's Revenue and Customs
MFN	Most Favoured Nation
NI	Northern Ireland
NIAP	Northern Ireland Agricultural Policy
NIMEA	Northern Ireland Meat Exporters Association
NTB	Non-Tariff Barrier
OCT	Overseas Country or Territory (of the EU)
OMR	Outermost Region (of the EU)
ONS	Office for National Statistics
ROI	Republic of Ireland
SPS	Sanitary and Phytosanitary (Measures)
TFP	Total Factor Productivity
TRNC	Turkish Republic of Northern Cyprus
TRQ	Tariff Rate Quota
UK	United Kingdom
UKAP	UK Agricultural Policy
VAT	Value Added Tax
WTO	World Trade Organisation

1. INTRODUCTION

1.1 BACKGROUND AND PURPOSE

The beef and sheep meat industry is a major contributor to the Northern Irish economy with previous studies estimating that it employs close to 5,000 people and supports nearly 20,000 jobs in beef and sheep farming across the region¹. Whilst the majority of Northern Irish beef and sheep meat is sold within the UK, exports to the EU play a critical role, particularly for sheep meat. There is also a small but growing trade to third countries in Asia, Africa and North America. Much of the export trade is focused on beef and lamb cuts, offal and by-product for which there is little or no market within the UK. The Northern Ireland (NI) beef and sheep meat industry also depends heavily on significant quantities of imported beef from the Republic of Ireland for further processing and onward sale into both the UK and other EU countries.

The industry is therefore concerned about how Brexit could potentially affect trade, particularly in a scenario where the UK and the EU fail to agree a trade deal. This circumstance would lead to WTO trading conditions becoming applicable to outbound trade (exports) and potentially also to inbound trade (imports).

Given the concern that WTO trading conditions are a realistic possibility, the LMC in conjunction with the Northern Ireland Meat Exporters Association (NIMEA) commissioned The Andersons Centre and Oxford Economics to conduct a detailed economic impact assessment of the potential impact of WTO trading on the Northern Irish beef and sheep meat sector. Further information on both companies is provided in Appendix I.

1.2 AIMS AND OBJECTIVES

The overall aim of this project is to gauge the potential impact of WTO trading conditions on the Northern Irish beef and sheep meat industry and to assess the implications thereof for the sector's future development.

Within this context, the following objectives are also specified:

¹ DAERA (2016) "*The Agricultural Census in Northern Ireland – Results for June 2016*", May 2017, https://www.daera-ni.gov.uk/sites/default/files/publications/daera/16.17.214%20The%20Agricultural%20Census%20in%20NI%202016%20final_0.PDF

1. Analyse the impact of WTO tariffs, and accompanying tariff schedules, for each relevant product code, particularly with regards to UK-EU trade.
2. Assess the impact of customs inspections and non-tariff barriers to trade under WTO.
3. Examine the impact of Country of Origin Rules.
4. Set-out clear recommendations to the sector on how to mitigate the impacts of WTO trading to help support the long-term competitiveness of the NI beef and sheep meat sector.

1.3 DEFINITION OF WTO TRADING

Before assessing the impact of WTO trading conditions, it is worth defining at the outset what WTO trading entails as this will provide the foundation for the remainder of the report. Appendix I provides a brief overview of the WTO and the key rules that affect agricultural trade. For the purposes of this study, WTO trading conditions are generally defined as;

The UK's trading relationship with the EU would be based on Most Favoured Nation (MFN) rules and agricultural trade between both entities is subject to tariffs, customs and official controls procedures as set out under various WTO Agreements. As a result, the UK's trading relationship with the EU would be broadly similar to the current relationship that the likes of New Zealand or the US has with the EU.

Furthermore, this study assesses the impact of WTO trading using three broad scenarios which are;

- A. Status Quo (baseline):** refers to Northern Ireland's current European Union status. The impacts of scenarios B and C will be compared with the status quo.
- B. WTO Equivalence:** where the UK imposes tariff barriers on all imports, with the EU imposing its Common External Tariffs (CET) on imports from the UK. Under this scenario, there will also be mutual recognition of veterinary and other technical standards between the UK and the EU because, by virtue of the Great Repeal Bill, all existing EU standards will be automatically transposed into UK law and will essentially remain the same as present. UK and EU tariffs would also be identical.
- C. WTO Liberal Trade:** the UK decides to reduce its tariffs on imports from major agricultural producers (e.g. EU, Mercosur, New Zealand and Australia) but UK exports to the EU continue to face the EU's CET. Under this scenario, whilst the UK's food, animal health and veterinary standards are not expected to change significantly, it is assumed that any beef and sheep meat exports to the EU will be subject to the EU's standard rules on physical checks (i.e. 20% of beef and sheep meat consignments). This is primarily

because of EU concerns around Country of Origin rules and products from outside the UK entering into the EU. The UK would reciprocate and adopt similar procedures for imports arriving from the EU-27. This scenario is also referred to as an “Open-Door” trade policy.

Under both WTO trading scenarios, it is further assumed that, because the UK and the EU have failed to reach an agreement on the future trading relationship, no provisions have been made to introduce tariff rate quotas (TRQs) to permit specified quantities of products (e.g. beef and sheep meat) to continue to be traded between both parties on a zero or significantly reduced tariff basis. Whilst one of the recommendations listed in Chapter 7 is to make provision for TRQs under a WTO trading scenario, it was decided that including them within a WTO assessment at this juncture would be highly speculative and could cloud what the real impact of WTO trading would be.

1.3 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.
- **Great Britain (GB):** consists of England, Scotland and Wales; sometimes referred to as Britain.
- **Republic of Ireland (ROI):** sometimes referred to as the Irish Republic and is included within the EU-27 (see below).
- **The European Union (EU):** currently consisting of all 28 EU Member States; sometimes referred to as the EU-28.
- **EU-27:** EU Member States excluding the UK.
- **EU-26:** EU Member States excluding the Irish Republic as well as the UK. Sometimes referred to as Rest of EU.
- **Cyprus:** refers to the entire island. Other territories are also defined.
 - **Turkish Republic of Northern Cyprus (TRNC):** also referred to as Northern Cyprus.
 - **Republic of Cyprus:** also referred to as Southern Cyprus.
- **Non-EU:** all countries outside of the EU-28; periodically referred to as Rest of World (ROW).

1.4 REPORT STRUCTURE

The structure of this 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.
- **Literature review** (Chapter 3): compiled by The Andersons Centre, explores what precedents exist for a reversion to WTO trading conditions and to examine previous studies' assessments of the potential impacts of WTO including both tariff and non-tariff effects.
- **NI and UK beef and sheep meat industry overview** (Chapter 4): provides a top-level summary of output and trade and inputs used by the sector based on primary data collected by The Andersons Centre during this study and from secondary sources. This forms a basis for the assessment of the impact of WTO trading.
- **Impact of WTO trading** (Chapter 5): examines in detail how WTO would affect the sector both in terms of tariffs and non-tariff barriers for both inputs and outputs. This examination (see Sections 5.1 and 5.2) was led by The Andersons Centre and forms a prelude to the Global Trade Analysis Project (GTAP) analysis, conducted by Oxford Economics (see Section 5.4). Some commentary (Section 5.3) is also provided by The Andersons Centre on the impact on labour used by the industry if freedom of movement from the EU is discontinued and no replacement scheme is put in place.
- **Implications for the NI beef and sheep meat sector** (Chapter 6): based on the GTAP modelling exercise and other analyses conducted during this study, the key implications for the processing sector are set out in detail. This is led by The Andersons Centre with support from Oxford Economics and a commentary on the potential implications for farming and retail is also included.
- **Conclusions and recommendations** (Chapter 7): which were compiled by The Andersons Centre summarise the main findings from this study and set out recommendations on how the NI beef and sheep meat industry should proceed as well as outlining steps that could be taken to mitigate the impacts of WTO trading.

At the end of the report, supplementary information is provided in the Appendices (e.g. overview of WTO trading in Appendix II).

2. METHODOLOGY

2.1 INTRODUCTION

To fulfil this project's objectives, a combination of quantitative and qualitative research techniques were used. This included desk-based research (literature review) as well as detailed discussions with processors and other industry experts to gain a better understanding of the key issues within a Northern Irish context and to formulate and verify key assumptions made during this study. Furthermore, several of the major processing companies representing over 80% of NI beef and sheep meat output provided detailed sales data by product (encompassing commodity code). This input was also supplemented by data from a wide variety of sources to verify estimates and to frame the Northern Irish beef and sheep meat industry within the wider UK context. The following sections briefly outline the steps taken at each stage of the project.

2.2 LITERATURE REVIEW

At the outset of this study, a literature review (Chapter 3) was undertaken to gain a better understanding of previous work in this area and to identify what insights could be gleaned from past research. This encompassed a review of over 50 studies exploring a wide range of issues around the impact of tariff and non-tariff barriers and to identify precedents that could be used to give an indication of what Brexit might entail for a region like Northern Ireland. These insights were used to formulate initial assumptions on key topics (e.g. estimates of how non-tariff barriers affect agricultural trade) and several of these were subsequently tested during interviews with processors and stakeholders.

The literature review also uncovered numerous data sources that could be deployed in this study and several of those are referenced elsewhere in this report. These data were used to help establish the terms of trade for each commodity group within the beef and sheep meat sector under both WTO and status quo scenarios. Chapter 5 sets out the 'default' trading terms that Northern Ireland would face in the event of a WTO scenario with respect to trade with the rest of the UK, Republic of Ireland, the rest of the EU and non-EU countries.

2.3 QUANTIFYING THE OUTPUT OF THE NORTHERN IRISH BEEF AND SHEEP MEAT SECTORS

As alluded to above, several of the leading Northern Irish processors accounting for over 80% of output, provided data relating to their sales and production volumes for 2014 to 2016. This included a detailed segmentation of 2016 sales on the basis of:

- Product sales by commodity code in terms of volume and revenues
- Sales breakdown by customers' location (i.e. NI, GB, ROI, EU-26 and Non-EU)
- Inputs used in terms of volume (e.g. meat inputs) and no. of animals
- Segmentation of inputs by origin (i.e. NI, GB, ROI etc.).

This input was also supplemented by detailed discussions where processors provided information on:

- Number of employees and their origin
- Operational costs by key area (e.g. raw material, labour etc.)
- Potential impacts of WTO trading including tariff and non-tariff barriers
- Impact of WTO on operations and costs
- Opportunities that could arise from WTO trading.

Processors' input was also complemented by detailed data from both the LMC and the AHDB which played a key role in verifying the estimates provided by processors as well as framing the Northern Irish industry within the wider UK context. The data obtained related to:

- Value of UK beef and sheep meat output
- UK import and export data for beef, sheep meat and offal
- Deadweight price reporting statistics for NI
- NI, ROI and GB cattle slaughtering statistics
- Retail beef price and expenditure data for the GB and NI markets

Numerous other data sources were also drawn upon during this study including:

- **DAERA NI** – provided detailed estimates of output (on the basis of gross turnover) for the Northern Ireland beef and sheep sector as well as ancillary industries (i.e. animal by-products).
- **Irish Central Statistics Office (CSO)** – to quantify the cross-border trade between NI and ROI as well as data on the Irish Republic's beef and sheep meat trade with GB.
- **UK HMRC** – was used in conjunction with AHDB data to obtain estimates of UK trade with EU and Non-EU countries.
- **EU Commission (including COMEXT) and Eurostat** – to quantify external EU trade including the volume of tariff rate quotas (TRQs) for beef and sheep meat commodities. EU datasets were also used to calculate import tariffs for beef and sheep meat commodities.
- **WTO data** – to ascertain the tariffs applied by non-EU countries for beef and sheep meat and to clarify what is included within the EU's schedule with the WTO.

Data from a variety of other UK and Irish sources including DEFRA, Bord Bia and the Office of National Statistics (ONS) were also used during this research and are referenced elsewhere in this report.

The combined information from the aforementioned sources, helped to provide a robust estimate of the output from the Northern Irish beef and sheep meat sector whilst also giving a reliable baseline from which to ascertain the impact of WTO tariffs.

2.4 QUANTIFYING THE IMPACT OF TARIFFS AND NON-TARIFF BARRIERS UNDER WTO TRADING

Drawing upon data from the EU Commission and WTO, this study firstly assessed the immediate impact of tariffs with respect to UK (NI) and EU trade. At the outset, it was also decided to assess the impact of WTO trading using three scenarios, i.e. Status Quo, WTO Equivalence and WTO Liberal Trade which are defined in Chapter 1 above.

The rationale for these scenarios was based on political analysis since the Referendum. Some within political circles have been advocating a “cheap food” or an “open-door” trade policy which would entail permitting imports from producers such as New Zealand to enter into the UK relatively unrestricted. In such countries, farmers’ costs of production are lower and hence they are more competitive. However, without a free trade deal, UK and Northern Irish exports to the EU would still be subject to tariffs. Conversely, a scenario where the UK adopts an ‘equivalence’ stance and imposes similar tariffs to those the EU currently imposes is also a possibility. Therefore, it is prudent to examine the effects of both in a WTO context. Accordingly, this part of the study involved a series of additional sub-steps including:

- i. Impact of tariffs:** the focus here was to quantify the effect of tariffs for each commodity code relating to the inputs (i.e. live animals and meat) being supplied to Northern Ireland from outside the UK as well as the outputs produced by the Northern Irish beef and sheep meat sector which were supplied to various EU and Non-EU markets. Firstly, a dataset was compiled to quantify the percentage impacts of tariffs for both inputs and outputs at a commodity code level (8 digits). This information was then incorporated into the Oxford Economics GTAP model to quantify how UK and Northern Irish trade with the rest of the EU was likely to be affected under both WTO scenarios.
- ii. Impact of non-tariff barriers (NTBs):** in conjunction with quantifying tariffs, estimates were also derived on the potential effects of NTBs, with the focus being on four main areas:
 - a. Official controls** – encompassing physical checks, sampling, additional veterinary staff required for compliance and associated charges at border inspection posts.

- b. **Customs and transport** – accounting for costs associated with customs checks and delays associated with queuing to cross the border.
- c. **Administration costs** – relate to costs that private companies and processors would incur in terms of additional time associated with completing shipping documentation as well as production planning and scheduling.
- d. **Deterioration of product value** – losses in the value of loads due to delays associated with physical checks and sampling as well as the restricted ability of Northern Irish processors to supply high-end continental customers who set challenging specifications with respect to use-by dates (e.g. pack plus 8 days specification).

These estimates were compiled based on discussions with industry experts from across the Northern Irish, UK and the EU including government and veterinary officials, academic experts, trade associations and processors.

- iii. **Effect of other WTO rules:** assessments were also made on the potential effects of changes to input costs including raw materials, packaging, as well as power and energy. Labour issues were also taken into consideration and whilst they are covered in Chapter 6, they have been dealt with separately from the trade (GTAP) analysis.

2.5 QUANTIFY IMPACT ON UK AND NORTHERN IRISH BEEF AND SHEEP MEAT TRADE

Scenario Definition

The research has involved modelling two scenarios to understand the impact of WTO trading conditions on the economic activity of the beef and sheep sector in Northern Ireland. The two scenarios, explained in Chapter 1, involved assuming that upon exit the UK moves to a Most Favoured Nation (MFN) trading relationship with the EU. The implication of this is that UK exports would now become subject to the Common External Tariff (CET). In addition, moving outside of the Customs Union will mean that both exports and imports will become subject to border checks creating additional administrative costs and time delays.

Both scenarios will lead to the UK assuming independence over its own trade policy. In particular, it will be able to set its own tariff structure on merchandise imports being purchased from abroad. In the first scenario (WTO Equivalence), it is assumed that the UK government opts to maintain the status quo i.e. the existing structure of the CET. In the second scenario (WTO Liberal Trade), however, the government decides to adopt a unilateral abolition of tariff barriers. This would mean no change for

imports that are currently being received from the EU but would lead to a reduction in tariffs for imports coming from countries with whom the UK currently operates with via MFN status.

Modelling Process

In each scenario, a two-stage macroeconomic modelling approach has been undertaken which is designed to capture the key changes that would affect the industry and the wider economy following this type of economic shock. The modelling process itself has been run at a UK level, reflecting the constraints of the available modelling frameworks. However, given the context of the study, Northern Ireland-specific results have also been provided. Therefore, the proportionate impacts in each case are applied to the level of sectoral activity in 2016 in Northern Ireland based on data collected by The Andersons Centre as part of this project.

The first stage involved modelling the change in trade barriers (both tariff and non-tariff) between the UK and the EU that would result from Brexit via the Global Trade Analysis Project (GTAP) model. The GTAP provides a rigorous and consistent framework for understanding the impact of a change in international trade policy on comparative advantage in affected economies. Changes in relative prices, as a result of trade policy, lead to expenditure switching effects. In the context of an increase in tariff barriers, the GTAP model would simulate the extent to which the increase in the cost of imports would lead to consumers switching to a domestically priced alternative. In turn, these effects lead to a change in domestic resource allocation (labour and capital) and therefore output. The GTAP model does not provide results on a sequential time series basis – it simply illustrates a before and after impact. Given the type of changes being modelled, it is reasonable to assume that much of this effect would emerge quite quickly (1-2 years) with the full (second-round) impact being reflected within the medium-term (e.g. five years).

The second-round impact takes account of subsequent dynamic effects that will result from changes in trade patterns. Oxford Economics' econometric modelling has shown that trade is linked to the performance of Total Factor Productivity (TFP) growth which is a key driver of GDP in the long-term. Increased trade helps to increase efficiency via a number of channels including specialisation, technology transfer and economies of scale. In terms of how these will feed through to the beef and sheep sector the key channel is via the purchasing power of households. Ultimately, faster or slower TFP growth becomes reflected in real wage growth and hence the demand for meat. These effects will occur more gradually – a reasonable approximation is to assume that the full impact modelled would have occurred by end-2030 given the Brexit timetable.

Further background information on the GTAP modelling process is provided in Appendix IV.

Scenario Calibration

For each scenario to be examined, inputs to GTAP would include both the implied impact on observed bilateral tariffs as well as unobserved Non-Tariff Barriers (NTBs). NTBs can be broadly divided into two categories: those that apply “at the border”; and those that restrict trade “behind the border”. The former reflects documentation and compliance requirements and other administrative procedures that are associated with clearing customs.

As things stand, goods that pass between Northern Ireland and the EU are not subject to such delays, as a result of their common membership of the Customs Union. On the other hand, ‘behind the border’ NTBs that are most relevant in this context relate to the domestic regulatory framework of the importing country, including sanitary and phytosanitary measures, technical barriers to trade and domestic content requirements. Compared to border checks, there is much less certainty as to the impact of Brexit on this type of trade barrier. As part of the Great Repeal Bill, the UK Government has announced that it will incorporate all existing EU law into domestic legislation upon exit. From that point onwards, there is scope for regulatory divergence that will create further barriers to trade. Therefore, the extent to which this type of NTB emerges will reflect a greater degree of judgement compared to “at the border” costs which will apply depending on whether the UK is assumed to remain inside the EU Customs Union. For the purposes of this study it is assumed that these ‘behind the border’ costs do not emerge.

In order to calculate the magnitude of the tariff rates imposed by the European Union (EU) on imports of beef and sheep products from Northern Ireland under the two scenarios analysed as part of this project, Oxford Economics conducted a detailed bottom-up estimation exercise. Specifically, data were collected from the ITC Market Access Map on the EU’s Common External Tariff (CET) rates relating to beef and sheep product lines (see Table 13). These data were combined with information collected by The Andersons Centre on the value and volume of Northern Irish exports to the EU across each of these product lines in order to compute an average effective EU tariff rate applicable to Northern Irish sheep and beef sector exports. The average effective tariff rate was computed as the average of the EU CET rates across each beef and sheep product line, weighted according to the structure of Northern Irish beef and sheep exports to the EU across each of these product lines.

As detailed in Table 13, EU CET rates in the beef and sheep sector typically comprise a fixed rate (12.8%) plus a fixed price per 100kg of the commodity being exported. The GTAP model requires that

tariff rate shocks are input as *ad valorem* equivalent rates, and so Oxford Economics converted the volume-dependent portion of the CET into this format based on the average selling price of Northern Irish beef and sheep exports across each product line, as provided by The Andersons Centre, based on information obtained as part of their consultation exercise. A key finding in this context was that the volume-dependent portion of the EU CET rates in the beef and sheep sector would disproportionately penalise Northern Irish exporters, relative to the rest of the United Kingdom, due to the typically lower average selling prices achieved by Northern Irish exporters.

To calculate the 'at the border costs' (NTBs), evidence collected by The Andersons Centre with regards to average delays in the beef and sheep sector was included in the analysis. The Andersons Centre's NTB estimates are outlined in detail in Chapter 5 and were found to be consistent with the most recent World Bank Doing Business Survey² and previous studies estimating the ad valorem equivalent cost of time in trade based on US data.³

2.6 ASSESS IMPACT AT EACH SUPPLY CHAIN STAGE

Although the processing sector was the primary focus of this study, the findings from the GTAP analysis were used to assess the impact of WTO trading on each major stage of the supply chain.

At the farm level, the effects of WTO trading were quantified using Andersons' Northern Irish Meadow Farm model, a spreadsheet-based notional farm, which seeks to typify a Northern Irish beef and sheep unit. The implications of inhibited trade with the EU, displacement on the UK market and shifts in market outlets in the context of carcase balances were assessed. The overall purpose of this exercise was to calculate how much farm gate prices for both bovines and ovines were affected (positively or negatively) by the introduction of WTO trading conditions.

In terms of processing, the core focus of this project, the focus was on quantifying the extent to which trade volumes and associated prices (per kilo) were affected. Where possible, this analysis was conducted on an individual commodity basis (i.e. by 8-digit product code) and these individual findings were then aggregated to assess the overall impact on an industry level. Where appropriate, this assessment also considered any price-shifts that needed to be accommodated in the event of trade restrictions in non-domestic markets for cuts that UK consumers do not favour. This step also

² The World Bank (2017) *Doing Business Rankings*, June 2017, <http://www.doingbusiness.org/rankings>

³ United States Agency for International Development, "Calculating Tariff Equivalents for Time in Trade", March 2007.

included examples of prices that processors may have to achieve for beef and lamb to remain competitive in the key export markets (e.g. Rungis, France)⁴ as well as consideration of how transport times from Northern Ireland to key EU markets would be affected.

At the retail level, the onward implications of WTO trading at the farm and processing levels for retail prices were assessed. Where appropriate, consideration was also given to what may be required to maintain current consumer prices. This included commentary on altering production systems (e.g. less intensive), finding new markets for offal and other cuts not consumed widely in the UK etc.

Having considered the potential impacts at each supply chain stage, an overall assessment of the impact of WTO trading on the Northern Irish beef and sheep industry was compiled both on a *bottom-up* and *top-down* basis. The bottom-up assessment examined the impact for each commodity group (e.g. boneless beef, beef offal etc.). The top-down approach was derived from the GTAP modelling exercise to understand the implications for activity in the Northern Irish beef and sheep meat sector and the wider UK economy. These assessments help to contextualise the results—for example, to compare the impact (in proportionate terms) to the overall effect on the UK economy and, potentially, other mainstream sectors.

⁴ Rungis is Europe's main meat market, located near Paris. See: <http://www.rungismarket.com/>

3. LITERATURE REVIEW

3.1 INTRODUCTION

Before assessing the impact of WTO trading on the beef and sheep meat sector, it is firstly useful to review existing literature to identify lessons which could be applied in a UK and Northern Irish context. As Brexit is unprecedented, the passage of negotiations from here is unknown. There are almost no examples of entire countries leaving trading blocs and none that are comparable to the UK departing from the EU, to offer insights on how a reversion to WTO trading conditions might evolve for the UK generally. How rules could vary within a nation that could give hints on how the specific circumstances facing Northern Ireland could be treated in a WTO context are also scarce. Yet history has one or two cases of departures from trading agreements and where trading regions intersect national boundaries.

3.2 PRECEDENTS FOR LEAVING THE EUROPEAN UNION

The EU has seen country territories leave its ranks, but not entire Member States; Algeria, Greenland and Saint Barthélemy. Greenland voted 52:48 (coincidentally the same as the UK) in favour of leaving the EEC, as it was then known, in 1982 after the introduction of home rule in 1979.

The Greenlanders were concerned by the EEC's (EU's) control over fishing rights. It took 3 years to complete the negotiations involving over 100 meetings, which, for an island of 56,000 residents, and realistically only one industry (fishing) and a far less complex EU in those days, suggests the Brexit talks might be far more onerous. The concluding agreement still left the EU in control of fishing rights but paid a hefty sum for the privilege. Still being part of Denmark, Greenlanders remain EU citizens and the EU provides considerable financial support. Furthermore, the Single Market (which they retained access to), is intrinsic to their fish goods, as is the Common Fisheries Policy, which, being out of the EU, they have no say over. This provides a lesson of the limits of freedom from the EU; if you still want to trade and travel, your new 'independence' can still be rather restrictive⁵.

Algeria was once part of the EEC, being a territory of France. However, in the same year as they gained their independence, 1962, they left the Community. Saint Barthélemy, a tiny Caribbean Island with less than 10,000 inhabitants is an overseas department of France and therefore was an outermost region

⁵ Mates. J.: *What Lessons can the UK Learn from Greenland Leaving the EU?* ITV News, May 2016
<http://www.itv.com/news/2016-05-10/what-lessons-can-the-uk-learn-from-greenland-leaving-the-eu/>

(OMR) of the EU. Due to its remoteness, distance from the EU and difficulties meeting EU regulations, it became an overseas country or territory (OCT). This was a political change with no implications to its economy or residents. No lessons can be gleaned from the event.

3.3 PRECEDENTS FOR REVERTING TO WTO TRADING CONDITIONS

When the UK entered the European Economic Community (EEC) in 1973, established trade patterns that the UK had with other (non-EEC) countries were broken. This was particularly the case with Commonwealth countries. Before 1973, Commonwealth countries exported most agricultural produce to the UK on a tariff-free basis due to the Ottawa Agreements of 1932. EEC accession meant joining a Single Marketplace, so trade agreements the UK had carved out in the past had to be either abandoned or negotiated into the new Single Market membership. Most, but not all were abandoned. One country where trade arrangements had to change pertinent to the red meat sector (and dairy products) was New Zealand. The UK's shift from the Ottawa Agreement to the EEC is akin to other Commonwealth countries losing a Free Trade Agreement with the UK. This is not an exact comparable to Brexit but is worthy of examination.

New Zealand's Trading Relationship with the UK

After the end of World War 2, the UK was in dire need of food supplies so undertook to purchase New Zealand's entire exportable surplus of meat, butter and cheese⁶. The arrangement was extended in 1948 for a 7-year period but as production rose in the UK, the exclusivity deal was broken in 1954. New Zealand started finding new export markets. By the time the UK announced it wished to join the (then) EEC in the 1960s, it was buying approximately half of New Zealand's food exports (*this is coincidentally similar to the EU's share of British exports today for goods generally*)⁷.

The UK's application for EEC membership was postponed partly out of loyalty to the Commonwealth regarding the trade it had been providing, and the UK's accession was arguably delayed as it negotiated special trade arrangements for New Zealand to the annoyance of the French⁸. Indeed,

⁶ Nixon. C., and Yeabsley, J., *Overseas trade policy*, Te Ara - the Encyclopedia of New Zealand, <http://www.TeAra.govt.nz/en/overseas-trade-policy> Published March 2010 (accessed April 2017)

⁷ The Economist; *Brexit, the New Zealand Precedent*. 11, Feb 2017. <http://www.economist.com/news/finance-and-economics/21716620-how-new-zealand-coped-loss-preferential-access-its-biggest>

⁸ Lemaitre P., *Britain Gives Cool Reception to the Six's Agreement on New Zealand Produce*. From Le Monde 23 June 1971. Extracted from cvce.eu

Harold Wilson, Britain's Prime Minister remarked that the EEC's agricultural policy was the main obstacle to entry, as it would have "a most serious and damaging effect on Commonwealth imports and upon our balance of payments"⁹.

As a result of these EEC-entry negotiations, the imports of New Zealand lamb into the UK (EU) have a Tariff Rate Quota (TRQ) allowance¹⁰. When the UK eventually joined the EEC in 1973, it was purchasing only a quarter of New Zealand's exports (*which has continued to fall to only 3% now*). This is partly because the transition away from UK trade dependence was 20-years old by then but also as the EEC had its own import tariffs and protectionist policies towards its farming industry, both of which disadvantaged New Zealand food imports. *The UK is hoping for an amicable settlement with the EU, as it seeks a free trade deal although the 'divorce' shares less goodwill and trade enhancing or protecting policies might not be so easy to achieve.*

The UK's EEC-accession had a considerable impact on trade flows very quickly but also spurred improvements of efficiency and accelerated New Zealand's search to develop new export outlets with lower trade barriers¹¹. They realised that these alternative markets were closer and therefore cheaper to ship to, and included many of the fast-growing populations and economies of the world¹². China, Australia and other members of the Pacific Rim now account for the majority of New Zealand's trade. *This sits uncomfortably with the UK because if Brexit means refocussing export arrangements with other countries that are not its immediate neighbours, trade would presumably cost more. The widely used Gravity Theory of Trade¹³ states that the greater the distance between two countries, the less they trade with each other.*

The UK's EEC accession, and consequential trade barriers, it adopted transformed New Zealand agriculture from a traditional to a forward-thinking industry. This was a key event that led New Zealand to implement radical agricultural policy reform in 1984, taking support from a high 40% of

⁹ Miller V., *The 1974-75 UK Renegotiation of EEC Membership and Referendum*. House of Commons Briefing Paper Number 7253, July 2015

¹⁰ Holland M., and Kelly, S., 'Britain, Europe and New Zealand', Te Ara - the Encyclopedia of New Zealand, <http://www.TeAra.govt.nz/en/britain-europe-and-new-zealand> Published June 2012 (accessed April 2017)

¹¹ The Telegraph; *Brexit; Lessons the UK could learn from nimble New Zealand*. 09 March 2016 <http://www.telegraph.co.uk/business/2016/03/08/brexit-lessons-the-uk-could-learn-from-nimble-new-zealand/>

¹² Refer to footnote 7

¹³ The Gravity Theory of Trade, was first presented in 1962 by Dutchman Jan Tinbergen who recognised the strength of trade flows is described using a gravitational metaphor, the closer and larger the trading blocs are, the stronger the trade links.

total farm output to almost nothing. Having gone through the transition and seeing the benefits of operating on the open market, New Zealand farmers now, on the whole, would not return to a protected industry. Whether this is because those who were dependant on support have left the industry, or whether they have simply found ways of operating at a higher level of efficiency is not clear. Whilst some farmers suffered, others thrived but some farming systems were reformed.

The EU has Free Trade Agreements with 18 of the 50 non-EU Commonwealth countries and has agreed FTA's with 14 others which await ratification or implementation. Of the remaining 18, the EU is in negotiation with 13 of them¹⁴. It is unknown whether UK exports to other Commonwealth countries would increase after Brexit. Indeed, short term they would be more likely to fall in the absence of any trade agreement (UK or EU FTA). Some Commonwealth countries might not want to agree a Free Trade Agreement and they would take time to negotiate even if they did. If trade with these countries increases, it would have to be from a concerted effort as the UK already benefits from so many FTAs between the EU and Commonwealth countries¹⁵.

Simply, if all producers globally are free to compete with each other unobstructed, the most efficient country per sector will win business at the expense of others. Thus, it is a concern to Northern Ireland and the rest of the UK that other 'agricultural heavyweight' countries potentially including New Zealand, Brazil, India and Canada might outcompete the UK at agriculture, whilst the UK wins business in the service sector or other areas where it can demonstrate greater competitive advantage.

The New Zealand-EU trade position and relationship is considered to be in '*reasonable shape*'¹⁶, but many exports from New Zealand to the EU are restricted by trade barriers, adding costs and preventing a full development of the opportunities of closer economic collaboration. Clearly, New Zealand is seeing its restrictions to trade as being obstructive to their growth.

Case studies like this illustrate the issues the UK might face in years to come if the free trade arrangement that we have come to almost take for granted comes to a sudden end. It is possible that British citizens or exporters have forgotten the complexities of trading outside of a Single Market and

¹⁴ Peers. S., *The Commonwealth and the EU: Let's do (trade with) both*. London School of Economics and Political Science (December 2015) <http://blogs.lse.ac.uk/brexit/2015/12/10/the-commonwealth-and-the-eu-lets-do-trade-with-both/>

¹⁵ *ibid*

¹⁶ The New Zealand International Business Forum; *Towards a New Zealand European Union FTA: A Business Perspective*. September 2015 <http://www.tradeworks.org.nz/wp-content/uploads/2015/09/NZIBF-NZ-EU-FTA-9-SEPT-2015.pdf>

this could be a shock to some if arrangements are not made to handle with the transition in two years' time.

Other countries provide lessons we can learn about the UK's forthcoming departure from the EU and how it might impact on the meat export trade; notice how Iceland, with a population of 300,000, comparable with the City of Belfast, has a trade agreement with China, but, according to some, if it were to accede into the EU, would have to forego it¹⁷.

After joining the Common Market, UK consumers found Australian butter was more expensive and therefore less available than EU alternatives. Therefore, the impact on the Australian dairy industry was substantial as there was a 90% fall in exports to the UK. However, with European alternatives, the UK consumer still had butter. Australian apple exports to the UK also fell by two thirds in 15 years. Oliver Hardwich points out in *The Australian* that when the UK announced it was to apply for EEC membership, the Australian Prime Minister said it was "the most important event of peace in his lifetime"¹⁸.

3.4 TARIFF-RELATED IMPACTS OF WTO TRADING

In the lead-up to the Referendum last year, several studies examined the potential implications of Brexit for farming under a range of scenarios including WTO trading. One of the most prominent of these was the NFU's report on the implications of Brexit for UK agriculture, completed on its behalf by LEI Wageningen UR¹⁹. This study considered both tariff and non-tariff impacts and concentrated on four trading scenarios for the UK as a whole namely, *Baseline* (EU membership), *free-trade agreement (FTA) between UK and EU*, *WTO default position* and *UK trade liberalisation*. It also included a range of agricultural policy assumptions namely, no changes to direct payments, 50% reduction in direct payments and no direct payments (rural development policy was assumed to remain unchanged). The study found that under FTA and WTO scenarios, UK domestic prices would increase. This was driven mainly by trade facilitation costs (encompassing customs checks and official controls checks to ensure that Rules of Origin and (Sanitary and Phytosanitary (SPS) rules are being adhered

¹⁷ Dartmouth W.; *Inconvenient Truths about UK Trade and the EU*, published by the Institute of Direct Democracy in Europe pub. 2016.

¹⁸ Hartwich O. M.; *A Necessary Shock*. The Australian 2 February 2011. www.theaustralian.com.au/arts/books/a-necessary-shock/news-story/3d2549d950c986e1703f6c62be520055

¹⁹ Berkum. S. van, Jongeneel, R.A., Vrolijk, H.C.J., Leeuwen M.G.A. van and Jager J.H.: *Implications of a UK exit from the EU for British agriculture*, Sponsored by National Farmers' Union (NFU), (2016) Warwickshire, UK. Available online via: <http://www.nfuonline.com/assets/61142>

to). Also, under a WTO scenario, these cost increases would be intensified by the UK no longer having to adhere to EU TRQ import concessions. It went on to state that higher farm gate prices would have a positive impact on domestic production but that domestic consumption would decline in most cases. *As mentioned above, given that New Zealand's TRQ with the EU has primarily arisen from its historic trading relationship with the UK, it is a big assumption that both the EU and New Zealand (as well as other WTO members) would permit the UK to trade using WTO rules whilst not adhering to at least a share of existing EU TRQ import concessions or providing additional TRQ for countries like New Zealand. As covered below, this issue is likely to emerge as one of the major challenges for the UK in negotiating its future trading relationship with all WTO members (including the EU).*

Under its trade liberalisation option, the NFU study implied a lowering of the UK's external tariffs by 50% and the impacts on the UK meat industry would be significant. Prices for animal products would decline, leading to a reduction in UK meat output. With lower domestic production, UK beef imports would increase whilst the trade balance for sheep meat would turn from positive (exports exceeding imports) to negative. As a result, meat prices in the UK and EU would start to deviate, making it difficult for the EU to export competitively to the UK. *From a beef and sheep meat perspective, such results would have a significant impact on Northern Irish production and would have a major impact on the Irish Republic's beef exports to the UK.*

In terms of farm incomes, the Wageningen study found that under most scenarios UK (Northern Irish) farm income would fall – the exceptions being under a FTA and WTO default scenario where direct payments are maintained to present levels. Where direct payments decline, farm incomes would fall with the most pronounced effects taking place under a liberal trade scenario where farm incomes could drop by almost 20% if direct payments were halved and by 30% if direct payments were removed completely. Under a WTO default scenario where direct payments reduce by 50%, the projected decline in farm incomes is slight (less than 5%). Although the effect on Northern Irish farm incomes by sector were not assessed in this study, the research highlighted that in scenarios where farm incomes did decline, both sheep and cattle farming sectors would be amongst the most severely affected. The study also highlighted that even with a full continuation of direct payments under a WTO trade liberalisation scenario, a projected 10% of UK cattle and sheep farms would show a decrease in viability.

Overall, these findings suggest that whilst it is possible for UK farm incomes to increase under a WTO scenario, this would be heavily dependent on a full continuation of direct payments as well as a significant curtailment of access for imports. Considering agriculture in the wider context of the UK

economy, including its small contribution to GDP, it is difficult to envisage such scenarios remaining in place over the long-term post Brexit.

The NFU study also outlined the percentage impact of the EU's MFN tariffs which range from approximately 30% to almost 90% depending on the type of meat and the degree to which it is processed. Table 13 in Chapter 5 shows the percentage impact of the EU's Common External Tariffs (CET) on selected Northern Irish beef and sheep meat commodities taking account of 2016 prices at the processing level.

The AHDB, as part of its *Horizon* series,²⁰ assessed how Brexit could impact the UK beef and lamb sector and published a summary of its findings in January 2017²¹. This report provided a useful summary of the effective tariff rate (i.e. the percentage impact of EU tariffs considering both the basic *ad valorem* component (e.g. 12.8%) and the fixed component (e.g. €176.80 per 100 kg) and showed that for beef and sheep meat products the tariffs range from 32% (frozen lamb carcasses) to 160% (other bone-in cuts). It also highlighted that as a commodity gains in value, the *ad-valorem* tariff will rise as it is calculated as a percentage of the good's value at the point of trade. Agricultural markets are inherently volatile and so as prices rise, so does the tariff in this scenario, thereby making proportionally equal impact on farmgate prices regardless of value. However, the fixed rate tariff, which is applied regardless of commodity price, becomes increasingly burdensome as farmgate prices fall. Another of the *Horizon* papers, that focusses on what Brexit might mean for UK trade of agricultural outputs²², identifies that the fixed component becomes a progressively greater proportion of the value of the good as the cost of the tariff passes back up the supply chain. If something is exported directly from the farm, it will be of lower value than if it has undergone some processing and the fixed tariff will be a major component of its value. Similarly, something that has undergone value adding before export, its *ad valorem* tariffs, if passed back along the supply chain become increasingly prohibitive unless the processors margins reflect the new tariff costs. The impact could be strongly detrimental to farmers of commodities that are exported. Once again, to see examples of such tariffs, refer to Table 13 in Chapter 5.

²⁰ AHDB Brexit 'Home Page' <http://www.ahdb.org.uk/brexit/default.aspx>

²¹ AHDB Market Intelligence Horizon Paper: *What might Brexit mean for UK trade in beef and lamb products?* Dec 2016: http://www.ahdb.org.uk/brexit/documents/BeefandLamb_bitesize.pdf

²² AHDB Market Intelligence Horizon Paper: *What might Brexit mean for UK trade in agricultural products?* October 2016 www.ahdb.org.uk/documents/Horizon_Brexit_Analysis_Report-Oct2016.pdf

From a Northern Irish perspective, the recently published InterTradeIreland study²³ provides a range of detailed projections on how WTO could potentially affect cross-border trade under three scenarios. As Table 7 shows, the study forecasts that, by applying the WTO tariff schedule (Scenario 1) to 2016 trade levels, total cross-border trade for all goods between the UK and Ireland will decrease by 9%. If non-tariff barriers were added to this (i.e. under Scenario 2), cross-border trade would reduce by 16%, almost double that of Scenario 1. Scenario 3 modelled the effect of a 10% reduction in the value of Sterling (i.e. decline from €1=82p to €1=90p) and found that this led to a further 1% reduction in total cross border trade, resulting in a 17% decline. In Scenario 3, decreases in trade from ROI to NI and GB were partly offset by increases in the opposite direction with GB to ROI trade rising by 0.3% whilst the decrease in NI to ROI trade declines reduced from 19% (Scenario 2) to 11%.

However, changes in overall trade flows disguise a wide variation between sectors as Table 7 also illustrates. For live animals, trade flows from ROI to NI decrease significantly across all scenarios. The smallest decline (-15%) is projected under Scenario 1 but this doubles under Scenario 3 (-30%). NI to ROI trade also declines across all scenarios, although with the weaker Sterling making exports from NI more competitive (as in Scenario 3), it offsets most of the decline. Meat and fish trade also shows a similar trend, although the declines from ROI to GB (-36% to -65%) are much more pronounced than in other sectors. This reflects the importance of the GB market to meat processors in the Republic of Ireland and also shows the potential impact on the application of tariffs to higher value cuts (e.g. boneless beef) as opposed to the carcass trade which is more prevalent between NI and ROI. This potentially presents an opportunity for Northern Irish processors to displace ROI exporters – a point which is examined in more detail in Chapter 6. The projected changes in dairy trade flows are also included for reference purposes and the projections highlight that NI-ROI trade (in both directions) could shrink by more than 50% when tariff and non-tariff barriers are considered.

²³ Inter Trade Ireland: *Potential Impact of WTO Tariffs on Cross-Border Trade*. June 2017
www.intertradeireland.com/media/InterTradeIrelandPotentialImpactofWTOTariffsResearchReportFINAL.pdf

Table 7 - Trade Flow Effects of Alternative Scenarios in Selected Sectors by Value

Product Type	Scenario	ROI to GB	GB to ROI	ROI to NI	NI to ROI	Total Cross-Border
2016 Trade (€ million)		13,400	15,600	1,646	1,050	2,696
Percentage Change						
All goods	1: WTO (tariffs) only	-8%	-3%	-8%	-11%	-9%
	2: WTO +NTB	-12%	-6%	-14%	-19%	-16%
	3: WTO+NTB (10% ex rate)	-20%	+0.3%	-21%	-11%	-17%
Live animals	1: WTO (tariffs) only	-2%	0%	-15%	-18%	-15%
	2: WTO +NTB	-5%	-2%	-21%	-11%	-20%
	3: WTO+NTB (10% ex rate)	-11%	4%	-30%	-3%	-29%
Meat and fish	1: WTO (tariffs) only	-36%	-18%	-31%	-21%	-28%
	2: WTO +NTB	-54%	-30%	-51%	-35%	-47%
	3: WTO+NTB (10% ex rate)	-65%	-21%	-62%	-26%	-52%
Dairy	1: WTO (tariffs) only	-28%	-19%	-31%	-39%	-37%
	2: WTO +NTB	-48%	-39%	-54%	-65%	-62%
	3: WTO+NTB (10% ex rate)	-59%	-29%	-66%	-52%	-51%

Source: InterTradeIreland (2017)

Overall, this study provides some very useful top-level insights on how WTO trading could affect cross-border trade across the UK and Ireland. It also contains some noteworthy points on Inward (and Outward) Processing authorisations (see Appendix A of the InterTradeIreland report) which allows an EU Member State to apply for a permission for duties on products to be imported from (or exported to) a non-EU country for processing to be suspended until the end-product is produced. However, under these regulations, meat is treated as a “sensitive product” and the onus is on companies applying for such authorisations to prove that the products in question qualify. So, whilst such authorisations may be deployed in some circumstances, administrative and regulatory costs would still apply and negatively affect cross-border trade. Furthermore, the report also hints that the additional administration costs associated with WTO trading are likely to have a larger impact on smaller firms. This issue is explored further in Chapter 6.

3.5 NON-TARIFF BARRIERS (NTBs)

The tariffs that importers and exporters pay to move goods into other trading blocks are measurable and predictable. However, the non-tariff barriers that have to be overcome can become considerable. They can amount to large costs and delays. Time costs money and as a result, delivery of goods have,

in the last 45 years become tailored to specific orders, leading to 'just-in-time' food supply. The delays are more critical to rapidly perishable goods such as newspapers and food. Before the UK joined the EEC, the majority of meat traded was frozen for that reason. Now, meat consumers are considerably more sophisticated and the demand for fresh (chilled) meats is 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. The OECD report on trade costs reports that non-tariff barriers 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. However, it also notes that the additional time taken to cross borders often adds up to even more, especially if it makes the goods valueless.

The InterTradeIreland report covered in the previous section cited a study (by Kee et al)²⁴ commissioned by the World Bank in 2009 which estimated that the average *ad-valorem* equivalent of non-tariff barriers is 12%. However, the InterTradeIreland study also suggested that richer countries tend to impose lower barriers on trade and using findings from a 2016 study (by Dhingra et al)²⁵, it decided to assume a non-tariff barrier *ad-valorem* equivalent of 3% (i.e. a quarter of the 12% figure shown above). Admittedly, gauging the impact of non-tariff barriers is very difficult, particularly for perishable products such as chilled meat.

Galvao de Miranda and Barros (2010)²⁶ stated that trade barriers, particularly non-tariff barriers are particularly high in the meat trade with sanitary, technical, and other quality standards. They highlight that Brazil is particularly vulnerable to these barriers, with a large volume of beef exports from the country. They also point out the trade vulnerabilities when a part of a country has succumbed to a notifiable livestock disease such as a Foot and Mouth outbreak. Even when the disease has been controlled, trade restrictions remain in place in many countries for a considerable length of time.

The New Zealand farming industry receives minimal direct aid, and, being a net exporter has trade barriers to contend with. A declining tariff barrier over the years has facilitated trade, but the gradual

²⁴Hiau Looi, K., Nicita, A., and Olarreaga, M., (2009): *Estimating Trade Restrictiveness Indices*. in The Economic Journal, 119 (January 2009), 172-199.

²⁵ Swati, D., Ottaviano, G., Sampson, T., and Reenen J. V. (2016): *The consequences of Brexit for UK trade and living standards*. Centre for Economic Performance, London School of Economics, Paper Brexit 02

²⁶ Sílvia Helena Galvão de Miranda and Geraldo Sant'Ana de Camargo Barros. 2009. *The Application of Intervention Models to Non-Tariff Trade Barriers: A Case Study of Brazilian Beef Exports*. Journal of International Agricultural Trade and Development 5 (2): 255-72.

rise of non-tariff barriers is more costly. Analysis by the New Zealand Institute of Economic Research²⁷ suggests the cost of non-tariff trade barriers is 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 USDA²⁸ 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 study points out usefully that as (formal) trade tariffs are negotiated down between trading regions, the 'less formal' non-tariff measures tend to rise. These are more difficult to regulate on a WTO basis, as they are difficult to quantify. Indeed, an article on the MeatexportNZ website highlights²⁹ that sometimes they are quietly implemented with no negotiation and only come to light when the consignment is at the border crossing.

Furthermore, some of these regulations are in place to protect human health, such as meat sanitary regulations, so they are hard to legislate against. Thus, costly procedures such as mandatory inspections of lorries can be prohibitively expensive. Even legitimate trade controls are expensive. This is the kind of trade barrier that the UK is likely to encounter with the EU even if a Single Market access is negotiated. The border between Northern Ireland and the Republic of Ireland, being the only land border between the UK and the EU will be a critical barrier. Whether a large wall with passport control, inspection bays, armed border staff and so on, a *light-touch* border which is more similar to the M6-toll booth in Britain (the old M-50 toll-booth in Dublin might also be a relevant example) or potentially even less will make a considerable difference to the day-to-day trading patterns that the Irish communities have developed over the last 20 years. This is unknown with little hint of which way the negotiations might head.

In the light of the failure of the World Trade Organisation to reach agreement on any deal involving all countries, the World is gradually agreeing more and more bilateral trade agreements between two distinct regions. The recently agreed, but not yet implemented, EU and Canada 'CETA' deal is one such example. These negotiations focus on the reduction and removal of the tariffs, and less on the non-

²⁷ Ballingall, J., and Pambudi, D., *Quantifying The Costs Of Non-Tariff Measures In The Asia-Pacific Region: Initial Estimates*, Nzier Public Discussion Paper 2016/4 Pub Nov 2016 <https://nzier.org.nz/publication/quantifying-the-costs-of-non-tariff-measures-in-the-asia-pacific-region-initial-estimates-nzier-public-discussion-paper-20164>

²⁸ Lee-Jones, D., USDA Foreign Agricultural Service. *New Zealand Livestock and Products Annual*. January 2011, GAIN NZ1112 https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Annual_Wellingto_n_New%20Zealand_9-2-2011.pdf

²⁹ Karapeeva, S., *Non-Tariff Barriers Costly For Meat Business*. Pub; June 2016 <http://meatexportnz.co.nz/2016/06/09/non-tariff-barriers-costly-for-meat-business/>

tariff barriers. To this extent, some consider that non-trade tariffs are in effect replacing the tariffs and thereby ensuring the barriers to trade are as costly as they ever were. The Australian Meat Industry Council calculates the impact of such non-tariff barriers 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 product³⁰. Dean *et al* in a report by the US International Trade Commission³¹ suggest that awareness of the NTBs might simply be rising as the tariffs are in decline, it focusses the attention to what is left.

Trade restrictions can hamper the value of goods in convoluted ways, especially those where bi-products are produced. Carcasses amount to a series of several cuts of meat, with varying demand by the home market, meaning exports are necessary to maximise the value of the carcass³², and this 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.

3.6 OTHER TRADE RELATED IMPACTS

Multilateral Resistance

The situation is more complicated than the bilateral UK-EU relationship described above. Research has demonstrated³³ 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 the EU, China, South East Asian countries etc.). This is referred to as '*Multilateral Resistance*'³⁴. Multilateral Resistance issues are likely to become more prevalent if the UK departs the EU and then changes its standards. Importers from Third Countries which previously traded with the UK on the basis of EU standards could become hesitant about importing UK produce until they are satisfied that the new UK standard still conform to their

³⁰ Condon, J., *Impact from Non-Tariff Trade Barriers on Red Meat explodes to \$3.4bn*. Pub: BeefCentral December 2016 <http://www.beefcentral.com/trade/impact-from-non-tariff-trade-barriers-on-red-meat-explodes-to-3-4b/>

³¹ Dean, J. M., Feinberg, R., Signoret, J. E., Ferrantino, M., Ludema, R., *Estimating the Price of Non-Tariff Barriers*. Office Of Economics Working Paper U.S. International Trade Commission No. 2006-06-A(r) 2009 <https://www.usitc.gov/publications/332/EC200606Ar.pdf>

³² International Meat Trade Association: *The Future of the UK's Trade Policy for the Meat Sector post Brexit*: IMTA Policy Position. 2017.

³³ Anderson J. E. and E. van Wincoop, 2003, *Gravity with Gravitas: A Solution to the Border Puzzle*, American Economic Review 93(1), 170-192. <https://ideas.repec.org/a/aea/aecrev/v93y2003i1p170-192.html>

³⁴ Chen, N., Novy, D., *Many trade barriers remain high in the EU*. 2009. <http://voxeu.org/article/zero-tariffs-and-high-trade-costs-eu-technical-barriers-trade>

requirements. Two countries with Free Trade Agreements with a single country effectively adopt a mutual free trade agreement. Trade could enter one country from the other via the mutual country. Even if Country of Origin certification is in place, displacement trade would occur. This is why TRQs are imposed, limiting the amount of trade with each other.

It is also noteworthy that CETA includes an agreement on the possibility of a future rule of origin 'Cumulation' for third countries that have a Free Trade Agreement with both the EU and Canada. This would allow material of the third country to be taken into consideration when determining where a product is originating from under CETA. For example, if the UK agreed a trade deal with both the EU and Canada, ingredients produced in the UK could count towards the originating status of food products produced in the EU or Canada. Such an arrangement would certainly support existing supply chains.³⁵

CETA took seven years to negotiate and Canada does considerably less business with the EU than the UK does with the remaining Member States. The service sector, particularly financial services is complex and might require considerable time to negotiate a trade deal. However, the UK starts from a position of aligned markets for all goods and services so many have suggested that notwithstanding the volume of trade undertaken, the regulations and terms of trade should be negotiable in a considerably shorter period of time than CETA was.

Internal Trade Barriers and Divergences

Due to the Good Friday Agreement and the specific circumstances with regards 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. Arguably, this could give rise to some form of internal trade barriers that could affect domestic UK trade flows. Accordingly, it is worth examining internal trade barriers and divergences that exist in other countries as well as with territories which are British Crown Dependencies although not officially part of the UK.

Canada

There are diverging trading standards between Canadian States despite a constitution outlining free trade throughout the entire country since 1867. Barriers for trade between the 13 provinces and territories have been built over 150 years of aggressive and often self-defeating competition. Regional

³⁵ Haverty, M., Inside Track November 2016. [Insidetrack.org.uk](http://insidetrack.org.uk)

regulations imposed, largely to protect a weak industry within States have grown out of proportion meaning that trade patterns are unusual; for 21 years, Quebec had a rule outlawing butter-coloured margarine, thereby protecting its own struggling dairy industry³⁶. Heavy road consignments require licences to travel on the roads of each region in Canada, and these licences can take half a year to be issued. The purpose of this is to encourage near-by business. Unfortunately, though, as often as not, purchases are made via the US rather than from neighbouring Canadian States³⁷. This demonstrates just how disruptive and self-defeating the use of non-tariff barriers can be. It is a possibility that the UK might develop a greater 'micro-patriotism'.

The devolved countries of Scotland, Wales and Northern Ireland are more patriotic than England. However, trading routes identify no restrictions between them other than water and local preference in some cases. Greater powers of devolution coupled with the differences identified in each devolved region at the Brexit referendum might spark a rise of localism. This could become particularly relevant if Northern Ireland has some form of special status within the UK that permits it to trade with the Republic of Ireland (and hence the EU) similar to the *status quo*. Such an arrangement could have implications for its trade with GB and it is for this reason that the Canadian model becomes relevant. A divisive UK would be very painful for both trade and prosperity.

Cyprus

One possible, but less than ideal, example of how a trading relationship between Northern Ireland and the Republic of Ireland might work is by examining the Cypriot model. The island of Cyprus is within the EU, but only half of it (i.e. the southern half) is recognised as within the Single Market. This is because the Government of the Republic of Cyprus does not exercise effective control in the northern part (occupied). The area where the Government does not exercise effective control (also known as the Turkish Republic of Northern Cyprus (TRNC)) operates as a separate State. It is only recognised by Turkey. The two parts of the island are divided by a Green Line buffer zone, which is patrolled and guarded like a country border³⁸. This means that the border controlling the movement

³⁶ CBC News, *Resolving Canada's Conflicted Relationship with Margarine*, 09 July 2008, <http://www.cbc.ca/news/technology/resolving-Canada-s-conflicted-relationship-with-margarine-1.741363>

³⁷ The Economist; *Canada's Internal Trade; The Great Provincial Obstacle Course*. 23 June 2016.

³⁸ Parliamentary Publications <https://www.publications.parliament.uk/pa/cm200708/cmselect/cmeuleg/16-xxx/01610.htm>

of goods (and people) into and out of the Common Market is through the centre of the country and not around it.

There are special rules regarding the trade of goods between the two sides of Cyprus. Trade that moves from the area the Government of the Republic of Cyprus does not exercise effective control to area which it does, is governed by the so called Green Line Regulation (GLR)³⁹. It states that Turkish Cypriots (Northern Cyprus) can only sell goods produced or manufactured locally into the South. They cannot sell goods from Turkey. Since 2004, the TRNC Government has reciprocated, legalising imports of goods produced in Southern Cyprus as long as they are accompanied with relevant documentation demonstrating they originate from Southern Cyprus. Goods imported into Southern Cyprus cannot be further traded into the North. Irish Beef cannot therefore enter Northern Cyprus routed via Southern Cyprus. Many traders though are aware these regulations are fluid and can change at any time whilst import licences into the North can take a long time to be issued (or not at all). This inhibits investment in building trading links between the two sides of the divided country⁴⁰. Ikea, who built an outlet in Nicosia in Southern Cyprus in 2007 found these issues as soon after, residents from Northern Cyprus started travelling south to visit the store for their own consumption. This contravened trade regulations and controls were implemented to stop it⁴¹. There are also other issues caused by a lack of cooperation between the two governments such as double charging of VAT.

This leads us to consider the implications in Ireland. The Cypriot arrangement is functional but clearly not ideal, possibly primarily because of lack of cooperation. A similar relationship between Northern Ireland and the Republic of Ireland could work with greater collaboration, partly because Northern Ireland is recognised by the Irish Republic as being part of the UK. Clearly, the evidence of Country of Origin paperwork would be required, which would cause delays and administration costs, but it is potentially one solution to the trading border. A collaborative approach would, one would expect, keep the costs of Country of Origin bureaucracy down, and other non-tariff barriers that tend to be lower in more developed countries. As the economy per capita in Northern Cyprus is about half that

³⁹ Republic of Cyprus: *Customs and Excise Department: Information for Passengers and Public*
<http://www.mof.gov.cy/mof/customs/customs.nsf/All/05AEEF243C9BFC8BC22572BF002D0A28>

⁴⁰ Apostolodes. A., *How Cross Border Trade Works (Cyprus)* January 2013
www.embargoed.org/news.php?news_id=178

⁴¹ BBC News: *Ikea Sparks New Row in Cyprus Politics. January 2008*
<http://news.bbc.co.uk/1/hi/business/7176583.stm>

of the South, means a substantial differential in wealth is separated by the Green Line, something that is less evident in the Irish situation, this too should facilitate smoother trade.

The Channel Islands

The Channel Islands are part of the EU for Customs purposes but are not part of the fiscal (VAT) territory. All goods imported from the Channel Islands must be declared to Customs and are liable to import VAT. When EU goods move direct between the Channel Islands and the UK (in either direction), no Union Transit or status documents are needed, as long as the movement is cleared at the frontier. A Union Transit documentation will be required, however, if the goods are to be cleared inland in the UK or are to pass through the UK to another member state of the EU.

The Isle of Man

As a general rule goods moving between the Isle of Man and the UK, including any previously imported from non-EU countries on which duty has been paid, are considered not to be imported into or exported from either the Isle of Man or the UK. These goods aren't subject to customs control other than controls applicable to similar goods moving on the British mainland.

3.7 OTHER IMPLICATIONS OF BREXIT

The House of Lords report on Brexit and its impact on UK-Irish relations⁴² is clear on its concern over the impact that Brexit might have on the special relationship the UK has with the Republic of Ireland and how Great Britain has played a role (with others) in advancing the Northern Ireland Peace process. The report suggests therefore that the impacts of Brexit could be more profound than trade alone and more for the Republic of Ireland than any other remaining Member State and discusses the Common Travel Area as an example. The study continues to suggest that the unique nature of UK-Irish relationship necessitates a unique solution.

3.8 CONCLUDING REMARKS

This literature review confirms that there are no real precedents to Brexit which are applicable to the UK-EU context and whilst territories have left the EU in the past, the process is arduous, even where only a small population is concerned. Where trading relationships have reverted back to WTO trading

⁴² House of Lords European Union Committee. 6th Reports of Session 2016-17: *Brexit: UK-Irish Relations December 2016* <https://www.publications.parliament.uk/pa/ld201617/ldselect/ldeucom/76/76.pdf>

conditions, there was a considerable impact on agricultural trade. Although NTBs are frequently cited as an impediment to trade, the extent of their impact varies considerably amongst previous studies and it is difficult to draw inferences that would be appropriate for UK-EU trade. Whilst there are variations in trading relationships within territories, caution needs to be exercised to ensure that no internal trade barriers are created between Northern Ireland and the rest of the UK post-Brexit. This need, however, has to be balanced against the terms set out in the Good Friday Agreement. Whilst the example of Cyprus offers some insights as to how a trading relationship across two jurisdictions on one island could be handled in a post-Brexit scenario to permit cross-border trade to take place, it is far from ideal and will leave numerous challenges to overcome. These issues will be examined further in the remainder of the report once some context has been provided via an overview of the Northern Irish and UK beef and sheep meat sectors.

4. NORTHERN IRELAND AND UK BEEF & SHEEP MEAT INDUSTRY OVERVIEW

4.1 NORTHERN IRELAND MARKET OVERVIEW

According to DAERA⁴³, the Northern Irish beef and sheep meat processing sector accounted for approximately 27.5% of the gross output of the Northern Irish food and drinks sector in 2015. DAERA also estimates that the beef and sheep meat industry directly employs more than 4,750 people across Northern Ireland. For agriculture and food and drink processing generally, another DAERA study⁴⁴ estimates that these industries account for 3.3% of the gross value added (GVA) in Northern Ireland during 2016, significantly more than the UK equivalent (2.1%). In terms of employment, DAERA estimates that agriculture, forestry and fishing accounts for 3% of total employment whilst food and drink processing accounts for an additional 1.7%. This is significantly more than in the UK generally where agriculture, forestry and fishing represents 1.1% of employment whilst food and drinks processing accounts for 1.3%. Therefore, relative to the UK, the agri-food sector is much more important to the Northern Irish economy and is a major contributor to the wider rural economy. It is also important to note that around 40% of Northern Ireland's population live in rural areas⁴⁵.

In this study, industry output estimates were compiled in terms of value (£m) and volume (tonnes). Table 8 shows that the estimated output of the Northern Irish beef and sheep meat sector for 2016 is valued at £1.1 billion, up 6.1% on 2015. Edible beef and sheep meat (£1.05 billion) account for the vast majority of this with sales up 6.4% on 2015 which was a relatively poor year in comparison with 2014 and 2016. In volume terms, just over 276,000 tonnes of edible beef and sheep meat were dispatched in 2016, a rise of 1.8% on 2015. These results are aligned with the industry view that the weaker exchange rate experienced in the latter half of 2016 has contributed to price rises and has helped to make Northern Irish produce more competitive against produce from the Eurozone (including the Republic of Ireland).

⁴³ DAERA (2016) *Size and Performance of the Northern Ireland Food and Drinks Processing Sector, Subsector Statistics 2014, with provisional estimates for 2015*, May 2017, <https://www.daera-ni.gov.uk/sites/default/files/publications/dard/Size%20and%20Performance%20NI%20Food%20%26%20Drink%202014-15%20Final.pdf>

⁴⁴ DAERA (2017) *Northern Ireland Agri-Food Sector Key Statistics, June 2017*, <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/Northern%20Ireland%20Agri-food%20Sector%20Key%20Statistics%202017.pdf>

⁴⁵ DAERA (2016) *Statistical Review of Northern Irish Agriculture*, <https://www.daera-ni.gov.uk/sites/default/files/publications/daera/16.17.255%20Stats%20Review%202016%20final.PDF>

Table 8 - Northern Ireland Beef and Sheep Meat Output 2014 to 2016 (£ million)

Product Category	2014 (£m)	2015 (£m)	2016 (£m)
Beef carcasses	13.0	8.9	5.7
Beef cuts	897.4	884.3	949.2
Edible beef offal	28.0	22.0	26.2
Lamb carcasses	16.7	12.0	10.0
Lamb cuts	62.0	59.6	59.2
Edible lamb offal	3.2	3.1	2.7
Total edible meat output	1,020.4	989.9	1,053.0
Miscellaneous (incl. hides, inedible offal)	49.6	46.6	47.0
Total output (£)	1,070.0	1,036.5	1,100.0

Source: The Andersons Centre (2017)

4.1.1 Northern Ireland Trade – Inputs

When assessing the impact of WTO trading on beef and sheep meat, it is important to examine trade from both an inputs and outputs perspective. Table 9 provides a breakdown of the origin of live animals used by the Northern Irish beef and sheep meat industry during 2016. As one would expect, animals sourced in Northern Ireland dominate and account for 94% of the total cattle slaughter (429,618 head) and virtually all of the sheep kill (453,041 head). The data also indicate that there is a significant cross-border trade in cattle with the Irish Republic (23,173 head) which accounts for around 5% of the 2016 kill. Please note that these Republic of Ireland figures include animals imported directly for slaughter (10,580 head) and animals born in ROI and sent to Northern Ireland for further breeding and production before being slaughtered in Northern Ireland (12,593 head). This trade would be affected by the imposition of WTO trading conditions.

The Northern Irish beef and sheep meat industry also sources significant volumes of meat inputs for further processing. Imported meat inputs from the Republic of Ireland are significant, totalling nearly 49,000 tonnes, virtually all beef. Non-EU inputs feature most prominently within the sheep meat category, and as Figure 3 below for the UK sheep meat sector indicates, imports from New Zealand features prominently.

Table 9 - Breakdown of Northern Ireland Cattle and Sheep Slaughtering – 2016

Animal Type	Total Slaughtered (Head)	NI Origin	GB Origin	ROI Origin
Steers	164,726	94%	0%	5%
Heifers	115,363	97%	0%	3%
Young Bulls	37,870	98%	0%	2%
Cows	99,943	88%	3%	9%
Bulls	4,176	87%	0%	13%
Calves	7,540	100%	0%	0%
Total Cattle	429,618	94%	1%	5%
Sheep & Lambs	423,896	100%	0%	0%
Ewes and Rams	29,145	100%	0%	0%
Total Sheep	453,041	100%	0%	0%

Source: The Andersons Centre (2017)

4.1.2 Northern Ireland Trade – Outputs

From a geographical perspective, Table 10 provides a breakdown of NI beef and sheep meat sales by both immediate customer and end-customer markets for 2016. It reveals very little difference between both categories. During the primary research, respondents were asked to provide sales estimates on the basis of both immediate customer and end-customer to help determine whether there were any major differences that needed to be accounted for in the analysis. Overall, it shows a minimal degree of variation. Admittedly, some processors found it difficult to ascertain sales by end-customer and where they were unsure, they advised the project team to use the same immediate customer sales breakdown for end-customers. For the GTAP analysis presented in Chapter 5, it was decided to use sales by immediate customer as the basis for the modelling as it is based on trade flows. However, for other segmentations of NI sales presented in this Chapter, they are presented on an end-customer basis because for categories such as hides, these are believed to be more meaningful to readers.

Table 10 also shows that;

- The domestic (UK) market represents almost 80% of sales in both categories. Great Britain is the dominant market accounting for over 70% of sales whilst the local Northern Irish market (circa 9%) is relatively small.
- On an end-customer basis, the EU-26 market (£123.6 million) is somewhat larger than the Republic of Ireland (£71.1 million).

- The Non-EU end-customer market (£28.0 million) whilst relatively small in value terms performs an important market clearing/carcase balance function is a critical outlet for parts of the carcase that UK consumers do not utilise.

Table 10 - NI Beef and Sheep Meat Sales by Geography and Customer Type (2016)

Geographic Region	Immediate Customer		End Customer	
	£ million	% Total	£ million	% Total
UK (NI and GB)	869.0	79.0%	877.3	79.8%
Republic of Ireland	81.0	7.4%	71.1	6.5%
EU-26	124.7	11.3%	123.6	11.2%
Non-EU	25.3	2.3%	28.0	2.5%
Total sales	1,100.0	100.0%	1,100.0	100.0%

Source: The Andersons Centre (2017)

From a product category perspective, Table 11 segments end-customer sales by geographic region for 2016. It shows that beef cuts (including boneless beef) is the most significant category with an 86% share of total output. Of this £949 million, the GB market (£706 million) has a 74% share, followed by the EU with a 10% share. Whilst beef offal sales (£26 million) are relatively small, it is noticeable that the non-EU market features more prominently, with 13% of category sales. Similarly, for miscellaneous products including hides, non-EU markets have a 32% share (£47 million). In an industry where net margins are less than 2%, such markets make a significant difference because otherwise these marginal products would be used for pet-food (at much lower prices) or sent to waste (incurring additional disposal costs).

Table 11 – NI Beef and Sheep Meat Sales by Product Category and Region (£M) - 2016

Product Type	NI	GB	ROI	EU-26	Non-EU	Total (£M)
Beef carcasses	3.9	0.9	0.7	0.1	0.0	5.7
Beef cuts (incl. boneless)	79.0	706.4	59.8	94.6	9.3	949.2
Edible beef offal	6.6	9.8	1.8	4.7	3.3	26.2
Lamb carcasses	0.7	2.4	3.0	3.9	0.0	10.0
Lamb cuts (incl. boneless)	5.5	39.3	4.7	9.7	0.0	59.2
Edible lamb offal	0.2	1.5	0.7	0.2	0.1	2.7
Total edible meat output	96.0	760.3	70.7	113.2	12.7	1,053.0
Miscellaneous (incl. hides, inedible offal)	4.0	16.9	0.3	10.4	15.2	47.0
Total output	100.1	777.2	71.1	123.6	28.0	1,100.0

Source: The Andersons Centre (2017)

For sheep meat categories, sales of lamb cuts (£59 million) represent the bulk of total output (£72 million). The GB market dominates with a 66% share of lamb cuts sales. Lamb cuts' exports to the EU-26 account for 16% of the category total. The EU-26 market is also a leading destination for lamb carcasses with an estimated 39% share of sales. Given the volume of lambs reared in Northern Ireland each year (1 million⁴⁶), these figures for sheep meat trade appear to be relatively small. However, these estimates do not include live exports to the Irish Republic which are estimated at around 400,000 head each year according to official Irish estimates. The value of this live sheep trade with the Republic of Ireland is estimated at around £31.5 million.

4.2 UK BEEF AND SHEEP MARKET OVERVIEW

Table 12 summarises UK beef and sheep meat production, trade and consumption in 2016. It shows that;

- UK domestic production is valued at just over £4.8 billion, with beef (£3.4 billion) accounting for 71% of this total.
- Total imports are valued at just over £1.6 billion and the majority of these come from the EU (£1.1 billion). This is primarily due to the substantial volumes of Irish beef imported into the UK which according to the Irish Central Statistics Office is valued at €1.1 billion (£946 million).
- Non-EU imports feature prominently in the sheep meat sector, mainly due to significant volumes of New Zealand lamb being purchased at certain times of the year.
- UK beef and sheep meat exports (£782 million) are just under half the value of imports with EU markets account for the vast majority (91%) of total exports.

As noted above for Northern Ireland, although Non-EU exports may appear to be small, these markets play a critical carcass-balancing role as they consume parts of the carcass that UK consumers have minimal demand for.

Table 12 also includes consumption estimates which have been derived from domestic production and imports, less exports. From a processing perspective, UK beef and sheep meat market is valued at over £5.6 billion and consumed around 1.5 million tonnes during 2016. Based on a population of 65 million, this puts UK per capita consumption of beef and sheep meat at nearly 23.6 kg per year.

⁴⁶ DAERA (2017) *Farm Animal Populations*, June 2017, <https://www.daera-ni.gov.uk/publications/farm-animal-population-data>

Within this beef consumption is estimated at 18.3 kg/capita whilst sheep meat is just over 5.2 kg/capita.

Table 12 - UK Beef and Sheep Meat Estimated Output (Edible Meat only) – 2016

	Beef and edible offal		Sheep meat and edible offal		Total beef and sheep meat	
	£m	Tonnes	£m	Tonnes	£m	Tonnes
Domestic production	3,427.5	994,800	1,381.2	326,587	4,808.7	1,321,387
Imports	1,260.1	354,670	366.3	99,352	1,626.4	454,022
- EU	1,062.9	306,733	38.5	11,119	1,101.4	317,852
- Non-EU	197.2	47,937	327.8	88,233	525.0	136,170
Exports	445.5	159,226	336.9	85,086	782.4	244,312
- EU	388.2	127,380	325.1	79,117	713.3	206,497
- Non-EU	57.2	31,846	11.8	5,969	69.0	37,815
UK consumption	4,242.1	1,190,244	1,410.6	340,853	5,652.8	1,531,097

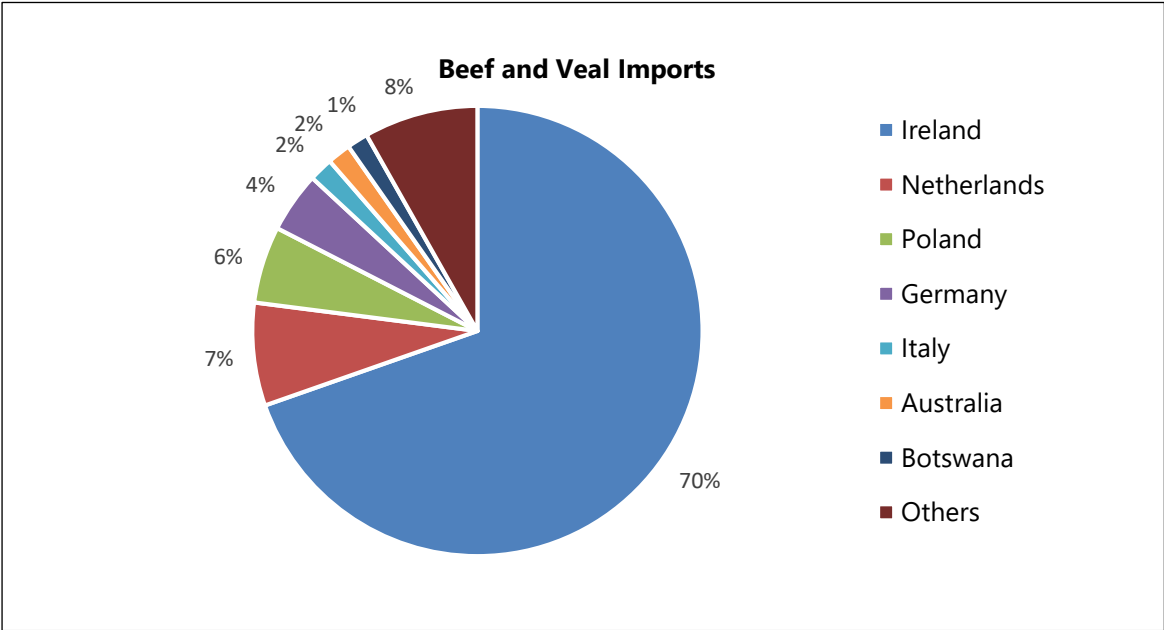
Sources: The Andersons Centre calculations based on AHDB, HMRC and DEFRA data.

Looking at UK trade in further detail, Figure 1 and Figure 2 give a breakdown of UK beef and veal trade (excluding offal) for imports and exports respectively during 2016. Figure 1 highlights the dominance of Ireland which represents 70% of total imports. The Netherlands (7%) is also noteworthy although a significant proportion of this is likely to be imports via Rotterdam (i.e. 'the Rotterdam effect'). Polish and German imports together represent 10% of the total and signifies the emergence of Poland in particular as a significant beef producer in recent years. The data suggest that non-EU markets are minor with only Australia (2%) and Botswana (1%) featuring amongst the leaders. Brazil (3,650 tonnes) was just outside the leading countries which was around 300 tonnes lower than Botswana.

Ireland also features prominently as an export market, accounting for nearly one-third of UK exports. The Irish Central Statistics Office (CSO) estimate that exports from Northern Ireland to the Irish Republic accounted for about 15% of total UK volumes in 2016. The vast majority of UK exports to Ireland emanate from Great Britain, and consists of a variety of carcass, boneless and bone-in beef. The Netherlands (23%) is also a significant export market but, once again, the Rotterdam effect is likely to distort exports somewhat. France (8%) and Italy (5%) are frequently cited as key markets for higher value beef exports. Hong Kong (3%) is ranked as the leading non-EU export market, although, like the Netherlands it is likely that consignments shipped to Hong Kong end up elsewhere in Asia.

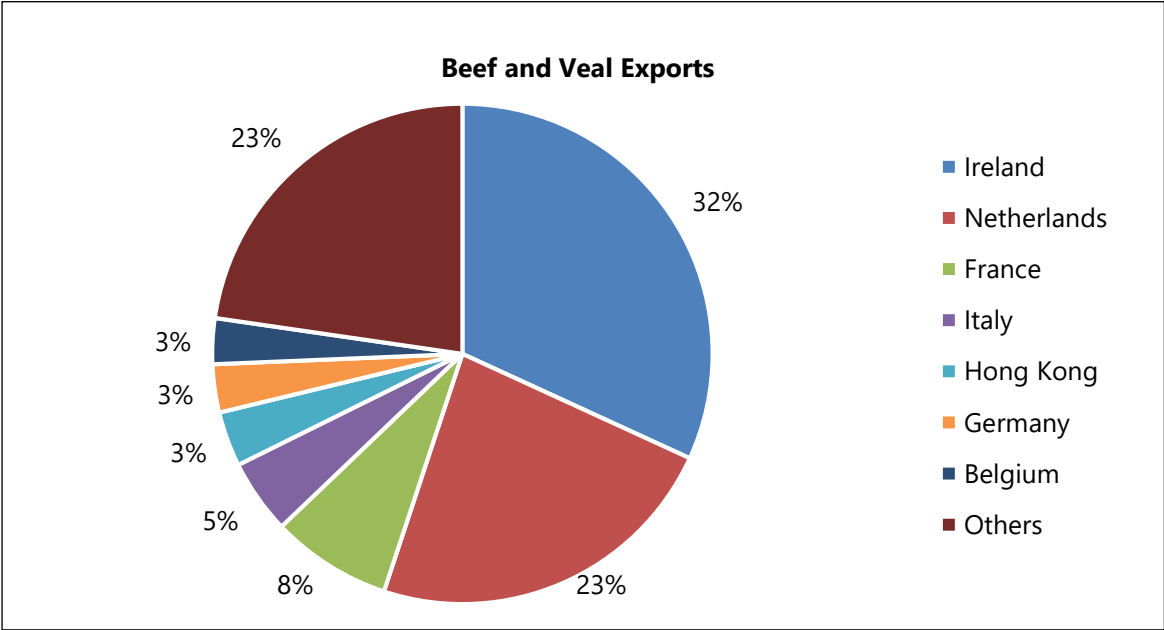
Other countries (23%) are led by EU countries such as Sweden, Denmark and Spain whilst Vietnam is ranked as the next most prominent Non-EU country representing 1.3% of total UK beef exports.

Figure 1 – Geographic breakdown of UK Beef and Veal Imports (by volume) – 2016



Source: AHDB/HMRC

Figure 2 – Geographic breakdown of UK Beef and Veal Exports (by volume) – 2016

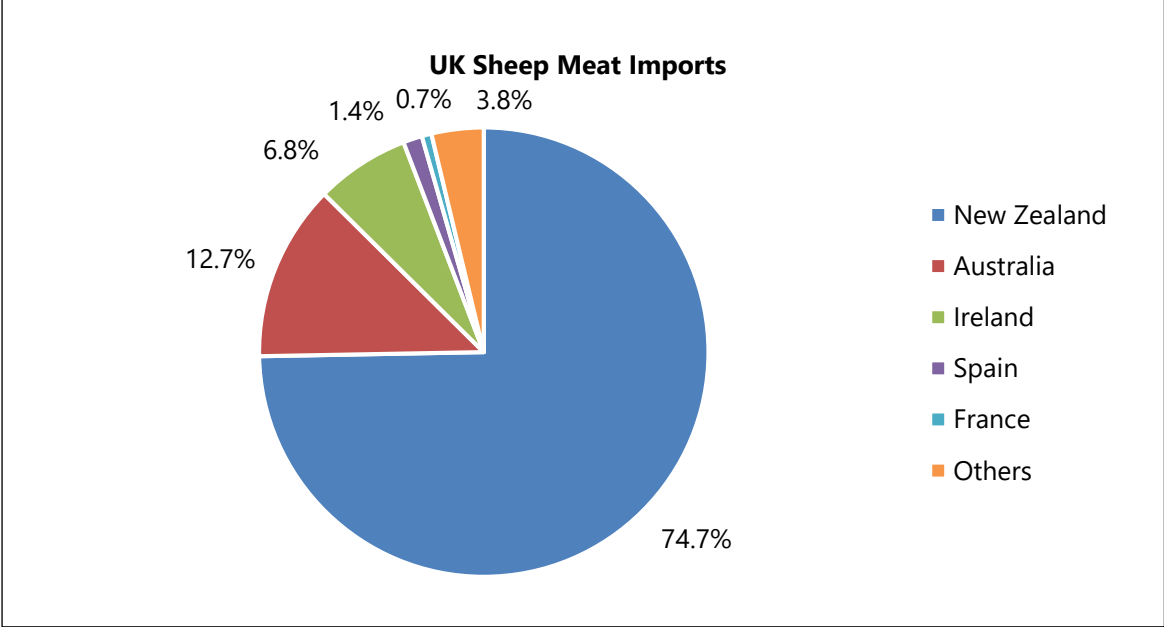


Source: AHDB/HMRC

Figure 3 segments UK sheep meat imports, in terms of volume, by country for 2016. Unsurprisingly, New Zealand dominates imports accounting for nearly 75% of volumes. Australia (12.7%) is also a noteworthy player. Imports from Ireland (6.8%) are relatively small whilst remaining markets have a

share of less than 6%. These estimates highlight the influential role that New Zealand in particular plays in the UK market and suggests that whatever the outcome of the Brexit negotiations, New Zealand (and Australia) will strive for greater access to the UK than which is presently available.

Figure 3 – Geographic breakdown of UK Sheep Meat Imports (by volume) – 2016

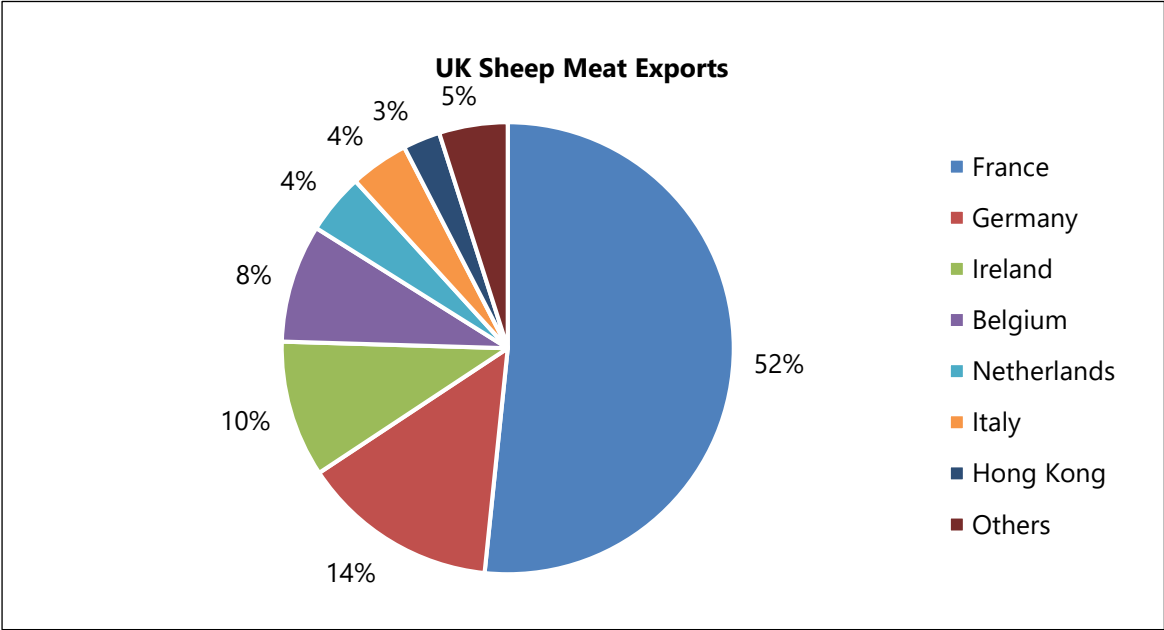


Source: AHDB/HMRC

As regards UK sheep meat exports, EU markets are dominant and account for over 95% of volumes. Of the leading countries shown in Figure 4, France is most prominent, with a 52% share. This is significantly lower than in previous years when French market represented approximately 60% of UK sheep meat exports. This is partly attributable to the emergence of Germany which now accounts for 14% of UK exports, up significantly from 2014 when its share was under 10%. This is likely to be due to the influx of migrants from countries that traditionally consume relatively large amounts of sheep meat. Sheep meat exports to Ireland account for around 10% of the UK total. Based on CSO data, Northern Ireland has a tiny (1%) share of exports from the UK. However, these figures do not include live animal exports, which, as noted below for sheep are significant with respect to Northern Irish trade with the Irish Republic. Other markets of some significance include Belgium, the Netherlands

and Italy, with Belgium in particular being a traditionally noteworthy market for UK sheep meat. Hong Kong is once again the most significant non-EU market with a 3% share.

Figure 4 – Geographic breakdown of UK Sheep Meat Exports (by volume) – 2016



Source: AHDB/HMRC

4.3 CONCLUDING REMARKS

The above segmentations underscore the importance of EU markets for both the Northern Irish and UK beef and sheep meat sectors and indicate that the industry could be significantly exposed if EU market access becomes severely restricted under WTO trading conditions. Looking at the data from another perspective, a WTO trading scenario could potentially present opportunities for UK producers to displace significant volumes of imports of beef (particularly from the Republic of Ireland) and sheep meat (from New Zealand and Australia) under conditions that offer tariff protection to domestic producers from all import markets. The extent to which it is possible to do this is explored in further in Chapter 5.

5. IMPACT OF WTO TRADING

Building upon the literature review (Chapter 3), this Chapter examines in detail how WTO trading conditions are likely to affect the Northern Irish beef and sheep meat industry. It firstly focuses on the tariff-related impacts before assessing how non-tariff barriers are likely to affect the industry. Thereafter, the results of the Oxford Economics GTAP analysis are outlined and the implications for the beef and sheep meat sector are discussed in Chapter 6.

5.1 TARIFF-RELATED IMPACTS

As discussed in Chapter 3 with additional explanation in Appendix II, the European Union's import tariffs for beef and sheep meat products are considerable and will constitute a major impediment for Northern Irish exports should they be introduced for UK-EU trade post-Brexit. Taking account of the average selling prices in 2016 for exports to the EU-27, Table 13 provides a summary of the tariffs that would have been applicable for a selection of commodities. These tariffs reveal a wider degree of variation vis-à-vis the 40-60% range discussed in Chapter 3. This occurs due to differences in average selling prices and illustrates the significant challenge in dealing with tariffs which have an ad valorem component (i.e. 12.8%) and a weight-based (fixed) component. When prices are low, the overall tariff rises significantly in percentage terms because the fixed component of the tariff (e.g. €176.80/100 kg for chilled beef carcasses) will account for a higher proportion of the price charged.

Furthermore, if the average selling prices for meat varies between different EU markets, e.g. French price is higher than the ROI price, then the overall percentage tariff rate will also vary. As ROI prices are generally lower, this would mean that the overall percentage tariff rate would be higher for ROI consignments than French equivalents. This principle would also operate for products exported under the same commodity code (e.g. 02013000) but have different prices. For example, fillet steaks (priced at £15/kg) and rump steaks (£7/kg) would both be subject to the same tariff (i.e. 12.8% + €303.40 /100 kg) but due to the substantial difference in price, the effective tariff rate for fillet steaks would be 25% but for rump steaks, the tariff rate would be 50%.

Therefore, in addition to the substantial tariff payable, companies will also have a further burden in having to recalculate percentage tariff rates when prices change. The effect of these tariffs being levied on the industry is examined further in the GTAP analysis section.

Another major issue to be aware of is that of cascading tariffs, where the duty rate increases as more value is added to the product is of particular importance in the meat sector. For example, boneless lamb has a tariff of 12.8% + €311.80 /100 kg for imports coming into the EU under MFN rules. For Northern Ireland, this would imply a 69% tariff based on 2016 prices. This is significantly higher than

the carcass lamb tariff (12.8% + €171.30 /100 kg) which equates to a 48% tariff based on 2016 prices. Whilst it is arguable that any tariffs of 30% or more would undermine the ability of NI processors to export to the EU in any case, it is important to be aware of their influence.

Table 13 – EU Tariff Rates for Selected Beef and Sheep Commodities Based on N.I. Prices - 2016

CN Code	Description	EU Common External Tariff	Total Tariff EU-27 (%)
02011000	Fresh/chilled beef carcasses and half carcasses	12.8% + €176.80/100 kg	96%
02013000	Fresh/chilled boneless beef	12.8% + €303.40 /100 kg	86%
02041000	Fresh/chilled lamb/sheep meat carcasses and half carcasses	12.8% + €171.30 /100 kg	48%
02042230	Fresh Chilled Lamb Cuts	12.8% + €188.50 /100 kg	49%
02042300	Fresh/chilled boneless lamb/sheep meat	12.8% + €311.80 /100 kg	69%
02044310	Frozen lamb/sheep meat cuts	12.8% + €234.50 /100 kg	75%
02061098	Fresh/chilled beef offal (other)	0.00%	0%

Sources: The Andersons Centre, Gov.uk and the EU Commission

Of course, Northern Ireland will also have to contend with tariffs on inputs which, as reported in Chapter 4, are significant. Table 14 and Table 15 estimate the percentage tariffs that would be applicable on selected live animal and meat imports from the Republic of Ireland if the UK were to apply an equivalent tariff to the EU CET on imports. As an illustrative example, if the price of steers was £3.20/kg, then the imposition of a 55.1% tariff would equate to £1.76/kg. Once again, the tariffs are substantial and would constitute a major impediment to trade if they were applied. In such circumstances, one would expect cross-border trade to diminish considerably. This would present major challenges to meat supply chains on both sides of the border, and companies would have to alter operations considerably to continue to supply the market both within the UK and across the EU.

Table 14 – Estimated Tariffs on Live Animal Imports from the Republic of Ireland (2016)

CN code	Description	European CET	Total Tariff ROI (%)
01022991	Steers	All 10.200 % + €93.10/100 kg	55.1%
01022951	Heifers		54.9%
01022991	Young Bulls		55.4%
01022961	Cows		78.6%
01022999	Bulls		75.3%
01022910	Calves		60.0%
01041030	Sheep & Lambs	All €80.50/100 kg	32.7%
01041080	Ewes and Rams		40.8%

Sources: The Andersons Centre, Gov.uk and the EU Commission

Table 15 – Estimated Tariffs on Imports of Meat Inputs from the Republic of Ireland (2016)

CN code	Description	European External Tariff	Common	Total Tariff ROI (%)
02011000	Beef carcasses	12.8% + €176.80/100 kg		67.9%
02013000	Boneless beef	12.8% + €303.40 /100 kg		85.0%
02041000	Lamb carcasses (chilled)	12.8% + €171.30 /100 kg		54.3%
02042300	Boneless lamb (chilled)	12.8% + €311.80 /100 kg		77.1%
02044310	Lamb/sheep meat cuts (Frozen)	12.8% + €234.50 /100 kg		52.4%
02044390	Boneless lamb/sheep meat (Frozen)	12.8% + €128.80/100 kg		62.4%
02061098	Beef offal	0.0%		0.0%
02068099	Edible lamb offal	0.0%		0.0%

Sources: The Andersons Centre, Gov.uk and the EU Commission

Other tariffs of relevance include those applicable on inputs such as packaging. For the purposes of this study, such costs are categorised as a non-tariff barrier (NTB), because they are not associated with the primary products (i.e. meat, animals) under consideration. Section 5.2 has further analysis.

With regards to non-EU trade, the data collected from processors during this study did not provide any further segmentation on trade between Northern Ireland and individual countries. That said, several processors and other stakeholders stated that Hong Kong was a particularly prevalent export market. Other industry experts consulted during this study reported that Hong Kong accounted for almost 60% of Northern Irish beef and sheep meat exports to non-EU countries during 2016. Furthermore, for other countries frequently cited as receiving exports from Northern Ireland (e.g.

South Africa, Senegal, Ivory Coast and Republic of Guinea), the applied tariff rates would remain the same irrespective of whether the UK remained part of the EU or traded under WTO (MFN) conditions. This is because despite the EU having free trade agreements with some of these countries (e.g. South Africa), the import tariff rates currently being applied by such countries are lower than those set-out in any free trade agreements with the EU⁴⁷. Therefore, the UK leaving the EU will make no difference to trade with these countries.

Accordingly, for the purposes of this study, it was decided to assume that trade with non-EU would not be affected by WTO trading conditions. That said, it must be emphasised that this condition would only hold if the UK did not alter its standards post-Brexit and that this was recognised by non-EU countries as being the case. If the UK decided to change its standards and these were no longer accepted by non-EU countries, then trade with many of these countries would be seriously affected. This would be especially the case with trade to countries like China, Japan, USA and Canada because the UK (and Northern Irish) authorities have spent years trying to access these markets and are still years away from getting access in some cases. Trade with least developed countries would be less affected because, as industry experts pointed out during the study, products to these countries are exported on Exporters' Risk certification.

5.1.1 Tariff Rate Quotas (TRQs)

As explained in Appendix II, TRQs set lower tariff rates for specified quantities of imports which reflect historical trade between two countries or between groups of countries (e.g. 228,254 tonnes of lamb from New Zealand to the EU)⁴⁸ and higher (sometimes significantly higher) rates for quantities exceeding the quota. TRQs are set for the whole of the EU, and claims are generally granted on a first-come-first-served basis. Most quotas are controlled entirely by the European Commission⁴⁹. With the introduction of WTO trading conditions due to Brexit, the UK will need to establish its own schedule of TRQs and tariffs. Whether these will be split out from the existing EU TRQs or whether the UK will establish an entirely new set of TRQs will be a key aspect of the upcoming future trading relationship

⁴⁷ EU Commission, Market Access Database, June 2017, <http://madb.europa.eu/madb/atDutyOverviewPubli.htm?hscode=0206&countries=ZA>

⁴⁸ See: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011R1354>

⁴⁹ HMRC (2009) Guidance UK Trade Tariff: tariff quotas and ceilings, June 2017, <https://www.gov.uk/government/publications/uk-trade-tariff-tariff-quotas-and-ceilings/uk-trade-tariff-tariff-quotas-and-ceilings>

negotiations. These talks will not only involve the UK and the EU-27 but will also involve other WTO members, and therefore, have the potential to become highly complex.

Added to this, there will also be the question of whether new TRQs should be established to reflect historical trade between the UK and the EU-27. This will be a critical issue for UK and Irish farming in a WTO trading scenario because as outlined above, the standard tariffs for beef and sheep meat are highly prohibitive and would have a major impact on the competitiveness of Northern Irish beef and lamb exports into the EU, as well as imports from the Irish Republic into the UK. Whether such "UK-EU TRQs" would be available exclusively between the UK and EU or whether they would have to be offered to all countries on an "ERGA OMNES" basis (i.e. towards all countries trading under MFN arrangements) is also a contentious topic. Some of the industry experts interviewed during this study stated that such TRQs would have to be offered on an ERGA OMNES basis whilst others believe that this question will depend on the outcome of the negotiations and have not ruled out exclusive UK-EU TRQs similar to New Zealand's allocation for sheep meat or 11,500 tonnes of beef allocated to the US/Canada under the "Hilton" quota.

As mentioned in Chapter 1, for the purposes of this study no provision has been made for new, specific UK-EU TRQs under a WTO trading scenario. However, it is worth assessing what TRQs might be available to UK exporters (on an ERGA OMNES basis) under WTO trading conditions. These are set out in Table 16 and Table 17. For beef, Table 16 shows that whilst there is potentially a sufficient volume of quota available to cover British exports to the EU (127,380 tonnes), the UK would face intense competition from other lower cost countries and is unlikely to be able to avail of the full quota available, especially if there are within quota tariffs and non-tariff barriers to contend with. Furthermore, much of the quota is for frozen beef whilst most UK and Northern Irish exports are chilled. This is particularly pertinent for exports to the Irish Republic (24,375 tonnes) which account for almost half of Northern Ireland's total exports to the EU. So, the overall relief that existing beef TRQs could provide will be limited.

The available TRQ for sheep meat is minimal (200 tonnes) and highlights the potentially perilous position that Northern Irish and UK exports would be in if there is a default to WTO trading conditions. It is also worth highlighting that whilst the TRQ available to the UK would be minimal, New Zealand will continue to avail of the substantial TRQ (currently 228,254 tonnes) with the EU.

Table 16 - EU Beef TRQs potentially available to the UK (2016)

Product Quota /	Commission Regulation	Order No.	Eligibility	Available Tonnage	Duty / Tariff
Frozen beef for processing	412/2008	09.4057	ERGA OMNES	50,000	20%
		09.4058		13,703	20% plus additional specific duty
Frozen beef (GATT)	431/2008	09.4003	ERGA OMNES	53,000	20%
Frozen thin skirt ('hampe')	748/2008	09.4020	ERGA OMNES (Excluding Argentina)	800	4%
High quality grain-fed beef	481/2012	09.2202	ERGA OMNES	48,200	0%
Total TRQ				165,703	
UK exports to EU (2016)				127,380	
NI exports to EU (2016)				51,568	

Sources: AHDB, European Commission, The Andersons Centre

Table 17 – Sheep meat TRQs potentially available to the UK

Product Quota /	Commission Regulation	Order No.	Eligibility	Available Tonnage	Duty / Tariff
Boneless lamb	1354/2011	09.2178	ERGA OMNES	200 (for all products)	0%
Boneless mutton/sheep		09.2179	ERGA OMNES	53,000	
Bone-in and carcasses		09.2016	ERGA OMNES (Excluding Argentina)	800	
Total TRQ				200	
UK exports to EU (2016)				79,967	
NI exports to EU (2016)				5,627	

Sources: AHDB, European Commission, The Andersons Centre

5.2 IMPACT OF NON-TARIFF BARRIERS

As shown in Chapter 3, previous studies on non-tariff barriers (NTBs) are inconclusive and were not always relevant to a Northern Irish context. Therefore, it was decided to conduct a bespoke

assessment of the impact of NTBs for NI beef and sheep meat to get the most accurate figure possible. This would help to determine whether the view put forward by many commentators that NTBs were potentially more trade-inhibiting than tariffs was true in the Northern Irish case. As mentioned in Chapter 2, the assessment undertaken in this study focused on four key areas, namely *official controls, customs checks and transport delays, administrative costs and deterioration in product value*.

The authors acknowledge that additional non-tariff barriers such as, labelling requirements, public procurement rules etc. could also affect meat shipments from Northern Ireland. However, they were omitted from the analysis for the following reasons. Firstly, the degree of difficulty in quantifying such effects. Secondly, the fact that UK and EU standards would start out the effectively the same post-Brexit due to the Great Repeal Bill. Thirdly, based on input received during the interviews with industry experts, the aforementioned areas accounted for the vast majority of NTB costs. Below is an overview of how NTBs could affect the Northern Ireland beef and sheep meat under both a *WTO Equivalence* and *WTO Liberal Trade* scenario. For each section, i.e. inputs-related NTBs and outputs-related NTBs, further detail, including the calculations for each NTB category, is given in Appendix III.

5.2.1 Inputs-related NTBs

This section examines the potential impact of trade barriers on inputs used by the Northern Irish beef and sheep meat industries by focusing on four key areas, i.e. *official controls, customs checks & transport delays, packaging inputs and other costs*. Using 2016 as the status quo, Table 18 summarises the additional costs that would be incurred in each area if WTO trading conditions were imposed. It considers the additional NTB costs associated with bringing live animals and meat inputs from ROI as well as the impacts on packaging costs under both a WTO Equivalence and WTO Liberal Trade scenario. Whilst costs rise in most instances, in some cases (e.g. packaging costs under Liberal Trade), costs decrease because the removal of tariffs would reduce the price of imports from Third Countries.

For this report, it is assumed that WTO Equivalence will have minimal official controls (e.g. 1% physical checks) but under WTO Liberal Trade the EU's standard official controls apply (e.g. 20% physical checks). This is the key reason for the significant difference between official controls costs in both scenarios because as physical checks increase, the rate of sampling also increases. See Appendix III for the full calculations.

The estimated cost increase due to customs checks and transport delays for inputs is £316,541 under WTO Equivalence and £786,742 under WTO Liberal Trade. Administration fees (£215,125) account for 68% of the total charges in a WTO Equivalence scenario. However, under WTO Liberal Trade,

miscellaneous queuing time (£553,178) represent the majority (70%) of costs. Of course, queuing times could vary significantly depending on the traffic management system that is put in place.

There was insufficient evidence provided during the study that costs such as power and energy, insurance etc. would change significantly or would constitute a significant NTB with respect to trade with the EU. Therefore, other costs were not assumed to change. That said, it was noted that if UK regulatory standards were lowered significantly, then authorities in non-EU countries would become very concerned and may refuse to take consignments of marginal products within beef and sheep offal categories. In recent years, Northern Irish meat plants have undergone numerous inspections and audits by Third Country authorities before approval for export. Any such approvals, either granted previously or in the process of being awarded, are given on the basis of EU standards and equivalence. Such premises are also subject to onward inspections. If standards are changed then the confidence amongst Third Country trading partners would be compromised.

If such approvals were rescinded, then the affected beef and sheep offal products would have to be sent elsewhere, either to pet-food processors (for a much lower price) or to waste which would incur a cost. This could substantially alter the cost base for the industry meaning that waste rates would rise significantly. Whilst this study has assumed that UK standards will not alter, under a WTO Liberal Trade scenario, it is worth highlighting that any changes to standards could incur additional costs to the industry over and above what has been included within the analysis presented in section 5.4.

Table 18 – Summary of Inputs-Related NTB Costs for NI Beef and Sheep Meat Sector

NTBs on Inputs	WTO Equivalence	WTO Liberal Trade
Official controls	£430,601	£683,145
Customs and transport	£316,541	£786,742
Packaging and other costs	£251,578	-£251,578
Other costs	£0	£0
Sub-Total – Inputs	£998,720	£1,218,308

Source: The Andersons Centre

5.2.2 Outputs-related NTBs

Table 19 summarises the potential impact of NTBs on outputs from the NI beef and sheep meat industry that are exported to the EU (i.e. EU-26 and ROI). This assessment focused on four key areas, namely *official controls, customs checks and transport delays, administrative costs and deterioration in product value*. Again, the detail underpinning these estimates is outlined in Appendix III. Using 2016 as the status quo, the estimated additional cost of imposing these NTBs were calculated separately

for the ROI and EU-26. This is because, taking miscellaneous queuing times for example, time delays when transporting to EU-26 are expected to take longer because loads are assumed to travel via Belfast Port in order to avoid the prospect of physical checks and sampling at the Irish border.

Taking all of the official controls charges outlined into consideration, the estimated cost increase under a WTO Equivalence scenario is £1,479,914 and the equivalent under WTO Liberal Trade is £2,170,886. Similar to inputs, differences in the rate of physical checks and sampling have a significant impact in a Liberal Trade scenario as the calculations shown in Appendix III illustrate. It should be also noted that the official controls cost listed below relates to what the industry incurs only. It does not include additional charges that DAERA or other official controls bodies may have to pay to ensure that border inspection posts etc. are adequately staffed. Some industry experts consulted during this study believe that if export health certificates were required for EU-27 consignments, that this could add a further £10 million to the costs which DAERA already incurs.

The estimated cost increase associated with customs checks and transport delays for outputs is £726,141 under WTO Equivalence and £890,795 under WTO Liberal Trade. The key reason for this difference is the duration of customs checks which are likely to be more stringent under Liberal Trade scenario because the incentive to smuggle increases.

The administrative costs relate to the additional time required for shipping and scheduling to complete added documentation associated with adhering to EU rules for third country consignments. These delays are expected to be more pronounced in a Liberal Trade scenario due to additional declarations and paperwork that may be needed to conform with more stringent checks, particularly for EU-26 consignments which encompasses multiple drop loads, longer journeys etc.

Deterioration in product value was frequently cited as a key concern amongst processors as there are often stringent specifications associated with supplying high-end continental retailers (e.g. use-by date of packing date plus 8 days) and if these are not met, then the product value could decrease significantly. Appendix III sets-out the projected delays for both ROI and EU-26 consignments in each scenario and also calculates the costs associated with deterioration in product value arising from WTO trading. As loads to the EU-26 tend to be higher value and have more stringent specifications associated with them, the deterioration in value is projected to be more pronounced. Taking both the ROI and EU-26 costs together, the estimated costs associated with deterioration of product value would be £2,543,901 (WTO Equivalence) and £6,701,507 (WTO Liberal Trade).

Table 19 – Summary of NTB Costs for Northern Irish Beef and Sheep Meat Sector

NTBs on Outputs	WTO Equivalence	WTO Liberal Trade
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

Source: The Andersons Centre

5.2.3 Total NTB Costs

By combining the output related NTB costs under *WTO Equivalence* (£4,854,351) with the corresponding £998,720 of input costs outlined in Section 5.2.1, the total amount of NTB costs comes to **£5,853,072**. The corresponding figure for *WTO Liberal Trade* is **£11,120,688** (£9,902,380 + £1,218,308). As a percentage of the value of output for EU-26 and ROI consignments combined (£194.7 million), these NTBs amount to a tariff equivalent of **3.0%** under *WTO Equivalence* and **5.7%** under *WTO Liberal Trade*. These percentage estimates were then used as the basis for estimating the NTB costs included within the GTAP analysis. It is worth noting that these figures are consistent with the figures from other studies, such as InterTradeIreland, covered in Chapter 3.

5.3 OTHER COST IMPACTS

During this study, labour was often cited as a major issue that would affect the competitiveness of Northern Irish beef and sheep meat processors. However, as this issue is not specific to WTO trading, i.e. it would be equally applicable under an EU:UK FTA scenario or a Customs Union arrangement, it was decided to omit labour from the GTAP analysis and comment on its impact separately.

Based on input received from processors, labour costs within the Northern Irish beef and sheep meat sector (£108.3 million) represent around 10% of the total cost base (£1.08 billion). Given that processors perceive raw materials costs (80% of total) are dictated by market forces, labour is seen as the key cost area over which they can exercise some control. It is estimated that two-thirds of labour used in the Northern Ireland beef and sheep meat is from the EU-26 countries with virtually all of the remainder sourced from Northern Ireland, the UK or the Irish Republic. Employees from non-EU countries (0.1%) are estimated to account for a minute proportion of total employment in the beef and sheep meat sector. Applying these percentages to DAERA's direct full-time employee equivalents (FTEs) data (for 2015), shows that the Northern Irish beef and sheep meat sector directly employed just over 3,100 EU-26 FTEs in 2015.

Table 20– Estimated Employment Breakdown for Northern Irish Beef and Sheep Meat Sector

Origin	Estimated breakdown (%)	Estimated DAERA* (2015)
Northern Ireland / UK / ROI	34.5%	1,642
EU-26	65.4%	3,107
Non-EU	0.1%	3
Total		4,752

* Direct Full-Time Equivalents; based on % breakdowns Sources: The Andersons Centre; DAERA

These estimates suggest that, if there were significant restrictions on migrant labour from EU-26 countries and this was not adequately replaced by local labour or non-EU migrants, it would pose a major challenge to the Northern Irish beef and sheep meat sector. Some processors claim that the Brexit vote is already having an impact with the UK becoming a less attractive option due to the weakened Sterling and it is also reported that some EU-26 staff are planning to leave the UK following the Referendum result. This could mean in a significant increase in recruitment costs which some processors estimate could rise by 10% (i.e. it will cost 10% more to recruit each new staff member for operations (£2,000 per person) versus the status quo if free movement ends). Furthermore, wage costs are also likely to increase as there could be intense competition for a smaller pool of labour. Processors also believe that a limited migrant labour availability would lead to increased staff turnover (and training costs) which would impinge on operations. To mitigate this, several processors stated that they would have to consider introducing more automation to operations or, in some circumstances, consider moving operations elsewhere, particularly if reduced labour availability is combined with WTO trading conditions.

The availability of veterinary staff has also been highlighted as a challenge in the UK meat industry. Whilst there are some EU-26 nationals employed as veterinary staff in Northern Ireland, it does not appear to be as significant as in GB where some estimates put the amount of migrant veterinary staff at 85-90% of the meat industry total. If there was a major shortfall of veterinary inspectors in GB, salaries would likely rise, thus making GB more attractive to veterinary staff currently based in Northern Ireland. This issue is dealt in some more detail in Chapter 7.

5.4 GTAP ANALYSIS

As detailed in Chapters 1 and 2, the GTAP trade model was used to assess the impact of WTO trading conditions on the UK and Northern Irish beef and sheep meat sector under two scenarios, *WTO Equivalence* and *WTO Liberal Trade*. The modelling process itself has been run at a UK level, reflecting the constraints of the available modelling frameworks. However, given the context of the study,

Northern Ireland-specific results have been provided. At the end of this section, reflections are made on the extent to which applying the UK-wide proportionate results might downplay or otherwise the extent of the risks that are present given differences in structural characteristics of the Northern Ireland beef and sheep sector.

The findings are 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 (here the focus is on the impact on the UK in aggregate as even for producers in Northern Ireland, the rest of Great Britain accounts for the vast majority (90%) of demand).

To assess the impact on the output of the sector the change in Gross Value Added (GVA) is 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 this study, the percentage changes to GVA are also assumed to apply to output in the NI beef and sheep meat sector.

Scenario 1 – WTO Equivalence

In the first scenario, the imposition of the Common External Tariff (CET) by both sides leads to a dramatic shifting of bi-lateral trade flows as documented in Table 21 below. In total, it is estimated that Northern Irish exports to the EU would be almost wiped out with a 93% reduction (£191 million based on 2016 data). Overall, beef and sheep meat exports from Northern Ireland are projected to fall by 82% or £190 million. Across the UK generally, exports are also forecast to decline significantly (by 78%).

However, the impact on the sector will be moderated by the impact on UK demand for domestically-produced beef in particular and sheep meat to a lesser extent. With EU imports now much less price competitive it is estimated that these will fall by 85.2% or £939 million based on current figures. Part of this fall will reflect import substitution from the Rest of the World (ROW) – as it is expected that imports from ROW will rise by close to 31% or £162 million partly filling the void of EU exports.

Overall, the purely static effects from these trade policy changes are expected to reduce UK consumer spending by 0.7% or £40.8 million⁵⁰. However, given the simulated fall in imports, this would still

⁵⁰ This figure could be significantly higher if other potential channels from Brexit e.g. migration had been modelled.

imply that UK consumption of domestically produced beef and sheep would rise by nearly 15% (£736 million).

Whilst it is projected that the impact on the GVA of the UK beef and sheep sector would rise by 4.3% as a result of this shock, Northern Ireland's ability to take advantage of this change will be impeded due to a significant proportion of its raw material (circa 20%) is imported directly from the Republic of Ireland. Although raw materials availability will be aided somewhat from the meat of 390,000 live lambs which would previously have been sent to the Irish Republic for exporting, overall, Northern Ireland would struggle to maximise its share of the wider UK market. Accordingly, it is estimated that Northern Ireland's turnover would only rise marginally by 0.7% (£8.2 million). This would imply that UK consumption of Northern Irish produced beef and sheep will rise by nearly 23% or £198 million (given the projected fall in export sales). This, in turn, would imply that Northern Irish producers' market share of domestic UK consumption would rise from 17.3% to 18.5%.

Table 21 – WTO Equivalence Scenario Trade Impact on UK and NI Beef and Sheep Meat Sector

Indicator	2016 – Baseline (£m)	% Change	Change (£m)	Forecast (£m)
NI exports to the EU	205.7	-92.9%	-191.0	14.6
NI exports to the ROW	25.3	5.1%	1.3	26.6
Total value of NI exports	231.0	-82.2%	-189.8	41.2
UK imports from the EU	1,101.4	-85.2%	-938.9	162.5
UK imports from the ROW	525.0	30.9%	162.1	687.1
Total value of UK imports	1,626	-47.8%	-776.7	849.6
UK consumption of domestically produced (UK) beef and sheep meat products	5,023.6	14.7%	736.0	5,759.6
UK consumption of NI produced beef and sheep	869.0	22.8%	197.9	1,066.9
GVA of NI beef and sheep meat sector	558.5	0.7%	4.2	562.7
NI beef and sheep meat turnover	1,100.0	0.7%	8.2	1,108.1

Sources: Oxford Economics and The Andersons Centre

In the longer-term, Oxford Economics' modelling suggests that this type of scenario would result in a further reduction in consumer spending of 2.8% by 2030. Given the new structure of Northern Irish turnover (which will become much more heavily domestically focused) it is estimated that the marginal impact of this change would be to reduce turnover by 2.6% or £29 million. This would imply that in the long-run Northern Ireland's beef and sheep sector's GVA would fall by 1.9% in real terms or £10.6 million based on 2016 levels. When applied to NI industry turnover, this 1.9% decrease would equate to a £20.9 million decrease in turnover in the long-term versus 2016.

Table 22 – Long-run impact of WTO Equivalence on Northern Ireland’s Beef and Sheep sector

Indicator	2016 – Baseline (£m)	% Change	Change (£m)	Forecast (£m)
UK consumption of beef and sheep meat	5,652.8	-2.8%	-156.3	5,496.7
Marginal impact on NI beef and sheep meat turnover	1,100.0	-2.6%	-29.1	1,070.9
Estimated impact on beef and sheep meat GVA	558.5	-2.6%	-14.8	543.7
Total GVA impact on beef and sheep meat sector*	558.5	-1.9%	-10.6	547.9
Total turnover impact on NI beef and sheep meat sector*	1,100.0	-1.9%	-20.9	1,079.1

* Includes short and long-run combined Sources: Oxford Economics and The Andersons Centre

Scenario 2 – WTO Liberal Trade

In contrast, the static impact of a combination of a move to WTO trading conditions and a Liberal Trade policy (i.e. unilateral abolition of UK tariff barriers) would be devastating for the output of the UK and Northern Irish beef and sheep meat sector.

The imposition of the CET on exports to the EU would lead to a similarly dramatic fall of 91.5% (£188 million). Although there is some offset with exports to ROW rising by £6.1 million, it is expected that total NI exports will fall by close to 80%, or £182 million based on 2016 values. Meanwhile, the freedom created by the abolition of trade barriers is expected to cause a very sharp shift in UK trading patterns with imports from the EU substituted for those from the ROW. On a net basis, we expect UK imports of beef and sheep to rise by close to 12% or £190 million.

Overall, the purely static effects from these changes in trade policy are expected to reduce UK consumer spending by 0.2% or £11.3 million⁵¹. Together with the estimated rise in imports, this would imply that UK consumption of domestically produced beef and sheep would fall by 4% or £201 million.

Putting this all together, the GTAP model simulates that the UK beef and sheep sector’s GVA would fall by nearly 21% following these changes. Applying this proportionate change to NI, this would be consistent with a decrease in turnover of £230 million which, in turn, would imply, based on GTAP calculations, that UK consumption of Northern Irish produced beef and sheep would fall by 5.5% or

⁵¹ This figure could be significantly higher if other potential channels from Brexit e.g. migration had been modelled.

£48 million (given the projected fall in export sales). This would imply that NI producers would account for around 22% of the aggregate drop in domestic sales compared to their current market share (in value terms) of 23%. Therefore, the results are consistent with the current industry structure.

Table 23 – WTO Liberal Trade Scenario Trade Impact on UK/NI Beef and Sheep Meat Sector

Indicator	2016 – Baseline (£m)	% Change	Change (£m)	Forecast (£m)
NI exports to the EU	205.7	-91.5%	-188.2	17.5
NI exports to the ROW	25.3	24.2%	6.1	31.4
Total value of NI exports	231.0	-78.8%	-182.1	48.9
UK imports from the EU	1,101.4	-62.1%	-684.5	416.9
UK imports from the ROW	525.0	166.6%	874.7	1,399.7
Total value of UK imports	1,626.4	11.7%	190.2	1,816.6
UK consumption of domestically produced (UK) beef and sheep meat products	5,023.6	-4.0%	-201.5	4,822.1
UK consumption of NI produced beef and sheep	869.0	-5.5%	-47.9	821.1
GVA of NI beef and sheep meat sector	558.5	-20.9%	-116.8	441.7
NI beef and sheep meat turnover	1,100.0	-20.9%	-230	870.0

Sources: Oxford Economics and The Andersons Centre

In the longer-term, Oxford Economics' previous modelling suggests that this type of scenario would result in a further reduction in consumer spending of 0.8% by 2030. Given the new structure of Northern Irish turnover (which will become more domestically focused) it is estimated that the marginal impact of this change would be to reduce turnover by 0.7% or £7.3 million. This would imply that in the long-run Northern Ireland's beef and sheep sector's GVA would contract by 21.6 % in real terms or £120.5 million based on 2016 levels as outlined in Table 24.

Table 24- Long-run impact of WTO Liberal Trade on Northern Ireland's Beef and Sheep sector

Indicator	2016 – Baseline (£m)	% Change	Change (£m)	Forecast (£m)
UK consumption of beef and sheep meat	5,652.8	-0.8%	-45.2	5,607.6
Marginal impact on NI beef and sheep meat turnover	1,100.0	-0.7%	-7.3	1,092.7
Estimated impact on UK beef and sheep meat GVA	558.5	-0.7%	-3.7	554.8
Total GVA impact on beef and sheep meat sector*	558.5	-21.6%	-120.5	438.0
Total turnover impact on NI beef and sheep meat sector*	1,100.0	-21.6%	-237.6	862.4

* Includes short and long-run combined Sources: Oxford Economics and The Andersons Centre

Additional Comments on GTAP Modelling Results

The modelling results presented above contain a number of simplifying assumptions. This section discusses the implications of these, focusing on how they relate to the results for Northern Ireland.

As highlighted, the GTAP modelling work has taken results simulated for the UK's beef and sheep sector in aggregate and applies these results proportionately to Northern Ireland. However, there are a number of structural differences between Northern Ireland's beef and sheep sector and the rest of the UK which could affect the validity of this approach as discussed below:

Average effective tariff rate

The CET on key beef and sheep exports is charged as a mixture of both ad valorem and specific rates. In the GTAP model, an average effective tariff rate of 37.4% was imposed on UK exports – this was the estimated effective rate that was calculated to apply using information from MACMAP (see Appendix IV). However, data collected by The Andersons Centre indicates that the effective tariff rate on Northern Irish beef and sheep meat would be much higher as a result of a lower average selling price, in comparison with the UK, which means that the effective specific rate per kg of exports is higher.

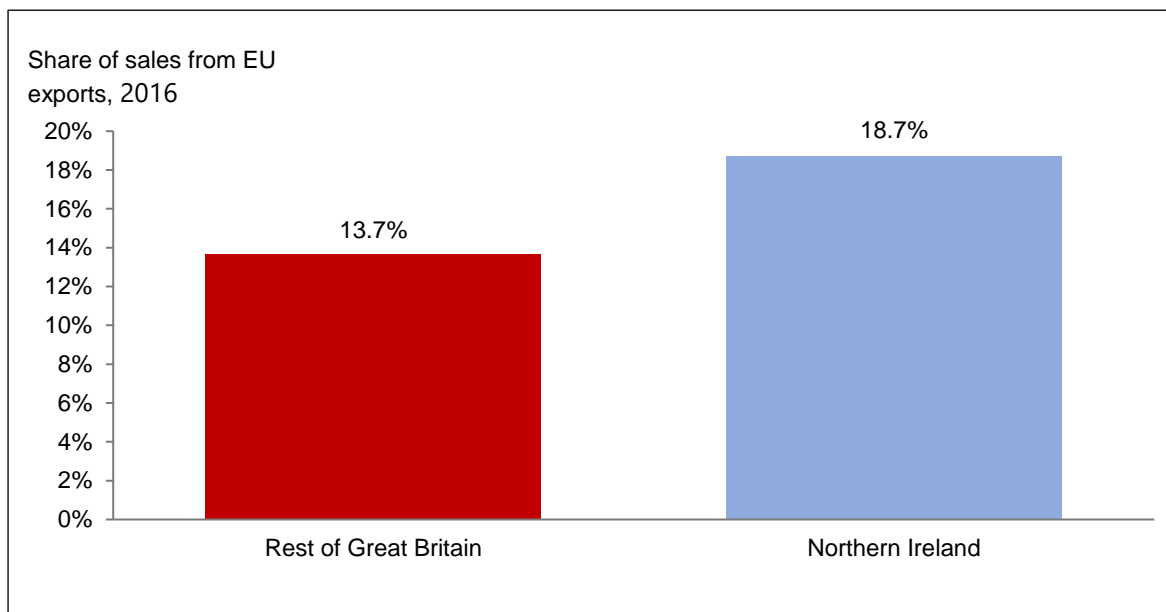
To test the sensitivity of the GTAP modelling results to this, Oxford Economics re-ran its scenarios using a tariff rate of 72.6% on the beef and sheep sector – the effective rate that was estimated to apply to Northern Irish exports. The effect on export sales to the EU is unsurprisingly more severe but because the original impact was so dramatic the additional absolute difference in terms of exports and turnover is relatively modest. Using the results from these alternative scenarios would imply that NI exports to the EU would fall by 98.9% or £203.2 million (WTO Equivalence) and by 97.8% or £201.2 million (WTO Liberal Trade). Following through the same logic chain as used previously, this would imply that the short-run rise in GVA under WTO Equivalence would become even more modest, whilst the severe decline projected under WTO would become even more pronounced (i.e. a fall of 22.1% in real GVA or £123.3 million based on 2016 levels).

The implication of this sensitivity testing is that Northern Ireland's lower average sales price (and hence higher effective tariff) does increase the sector's vulnerability to a hard Brexit somewhat compared to the rest of the UK. However, the narrative of each scenario remains broadly unchanged – the essential trade policy decision following a hard Brexit that will affect the sustainability of the market is how and whether the UK Government seeks to adjust the CET.

Dependence on the EU export market

Another key feature that could differentiate NI from the rest of the UK is in terms of its relevant dependence on the EU as a source of demand. As has been demonstrated in both scenarios, sales to the EU are likely to be devastated by a hard Brexit – in both cases they collapsed by over 90%. Data gathered by The Andersons Centre suggests that in this light NI appears marginally more vulnerable on this score although not decisively so. In 2016, 14.8% of UK revenue were generated via sales to the EU. Netting out Northern Ireland’s contribution to this would imply that the rest of Great Britain’s beef and sheep sector generated 13.7% of its turnover via sales to the EU. This compares to an EU-export share of revenues of 18.7% in Northern Ireland in 2016 as Figure 5 illustrates.

Figure 5 – Share of NI and GB Sales obtained from Exports to the EU.



Source: The Andersons Centre, Oxford Economics’ calculations

These structural characteristics mean that the Northern Ireland results which have been presented may be overly optimistic for WTO Equivalence but approximately correct for WTO Liberal Trade. The key point is the estimated increase in domestically consumed production that is assigned to Northern Irish producers. Under WTO Equivalence, this is higher than their current market share. If it was instead assumed that this increase was in line with their current market share then it would imply that sector GVA in Northern Ireland would contract by 6.4% (£35.7 million) in the long-term compared to the 1.9% decrease in the central projection (see Table 22). In contrast, the estimated fall in domestically consumed production assigned to Northern Ireland under WTO Liberal Trade was very close to its current market share.

However, with regard to the above, the authors would caution that this is a relatively simplistic piece of sensitivity testing. What would really determine which region's beef and sheep sector would be able to capture the vacated domestic market would depend on the type of EU import products that are displaced. If Northern Irish producers were relative specialists in the products that experience the greatest import contraction, then it may well be the case that they would be able to increase their share of the domestically consumed market, provided they have the raw materials available to do so.

Hard border with the Republic of Ireland

One very important differential between Northern Ireland's economy and the rest of Great Britain in the context of Brexit is the shared border and much closer trade links with the Republic of Ireland. Formally quantifying how this will affect economic activity is beyond the scope of this modelling exercise. However, clearly the disruption caused could be significant and it is evidently the case that input costs could rise much more significantly for Northern Irish producers given their greater reliance on the ROI as a source of supply. It is not possible to provide an indication as to the potential scale of this effect but it is certainly a point that should be considered and contextualised when interpreting the scenario results presented above.

The GTAP modelling framework is also insufficiently granular to differentiate between different sub-sectors of the beef and sheep industry. Therefore, it is not possible to quantify formally the impact on each segment of the industry but based on a reflection on the relative scale of risks, the threat confronting the sheep sector would appear to be larger. One of the key reasons for this is the greater dependence of the sheep industry on sales to the EU compared to the more domestically-oriented beef sector. The Andersons Centre data, excluding live animal trade, indicates that EU exports accounted for approximately 31% of sheep meat industry revenues in 2016 compared to around 17% for the beef industry in Northern Ireland. Moreover, whilst the UK is nearly self-sufficient with regards to sheep meat, the room for domestic substitution to offset lower exports (as one sees occurring in WTO Equivalence) is constrained by the fact that existing UK demand for sheep can only be satisfied by Northern Irish producers during one part of the season (with New Zealand produced lamb substituting during the other for a significant proportion of the year). It is also worth pointing out that a significant proportion of UK sheep meat production is from hoggets, but UK consumers prefer spring lamb which can be competitively supplied by New Zealand, particularly when domestically produced spring lamb is unavailable. Such competition would become even more pronounced under a WTO Liberal Trade scenario.

6. IMPLICATIONS FOR NORTHERN IRISH BEEF AND SHEEP MEAT

The GTAP analysis presented above sets-out an overall direction of travel for the Northern Irish and UK beef and sheep meat sectors. This chapter considers the implications of each WTO trading scenario for the future of the industry. It is important to emphasise that the findings presented above are critically dependent on the policy decisions that the UK Government takes with respect to the application of the EU CET as well as the future agricultural policy that will be formulated for the UK. Within this, decisions taken on Northern Ireland concerning the border with the Irish Republic will shape the competitiveness of agriculture for decades to come.

6.1 IMPLICATIONS - WTO EQUIVALENCE

Although the GTAP analysis suggests a slight increase (of 0.7%) in the overall UK and Northern Irish output in the short-run after Brexit, these would be eroded and industry revenues would decline in the long-term. There would also be major declines in export trade as well as considerable displacement of imports from the EU (particularly ROI) by domestic NI/GB produce as well as imports from ROW. Furthermore, additional factors need to be considered at each stage of the supply chain which would affect performance.

6.1.1 Farm Level

Below is a selection of the key impacts and these are collectively considered within the Northern Irish livestock farm model which is explained below.

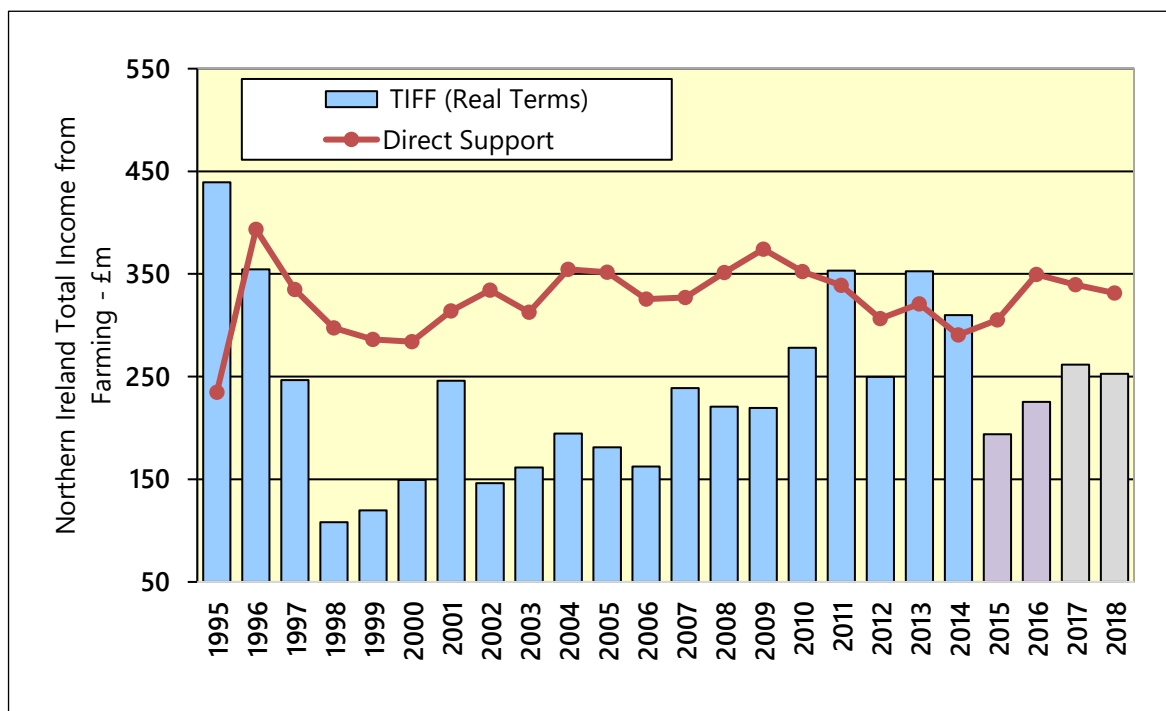
Key Impacts

- **Input costs and usage:** one would expect input costs to increase based on the same tariff rates as the EU CET continuing to apply (although these would become UK CET) but crucially, any imports from the EU-27 would become more expensive. This, in turn, would lead to less competition in the domestic UK market and prices would likely increase. Such influences would be particularly important for areas such as fertiliser where cheaper nitrogen for example can currently be sourced from Eastern Europe without tariffs or NTBs. Under WTO Equivalence, the competitive position of such products would be eroded, thus resulting in input price rises for UK farming.
- **Choice of market outlet:** at present, the ROI is major outlet for Northern Irish lambs (circa 389,000 exported per year). If WTO trading restricts cross-border animal movements, then NI farmers would have limited options for slaughtering lambs. Whilst evidence from this study

suggests that there is adequate capacity within Northern Ireland to slaughter these lambs, if there are fewer buyers, then prices are likely to decline due to decreased competition.

- Profitability:** with tariffs applying to imports from ROI for example, the competitive position of Northern Irish and UK farmers is protected. This should help to raise prices and, in turn, enhance farm-level profitability provided these price increases are larger than input cost increases. That said, close attention will need to be paid to the support systems in place for Northern Irish farming which is historically heavily dependent on support payments as Figure 6 indicates. The profitability situation is arguably better for beef than sheep meat due to large domestic demand for beef in the UK. Also, one would expect that the tariff-free sheep meat imports currently coming in from New Zealand and Australia would continue to take place in some form post-Brexit. Such imports are more influential in the sheep meat sector than in beef and would therefore constitute more of a competitive challenge than similar TRQs in the beef sector.

Figure 6 – Northern Ireland Total Income From Farming (TIFF) (All Agriculture) – 1995 to 2018



Sources: DAERA / The Andersons Centre

- Productivity:** a more insulated farming sector and a strong domestic market, as is the case for beef, could give rise to a temptation to hold back on adopting new technologies, benchmarking performance or investing in innovation at the farm level. Previous studies have shown that the beef and sheep meat sector tends to lag behind on productivity. So, if there

is reduced competition, arguably the impetus to become more competitive also diminishes. That said, productivity is featuring prominently in UK Government statements on future agricultural policy. One would therefore anticipate that future support payments to farmers would be contingent on minimum standards of performance and productivity.

- **Policy Framework:** the financial performance of the Northern Irish agricultural sector, in its current structure, is heavily dependent on support payments. The extent to which these continue in a UK Agricultural Policy (UKAP), or indeed a Northern Ireland Agricultural Policy (NIAP), environment will remain critically important for performance. It is arguable that if a protective trade policy is inducing higher meat prices, the UK Government could decide to reduce support payments under UKAP.
- **Farm Structures:** although the GTAP results under WTO Equivalence suggest relatively little change in overall output for the beef and sheep meat sectors, there is likely to be some shifts within livestock farming, most notably, a movement from sheep production to beef production, particularly in the lowlands. The primary reason for this is that sheep meat is more dependent on exports to the EU, particularly France. As much of this market will close-off under WTO trading, domestic UK consumption is unlikely to take-up a significant proportion of the difference. This is because UK sheep meat consumption is relatively low and declining (see Figure 7). Additionally, with UK production being highly seasonal and hoggets accounting for a significant proportion of output, this is not well aligned with UK consumers' preference for spring lamb throughout the year. Furthermore, if the movement of live lambs from NI to ROI is curtailed, then the prognosis for sheep farming is poor.

Introducing NI Meadow Farm

'Meadow Farm' is Andersons' notional livestock farm situated in Northern Ireland. It consists of 60 hectares and has a 27 cow suckler herd with all progeny being finished, a small dairy bull beef enterprise and a 200 ewe breeding flock. It is a family farm using mostly own labour, although some casual labour is used during peak periods. Whilst a loss from production is forecast for 2017/18 (despite the Pound weakening), the support payments enable this farm to be profitable. Whilst this farm does not necessarily represent the average Northern Irish livestock farm, it does reflect the position of a significant proportion of farms across the province today.

Under the WTO Equivalence scenario envisaged in 2025, further assumptions are made regarding the level of support that this farm receives under UKAP. In addition to support remaining the same (*Same Support*), reductions of 33% and 66% are also considered. As Table 25 shows, this farm is heavily

dependent on direct support. Although beef prices improve slightly (circa 5%) under WTO Equivalence due to a more protected domestic market, lamb prices are assumed to fall by approximately 10%. Currently, the UK lamb sector is trade neutral as it imports significant volumes from New Zealand and exports similar quantities to the EU. With EU trade costing more, and New Zealand imports expected to continue, prices would fall. Initially, such price falls could be more pronounced (i.e. higher than 10%) due to supply-demand imbalances but over time, these would level out to some extent so the price fall is estimated at 10% in 2025.

Variable costs are forecast to show some increases as inflation has an impact in some areas, particularly veterinary and medicines. Overhead cost increases are expected to be more pronounced with power, machinery, and labour all rising due to inflation. Drawings also increase to take account of inflationary pressures in the general economy. Please note that with the exception of rent, whose change is assumed to be around half of the change in support (e.g. a 33% decrease in support would lead to a 16.5% reduction in rent), other (second order) cost changes have not been modelled as support levels change. The following are the key implications under each scenario:

- **Same Support:** although the production margin declines slightly, with support remaining the same, this farm still generates a modest surplus of £30/ha (£1,800 for the farm).
- **-33% Support:** despite an improvement in production performance as the farm seeks to cut costs, production margin remains negative. With reduced support (at £218/ha), this business moves into loss-making position (of £73/ha) which equates to around £4,380 for the farm. Whilst not devastating in a single year, over time, such losses will become unsustainable if remedial action is not taken.
- **-66% Support:** despite trying to reduce costs further, the additional loss in support has a major effect on this farm as losses climb to £175/ha, or £10,500 for the entire farm. In such circumstances, farms such as this will have to make tough decisions on whether to continue farming or alter operations substantially.

Table 25 – NI Meadow Farm Performance under WTO Equivalence Scenario

Current Performance		WTO Equivalence – 2025/26		
£ per Ha	2017/18	Same Support	-33%	-66%
Livestock Output	1,007	1,002	1,002	1,002
Livestock Variable Costs	399	404	404	404
Gross Margin	608	598	598	598
Overheads	493	510	510	510
Rent, Finance and Drawings	376	383	378	374
Margin from Production	(261)	(295)	(290)	(286)
Support	325	325	218	111
Business Surplus	64	30	(73)	(175)

Source: The Andersons Centre

6.1.2 Processing Level

- Raw materials availability:** following on from the farm level analysis, one would expect raw materials costs to generally rise for beef and sheep meat processors. If these price changes apply uniformly across the industry and are passed on to retailers and consumers, then on the face of it, such changes would have relatively little impact. However, these need to be considered against the back-drop of consumer demand and willingness to pay for such increases as well as the bargaining power of retailers. Furthermore, in an industry with wafer-thin net margins (circa 1.5%), profitability would be seriously eroded in the processing sector if such price changes cannot be passed on.
- Cross-border trade:** will be an issue from a number of perspectives. Firstly, if significant changes take place in the competitiveness of an imported raw material source (e.g. inputs from ROI), then processors which are heavily reliant on such sources for throughput will become severely disadvantaged. Whilst switching over to domestic (NI/UK) sources is possible, it can take time to establish new relationships and transaction costs may rise in these situations. Of more concern will be the accessibility of ROI and EU markets for outputs. Obviously, the imposition of tariffs will have a major impact. Added to this, the ability to consolidate loads by adding NI volumes to ROI volumes will be curtailed and cross-border supply chain operations would have to undergo significant change. All of this would incur additional costs to the industry.
- Carcase balance:** has been highlighted by processors during the study as a key concern. Although the CET tariffs for offal are relatively low for some products and one would therefore expect trade between the UK and the EU-27 to be relatively less affected under WTO

Equivalence, NTBs will still have an influence. NTBs are forecast to add circa 3% to the cost of such products. Again, this would eat into companies' net margins, particularly because demand for such products in the UK is low. Over time, new markets should open-up if the UK pursues FTAs, but there is an opportunity to begin work now in achieving recognition and acceptance of UK standards in high-growth overseas markets.

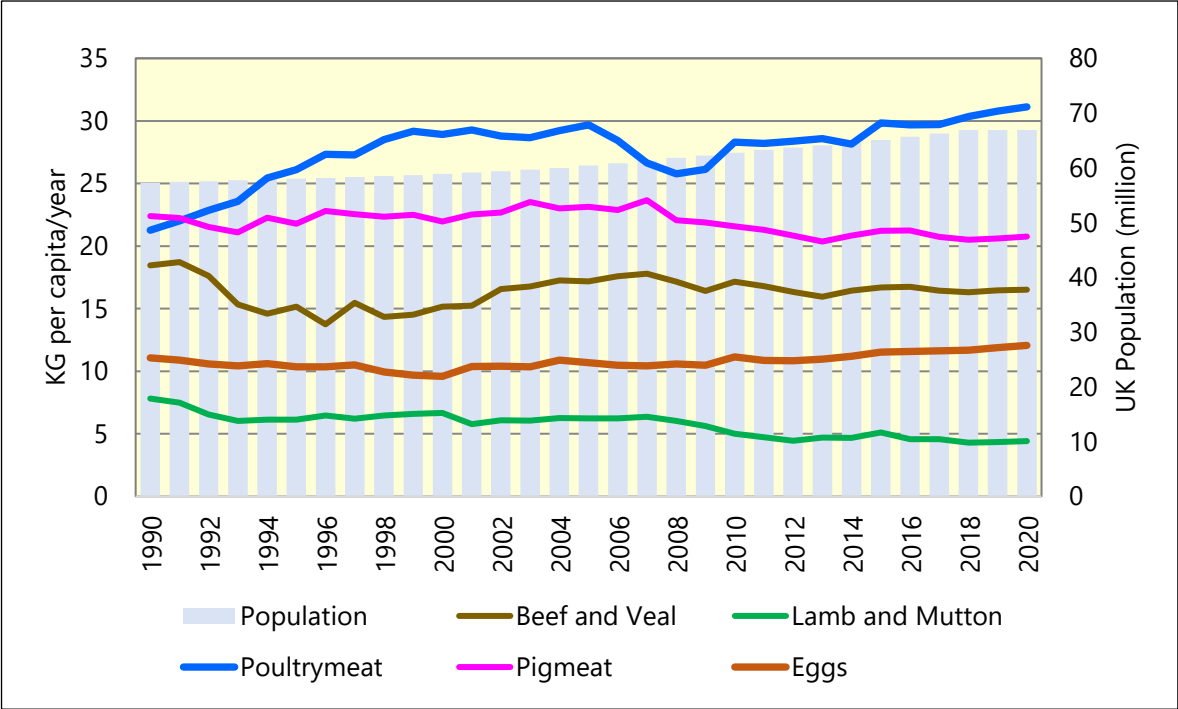
- **Efficiency of operations:** the additional costs of WTO trading and the associated delays brought about by NTBs will impinge upon the operational efficiency of the NI beef and sheep meat sector. There will be less flexibility with respect to fulfilling orders (e.g. procuring material from ROI to complete a load) and waste rates are likely to increase. That said, by having a larger domestic market, those processors less reliant on imported inputs could see operational efficiency boosted, especially if they can find new markets for marginal offal products by focusing on markets where applied tariffs are relatively low.
- **Impact on SMEs:** previous studies have mentioned that the added administration costs associated with WTO trading, will place a heavier burden on SMEs, particularly initially. Evidence from the primary research conducted during this study suggests that several of the larger processors already employ staff who are experienced in processing shipping documentation for trade conducted under MFN rules. Although such staff's job roles may expand, the key point is that the expertise and systems are already in situ. For other companies and SMEs in particular, such expertise is not as readily accessible. This implies added costs for such companies and an erosion of their competitive position particularly because such companies will be more dependent on meat traders to export their produce which is a more expensive way of doing business. For some companies whose operations are heavily reliant on imports from ROI, a WTO Equivalence scenario could mean that they have to reconsider the location of their operations (i.e. moving operations to ROI). This would result in job losses which would damage the local economy in which these plants operate. Under whatever Brexit scenario that eventually emerges, it will be important to support such companies and to ensure that they have the adequate skill-sets to cope with the bureaucratic changes that may arise.

6.1.3 Retail and Consumer

- **Consumer spending and consumption:** the GTAP modelling results presented in Chapter 5 forecast a decline in UK consumer spending on beef and sheep meat under WTO Equivalence. Although the initial decline would be slight (-0.7%), when additional dynamic effects are

considered the decline (-2.8%) would become more pronounced and equates to a loss of £24 million in absolute terms. The increased prices brought about by lower competition would have a key role to play in this. However, other factors also need consideration. It is worth pointing out that whilst competition with imported EU sources could decrease, one needs to pay attention to alternative protein sources which are often cheaper. Figure 7 depicts per capita consumption of selected protein sources across the UK since 1990. It shows that lamb consumption has deteriorated from 7.8 kg per capita to under 5kg per capita in 2016. Beef and veal consumption has also declined from 18.4kg per capita to 16.7 kg per capita in 2016. Contrast this with poultry consumption which has risen by nearly 40% (or 8.5 kg per capita) over the same period. Poultry meat is widely perceived by consumers as being a cheaper protein source and more convenient to cook. Any further price rises for beef and sheep meat would suggest an accelerated switch-over to cheaper proteins.

Figure 7 – UK per Capita Consumption of Selected Proteins – 1990 to 2020



Sources: DEFRA, ONS, The Andersons Centre

- Operational efficiency:** input from retailers consulted during this study highlight the importance of a fast and flexible supply chain which can supply product on-demand at peak periods (e.g. Easter, Halloween, Christmas etc.). Key to this is ensuring that the infrastructure to satisfy such demand remains flexible and open at all times. For Northern Irish suppliers, the ability to source produce from ROI when needed has a key role to play in this set-up. If

such avenues are no longer available at short-notice, then lost sales opportunities could result. Alternatively, more storage space would be required to ensure that adequate supplies are available to meet demand spikes at short notice, thus adding further costs to the supply chain. Again, these marginal costs become significant when compounded over time.

6.1.4 General Impacts

- Self-sufficiency and food security:** should be improved under WTO Equivalence as more of the UK demand is satisfied via domestic production. This is seen by many as one of the positives that would arise from a Brexit that protects domestic producers and encourages them to produce more of what UK consumers need. Table 26 shows the UK's self-sufficiency for food generally and for selected meat categories for 2015 and reveals that the UK is reliant on imports to meet its food consumption needs. For beef, the UK's self-sufficiency is 75% whilst for lamb the UK's self-sufficiency (92%) is much higher. This indicates that there is scope for expansion, particularly for beef. Indeed, the GTAP modelling suggests that UK consumption of NI beef and sheep meat would rise by 27% (£237 million). Although this needs to be considered in the context of exports falling by £191 million. One point worth mentioning on food security is that if a food crisis were to arise due to disease (e.g. food-and-mouth), it would be important for the UK to have access to alternative meat sources to mitigate any potential shortages. Under such circumstances, the UK could potentially reduce its applied tariffs for a period to overcome such a crisis. Despite this, one would expect food security to generally improve in this scenario as more is produced domestically, provided adequate support is given to UK agriculture to achieve this.

Table 26 – UK Self-Sufficiency Rates for Selected Food Categories, 2015

Food Type	Self-Sufficiency (%)
Beef	75%
Sheep meat	92%
Pig meat	55%
Poultry	73%
Indigenously-type food	76%
All food	61%

Sources: AHDB, DEFRA

- **Rural economy:** with the GVA of the beef and sheep meat sector projected to improve by 4.3%, one would expect that this would be positive for the economy generally. That said, numerous other factors will be at play in a Northern Irish context which are likely to be much more influential on the wider rural economy (e.g. ease of movement across the border with the ROI). But these are outside the scope of this study.

6.2 IMPLICATIONS OF WTO LIBERAL TRADE

The results presented in the previous Chapter forecast a devastating impact on the UK and Northern Irish beef and sheep meat sectors if the UK adopts a unilateral liberal trade policy. This will have severe repercussions for both the processing and farming industries.

6.2.1 Farm Level

- **Input costs and usage:** one would expect that with zero tariffs being applied on inputs that some farm input costs would decline post-Brexit. From a livestock perspective, this will be particularly important for imported feed as there will be more opportunities to import from non-EU countries. The GTAP analysis also suggests that the fall in input costs will moderately raise competitiveness vis-à-vis the EU. For the Northern Irish Meadow Farm, variable costs are forecast to fall by 2% in this scenario, although this will be more than offset by a rise in overhead costs, particularly labour, power and machinery as explained in Section 6.1.1.
- **Productivity:** NI farmers will be competing with low cost producers from across the globe and over the longer term, only the most competitive will survive. Such a move will entail achieving greater economies of scale for the industry generally with a much sharper focus on inputs to outputs usage. For Meadow Farm, this will translate to lower prices on-farm which on aggregate are estimated to fall by around 21% under WTO Liberal Trade as illustrated in Table 27.
- **Profitability:** as depicted in Table 23, the introduction of a UK Liberal Trade policy would have a devastating impact on the profitability of livestock farming in Northern Ireland, especially if support payments also decline. Even if support remains the same, Meadow Farm generates a loss of £156/ha (£9,360 for the farm). If support reduces, these losses rise to £15,600 with a 33% reduction and to over £21,000 if support is reduced by two-thirds. Clearly such losses are unsustainable for any length of time and would require major changes to operations or a discontinuation of production.

Table 27 – NI Meadow Farm Performance under WTO Liberal Trade Scenario

Current Performance		WTO Liberal Trade – 2025/26		
£ per Ha	2017/18	Same Support	-33%	-66%
Livestock Output	1,007	799	799	799
Livestock Variable Costs	399	391	391	391
Gross Margin	608	408	408	408
Overheads	493	510	510	510
Rent, Finance and Drawings	376	378	376	369
Margin from Production	(261)	(481)	(478)	(472)
Support	325	325	218	111
Business Surplus	64	(156)	(260)	(361)

Source: The Andersons Centre

- Farm structure:** the sharp decrease in output under WTO Liberal Trade and the substantial deterioration in profitability outlined above would lead to a major restructuring of beef and sheep meat farming over the longer term, particularly if support is reduced. The precise nature of such changes is difficult to predict at this point, however, for a farm to survive, its cost base would need to alter substantially. This could be achieved through economies of scale which suggests a major rationalisation of farming with numerous farmers exiting the industry. In some areas, it is likely to entail a movement towards much less intensively managed systems meaning that sheep being raised on the hills for example will not be inspected by the farmer very frequently and feed inputs etc. will be slashed. This is likely to have negative implications for mortality rates and potentially animal welfare. For other farms, this may mean curtailing agri-environmental improvements which have been made in recent years, thus leading to environmental degradation in some instances. However, farmers will be forced to consider such dramatic changes in addition to part-time farming as a WTO Liberal Trade scenario plays out. All the while, farmers will have to contend with a more volatile world market and all of the uncertainties that brings in terms of prices and cashflow challenges.

6.2.2 Processing Level

- Raw materials availability:** will decline substantially and the processing industry will also be significantly downsized in such circumstances, with some potentially moving operations elsewhere (e.g. to ROI). Over the longer term (e.g. 10 years post-Brexit), the industry may begin to expand again as new markets become available and a rising global middle-class

population demands more meat. However, the extent to which the Northern Irish farming sector would be able to react to such opportunities would be contingent on the amount of land available (i.e. grassland which is not converted to forestry), and the number of adequately skilled farmers remaining within the industry. Added to this, it is also worth emphasising that developing new markets takes time as the likes of New Zealand has found in the past.

- **Cross-border trade:** exports to the EU would almost collapse particularly as the imposition of the EU CET renders NI beef and sheep meat exports uncompetitive. One would anticipate that trade with non-EU markets will increase and the GTAP model estimates this trade to rise by 24%. However, the extent to which this is possible will be limited by the availability of raw materials within NI and competition from low-cost producers elsewhere. For NI processors, the ability to procure inputs from ROI should be relatively unhindered (due to no tariffs on inputs), although NTBs will remain an issue. For the UK generally, imports from the EU are projected to decrease by 62% as imports from non-EU are more competitive.
- **Carcase balance:** with EU markets being closed-off due to the CET, non-EU outlets will become even more important. With the prospect of new markets opening up, particularly in Asia, one would expect that it this should make up a significant proportion of the shortfall previously destined for EU markets. However, with the significant downsizing projected under WTO Liberal Trade, the amount of offal and other marginal products available for sale would also decline.
- **Operational efficiency:** all of the above point towards a major rationalisation of the Northern Irish processing industry. This should mean that long-term operational efficiency would increase at a plant level, but the price for that would be a downsized industry which contributes much less to the NI economy.
- **Impact on SMEs:** following on from the previous point and the issues highlighted above, the impacts of rationalisation will be most pronounced on the SME sector. Unless they can find high quality, niches which insulates them from the vagaries of the mainstream market, trading conditions will become even more challenging.

6.2.3 Retail and Consumer

- **Consumer spending and consumption:** is forecast to experience minimal change in overall terms, however, a much greater proportion of this spending will come from imports from both the EU and non-EU as the UK's Liberal Trade policy will not discriminate by origin. Added to this, it is likely that the food-service sector which is reported by some industry experts to

be growing by 10% per annum will play a much more prominent role in future consumer spending. As consumer choices within the food-service sector tend to be less discerning, this will add further momentum towards a shift towards imported sources of beef and sheep meat, to the detriment of UK and Northern Irish sources. This will especially be the case if general inflation erodes spending power.

- **Operational efficiency:** in contrast with WTO Equivalence, the ability to continue to procure from the EU-27 without tariffs should mean a less pronounced effect for retail operations. That said, NTBs will be a hurdle and could add up to 6% onto costs as outlined in Chapter 5. Arguably, the sector will be more exposed to risks that could arise from diseases, supply shocks etc. as there will be a smaller domestic industry to procure from at short notice. This will pose a challenge during peak demand periods in particular.

6.2.4 General Impacts

- **Self-sufficiency and food security:** will decrease substantially under this scenario. The UK market will be more exposed to the risks associated with global supply chains and future crises (e.g. disease, fuel shortages, wars etc.) will exacerbate this exposure, particularly given the long production cycles associated with beef especially as well as the likely loss of grassland to afforestation. Admittedly, with the UK being able to source produce from the EU at a similar level to present, this should decrease the risk somewhat.
- **Rural economy:** a major downsizing of the NI industry coupled with substantial numbers of farmers exiting the industry will have a major knock-on effect for the Northern Irish rural economy. Although around two-thirds of the labour used in the NI beef and sheep meat processing industry is foreign, these migrants' incomes are predominantly spent in the local economy so it will have an impact. What is more of an issue is that if the number of beef and sheep farmers, currently estimated at around 20,000, declines significantly and there are no alternative sources of work, the viability of the rural economy would be seriously damaged. This is likely to accelerate rural depopulation, particularly the young which does not auger well for long-term prospects.

6.3 CONCLUDING REMARKS

Overall, the introduction of WTO trading conditions will cause major upheaval within the Northern Irish beef and sheep meat sector not just within the processing industry but across the wider supply chain. This effect will be particularly pronounced under WTO Liberal Trade which is likely to lead to a

significant increase in rural unemployment and will severely undermine the economic prospects for the region and leave it even more reliant on Government support. Under this scenario, it is clear that no deal with the EU would deal a disastrous blow to Northern Irish agriculture.

Under WTO Equivalence, the prospects are less pessimistic, especially for beef. However, sheep meat will undergo significant changes as vital EU export markets are lost. That said, serious questions remain as to whether UK consumers and taxpayers would be willing to tolerate higher food prices. One also needs to consider that over the long-term, Government policies and spending priorities will change. A farming sector which becomes more protected under WTO Equivalence would find it very challenging to adapt to a sudden change in trading policy. Therefore, whichever scenario emerges post-Brexit, the beef and sheep meat sector as well as agriculture generally will need to address the productivity challenge.

7. CONCLUSIONS AND RECOMMENDATIONS

Brexit in itself represents a major change for the UK economy and the food and farming sectors in particular. If the future UK-EU trading relationship is based on WTO rules, then the impact will be even more profound. The results outlined in this report show that the beef and sheep meat sector is an important contributor to the Northern Irish economy and would be significantly affected by the introduction of WTO trading conditions. Below is a summary of the key conclusions of this study whilst the Recommendations section puts forward The Andersons Centre's proposals on the form of Brexit that should be pursued as well as suggestions on how the Northern Irish industry could address the opportunities and challenges associated with WTO trading conditions, should such a scenario come to pass.

7.1 KEY CONCLUSIONS

1. Output and Trade

The aggregate output of beef and sheep meat in Northern Ireland is estimated at £1.1 billion in 2016. Of this, exports to end-customers in the EU are valued at £195 million (£71 million to ROI; £124 million to other EU) and account for 17% of total sales. The domestic (UK) market is valued at £877 million (79% of total output). Whilst exports to non-EU end-customers (£28 million) are small, representing 3% of sales, they play a very important carcass balancing role. Some of the major impacts forecast to emerge from WTO trading under each scenario include:

WTO Equivalence:

- **Exports:** from Northern Ireland are forecast to fall by 82% (£190 million) on aggregate with EU-bound exports projected to shrink to under £15 million (a 93% decline). Exports to non-EU will offset this only very slightly (£1.3 million increase).
- **Imports:** from the EU into the UK are estimated to fall by £939 million (85%). This occurs due to domestic (NI and GB) produce displacing imports as a result of the UK imposing the CET.
- **Output:** is forecast to rise slightly (by 0.7%) in the short-run which equates to an additional £8.2 million in sales for the industry. Based on UK-level modelling, domestic consumption of Northern Irish produced beef and sheep meat is forecast to rise by nearly 23% (£198 million). This is definitely a positive for Northern Ireland. However, consideration needs to be given to the extent to which UK consumers will tolerate the price rises that would come about under such a scenario and the long-term commitment of Government to continue such a policy,

given likely budgetary constraints (NHS etc.) and the need to pursue free trade deals with other countries (who will likely demand more access for food products).

- **EU cross-border trade:** will experience a major decrease due to tariffs. Whilst the effective tariff rate is estimated at 37% across the UK generally, this effect would be even more pronounced for Northern Ireland as it has lower average selling prices which means that the impact of the EU tariffs which are primarily constructed on the basis of weight (e.g. 12.8% + €1.76/kg) will be proportionally higher. This could lead to even higher export trade shrinkages and would also severely curtail imports from ROI.
- **Farm-level performance:** in its current structure is heavily dependent on the level of support that the industry receives. If support levels remain the same under WTO Equivalence then incomes are forecast to only fall slightly. As the support levels drop, the profitability of beef and sheep farms deteriorate significantly with many likely to experience losses which over time would become unsustainable and cause significant restructuring. This has significant implications for the processing sector which relies heavily on domestically produced materials. Therefore, the development of a future Northern Irish agricultural policy requires careful consideration.

WTO Liberal Trade:

- **Exports:** an aggregate 78.8% decline is projected (£182 million) for Northern Ireland with EU exports to fall by 91.5% (£188 million) to £17.5 million. Exports to non-EU will slightly offset this as a £6.1 million increase is forecast.
- **Imports:** from the EU into the UK are forecast to decline by 62%. Although some would continue to sell into the UK under a Liberal Trade policy, cheaper non-EU imports would soar by 167% (£875 million).
- **Output:** is expected to decline by almost 21% (£230 million) which will have a devastating impact on the sector as domestic producers struggle to compete with imports from around the world. This will have serious repercussions for the processing industry and the wider rural economy.
- **Farm-level performance:** even if the current level of support is maintained, farm incomes would decline significantly as livestock prices witness sizeable declines. If this is coupled with decreases in support, then many of Northern Ireland's livestock farms would quickly become unsustainable. This will result in even more pronounced industry restructuring and would severely damage the rural economy as the effects of such a policy would not just be limited

to beef and sheep meat but would be felt similarly in other pivotal rural sectors such as dairying.

2. Tariffs and Non-Tariff Barriers (NTBs):

As pointed out in the previous section, the imposition of the CET will severely erode UK-EU trade. These effects could be even more pronounced on Northern Ireland due to the nature of its exports to the EU and the fact that meat prices in Northern Ireland (which includes cross-border trade within the supply chain) are lower than the UK equivalents. For the UK generally, the effective tariff rate averages around 37% but for NI the equivalent effective tariff rate is almost 72%. Tariffs would also have a would have a major impact on cross-border trade with the Irish Republic (both for inputs (live animals, beef carcasses) and outputs).

NTBs equate to a 3% effective tariff rate under WTO Equivalence but almost doubles to 5.7% under WTO Liberal Trade. The calculations underpinning these estimates are shown in detail in Chapter 5. This difference mainly arises due to lower physical checks and customs delays at the border which limits the scope for the value of products to deteriorate significantly. That said, where physical checks do take place they have the potential to add significant delays to ROI and EU bound consignments especially if sampling is required. Samples take 3 days to be completed and the deterioration in the value of a load in such circumstances is substantial (in the 25-30% range). Overall, the estimated NTB effect is approximately double that of the average industry net margin (1.5%) so it is significant.

3. Animal and Food Standards

This topic arose time and again during discussions with processors and other industry experts. It is seen as critical that if the frictionless border between NI/UK and ROI/EU is to continue, then the same standards as the EU must be maintained both now and into the future. If UK standards change upon or after Brexit, then the risk of the imposition of a default physical check rate (20% of all consignments) is a major risk. This needs to be avoided. Added to this, if UK standards change upon Brexit there is a significantly increased risk that non-EU countries will refuse to accept UK exports until they have satisfied themselves that the UK standards are compliant with their own domestic standards (this could take months/years in some cases). Keeping the same standards as the EU will also necessitate the UK keeping step with EU standards as rules change in the future.

4. Labour

Difficulties in sourcing suitably skilled staff was also highlighted as a major issue by companies. There is already evidence to suggest that the ability to recruit staff from the EU-26, which makes-up around

two-thirds of the NI workforce in processing plants is becoming more difficult, particularly due to currency movements. Maintaining the relatively unimpeded access to such staff is a key ask from the industry, because it is reported that sourcing staff locally is extremely challenging. It is estimated that the cost of recruiting EU-26 staff could rise by 10% per person under a hard Brexit due to the extra administration involved. If the available labour pool reduces, then wage inflation will also force costs to increase. Admittedly, if WTO trading conditions lead to a deterioration in economic performance, then recruiting locally may become somewhat easier but this is not a foregone conclusion. Increased automation is seen by some as a partial answer to labour shortages although the variability in carcasses for example is cited as an impediment to its uptake in comparison with other processing sectors.

5. Competitiveness

Based on the points listed above, the introduction of WTO trading conditions would pose serious challenges for the competitiveness of the NI processing industry as it currently stands. Under WTO Equivalence, a more protected domestic market will increase consumer prices. If inflation becomes rampant across the economy generally, then taxpayers are unlikely to accept this, especially if the funding for the NHS and other Government spending is also under pressure. Even if a WTO Equivalence-esque policy is pursued in the short-run, there are no guarantees that this would continue long-term.

Under WTO Liberal Trade, a significant proportion of domestic production would succumb to cheaper imports from abroad. This would leave the UK and Northern Ireland much more exposed to food security and continuity of supply issues in the event of an international crisis (e.g. disease, natural disaster etc.). The future UKAP to be developed by the Government needs to consider this carefully.

7.2 RECOMMENDATIONS

Based on the concerns highlighted by the Northern Irish beef and sheep meat industry, it is clear that continued unimpeded access to the Single Market (both for high-value exports and for carcass balance) and the ability to obtain appropriately skilled labour when required are essential to safeguarding its competitiveness. Whilst the UK Government has provided a long-term indication of the type of Brexit that it wishes to pursue as well as the pressing need to give certainty to businesses as they strive to make decisions against the backdrop of Brexit, it is clear that a comprehensive interim arrangement will be required. It is also clear that local government and industry will need to work together to safeguard the Northern Irish beef and sheep meat industry during what is expected to be a period of uncertainty. In this context, the following recommendations are put forward:

1. Interim Single Market and Customs Union membership:

In view of the concerns highlighted by industry, it is proposed that the UK-EU trading relationship should move to an interim Single Market and Customs Union arrangement for at least 5 years post-Brexit. This arrangement should also include mutual recognition of existing official controls (i.e. veterinary standards, etc.). During this interim period, there should also be a mid-way review to examine progress in implementing arrangements (e.g. technology to facilitate frictionless cross-border trade) for the finalised post-Brexit relationship with the EU-27. This would enable timelines to be adjusted as required (i.e. brought forward or delayed).

The reasons for this approach are:

- **Provide certainty to businesses and permit them to operate without impediment:** interim membership of the Single Market (via the European Economic Area (EEA)) is the best available means to ensure a continued 'open' border and access to skilled labour whilst the details of how a frictionless Irish border would operate within a comprehensive UK-EU free trading relationship are clarified. However, as existing EEA arrangements do not include agriculture, an interim Customs Union arrangement is also needed. Although an interim Customs Union arrangement of itself would permit trade to flow unimpeded (provided there is mutual recognition and acceptance of existing official controls), it would not sufficiently address industry concerns around labour.
- **Facilitate a more considered long-term trading arrangement:** this approach would also give the UK and the EU additional time to agree a more considered longer-term settlement as opposed to something "quick" which is then challenged by other WTO members in future.
- **Give immediate certainty and a smoother transition:** this arrangement should be pursued and agreed upon as soon as possible after the "future relationship" strand of the exit negotiations commences. In an ideal scenario, such an arrangement could be agreed in principle by Q1 2018 and take effect from the UK's formal departure date in March 2019.
- **Enable suitable cross-border management systems to be established:** whilst there is likely to be resistance from the UK Government on the above approach, mainly due to issues around migration and partly because it has envisaged a shorter (1-2 year) transitional period, the UK Government's track record with introducing complex new IT systems (e.g. for Basic Payment Scheme applications in agriculture) is patchy to say the least. With the form of Brexit that the UK Government is pursuing, many new systems will need to be introduced post-Brexit to facilitate frictionless trade and simultaneously meet official controls and customs rules. Such systems need to be fully tried, tested and trusted in advance of becoming

operational. This is particularly important considering the significant potential for smuggling which is likely to emerge if there is price divergence between NI and ROI markets, which would be inevitable in a WTO scenario. Under such circumstances, there are serious concerns about whether such systems can be successfully developed and deployed within 12-24 months (without creating substantial upheaval for industry). Added to this, huge questions remain as to how such a system could be effectively policed whilst maintaining an open border. Adequately addressing these questions will take time and a lot of thought, and therefore, necessitate a longer transition (interim) period. It would also require a mid-way review during the interim period to ensure that the development and testing of systems to facilitate the finalised UK-EU post-Brexit relationship are sufficiently robust so that timelines are adjusted as deemed necessary to facilitate a smooth and orderly Brexit.

2. Labour

In light of the concerns listed above, both the UK Government and the EU need to resolve the current impasse on the status of EU citizens in the UK (and UK citizens in the EU) as quickly as possible. Continuing to be part of the Single Market, for an interim period, will provide security to those already employed in the Northern Irish agri-food sector. In the longer term, additional measures need to be put in place to ensure that industry has continued access to the labour it needs post-Brexit. Otherwise, recruitment costs and wage inflation will erode competitiveness. To address these long-run issues, it is proposed to:

- **Set-up an Agri-Food Workers' Scheme (AFWS):** this would operate similarly to the Seasonal Agricultural Workers Scheme (SAWS) previously in operation for Romanian and Bulgarian farm workers before they could avail of free movement. However, the AFWS should be more ambitious by encompassing the wider agri-food sector and cover full-time labour staff who have not already achieved "settled status" or similar post-Brexit. The AFWS needs to enable the meat industry to continue to recruit in as flexible manner as possible and should not be subject to cumbersome administrative procedures each time they wish to recruit.
- **Incentives for locally based staff:** need to be encouraged as much as possible and tie-in with local communities and farming. Based on this study and previous research, UK farming faces a number of headwinds and a critical challenge for the future of the industry is to have farmers who better understand the needs of their clients and to produce accordingly. Brexit and the imposition of WTO trading conditions is forecast to exert significant pressure on the numbers of farmers that will be competitive in the long-term. These farmers will need alternative income sources and there could be an opportunity for such farmers to work part-

time, or in some form of shared-job arrangement, within the meat processing sector. Added to this, partnership opportunities in terms of training young farmers should also be considered. This could take the form of placements in meat plants as a part of their training. Such initiatives, if formulated correctly, could permit farmers to gain a better understanding of the product and quality specifications that the meat industry needs to adhere to and would also give them a greater appreciation on consumer requirements. This could play a useful role in influencing their future farming practices and would help NI compete more effectively with the likes of New Zealand.

- **Time and resources to adjust:** just as the UK and EU will need a transitional period to adjust to the future trading relationship, it is vital that the meat industry has time to adapt to any new regulations that will affect how they source labour. Accordingly, it is suggested to give at least 12 months' notice (and ideally more if possible) so that companies have time to adapt. If the exit negotiations proceed according to plan, one would hope that the issue of citizens' rights will be agreed upon by Q4 2017 and that there would therefore be at least 15 months before any new arrangements are enforced. Such time is critical for meat plants to plan their operations. Linked with this, if restrictions are placed on migrant labour in the long-term, then Northern Irish beef and sheep meat processing companies will need adequate access to finance to invest in capital (equipment etc.) to replace labour.
- **Veterinary staff:** similar to operations-related labour, the majority of veterinary staff in the UK generally are EU-27 citizens. Whilst this issue is not as pronounced for Northern Ireland, any additional restrictions on the availability of staff in the UK generally will exert pressure in terms of salary costs etc. Given that a substantial proportion of newly qualified veterinary staff prefer to work in the small animals (pets) sector, Government and industry should consider introducing incentives for staff to remain in the meat sector upon qualification. For instance, veterinary students could be offered free or heavily subsidised training/tuition provided they commit to remaining in the meat sector for at least five years after qualification. Such schemes are already in place in parts of the US and should be considered in the UK.

3. Opening new Third Country markets:

Some would argue that remaining part of an interim EU-UK Customs Union limits scope to open-up new markets. However, there is plenty of work that the Department of International Trade and DEFRA could be doing already in terms of getting meat from UK and Northern Irish premises approved for sale in non-EU countries (e.g. recognition/acceptance of veterinary standards). With cut-backs in recent years, Government spending in this area has been neglected and it is a key reason why the UK

has fallen behind other countries (e.g. Republic of Ireland) in opening-up new markets. Such work could begin immediately and would form a useful prelude to any future trade agreements because getting standards mutually recognised and accepted has been a key factor in delays associated with new FTAs becoming operational. Prioritisation needs to be given to the most attractive markets for Northern Irish meat produce which includes ensuring that Northern Ireland gets access to new markets for high-value processed meat and not just carcasses. Of course this includes traditional high-end markets in the likes of North America and the Gulf region. However, it has been emphasised by processors during this study that South East Asian markets have been growing strongly and are quickly catching-up with their more established counterparts in terms of quality expectations and price. Added to this, markets that are key outlets from a carcass balancing perspective also need to be prioritised. Whilst Brexit presents opportunities for Northern Ireland to supply more of the domestic UK market, if it does not have an outlet for marginal parts of the carcass (e.g. trimmings etc.), then the overall cost of higher quality cuts will increase.

4. Develop an aligned long-term strategy for food and farming

Linked with the above point, there needs to be a joined-up long-term strategy for the sector that aligns multiple departments (e.g. Trade and DEFRA) and spans multiple Parliaments. Ireland's Food Harvest 2020 strategy which was compiled at the start of the decade is a useful example of how multiple industry and governmental stakeholders can come together to set a unified logic and direction for the industry. This needs to be initiated immediately so that the industry is as prepared as possible for the opportunities and challenges of Brexit and beyond. Such a strategy will also require continued support for, and investment in, the agricultural sector as it adapts to the post-Brexit environment.

5. Develop a new agricultural policy based on fair competition and adherence to existing standards

The UK agricultural policy that emerges post-Brexit needs to encourage Northern Irish and UK farmers to compete on a level playing field with its closest competitors (in the EU). Permitting access of cheap food that is not produced to the same standard as domestic produce is unfair, both to farmers and to consumers. In the long-run such a policy has the potential to undermine security of supply. In this regard, agricultural policy needs to be aligned with trade and environmental policies because importing "cheaper" food from other parts of the world is not necessarily optimal, particularly when issues such as carbon footprint and food standards are considered.

It is also worth noting that whilst the UK will have to continue to adhere to WTO rules on support to agriculture, post-Brexit, there is scope to tailor support policies in accordance to domestic farming needs. This includes greater scope to introduce coupled support vis-à-vis how the EU currently supports farmers (i.e. primarily direct payments with limited coupled support in some countries). Such opportunities should be availed of, provided they contribute to the development of a competitive and quality-focused farming industry in the long-term.

6. Adapt EU Official Controls regulations to permit frictionless cross-border trade

Whilst examining the detail of EU Official Controls regulations (2017/625)⁵² was not a core focus of this study, it is an area that needs careful consideration if a frictionless cross-border trade is to be maintained post-Brexit. *Article 44* of these regulations states that official controls can be “performed at an appropriate place” within the customs territory of the Union, including:

- point of entry into the Union, a border control post,
- the point of release for free circulation in the Union,
- *the warehouses and the premises of the operator responsible for the consignment* and
- the place of destination.

However, *Article 47* states that animals and products of animal origin (i.e. meat) need to be performed at the border control post on first arrival into the EU. Given the unique circumstances of Northern Ireland, the possibility of obtaining a derogation to Article 47 to permit official controls of meat and animal consignments to take place at slaughter houses, meat plants and collection centres for live cattle should be pursued. In addition to covering NI-ROI trade, it may also be possible to cover GB-ROI trade within this derogation. However, to have any possibility of success, it is vital that the existing EU official controls and standards would continue to be enforced across the UK post-Brexit.

7.3 RECOMMENDATIONS UNDER A WTO TRADING SCENARIO

If the Brexit negotiations result in no deal and WTO trading conditions ensue, below are some additional proposals for the industry and policy-makers to consider.

⁵² See: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0625&from=EN>

1. UK-EU Specific TRQs

As outlined above, simply reverting to standard WTO rules will cause major upheaval for Northern Ireland, the UK and the EU (particularly the Republic of Ireland). Even under WTO trading conditions, steps can be taken. For instance, introducing TRQs that take account of the historic trade flows between the EU and the UK would be vital, particularly for UK-Ireland trade. Whilst some argue that TRQs can only be introduced on an ERGA OMNES basis, the fact remains that there are country-specific (bilateral) TRQs already in place. Therefore, the possibility of introducing new bilateral TRQs should not be ruled out and should at least be included in the negotiations. Of course, other WTO members would monitor such developments closely to ensure that their interests are protected. However, if such TRQs were introduced based on historical trading within a 7-year reference period (7 years is used to mitigate the influence of exchange rate movements over a shorter timespan), it would permit established trade flows to continue. This would help to safeguard existing cross-border trade between Northern Ireland and the Irish Republic as well as Northern Irish-EU trade as tariffs would be reduced dramatically, potentially to zero. Admittedly, NTBs would still be a hurdle but at least the challenge would become more surmountable.

A similar historical trading reference period could potentially be used to split-out existing TRQs between the UK and the EU-27. Taking the 228,254 tonnes of New Zealand lamb TRQ as an illustrative example. If the average annual trade volume with the EU over 7 years was estimated at 170,000 tonnes and the UK accounted for 50% of this amount (85,000 tonnes). Then based on this 50% historical share, the 228,254 allocation could be split 50:50 between the UK and the EU-27 (i.e. 114,127 tonnes each). However, it must be acknowledged that such a split is arguably unfavourable to New Zealand because its "option value" would decrease. Under the old EU TRQ, it could send 228,254 tonnes anywhere across the 28 Member States. Under the new arrangement, it could only distribute 114,127 tonnes across 27 countries. Furthermore, the "Rotterdam effect" where imports arrive from New Zealand and then further distributed across the EU (including the UK) would also need to be accounted for. Therefore, it could be that an additional TRQ allowance of say 10% per year (11,413 tonnes) might be required to compensate for these effects. As a result, New Zealand's aggregated TRQ (i.e. EU-27 and UK) would rise to just over 251,000 tonnes.

Of course, this may be seen as a negative by domestic producers. But, if the alternative is to see exports reducing by nearly 90%, then such concessions might be more palatable. Particularly considering that New Zealand has not used up its TRQ allocation with the EU for several years.

2. Capture more of the domestic UK market

As illustrated under WTO Equivalence, there is scope for Northern Ireland to grow its share of the UK market. This is something which should be pursued under any trading relationship with the EU but most particularly under a WTO scenario. A 27% increase in market share as shown in Section 5.4 equates to around £237 million. If exports to the EU decline (potentially by a similar proportion), then NI producers and processors must do all they can to maximise UK sales. It was noted during the research that some of the top-performing UK beef producers, in terms of quality, are from Northern Ireland. Added to this, Northern Ireland has some great comparative advantages. Most notably, it is a great place to grow grass, and therefore, a great place to produce quality meat. There are also in excess of 65 million affluent UK consumers on its doorstep. Furthermore, Northern Ireland has a strong track-record with regards to traceability, animal welfare and adherence to retailers' specifications. Under any scenario, particularly in WTO trading conditions, the industry needs to emphasise and maximise such competitive advantages and continue to promote its "clean and green" image domestically whilst extracting as much value as possible from each carcass produced. At the same time, there needs to be a recognition that beef and sheep meat are sensitive products, particularly in economies such as Northern Ireland and the UK Government needs to strike a careful balance between unacceptably high food prices and protecting the market share of UK farmers, and hence the livelihoods of many rurally-based families.

3. Open up new markets to help with carcass balancing

A key aspect of maximising carcass value is finding markets for parts of the carcass which UK consumers prefer not to eat. If Northern Ireland grows its share of the UK market, then a parallel strategy to develop markets for offal and by-products needs to be developed. As mentioned in Chapter 5, a reversion to WTO trading would not necessarily impede access to non-EU markets as the effective tariffs would be the same regardless of whether the UK was in the EU or not. Although work to expand Northern Ireland's footprint in these markets has been underway for several years, it needs to be expanded whilst the development of new opportunities in similar markets also needs to be initiated. Ideally, Northern Ireland needs to simultaneously develop as many opportunities as possible. That said, resources need to be optimised and a more targeted export development strategy needs to be implemented whereby markets which are relatively easy to enter and help Northern Ireland to grow its domestic UK share are prioritised. Initially, this may mean forgoing opportunities in bigger markets (e.g. China) but several experts have pointed out that such markets are difficult to penetrate and that it may be easier to focus on other fast-growing markets in South East Asia.

Throughout this process, having access to adequate support including market development expertise, will be essential for the Northern Irish beef and sheep meat industry as it alters its product portfolio and repositions itself to capture new markets.

4. If no agreement is reached consider the Cyprus model.

As explained in Chapter 3, this arrangement is less than ideal. However, it is worth considering as a last resort if no other agreement can be reached between the UK and the EU which would at least permit some semblance of frictionless trade across the island of Ireland. Under such a model, Northern Irish/UK beef and sheep meat could only be sold into the Irish Republic and not the remainder of the EU. A reciprocal arrangement would work in the opposite direction, meaning that only beef and sheep meat originating in the Irish Republic could be sold in the UK (i.e. no goods from EU-26 would be permitted tariff free under this arrangement). Such arrangements would require additional documentation demonstrating the requisite Country of Origin and would likely be subject to TRQs, but it would at least help to facilitate trade reasonably close to existing levels in such a scenario.

7.4 FINAL REMARKS

Overall, this study shows that WTO trading would have a devastating impact on Northern Irish trade with the EU for beef and sheep meat and whilst displacement within the UK market may mitigate this under WTO Equivalence, it would lead to increased prices, reduced consumption (in volume terms) and an increased propensity amongst consumers to switch to cheaper protein sources. A WTO Liberal Trade scenario would seriously damage the industry both domestically and internationally. It is clear that such scenarios need to be avoided. The argument that “no deal is better than a bad deal” is at best highly questionable when both consumer and producer perspectives are taken into consideration. At worst, under a liberal trade regime, a no deal scenario would be highly destructive for the Northern Irish beef and sheep meat sector.

Whilst fully acknowledging and respecting the outcome of the Brexit Referendum, an alternative approach *needs* to be found so that farmers, businesses and citizens across both the UK and the EU have greater certainty and a relatively smooth transition to the post-Brexit relationship. Such an approach requires compromise and realism on both sides not just in terms of desired destinations but also the terrain that must be traversed in order to get there. Hopefully, this report and its findings have brought clarity on the routes ahead for the Northern Irish beef and sheep meat industry as well as the road that should be taken.

APPENDIX I: COMPANY BACKGROUNDS

BACKGROUND TO THE ANDERSONS CENTRE

Andersons the Farm Business Consultants started trading in 1973 providing business advice to farmers throughout Great Britain. The Andersons Centre is one of five separate businesses now trading under the Andersons registered brand. Whilst still retaining a strong presence in the farm consultancy market, The Andersons Centre has expanded to offer research services to businesses along the food supply chain, as well as to Government, levy bodies and not-for-profit organisations. It also owns The Agricultural Budgeting and Costing Book and the John Nix Farm Management Pocketbook which are widely regarded as the leading costings books in UK agriculture. Over the past three years, The Andersons Centre has conducted numerous Brexit-related projects and has delivered around 100 papers on the topic to variety of audiences across the UK and Ireland. More details on The Andersons Centre can be found at www.theandersonscentre.co.uk.

BACKGROUND TO OXFORD ECONOMICS

Founded in 1981, Oxford Economics has more than 20 offices across the globe. It employs over 300 full-time staff, including 200 professional economists, industry experts and business editors – one of the largest teams of macroeconomists and thought leadership specialists which provides economic research, analysis and forecasting services on 200 countries, 100 industrial sectors and over 3,000 cities. Its global team is highly skilled in a full range of research techniques and thought leadership capabilities, from econometric modelling, scenario framing, and economic impact analysis to market surveys, case studies, expert panels, and web analytics.

Oxford Economics is a key adviser to corporate, financial and government decision-makers and thought leaders. Its worldwide client base now comprises over 1,000 international organisations, including leading multinational companies and financial institutions; key government bodies and trade associations; and top universities, consultancies, and think tanks. It has conducted numerous studies on the impact of impact of tariffs and non-tariff barriers (NTBs) on trade and employment across many regions and industrial sectors (including agriculture). Further information on Oxford Economics can be found at: <https://www.oxfordeconomics.com/>

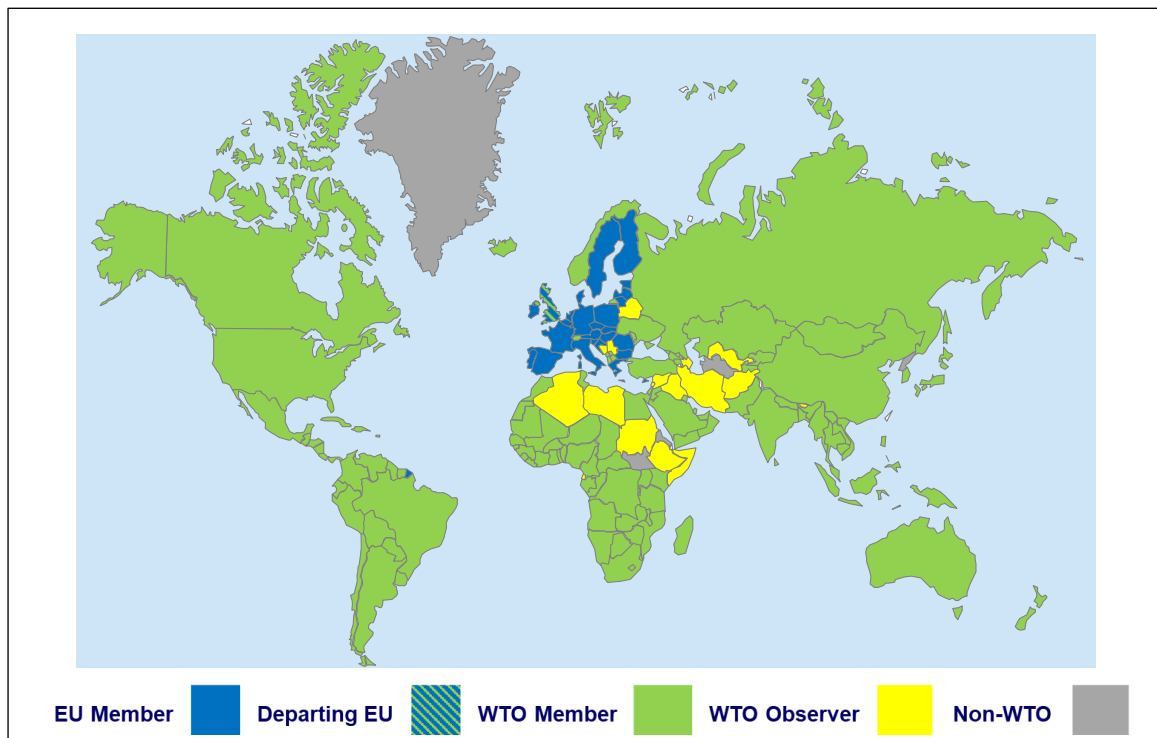
APPENDIX II: WTO OVERVIEW

Below is a brief overview of how the WTO functions, its effects on agricultural trade and a summary of how WTO tariffs would work. It examines some of the key areas where Brexit is likely to affect the UK's WTO membership. This overview is partly based on the AHDB Horizons publication entitled "*The WTO and its Implications for UK Agriculture*"⁵³. Readers seeking a more in-depth understanding of the WTO and its impact on UK agriculture are encouraged to read the AHDB Horizons report.

WHAT IS THE WTO?

The World Trade Organisation (WTO) is an international membership organisation which positions itself as the only international organisation dealing with the global rules of trade between nations⁵⁴. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible between its members. Headquartered in Geneva, it has 164 members which together account for around 95% of global trade. The WTO was established in 1995, replacing GATT (General Agreement on Tariffs and Trade), which was set-up in 1947, as the organisation overseeing the multilateral trading system.

Figure 8- Overview of WTO Members, Observers and Non-Members



* EU and Departing EU countries are also WTO Members

Source: Derived from WTO

⁵³ http://www.ahdb.org.uk/documents/Horizon_june2017.pdf

⁵⁴ https://www.wto.org/english/thewto_e/whatis_e/inbrief_e/inbr00_e.htm

In addition to liberalising trade, it also serves as a forum for governments to negotiate trade agreements and to settle trade disputes that may arise between members. The WTO also reviews national trade policies and assists developing countries in trade policy issues, through technical assistance and training programmes.

Major developments in WTO agreements (and GATT before 1995) are negotiated via a series of rounds. The most recent of these was the Uruguay Round, agreed in 1995) which established the WTO. The current round being negotiated is the Doha Round which has been underway since 2001.

The WTO operates under five general principles which serve as a foundation for the international trading system. These are summarised briefly below with further information available via the WTO website⁵⁵.

1. **Trade without discrimination** – within this principle, two key concepts apply. Firstly, the equal treatment of trading partners via the **most-favoured nation (MFN)** rules. This means that any advantage given to one WTO member (MFN) must be granted equally to all other MFNs. There are exceptions to this rule which are granted under strict conditions and the most significant of these is using a free trade agreement between countries to discriminate against goods from outside. Secondly, **national treatment** refers to treating imported and locally produced goods equally, once the goods (or services) have entered the market. Importantly, charging customs duties on imports is not a violation of this principle.
2. **Freer trade: gradually, through negotiation** – focuses on lowering barriers to encourage trade. These barriers include customs duties (tariffs), import bans or quotas that restrict quantities selectively.
3. **Predictability: through binding and transparency** – centres on promising not to raise trade barriers to give businesses a clearer view of future opportunities. By opening their markets in this fashion, countries “bind” their commitments and for goods trade, this encompasses placing ceilings on customs tariff rates (hence the term binding/bound tariff). As a result of the Uruguay Round, 100% of agricultural products now have bound tariffs. As such tariffs and duties are clear and will not be increased unexpectedly, this has resulted in a substantially higher degree of market security for traders, investors and other market participants.

⁵⁵ https://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm

Some countries, particularly developing economies, apply import tariffs at a lower rate than the bound rate. It is from this practice that the concept of an applied tariff is derived. There are circumstances in which a country can change its bound tariffs but only after negotiating with its trading partners, which could mean compensating them for loss of trade. Under this principle, the use of quotas has been discouraged due to added bureaucracy and alleged unfair play. There has also been an effort to make a country's trade rules as clear and transparent as possible.

4. **Promoting fair competition** – the WTO seeks to put forward a system of rules dedicated to open, fair and undistorted competition. These non-discrimination rules are therefore aimed to secure fair conditions of trade for all members. Included within this are rules relating to dumping (exporting at below cost in order to increase market share) and subsidies. The WTO acknowledges that such issues are complex, and the rules try to establish what is fair or unfair, and how governments can respond, in particular by charging additional import duties calculated to compensate for damage caused by unfair trade (e.g. dumping).
5. **Encouraging development and economic reform** – this principle agreed during the Uruguay Round states that better-off countries should *“accelerate implementing market access commitments on goods exported by the least-developed countries, and it seeks increased technical assistance for them.”* It effectively gives developing countries more time to adjust to market access measures which may be unfamiliar and difficult to implement. More recently, the WTO notes that developed countries have started to allow duty-free and quota-free imports for almost all products from least-developed countries.

HOW DOES THE WTO AFFECT AGRICULTURAL TRADE?

As alluded to above, the WTO has a comprehensive set of rules which govern global agricultural trade and the overall aim is to establish a fairer trading system that will increase market access and improve the livelihoods of farmers around the world⁵⁶. The WTO Agreement on Agriculture entered into force in 1995 and seeks to reform agricultural trade by making it fairer and more competitive.

The Agreement covers:

- **Market access** — the use of trade restrictions, such as tariffs on imports

⁵⁶ https://www.wto.org/english/tratop_e/agric_e/agric_e.htm

- **Domestic support** — the use of subsidies and other support programmes that directly stimulate production and distort trade
- **Export competition** — the use of export subsidies and other government support programmes that subsidize exports.

Under the Agreement, WTO members agree to “schedules” (or lists of commitments) that set limits on the tariffs they can apply to individual products and on levels of domestic support and export subsidies. As such, each country submits its schedule to the WTO and cover commitments on market access and national treatment of products, and therefore, represent an important legally binding component of WTO membership.

As part of the Uruguay Round, previous restrictions on agricultural imports (e.g. quotas and other non-tariff measures) were replaced by tariffs which provide a similar level of protection. For example, if previous policy instruments put domestic prices 50% higher than world market prices, then the new tariff could be set at approximately 50%. This process is known as ‘tariffication’. It also ensured that previous volumes of agricultural commodities imported before the agreement could continue to be imported whilst some new quantities of imports could be charged at duty rates that were not considered to be prohibitive. As such, a system of tariff rate quotas (TRQs) were introduced which set lower tariff rates for specified quantities of imports (e.g. 228,400 tonnes of lamb from New Zealand to the EU) and higher (sometimes significantly higher) rates for quantities exceeding the quota.

The Agriculture Agreement also imposes restrictions on the amount of support that governments could provide to the agricultural sector. A key aspect of this is delineating between support that directly encourages production (e.g. coupled support) and supports which are not considered to have a direct effect (e.g. de-coupled support). As the focus of this study is on agricultural trade, the policy aspects of the WTO Agriculture Agreement are not covered in detail here. For those interested in this topic, please visit: https://www.wto.org/english/tratop_e/agric_e/ag_intro03_domestic_e.htm.

OVERVIEW OF HOW IMPORT TARIFFS WORK

As outlined by the AHDB⁵⁷, import tariffs are customs duties applied to merchandise imports (including beef and sheep meat). In an EU context, they are primarily used to give protection (price

⁵⁷ See: http://www.ahdb.org.uk/documents/Horizon_Brexit_Analysis_Report-Oct2016.pdf

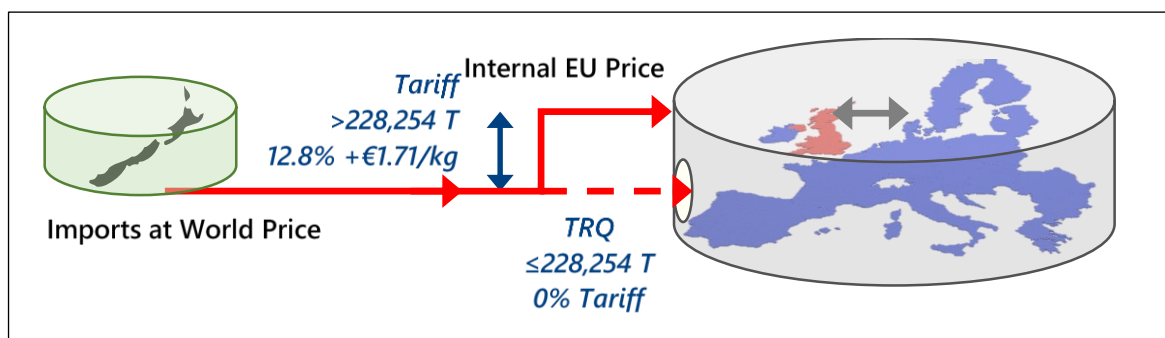
advantage) to EU-produced goods over similar goods which are imported from elsewhere. Customs duties are also one of the sources of public finance for the EU and its Member States. Tariff rates can be set in several ways but below are the three key types of relevance to beef and sheep meat:

1. **Ad valorem tariffs:** the amount paid (duty) is a percentage (e.g. 20%) of the price of the good being imported.
2. **Fixed tariffs:** the duty consists of a fixed monetary amount per unit, usually expressed in terms of weight (e.g. €176 per 100kg or €1.76 per kg). These are also referred to as specific tariffs.
3. **Mixed tariffs:** include both an ad valorem and fixed component (e.g. 12.8% + €176.80 per 100 kg). These are the most common form of tariffs in the beef and sheep meat sector as outlined in Chapter 5.

The AHDB also points out that there are additional tariffs which may vary seasonally, however these are not very relevant within an EU beef and sheep meat context. However, **cascading tariffs** where the duty rate increases as more value is added to the product is of particular importance in the meat sector. For example, boneless beef has a tariff of 12.8% + €303.40/t for imports coming into the EU under MFN rules. This is significantly higher than the carcass beef tariff (12.8% + €176.80/100 kg). The reason for such tariffs is to assist processing industries by making it more cost effective to import the raw materials and then process them in the EU. It is for this reason that European coffee brands (e.g. Douwe Egberts, Illy etc.) are market leaders despite all the raw materials being imported from Brazil, Colombia or Vietnam for example. This would be a major issue for Northern Irish processors to contend with in the event of WTO trading conditions, particularly for cross-border trade with the Republic of Ireland but also for trade between ROI and GB.

As alluded to above, TRQs permit a specified quantity of produce (e.g. lamb) to enter the market at a reduced or zero tariff. Once that limit has been surpassed, all additional imports are subject to the standard external tariff rate (e.g. EU CET). Below is a graphical illustration of how tariffs and TRQs work using New Zealand sheep meat trade with the EU as an example.

Figure 9 – Summary of Sheep Meat Tariff Arrangements between New Zealand and the EU.



Source: The Andersons Centre

HOW WILL BREXIT AFFECT THE UK'S WTO MEMBERSHIP?

Once the UK departs the EU, it will become a WTO member in its own right and must abide by the WTO's rules and obligations (including the UK's newly agreed schedule of commitments). If the UK departs the EU without a trading agreement (FTA, Customs Union agreement or similar), then its trade with the EU-27 will be conducted on a MFN basis. Under the non-discriminatory principle, this means that all EU-UK trade would be subject to tariffs and official controls in much the same manner as EU-New Zealand trade is currently conducted. As an EU Member State, the UK's commitments were included within the EU's WTO schedule. Under a WTO trading scenario, the UK will need to have submitted its own schedule with the WTO in order to trade with the EU and other countries upon Brexit. How the EU's current commitments are to be divided up between the UK and EU-27 will be one of the major talking points during the negotiation process and will involve discussions with Brussels and Geneva. Therefore, the extent to which Brexit will affect the UK's WTO membership will be heavily determined by the schedule that the UK submits to, and gets agreed by, the WTO.

Based on the provisions of the Great Repeal Bill which would transpose all existing EU legislation into the UK statute, it is envisaged that the UK would adopt the EU's Common External Tariff (CET) immediately upon Brexit. Whilst tariff rises are theoretically possible when the UK submits its own schedule, such rises would have to be agreed by affected WTO members and would likely require compensating measures to be offered. Given the UK Government's stated aim of pursuing freer trade globally, it is thought unlikely that it would pursue such tariff rises.

However, it is possible that the UK Government could decide to apply a lower tariff rate than the bound rates under the EU CET. This could encompass lowering tariffs significantly or reducing them altogether as per the Liberal Trade scenario set-out in Chapter 1.

In addition to tariff-related impacts, the WTO also sets out the legal ground rules on several issues which are of relevance to agriculture. These include:

1. **Sanitary and Phytosanitary (SPS) Measures**⁵⁸ – these rules concern how governments apply food safety and animal health measures and address the challenges of ensuring that consumers are supplied with safe food whilst also checking that food health and safety regulations are not used as an excuse to protect domestic producers and restrict trade. In the EU, such issues are addressed in the latest EU Official Controls Regulations ((EU) 2017/625) covered in Chapter 5. It is noteworthy that WTO SPS measures only focus on certain aspects of animal welfare (e.g. protection from diseases, pests, disease causing organisms, toxins, additives or food contaminants).
2. **Technical Barriers to Trade (TBT)**⁵⁹ – this measure is focused on ensuring that regulations and standards as well as testing and certification procedures do not create unnecessary trade obstacles. The TBT Agreement essentially covers all technical regulations, except those defined in the SPS Agreement. It recognises countries' rights to adopt standards they consider appropriate (e.g. environmental protection to meet consumers' interests), provided such regulations do not discriminate. The Agreement also encourages countries to recognise each other's procedures for checking whether products conform to applicable standards so that such procedures are fair and equitable. The aim of such measures is to minimise multiple testing procedures of the same product across different countries. Within an agri-food context, labelling requirements, nutritional information, quality procedures and packaging regulations tend to be subject to the TBT Agreement. Animal welfare measures could also potentially fall under the TBT remit.
3. **Rules of Origin** – are the criteria used to define where a product was made⁶⁰. These are critically important because a number of policies discriminate between export countries (e.g. quotas, preferential tariffs etc.). Furthermore, they are also used to compile trade statistics and for labelling ("Made in ...") purposes. According to the WTO website, the Rules of Origin Agreement requires WTO members to ensure that their rules of origin are transparent; that they do not have restricting, distorting or disruptive effects on international trade; that they are administered in a consistent, uniform, impartial and reasonable manner; and that they are

⁵⁸ https://www.wto.org/english/thewto_e/20y_e/sps_brochure20y_e.pdf

⁵⁹ https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm

⁶⁰ https://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm9_e.htm#origin

based on a positive standard (in other words, they should state what does confer origin rather than what does not). When the UK departs the EU, rules of origin will become much more important as they will be used to determine where a product originates and whether it is permitted to move freely within the UK or the EU (i.e. has preferential access under a FTA or a similar trading agreement). It is likely to be a particularly important issue for Northern Ireland because product originating in the Republic of Ireland could arguably be shipped into the North, processed and sold onwards in the UK as a Northern Irish product. Therefore, Northern Ireland could be used as a "back door" into the UK and similarly the Republic of Ireland could be used as a back door to the EU for product originating in the UK. Rules of Origin are widely perceived as being costly to implement.

There are a number of additional issues of relevance to agriculture (e.g. anti-dumping) which have not been covered by this brief overview. Readers are advised to visit the [Agriculture section of the WTO website](#) for further information if such topics are of interest.

APPENDIX III: NTB CALCULATIONS FOR INPUTS AND OUTPUTS

Following on from Section 5.2 of the main report, the calculations underpinning the inputs and outputs-related NTB estimates for the Northern Irish beef and sheep meat industry are outlined below.

Inputs-related NTBs

This section examines the potential impact of trade barriers on inputs used by the Northern Irish beef and sheep meat industries. This analysis also focuses on four key areas, i.e. *official controls, customs checks & transport delays, packaging inputs and other costs*. Using 2016 as the status quo, it estimates the additional cost within each area that would be incurred, on top of the status quo, if WTO trading conditions were imposed. It therefore considers the additional NTB costs associated with bringing live animals and meat inputs from ROI as well as the impacts on packaging costs under both a WTO Equivalence and WTO Liberal Trade scenario. Whilst costs rise in most instances, in some cases (e.g. packaging costs under Liberal Trade), costs decrease because the removal of tariffs would reduce the price of imports from Third Countries.

1. Official controls

This category includes a wide variety of checks, sampling procedures, regulatory rules and associated infrastructure (e.g. veterinary staff etc.) which have been established by the EU (Regulation (EU) 2017/625)⁶¹ which it states are designed to “ensure a high level of human, animal and plant health as well as animal welfare along the agri-food chain” to fight against the possible spread of diseases and to protect the environment. Within the EU, if meat consignments are approved by an inspection body at the national level, they are automatically approved within all EU Member States. For countries outside the EU, which the UK and Northern Ireland would be upon Brexit, this automatic approval would no longer apply, and therefore, official controls would need to be implemented at the border. The implementation of such measures would incur costs for the industry, both in terms of inputs and outputs, and these are estimated as follows:

- A. Documentary and ID checks:** are undertaken on all consignments of meat and animals crossing the border (either from ROI to NI or from the UK to the EU).

⁶¹ Official Journal of the European Union (2017) *Regulation (EU) 2017/65 of the European Parliament and of the Council*, May 2017.; <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0625&from=EN>

- a. Animal inputs:** it is assumed that each load contains 30 cattle and based on 10,578 cattle that were transported for direct slaughter from ROI to NI in 2016, it is estimated that 353 loads of cattle crossed the border and that the weight of each animal was 607.5 kg. Using the €9/tonne (£7.65/tonne) charge for live animal shipments cited in EU 2017/625 (p. 118), it is estimated in both scenarios that the cost of these checks is **£49,079**.
- b. Meat inputs:** a cost of £7.65/tonne is assumed and based on 48,971 tonnes of meat imported from ROI as inputs, it is assumed that 2,721 loads were imported (each load weighing on average 18 tonnes). The charge under both scenarios is therefore estimated at **£374,628**.
- B. Physical checks:** EU regulations state that a proportion of meat consignments need to be checked to ensure that rules concerning packaging, the means of transport, labelling and temperature etc. are being complied with. For red meat, the standard frequency of physical checks is 20% of loads, however, as New Zealand’s standards are recognised as being very closely equivalent to EU standards, only 1% of meat consignments from this country are physically checked. In view of this, the physical checks costs in this study diverge significantly under each scenario as outlined in Table 28.

Table 28 – Physical Checks on Inputs: Cost Analysis Summary

WTO Equivalence	WTO Liberal Trade
No. loads physically checked: (2,721 loads @ 1% frequency) = 27	No. loads physically checked: (2,721 loads @ 20% frequency) = 544
Physical checks cost assumptions: 30-minute delay per load (@£1/min/load) which includes associated queuing upon being selected for physical check.)	Cost assumptions: 3-hour delay under WTO Liberal Trade Scenario. Additional queuing up for physical checks etc.
Estimated cost: £816	Estimated cost: £16,324

Source: The Andersons Centre

- C. Sampling:** a proportion of the loads physically checked will also be subject to sampling analysis to help ensure that consignments are free from diseases and conform to EU standards. Based on discussions with industry experts, DEFRA sampling targets range from 1% to 10%. The associated costs under each scenario are calculated as:

Table 29 – Sampling of Inputs: Cost Analysis Summary

WTO Equivalence	WTO Liberal Trade
Sampling frequency: 5% of all physically checked loads	Sampling frequency: 10% of all physically checked loads - higher due to greater perceived risks of non-compliant meat consignments entering EU via UK (UK to adopt reciprocal procedures).
Sampling cost assumptions: £148/sample and 72-hour delay for each load sampled (@£1/min/load)	Sampling cost assumptions: £148/sample and 72-hour delay for each load sampled (@£1/min/load)
Estimated cost: £6,078	Estimated cost: £243,114

Source: The Andersons Centre

Based on these calculations, official controls costs for meat and animal inputs were estimated at **£430,601** under the *WTO Equivalence* scenario and **£683,145** under *WTO Liberal Trade*.

2. Customs and transport

- A. Customs administration fees:** relates to the fee charged by freight forwarders or similar parties for organising customs-related documentation, procedures etc. These are assumed to be **£70 per load** on average (the estimates obtained during this study ranged from £50 to £90 per load for non-EU shipments). The fees charged are the same in both scenarios and are estimated at £24,682 for animal consignments (i.e. £70 x 352.6 loads) and £190,443 for meat consignments.
- B. Delays associated with customs checks:** at the border, all consignments would be subject to customs checks and whilst these might be targeted on specific shipment types, the industry experts consulted during this study stated that it would be very difficult to apply a percentage sampling rate (e.g. 8%) as this would vary depending on which types of consignments would be of most interest to authorities at any given time. Instead, it was proposed to apply a uniform average delay for each consignment passing through the border as shown below.

Table 30 – Customs Checks on Inputs: Summary of Costs

WTO Equivalence	WTO Liberal Trade
Key assumptions: the duration of customs checks to average 3 mins/load crossing the border. Time delay assumed to be £1/min/load.	Key assumptions: duration of each check to average 6 mins/load as checks are likely to be more stringent because incentive to smuggle increases
Estimated cost – animals: £1,058	Estimated cost – animals: £2,116
Estimated cost – meat: £8,162	Estimated cost – meat: £16,324

Source: The Andersons Centre

- C. Miscellaneous queuing time:** associated with delays for commercial traffic on approach to the border. This estimate also includes any time delays associated with undergoing official controls documentary/ID checks.

Table 31 – Summary of Miscellaneous Queuing Time Costs for Inputs

WTO Equivalence	WTO Liberal Trade
Key assumptions: 30-minute delay for all commercial traffic approaching the border (@£1/min/load)	Key assumptions: 3-hour delay for all commercial traffic approaching the N.I. border. Whilst it is assumed that some extra resources will be put in place to alleviate delays (e.g. 20 times the volume of physical checks, more stringent customs checks), these will be insufficient to deal with traffic build-up.
Estimated cost – animals: £10,158	Estimated cost – animals: £63,468
Estimated cost – meat: £81,618	Estimated cost – meat: £489,710

Source: The Andersons Centre

The estimated cost increase associated with customs checks and transport delays for inputs is **£316,541** under *WTO Equivalence* and **£786,742** under *WTO Liberal Trade*. Administration fees (£215,125) account for 68% of the total charges in a WTO Equivalence scenario. However, under WTO Liberal Trade, miscellaneous queuing time (£553,178) represent the majority (70%) of costs. Of course, queuing times could vary significantly depending on the traffic management system that is put in place.

3. Packaging inputs

In 2016, packaging was estimated to cost the Northern Irish beef and sheep meat sector £19.5 million. Based on this figure, Table 32 calculates how these costs would change under WTO trading. Polyethylene-based packaging has a tariff of 6.5% for products entering the EU. Under WTO conditions, if the UK applied an equivalent tariff on imports from the EU, this would affect input costs for Northern Irish beef and sheep meat processors. Based on the data obtained during this study, it is estimated that approximately 33% of packaging inputs came from the EU-27, with another third sourced from the US and the remainder coming from domestic suppliers. For packaging, it was further assumed that 60% was polyethylene-based and the remainder was from cardboard which is not to be subject to tariffs. Taking this into consideration, the following packaging related cost changes were assumed under each scenario:

Table 32 – Packaging Cost Changes associated with WTO Trading

WTO Equivalence	WTO Liberal Trade
<p>Key assumptions: packaging has 60:40 split for polyethylene:cardboard. 33% of polyethylene material (i.e. volume arriving from EU) would incur a 6.5% tariff increase. Accordingly, cost increase is calculated based on $(6.5\% \times 0.33) \times 0.6 \Rightarrow$ 1.29%</p>	<p>Key assumptions: as 33% of polyethylene inputs coming from US no longer has a tariff. Based on calculations shown under WTO Equivalence, instead of the packaging cost increasing, it would reduce because non-EU (US) imports are no longer subject to tariffs.</p>
<p>Estimated cost – meat: £251,578</p>	<p>Estimated cost – meat: -£251,578</p>

Source: The Andersons Centre

As shown above, packaging costs would decrease by 1.29% in a Liberal Trade scenario, vis-à-vis the Status Quo, because tariffs previously applicable on US-sourced material would no longer be applied.

4. Other costs:

There was insufficient evidence provided during the study that costs such as power and energy, insurance etc. would change significantly or would constitute a significant NTB with respect to trade with the EU. Therefore, costs within these categories were not assumed to change. That said, it was noted that if UK regulatory standards were lowered significantly, then authorities in non-EU countries would become very concerned and may refuse to take consignments of marginal products within beef and sheep offal categories. In recent years, Northern Irish meat plants have undergone numerous inspections and audits by Third Country authorities before approval for export. Any such approvals, either granted previously or in the process of being awarded, are given on the basis of EU standards and equivalence. Such premises are also subject to onward inspections. If standards are changed then the confidence amongst Third Country trading partners would be compromised.

If such approvals were rescinded, then the affected beef and sheep offal products would have to be sent elsewhere, either to pet-food processors (for a much lower price) or to waste which would likely incur a cost. This could substantially alter the cost base for the industry meaning that waste rates would rise significantly. Whilst this study has assumed that UK standards will not alter, under a WTO Liberal Trade scenario, it is worth highlighting that any changes to standards could incur additional costs to the industry over and above what has been included within the analysis presented in section 5.3.

Outputs-related NTBs

Similar to the inputs-related NTBs covered above, this section assesses the potential impact of NTBs on outputs from the NI beef and sheep meat industry that are exported to the EU (i.e. EU-26 and ROI). This assessment focused on four key areas, namely *official controls, customs checks and transport delays, administrative costs and deterioration in product value*. Again, using 2016 as the status quo, the estimated additional cost of imposing these NTBs is calculated. Throughout this section, costs are listed separately for the ROI and EU-26 as the calculations differ depending on destination in some instances. For example, miscellaneous queuing times to EU-26 expected to take longer because loads are assumed to travel via Belfast Port in order to avoid the prospect of physical checks and sampling at the Irish border.

1. Official controls

Similar to the official controls for inputs and considering the standard charges set out EU Regulation 2017/625⁶², the following sections set-out the estimated costs associated with official controls for beef and sheep meat outputs from Northern Ireland.

- A. Documentary and ID checks:** the estimated costs are **£207,613** for consignments to **ROI** (i.e. 27,139 tonnes @ £7.65/tonne) under both scenarios and **£251,136** for **EU-26** consignments (32,828 tonnes@ £7.65/tonne).
- B. Physical checks:** are set out as follows

⁶² See: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0625&from=EN>

Table 33 – Summary of Physical Checks Costs for Outputs

WTO Equivalence ROI	WTO Liberal Trade ROI
No. loads physically checked: (1,508 loads @ 1% frequency) = 15	No. loads physically checked: (1,508 loads @ 20% frequency) = 301.5
Physical checks cost assumptions: 30-minute delay per load (@£1/min/load) which includes associated queuing upon being selected for physical check.)	Cost assumptions: 3-hour delay under WTO Liberal Trade Scenario. Additional queuing up for physical checks etc.
Estimated cost: £452	Estimated cost: £54,278
WTO Equivalence EU-26	WTO Liberal Trade EU-26
No. loads physically checked: (1,824 loads @ 1% frequency) = 18.2	No. loads physically checked: (2,721 loads @ 20% frequency) = 365
Physical checks cost assumptions: 3-hour delay per load (@£1/min/load) which includes associated queuing upon being selected for physical check at congested ports and substantial increases in volumes checked.	Cost assumptions: 16-hour delay under WTO Liberal Trade Scenario due to additional queuing at congested ports.
Estimated cost: £3,283	Estimated cost: £350,167

Source: The Andersons Centre

C. Sampling:

Table 34 – Summary of Sampling Costs for Outputs under WTO Trading

WTO Equivalence ROI	WTO Liberal Trade ROI
Sampling frequency: 5% of all physically checked loads. (15 x 0.05 =>0.75 loads)	Sampling frequency: 10% of all physically checked loads - higher due to greater perceived risks of non-compliant meat consignments entering EU. (30 loads)
Sampling cost assumptions: £148/sample and 72-hour delay for each load sampled (@£1/min/load)	Sampling cost assumptions: £148/sample and 72-hour delay for each load sampled (@£1/min/load)
Sampling frequency: 5% of all physically checked loads. (15 x 0.05 =>0.75 loads)	Sampling frequency: 10% of all physically checked loads - higher due to greater perceived risks of non-compliant meat consignments entering EU. (30 loads)
Estimated cost -ROI: £3,368	Estimated cost: £134,730
WTO Equivalence EU-26	WTO Liberal Trade EU-26
Sampling frequency: 5% of all physically checked loads. (18.24 x 0.05 =>0.91 loads)	Sampling frequency: 10% of all physically checked loads - higher due to greater perceived risks of non-compliant meat consignments entering EU.
Sampling cost assumptions: £148/sample and 72-hour delay for each load sampled (@£1/min/load)	Sampling cost assumptions: £148/sample and 72-hour delay for each load sampled (@£1/min/load)
Estimated cost: £4,074	Estimated cost: £162,974

Source: The Andersons Centre

D. Additional veterinary staff: based on comments from industry experts, Northern Ireland processors are currently charged for veterinary staff required to ensure compliance with EU standards (please note that this differs from issuing health certificates which is currently free of charge within Northern Ireland). These fees are charged in accordance with Food Standards Agency’s standard fees. Using a 40-hour week as an average, it is estimated that 14 additional veterinary staff (70% at inspector level and 30% a veterinarian level) would be required to ensure continued compliance with EU standards, which are expected to become more arduous to implement under WTO rules. It is estimated that these costs would amount to an additional **£1,009,987** under both scenarios (i.e. average annual charge of £72,142 per person X 14 additional staff).

It should be noted that this cost relates to an estimate of what the industry incurs only. It does not include additional costs that DAERA or other official controls bodies may have to pay to ensure that border inspection posts etc. are adequately staffed. Some industry experts consulted during this study believe that if export health certificates were required for EU-27 consignments, then this could add a further £10 million to the costs which DAERA already incurs.

E. Total official controls charges: taking all of the official controls charges outlined above into consideration, the total under a WTO Equivalence scenario is estimated at **£1,479,914** and the equivalent under WTO Liberal Trade is **£2,170,886**.

2. Customs and transport

A. Customs administration fees: as per the inputs, charged at a standard £70 per load. For ROI, the estimated fee is £105,541 and £127,665 for the EU-26. These fees are assumed to be constant across both scenarios.

B. Delays associated with customs checks:

Table 35 – Customs Checks on Outputs – Summary of Additional Costs

WTO Equivalence	WTO Liberal Trade
Key assumptions: the duration of customs checks to average 3 minutes per load crossing the border. Time delay assumed to be £1/min/load.	Key assumptions: duration of each check to average 6 minutes/load as checks are likely to be more stringent under Liberal Trade scenario because incentive to smuggle increases
Estimated cost – ROI: £4,523	Estimated cost – ROI: £9,046
Estimated cost – EU-26: £5,471	Estimated cost – EU-26: £10,943

Source: The Andersons Centre

- C. **Miscellaneous queuing time:** associated with delays for commercial traffic on approach to the border (includes time undergoing official controls documentary/ID checks).

Table 36 – Summary of Miscellaneous Queuing Time Costs for Inputs

WTO Equivalence	WTO Liberal Trade
Key assumptions: 30-minute delay for all commercial traffic approaching the ROI border (@£1/min/load). For EU-26 consignments it is assumed that there will be a 4-hour delay as traffic previously routed via Dublin now gets shipped via Belfast.	Key assumptions: additional 30-minute delay on top of WTO Equivalence for ROI consignments and an additional 1-hour delay on top of WTO Equivalence delay (4 hrs) for EU-26 consignments.
Estimated cost – ROI: £45,232	Estimated cost – ROI: £90,463
Estimated cost – EU-26: £437,709	Estimated cost – EU-26: £547,137

Source: The Andersons Centre

The estimated cost increase associated with customs checks and transport delays for inputs is **£726,141** under *WTO Equivalence* and **£890,795** under *WTO Liberal Trade*.

3. Administrative costs

As mentioned previously, these relate to additional time required for shipping and scheduling to complete added documentation associated with adhering to EU rules for third country consignments. These costs are set-out as follows.

Table 37 – Additional Administration Costs associated with WTO Trading

WTO Equivalence	WTO Liberal Trade
Key assumptions: additional 1.5 hours per load for all consignments to ROI and an additional 2 hours per load for all EU-26 shipments (assumed to have more drops per load than ROI). Standard charge is £13.50 per hour.	Key assumptions: for ROI assume an additional 30 minute per load delay due to additional declarations/paperwork etc. that may be needed to conform with more stringent checks. For EU-26 an additional 1 hour per load is assumed to deal with any additional paperwork associated with multiple drop loads, longer journeys etc.
Estimated cost – ROI: £30,531	Estimated cost – ROI: £40,709
Estimated cost – EU-26: £73,863	Estimated cost – EU-26: £98,485

Source: The Andersons Centre

4. Deterioration in product value

This was frequently cited as a key concern amongst processors as there are often stringent specifications associated with supplying high-end continental retailers (e.g. use-by date of packing date plus 8 days) and if these are not met, then the product value could decrease significantly. Table 38 summarises the delays for both ROI and EU-26 consignments under each scenario which have been obtained from the various delays listed in Sections 5.1 and 5.2. The calculations shown in Table 39 and Table 40 underneath provide estimates of the costs associated with deterioration in product value arising from WTO trading for the ROI and EU-26 respectively. As loads to the EU-26 tend to be higher value and have more stringent specifications associated with them, the deterioration in value is projected to be more pronounced.

Adding both the ROI and EU-26 costs together, the estimated costs associated with deterioration of product value would be **£2,543,901** (*WTO Equivalence*) and **£6,701,507** (*WTO Liberal Trade*).

Table 38 – Estimated Time Delays under each WTO Scenario

ROI Loads	WTO Equivalence (hrs)	WTO Liberal Trade (hrs)
Standard load (no physical checks)	0.55 (33 mins)	1.10 (66 mins)
Load with physical checks	1.05	4.10
Load with physical checks and sampling	73.05	76.10
EU-26 Loads		
Standard load (no physical checks)	4.05	5.10
Load with physical checks	7.05	21.10
Load with physical checks and sampling	79.05	93.10

Source: The Andersons Centre (2017)

Table 39 – Estimated Deterioration in Product Value Costs for ROI Consignments

Delay Type	WTO Equivalence	WTO Liberal Trade
Documentary check only – minimal deterioration	£0	£0
Documentary and physical check – minimal deterioration	£0	£0
Physical checks and sampling: cost estimated to average at 24.2% of load value across both scenarios	£8,600	£171,996
Total cost	£8,600	£171,996

Source: The Andersons Centre

Table 40 - Estimated Deterioration in Product Value Costs for EU-26 Consignments

Delay Type	WTO Equivalence	WTO Liberal Trade
Documentary check only – 2% decrease due to time delays and being routed via Scotland etc.	£2,472,801	£3,113,898
Documentary and physical check – 4.2% decrease due to additional time and costs associated with missing delivery slots etc.	£49,456	£3,108,364
Physical checks and sampling: cost estimated at 21.1% of load value, but increases to 24.85% under Liberal Trade scenario.	£13,044	£307,428
Total cost	£2,535,301	£6,529,510

Source: The Andersons Centre

Total NTB Costs

By combining the output related NTB costs under *WTO Equivalence* (£4,854,351) with the corresponding £998,720 of input costs outlined in Section 5.2.1, the total amount of NTB costs comes to **£5,853,072**. The corresponding figure for *WTO Liberal Trade* is **£11,120,688** (£9,902,380 + £1,218,308). As a percentage of the value of output for EU-26 and ROI consignments combined (£194.7 million), these NTBs amount to a tariff equivalent of **3.0%** under *WTO Equivalence* and **5.7%** under *WTO Liberal Trade*.

APPENDIX IV: FURTHER INFORMATION ON THE GTAP METHODOLOGY

Following on from the brief summary of the GTAP modelling process (Chapter 2, Section 2.5), below is some additional background information.

ABOUT THE GTAP MODEL

The standard GTAP model is a multi-region, computable general equilibrium model, with perfect competition and constant returns to scale. Bilateral trade is handled via the Armington assumption. Trade elasticities vary between sectors but are constant across countries and these elasticities are crucial in determining the results of the GTAP model. Other aspects of this model include: the treatment of private household preferences using the non-homothetic CDE functional form, explicit treatment of international trade and transport margins, and a global banking sector which intermediates between global savings and consumption.

The GTAP model is the benchmark database and model for 'static' analysis of trade policy, and for estimating the impact of trade on output via the reallocation of resources across countries. It informs users on how international trade enables economies to exploit the underlying patterns of comparative advantage. However, it does not take into account a range of other dynamic impacts of changes to trade policy.

OXFORD ECONOMICS GLOBAL ECONOMIC MODEL (GEM)

The GEM is the most widely used commercial macroeconomic model in the world. 46 of the largest economies (which together account for over 90% of global GDP) are covered in depth by individual country models, with the remainder accounted for by regional blocs. Most of the core behavioural equations are specified in an Error Correction Mechanism (ECM) format. Below, the key theoretical features of the model are discussed in more detail.

Supply side

The structure of each of the country models is based on the income-expenditure accounting framework. However, the models have a coherent treatment of aggregate supply. In the long run, each of the economies behaves like the classic one sector economy under Cobb-Douglas technology. Countries have a natural growth rate, which is determined by its capital stock, labour supply adjusted for human capital, and TFP. Output cycles around a deterministic trend, so the level of potential output at any point in time can be defined, along with a corresponding natural rate of unemployment.

Firms are assumed to set prices given output and the capital stock, but the labour market is characterized by imperfect competition. Firms bargain with workers over wages but choose the optimal level of employment. Under this construct, countries with higher real wages demonstrate higher long-run unemployment, while countries with more rigid real wages demonstrate higher unemployment relative to the natural rate.

Inflation and Monetary Policy

Inflation is a monetary phenomenon in the long run. All of the models assume a vertical Phillips curve, so expansionary demand policies place upward pressure on inflation. Unchecked, these pressures cause an unbounded acceleration of the price level. Given the negative economic consequences of this (as seen in the 1970s in developed economies and more recently in some emerging markets), most countries have adopted a monetary policy framework which keeps inflation in check. The model mirrors this, by incorporating endogenous monetary policy. For the main advanced economies, monetary policy is underpinned by the Taylor rule, captured using an inflation target, such that interest rates are assumed to rise when inflation is above the target rate, and/or output is above potential. The coefficients in the interest rate reaction function, as well as the inflation target itself, reflect assumptions about the hawkishness of different country's monetary policymakers.

Quantitative easing, whereby the central bank prints money and uses it to purchase assets in order to stimulate the economy, has played an important role as a policy tool in the aftermath of the Great Recession. The model introduces this policy using an exogenous variable for the US, Japan, the Eurozone, and the UK. All else equal, QE lowers government bond yields and boosts share prices through portfolio effects.

In addition, a number of central banks have begun using Forward Guidance in an attempt to influence the yield curve using verbal descriptions of their expectations about future monetary policy. The GEM also introduces this policy as an exogenous variable for the US, Japan, and the UK. This variable affects exchange rates, long-term government bond yields, and share indices. US Forward Guidance also affects confidence levels and exchange rates in a number of other countries, which in turn alter consumption, investment, and impose additional amplification on share price effects. The relative effects of changes in Forward Guidance were calibrated after the Fed's May 18 2009 policy announcement.

Aggregate Demand

Private consumption is modelled as a function of real incomes, real financial wealth, real interest rates and inflation. Investment equations are underpinned by Tobin's Q Ratio, such that the investment rate is determined by the return relative to the opportunity cost, adjusted for taxes and allowances. Countries are assumed to be "infinitely small", in the sense that exports are determined by aggregate demand and a country cannot ultimately determine its own terms of trade. Consequently, exports are a function of world demand and the real exchange rate, and the world trade matrix ensures adding-up consistency across countries. Imports are determined by real domestic demand and competitiveness.

GDP and Employment by Sector

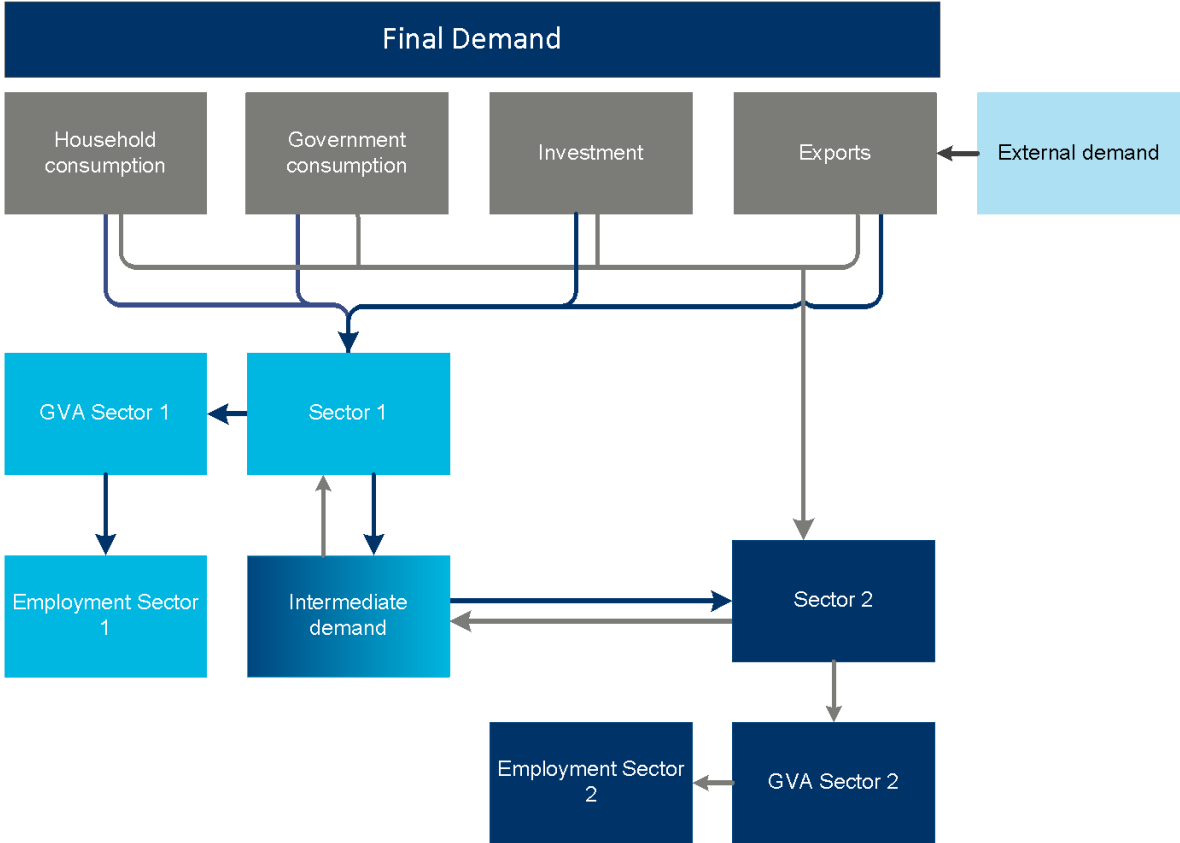
In addition to the income-expenditure approach, the Global Economic Model includes a break-down of value added and employment by sector. Consistency between the income-expenditure and value-added approaches to output is ensured by scaling value added in each sector up or down to obtain expenditure-based value added as the sum of value added in the sectors.

The sector breakdown reflects the input-output structure of each economy. For each sector, total demand is calculated as a weighted average of value added in other sectors and final expenditure, with the weights taken from input-output tables. We then use total demand to estimate the value added for that respective sector since in the long run (everything else equal) value added and demand must grow in line with each other. Value added is also affected by competitiveness (measured by relative unit labour costs) to a degree that reflects the international openness of each sector.

Employment by sector is derived from value added in that sector and sector-specific productivity trends. As in the case of value added, consistency between the total employment forecast and employment in all sectors is achieved by scaling the sector employment variables up or down.

The breakdown of value added and employment by sector depends on data availability and varies by country. For instance, for the European Union it consists of 14 sectors – agriculture and forestry, extraction, manufacturing, utilities, construction, distribution services, hotels and catering, transport and communications, financial services, business services, public administration, education, health and other services. Several additional sectors such as entertainment, arts and recreation and real estate are also included for the United States. The breakdown for Asia is less detailed.

Figure 10 – Interaction between Intermediate and Final Demand



Treatment of Expectations

Finally, the GEM assumes adaptive rather than forward looking expectations because we believe that introducing expectations on the basis of economic theory is more advantageous than using the forward-looking assumption ubiquitously. There is disagreement among economists about whether forward looking expectations are consistent with observed data, which has become even more acute in light of the difficulties with obtaining accurate data on expectations for model-building purposes.

Instead, we adopt adaptive expectations, which are introduced using a framework in which expectations are formed using the actual predicted values from the model. Exogenous variables are assumed to be known a priori. Where appropriate, the model does introduce expectations implicitly and explicitly, therefore accounting for how and the extent to which agents respond to information about changes in fundamentals. An example of this includes our derivation of exchange rate forecasts which implicitly capture expectations: in the short-run, the exchange rate is driven by movements in domestic interest rates relative to the US, therefore accounting for uncovered interest rate parity. Another example is our use of a variable for forward guidance to capture expected movements in interest rates.