

REPORT ANNEX II: LITERATURE REVIEW  
PROVISION OF ANALYSIS OF BREXIT SCENARIO  
IMPACTS ON SCOTTISH AGRICULTURAL SECTORS

FOR



BY

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Date: October 2020

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## 1. LITERATURE REVIEW SUMMARY

### 1.1 INTRODUCTION

This Literature Review summarises the findings of an examination of over 80 studies on the potential impact of Brexit on UK and Scottish agriculture, undertaken in recent years. It is broadly split into two parts, the first looks at previous studies into the overall (macro) effect of Brexit on the UK, and especially Scottish, farming industry. It then goes on to summarise studies into the potential effects on the wider Scottish economy. *This past work has been used for two purposes – as a ‘check’ on methodology and results to inform the design of this report. Also, to provide an initial data source for variables to incorporate into the subsequent economic modelling.*

The second part of the literature review looks in more detail at some of the key variables that are used in the later modelling – tariffs, non-tariff barriers, TRQs, support systems etc. These sections pick-up elements from the earlier ‘macro’ studies, but also bring in more detailed analysis from elsewhere.

### 1.2 KEY AGRICULTURAL STUDIES

The announcement of a referendum on the UK’s membership of the European Union in a speech by David Cameron January 2013 put ‘Brexit’ on the mainstream political agenda. The General Election win for the Conservative Party in May 2015 followed by the passing of the European Union Referendum Bill<sup>1</sup> turned the prospect into legislative fact and prompted a succession of impact analyses which continue to be produced to this day. *With Brexit being a process, many of the scenarios modelled in the early studies (e.g. ‘Norway’ options) have since been ruled-out by political events.*

#### 1.2.1 UK-Wide Initial Studies

The first major study to appear in a peer-reviewed Journal article was that produced by Boulanger and Philippidis (2015)<sup>2</sup>. This looked at the overall financial impact of the UK’s exit from the EU and did not specifically focus on agriculture.

In the run-up to the referendum in June 2016, van Berkum et. al. (2016)<sup>3</sup> published their assessment of the implications for agriculture of a UK exit from the EU. The report produced by LEI-Wageningen in April 2016 was commissioned by the National Farmers Union and is often referred to as the ‘LEI/NFU study’. It modelled the impact of Brexit by taking account of possible changes in domestic agricultural support policy and trade arrangements using the AGMEMOD model. It then used the outputs from this in farm-level modelling. In common with many of the studies completed since, it did not attempt to model the costs of supply of labour (particularly migrant labour) to the UK agricultural industry nor the impact of a changing regulatory burden on farmers.

Post-referendum, the Agri-Food and Biosciences Institute (AFBI) from Northern Ireland produced a study looking at the impact of three Brexit scenarios on different farm sectors. This analysis, published as Davis et. al. (2017)<sup>4</sup>, but commonly known as the ‘AFBI Study’ used the FAPRI-UK modelling system. This is partial-equilibrium model initially developed by the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri. The model captures the dynamic interrelationships between the variables affecting supply and demand in the main agricultural sectors of England, Wales, Scotland and Northern Ireland. The study focused on the effects from changes in trading conditions

and domestic support arrangements but did not include an analysis of regulatory effects or labour availability shifts.

The AHDB produced a report in September 2017 undertaken by AgraCEAS (Informa) led by Bradley and Hill (2017)<sup>5</sup>. This report, often called the 'AHDB study', assessed the impact of future domestic agricultural and trade policy on farm incomes. It built on previous Brexit work produced by the AHDB, including;

- A series of sector-based 'Horizon' reports published during 2016<sup>6</sup> (subsequently updated in some areas – see Beef and Lamb report for 2019<sup>7</sup>) .
- Report on possible future trading relationships (AHDB, 2016<sup>8</sup>)
- Implications for Agriculture if the UK Trades under World Trade Organisation (WTO) rules (AHDB, 2017<sup>9</sup>)

The AHDB/Informa study, unlike the LEI/NFU and AFBI analyses attempted to model the impact of changing labour costs and regulatory burdens as well as trade and subsidy shifts. The report was subsequently used as the evidence base for AHDB's publication on 'Brexit scenarios: an impact assessment'<sup>10</sup> of October 2017.

The three studies outlined above (NFU, AFBI and AHDB) are the most cited of the early impact analyses undertaken for the UK as a whole.

The findings have not been summarised here as later studies are more relevant. This is partly due to the evolution of the nature of Brexit since 2016/2017 and partly due to the fact that both the AFBI and AHDH studies have been updated in the interim. These two updates are covered in section 1.2.4.

## 1.2.2 Scottish Studies

The studies outlined above looked at the UK-wide situation. Two main reports have focused on Scotland.

### AHDB

Firstly, the AHDB produced a report in November 2017<sup>11</sup> looking at the specific effects on Scotland. This built on the assumptions set out in its earlier UK-wide analysis (see above) and so looked at the effects of trade, domestic support, labour availability and regulation. It recognised the specific challenges poses by Brexit to Scottish agriculture including;

- The high proportion of Less Favoured Area (LFA) land in Scotland (85% of agricultural land compared to 17% in England).
- Distance to key markets and lack of local processing facilities in some cases.
- Differences in the relative sizes of sectors, with beef and potatoes being especially important in output terms in Scotland.

*It was also noted that Scottish agriculture has advantages in terms of its 'brand' – notably Scotch Whisky, Scotch Beef and its seed potato industry.*

Figure 1 below summarises the key assumptions used in the modelling and the headline results. The study applied the variables to some Scottish-specific farm types and calculated the change in Farm Business Income (FBI) compared to the baseline (current) situation.

The 'Evolution' scenario might be considered to approximate to an FTA deal. Unilateral Liberalisation as an option now seems unlikely with the publication of the UK's proposed tariff regime (see section 1.4.1). However, the UK/Scotland could approach this situation over time, depending on the future FTAs it strikes with other countries or if it introduces significant new TRQ volumes. The Fortress UK option most closely models the No-Trade-Deal outcome, but the Support assumptions are unlikely to occur in the short-to-medium-term. It can therefore be seen that none of the scenarios quite model the current Brexit situation.

**Figure 1: AHDB: Assumptions and Results of Brexit Implication for Scotland**

Key Assumptions	Scenario 1: Evolution	Scenario 2: Unilateral Liberalisation	Scenario 3: Fortress UK
Support	Direct Payments (DPs) and Agri-Environment Payments remain at current levels	DPs removed, Agri-environment payments increased to 50% of total current support levels.	DPs removed, Agri-environment payments set at 25% of total current support levels.
Labour	As at present.	50% increase in regular labour cost. No change in casual.	50% increase in both regular and casual labour cost.
Trade	Comprehensive UK/EU FTA giving tariff-free trade. 5% increase in cost of EU imports due to trade friction. 8% increase in RoW import costs due to friction.	No UK/EU deal. 8% increase in cost of EU and RoW imports due to trade friction but no import tariffs applied.	No UK/EU deal. 8% increase in cost of EU and RoW imports <b>plus</b> tariff costs. Exceptions for some TRQs.
Regulation	As at present.	Regulatory burden to fall over time. 5% cost reduction in some inputs.	All EU regulations adopted. No change in costs.
Results - % change in Farm Business Income From Baseline			
Specialist Sheep	-10%	-8%	-210%
Specialist Cattle	+14%	-89%	-86%
Dairy	+52%	-88%	+37%
Cereals	-9%	-81%	-103%
General Cropping	+2%	-66%	-60%
Pigs	+49%	+25%	+346%
Horticulture	+45%	-12%	-8%

Source: AHDB

## SRUC

A further report from SRUC for the Scottish Government (Shrestha *et. al.* Jan 2018<sup>12</sup>) used the FAPRI-UK model to assess the impacts on Scottish agriculture.

This used three trade scenarios equivalent to those seen in the AHDB study. Support changes were limited to keeping present subsidy levels (denoted by a '+' in the results) or a complete removal of direct aid ('-'). No account was taken of labour or regulatory changes.

The price changes produced by the FARPI model are mapped onto typical Scottish farm businesses based on the Scottish Farm Business Survey (2014/15 reporting year). Results are presented for four major farm types which cover the majority of Scottish agriculture.

**Figure 2: SRUC: Assumptions and Results of 'Assessing the Impacts of Alternative Post-Brexit Trade and Agricultural Support Policies on Scottish Farming Systems'**

Key Assumptions	Scenario 1: Free Trade (FT)	Scenario 2: WTO Default (WTO)	Scenario 3: Unilateral Trade Liberalisation (LT)			
Trade	UK and EU retain tariff and quota free access to each other's markets. UK maintains tariffs equivalent to CET on RoW imports. 5% trade facilitation costs	Tariffs imposed on UK-EU trade (at CET levels). UK maintains tariffs equivalent to CET on RoW imports. 8% trade facilitation costs	Zero tariffs on UK imports from all sources. Standard CET on UK exports to EU. 8% trade facilitation costs.			
Support	Two scenarios – current support maintained in full ('+') or all direct support removed ('-').					
Price Changes Compared to Baseline (2025) - FAPRI						
Beef	3%	17%	-45%			
Sheep	-1%	-30%	-29%			
Milk	1%	30%	-10%			
Wheat	-1%	-4%	-5%			
Barley	-1%	-5%	-7%			
Results - % change in Farm Business Income From Baseline						
Support:	+	-	+	-	+	-
LFA Beef	0%	-68%	-14%	-56%	-66%	-126%
Dairy	3%	-18%	59%	42%	-25%	-44%
LFA Cattle & Sheep	2%	-148%	16%	-141%	-69%	-199%
Crops	1%	-56%	-3%	-58%	-4%	-59%

Source: SRUC

In both the AHDB and SRUC work, a Free Trade deal between the UK and EU leads to the least change from the status quo. However, it can be seen that, particularly under the AHDB 'Evolution' scenario, there are still big changes in Farm Incomes (profit) compared to current levels. Any 'No Deal' outcome, either with or without tariff protection around the UK market, tends to exacerbate the level of change. These points are picked up in more detail in section 1.2.5. below.

### 1.2.3 Other Analyses

Whilst the reports outlined so far are the most relevant for this study, they are by no means exhaustive. A paper to a symposium of the Agricultural Economics Society in April 2018 by Berkley Hill<sup>13</sup> found more than 20 relevant studies at that point. Additional ones have been added since. Many of these have a focus on a specific geographic region or sector. Some examples include;

- Impact on agriculture in Wales (AHDB, 2018<sup>14</sup>).
- Impact on grazing farms in the Lake District National Park (Newcastle University (Wallace & Scott)<sup>15</sup> and AgraCEAS Consulting 2018<sup>16</sup>).
- Impact of WTO trading on the Northern Ireland Beef and Sheep Meat Industry (The Andersons Centre for the LMC (Haverty) 2017<sup>17</sup>).
- Implications of Brexit for Agriculture, Rural Areas and Land Use in Wales (Wales Centre for Public Policy, 2018<sup>18</sup>)
- Summary paper of EU Exit Scenario Planning Workshops (Welsh Government, 2018<sup>19</sup>)
- Impact on environmental outcomes for the RSPB (Cumulus Consultants, 2017<sup>20</sup>)
- Red Meat Route to Market (The Andersons Centre for the AHDB (Haverty) 2019<sup>21</sup>).
- Possible impacts of a hard Brexit on UK sheep meat production (AHDB, 2019<sup>22</sup>).

Of course, Brexit does not just have an impact on the UK, but will also affect the EU-27. For this reason, there have been a number of studies carried that have assessed the impact of Brexit on EU-UK trade relations from an EU perspective. These include:

- The Product and Sector Level Impact of a Hard Brexit across the EU (Lawless and Morgenroth, 2016<sup>23</sup>)
- Brexit Impacts on Irish Agri-food Exports to the UK (Matthews, 2017<sup>24</sup>)
- Cumulative economic assessment of future trade agreements on the EU agriculture (Boulangier et. al. 2017<sup>25</sup>)
- EU-UK agricultural trade: State of play and possible impacts of Brexit - Research for AGRI Committee (Bellora et. al., 2017<sup>26</sup>)
- Possible impact of Brexit on the EU budget and, in particular, CAP funding - Research for AGRI Committee (Haas and Rubio, 2017<sup>27</sup>)
- Possible transitional arrangements related to agriculture in the light of the future EU-UK relationship - Research for AGRI Committee (Matthews, 2017<sup>28</sup>)
- Brexit's Agri-trade Impacts on the Netherlands (Van Berkum et. al., 2018<sup>29</sup>)

Whilst these reports are interesting in themselves, they have limited relevance to the impact of Brexit on Scottish agriculture.

### 1.2.4 Recent Studies

After an initial burst of research, there was a noticeable 'lull' in published reports through late 2018 and early 2019. Two pieces of research have subsequently been produced which are relevant to this study.

#### ERSC

The Economic and Social Research Council (ESRC) funded a project (the 'ESRC study'<sup>30</sup>) which is a collaborative work involving a number of researchers who have previously written in this area including the AFBI team and the SRUC. It was published in March 2019 and was led by Newcastle University. It

is probably the most comprehensive study to date on the topic as it incorporates previous research plus new analysis.

The study used two economic equilibrium models to assess the impact of Brexit across several UK agri-food sectors;

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

The outputs from the two models were linked and then applied to farm-level data (derived from the Farm Business Survey - FBS) to determine changes in farm profitability. The aim was to estimate the possible macro, sector and farm-level effects of selected trade and domestic policy scenarios for UK agriculture. As the FBS is undertaken on a devolved basis, there are separate analyses for Scotland, England, Wales and Northern Ireland.

Three trade policies were explored which included a UK-EU Free Trade Agreement, Unilateral Trade Liberalization and WTO rules. Generally, these were similar to the 'standard' scenarios set out in the two reports highlighted in section 1.2.3. but with some subtle modifications. Figure 3 below summarises the key results.

Figure 3: ERSC: Summary of Assumptions and Resulting Price Changes

Key Assumptions	Free Trade Agreement (FTA) (Akin to Brexit Deal)	Unilateral Trade Liberalisation (UTL)	World Trade Organisation (WTO)			
Trade	<ul style="list-style-type: none"> <li>Comprehensive UK/EU Free Trade Agreement with UK/EU tariffs at zero</li> <li>UK adopts the EU common tariff schedule on Rest of World imports</li> <li>UK maintains share of EU Tariff Rate Quotas applying to Rest of World imports.</li> <li>Additional trade costs of 5% (livestock) and 2% (crops) for UK↔EU trade flows</li> </ul>	<ul style="list-style-type: none"> <li>An extreme free-trade scenario.</li> <li>Elimination of all UK import tariffs for Rest of World including imports from the EU.</li> <li>UK-EU exports subject to EU Common Custom Tariffs (CCT)</li> <li>TRQs on UK-EU exports (limiting exports to Baseline flows)</li> <li>Additional trade facilitation costs of 10% (livestock) and 5% (crops) for UK↔EU trade flow</li> </ul>	<ul style="list-style-type: none"> <li>No agreement upon Brexit, hence a fall back to WTO rules and current EU tariff schedules</li> <li>UK trading with EU and Rest of World under Most Favoured Nation (MFN) tariffs</li> <li>Requires a UK allocation of a share of the current EU tariff rate quotas with Rest of the World</li> <li>Additional trade facilitation costs of 8 per cent (livestock) and 4 per cent (crops) for UK↔EU trade flows</li> </ul>			
	<b>Comment:</b> this scenario is akin to Brexit Deal scenario used in this study.	<b>Comment:</b> given recent UK announcement on tariffs, tariffs on sheepmeat imports will be applicable. With a 230Kt beef TRQ with a zero tariff, imports under a No-Deal scenario would have some similar tendencies to UTL.	<b>Comment:</b> projections in this WTO scenario of relevance to Brexit No Deal. Allocations of TRQs also applicable. Imports of sheepmeat into UK likely to be similar to this scenario under No Deal. Beef imports will be more akin to UTL.			
Support	Two scenarios – current support maintained in full ('+') or all direct support removed ('-').					
Price Changes (2017 to 2026) - FAPRI						
Support:	+	-	+	-	+	-
Beef	1%	2%	-42%	-42%	17%	17%
Sheep	0%	4%	-19%	-19%	-23%	-23%
Pigs	1%	1%	-4%	-4%	25%	25%
Poultry	0%	0%	-3%	-3%	15%	15%

Milk & Dairy	1%	1%	-8%	-8%	28%	28%
Wheat	0%	1%	-2%	-2%	7%	8%
Barley	0%	1%	-8%	-8%	-5%	-5%

Source: ERSC (Hubbard et. al. (2019))

As well as the price changes shown in Figure 3 above, the economic models produced detailed results by commodity on changes in production, usage, and trade. The CGE model also produces effects on land and labour markets. It is not intended to attempt to summarise all these outputs within this report.

As well as a split between the four devolved nations, the analysis is split down by size of farm – small, medium, large and very large. This means there is a large number of data points, even if the focus is limited to the Scottish results. The farm-level effects are shown based on the change in Farm Business Income - on a £s basis rather than %. This is less helpful, as the larger farms show a bigger overall effect even though the percentage change may be smaller. The baseline FBI data is not provided, so it is not possible to calculate the percentage change. For this reason, and for the sake of brevity, a summary of the farm level effects has not been provided within this report.

However, the conclusions of the report drawn across different commodities are broadly in line with those from earlier reports – see also section 8.2.5 below.

In their conclusions the authors clearly show that Brexit will have significant implications for UK agriculture, which is a sector with strong trade links to the EU and reliance on direct payment support. Under the trading scenarios modelled these impacts will be different for the commodity sectors and geographical regions of the UK. Whilst they recognised that tariffs and additional trade costs would vary under the trade scenarios explored, they also concluded that these trade effects could be overshadowed by foreign currency exchange rates, possible labour market changes and other NTBs. The impact of these other NTB's were not addressed in their study.

#### **AHDB 2019 (Bradley & Hill)**

The second 'recent' study is an update of the AHDB work undertaken by Bradley and Hill<sup>31</sup>. This was produced in April 2019 and updates the earlier, 2017, report. It had a number of changes from the earlier analysis in that the assumptions were amended to incorporate amended changes in labour availability/cost, no changes in regulatory costs, and different assumptions on subsidy amounts (effectively the same overall level of payments but a shift in the type of payments).

Only two scenarios were modelled; 1. an agreed FTA and 2. trading on WTO terms. Thus, there was no unilateral trade liberalisation outcome. The WTO terms option incorporated the 'No Deal' tariffs that the UK Government announced in March 2019<sup>32</sup>. As these reduced the level of protection compared to the EU CET, then the 'WTO' option in this modelling sits somewhere between previous WTO and Liberalisation options outlined in previous studies. The No Deal tariffs have themselves, since been superseded by the UKGT regime.

The study uses the same basic trade scenarios as outlined in the 2017 AHDB report. It deploys a gravity model to assess the impact of price changes and the resultant impact on domestic production and also incorporates AFBI/FAPRI modelling analysis, a precursor to the FAPRI modelling work undertaken in the ERSC study. However, it should be noted that for the gravity modelling, one commodity at a time is

examined, so there is no account of the cross-effects between different commodities. A series of farm-level modelling exercises are then undertaken to assess the impact of various scenarios on farm business income.

The projected price changes of selected products are presented in Figure 4. These take account of some slight amendments to the original Bradley and Hill projections as set-out recently by the AHDB<sup>33</sup>.

**Figure 4: Projected Price Changes on the Domestic Market (2022) – Selected Products**

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

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

### 1.2.5 Commentary on Past Studies

Past studies provide useful background to the analysis of Brexit on Scottish agriculture. The results can be briefly summarised as follows;

- If a UK/EU FTA is agreed, then the effect on prices and consequently farm incomes is relatively small. There are effects from the additional costs of doing trade with the EU, but as the UK is generally a net importer from the EU, this increases prices for many commodities. In this scenario, with trade effects relatively minimal, the effect of any subsidy changes is the key issue. Significant drops in farm income are seen if farm support is reduced or withdrawn.
- In the absence of a UK/EU FTA then two alternative scenarios have generally been modelled. One is trade with the EU on WTO terms, but mirroring current EU tariffs with new UK tariff rates. The other is unilaterally opening the UK market to tariff-free imports for the EU and RoW.
- In terms of WTO trade, the effect on a particular commodity largely depends on the UK trade balance. Where exports are required (e.g. lamb and barley) then prices generally fall as exports to key markets in the EU are restricted by new tariffs. Where the UK is a net importer (e.g. pigmeat, wheat, dairy products) prices rise as imports from the EU are rendered more expensive by the new tariffs.
- A unilateral liberalisation of trade causes UK prices to fall across all commodities as UK producers are forced to compete with cheaper prices from non-EU producers. This has significant adverse effect on farm incomes.
- In either of the 'No Deal' scenarios the negative effect on farm incomes is amplified by any changes to domestic farm support arrangements.

- In studies that have incorporated labour effects, this is generally seen to be detrimental to farm incomes as limits on free movement of labour increase UK costs.

The Brexit process continues to move forward and changes in the political and economic landscape have occurred since the latest reports were published. These will affect the assumptions used in modelling and thus the outcomes;

- The European Union (Withdrawal Agreement) Act 2020<sup>34</sup> received Royal Assent on the 23<sup>rd</sup> January 2020. The UK formally left the European Union at 11pm on the 31<sup>st</sup> January 2020. Therefore, 'Brexit' has occurred. However, the practical effects of this are largely delayed until the end of the Transition period on 31<sup>st</sup> December 2020. The Withdrawal Agreement means that a 'No Deal' Brexit has been avoided. However, a deal on the Future Relationship between the UK and EU still has to be concluded.
- Talks on the Future Relationship are continuing to put new arrangements in place between the UK and EU before the end of the Transition Period. These largely focus on trade and agreeing a Free Trade Agreement, but also cover other matters of co-operation. These could fail to reach an agreement in which case a 'new' No-Deal or 'No Trade Deal' scenario emerges. This would be very similar to previous 'No Deal' scenarios modelled but may require the adjustment of some assumptions – for example to take account of the Northern Ireland protocol.
- As talks have progressed the ambition for the UK/EU FTA has contracted. This, again, may involve amendments to the assumptions seen in previous models.
- Linked to the above, the UK Government has been clear that it both reserves the right to depart from EU rules and intends to do so if it is in the interest of the UK. This may affect the regulatory environment for UK farming and hence costs.
- Over the last few months, the issue of the UK internal market has become more widely discussed. With regulation in many areas a devolved competence, there is the possibility of divergent rules in different parts of the UK and associated effects on, for example, Scottish farmers if they are operating under different rules than English producers. There may be effects on internal UK trade which impacts at the farm level.
- The UK post-Brexit Tariff schedule has been published – this is covered in more detail in section 1.4 below. This effectively rules out a unilateral trade liberalisation model.
- Previous studies have tended to provide use a very 'broad-brush' approach to Non-Tariff costs, which can be greater than Tariff barriers in some cases. There is now far better data on these which can be incorporated on a commodity-by-commodity basis. Again, this issue is looked at in more detail in section 1.5.
- Both the EU and UK Government have clarified their positions on how border checks will operate after the end of the Transition - in the latter case through the UK's Border Operating Model (BOM)<sup>35</sup>.
- The UK Governments position on labour, whilst still vague in some respects, is clearly than previously, allowing greater precision in modelling.

All the issues above point to the need for an updated modelling study based on the most up-to-date information.

### 1.3 EFFECT ON THE WIDER SCOTTISH ECONOMY AND FOOD-CHAIN

Aside from studies focusing primarily on agriculture it is also worth noting that there have been a number of studies looking at the effect on the wider Scottish economy and the food chain in Scotland. A very brief overview of the key ones is set out in this section. Although not directly related to the farming sector, the health of the overall economy obviously has bearing on the trading environment for Scottish farmers. The Scottish Government's 'Scotland's Economic Strategy'<sup>36</sup> recognises the Food and Drink industry as one of six key Growth Sectors (alongside Financial and Business Services, Life Sciences, Energy, Tourism and Creative Industries) and Brexit's effects on the wider food chain will have impacts on achieving the ambitions in the Strategy.

A major study on the long-term effects of Brexit on Scotland was undertaken by Strathclyde University<sup>37</sup> and published in 2017. This used the usual scenarios of an FTA deal and WTO trading and employed an interregional computable general equilibrium (CGE) model of Scotland and the rest of the UK (RUK). It found that 'withdrawal from the Single Market is, in the absence of significant new bilateral trade deals, unambiguously bad news for the UK economy as a whole and for both the Scottish and RUK economies'. The report states 'if no trade deal is secured and the WTO default position is adopted, the impact on trade flows alone could generate a loss of as much as nearly 6% of GDP after 10 years. However, we find that a free trade agreement in these circumstances could limit the impact after 10 years to just over 4% of GDP.

Similar conclusions were reached by a Scottish Government<sup>38</sup> analysis in Jan 2018. The headline result was that 'leaving the EU and the Single Market [and trading on WTO terms] could reduce Scotland's economic output by 8.5% by 2030, equivalent to a loss of £2,300 a year for each person in Scotland'.

Both these studies were economy-wide. A more detailed sectoral analysis, including the food and drink sector, was published by the Scottish Government<sup>39</sup> in February 2019. This looked at the effects of an 'orderly' Brexit – comparing a UK/EU FTA versus the *status quo* EU membership. The results of this study are set out in Figure 5.

**Figure 5: Sectoral Change in GVA to 2030**

Sector	Scotland	Rest of UK	GVA Impact Index
Chemical Coke and Pharmaceutical	-10.1%	-8.4%	1.2
Mining and Quarrying	-8.3%	-9.4%	0.9
Basic Metals, Rubber & Plastic	-8.3%	-6.3%	1.3
Textiles, Leather, Wood & Paper	-6.9%	-6.4%	1.1
<b>Food &amp; Drink</b>	<b>-6.8%</b>	<b>-5.8%</b>	<b>1.2</b>
<b>Agriculture, Forestry and Fishing</b>	<b>-6.4%</b>	<b>-6.1%</b>	<b>1.1</b>
Computer, Electronic & Optical	-5.7%	-4.4%	1.3
Machinery, Transport Equip & Furniture	-5.7%	-5.3%	1.1
Administrative & Support Services	-5.4%	-4.5%	1.2
Professional & Scientific Services	-5.0%	-3.5%	1.4

Source: Scottish Government

The report undertook a further analysis investigating which sectors faced the greatest 'shock' compared to the rest of the UK, given their relative size in the economy. On this measure, 'Agriculture, Forestry & Fishing' and 'Food & Drink' came first and second respectively.

It was subsequently supplemented by a report<sup>40</sup> looking at the effects of a 'No Deal' Brexit on Scottish sectors. Whilst this did not provide specific figures on the sectoral impact in terms of GVA reductions, it found that the sectors where No Deal would have the greatest potential impact were 'Agriculture, Forestry & Fishing', 'Chemicals', 'Food & Drink' and 'Construction'.

In January 2020 a report on the Social and Equality impacts of Brexit<sup>41</sup> was issued. This was a wide-ranging report not specifically looking at economic impacts. However, it highlights that those living in remote and rural areas may be particularly affected by the loss of EU Rural Development funding and labour shortages (as it has often been migrant labour that has filled roles in the most remote parts of the country).

The latest overall analysis of the Scottish economy, the 'State of the Scottish Economy'<sup>42</sup> was produced by the Scottish Government in April 2020. This had little to say about the impact of Brexit as the forecasting was largely focused on the impact of Covid-19. At that early stage in the outbreak, analysis suggested that there could be a 33% fall in GDP for the period 'lockdown' measures were in place. Farming and food were seen as being relatively lightly affected by the outbreak compared to other sectors. However, this economic shock, in addition to that which Brexit might bring, will bring added pressure on the sector. This subject is returned to later in the report.

Lastly, focusing in more detail on the food and drink sector, an evidence report by the Scottish Government<sup>43</sup> looked into food and drink export logistics in the light of Brexit, and in particular the resilience of those logistics to ensure the reliable, timely delivery of products to markets. It found that there was a heavy reliance on road transport via England to the South East ports and also on Heathrow for air transport. A more diverse set of logistics options with more direct movements from Scotland to key markets was seen as desirable.

## 1.4 TARIFFS AND TARIFF RATE QUOTAS (TRQs)

### 1.4.1 Tariffs

The situation on tariffs is one of the most clear-cut areas of policy. The import tariffs that will apply after the end of the Transition Period from 1<sup>st</sup> January 2021 were set out in the UK Global Tariff (UKGT) regime<sup>44</sup> on the 19<sup>th</sup> May 2020.

Currently, the UK is part of the EU's Customs Union and consequently there are no tariffs applied to imports from EU countries. Imports from the rest of the world are subject to the EU's Common External Tariff (CET) where they do not enter under a free trade or preferential agreement. Tariffs are applied against the individual product being imported using a combination of both '*ad valorem*' tariff (where a percentage of the price is paid) and a fixed amount in monetary terms per tonne. EU tariffs (and in the future UKGT tariffs) are applied to products categorised by 4- and 8-digit product codes. For some commodities, such as beef, there are varying tariffs depending on the product in question (i.e. the specific cut, frozen or chilled etc.).

If there is no trade deal in place with the EU by the end of the Transition Period, then the UKGT tariffs will apply to imports from the EU as well as from all other countries that the UK does not have a specific trade deal with. Compared to the CET, nearly 6,000 tariff lines have been streamlined or simplified, and 'nuisance' tariffs (tariffs under 2%) have been removed.

From an agri-food perspective, as Figure 6 below illustrates, most of the tariffs under the CET have been maintained at the same levels of the CET, but converted from Euro into Sterling. In most cases, the currency conversion rate is €1 = £0.83, but there are some variations due to rounding and simplifications. *Effectively, the protection around the UK market will be kept at the same level as it was round the EU Single Market.* It should be noted that only a selection of agri-food tariffs are shown in Figure 6 – there are multiple tariffs in many sectors.

Another noteworthy point is that the UK plans to discontinue the EU's Meursing table which creates thousands of tariff variations for products such as biscuits, pizzas, confectionary and spreads which complicates the calculation of tariffs for these products. This is unlikely to have a large effect on farm-gate prices but could have a greater impact further up the food chain.

**Figure 6: UK Global Trade Tariffs**

<b>% or €/£ per tonne</b>	<b>EU Common External Tariff</b>	<b>UK Global Trade Tariff</b>	<b>Reason for Change</b>
Feed Wheat	€95	£79	<i>currency</i>
Feed Barley	€93	£77	<i>currency</i>
Oilseeds	none	none	<i>n/a</i>
Maize	€10.4	£0	<i>liberalisation</i>
Sugar (raw cane)	€339	£280	<i>currency</i>
Butter	€1,896	£1,580	<i>currency</i>
Cheese (Cheddar)	€1,671	£1,390	<i>currency</i>
Beef Carcasses <sup>①</sup>	12.8%+€1,768	12%+£1,470	<i>currency</i>
Lamb Carcasses <sup>①</sup>	12.8%+€1,713	12%+£1,430	<i>currency</i>
Pig Carcasses <sup>①</sup>	€536	£440	<i>currency</i>
Chickens <sup>①</sup>	€262	£210	<i>currency</i>
Potatoes	14.4%	14%	<i>simplification</i>
Oranges	12%/16%	12%	<i>simplification</i>

Source: Department for International Trade    ① fresh/chilled

For many commodities, the UK both imports and exports. This is due to factors such as seasonality in production and markets, together with consumer preferences. For example, Defra figures for 2017 were 101,000 tonnes of lamb imports to the UK and 104,000 tonnes of exports<sup>45</sup>. Therefore, both tariffs on imports and exports need to be considered when looking at impacts on patterns of domestic production and consumption.

### 1.4.2 Tariff Rate Quotas (TRQs)

Tariff Rate Quotas (TRQs) allow a defined quantity of goods to be imported at lower, or zero, tariff rates. At present

For historical reasons, the EU has built-up a complex series of TRQs. The majority of EU TRQ's tend to run on a 12-month basis from 1<sup>st</sup> July to 30<sup>th</sup> June. TRQs are managed through the issuing of import and export licences and can be specific to one exporting country, a group of specified countries or can be open to all suppliers ('*Erga Omnes*'). Having secured a TRQ, the national allocation for a country is usually allocated on a first-come-first-served basis by the authority issuing the relevant licences.

There are two main issues for the UK arising from Brexit relating to TRQs. The first is how to apportion existing EU-28 TRQs between the UK and the EU-27. The other is whether the UK issues any additional TRQs when it runs an independent trade policy.

#### Existing TRQs

A method was negotiated in October 2017 between the UK and EU to split existing TRQs<sup>46</sup>. This is based on an agreed percentage split of the present tariff quotas of the 28 EU Member States, based on historic import quantities to each part of the EU. Needless to say, a number of other WTO members have promised tough negotiations to produce something different. Already, Australia, New Zealand, Brazil and many other countries have been critical about the methodology, timing and the basis of the proposals. Russia and several other WTO members, including China and USA, have now formally sought to block this process at the WTO<sup>47</sup>. At the time of writing, no resolution had been found. For the purposes of this study, it will be assumed that the UK/EU proposal to split existing TRQs based on historic usage will prevail. Figure 7 outlines the proposed splits for key commodities. Note that the EU-27 TRQs are important as, if there is no FTA agreed and the UK becomes a third country, these quantities will be available to UK exporters.

**Figure 7: Proposed Split of Existing EU-28 TRQs (Selected)**

Product	EU-28 tonnes	Beneficiary	EU-27 %	UK %	UK tonnes
Beef	10,000	Brazil	89.5%	10.5%	1,049
Beef and Offal	118,578	<i>Erga Omnes</i>	53.5%	46.5%	55,170
Sheep Meat	228,389	N. Zealand	50%	50%	114,205
Cooked Poultry	79,477	Brazil	66.3%	33.7%	26,812
Cooked Poultry	160,033	Thailand	68.4%	31.6%	50,592
Butter	74,963	N. Zealand	63.2%	36.8%	27,516
Cheese (processing)	20,007	<i>Erga Omnes</i>	58.7%	41.3%	8,266
Common Wheat	2,371,600	RoW <sup>①</sup>	96.4%	3.6%	89,935
Malting Barley	50,890	<i>Erga Omnes</i>	40.9%	59.1%	30,101
Raw Cane Sugar	372,876	<i>Erga Omnes</i>	91.6%	8.4%	31,416

Source: European Commission ① all countries apart from US and Canada which have specific TRQs

#### New TRQs

At present, it is not known whether the UK will be issuing any additional TRQs. When the original 'No Deal' tariffs were published in March 2019 some significant additional UK TRQs were included;

- 260,000 tonnes of cane sugar
- 230,000 tonnes of beef (comprising 124,401 tonnes of fresh/chilled beef, 56,217 tonnes of frozen beef and 50,042 tonnes of processed beef)
- 245,706 tonnes of poultry meat.

With the publication of the UKGT then these allocations are void. The only additional agri-food TRQ included in the UKGT is 260,000 tonnes of raw sugar (of little relevance to Scottish agriculture). It is assumed in this project that no additional TRQs will be offered. However, further information on this area is expected to emerge in the autumn of 2020.

### 1.4.3 Northern Irish Protocol

One further issue to consider with tariffs is their interaction with the Northern Ireland protocol of the Withdrawal agreement<sup>48</sup>. A major concern on the island of Ireland is the possibility of an increase in tariff avoidance through illegal smuggling across the border between the Irish Republic and Northern Ireland dependent upon the Brexit Deal or No Deal outcome. This includes instances of avoiding import tariffs if agricultural products were moved through the Single Market (specifically the Irish Republic), into Northern Ireland and then into Great Britain. In such cases, the impact of NTMs would also be significantly reduced compared to a direct import into Great Britain.

At the time of writing (mid-October), further information was expected on the implementation of the NI Protocol which continues to be discussed at the Joint Committee overseeing the Withdrawal Agreement. Whilst it is believed that progress is being made despite the challenges which have arisen to the NI Protocol as a result of the UK Internal Market Bill, the detail required to "operationalise" the arrangements for GB-NI trade in both directions are unclear. Figure 8 below summarises the documentation requirements for NI trade, based on information provided by the Customs Clearance Consortium<sup>49</sup>, which is a stakeholder in a recently successful tender to operate the Trader Support Service to help NI businesses to address some of the regulatory costs of Brexit<sup>50</sup>.

Figure 8: Overview of the Documentation Needed for Trading with Northern Ireland from 2021

Component	NI to GB	GB to NI	NI to GB via ROI	GB to NI via ROI	NI to EU26 via ROI/GB	NI to EU26 via GB
Export Declaration (EAD)						
Exit Safety & Security Declaration (EXS)	✓?		✓			
Transit Document (TAD)				✓	✓	✓
Goods Vehicle Movement Service (GVMS)		✓	✓	✓	✓	✓
Pre-Boarding Notification (PBN)			✓	✓	✓	
Entry Safety & Security Declaration (ENS)		✓		✓		
Import Entry (Declaration)		✓		✓		
Export Health / Phyto. Certificates		✓		✓	Possible pre-notification system to permit "Green Lane" entry into EU26; less onerous than TRACES	
TRACES		?		?		
IPAFFS		✓		✓		
Border Control Post (BCP)		✓		✓		
Duty		✓?		✓?		

Sources: Customs Clearance Consortium and Andersons.

## 1.5 NON-TARIFF MEASURES AND OTHER TRADE RESTRICTIONS

### 1.5.1 Non-Tariff Measures

Non-tariff measures (NTMs) are Government-imposed requirements, unrelated to tariffs, but which are faced by trading businesses. NTMs include customs procedures, sanitary and phytosanitary regulations, labelling, packaging, and testing requirements and certification, together with rules governing product origins and Government procurement<sup>51</sup>. They are used to overcome or reduce the impacts of perceived product risks, including risks to human, animal or plant health or product descriptions and standards.

NTMs tend to increase production costs and can lead to delays, wastage, and added trading costs. They are, therefore, often a barrier to trade, particularly in the agri-food sector where risks to environmental quality and human, animal, and plant health need to be managed. Whilst NTM increase costs and act as a barrier to trade it must be noted that, as stated in a 2016 study<sup>52</sup>, As a rule, NTMs tend to increase production and trade costs and, therefore, act as a barrier to trade. That being said, the same study noted that '*not all NTMs are bad*' and that most are "*necessary for consumer safety, and environmental, animal, and plant protection.*"

Non-tariff barriers (NTBs) are often conflated with NTMs. However, in most trade definitions<sup>53</sup>, NTB are *additional* restrictions that are unrelated to Government-imposed regulations (e.g. private standards) which are discriminatory. This study focuses only on NTMs.

While trade tariffs have progressively reduced globally since 1948 to facilitate trade, evidence suggests that the same does not hold for NTMs, and in many instances they have become more burdensome. Academic reports have identified an increase in the number of locally-implemented NTMs as a response to falling trade tariffs that have been agreed globally<sup>54</sup>, and while NTMs may be justified in terms of protecting health, welfare and the environment, they are sometimes used as a form of industry protection by governments<sup>55</sup>.

Currently, as part of the Single Market, the UK faces few NTMs when exporting to the EU and are not subject to sanitary or phytosanitary measures (SPS), technical barriers to trade (TBT) or rules of origin (RoO) checks. Once the UK leaves the Single Market all such NTMs will apply. This will be the case whether the UK concludes an FTA or not as it will become a third country. Thus, there will be NTM impacts on trade whatever the final 'future relationship' is. Lower levels of checks may apply if a comprehensive trade deal is concluded.

There is also the question of controls on *imports* into the UK, especially from the EU. This also has an effect on domestic prices, albeit not as great on export controls. The UK Government published its Border Operating Model (BOM) in June 2020<sup>56</sup>. This foresees a gradual phasing-in of checks and paperwork after the end of the Transition Period (whether there is a deal or not deal). Full checks will only be in place from July 2021. For the purposes of this study, modelling will assume that full checks are taking place on agri-food goods imported from the EU.

### 1.5.2 Estimating NTM Costs

NTMs are much more difficult to identify and quantify<sup>57</sup> than tariffs because they are not always published, are difficult to calculate, and vary across the region. However, they can be considerable, amounting to large costs and delays. Because time costs money the delivery of goods has become tailored to specific orders, leading to 'just-in-time' food supply. Frictions to trade that result in delays are, therefore, particularly critical to rapidly perishable food. Indeed, before the UK joined the EEC, the majority of meat traded was frozen for that reason. Their impact in certain food supply chains can be significant where perishable goods are easily damaged or lost as a result of delays<sup>58</sup>. The OECD suggests that non-tariff frictions, particularly at the border, can, for many commodities and trade routes, be larger than the costs of the tariffs themselves. It states that customs compliance costs add 2% to 24% to the value of traded goods with smaller businesses being disproportionately affected<sup>59</sup>.

The likely impact of NTMs on UK and Scottish trade is more difficult to assess with high degrees of confidence than tariffs. The research literature identifies two broad approaches to quantifying NTMs in the agri-food sector namely, top-down and bottom-up. Within these broad approaches, there are several methodologies which have been employed.

- The 'top down' approaches primarily use macroeconomic data on trade and seek to provide insightful estimates on the costs of the trade restrictions implied by NTMs. Within this, three main methodologies are identified:
  - Gravity model estimates encompassing quantity-based equations.
  - Price-based methodologies.
  - Time-cost methodologies.
- The 'bottom-up' methodologies use stakeholder surveys and related techniques (e.g. workshops, field-trips and case-studies) to gain a better understanding of the prevalence of NTMs for a variety of analytical purposes. These include information about the frequency of NTMs and relative importance of different measures such as their trade restrictiveness or trade impact<sup>60</sup>.

The use of "bottom-up" business surveys or case studies has become more frequent in recent years to address the shortcomings of the top-down methods and to gain a more granular understanding of how NTMs affect business supply chains. Examples using business surveys include Grainger<sup>61</sup>, ABAC<sup>62</sup>, Haverty<sup>63</sup> and the International Trade Centre (ITC)<sup>64</sup>. Examples employing a case-study methodology

include Orden et al.<sup>65</sup> and Grainger<sup>66</sup>. The bottom-up approaches have the potential to address many of the problems of top-down methodologies, but caution needs to be employed in solely relying on perceptions-based inputs from any one group of stakeholders (e.g. businesses, port health officials etc.) as it can lead to biases. What is required is a balanced approach which considers the perspectives of all stakeholders and based as factually robust data as possible.

When looking at NTMs it is important to recognise the differences between different **products**. Simply using AVE percentages and applying across a whole category of trade (e.g. beef) is unlikely to capture all the nuances (e.g. chilled products more affected by value deterioration than frozen etc.).

For the purposes of this study, the NTM figures used will be based on work undertaken for the AHDB<sup>67</sup>, supplemented by data generated from other NTM projects that The Andersons Centre has been involved in. Previous estimates will be validated to ensure they are relevant for the Scottish industry.

### 1.5.3 Rules of Origin

Issues around Rules of Origin (RoO) requirements are also worthy of comment at this point. The RoOs determine in which country a product and its components have to be produced to benefit from preferential tariffs. It is argued<sup>68</sup> that even if the EU and the UK reach a trade agreement, many UK exports to the EU would not be eligible anymore to preferential access (if value chains remain unchanged) because not enough value added is being produced in the UK. This would especially be the case where in the case of agri-food where UK and EU agri-food supply chains are closely integrated, as compliance with European RoO requirements potentially could increase administrative costs for exports to the EU<sup>69</sup>.

In summary, as long as over 90% of raw materials (based on bill of materials) meet origin requirements as deriving from the UK or EU then they would be permitted tariff-free access under an FTA. If the 'non-indigenous' component is over 10% then restrictions apply.

### 1.5.4 Other Trade-Related Impacts

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

Research<sup>70</sup> has demonstrated that trade is not only limited by the barriers set up between the importing and exporting nations (i.e. UK and EU), but also by the overall trade restrictions with other countries (i.e. trade restrictions the UK faces when exporting to China and South East Asian countries etc.). This is referred to as 'Multilateral Resistance'<sup>71</sup>. The impact of multilateral trade resistance is likely to increase if the UK departs the EU and then changes its standards. Under these conditions, importers from Third Countries, which previously traded with the UK on the basis of EU standards, could become reluctant to import UK produce until they are satisfied that the new UK standards still conform to their requirements.

## 1.6 FARM SUPPORT

Legislation is currently passing through the Scottish Parliament to set the rules for farm support for the next few years. Unlike the 'Agriculture Bill' in England, the Scottish equivalent<sup>72</sup> is specifically designed to make little change to the current EU support schemes. This is in line with the Stability and Simplicity

consultation<sup>73</sup> back in 2018 which foresees no major change to the BPS (and only tweaks to LFASS) before 2024.

The Scottish legislation has passed through Stage 2 – the Committee Stage. It now only has to progress through Stage 3 to become law. One important amendment was made at Stage 2. This is effectively a 'sunset clause' that means a replacement for the current legislation has to be put forward before the end of the next Scottish Parliament in May 2026. The Government could put forward plans before this date, but it means that the current schemes cannot carry-on indefinitely. Also contained within the Bill are powers for the Scottish Government to set rules on standards for agricultural products.

Although the systems in Scotland look set to remain unchanged until 2024, this does not mean that amount of funds flowing through the system will remain the same. In terms of the budget available for farm support in the future, the Conservative Party made a pledge during the 2019 General Election<sup>74</sup> campaign to '*to match the current annual budget for agriculture through the next Parliament*'. The Parliament is due to end in 2024. The form of words also allows for a variety of interpretations – for example, the phrase 'for agriculture' could limit funds to the BPS rather than including Rural Development money. Other spending, previously funded from the CAP (for example rural broadband) could be funded from the new domestic budget. It also possible that funding to 2024 will only be guaranteed at current prices – i.e. it will not be increased in line with inflation.

After 2024, there may well be a sharp squeeze on budgets as farming competes with other Government priorities such as the NHS, schools, social care etc. Even in the short -term, there is an argument that the unforeseen expense of the Covid-19 outbreak renders past promises in funding irrelevant and agriculture should 'do its bit' by accepting less support.

Some of these uncertainties should be settled when the sums for agricultural support are set out as part of the UK Government Comprehensive Spending Review, anticipated in Autumn 2020<sup>75</sup>. Historically, Spending Reviews have only fixed budgets for three years – so this would not cover the full length of the 'guarantee period' to 2024. Under the Agriculture Act<sup>76</sup> currently passing through Parliament, the Secretary of State must set out a Multi Annual Financial Assistance plan for farm support, of which the first one plan is for a period of seven years beginning with 1<sup>st</sup> January 2021. However, this only applies to England, and it is currently unclear whether such a long-term financial perspective will be adopted by the Scottish Government.

Given all these uncertainties, for the purposes of this report it will be assumed that support to Scottish farmers, both in its overall value, and the schemes via which it is paid, will remain unchanged for the duration of this study.

## 1.7 OTHER ISSUES

### 1.7.1 Labour

The effect on Scottish agriculture and the wider food chain through changes in labour availability has not been researched in any great detail. However, some studies are relevant.

One analysis by QMS<sup>77</sup> looked at the situation for the Scottish red meat sector. The survey, published in February 2017, shows 52% of the unskilled workforce, 44% of the skilled workforce and 16% of supervisory and management staff to be non-UK nationals. In total among those businesses responding

to the survey just in excess of 1500 employees are non-UK nationals or some 43% of the total workforce. In addition, Food Standards Scotland reported that around 98% of their official veterinarians were non-UK nationals.

At the UK level, the Migration Observatory reported in 2017<sup>78</sup> that 40% of the workforce of 'Process Operatives' (primarily food processing workers) are foreign born.

A 2018 study<sup>79</sup> looked at migrant labour in the agri-food sector in Northern Ireland. This is likely to have some relevance to Scotland, having reasonably similar labour markets. This found that the number of indigenous workers (in this case those from the UK and Ireland) remained broadly stable between 2001 and 2017. There was a large increase in EU-26 workers, but this simply led to higher overall employment in the sector. The Gross Value Added of the sector rose substantially during the period in question. This indicates that immigrants have not taken locals' jobs. Instead, a ready supply of good quality, and cheap labour has allowed the sector to grow. This may have actually supported (higher paid) domestic jobs in the sector.

None of these studies specifically tries to quantify the additional labour cost that would be incurred if migrant labour from the EU under the free movement provisions of the Single Market were not in place.

A report on the UK economy as a whole by the Migration Advisory Committee (MAC)<sup>80</sup> found that migration from the EU was not a major determinant of wages for UK workers. However, it did find that some evidence suggesting that lower-skilled workers face a negative impact while higher-skilled workers benefit. As the agri-food sector is relatively low-wage then it is likely to be one of the areas of the economy where wages have been restricted by migration. The report goes on to state that the labour market opportunities of indigenous residents will be improved by migrants who are complementary to them, for example complementary migrants might raise the productivity of resident workers perhaps by working with them or filling shortages that would otherwise restrict the growth of some sectors.

Nickell and Saleheen (2015)<sup>81</sup> similarly found that a 1% increase in the migrant/non-migrant ratio in the semi/unskilled service occupation group led to a reduction of wages for those in that group of around 0.2%, larger than can be accounted for purely by compositional changes.

As any negative effect of migration is skewed towards those at the lower end of the wage distribution, the analysis looked at the effect on different percentiles of earnings. The 6.7% increase in the EU-born working age population ratio between 1993 and 2017 the implied total effect on UK-born nominal wages of EU immigration is of the order of a 5.2% reduction to the 5th percentile a 4.9% reduction at the 10th percentile. Although not all agri-food jobs are low wage, it might be fair to assume that, in the absence of free-movement, wage costs in the sector might have been around 5% higher.

These analyses are conducted on permanent, full-time employment. Of course, much employment in agriculture, and especially horticulture is seasonal and casual.

One study that provides some pointers was carried out by Anderson Midlands<sup>82</sup> for the NFU in early 2020. This focused on the additional costs in the fruit and vegetable sector due to Covid-19 restrictions. Although not directly a Brexit issue, Covid has limited the supply of labour from the EU in the same way that ending free movement of labour will. The study found that farm employment costs increased by between 6% and 15% in the UK fruit and vegetable sector. It identified five key areas which have

attributed to the increase; worker availability & recruitment, training, accommodation, transport & logistics and operations.

A recent survey<sup>83</sup> by the NFU of England further illustrates the issue of seasonal labour in agriculture. This found that, for the 2020 season, UK residents made up only 11% of the seasonal workforce in the fruit, vegetable, and flower sectors. The Survey also found that first-time UK resident workers stayed for nine and a half weeks on average, compared to just over 14 weeks for first-time non-UK workers and 18 weeks for returnee non-UK workers. The latter category are thus the most valuable to growers – as well as staying the longest and so minimising re-recruiting costs, they will also already have the skills and knowledge to be productive from day one, and not require extensive training and supervision. With the end of the Transition Period on the 31st December, free movement for EU national will cease and the 89% of seasonal workers coming from this source will no longer be an option for growers. The NFU, NFUS and other industry bodies are campaigning for an increase in the Seasonal Agricultural Workers Scheme (SAWS) from its current 10,000 per annum.

### 1.7.2 Regulation

The cost of regulation is partly captured in the analysis of NTMs – divergence in standards between the UK and the EU will increase the amount of border checks and thus the cost of doing trade.

However, the issue of regulation also impacts directly at farm level. This is both directly, in terms of the costs of complying with farm standards (e.g. NVZs or animal welfare requirements) and indirectly through access to technology and inputs.

The Institute for Government's Whitehall Monitor<sup>84</sup> (2019) found that Defra had responsibility for 1,200 pieces of EU legislation. Not all of them will relate to farming, as some will cover environmental issues, but this illustrates the level of regulation the agricultural industry is exposed to.

There is widespread acceptance of the regulatory burden placed on agriculture and the need for reform to enable farmers to get on with the business of farming whilst the sector still retains an appropriate level of oversight. The 'Pack Report'<sup>85</sup> – 'Doing Better: Initiative to Reduce Red Tape for Farmers & Rural Land Managers, published in 2014, made over 60 recommendations on how the system in Scotland could be improved. A similar exercise was undertaken in England in 2018 with the Stacey Review<sup>86</sup>. In fact, there have been a number of 'regulation' reviews over the years with the subject returned to at regular intervals. This demonstrates the inherent problem in tackling bureaucratic 'red tape'.

The National Audit Office<sup>87</sup> estimated in 2012 that compliance with regulation cost the average English farm £5,500 per year. With the same basic set of (EU) regulation, it is unlikely that the figure for Scotland would be much different and it is also likely the costs are far more likely to have gone up rather than down in the interim period.

For the purposes of this study, it is assumed that there will be no significant change in the regulatory burden (and cost) on Scottish agriculture. Both the Agriculture and Environmental Bills in the Scottish Parliament are specifically designed to provide little change to the status quo and to keep Scottish legislation in conformity with EU laws (even as they evolve) in the future. This is contrast to Westminster where there is much talk of 'doing regulation better'. However, all across the UK there seems little chance of a 'bonfire of red-tape' in the short-to-medium term – even if only due to capacity constraints

in the Civil Service. This is perhaps ironic, given that 'EU red-tape' was one of the main reasons that UK farmers voted for Brexit<sup>88</sup>.

The second impact of regulation is less direct but affects the way agricultural technology is regulated. This influences the inputs UK farmers have access to and their relative competitiveness against international competition. Two often-cited examples are the regulation of genetic modification technologies and plant protection products (pesticides). As with on-farm regulation, this study assumes that no substantive changes, large enough to have an economic impact, will occur in this area in the timescale being used. For example, the Scottish Government has a long-standing policy<sup>89</sup> of opposing the cultivation of GM crops in the open environment.

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