Assessing the impacts of alternative post-Brexit trade and agricultural support policy scenarios on Scottish farming systems

Authors:
Shailesh Shrestha, Steven Thomson, Bouda Vosough Ahmadi and Andrew Barnes
Policy, Innovation and Behaviour Change Team
Land Economy, Environment and Society Research Group
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http://www.gov.scot/Topics/Research/About/EBAR/StrategicResearch/strategicresearch2016-21/srp2016-21
Executive Summary

Changes in market prices and agricultural policy are predicted to have a major impact on the structure and resilience of the Scottish agricultural sector post-Brexit. However, uncertainty surrounding post-Brexit agriculture remains significant for the Scottish agricultural sector and therefore requires a detailed assessment of the impacts of potential alternative post-Brexit trade and policy arrangements. This report examines the impacts of three post-Brexit trade scenarios on different Scottish farming systems (beef, sheep, dairy and crops). The trade scenarios used in this report have been taken from a high profile Agri-Food and Biosciences Institute (AFBI) report on post-Brexit trade scenarios, namely;

- **Free Trade Agreement with the EU (FT)** where:
  - The UK and EU retain tariffs and quota free access to each other’s market. The UK maintains EU tariffs to the rest of the world. There are 5% trade facilitation costs.

- **Default World Trade Organisation tariff regimes (WTO)** where:
  - Existing EU tariffs are adopted by the UK along with a share of EU’s Tariff Rate Quotas (TRQs). Most Favoured Nation (MFN) tariffs apply to imports from, and exports to, the EU and the rest of the world. There are 8% trade facilitation costs.

- **Unilateral Trade Liberalisation (LT)** where:
  - There are zero tariffs on UK imports. UK exports are faced with the WTO’s Most Favoured Nation tariffs. There are 8% trade facilitation costs.

Under these FAPRI model post-Brexit scenarios the expected price increases between 2015 and 2022 are shown in Summary Table 1. By 2022 under the baseline (business as usual) scenario cereal prices are expected to increase by 16% to 20% with more modest increases (6% to 7%) expected in the livestock sector. Free trade with the EU post-Brexit is predicted to do little to prices. Under the scenario where the UK reciprocates the EU’s WTO tariffs (so called ‘fortress UK’) there are expected to be significant price increases in the beef (23%) and dairy (31%) sectors compared to the baseline predictions.

SRUC’s economic farm-level model, ScotFarm, was used for this study. The model explores the impact of each of the AFBI scenarios on Scottish farms under assumptions of continued (i.e. WTO+, FT+, LT+) and withdrawn (i.e. WTO-, FTA-, LT-) direct Pillar I support payments to farmers. It was assumed Pillar II payments such as agri-environment and Less Favoured Area (LFA) support remain. It is, however, important to realise that the model only projects impacts under these specific changes and does not in any way try to predict what will happen post-Brexit with, for example, changes to exchange rates or the regulation of agriculture.

Summary Figure 1 presents concise ScotFarm model results for the post-Brexit trade and policy scenarios across the main Scottish farming systems. The key messages are:

- The FT trade scenario has the least impact on all four farming systems studied.
- The WTO trade scenario is estimated to be financially beneficial for most of the Scottish dairy and beef farming systems if the direct support payments remain (due to import substitution).
- The LT trade scenario has a very substantial negative impact on Scottish farm profitability. This negative impact is particularly high for LFA specialist beef, LFA mixed beef and sheep, and LFA specialist sheep producers as tariff protection is lost. Even with continued direct support, Scottish beef and sheep production is projected to decrease if the LT+ trade agreement is implemented.
- Even with existing levels of direct support, the WTO+ scenario is expected to lead to Scotland’s ewe flock more than halving in size. This is due to new tariff barriers for Scottish lamb entering the EU market, and some shifting of production from sheep to cattle as farms seek to benefit from higher expected beef prices resulting from imports facing high levels of tariff.
- There is limited effect on the Scottish crop sector from these trade scenarios, but profitability within the sector is more affected by removal of direct support.

<table>
<thead>
<tr>
<th>Price change (2015 to 2022)</th>
<th>Baseline</th>
<th>FT</th>
<th>WTO</th>
<th>LT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>6%</td>
<td>7%</td>
<td>37%</td>
<td>-2%</td>
</tr>
<tr>
<td>Beef</td>
<td>6%</td>
<td>6%</td>
<td>29%</td>
<td>-39%</td>
</tr>
<tr>
<td>Sheep</td>
<td>7%</td>
<td>7%</td>
<td>-22%</td>
<td>-20%</td>
</tr>
<tr>
<td>Barley</td>
<td>16%</td>
<td>15%</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>Wheat</td>
<td>20%</td>
<td>20%</td>
<td>17%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Summary Table 1: Summary FAPRI price projections (2022 compared to 2015) under post-Brexit trade scenarios
This removal of direct support payments is predicted to lead to a substantial decrease in the viability of the Scottish beef and sheep sector, particularly under the unilateral trade liberalisation scenario (LT-). Under this scenario 89% of specialist sheep farms are expected to make losses in 2022 and two-thirds of specialist beef producers (see Summary Figure 2). Under this LT- scenario the number of suckler cows in Scotland is expected to fall by 28% and the number of breeding ewe numbers are expected to fall by half.

Summary Figure 1: Estimated average difference from the baseline net profit in 2022 resulting from post-Brexit trade and policy scenarios

Summary Figure 2: Proportion of LFA livestock farms estimated to be loss making in 2022 as a result of post-Brexit trade and policy scenarios

As part of ongoing work SRUC economists will provide updates as Brexit scenarios evolve and new price projections are generated. Using new FAPRI price projections, the next iteration of ScotFarm results are being developed through the Economic and Social Research Council (ESRC) funded project: Brexit: How might UK Agriculture Thrive or Survive?
Introduction
This report explores the impacts of the expected changes in commodity prices under three alternative trade scenarios the UK may adopt following the UK’s withdrawal from the European Union (referred to commonly as ‘Brexit’). These scenarios are each considered with and without direct agricultural support payments to illustrate the potential impacts on Scottish agriculture post- Brexit. These trade and policy scenarios are considered for the main farm types in Scotland, namely dairy, specialist beef, LFA cattle and sheep (including LFA specialist sheep) and cereal / general cropping farm types in Scotland. The trade scenarios are based on those developed by AFBI, and co-created with the UK administrations, for understanding potential options for Brexit. These trade scenarios, namely: (a) Free Trade (FT); (b) WTO default (WTO) and (c) Unilateral Trade Liberalisation (LT), follow different sets of assumptions, as set out in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Free Trade (FT)</th>
<th>WTO default (WTO)</th>
<th>Unilateral Trade Liberalisation (LT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>+3%</td>
<td>+17%</td>
<td>-45%</td>
</tr>
<tr>
<td>Sheep</td>
<td>-1%</td>
<td>-30%</td>
<td>-29%</td>
</tr>
<tr>
<td>Dairy</td>
<td>+1%</td>
<td>+30%</td>
<td>-10%</td>
</tr>
<tr>
<td>Wheat</td>
<td>-1%</td>
<td>-4%</td>
<td>-5%</td>
</tr>
<tr>
<td>Barley</td>
<td>-1%</td>
<td>-5%</td>
<td>-7%</td>
</tr>
</tbody>
</table>

Assumptions:
- **UK and EU retain tariffs and quota free access to each other’s market**
- **UK maintains EU tariffs to the rest of the world**
- **5% trade facilitation costs**
- **Most Favoured Nation**
  - tariffs on the imports and exports to the EU
  - Tariff Rate Quotas and tariffs to rest of the world retained
  - 8% trade facilitation costs
- **Zero tariffs on UK imports**
- **Most Favoured Nation tariffs on UK exports**
- **8% trade facilitation costs**

Table 1: Post-Brexit trade scenarios and percentage changes in price by 2025 of selective commodities compared to pre-Brexit scenario (source: AFBI, 2017)

Data and methods

(a) Data
This ScotFarm model applied individual farm-level data taken from the Scottish Government’s 2015 Farm Business Survey (FBS) which summarises the 2014/2015 reporting year. The FBS collects physical and financial data from around 500 farms annually. The farms in the survey are stratified by farm type and size but exclude smaller farms (i.e. those with less than €25,000 of output, such as crofts and smallholdings).

In this report we present results for four major farm types which cover the majority of Scottish agricultural production: (a) dairy, (b) specialist beef; (c) LFA mixed cattle and sheep including LFA specialist sheep, and (d) specialist cereals / general cropping.

Future price projections, for a number of agricultural commodities, under the AFBI (AFBI, 2017) trade scenarios were extracted from the FAPRI-UK partial equilibrium model. These FAPRI price projections are shown for different agricultural commodities in Figures 1 and 2 where price changes are indexed to 2015 prices.

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2 Most Favoured Nation: Under the World Trade Organisation rules member countries are treated equally and there cannot be discrimination between trading partners unless a Free Trade Agreement has been established between countries / groups of countries (or in giving developing countries preferential market access).
3 Data provided by the Scottish Government’s Rural & Environment Science & Analytical Services. For details please visit: [www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/Publications/FASdata](http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/Publications/FASdata)
5 We acknowledge the FAPRI-UK modelling team at AFBI, Belfast for providing us with the price projections for this study.
Figure 1 shows that the projected prices under the FT scenario are almost the same as the baseline for all three livestock production systems. The price projections are most favourable under the WTO scenario for both beef and dairy as a result of new UK tariffs for imports and the domestic market reacting to opportunity. However, the prices for sheep under this scenario are expected to see a substantial reduction as a result of exports to the EU facing tariff barriers. Price projections under the LT scenario show a substantial reduction for beef and sheep due to cheaper imports flooding the UK market, whereas the projected price reduction is comparatively very small for dairy. Crop prices are only expected to decrease marginally under all three trade scenarios when compared to the baseline FAPRI price projections for major cereal crops in Scotland - namely barley, wheat and oats.

Figures 1: Price index of FAPRI Brexit projections for 2010 to 2025 (2015 =100)
(b) Modelling

SRUC’s farm-level economic model, ScotFarm⁶, was used for this study. The model has been developed through the Scottish Government’s Strategic Research Programme(s) for agricultural policy analysis and it optimises net profits for each of the 500 individual farms within the FBS. The model optimises profits for each farm using its existing fixed farm resources, such as available land and capital. Other farm resources such as labour, feed and livestock replacements are assumed to be flexible and therefore are adjusted by the model to maximise the profit.

In the model, full Brexit occurs in 2019 with no period for transition, and the results shown throughout the report are for 2022, providing an evaluation of the predicted farm-level impacts of trade and policy scenarios four years after full Brexit taking place.

An outline of the ScotFarm methodology is presented in Figure 2. It should be noted that the model maximises the use of unpaid family labour where available, meaning the net profit reported still has to cover drawings and family labour. ScotFarm uses farm-level data for each of the sampled farms and runs a baseline scenario where support payment stay at existing (2014/15)levels. Profits for each farm were first optimised for the 2010 to 2025 period under the existing (pre-Brexit) trade and policy environment to identify a ‘baseline’, or do nothing, scenario. The model was then optimised for the three FAPRI trade scenarios introduced in 2019 with no transition period. Each scenario was also considered where direct support is continued (i.e. WTO+, FT+, LT+) and where direct support is withdrawn (i.e. WTO-, FTA-, LT-). Hence, six post-Brexit scenarios for each of the farm types were examined. Results for each scenario were then compared with the 2022 and are presented in this report. The results were further analysed after grouping the farms into four performance categories (‘quartiles’) based on each farm’s baseline net profitability to identify if these post-Brexit scenarios impacted differently depending on 2015 profitability levels.

![Figure 2: Flow chart of the modelling approach used in this study](image)

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⁶ Detail of ScotFarm is available at: [www.sruc.ac.uk/download/downloads/id/3513/scotfarm_%E2%80%93_a_farm_level_optimising_model.pdf](www.sruc.ac.uk/download/downloads/id/3513/scotfarm_%E2%80%93_a_farm_level_optimising_model.pdf)
LFA Beef

There were 105 specialist Less Favoured Area (LFA) beef farms included in the FBS 2015. Figure 3 illustrates the results when existing levels of direct support is continued. The net profitability of each individual farm under the ‘pre-Brexit’ baseline scenario is represented with bars and the three trade scenarios represented by coloured markers.

The results show that the majority of beef farms are projected to have positive farm net profits in 2022 under the baseline scenario when direct support is maintained. The estimated net profits of the majority of the farms stay almost the same under the FT+ scenario (red circle markers) and increase slightly under the WTO+ (orange triangle markers) as a result of the Scottish farmers benefiting from higher cost imports from the EU in a protected market. A more negative picture emerges under the unilateral trade liberalisation (LT+) scenario, which shows large expected reductions in farm net profits (blue line markers). Under LT+ the UK market opens to cheaper imports which push down the price that Scottish beef farmers would receive. However, despite reduced prices under the LT+ scenario many Scottish beef producers are expected to remain profitable due to the continuation of direct support (which makes up a large proportion of their net profit).

Figure 3: Estimated 2022 farm net profit (with direct support) of beef farms under the baseline scenario and three post-Brexit trade scenarios (FT = Free Trade; WTO = World Trade Organisation and LT = Unilateral Trade Liberalisation)

Figure 4 presents the ScotFarm predicted net profits in 2022 under all three trade scenarios with the removal of direct support payments from 2019. It shows that almost all of the farms are expected to have substantial reductions in net profitability if existing levels of support are removed.
Only a third of beef farms are expected to remain profitable in 2022 under the unilateral trade liberalisation scenario, with those that remain profitable predicted to have very small margins to cover unpaid family labour. The impact of the post Brexit trade agreement scenarios with and without farm payments on farms in different performance quartiles are summarised in Figure 5, where it is clear how farm profitability is particularly susceptible to tariff free imports to the UK (LT) and removal of direct support. When compared to the baseline, farms in all quartiles are predicted to have higher 2022 profits under the WTO+ scenario, but much lower profits under the LT+ scenario when direct support remains (Figure 5a). Naturally, with the removal of support payments (Figure 5b), nearly all farms show a substantial reduction in profitability. Farms in the top quartile (Q1) are most susceptible to the removal of support as they receive higher direct support payments and are larger meaning they also are more exposed to price fluctuations than smaller farms in other quartiles. Overall, compared to the baseline ScotFarm predicts there will be a 28% contraction in the suckler cow herd in 2022 under the unilateral trade liberalisation scenario if direct support is removed (38% in bottom quartile farms).

**Figure 5:** Predicted difference in beef farm net profits in 2022 for different performance quartiles under post-Brexit scenarios compared to the baseline.

Characteristics of the average beef farm in the top (Q1) and bottom (Q4) quartiles are presented in Table 2. Statistically, farms in Q1 have significantly more grazing land. On average these farms also have significantly more family labour to draw on and incur lower variable cost in their farming system. Lower quartile farms have slightly lower stocking density and hence are comparatively more extensive in nature. The top quartile farms also have significantly higher support payments and carry significantly more suckler cows and finishing cattle.

**Table 2:** Differences in beef farm characteristics and changes under trade scenarios. Average of farms in top and bottom 25% groups. (** P< 0.01, * P < 0.05)

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7 Performance quartiles are based on the farm net profits derived from the baseline scenario.

8 **Statistically significant at 1% level (P<0.01), and *5% level (P<0.05).**
Dairy
There were 51 dairy farms in the 2015 FBS available for use by ScotFarm. Figure 6 shows that all of these dairy farms, except one, were predicted to be profitable in 2022 under the baseline scenario where milk price is assumed to be 8% higher than in 2014/15. The net profit of Scottish dairy farms was estimated to increase significantly by 2022 under the WTO+ scenario assuming direct payments remain, as the UK market becomes protected from EU and global production through tariffs, meaning Scottish farmers extend output and some imports are substituted with local dairy products. The model only predicts marginal improvements in net profits under the FT+ scenario when direct payments are in place. Farm net profit for most of the farms is projected to decrease slightly by 2022 under the LT+ scenario (reduced protectionism as tariffs are lowered or removed), in response to an expected small milk price reduction.

Figure 6: Estimated 2022 net profits of dairy farms under the baseline and three post-Brexit trade scenarios (FT = Free Trade; WTO = World Trade Organisation and LT = Unilateral Trade Liberalisation) with direct support

Figure 7: Estimated 2022 net profits of dairy farms under the baseline and three post-Brexit trade scenarios (FT = Free Trade; WTO = World Trade Organisation and LT = Unilateral Trade Liberalisation) without direct support
When direct support payments are removed, as expected, dairy farm net profitability for each scenario is reduced by 2022 (Figure 7). However, for most farms, profits are projected to stay higher than the baseline under the WTO- scenario when support is removed. This is because the 31% increase in milk price compared to the baseline, driven by UK tariffs and the opportunity for import substitution, has greater impact on profitability than agricultural support payments. Even under unilateral trade liberalisation and the removal of support payments most dairy farms are expected to remain profitable (albeit, with much lower profits from which to pay family labour) in 2022 as the milk price only changes marginally. The model predicted no change in the size of the dairy herd under all scenarios as the farms were already operating optimally in a profitable sector.

Figure 8 summarises the predicted impact of the trade and policy scenarios on the dairy sector. Figure 8a shows farms in all performance quartiles are predicted to benefit from higher milk prices under the FT+ and WTO+ scenarios when direct support payments remain. Farms in the top baseline profitability quartile (Q1) are most likely to gain from higher expected prices if the UK introduces similar tariffs to the EU (WTO+) but also are exposed to greater profitability risk if the UK were to remove import tariffs under the unilateral trade liberalisation scenario. This pattern is replicated for the scenario where direct support is reduced (Figure 8b). This reflects the reality that dairy farm margins are significantly affected by the relative price of milk.

Figure 9: Difference in dairy farm net profit in different quartiles under post-Brexit scenarios compared to the baseline scenario

Some differences in the characteristics of the farms in the top and bottom baseline performance quartiles were found (Table 3). An average farm in Q1 is larger, has higher yielding cows and receives higher direct support payments than an average farm in Q4. Overall the results suggest that larger intensive dairy farms will be more resilient to absorb changes that may be brought about by Brexit, unless import tariffs are removed through UK unilateral trade liberalisation.

Table 3: Differences in characteristics of dairy farms in top and bottom quartiles of farm net profit (** P < 0.01, * P < 0.05)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean of top quartile</th>
<th>Mean of bottom quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grassland (ha)**</td>
<td>199</td>
<td>112</td>
</tr>
<tr>
<td>Arable land (ha)</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Family labour (FTE)</td>
<td>2.08</td>
<td>1.91</td>
</tr>
<tr>
<td>Variable costs (£/LU)</td>
<td>£259</td>
<td>£269</td>
</tr>
<tr>
<td>Stocking rate (LU/ha)</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Milk yield (litre/cow)**</td>
<td>7,088</td>
<td>6,269</td>
</tr>
<tr>
<td>Direct Support Payments**</td>
<td>£50,357</td>
<td>£27,843</td>
</tr>
<tr>
<td>LFA payments</td>
<td>£2,041</td>
<td>£2,579</td>
</tr>
</tbody>
</table>

(5) Statistical significance in difference of means at 1% level (**) and 5% level (*)
LFA Cattle and Sheep (*including LFA sheep farms*)

ScotFarm used 2015 FBS data from 107 LFA Cattle and Sheep and LFA specialist sheep farms. Figure 9 shows the net profit for each farm in 2022 for the baseline scenario and each of the three trade and policy scenarios, with direct support payments maintained.

On these LFA mixed livestock farms, the estimated FAPRI increase in beef prices under the WTO+ scenario, means that many farms will switch their resources out of sheep (which are predicted to have large price decreases) into suckler cows (23% price increase over the baseline in 2022). Whilst the results show that the estimated profitability of all farms is reduced under the unilateral trade liberalisation (LT+) scenario, many remain profitable (albeit with lower profits from which to take drawings and pay family labour) because of the continuation of direct support.

Figure 9: Estimated 2022 net profit **with direct support** on mixed LFA cattle and sheep (including LFA specialist sheep) farms under the baseline scenario and three trade agreement scenarios (*FT = Free Trade; WTO = World Trade Organisation and LT = Unilateral Trade Liberalisation*)

![Figure 9](image)

Figure 10: Estimated 2022 net profit **without direct support** on mixed LFA cattle and sheep (including LFA specialist sheep) farms under the baseline scenario and three trade agreement scenarios (*FT = Free Trade; WTO = World Trade Organisation and LT = Unilateral Trade Liberalisation*)

![Figure 10](image)
As many commentators\(^{10}\) have predicted, net profitability is estimated to be significantly reduced for LFA mixed cattle and sheep and specialist sheep farms under all trade scenarios when direct support payments are removed (Figure 10). ScotFarm predicts that when direct payments are removed only 45% of the farms remain profitable under the FT- and WTO- scenarios, falling to only 19% of farms under LT- scenario.

A summary of the predicted impacts of these policy and trade scenarios is shown in Figure 11. Variability in the amount of direct support received by each farm helps to explain the extent of changed profitability, with the top quartile farms receiving significantly higher direct support and having more sheep and cattle (meaning they have greater sensitivity to support and price changes). The difference between the with and without direct support payment scenarios) shows that these LFA mixed livestock and specialist sheep farms are more susceptible to changes in support payments than to market price – this is due to their high reliance on support in relation to overall business turnover and as a proportion of their profitability, compared to other sectors.

![Change in farm net profit](image)

**Figure 11: Difference in LFA sheep and mixed LFA cattle and sheep farms farm net profit in different quarters under post-Brexit scenarios compared to the baseline scenario**

Table 4 shows that an average farm in the top quartile (Q1) receives significantly\(^{11}\) larger support payments than an average farm in the bottom quartile (Q4). These top performing (2015) farms are significantly larger, with greater area and more than double the number of suckler cows and 70% more sheep, though with a slightly lower stocking density. With more sheep, the top quartile farms have greater exposure to the predicted large decreases in sheep prices under the WTO and LT scenarios, but their larger scale and wider resource base will allow them to redirect resources out of sheep

<table>
<thead>
<tr>
<th>Baseline Profit Quartile</th>
<th>Average Baseline Net Profit</th>
<th>(a) With Direct Support</th>
<th>(b) Without Direct Support</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FT+</td>
<td>WTO+</td>
</tr>
<tr>
<td>Top (Q1)</td>
<td>£114,857</td>
<td>£2,091</td>
<td>£13,930</td>
</tr>
<tr>
<td>2(^{nd}) (Q2)</td>
<td>£49,093</td>
<td>£385</td>
<td>£12,181</td>
</tr>
<tr>
<td>3(^{rd}) (Q3)</td>
<td>£16,770</td>
<td>£219</td>
<td>£1,603</td>
</tr>
<tr>
<td>Bottom (Q4)</td>
<td>-£28,980</td>
<td>£714</td>
<td>-£3,440</td>
</tr>
<tr>
<td>All Farms</td>
<td>£37,216</td>
<td>£841</td>
<td>£5,995</td>
</tr>
</tbody>
</table>

Table 4: Characteristics of LFA Sheep and LFA mixed cattle and sheep farms farm net profit in different quarters under post-Brexit scenarios compared to the baseline scenario

10 For example: [https://www.ft.com/content/1301d1be-b995-11e7-8c12-5661783e5589](https://www.ft.com/content/1301d1be-b995-11e7-8c12-5661783e5589) and [http://www.thescottishfarmer.co.uk/news/15665583.Say_goodbye_to_sheep/](http://www.thescottishfarmer.co.uk/news/15665583.Say_goodbye_to_sheep/)

11 Statistical significance in difference of means at 1% level (**) and 5% level (*)
and into beef under the WTO scenario where beef prices are expected to be significantly higher. Under LT scenarios these LFA beef and sheep farms are particularly exposed, particularly if there is a reduction or removal of direct support.

ScotFarm predicts that there will be a large decrease in ewe numbers under both the WTO and LT trade scenarios (with and without support) on farms across all quartiles. The ewe flocks of these farms are estimated to shrink by 50% to 56% under the WTO scenario and by 20% under the LT scenario. The difference between the WTO and LT predicted changes in ewe numbers reflects the relative profitability of cattle under the WTO scenario, where Scottish lamb exports to the EU are disadvantaged and the protected UK beef market (tariffs on imports) results in a more attractive beef sector.

Examining the specialist sheep farms in isolation, farm profitability is often marginal. Figure 12 shows over half of these hill sheep producers are predicted to make losses in 2022. Under the scenario of the UK undertaking unilateral trade liberalisation the proportion of sheep farms making losses in 2022 is expected to rise to 70% if direct support remains and 89% if direct support is removed. This highlights how the viability of Scotland’s hill sheep farms post Brexit will be heavily reliant on ensuring tariff free access to the EU sheep-meat market and the maintenance of support payments.

Table 5: Percentage change in sheep herd under post-Brexit trade scenarios compared to the baseline scenario

<table>
<thead>
<tr>
<th>Average of:</th>
<th>With direct support</th>
<th>Without direct support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>FT+ 0%  WTO+ -70%  LT+ -24%</td>
<td>FT- 0%  WTO- -65%  LT- -24%</td>
</tr>
<tr>
<td>Q2</td>
<td>FT+ 0%  WTO+ -64%  LT+ -29%</td>
<td>FT- 0%  WTO- -59%  LT- -29%</td>
</tr>
<tr>
<td>Q3</td>
<td>FT+ -1%  WTO+ -42%  LT+ -13%</td>
<td>FT- 0%  WTO- -38%  LT- -13%</td>
</tr>
<tr>
<td>Q4</td>
<td>FT+ -2%  WTO+ -28%  LT+ -8%</td>
<td>FT- -2%  WTO- -21%  LT- -7%</td>
</tr>
<tr>
<td>All farms</td>
<td>FT+ -1%  WTO+ -56%  LT+ -20%</td>
<td>FT- 0%  WTO- -50%  LT- -20%</td>
</tr>
</tbody>
</table>

Figure 12: Estimated 2022 net profit for LFA specialist sheep farms and average changes under the baseline scenario and three trade agreement scenarios
Crops
ScotFarm used data from 151 FBS (2015) specialist cereals and general cropping farms. The net profitability of the individual crop farms under the baseline scenario, and the three trade scenarios with direct support payments is presented in Figure 13. The majority of the farms are predicted to be profitable in 2022 with only 18% estimated to return losses under the baseline scenario. FAPRI estimate that there will only be small reductions in prices (3% lower compared to the baseline) under each of the trade scenarios. Therefore, this only leads to a slight deterioration in the net profitability of farms under all three trade scenarios. Under the unilateral trade liberalisation (LT) scenario the amount of crop farms predicted to make losses increases to 27%.

![Figure 13: Estimated 2022 net profit of crop farms under the baseline and three post-Brexit trade scenarios (FT = Free Trade; WTO = World Trade Organisation and LT = Liberalisation Trade) with direct support](image13)

The removal of direct support payments has a more pronounced negative effect on crop farms' net profitability than the trade scenarios alone (Figure 14) but for most farms it means lower profits (from which drawings and family labour have to be paid) rather than losses (with 8% more farms making losses under FT- and WTO- scenarios).

![Figure 14: Estimated 2022 net profit of crop farms under the baseline and three post-Brexit trade scenarios (FT = Free Trade; WTO = World Trade Organisation and LT = Liberalisation Trade) without direct support](image14)
The summarised impacts of the post-Brexit trade and policy scenarios are shown by baseline performance quartiles in Figure 15. It shows how the changes to profitability in 2022 is expected to be marginal when direct support is maintained. However, more significant pressures on net profit are expected if direct support is removed (and this is heavily related to scale of existing payments).

<table>
<thead>
<tr>
<th>Baseline Profit Quartile</th>
<th>Average Baseline Net Profit (a) With Direct Support (b) Without Direct Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top (Q1)</td>
<td>£78,175</td>
</tr>
<tr>
<td>2nd (Q2)</td>
<td>£31,088</td>
</tr>
<tr>
<td>3rd (Q3)</td>
<td>£13,789</td>
</tr>
<tr>
<td>Bottom (Q4)</td>
<td>-£31,505</td>
</tr>
<tr>
<td>All Farms</td>
<td>£22,825</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario Results - Average Change in Net Profit from Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) With Direct Support</td>
</tr>
<tr>
<td>FT+</td>
</tr>
<tr>
<td>WTO+</td>
</tr>
<tr>
<td>LT+</td>
</tr>
<tr>
<td>(b) Without Direct Support</td>
</tr>
<tr>
<td>FT-</td>
</tr>
<tr>
<td>WTO-</td>
</tr>
<tr>
<td>LT-</td>
</tr>
</tbody>
</table>

Table 6: Characteristics of crop farms in quartiles based on the baseline farm net profit (no statistically significant differences)

Assessment of the physical characteristics of the farms in the top and bottom baseline performance quartiles found no statistically significant differences in the means (see Table 6). This suggests that the performance differences are due to management practices between farms, and they are in receipt of marginally higher support payments, have more hectares and also use slightly more family labour.
Conclusions

- This report uses SRUC’s ScotFarm model to present an individual farm-level analysis of the expected impacts of AFBI’s three post-Brexit trade scenarios, along with two agricultural support scenarios on four major farming systems in Scotland.
- The trade scenarios used in this study are some of the potential trade arrangements that could be expected for Scottish agricultural sector post-Brexit.
- It is important to emphasise that the farming system analysis presented in this report only offers projections of potential impacts under different possible future post-Brexit arrangements.
- Under the examined trade scenarios, dairy farms are expected to benefit under a ‘World Trade Organisation’ default scenario (where tariffs offer enhanced UK protection from imports) due to favourable price projections - but are expected to see a small decrease in farm net profitability if the UK market is unilaterally liberalised.
- The majority of dairy farms are resilient as only a small number of farms are predicted to make losses when direct support payments are removed.
- Scottish arable farms are least affected under all three post-Brexit scenarios since the predictions of price changes for crops are the smallest under all three AFBI trade scenarios compared to other agricultural commodities.
- Arable farms show a high degree of Brexit resilience as only a small number of farms are expected to move from making profits to being loss-making under the trade scenarios, even when direct support is removed.
- Specialist beef and LFA mixed livestock farms are predicted to experience substantial financial pressure under Brexit, especially if the UK market is unilaterally liberalised.
- LFA specialist sheep farms are particularly vulnerable to trade scenarios where exports face tariffs or imports face no tariffs, particularly where direct support is removed. In the extreme scenario some 89% of the specialist sheep farms are expected to return losses in 2022.
- ScotFarm predicts a reduction in beef and sheep production under both ‘World Trade Agreement’ and ‘Unilateral Trade Liberalisation’. The model predicts that the national beef herd could shrink by up to 28% and the sheep flock by 56% depending on the trade and policy scenario.


For further details please contact:
Dr Shailesh Shrestha
☎: +44(0)131 535 4099
📧: shailesh.shrestha@sruc.ac.uk
or
Steven Thomson
☎: +44(0)131 535 4192
📧: steven.thomson@sruc.ac.uk

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