

HORIZON

**Understanding Brexit: An impact assessment
for England farm types**

Summary

- We have modelled impacts of Farm Business Income and prices of two Brexit scenarios.
- Farm business income drops under both Brexit scenarios for nearly all of the farm and enterprise types covered.
- For most sectors the main driver of the fall is expected increase in labour costs. However, in the Less Favoured Area (LFA) and lowland beef and sheep farms falls in production returns (from cattle and sheep sales) are much more substantial.
- Most sectors fare significantly better under a UK-EU FTA scenario.
- In general terms trade impacts vary depending on whether the UK is a net importer or net exporter. Net importing sectors generally gain from rising prices, whereas net exporting sectors see falls.
- Under the WTO: UK tariffs scenario some net importing sectors (beef and pigs) also experience a price fall as the model expects cheaper world market product to make its way to the UK market.
- As with the original 2017 study there is substantial variability of results by farm size and performance levels. The high performing farms, in terms efficiency of converting inputs to outputs, remain profitable under both scenarios.

Background

- The decision to leave the EU is a game changer for farming and growing across the UK. Brexit has created uncertainty across the industry as businesses have sought to understand what changes there will be to regulation and government policy around trade, migration and agricultural support. This piece of analysis is intended to quantify these changes and assess the overall impact by examining its likely effect on Farm Business Incomes, prices and outputs.
- At the time of writing it still is not clear whether the final Brexit outcome will involve a **deal** around future trade relationships with the EU or whether the UK will leave without this. As such, our analysis assesses both of these possible outcomes.
- AHDB has worked with Agribusiness Consulting to produce an impact assessment and quantitative analysis. This examines all six AHDB sectors as well as poultry.
- This work updates the 2017 Horizon report, *Brexit Scenarios an impact assessment*¹. The intention is to update and extend the original impact assessment work further by examining the impact of the 2018 Agricultural Bill and policy statement on agriculture in England. AHDB plans to work with the other UK levy boards, QMS and HCC, and the Scottish and Welsh Governments to produce an impact assessment for farm types in Wales and Scotland.

¹ahdb.org.uk/knowledge-library/brexit-scenarios-an-impact-assessment

AHDB's Brexit journey

Change is coming

- Raise awareness of change that will be driven by Brexit

What change means

- Help businesses understand the implications of change

Helping prepare

- Give businesses the capabilities and tools to prepare for change

- AHDB launched the Horizon series of reports in 2016 shortly after the EU referendum. These have explored a range of Brexit issues and aim to inform industry decision-making. Since the early reports content has evolved to focus on what change will mean for businesses and how AHDB can help those preparing for change.
- The results presented in this report focus on an average farm based on data from the Farm Business Survey. This should be considered as an indicator what Brexit means for your business. AHDB have produced an online Brexit impact calculator bic.ahdb.org.uk/ which can be used to produce a tailored analysis. The updated calculator will be available from 29 April.
- A range of other resources and tools on Brexit can be accessed here: ahdb.org.uk/brexit

Methodology (1)

- A detailed explanation of the methodology used in the study, the sources of data used and assumptions made can be found in the technical report published alongside this summary. The approach taken and results have been scrutinised by industry experts including members of AHDB's agricultural economics advisory group.
- In brief, Agribusiness Consulting used a gravity model to assess the impact of changes in tariffs and prices on trade. Like all models, this simplifies reality as some assumptions have to be made.
- The following inputs were used:
 - Domestic production (Defra data, 2013-2017 average)
 - Net trade (Defra data, 2013-2017 average)
 - Forecast prices in 2022 (EC, 2018-2030 medium-term outlook)
 - Existing and new tariff levels (UK government interactive database)

Methodology (2)

- A micro-economic policy model was developed for the project to enable on-farm impacts of changes in output prices, agricultural policy and input costs.
- This model is based on published Farm Business Survey data, averaged over three years to remove stochastic inter-seasonal variability. Data from 2017/18, 2016/17 and 2015/16 was used.
- Farms assessed in England:
 - Cereals
 - General cropping
 - Dairy
 - Pigs
 - Beef and sheep (lowland)
 - Beef and sheep LFA
 - Poultry
 - Potato enterprise
 - Carrot enterprise
- This model is based on historic data so results could be interpreted as describing what will happen if businesses do not respond and adjust to the changing environment. In reality we know that many business will adjust, through restructuring, changes in enterprise mix, diversification etc.

Scenarios assessed

UK-EU FTA

Policy: In England, direct payments reduced by £150 million; public good type payments increased by the same amount globally to leave overall support unchanged.

Labour: Seasonal non-UK labour: possible under an expanded SAWS-type scheme.
Permanent non-UK labour: restricted to 50% of current levels.

Trade: Free Trade Agreement with the EU:

- Trade facilitation costs for crops of 2%
- Trade facilitation costs for livestock products of 5%
- WTO rules for third countries

WTO: UK Tariffs

Policy: In England, direct payments reduced by £150 million; public good type payments increased by the same amount globally to leave overall support unchanged.

Labour: Seasonal non-UK labour: possible under an expanded SAWS-type scheme. Permanent non-UK labour: restricted to 50% of current levels.

Trade: Trade with the EU is on WTO terms:

- Trade facilitation costs for crops of 4%
- Trade facilitation costs for livestock of 8%
- UK tariff schedule covering agricultural imports for all countries

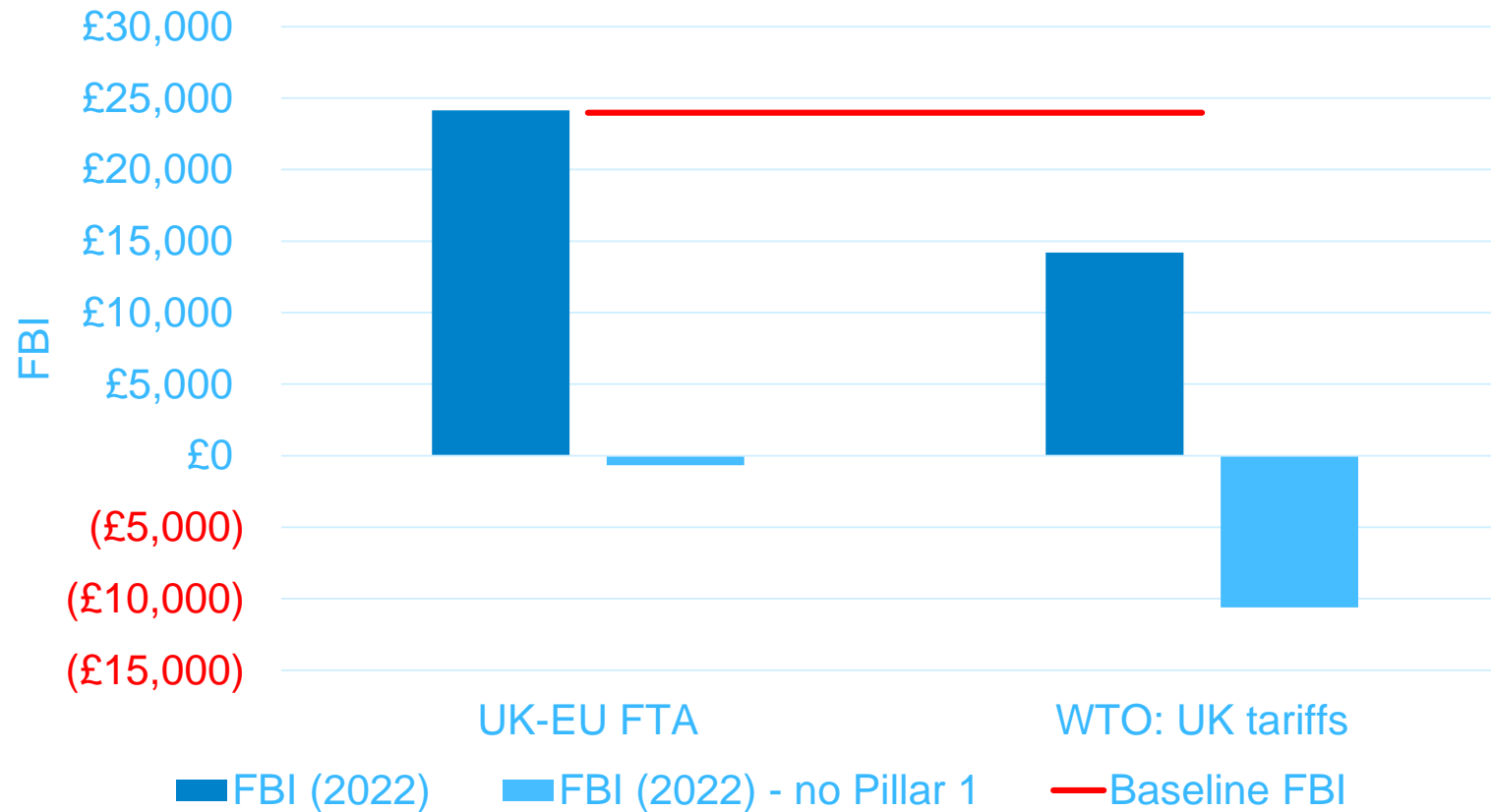
Farm level results

- The remainder of this report focuses on the impacts on farm. Results are presented for each of the farm and enterprise types assessed.
- There are two graphs and a table for each:
 1. Farm Business Income (FBI) 2022 under each scenario, also showing impact of total removal of direct payments, here we assume there is no further recycling of government funds into public good schemes after 2022.
 2. Breakdown of the components of FBI showing movements in production revenue, direct payments, fixed and variable costs.
 3. Breakdown of FBI by farm size and performance level where data permit. Performance level is measured in terms of the ratio between inputs and outputs, with high performers representing the top 25% and low performers the bottom 25%.

Less Favoured Area (LFA) Beef and Sheep

in England

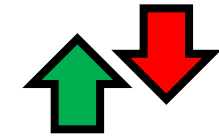
LFA Beef and Sheep: Farm Business Income (2022)









LFA Beef and Sheep

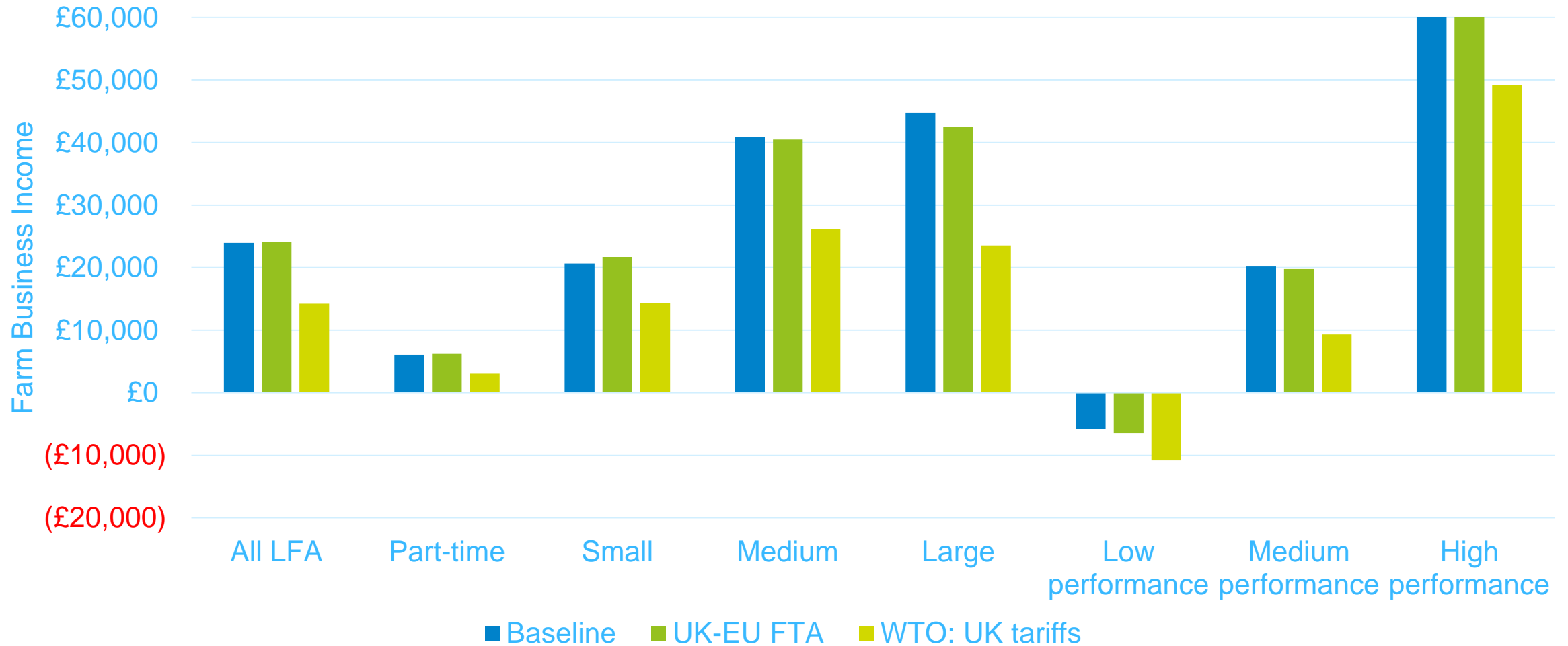
components of change on average farm 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (cattle and sheep sales)	-£520	-£10,548  
Direct payments	-£1,306	-£1,306
Public good payments	+£5,734 	+£5,734 
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£749	+£654
Fixed Costs (e.g. Labour, machinery)	+£2,997 	+£2,997 

LFA Beef and Sheep: Farm Business Income (2022)



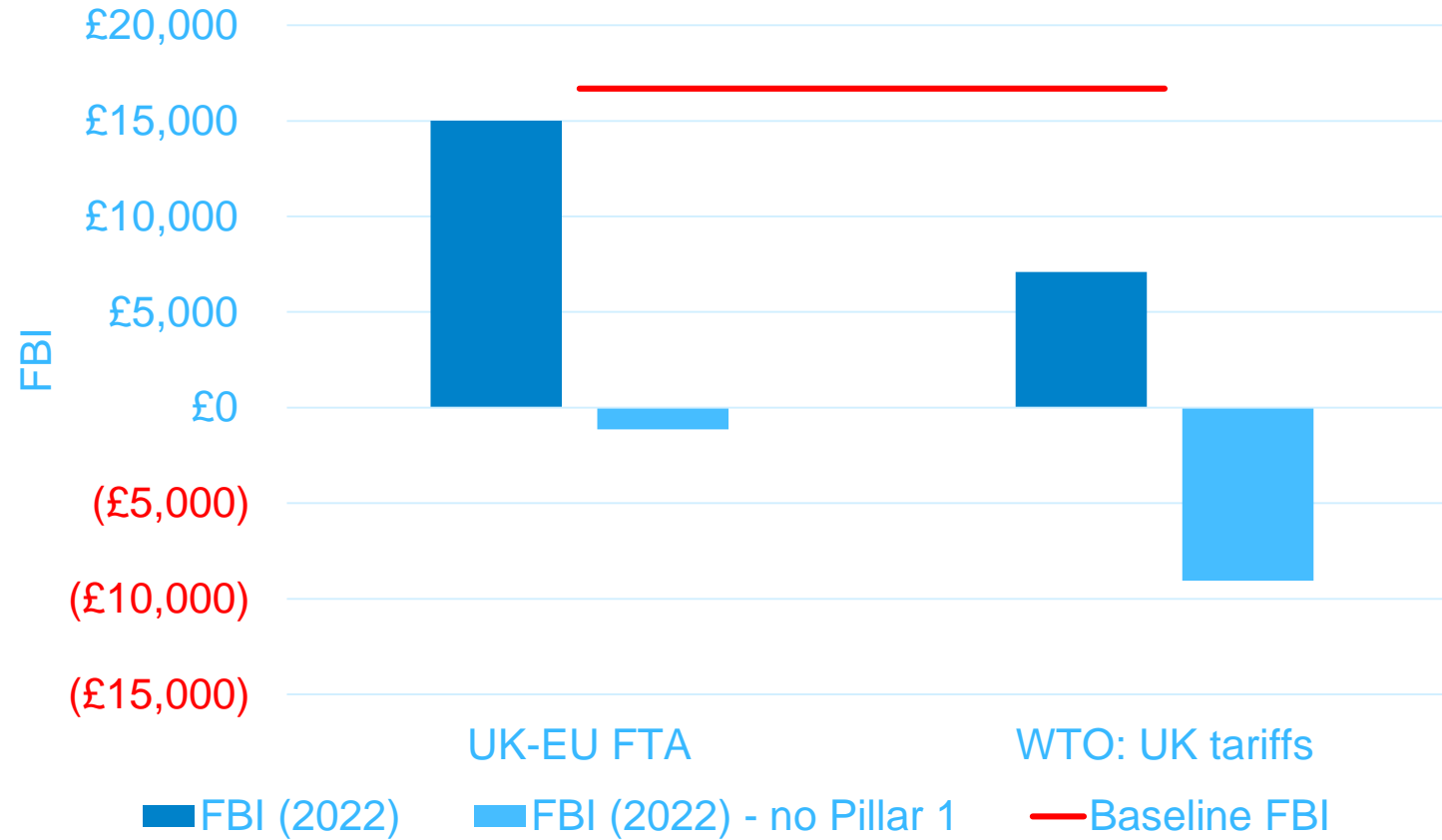
LFA Beef and Sheep – key findings

- Farm business income for LFA beef and sheep remains at a similar level under UK-EU FTA but fall significantly by £9,771 in the WTO: UK tariffs scenario.
- The main drivers for this change are:
 - A decline in production output (mainly sales from sheep and cattle) of £10,548 in the WTO-tariff schedule scenario
 - An increase in agri-environmental/public good payments (of £5,734), partially offset by a reduction in direct payments (of £1,308)
- In terms of trade the UK is a net importer of beef. Under UK-EU FTA there is a modest increase in production returns from beef caused by increased trade friction on imports. Under WTO: UK tariffs there is a new 0% TRQ for 230,000 tonnes of imports and the tariffs are lower than they are within the EU. As there is a big differential between world and UK prices the model expects cheaper world beef to flow to the UK pushing down prices even with the expected trade friction costs.
- For lamb, imports from New Zealand are expected to continue as they are within a protected WTO TRQ. In terms of EU trade the UK is a big net exporter of lamb. The model expects lamb production revenues to fall under WTO: UK tariffs as the model expects supplies on the domestic market to increase as our exports to the EU become less/un competitive due to tariffs and trade friction.
- Direct payments (Pillar 1) are significant in underpinning farm business income for this sector. If these payments are taken out the average farm business income would be negative in both scenarios.

Lowland Beef and Sheep

in England

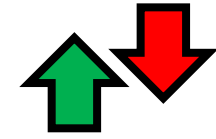
Lowland Beef and Sheep: Farm Business Income (2022)









Lowland Beef and Sheep

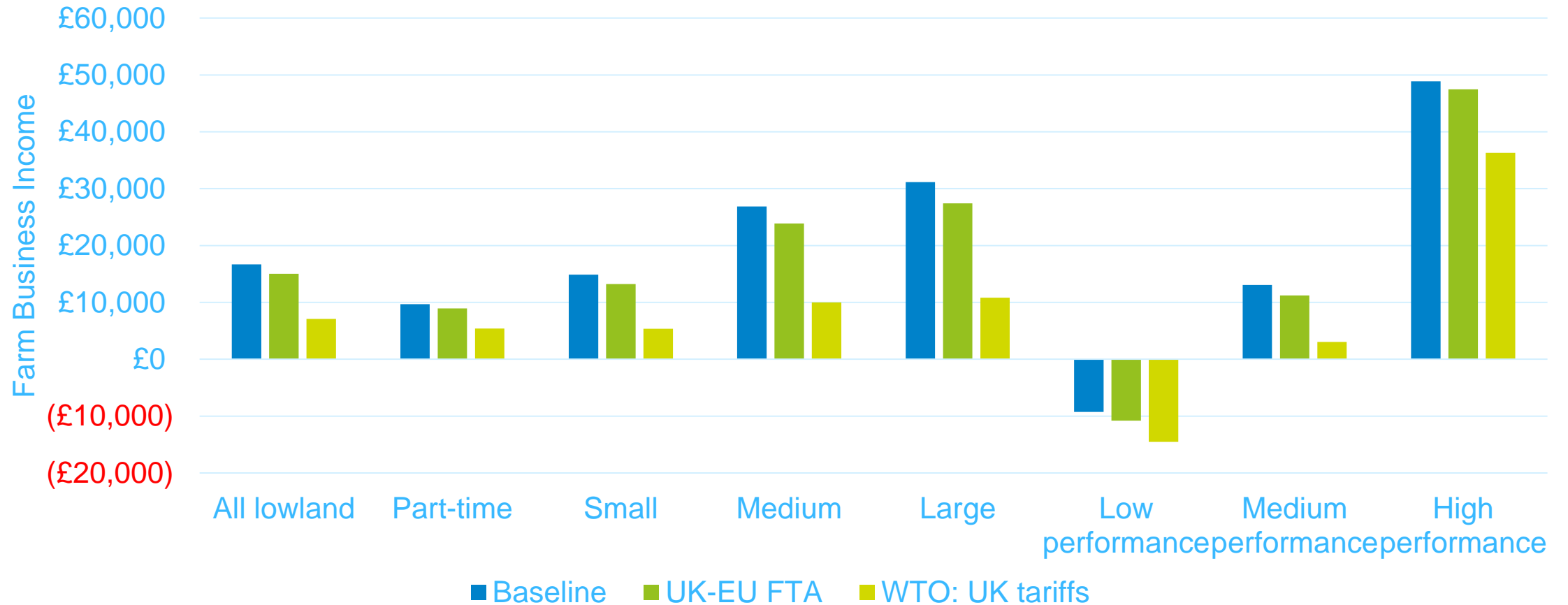
components of change on average farm 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (cattle and sheep sales)	+£907	-£7,044  
Direct payments	-£851	-£851
Public good payments	+£1,855 	+£1,855 
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£1,035	+£999
Fixed Costs (e.g. Labour, machinery)	+£2,545 	+£2,545 

Lowland Beef and Sheep: Farm Business Income (2022)



Lowland Beef and Sheep – key findings

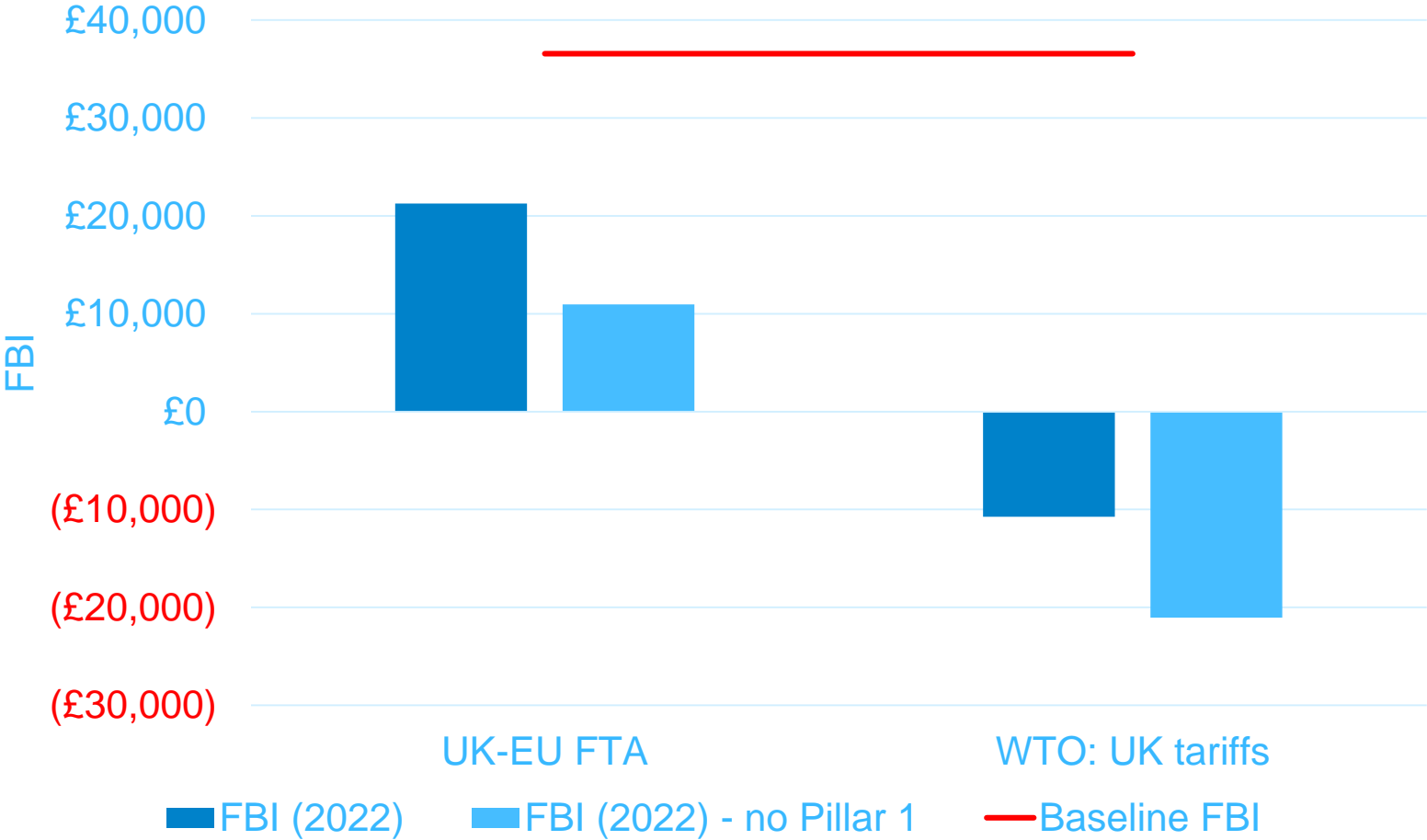
- Farm business income for lowland beef and sheep remains at a similar level under UK-EU FTA but fall significantly to £7,100 in the WTO: UK tariffs scenario.
- The main drivers for this change are:
 - A decline in production output (mainly sales from sheep and cattle) of £7,044 in the WTO-tariff schedule scenario
 - An increase agri-environmental/public good payments (of £1,855), partially offset by a reduction in direct payments (of £851)
- In terms of trade the UK is a net importer of beef. Under UK-EU FTA there is a modest increase in production returns from beef caused by increased trade friction on imports. Under WTO: UK tariffs there is a new 0% TRQ for 230,000 tonnes of imports and the tariffs are lower than they are within the EU. As there is a big differential between world and UK prices the model expects cheaper world beef to flow to the UK pushing down prices even with the expected trade friction costs.
- For lamb, imports from New Zealand are expected to continue as they are within a protected WTO TRQ. In terms of EU trade the UK is a big net exporter of lamb. The model expects lamb production revenues to fall under WTO: UK tariffs as the model expects supplies on the domestic market to increase as our exports to the EU become less/un competitive due to tariffs and trade friction.
- Direct payments are significant in underpinning farm business income for this sector. If these payments are taken out the average farm business income would be negative in both scenarios.

Pigs

in England



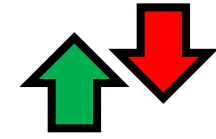
Pigs: Farm Business Income (2022)



Pigs

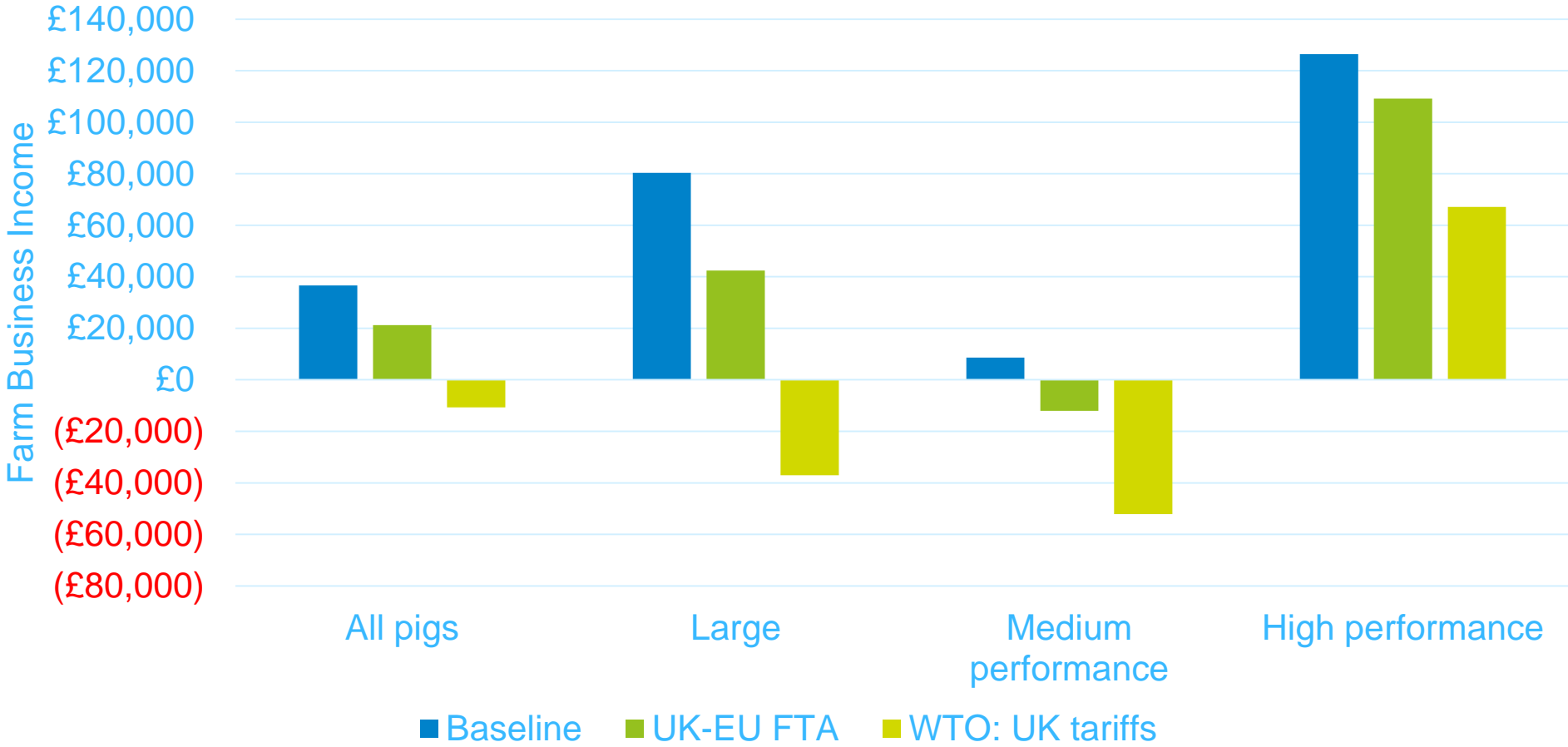
components of change on average farm 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (clean pig and sow sales)	+£14,157	-£20,712
Direct payments	-£543	-£543
Public good payments	+£993	+£993
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£3,681	+£826
Fixed Costs (e.g. Labour, machinery)	+£26,230	+£26,230

Pigs: Farm Business Income (2022)



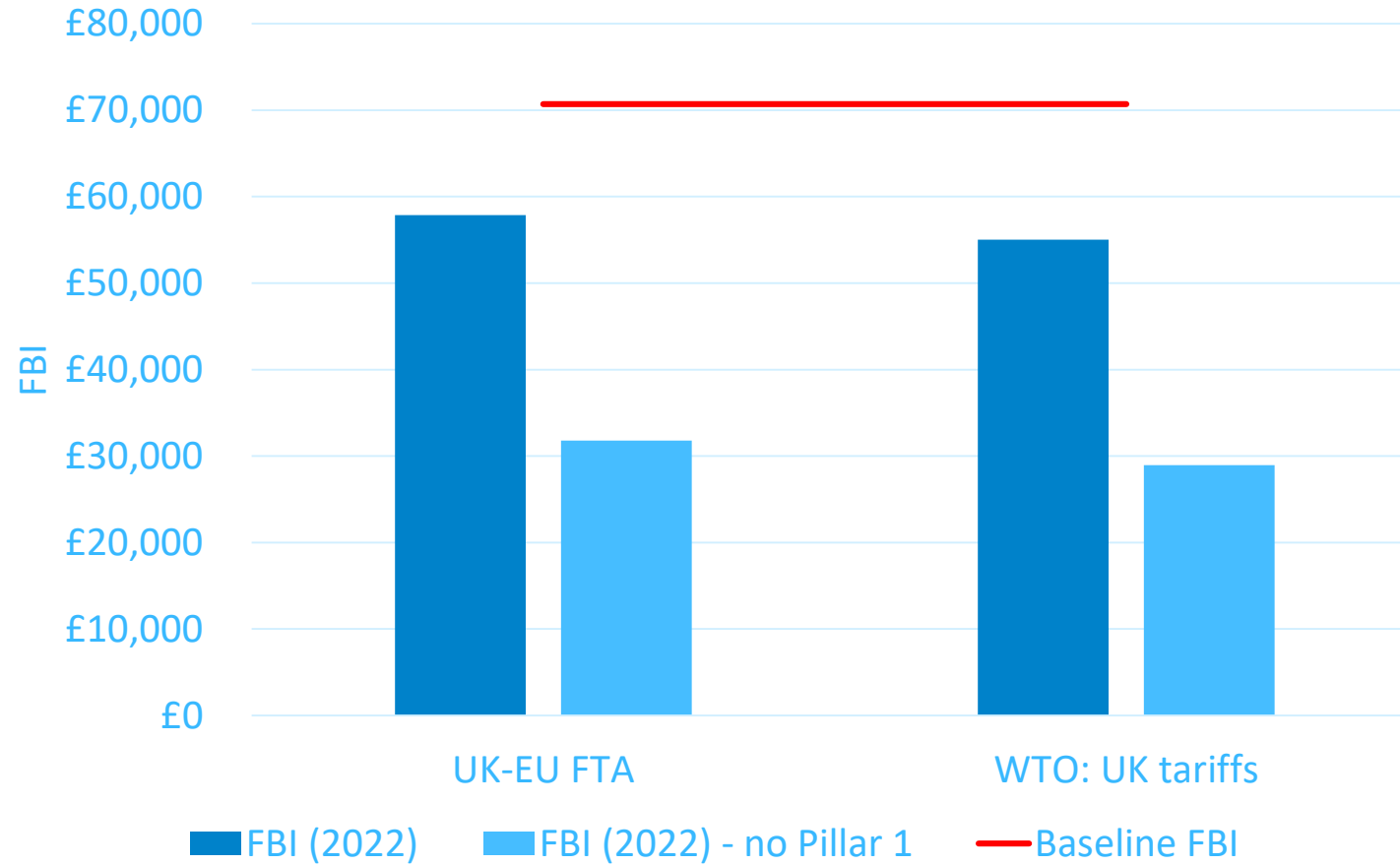
Pigs – key findings

- Farm business income for pig farms drops under UK-EU FTA to £21,273. The average farm becomes loss making with a -£10,741 FBI under the WTO: UK tariffs scenario.
- The main drivers for this change are:
 - An increase in labour costs (of £26,057)
 - In WTO: UK tariffs a reduction in production returns (of £20,712)
- In terms of trade the UK is a net importer of pig meat products. Under UK-EU FTA there is a modest increase in production returns caused by increased trade friction on imports. Under WTO: UK tariffs scenario tariffs are lower than they are within the EU but affect EU supplies coming into the UK market. This might be expected to cause prices to rise. However, the model expects prices to fall as there is a big differential between world and UK prices, and cheaper world suppliers are expected to flow to the UK pushing down prices even with the expected increase in trade friction costs.
- Direct payments are less significant on pig farms. The average pig farm used within this study is based on FBS data and will not be typical of many commercial units. When direct payments are taken out there are drops in FBI, but these direct payments largely apply to arable and other agricultural enterprise on the average pig farm within the model, rather than the pig enterprise itself.

Dairy

in England

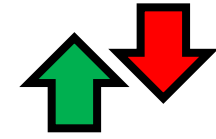
Dairy: Farm Business Income (2022)



Dairy

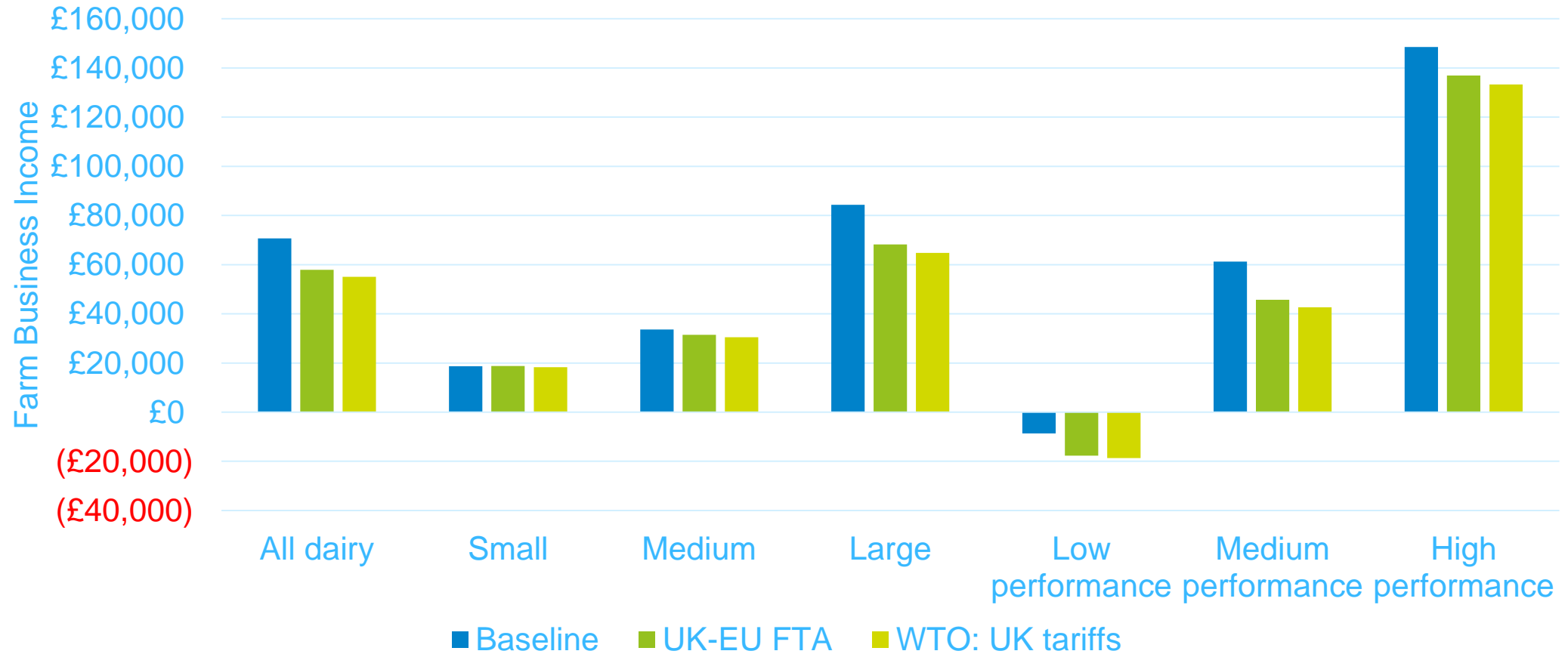
components of change on average farm 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (milk and cattle sales)	+£12,963	+£8,740
Direct payments	-£1,373	-£1,373
Public good payments	+£1,609	+£1,609
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£5,244	+£3,839
Fixed Costs (e.g. Labour, machinery)	+£20,790	+£20,790

Dairy: Farm Business Income (2022)



Dairy farms – key findings

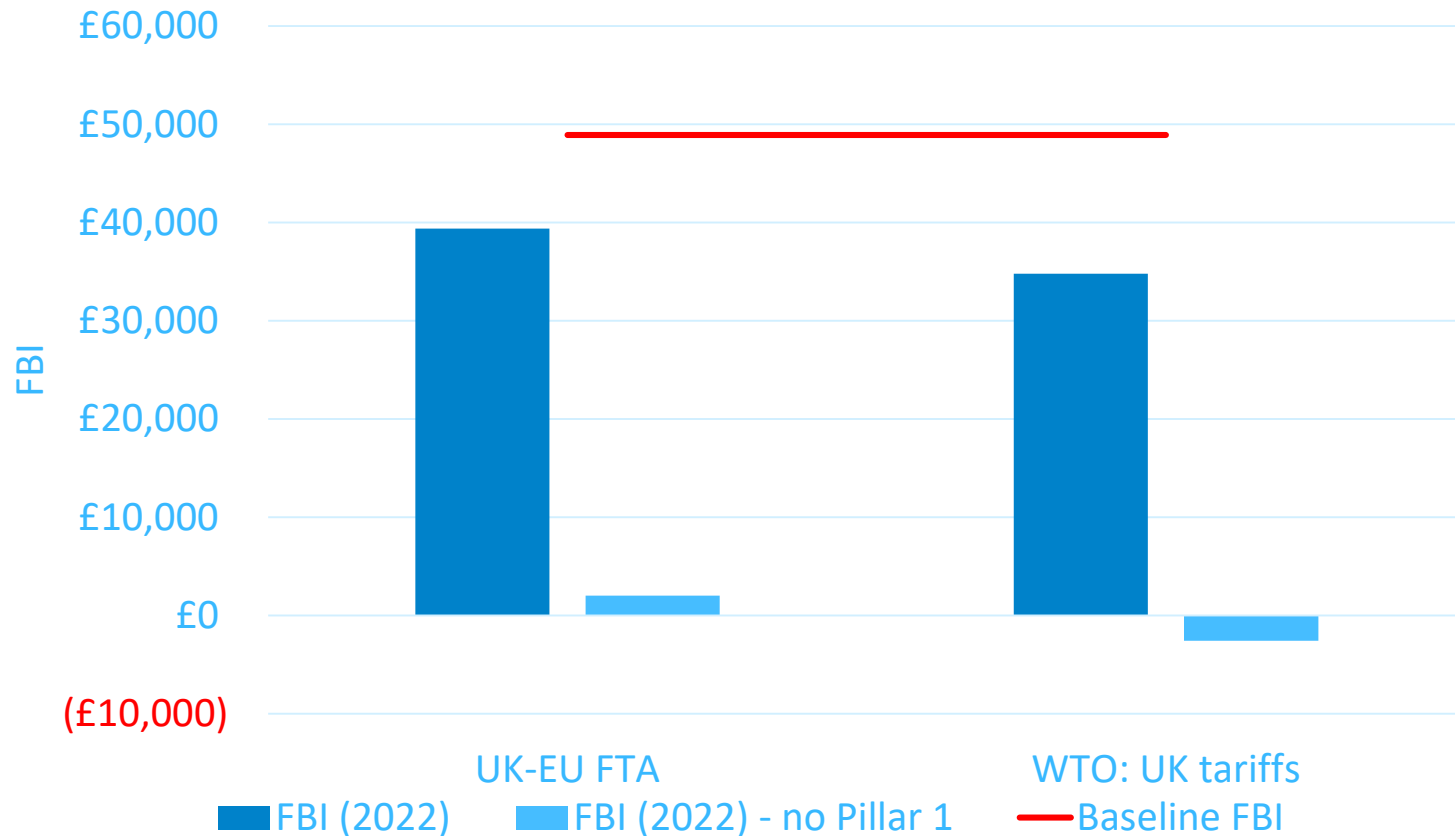
- Farm business incomes fall for dairy farms under both scenarios. Under UK-EU FTA they drop to £57,860 and under WTO: UK tariffs the fall is larger, to £55,042.
- The main drivers for this change are:
 - An increase in labour costs (of £20,582)
 - An increase of production returns (mainly from milk and cattle sales) of £12,963 under UK-EU FTA and £8,740 in WTO: UK tariffs
- In terms of trade, the UK is a net importer of dairy, notably for cheese and butter products. The model shows increased production revenues for these farms as the differential between UK and world prices is less than the expected increase in trade friction costs. This causes the costs of imports to rise, benefiting domestic producers.
- It is important to note that these results are for 2022, after the market has settled. This study has not attempted to assess short-term disruption and adjustments. It is possible that price movements for some dairy products could be negative in the short-term in a WTO: UK tariff scenario. For instance, UK processors hold stocks of cheddar intended for export to the EU. These stocks would have to find alternative markets if exposed to EU tariffs, and could increase domestic supplies in the short term which would provide downward price pressure.
- Direct payments are less significant as a proportion of FBI than most of the farm types assessed.

Cereals farms

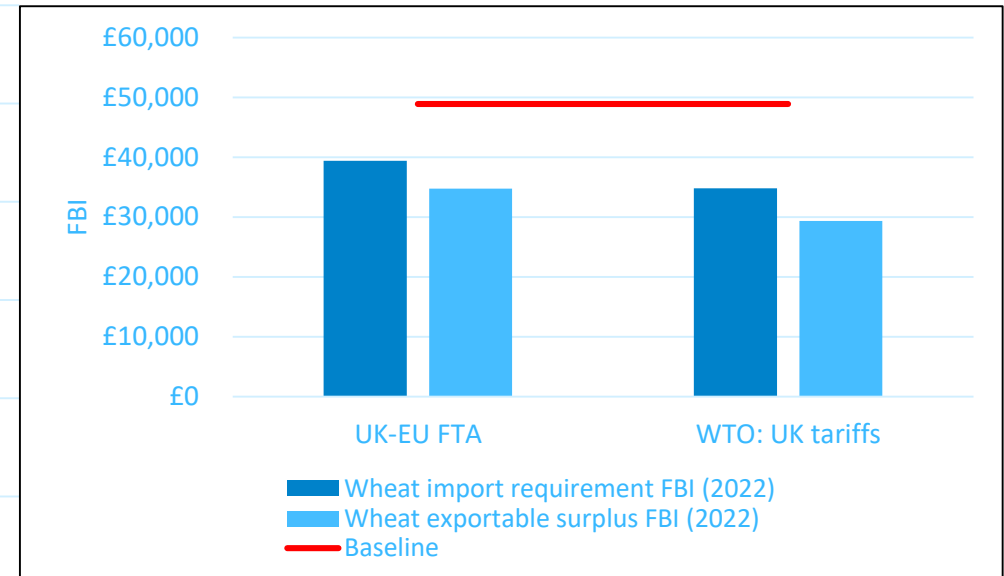
in England



Cereals: Farm Business Income (2022)



Sensitivity analysis – impact of UK having an exportable wheat surplus

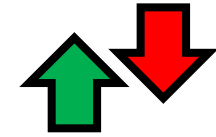


These results are based on the methodology outlined earlier, and as such reflect a position where the UK is a net importer of wheat. Within the cereals sector this situation can change from season to season. It is possible 2022 may be a net exporting season, as such a set of alternative results have been included where wheat production is increased by 1 m tonnes, as a sensitivity analysis. Under this situation domestic wheat prices would be expected to fall 3.2% in WTO: UK tariffs.

Cereals

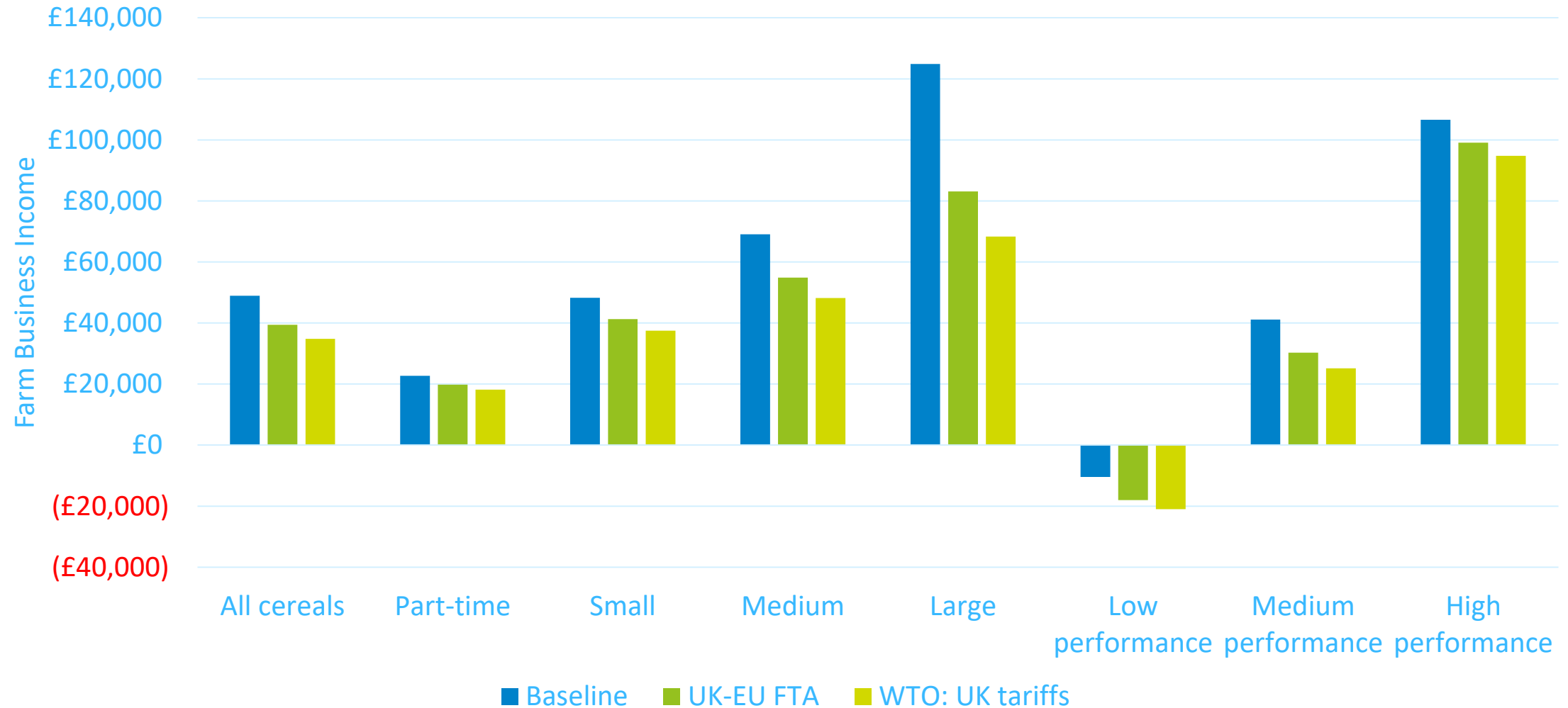
components of change on average farm 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (crop sales)	+£953	-£2,601
Direct payments	-£2,485	-£2,485
Public good payments	+£2,405	+£2,405
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£2,705	+£3,748
Fixed Costs (e.g. Labour, machinery)	+£7,676	+£7,676

Cereals: Farm Business Income (2022)



Cereals farms – key findings

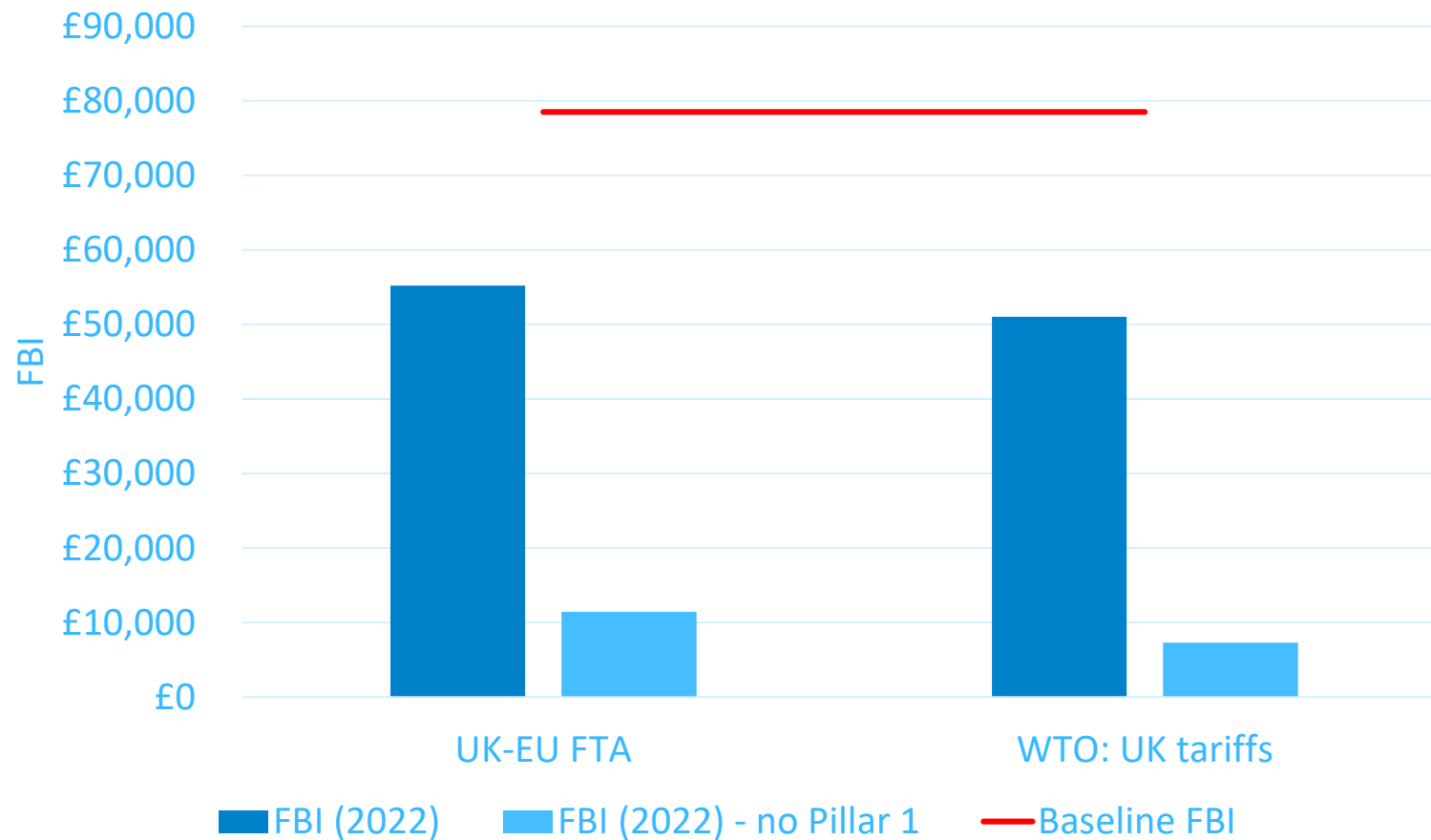


- Farm business incomes fall for cereals farms under both scenarios. Under UK-EU FTA they drop to £39,393 and WTO- UK tariffs the fall is larger, to £34,797.
- The main drivers for this change are:
 - An increase in labour costs (of £7,354), contractor and fertiliser costs.
 - A reduction in direct payments (of £2,485)
 - In the WTO-tariff schedule a decline in returns from barley, where the UK is a net exporter and experiences tariffs and trade friction on these exports.
- In terms of trade the UK has been a net importer for wheat (but not barley) in recent years. Due to this the model predicts a small rise in revenues from production. This is driven by the rise in wheat prices created by increased trade friction on imports. However, it is important to note that these results are based on UK being a net importer. This situation can change on a season by season basis depending on the level of UK production. Results have also been included based on a situation where the UK has an exportable surplus of wheat.
- Direct payments play an important role in underpinning farm business income for this sector. If these payments are taken out incomes would be negative in the WTO: UK tariffs scenario and close to £0 in UK-EU FTA.

General cropping

in England

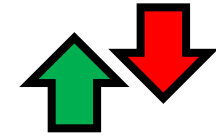
General cropping: Farm Business Income (2022)





General cropping

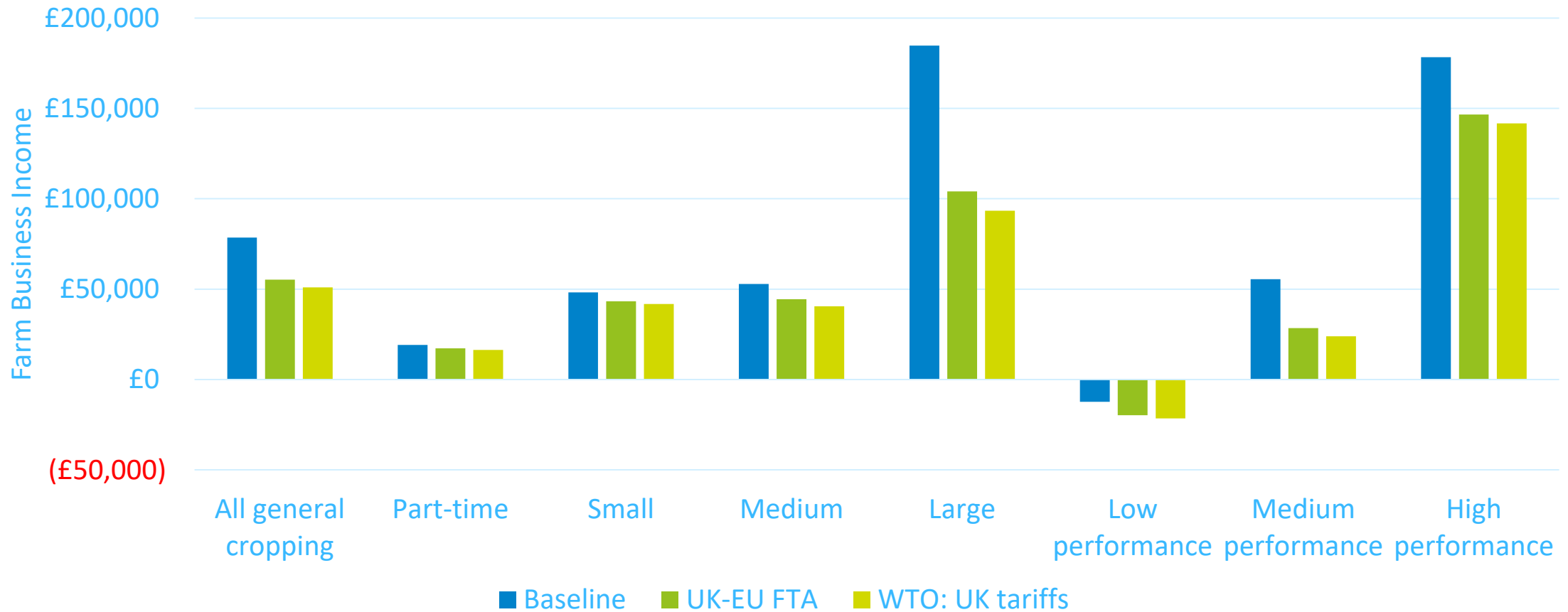
components of change on average farm 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (crop sales)	£2,786	-£173
Direct payments	-£3,194	-£3,194
Public good payments	+£4,006	+£4,006
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£4,389	+£5,600
Fixed Costs (e.g. Labour, machinery)	+£22,487 	+£22,487 

General cropping: Farm Business Income (2022)



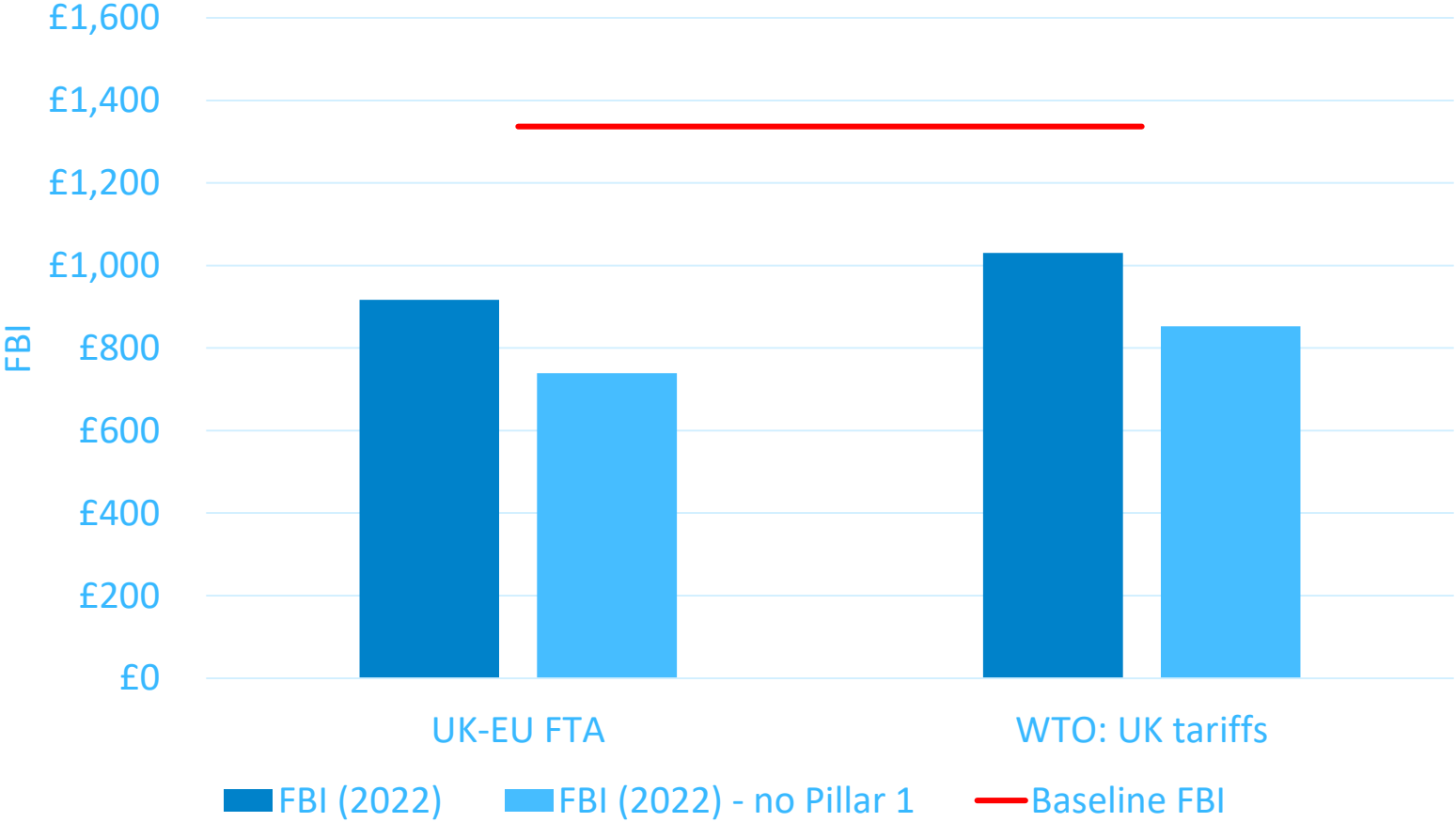
General cropping farms – key findings

- Farm business incomes fall for general cropping farms under both scenarios. Under UK-EU FTA they drop to £55,200 and WTO: UK tariffs the fall is larger, to £51,030.
- The main drivers for this change are:
 - An increase in labour costs (of £22,010). Labour costs make up a higher proportion of costs on general cropping farms, compared to cereal farms.
 - A reduction in direct payments (of £3,194)
- In terms of trade the UK has been a net importer for most of the outputs produced by these farms in recent years. Due to this the model expects a small rise in revenues from production. The main cause of this are trade friction costs impacting on imports. This is true even within the WTO: UK tariffs scenario where third countries are able to supply plant products into the UK with a 0% tariff. In many cases friction costs are greater than the differentials between UK and world prices meaning that some prices rise even with no tariffs.
- Direct payments play an important role in underpinning farm business income for this sector. If these payments are taken out incomes drop to only £7,282 in the WTO: UK tariffs and £11,452 in UK-EU FTA.

Potatoes

in England

Potato enterprise: Farm Business Income per ha (2022)



Potatoes

components of change on model enterprise 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (potato sales)	£127	£254
Direct payments	-£18	-£18
Public good payments	£17	£17
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£3	+£17
Fixed Costs (e.g. Labour, machinery)	+£542	+£542

Potato enterprise – key findings

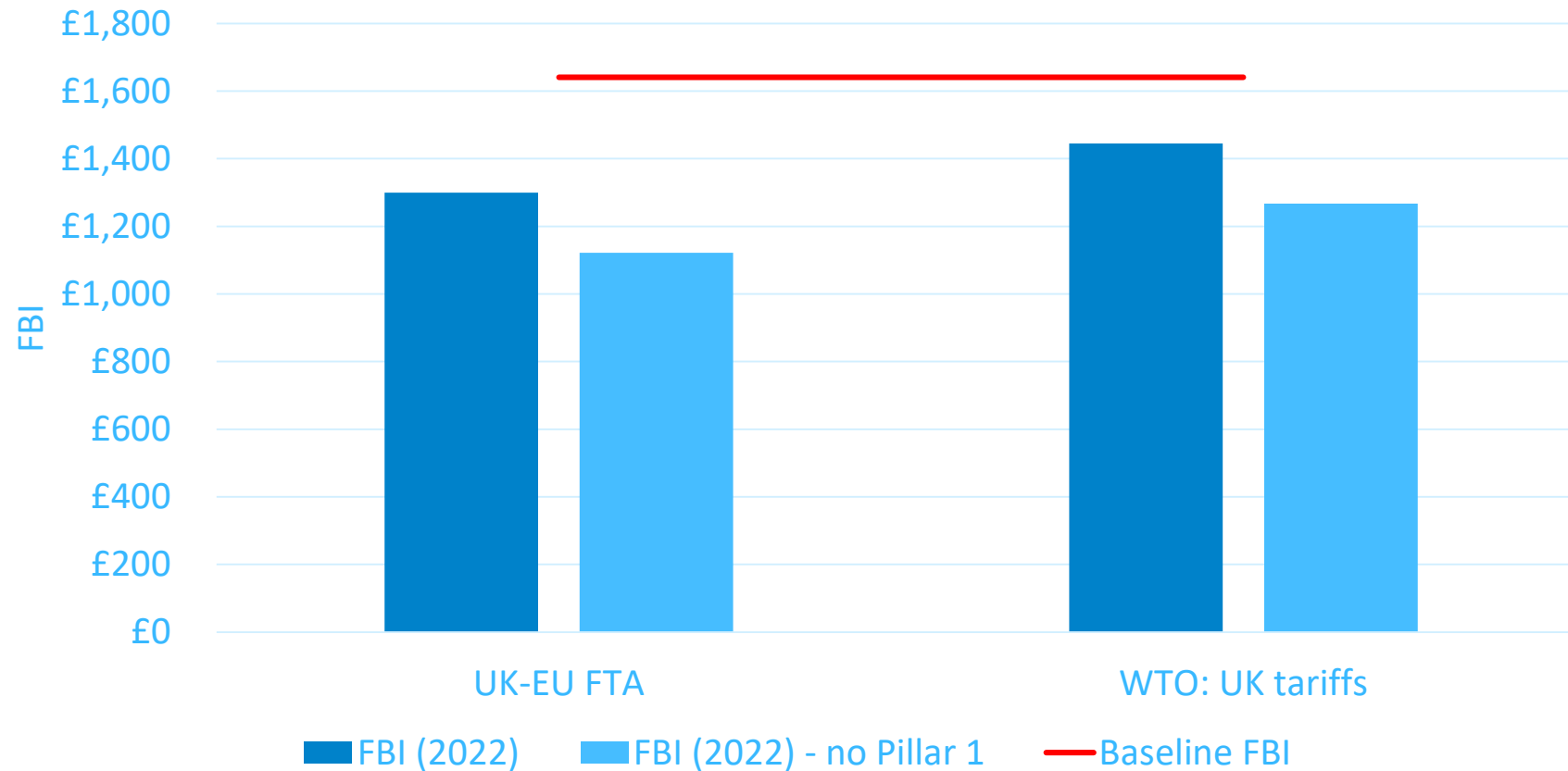
- Farm business income falls for potato enterprises under both scenarios. Under UK-EU FTA they drop to £917 per ha and WTO: UK tariffs the fall is less, to £1,030 per ha.
- The main drivers for this change are:
 - A increase in labour costs (of £542 per ha). Labour costs make up a higher proportion of costs than on arable farms assessed in this study.
 - A reduction in direct payments (of £18 per ha)
- In terms of trade, the UK is a net importer (notably for processed potato products) and production revenues rise due to rising potato prices in both scenarios. This is caused by trade friction on imports, with a 0% tariff under the WTO: UK tariffs scenario.
- These enterprises are much less dependent on direct support than the other arable farms assessed, although FBI drops further if this support is removed.

Carrots

in England



Carrot enterprise: Farm Business Income per ha (2022)



Carrots

components of change on model enterprise 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (carrot sales)	+£148	£298
Direct payments	-£18	-£18
Public good payments	+£17	+£17
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	+£1	+£6
Fixed Costs (e.g. Labour, machinery)	+£486	+£486

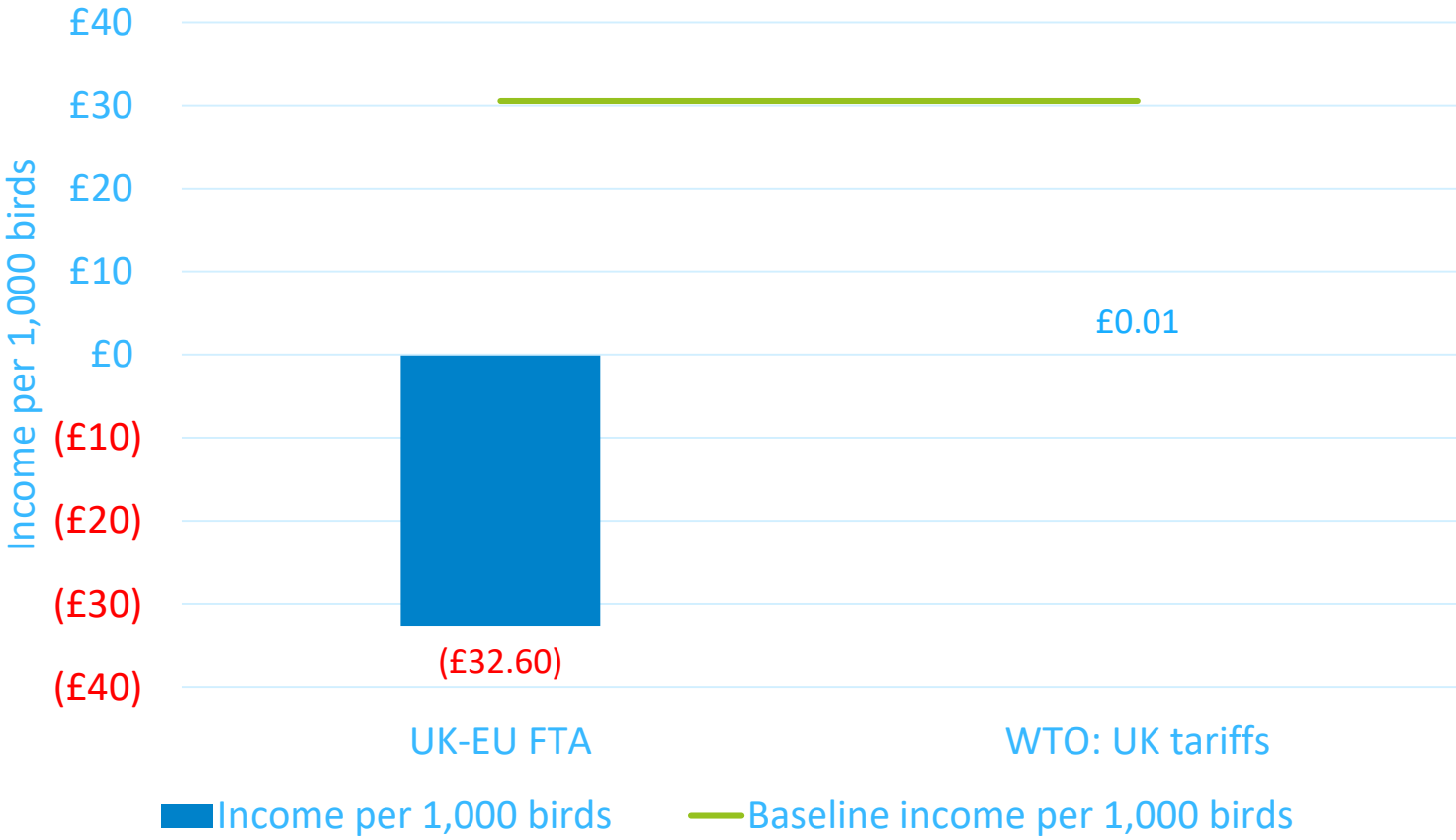
Carrot enterprise – key findings

- Farm business incomes fall for the carrot enterprise under both scenarios. Under UK-EU FTA they drop to £1,300 per ha and WTO: UK tariffs the fall is smaller, to £1,445 per ha.
- The main drivers for this change are:
 - An increase in labour costs (of £486 per ha). Labour costs make up a high proportion of costs compared to most other farm types assessed
 - An increase in production returns (from carrot sales) of £148 per ha in UK-EU FTA and £298 per ha in WTO: UK tariffs.
- In terms of trade, the UK is a net importer and production revenues rise due to rising carrot prices in both scenarios. This is caused by trade friction on imports, with a 0% tariff under the WTO: UK tariffs scenario.
- These enterprises are much less dependent on direct support than the most farms assessed, although FBI drops further if this support is removed.

Poultry

in England

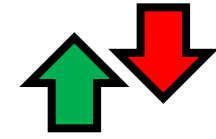
Poultry enterprise: Farm Business Income per 1,000 birds (2022)



Poultry

components of change for 1,000 birds on model enterprise 2022

notable increase/decrease



	UK-EU FTA	WTO: UK tariffs
INCOME:		
Production revenue (bird sales)	£8	£40
COSTS:		
Variable Costs (e.g. Feed, fertiliser, plant protection)	-£11	-£10
Fixed Costs (e.g. Labour, machinery)	-£60	-£60

Poultry enterprise – key findings

- Farm business incomes fall for the poultry enterprise under both scenarios. Under UK-EU FTA they drop to -£32.60 per 1,000 birds and under WTO: UK tariffs the fall is smaller, to 1p per 1,000 birds. The main drivers for this change are:
 - An increase in labour costs (of £60 per 1000 birds). This is exacerbated by increases in catching costs, which is another labour cost, and also by increases in cleaning costs which are around two-thirds labour.
 - An increase in production returns (from bird sales) of £8 per 1,000 birds under UK-EU FTA and £39 per 1,000 birds under WTO: UK tariffs.
- In terms of trade, the UK is a net importer and production revenues rise due to rising poultry prices in both scenarios. This is caused by trade friction on imports under both scenarios, and the imposition of tariffs for trade outside the 0% TRQ under the WTO: UK tariffs scenario. It should be noted that a constraint was added to the gravity model such that imports of fresh poultry could only come from the EU because the length of the supply chain precludes fresh imports from distant lower cost producers, such as Brazil and Thailand.

Price and production changes

Price changes on the domestic market (2022)

Changes to UK prices of commodities were estimated using the gravity model followed by validation by industry experts.

It should be borne in mind that this is a considerable simplification of reality. The economic logic underpinning the price changes for each commodity is discussed in the technical report.

	UK-EU FTA	WTO: Tariff Schedule
Wheat	+2.3%	+3.6%
Barley	-2.0%	-12.1%
Oats	+0.1%	-3.0%
Oilseed Rape	-2.0%	-4.0%
Potatoes	+1.8%	+3.6%
Carrots	+1.2%	+2.4%
Sugar beet	+0.8%	+1.1%
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%

Production changes on the domestic market (2025)

The gravity model used to determine price changes also estimates changes in domestic production. However, these are simplistic because the model examines one commodity at a time and so there is no account of cross effects between different commodities.

A further complication is that in many sectors we have attempted to address carcass and or market balancing issues which creates problems in trying to estimate production changes at the sector level.

As such a literature review of other modelling exercises has been used to assess the impacts of Brexit on agricultural production output. Results from the FAPRI model are shown here.

	FTA with the EU	WTO Default	Unilateral Trade Liberalisation
Beef	0%	+10%	-10%
Sheep	0%	-11%	-11%
Pigs	+1%	+22%	-6%
Poultry	0%	+11%	-3%
Milk	0%	+7%	-2%
Wheat	0%	-1%	-1%
Barley	0%	-1%	-2%

FAPRI analysis reported in Davis, *et al.* (2017)

FTA: UK retains tariff and quota free access to the EU

WTO default: EU MFN tariffs applied to UK imports and exports destined to the EU. No change in tariff structure for exports to the rest of the world

Unilateral liberalisation: Zero tariffs applied on imports to the UK from both the EU and the rest of the world

What does this mean for farm businesses?

- This report provides a framework for farmers to understand how Brexit might impact them.
- Change is coming whichever scenario, the question is how fast it will come. AHDB Brexit impact calculator is a tool farmers can use to understand how they might fare. The updated calculator will be available later this month <https://bic.ahdb.org.uk/>
- In the event of a deal, businesses in England need to use the time to prepare for the removal of direct payments.
- If there is no trade deal with the EU, accelerated restructuring of key sectors feels inevitable. Businesses will need help to make objective, rational decisions.
- Top performers remain resilient under any scenario. The key factors are within businesses own control – knowing your costs, knowing your market, having attention to detail and so on. Our Horizon report on the characteristics of top performing farms explores these ahdb.org.uk/knowledge-library/horizon-preparing-for-change-the-characteristics-of-top-performing-farms
- AHDB will support farmers and growers adapt and respond whichever outcome we see. A range of other resources and tools on Brexit can be accessed here: ahdb.org.uk/brexit

Authors

David Swales

Head of Strategic Insight, AHDB

david.swales@ahdb.org.uk

02476 478854

Dr Dylan Bradley

Informa Agribusiness Intelligence

Sarah Baker

Strategic Insight Manager, AHDB

sarah.baker@ahdb.org.uk

02476 478845

Professor Berkeley Hill

Informa Agribusiness Intelligence