

Agricultural Economics Society

Symposium on Brexit studies and their findings at farm level

INTRODUCTION

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Summary

More than twenty studies have been identified that are directly relevant to assessing the impact of Brexit on UK agriculture, almost all of which have appeared in the last two years. They differ in many respects, including: how many of the four major change elements (domestic policy, UK/EU trade arrangements, restrictions on migrant labour, and the regulatory burden) are considered and how they are specified; the data sources drawn upon and periods to which they relate; which UK countries are covered; the sophistication of the models used to assess changes in commodity prices; how the impacts at farm level are estimated (though some do not involve this stage and stop at aggregate level); the time horizon used, and so on. However, the three chosen for detailed presentation in this symposium share the following characteristics:

- they use closely-specified scenarios to explore the possible post-Brexit UK situations*
- they produce independent and original results, and*
- they assess the impacts at farm level, with a breakdown at least by farming types*

Presenters will focus on the scenarios employed and the results generated. There will be opportunity in discussions to compare and contrast the approaches and their results.

Context

This short introductory paper reviews what studies are available on the anticipated impact of Britain leaving the EU ('Brexit') on UK agriculture. Given that key elements that will determine post-Brexit UK agricultural policy remain uncertain, such exercises must be largely speculative. More than twenty studies have been identified, each of which contains some insights. From these, three have been chosen for detailed presentation.

The starting point of the symposium was a literature review carried out in 2017 as part of research by Bradley and Hill for the Agriculture and Horticulture Development Board (AHDB) that aimed to provide an independent assessment of the impacts of Brexit. This study was published in September 2017. The assessment was seen as a pre-requisite for the AHDB preparing its levy-paying farmers to respond to the changes in which they could find themselves if extremes of circumstances were encountered.

The many significant reports on the impact of Brexit on UK agriculture that have been produced by and for various organisations display a diversity of approaches and generate a range of results. Some literature covers leaving the EU at an economy level or from specific angles, such as the implications for food prices or migrant labour scenarios. However here, for an audience of agricultural economists, a more selective approach has been adopted which focuses on the impact on primary agriculture. A list of studies is given in the Annex to this paper, which also contains not only those from 2016 and 2017 but also several from earlier years that are of relevance and those that have appeared since the AHDB work was published. Among these publications are accounts of sessions held by Select Committees of the House of Commons and House of Lords dealing with Brexit (the House of Lords has a sub-committee devoted to Brexit and agriculture). Evidence given to these Parliamentary bodies often duplicates existing reports and studies, though the Committee system allows for a degree of scrutiny and follow-up of points of interest.

In terms of official work by Defra on the likely impact of Brexit on agriculture, Michael Gove (Secretary of State) was less than clear in his reply to questions from MPs in a Commons Committee session at the end of 2017 on what has been happening within his Department. However, from informal contacts Defra is known to have been interested in sector-level modelling of Brexit, and has partially funded a FAPRI project (together with the other agricultural departments in the UK) which was put in the public domain on 16 August 2017 (just before the research for the AHDB study was published). The FAPRI results form an input into the ESRC-funded project 'Brexit: How might UK agriculture survive or thrive' which is due to be completed in September 2018.

Alongside these studies and reports, academics, such as Alan Matthews and Alan Swinbank, have produced comment and analyses, often based on published results, and there are websites specialising in Brexit.

Diversity between studies

The twenty or so studies of Brexit and UK agriculture that have appeared in recent years differ in a number of ways:

Coverage of impact factors: In the studies, four main factors are seen to be at work. Not many studies deal with them all (though Bradley and Hill (2017) for the AHDB is one that does) and some focus on only one. These four are:

- The shape of ***possible domestic agricultural policy***, and in particular what may happen to the levels of Direct Payments (in particular, Basic Payments) once the UK has exited from the EU and its Common Agricultural Policy. This topic is complicated by the fact that the UK's devolved administrations may choose to apply different types of support post-Brexit, or to use different levels of the same support mechanism.
- The ***outcome of trade negotiations in the Brexit process that will impact on market prices received by UK farmers***, and which carry implications for trade with the rest of the world. These prices will also affect some of the costs farmers face and their volumes of output. There will be an impact on the net incomes of farm operators and their business viability.
- The ***availability and cost of migrant labour***, which can be expected to also affect the cost of UK labour.
- Any change in the ***regulatory burden*** on farmers as a result of leaving the EU, which can be expected to be felt in production costs (usually assumed to be a reduction from lightening regulations).

Detailed specification of impact factors: each of the impact factors is capable of alternative specification. For example,;

- The impact of trade relations on commodity prices received by farmers will reflect assumptions about tariff rates, world prices etc.. What proportion to be 'world prices' for a given time period differ between sources and even within the same source.
- Closely allied with trade is the exchange rate between the £ Sterling and other currencies, especially the Euro. Exchange rate changes can, and often do, overwhelm the relatively small cost differences (arising from comparative advantages and border taxes and trade facilitation costs) that determine the pattern and volume of trade
- The impact of changes in post-Brexit domestic agricultural policy will reflect choices in the shape of that policy, in particular the balance between direct income support (if any) and Pillar 2-like support, and the extent to which the latter is to compensate for additional costs or income forgone or represents net additions to income.
- The manner in which different ways of regulating migrant labour affect the costs of production on farms relies on assumptions (hopefully evidence-based) on the supply curve of both migrant and non-migrant labour.
- The extent to which changes in the regulatory burden are felt in costs and revenues at the farm level (even the rationale of such a link may differ).

Use of scenarios: Many studies use scenarios to explore the post-Brexit situation. How these scenarios are specified, in terms of which impact factors are covered and the details of each factor, are critical to the outcomes. The nature of these scenarios differ in at least two major ways:

- The number of factors considered. Various trade arrangements are almost universal in Brexit studies (though the details of the arrangements differ) while fewer consider changes in domestic support and even fewer tackle labour mobility.

- Rather than second-guess the actual situation that will result when the UK leaves the EU and its CAP, for which there is as yet no reliable guide, many of the scenarios aim to illustrate extreme positions (boundary situations) which can then be used to prepare the agricultural industry for best- or worse-case outcomes.

Sophistication of approach. Differences can be found in each of the impact factors:

- *Trade models:* When assessing the changes in market prices of farm commodities associated with Brexit several studies use sophisticated aggregate models, some use simpler gravity trade models, and others take a more qualitative approach using basic economic theory.
- *Farm models:* When assessing the impact of changes of commodity prices or levels of support on the incomes of farm businesses, almost all use a static approach based on the cost structure of a sample of farms in a single year (FBS or the UK contribution to EU-FADN). Some use the cost structure for a run of years. There is little attempt to build in the adjustment capability of farm over, say, 5 or 10 years (though an attempt to do this in a qualitative way is found in Bradley and Hil 2017).

Sector coverage: Many take an industry-wide view, and within this some also disaggregate into major sectors, at least when considering the impact of Brexit on commodity prices. However, some have examined the implications of Brexit for specific sub-sectors; of note here are the various papers produced by the AHDB.

Geographical coverage: While most studies have adopted a UK-level analysis, some have focused on England, though it should be recalled that this country accounts for most agricultural activity and the widest spread of farming types. Others deal with specific constituent countries (Northern Ireland, Wales or Scotland) with a narrower range of types that lower their relevance for Britain or the UK as a whole.

Main findings from the literature

It is useful to summarise the main lessons from the existing studies (a review of each is given in Bradley and Hill (2017)).

General points

- The sector-level models (as used by some of the prominent studies, such as that by LEI for the NFU (Berkum *et al.*, 2016) and FAPRI-UK (Davis, *et al.*, 2017)) are dependent on the assumptions and coefficients built into them. Policy scenarios that represent large shifts (such as are represented by some of the scenarios put forward by the AHDB) and contain the potential to trigger structural changes are less suitable for modelling, and any results should be interpreted with caution. Davis, *et al.* (2017) make the point that some of the projected price changes go beyond the range of variation on which the FAPRI model is calibrated and note that this adds some uncertainty to their projections.

- Static analysis at the farm level of changes in support policy, prices and/or costs ignores the behavioural responses by farmers, who have a proven ability to adapt their production and businesses, including by both short-term adjustments and longer-term structural change, investment and innovation. Again, first round impacts should not be interpreted as the final adjusted position, though this commonly happens.

Support under UK domestic agricultural policy

- It is widely assumed in the literature that Pillar I payments to UK farmers will be reduced or terminated post-Brexit (though assurances by the Conservative government indicate that they will be maintained to 2022). The Government's consultation paper of February 2018 underlines its intention to move away from the existing form of direct payment¹.
- It is also widely assumed that Pillar II payments, encompassing agri-environment and other payments under the Rural Development Programme, will be at least continued post-exit from the EU.
- Both forms of support will be/are devolved responsibilities, and different patterns and levels may emerge in the constituent countries of the UK.
- Static analysis can easily show that removing or scaling back Pillar I payments would have significant impacts on Farm Business Income, and would be particularly damaging for certain farming types (such as LFA livestock farms).
- Defra's analysis on the initial impact of cutting the level of Pillar I payments on income distributions, based on averaging figures on individual farms over five years, shows a predictable shift towards lower incomes.
- There is evidence that a wide variety of responses at the farm level to economic shocks can be expected. However, the proportion of farmers who intend to 'carry on as before' in the face of economic signals declines with greater persistence of these signals, and more fundamental changes are explored.
- Policymakers have in the past frequently under-estimated the ability of farmers and their households, as a group, to adjust to economic shocks. Given adequate notice, transitional arrangements, which may be advocated on economic, welfare or political economy grounds, may be unnecessary. However, experience in New Zealand points to the contribution that can be made by an exit package, financial advice and support to household consumption.
- Though Pillar I payments are nominally decoupled from production decisions, there are links that impinge on production decisions, so that removal of such payments could be expected to impact on output. Though more likely to affect sectors that are relatively large recipients of such payments, the extent of this output link is not well established.

Labour costs

- Several studies have considered the implications of Brexit for the supply of labour to the UK agricultural industry, and specifically the way that the supply of migrant labour will be affected.

¹ Health and Harmony: the future for food, farming and the environment in a Green Brexit. Cm 9577

- It is widely assumed that restricting access to migrant labour will cause difficulties for agriculture, with the greatest impact likely to be seen in the horticulture sector. The impact of these restrictions is assumed to be reflected in the labour costs faced by agricultural businesses.
- Wages are not the only factor in attracting labour. A lack of available UK labour and the perception of difficult working conditions is likely to exacerbate the difficulties in replacing migrant labour with UK employees.
- The NFU-LEI study on Brexit (Berkum *et al.*, 2016), with its modelling of commodity prices and trade, did not include any movement of labour costs, an important gap especially with the horticulture sector. Labour cost changes were also beyond the scope of the FAPRI analysis (Davis, *et al.*, 2017).
- There is no direct evidence on the likely increase in labour costs. However, there is evidence on the impact of higher labour costs on output prices which can be used to estimate the implied increase in labour costs (an approach adopted by Bradley and Hill (2017)).

Trade arrangements

- Leaving the EU Single Market (even though remaining in a Customs Union or Free Trade Area with the EU) will incur additional costs to trading, in the form of more border controls, checks on regulatory compliance, etc. For commodities that the UK imports, this will lead to a rise in market prices for UK farmers. *Ceteris paribus* this will lead to greater domestic production (replacing imports) and farm incomes will increase. [The quantity demanded in the UK will also be reduced by the rise in market prices.]
- Post-Brexit EU/UK trading relationships that involve placing import taxes on trade coming into the UK from the EU will take this increase in market price a stage further, resulting in higher prices and higher incomes for UK farmers, further expansion in domestic production and reduced imports. A similar effect will come from raising existing tariff levels. [Note: this effect on prices will cease once imports have been reduced to zero.]
- Trading relationships that open the UK market for commodities that UK agriculture produces to low-cost suppliers will lower the market price received by British farmers, cause them to supply less, and put downward pressure on their incomes.
- Where the UK exports farm output to the EU, more impediments (border checks, etc.) or tariffs (if applied by the EU on goods from the UK) are likely to depress the prices received by UK farmers.
- Only the NFU/LEI study (Berkum, *et al.*, 2016), Bradley and Hill (2017) and Davis, *et al.* (2017) quantify price shifts in these scenarios, and they do so for a range of commodities. However, there is a lack of clarity in the description of the NFU/LEI methodology that suggests alternative approaches should also be employed, such as use of a range of possible price shifts or sensitivity analysis.
- Real markets are often far more complex than can be assumed in trade models, and additional factors (such as consumer preferences for credence attributes like place of origin) need to be considered. Similarly, many commodities are not homogeneous,

including lamb which can be differentiated by age and specification and seasonality. Carcase balance issues are also likely to be significant.

- Currency exchange rates, as between £ Sterling and the Euro, influence competitiveness. A change here can easily outweigh any cost advantage arising from comparative advantage.
- Some costs of production in the UK will be affected by trading relationships and can influence farmers' supply decisions and farm incomes.
- Non-tariff barriers can impede trade to a significant extent; these are often mentioned in the literature but with few attempts to quantify the impact on farm incomes.

Regulatory burden

- Regulations impacting on domestic production are relevant to both trade and farm incomes. Post-Brexit widening disparities in regulations (sanitary, phyto-sanitary, animal welfare, environmental standards etc.) resulting from different regulatory environments will impede the movement of traded goods. However, by easing the regulatory burden production costs may be lowered, though the extent of this is rarely quantified (though Bradley and Hill (2017) attempt an approximation).

Studies selected for presentation in this symposium

In terms of considering the impacts of Brexit at the farm level the literature is characterised by a small number of studies that are of direct relevance and a long tail that are marginal.

All the studies listed from 2016 and 2017 discuss possible trade effects on agriculture, and many employ scenarios, though not all quantify price and output shifts.

While discussion of domestic support is again common, only five use farm-level models to estimate the first-round implications for incomes of reducing or removing Direct Payments, of which that by Buckwell (2016) for the Worshipful Company of Farmers adopts the findings of Gardner (2015). In contrast, Defra's 2016 analysis, though only considering the impact of removing direct payments, is strengthened by being based on five-year averages at the farm level, using a sub-sample of the FBS and making use of access to data of individual farms.

From this list three were selected to form the contents of this symposium. Though differing in detail and even which of the four main elements are considered (see Table 1) they share the following characteristics:

- they use closely-specified scenarios to explore the possible post-Brexit UK situations
- they produce independent and original results, and
- they assess the impacts at farm level, with a breakdown at least by farming types.

These three are:

- The study by LEI, Wageningen, for the National Farmers Union, published as **Berkum, S. van, R.A. Jongeneel, H.C.J. Vrolijk, M.G.A. van Leeuwen and J.H. Jager** (2016) Implications of a UK exit from the EU for British agriculture. This is presented by Lucia Zitte, of the NFU
- The technical report for the AHDB by **Bradley, D. and Hill, B.** (2017) Quantitative modelling for post-Brexit scenarios. (Agra CEAS Consulting. September 2017) that was the basis of the AHDB Horizon publication (October 2017). This is presented by Dylan Bradley.
- Preliminary results from the ESRC project “Brexit: How might UK agriculture survive or thrive?” which incorporates market-level assessment from FAPRI-UK project, already in the public domain as **Davis, J., Feng, S., Patton, M. and Binfield, J.** (2017) Impacts of Alternative Post-Brexit Trade Agreements on UK Agriculture: Sector Analyses using the FAPRI-UK Model. FAPRI-UK Project. August 2017. This is presented by Carmen Hubbard, University of Newcastle

Presenters will focus on the scenarios employed and the results generated. There will be opportunity in discussions to compare and contrast the approaches and their results.

Table 1
Some features of the selected studies

Study	Domestic policy	Trade policy	Migrant labour	Regulation
NFU/LEI (Berkum et al, 2016)	*	*	No	No
AHDB (Bradley & Hill, 2017)	*	*	*	*
ESRC (forthcoming) /FAPRI (Davis et al. 2017)	*	*	(*)	No

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- Bradley, D. and Hill, B.** (2017) Quantitative modelling of post-Brexit scenarios. Technical Report for AHDB. Agra CEAS Consulting. September 2017.
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- Packer, R.** (2017) Brexit, agriculture and agricultural policy. Centre for Policy Studies, London.
- Patterson, O.** (2017) UK Agricultural policy post-Brexit. UK2020 Foundation, London.
- Rabobank** (2017) Implications of a UK exit from the EU for British agriculture. Rabobank, Amsterdam, March 2017.
- Swinbank, A.** (2017) World trade rules and the policy options for British agriculture post-Brexit. Briefing Paper 7, UK Trade Policy Observatory, University of Sussex, Brighton.

Yorkshire Agricultural Society (2016) The implications of 'Brexit' for UK agriculture. Farmer-Scientist Network of the Yorkshire Agricultural Society (Chair, Professor Wyn Grant), Harrogate, N. Yorkshire. January 2016

ANNEX (studies listed alphabetically by source)

Source	Author	Date	Scenarios	Trade effects on agriculture discussed / quantified	Direct Payments micro-models	Sectoral	General message
AHDB/AgraCEAS Consultants	Bradley, D. and Hill, B.	2017 (October) (England) with supplementary analyses for Scotland and Wales	3	Yes, and quantified (simple gravity trade model)	Yes	Yes	For most farming types impact of changes in direct payments more important than trade impacts. Labour costs changes important to some types
Bootle	Bootle, R.	2015	2 (of 7)	Yes	No	No	Agriculture not treated specifically
British Retail Consortium	British Retail Consortium	2017	2 implied	Yes	No	No	Covers food consumers, but no mention of agriculture
Centre for Policy Studies	Packer, R.	2017 (January)	None	Yes	No	No	UK prices could rise or fall, depending on outcome of trade negotiations
Defra	Defra	2016	None	No	Yes	Yes	Only considers cuts in Direct Payments and their impacts on income distribution
ESRC	Hubbard, C. (project leader)	2018 (expected)	Yes – details not yet published	Incorporates FAPRI (2017 – see below)	Yes	Expected, and by country	The project will assess the impacts of various UK agricultural policy scenarios following Brexit by integrating economic modelling approaches at both sector and farm levels.
FAPRI	Moss, J. et al.	2009	2	Yes and quantified (FAPRI model)	No	Yes	Relates to changes outside Brexit, but similar scenarios
FAPRI	Davis, et al.	2017	3	Yes and quantified (FAPRI model)	No	Yes	Very similar impacts on prices to Bradley and Hill (2017)
Food Research Collaboration	Lang, T. and Schoen, V.	2016	5	No	No	No	Some focus on commodity details

Source	Author	Date	Scenarios	Trade effects on agriculture discussed / quantified	Direct Payments micro-models	Sectoral	General message
House of Commons	House of Commons	2016 (August)	None	Yes	No	No	Identifies areas of uncertainty and of opportunity
House of Lords	House of Lords	2016 (December)	None	No	No	No	Considers possible UK-EU trading relationship in general terms
House of Lords	House of Lords	2017a (March)	None	Yes	No	No	Considers impacts of tariffs, touches on immigrant labour
House of Lords	House of Lords	2017b (May)	None	Yes	No	No	Attention given to migrant labour and regulation
Informa (b)		2017	3	Yes	Yes	Yes	Updated farm-level impacts from the above
Informa(a)	Gardner, B	2016 (early)	3	Yes	Yes	Yes	Differential impacts across farming types
LMC-NIMEA/Anderson Centre	Haverty, M.	2017	2	Yes, and quantified (GTAP)		Relates only to beef and sheep meat in N.I.	
LUPG	Baldock et al.	2017	Not as understood in other studies			Adopted from Berkum et al	Outlines plausible policy developments. Emphasis on land use issues, and no attempt to independently model farm incomes.
NFU/LEI	Berkum et al.	2016 (April)	9 (3 trade & 3 Direct Payment levels)	Yes and quantified (AGMEMOD model)	Yes	Yes	Scenarios produce a range of outcomes
Rabobank	Rabobank	2017	3	Yes	No	No	Changes in prices received by UK farmers and shifts in production suggested

Source	Author	Date	Scenarios	Trade effects on agriculture discussed / quantified	Direct Payments micro-models	Sectoral	General message
UK Trade Observatory	Swinbank, A.	2017	None	Yes	No	No	Commodity prices could rise or fall dependent on trade arrangements
UK2020	Patterson, O.	2017	None	Yes	No	No	Opportunities. Migrant labour and regulations mentioned
Worshipful Company of Farmers	Buckwell, A	Feb 2016	2 implied	Yes	Yes (adopts Informa analysis)	No	Trade effects can be expected to affect prices, as will levels of Direct Payments affect income
Yorkshire Agricultural Society	Grant, W. (chair)	2016	5	Yes	No	Yes	Focus on other factors – labour and devolved administrations

