

Scotland's Rural College

Perceived legitimacy of agricultural support and priorities for a future support scheme in Scotland

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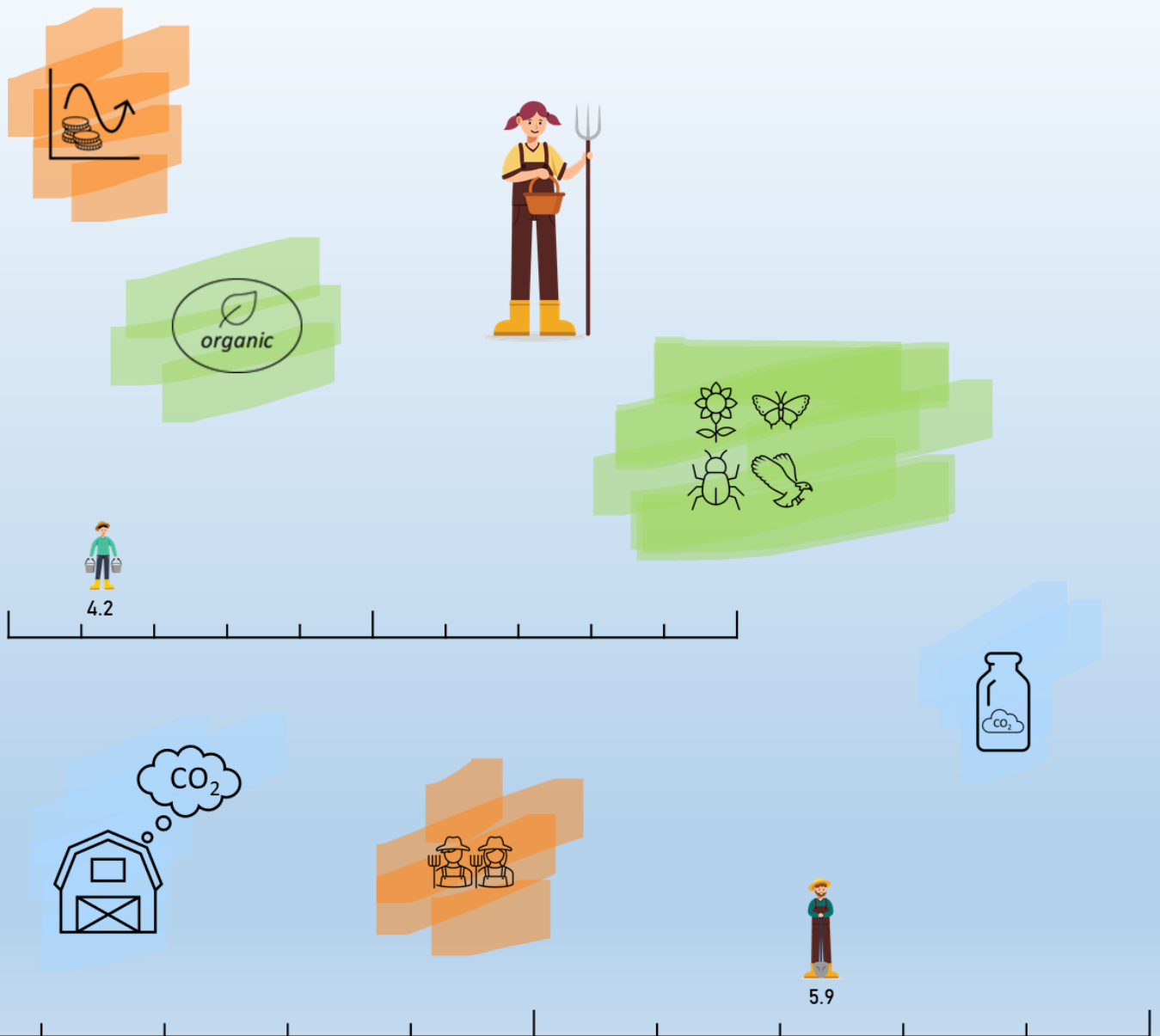
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Perceived legitimacy of agricultural support and priorities for a future support scheme in Scotland



Pictures of farmers sourced from vecteezy.com

Summary of results of a survey of members of the Scottish public

Perceived legitimacy of agricultural support and priorities for a future support scheme in Scotland

An output to RESAS as part of the Scottish Government Rural Affairs and the Environment Portfolio Strategic Research Programme 2016–2022

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Key Points

- Social acceptance of agricultural support payments depended on farm and farmer characteristics.
- Acceptance and fairness of government income support to farms was rated consistently lower for larger farms by members of the public, independent of the farm's financial position, proposed changes in payments, production efficiency or environmental performance. Respondents might have associated larger farms with 'industrial scale farming', and disregarded the potential of larger farms to operate at high levels of efficiency and environmental standards.
- Respondents rewarded environmental performance with respect to biodiversity and the carbon footprint. It is particularly encouraging to see that respondents considered both carbon footprint of the whole farm and carbon intensity of farm production in their judgements.
- Animal welfare standards were important determinants of social acceptance of agricultural income support through government.
- Profitability of a farm had a strong effect on social acceptance of payments. The findings suggest that members of the public preferred support for struggling businesses that are loss making without income support. However, the findings may also mask more nuanced perspectives about reasons for financial vulnerability; and correlations between desirable factors (production efficiency; environmental performance; animal welfare and product quality) and financial performance of farms.
- On average across the whole sample, farmer characteristics had a lesser influence than farm characteristics. An exception is agricultural qualification of farmers. Having an agricultural qualification increased willingness to be supplied by a farmer and willingness to petition on behalf of a farmer. This finding demonstrates the importance of continued (public) investment in agricultural education.
- For many people, the most important function of a new agricultural support scheme was to produce high quality food that is safe to consume. This is a reassuring result, and suggests people recognise the substantial value of food provision (that is of high quality and safe to consume) from agriculture and agricultural producers.
- Health and welfare of farmed animals was a priority for most people. This may be indicative of growing awareness of issues surrounding the welfare of farmed animals. It may also indicate a cognizance of potential for spill-over of zoonosis from captive animal populations. However, despite the importance placed on this objective, many believe it is least important that a new agricultural support scheme should encourage a shift in dietary habits to less animal-sourced food.
- Distributional fairness appears to resonate widely. Respondents showed a strong preference for support to be directed towards smaller farms.
- Environmental performance, specifically related to biodiversity, carbon emissions and the use of nature-based solutions, was an important driver of perceptions regarding guiding principles for future support schemes and social acceptance of payments.

Introduction

1. Scotland is facing important decisions on the structure and model of future support for agriculture following the exit of the UK from the EU. Agriculture Reform Implementation Oversight Board is considering options for future support models, with a Scottish Government commitment to bring forward a new Agricultural Bill to replace the Common Agricultural Policy in 2023.
2. Current agricultural support represents a significant contribution of the taxpayer. About two thirds of the total profit from farming in Scotland has been coming from support payments in recent years. In 2019, approximately £0.5 billion worth of support payments were made ([RESAS 2020](#)). On average, this amounts to £90 per year per capita.
3. The Agricultural Champions ([Scottish Government 2018](#)) recommended that *"The public must be better informed about Scottish farming and what it delivers, and policies must be guided by real evidence about what the public values. A civic conversation, both informing and listening to the public, must start now."* Specifically on 'Public Value' they highlighted that there was *"inadequate information on the state of public attitudes to farming"* that led to RESAS commissioned survey and citizen jury work on public attitudes to agriculture ([Mark Diffley Consultancy 2019](#)) as well as further citizens' jury work by the Scottish Parliament on land management and the natural environment ([Scottish Parliament 2019](#))
4. It thus seems expedient to re-establish the legitimacy of the basis for and priorities for agricultural support funding through understanding public acceptance of such payments. To this end, the aim of this survey-based study was to provide empirical evidence on views and acceptability of how key guiding principles and characteristics could shape farmer and crofter payments within a future agricultural support model by members of the public in Scotland.
5. In line with Scottish Government commitments to enhanced conditionality of support these results can help identify prioritised outcomes from future agricultural support as expressed by this sample. These findings can, therefore, help legitimise policy decisions and approaches as the ARIOB work progresses toward new legislation that focuses on delivering the Scottish Government vision for agriculture with a greater emphasis on climate change, biodiversity and wider environmental performance from land use ([Scottish Government 2022](#)).

Study Design

Overview

6. The survey entails two core elements. The first core element is a factorial survey to gauge social acceptance of income support payments to farmers. Most research to date aimed at assessing legitimacy of farm income support payments has been concerned with the efficiency of income support payments associated with public goods provision by farming activity. Government intervention may be justified if the economic value of public good provision exceeds payments plus transaction costs, assuming a lower degree of public goods in the absence of payments.
7. To assess efficiency of payments motivated by public good provision, researchers focus on the change in quantity or quality of public goods provided. It is typically considered irrelevant *who* provides the public goods.
8. The factorial survey in this study took a distinctly different perspective that included the farmer as person, and the farm as an individual business entity, in considerations of social acceptance of government income support to farmers. Respondents were asked to make judgements concerning the social acceptance of payments to farmers following a description of them and their farms. This added a novel and, as we argue, important lens to the ongoing debate concerning the design of future agricultural support in Scotland.
9. The second core element was a stated preference survey used to investigate people's perceptions of priority areas for consideration in the design of a future support scheme in Scotland. The list of potential priority areas included public good provision but extended to concerns relevant to the thriving of rural communities and the structure of the agricultural sector.

Survey design and administration

10. The survey was implemented online and administered by a professional market research company to a sample of 2,011 Scottish adults based on a quota sampling approach with hard quotas set for age and gender. Consequently, our sample compared well to population statistics with respect to age and gender (Table 1). Hard quotas based on an access panel, as was the case with our sample, are a practical and more affordable option but are not as representative as a significantly more expensive probability-based sample. Therefore, initial analysis indicates a slight

overrepresentation of respondents with higher levels of education relative to the 2011 Scottish Census, although the differences in education are considerably less pronounced if we compare our outcome to probability-based samples of the Scottish population such as the [Scottish Household Survey 2020](#).

Table 1. Sample vs Population statistics based on 2011 Census

	Scottish Census (2011)	Sample
Gender		
Male	47.8	46.5
Female	52.2	53.1
Other/Prefer not to say		0.3
Age		
18-24	11.9	12.1
25-34	15.7	16.1
35-44	17.3	17.3
45-54	18.5	16.2
55+	36.6	38.3

11. To cover the most important production systems in Scotland, respondents were randomly allocated to one out of four types of main production systems (beef: N=504; dairy: N=503; sheep: N=501; cropping: N=503).
12. Descriptions of hypothetical farms and farmers in vignettes were adjusted depending on their allocated production system. The study was designed to investigate of respondents' judgments of hypothetical farmers and their farms vary depending on the production system. However, the analysis in this report draws on the entire sample, so that results represent averages across the four production types.
13. The survey, which received ethical approval of the SRUC Social Science Ethics Committee and was subsequently approved by RESAS, was structured in four sections.
 - a. The first section provided background information on farming in Scotland followed by the six vignettes to be evaluated as part of the factorial survey experiment.
 - b. The second section investigated perceived priorities for a future agricultural support scheme in Scotland using Best-Worst scaling.
 - c. The third section obtained information on: i) attitudes regarding farmers and farm support; ii) respondents' consumption of

agricultural products; iii) ethnocentrism in food consumption; iv) attitudes and beliefs towards climate change.

d. The final fourth section asked further details about respondents and their households, including their political position (if any).

14. The analysis in this report focuses on the first two sections comprising the factorial survey and the Best–Worst scaling tasks to provide empirical evidence on views of members of the public in Scotland for key guiding principles and characteristics that should shape a farmer’s support payments.

Factorial survey experiment: summary of approach

15. Factorial survey experiments were first developed in the 1950s and have been applied more widely since the 1980s, mainly in quantitative sociological research. In factorial surveys, respondents are asked to evaluate descriptions of hypothetical situations, individuals, or objects. The descriptions of hypothetical situations, individuals, or objects are called vignettes and often come in the form of text, but may be presented and summarised in alternative formats, including tables or audio and visual formats.

16. Factorial survey experiments rest on the idea that there are often multiple dimensions that influence a person’s judgment of a situation, individual or object. For example, a person’s judgment of the fairness of wages paid to individuals has been found to depend on factors such as occupational prestige of the position evaluated, and age, gender and degree of training and education of the job holder (Auspurg et al. 2007). Judgments in factorial surveys may be made about fairness, but may also relate to subjective beliefs, social norms, and attitudes. For example, Liebe et al. (2017) use factorial surveys to assess the social acceptance of local wind energy expansion scenarios that included characteristics such as number of turbines, type of investor, the opportunity to participate in planning and how tax revenue would be used.

17. The multiple dimensions of hypothetical situations, individuals, or objects are often referred to as characteristics or attributes. In factorial surveys, the expressions that the attributes take vary across hypothetical situations, individuals, or objects that respondents are asked to evaluate. Crucially, variation follows an experimental design that ensures that the influence that an attribute has on the judgment can be robustly measured or identified. Such a design can be trivial if there are few attributes, but the complexity of the design increases considerably as the number of attributes that

describe a hypothetical situation, individual, or object increases. To increase efficiency in data collection, respondents participating in factorial surveys are typically asked to evaluate several vignettes within a single survey.

18. Data analysis typically employs regression modelling, where judgements of vignettes serve as dependent variables that are explained by attributes. Additionally, regressions can consider whether there are systematic relationships between respondent characteristics and judgments.
19. Beliefs, attitudes, and norms may be measured using alternative survey tools, for example psychometric scales based on Likert-scale type questions. Likert-scale type questions ask respondents to indicate their position concerning an item on typically four- or five-point scales. Items may be statements (e.g., "Farmers are the backbone of rural communities") and response scales are ordinal (e.g., Strongly Disagree – Somewhat Disagree – Somewhat Agree – Strongly Agree). There are several main benefits that factorial surveys have compared to asking a series of Likert-scale type questions:
 - a. Variation in the elements (jargon: 'attributes') of interest can be experimentally controlled. This allows to directly assess the effect of that attributes have on judgments.
 - b. The evaluation of hypothetical situations, individuals, or objects takes place considering all elements/attributes – not single aspects in isolation. This should reduce measurement error.
 - c. The factorial survey avoids a common finding for Likert-scale type questions that 'everything matters' – resulting in a low degree of discrimination between the aspects of interest. This can render Likert-scale data rather non-informative.
 - d. The design of factorial surveys is very flexible and can accommodate a broad range of topics and response dimensions.

Factorial survey experiment: implementation in this study

20. After presenting respondents with an overview of main farming systems in Scotland and making them aware of existing income support payments by government, respondents were randomly allocated to one out of four types of production systems (beef, dairy, sheep, cropping). Subsequently, respondents were asked to make judgments about hypothetical farmers and their farms of the production system.
21. Each farmer and farm was characterised by a total of 12 attributes (Table 2).

22. An additional attribute described changes in government support payments. The absolute amounts (in £) shown on vignettes were determined as a function of farm size and type of production system (beef, dairy, sheep, cropping). A detailed list of attributes and attribute expressions used in the survey can be found in Appendix 1. The experimental design comprised of 72 combinations of attributes (that is, it included 72 unique vignettes). Six vignettes were drawn randomly without replacement from the set 72 options and presented to respondents.

Table 2. Attributes considered in factorial survey experiment

Farmer characteristics	Farm characteristics
<ul style="list-style-type: none"> • Gender of farmer • Experience of farmer • Formal qualification of farmer 	<ul style="list-style-type: none"> • Farm size • Production type • Production level (Efficiency of production) • Animal welfare/Product quality • Biodiversity • Carbon footprint per farm • Carbon footprint per unit of output • Financial situation of farm without government support

23. Vignettes were textual descriptions of a hypothetical farmer and their farm. Figure 1 shows an example vignette for a sheep farm as shown to respondents in the online survey.



Figure 1. Example vignette

24. Each of the six vignettes presented to each respondent was shown for a minimum of ten seconds before respondents could advance to evaluating the hypothetical farm and farmer with respect to four criteria of interest, all measured on an 11-point scale (Table 3).

25. A screenshot of the vignette and response scales for the example of a sheep farm can be seen in Appendix 2.

Table 3. Criteria for evaluation of vignettes in factorial survey experiment

Criteria	Question	Scale
General acceptance of changes in payments	How acceptable are the described changes in payments to this farmer for you?	1: Fully Unacceptable; 6: Neither acceptable nor unacceptable; 11: Fully Acceptable
Fairness of payments	The farmer described, Mr/Ms X, will obtain £Xk per year in support payments. Do you think this amount is an unfairly low level of income support, a fair level of income support, or an unfairly high level of income support?	1: Unfairly low level of income support; 6: Fair level of income support; 11: Unfairly high level of income support
Intention to consume	How happy would you be for Mr/Ms X to supply you (through a shop or market) with [as per production type: dairy products/beef/lamb/potatoes].	1: Very unhappy; 6: Neither happy nor unhappy; 11: Very happy
Intention to petition	Imagine that a government income support scheme for farmers like Mr/Ms X would be discontinued. How willing would you be to write to your local MSP to lobby on behalf of this farmer for the continuation of their support payments?	1: Not willing at all; 6: Neither willing nor unwilling; 11: Very willing

Best–Worst Scaling (BWS): summary of approach

26. The Best–Worst Scaling (BWS) method is a type of discrete choice experiment (DCE). With DCEs, respondents are asked to identify the most favourable alternative from a series of choice–sets, in which a subset of all attributes are presented. Based on the choices made by respondents, it is possible to derive a measure of preference for all attributes. With BWS, the measure of preference is improved by asking respondents to also identify the least favourable alternative. There are 3–way to structure choices in BWS, named object–case, profile–case and multi–profile case; we use object case, which is useful for exploring preferences of respondents for a simple list of attributes or items.

27. BWS initially found use in areas such as marketing and healthcare (Louviere *et al.* 2015; Cheung *et al.* 2016). However, it is being used increasingly within the agricultural setting. For example, in a survey of Scottish dairy farmers, Glenk *et al.* (2014) used BWS to investigate GHG mitigation options that were perceived as beneficial to economic and environmental farm-performance but had seen only limited adoption by farmers – these mitigation options were found to have the highest potential. In a survey of European dairy stakeholders, Burns *et al.* (2022) found preferences for genetic traits of dairy cattle differed depending on whether the production objective was efficiency or resilience – suggesting potential antagonisms in production that aims to meet both objectives simultaneously. The proliferating use of BWS over the past 2–3 decades is likely because the trade-offs that respondents are required to make are representative of real-world choices, and the measure of preference for each item is scaled relative to all other items meaning the interpretation of results is intuitive.
28. As with factorial surveys, the sets of choices that respondents consider are constructed according to an experimental design. With BWS, the experimental design depends on the total number of items under evaluation, the number of items that will appear in each choice set, and the total number of choice sets an individual will be required to assess. The researcher has some influence over these parameters.
29. There are several analysis options for BWS data (Louviere *et al.* 2015). The simplest approach uses a count of the number of times each item is selected as best minus the number of items it is selected as worst. This simple approach is robust and gives similar estimates to more sophisticated statistical approaches. Statistical approaches for BWS data are probability-based and can give a measure of the probability of one item being selected compared with others. Both approaches provide opportunities to explore the influence of respondent characteristics on choices, although this is often better resolved with statistical approaches.
30. BWS provides more data on preference per choice set than traditional DCEs, meaning estimates are more accurate. The additional data on the least favourable items also helps with the discriminatory power of the analysis, especially for those traits that may not regularly be chosen as most favourable. BWS is also consistent with real-world decision-making since choices regarding items at the extremes of a scale are more reliable (Helson 1964; Louviere *et al.* 2015). For example, compared with some non-DCE alternative approaches where respondents might be asked to directly rank

each item, which can be problematic since respondents may struggle especially to place mid-ranking items.

Best-Worst Scaling (BWS): implementation in this study

31. Before the BWS section of the survey, respondents were asked whether they believe farmers should or should not receive government support if they meet certain environmental or welfare standards; conditional to a 'should' answer, they were progressed into the BWS section. In the BWS section, respondents were randomly allocated to one of 35 blocks of 8 choice sets in the experimental design, where they made choices on their most and least favoured objectives for a future agricultural support scheme. An example choice set is shown in Figure 2 as it appeared in the online survey.

Task 1 of 8

In the table below, please indicate which of the aspects you consider most and least important to be considered for the design of an agricultural support scheme in Scotland.

A new agricultural support scheme should ...

Least important		Most important
<input type="radio"/>	... ensure more young people take up farming	<input type="radio"/>
<input checked="" type="radio"/>	... encourage a shift in food production so less comes from animal-sources	<input type="radio"/>
<input type="radio"/>	... help restore degraded ecosystems and important stores of carbon such as forests and peatlands	<input type="radio"/>
<input type="radio"/>	... give extra support to people working the land in remote areas , which is often not profitable	<input checked="" type="radio"/>

Figure 2. An example choice set from the BWS section of the survey. Respondents could only select the single most important, and single least important objective

32. In total, there were 16 objectives, shown in Table 4. In all blocks, each objective appeared in 2 choice sets. Objectives covered were informed by, among others, the [Scottish land use strategy](#), surveys on the future of agricultural; support such as the [Special Eurobarometer 504: Europeans, Agriculture and the CAP](#), and reports concerning the transition to future agricultural support such as [Moxey et al. 2021](#).

Table 4. Objectives of agricultural support schemes included in Best-Worst Scaling exercise. Key information in each objective was emphasised in bold typeface.

#	Objective
	A new agricultural support scheme should
1	... ensure more young people take up farming
2	... encourage a shift in food production so less comes from animal-sources
3	... help restore degraded ecosystems and important stores of carbon such as forests and peatlands
4	... give extra support to people farming land in remote areas which is often not profitable
5	... reward groups of farmers who cooperate to provide environmental benefits
6	... support farmers to deal with consequences of climate change (for example through insurance)
7	... reward farmers who offer employment opportunities in rural communities
8	... ensure that farmers improve conditions on their land to promote wildlife
9	... ensure that carbon emissions from agriculture are reduced
10	... support the uptake of organic farming practices
11	... give extra support to small farms to help them stay in business
12	... encourage the use of technology that enhances productivity and reduces environmental impact
13	... enhance the production of food that supports regional and local businesses and industries
14	... ensure that high quality food is produced that is safe to consume
15	... maintain farming on land that is challenging to farm (for example hill sheep farming)
16	... reward farmers who improve their farm's animal health and welfare standards

Results

Factorial survey

33. The factorial survey assessed social acceptance of (changes in) agricultural support payments to farmers through four distinct criteria for evaluating hypothetical farms and farmers described in vignettes. The four criteria were general acceptance of changes in payments, fairness of payments, intention to consume and intention to petition. Distributions of responses to the four criteria are shown in Appendix 3.

34. Across the four criteria, the main findings of the factorial survey were:

- a. Social acceptance of agricultural support payments depended on farm and farmer characteristics.
- b. Acceptance and fairness of government income support to farms was rated consistently lower for larger farms by members of the public, independent of the farm's financial position, proposed changes in payments, production efficiency or environmental performance. Respondents might have associated larger farms with 'industrial scale farming', and disregarded the potential of larger farms to operate at high levels of efficiency and environmental standards.
- c. Respondents rewarded environmental performance with respect to biodiversity and the carbon footprint. It is particularly encouraging to see that respondents considered both carbon footprint of the whole farm and carbon intensity of farm production in their judgements.
- d. Animal welfare standards were important determinants of social acceptance of agricultural income support through government.
- e. Profitability of a farm had a strong effect on social acceptance of payments. The findings suggest that members of the public prefer support for struggling businesses that are loss making without income support. However, the findings may also mask more nuanced perspectives about reasons for financial vulnerability; and correlations between desirable factors (production efficiency; environmental performance; animal welfare and product quality) and financial performance of farms.
- f. On average across the whole sample, farmer characteristics had a lesser influence than farm characteristics. An exception was agricultural qualification of farmers. Having an agricultural qualification increased willingness to be supplied by a farmer and

willingness to petition on behalf of a farmer. This finding demonstrates the importance of continued (public) investment in agricultural education.

A: General Acceptance of Changes in Payments

35. Which attributes influenced evaluations of how acceptable the potential future changes in payments described in vignettes were to respondents? It is important in this case to bear in mind that a high rating on the scale may have a different meaning, depending on whether the vignette describes a farmer that will receive a decrease or an increase in payments. For example, one could expect that an increase in payments might be perceived to be more acceptable if a farm provides good conditions for wildlife; and that a decrease might be more acceptable if the farm is described to offer poor conditions for wildlife. All else equal, both cases could lead to increased ratings on the acceptance scale. Therefore, the difference in meaning of acceptance depending on payment change can only be understood through investigating interaction effects between attributes and payment change (the relevant interaction terms are shown in the lower half of the table in Appendix 5; see Appendix 4 for descriptions of variables included in models). Effects of farmer and farm characteristics on acceptance of changes in payments are shown in Figure 3.

36. The main findings were:

- a. Biodiversity had one of the strongest effects on acceptability of changes in payments. Providing better conditions for wildlife enhanced acceptability of increased payments.
- b. While no effect was found for carbon intensity per unit produced, a payment increase was significantly less acceptable if the farm's overall carbon footprint is high.
- c. An increase in payments was judged to be more acceptable for smaller rather than larger farms.
- d. Production level, that is, greater output than comparable farms per unit (animal; area of land) and thus greater levels of efficiency in production, increased acceptability of a payment increase.
- e. Exceptional standards with respect to animal welfare (beef, dairy, sheep farms) and exceptional product quality (cropping farms) were associated with greater levels of acceptance of a payment increase.
- f. If farms are profitable, a payment increase was seen as less acceptable relative to farms that are coping or that make a loss.

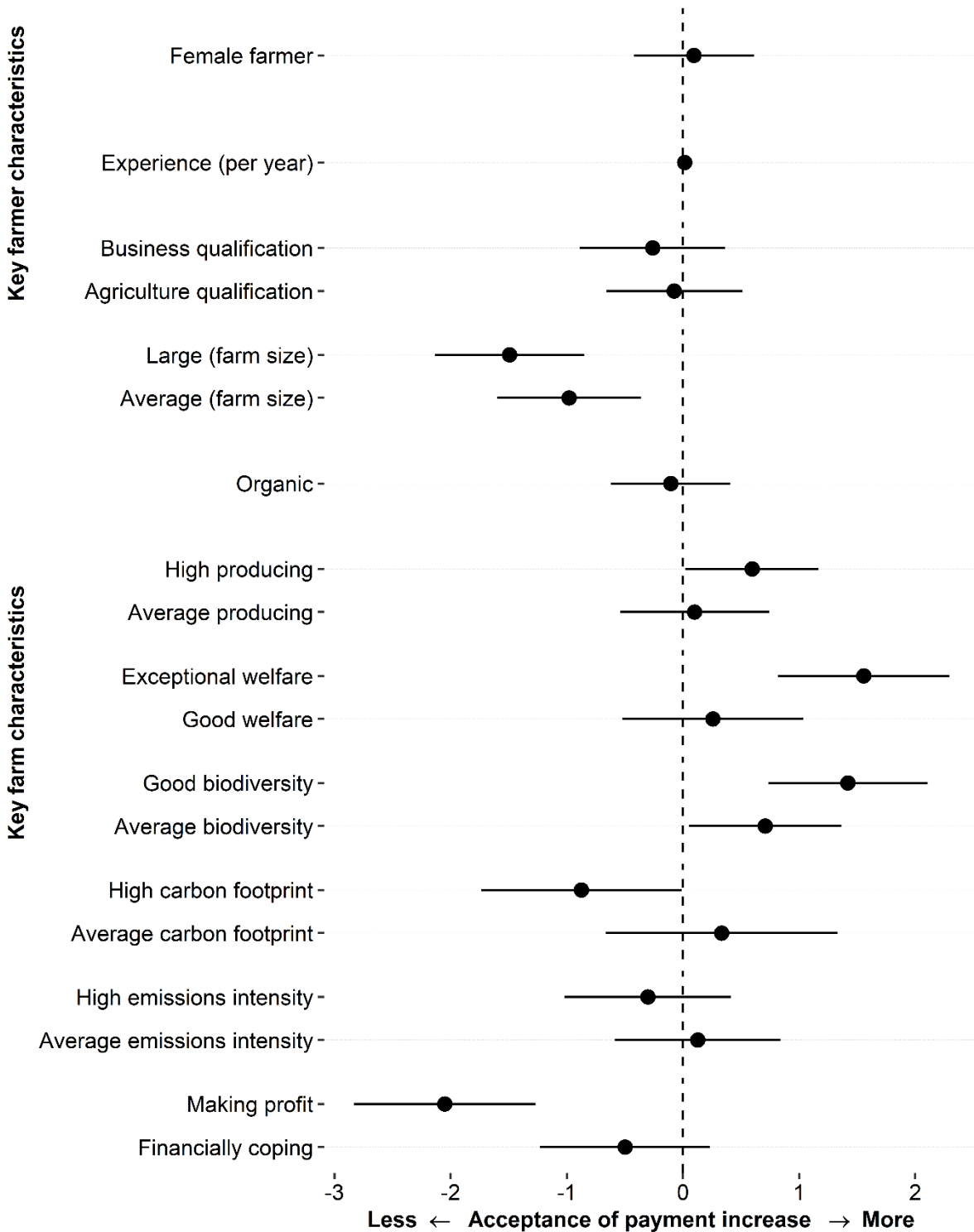


Figure 3. A plot to show the regression coefficients for attribute levels included in the vignette description (all else being equal). Note: Coefficients indicate the effect of a farm/farmer having the given characteristics on the general **acceptability** of a proposed payment increase to respondents. Attribute levels are presented with characteristics of the farmer at the top, and characteristics of the farm below. Error bars are 95% confidence intervals. The effect is significant where error bars do not cross the zero-line.

B: Fairness of payments

37. Are payments to farmers perceived to be unfairly low or high? This evaluation concerns notions of distributive justice in agricultural support. It addresses the question of which farm, in the eye of the Scottish public, is more deserving of agricultural support payments through government.
38. The main findings were:
- a. On average, respondents perceived payments to larger farms (as opposed to moderately or smaller sized farms) to be less fair.
 - b. Payments made to organic farms as opposed to conventional farms were evaluated to be fairer.
 - c. Payments made to farms with greater levels of efficiency in production relative to comparable farms were seen as fairer.
 - d. Exceptional standards with respect to animal welfare (beef, dairy, sheep farms) and exceptional product quality (cropping farms) were associated with higher fairness ratings.
 - e. Farms which perform better environmentally by offering better conditions for wildlife and having lower carbon footprint per unit of output and for the whole farm attracted higher ratings of fairness of payments.
 - f. Payments made to farms that make a profit were more likely to be rated as unfairly high than payments made to farms that make a loss.
 - g. All else equal, a future payment increase (decrease) had a negative (positive) effect on fairness ratings.
39. The effects of attributes on fairness ratings may be expressed in terms of payment offsets, that is, the % change in payments that is required to offset the presence of an attribute expression in a vignette, all else equal. This is shown in Figure 4, which clearly demonstrates the relative influence of the different attributes on overall fairness ratings.

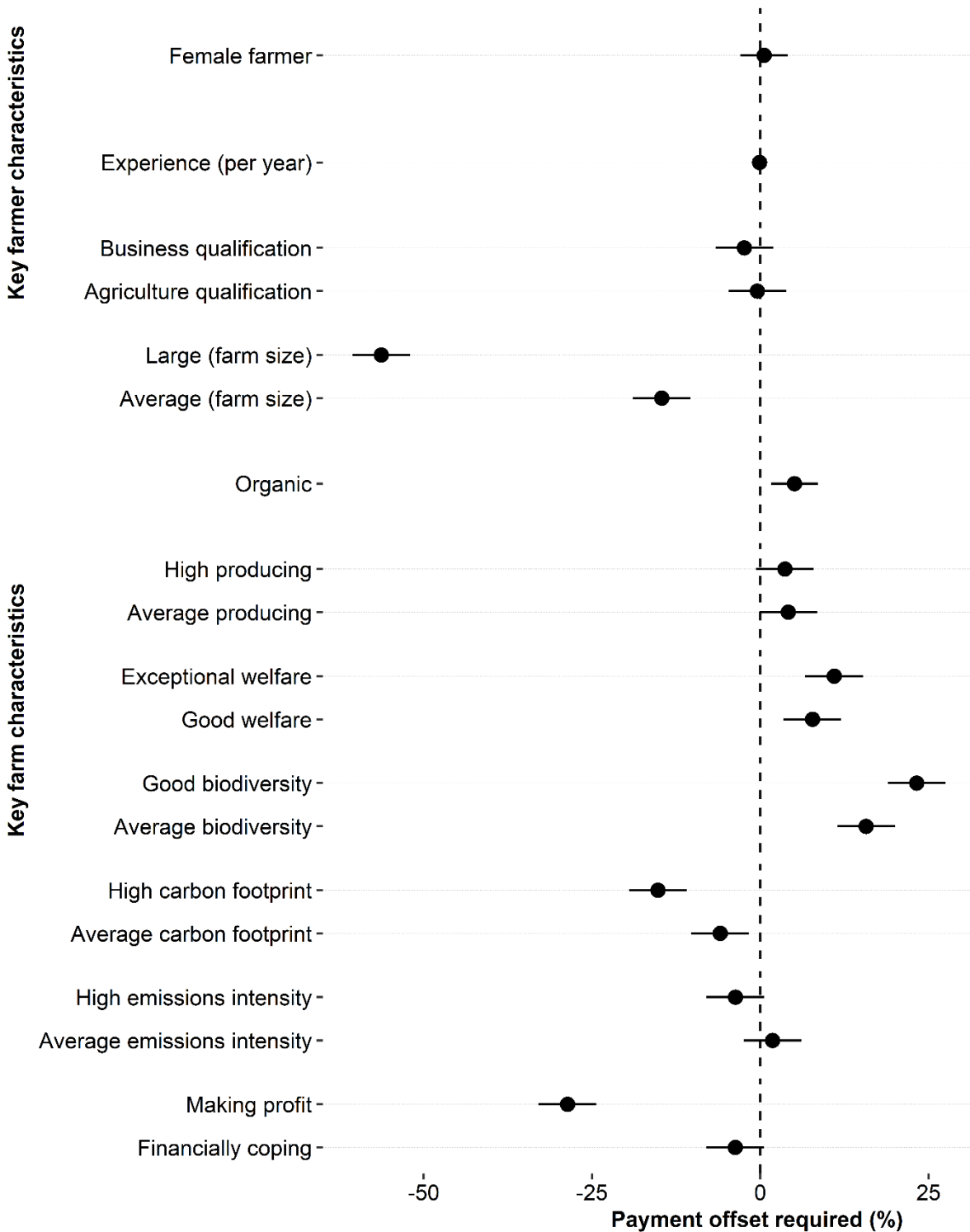


Figure 4. A plot to show the payment offset required if a given attribute level is included in the vignette description (all else being equal). Note: Values indicate the effect of a farm/farmer having the given characteristics on the payment offset required if respondents are to judge the proposed payment change as **fair**. Attribute levels are presented with characteristics of the farmer at the top, and characteristics of the farm below. Error bars are 95% confidence intervals. The effect is significant where error bars do not cross the zero-line.

C: Intention to consume

40. We asked respondents how happy they would be that the described farm/farmer would supply them (directly or through a store) with produce. We would particularly expect features to play a role that are directly or indirectly related to consumption experience. This includes perceived product quality, in addition to aspects that promote environmentally friendly consumption. Also, characteristics of farmers may be expected to play a role, since they could be perceived as important factors determining food quality and production standards. However, factors related to payments and finance might be expected to be unrelated to preparedness to be supplied by a farm. Our results, illustrated in Figure 5, confirm the above assumptions.

41. The main findings were:

- a. Farmer characteristics affected intention to consume produce of a farm. Greater experience of a farmer and having an agricultural degree increased willingness to be supplied by the farm.
- b. Respondents, as consumers, preferred to be supplied by small or moderately sized farms compared to larger farms.
- c. All else equal, consumers preferred to be supplied from organic farming systems rather than conventional systems.
- d. Greater levels of production efficiency relative to similar farms had a positive effect on respondents' willingness to be supplied by a farm.
- e. Higher standards of animal welfare (beef, dairy, sheep farms) and product quality (cropping farms) enhanced ratings of willingness to be supplied by a farm.
- f. Better environmental performance (biodiversity; carbon footprint per unit or for the whole farm) had strong effects on stated intentions to consume produce of a farm.

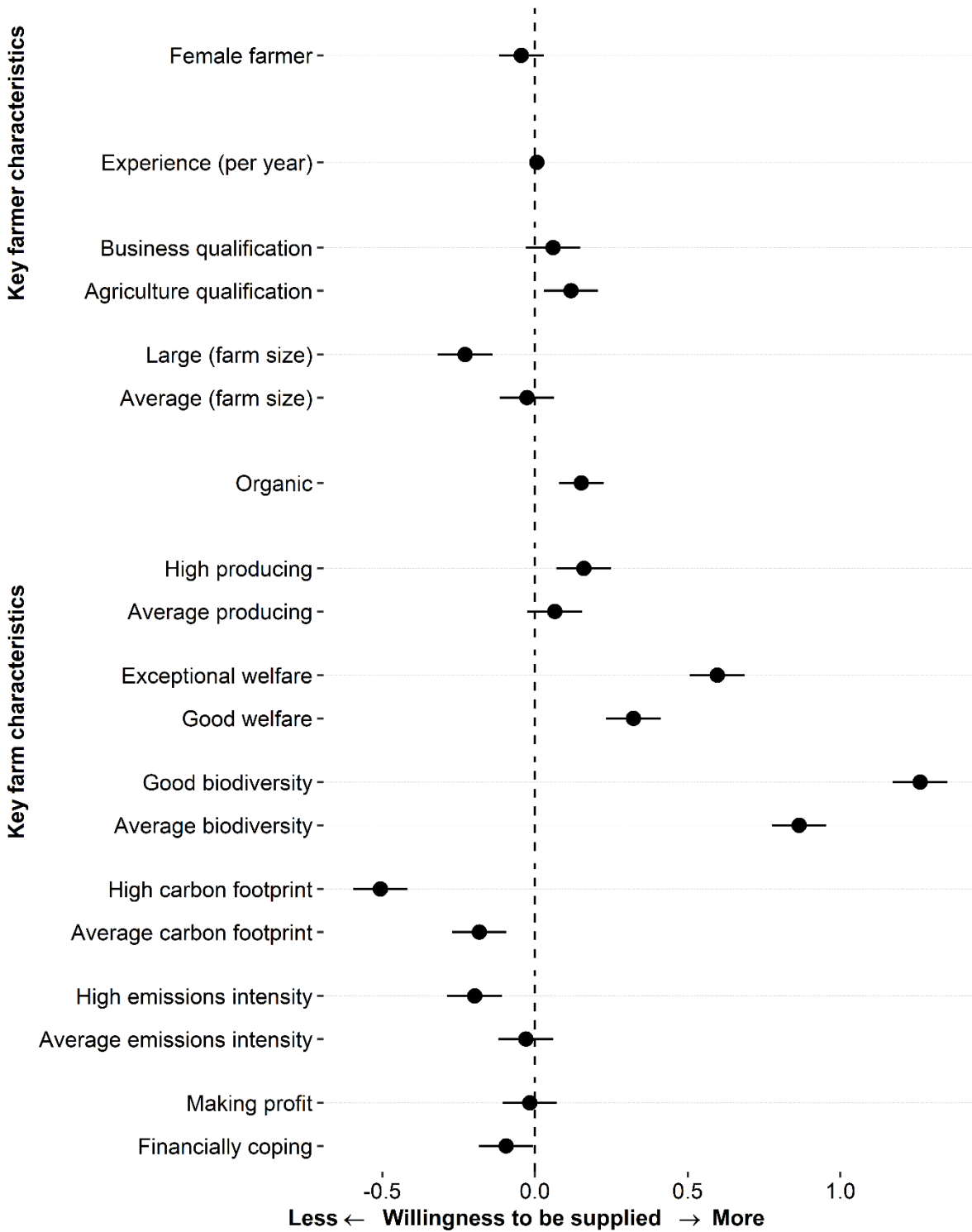


Figure 5. A plot to show the regression coefficients for attribute levels included in the vignette description (all else being equal). Note: Coefficients indicate the effect of a farm/farmer having the given characteristics on the willingness of a respondent to be **supplied** with produce by them. Attribute levels are presented with characteristics of the farmer at the top, and characteristics of the farm below. Error bars are 95% confidence intervals. The effect is significant where error bars do not cross the zero-line.

Intention to petition

42. As another measure of social acceptance of government support, we asked respondents about their willingness to sign a petition with a local MSP in support of a farmer, in the hypothetical situation that government income support for farmers like the described one would be discontinued. Willingness to act on behalf of someone else is a strong indicator of support and combines notions of A, B and C above. Figure 6 provides a summary of effects of attributes on willingness to write to a local MSP.

43. The main findings are:

- a. As the only farmer characteristic affecting intention to engage with local politicians, having an agricultural qualification has a positive effect.
- b. Larger farms are associated with lower willingness to sign a petition on behalf of a farmer in support of continued support payments.
- c. Organic production and great production efficiency both increase willingness to petition.
- d. Better farm performance with respect to animal welfare standards (beef, dairy, sheep farms) and product quality (cropping) have a positive effect on a respondent's stated inclination to petition.
- e. Conditions for biodiversity has the strongest effect on willingness to write to local MSPs in support of continued payments to the farmer. Carbon footprint (per unit and for the whole farm) has a lesser but also statistically significant effect. Lower carbon footprint enhances willingness to petition.
- f. Farms that making a loss are more likely to find support through willingness to petition, compared to farms that are coping or that are profitable.

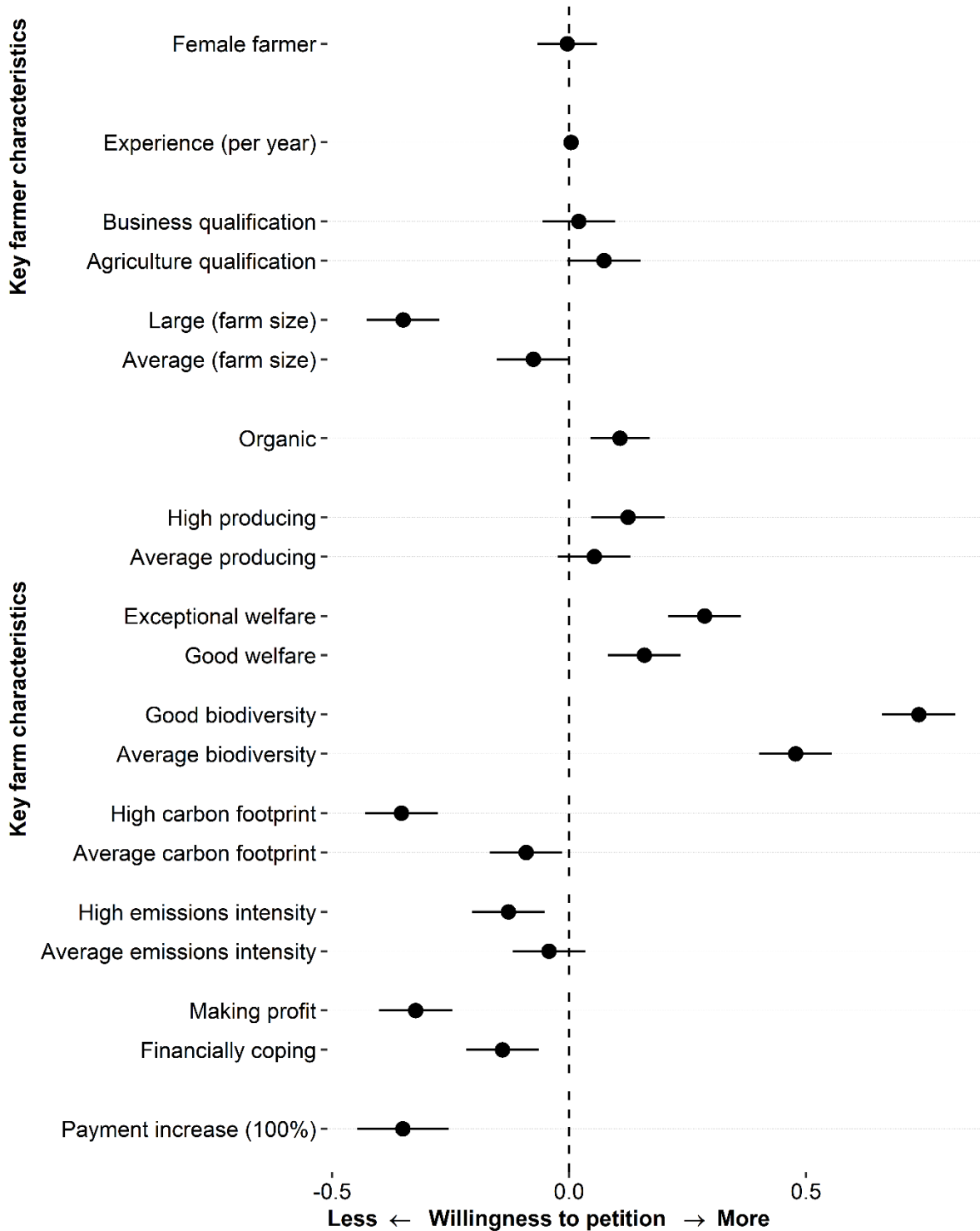


Figure 6. A plot to show the regression coefficients for attribute levels included in the vignette description (all else being equal). Note: Coefficients indicate the effect of a farm/farmer having the given characteristics on the willingness of a respondent to be **petition** their local MSP, should payments be withdrawn. Attribute levels are presented with characteristics of the farmer at the top, and characteristics of the farm below. Error bars are 95% confidence intervals. The effect is significant where error bars do not cross the zero-line.

Factorial survey: Infographic

44. The infographic on page 21 (Figure 7) shows how ratings of farmers and farms based on the four criteria for judgement following the vignettes differ for three stylised farmers and their farms. It also shows which of the farm and farmer characteristics had significant effects on respondents' evaluations. The results clearly show that the regression models achieve a considerable level of discrimination between described farms. They also show a consistent ranking of the three farmers concerning all four measures of social acceptance included in the survey.

45. A pdf copy of the infographic is available from Klaus.glenk@sruc.ac.uk

Social Acceptance of Government Support Payments In Agriculture

Results of a factorial survey in Scotland

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Social acceptance of government income support for agriculture depends on characteristics of farms and of farmers. Using evaluations made by respondents to an online survey, social acceptance is measured on an 11-point scale using four dimensions A-D. Regression models predict scores for three stylised farmers.

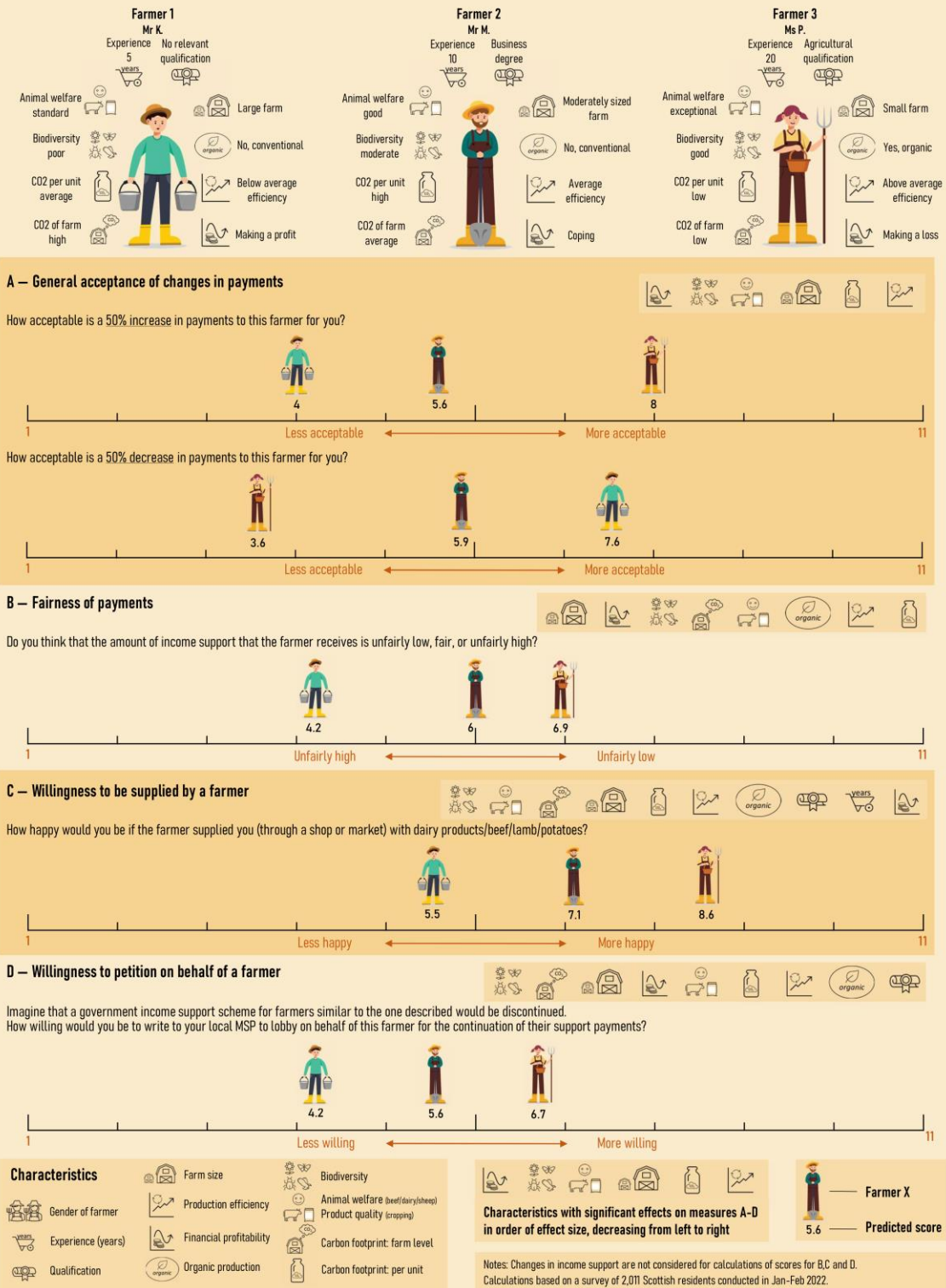


Figure 7. Infographic on main findings of factorial; survey experiment

Best–Worst scaling

46. The Best–Worst Scaling section of the survey was used to explore the objectives of a new agricultural support scheme. Only respondents who believed farmers should receive *any* government support (if they meet certain environmental or welfare standards) took part in this section ($n = 1799$). Therefore, in principle, 89% of respondents were supportive of agricultural income support payments.
47. We used the count method firstly to explore preferences at the sample level, and then for some select segments of the sample.
48. Figure 8 shows a summary of the best–worst data. At the sample level, respondents believed the most important objective of a new agricultural support scheme should be to produce high quality food that is safe to consume. However, there was also a strong belief that farmers who improve their animal health and welfare standards should be rewarded. As for the least important objectives, at the sample level, the bottom three were: maintaining activity on land that is difficult to farm, supporting the uptake of organic farming, and encouraging a shift in production so less comes from animal-sources. However, the latter two were selected slightly more often as best compared to maintaining activity on disadvantaged land – even though they were lower in the overall ranking. Within the sample, it is very likely that heterogenous preference groups exist, whose values and motivations will drive different rankings of the objectives.

Therefore, the aggregate preferences of the sample should be interpreted with some caution. However, some of the differences in values and motivations that drive heterogeneous preferences may be associated with respondent characteristics that were captured in other questions of the survey. Figure 9 is a bump chart that shows how the ranking of traits differs between the whole sample and three segments of the sample, namely: those who are not financially well-off, those who live in large urban centres, and those who strongly support pro-environmental causes. For the first two of these groups, rankings were similar, especially for the objectives at the extremes; the five most and three least important objectives were the same for both groups. For the pro-environmental group, the ranking changes substantially, with only one objective of the three most and three least important objectives remaining. For this group, almost one third of the objectives were more important than the production of food (that is of high quality and safe to consume), these include reducing emissions, and improving carbon storage and biodiversity.

A new agricultural support scheme should ...



Figure 8. Preferences for different objectives of a new agricultural support scheme for all respondents ($n = 1799$). Note: The scale of the horizontal axis is mirrored from zero, and shows the total number of times an objective was selected by all respondents in all choice sets as most important (blue bars, right of zero-line) or least important (red bars, left of zero-line). The black stars show the number of times an objective was selected as most important minus the number of times it was selected as least important (Most-Least score). On the vertical axis, objectives are ordered according to their rank position based on the Most-Least score.

A new agricultural support scheme should ...

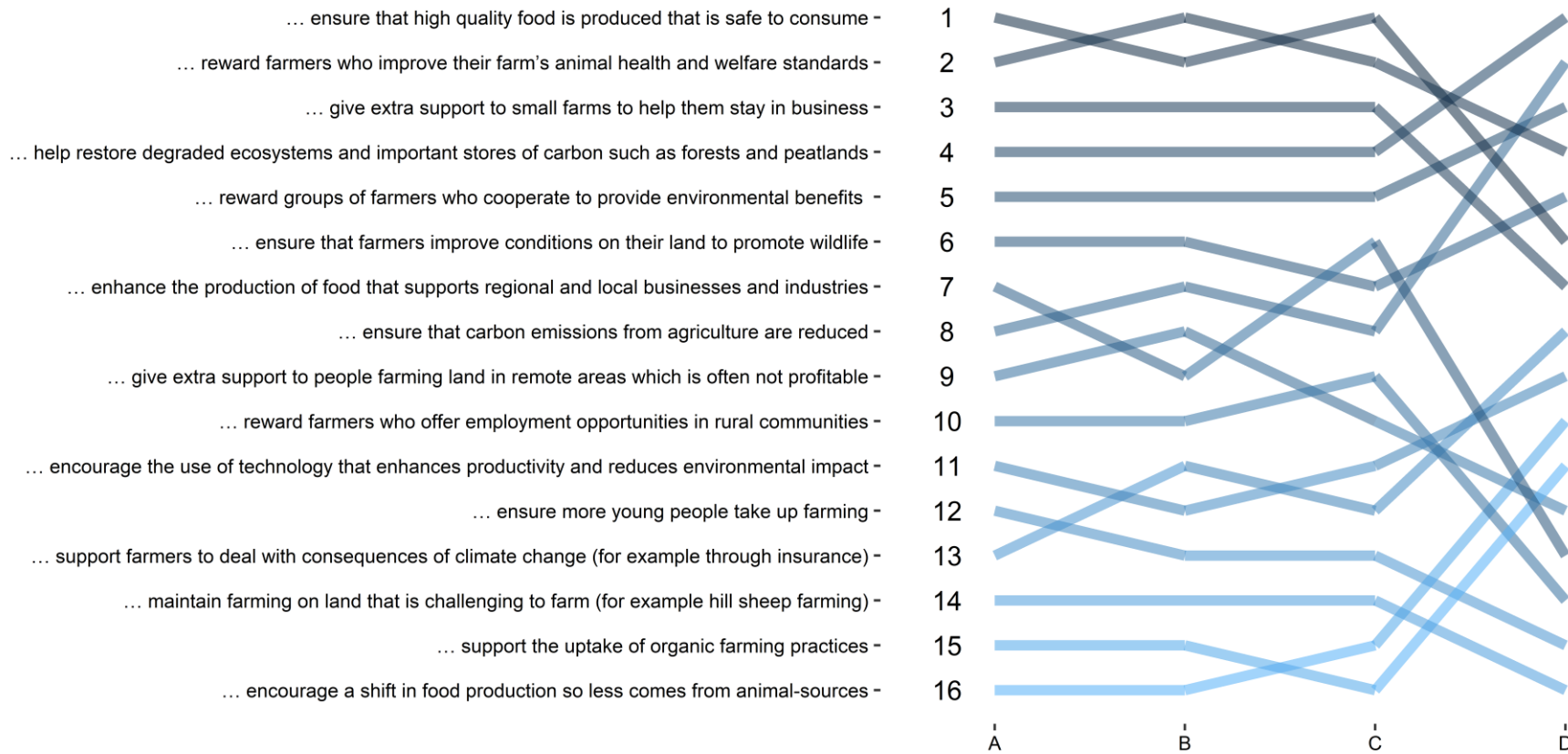


Figure 9. This bump chart shows the rank position of objectives at the sample level, and according to some select segments of the sample based on the Most–Least score. Note: On the horizontal axis, A is all respondents (n = 1799); B is just respondents who are not financially well-off (n = 902); C is just respondents living in the largest settlements (population of at least 120k) (n = 547); D is just respondents who are strongly pro-environment (e.g. donated/protested/petitioned to/for environmental causes) (n = 104). On the vertical axis, objectives are ordered according to their rank position in A. The rank positions of objectives in A are also given as annotations at the beginning of their line and lines are shaded for ease of comparison (e.g., the objective ranked in 1st position by A, is ranked in 6th position by D)

49. In summary, these results indicate that:

- a. For many people, the most important function of a new agricultural support scheme should be to produce high quality food that is safe to consume. This is a reassuring result, and suggests people recognise the substantial value of food provision (that is of high quality and safe to consume) from agriculture and agricultural producers.
- b. It appears very important that the health and welfare of farmed animals is a priority for most people. This may be indicative of growing awareness of issues surrounding the welfare of farmed animals. It may also indicate a cognizance of potential for spill-over of zoonosis from captive animal populations. However, despite the importance placed on this objective, many believe it is least important that a new agricultural support scheme should encourage a shift in dietary habits to less animal-sourced food.
- c. The most and least important functions of a new agricultural support scheme are generally agreed by larger respondent groupings, only the mid-ranking objectives are more contentious. However, even preferences for objectives at the extremes of the 'importance scale' will likely differ for smaller respondent groups, who may see the externalities of agricultural production as conflicting with deep-rooted values for other services that can be provided by agricultural land, e.g., public goods.

Conclusions and Outlook

50. Members of the public were generally supportive of Scottish government to provide government support to farmers if they meet certain environmental or welfare standards.
51. It is reassuring that members of the public perceived agricultural support to first and foremost safeguard the production of high-quality food that is safe to consume.
52. Distributional fairness appears to resonate widely. Results of both experiments (factorial survey and BWS) show a strong preference for support to be directed towards smaller farms. This is not an artefact of perceived correlations of smaller farms with other desirable features; at least concerning features considered in the factorial survey. This demonstrates the usefulness of an approach using an experimental design.
53. Environmental performance, specifically related to biodiversity, carbon emissions and the use of nature-based solutions, is an important driver of perceptions regarding guiding principles for future support schemes and social acceptance of payments. This affirms that an increasing focus on payments for public goods provision would be widely supported by the public.
54. Our findings do not consider heterogeneity in evaluations and preferences across the four farm types considered (beef, dairy, sheep, cropping). Results are also reported as averages across all respondents, while results such as the large number of choices of items as both most and least important in the BWS exercise point to the presence of considerable heterogeneity across the sample. Understanding how effects of characteristics on judgments in factorial surveys and preference rankings in BWS depend on socio-economic characteristics will be subject to further in-depth analysis.
55. Government interventions at the scale of agricultural support payments should arguably be scrutinized for their legitimacy. Legitimacy can arise from different sources, and different criteria can be used in an appraisal. We argue that one such source is the public; and take a novel approach focusing on individual farmers and their businesses to assess social acceptance of payments in a robust way. This is complemented by a ranking of guiding principles for the design of an agricultural support scheme, providing decision makers with information on which aspects of a support scheme might be contested in the eye of the public.

Acknowledgements

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Appendix

Appendix 1. Detailed list of attributes and attribute expressions included in the factorial survey

	Attribute	# Levels	Level expressions																				
1	Gender	2	Mr. Ms. ... in combination with pronouns ... in combination with randomly chosen first letter of surname B, D, F, H, J, M, R, P, S, T																				
2	Experience	3	5 years ago 10 years ago 20 years ago																				
3	Formal qualification	3	An agricultural qualification A business degree No relevant qualification																				
4	Size	3	Small Moderately sized Large																				
5	Production type	2	Conventional (rather than organic) Organic (rather than conventional)																				
6	Production level	3	Lower than average Average Above average																				
7	Animal welfare/Product quality	3	<u>Dairy/beef/sheep:</u> Standard Good Exceptional <u>Cropping farm:</u> Poor and is mainly used for livestock feed Decent with some used for livestock feed and some for human consumption Exceptional and is mainly used for human consumption																				
8	Biodiversity	3	Poor Moderate Good																				
9	Carbon footprint per farm	3	Amongst the lowest Average Amongst the highest																				
10	Carbon footprint per unit of output	3	Low Average High																				
11	Financial situation without government support	3	Not profitable (makes a loss) Coping (making neither profit nor loss) Making a profit																				
12	Changes in payments	6	6 levels if used for follow up question regarding justification for payment (too low/high) Decrease of 50% Decrease of 25% No change Increase of 10% Increase of 25% Increase of 50%																				
-	Payments (displayed amounts combine info from 4 and 12)		Absolute amounts linked to farm size and specific for farm type (in £1k/year): <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>Cropping</th> <th>Beef</th> <th>Dairy</th> <th>Sheep</th> </tr> </thead> <tbody> <tr> <td>Small</td> <td>10</td> <td>10</td> <td>20</td> <td>5</td> </tr> <tr> <td>Moderately sized</td> <td>30</td> <td>20</td> <td>30</td> <td>10</td> </tr> <tr> <td>Large</td> <td>70</td> <td>60</td> <td>60</td> <td>40</td> </tr> </tbody> </table>		Cropping	Beef	Dairy	Sheep	Small	10	10	20	5	Moderately sized	30	20	30	10	Large	70	60	60	40
	Cropping	Beef	Dairy	Sheep																			
Small	10	10	20	5																			
Moderately sized	30	20	30	10																			
Large	70	60	60	40																			

Appendix 2. Response scales (corresponding to example vignette shown in Figure 1)

How acceptable are the described changes in payments to this farmer for you?

1: Fully unacceptable	2	3	4	5	6: Neither acceptable nor unacceptable	7	8	9	10	11: Fully Acceptable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The farmer described, Ms. M, will obtain **£6.25k per year in support payments**.

Do you think this amount is an unfairly low level of income support, a fair level of income support, or an unfairly high level of income support?

1: Unfairly low level of income support	2	3	4	5	6: Fair level of income support	7	8	9	10	11: Unfairly high level of income support
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

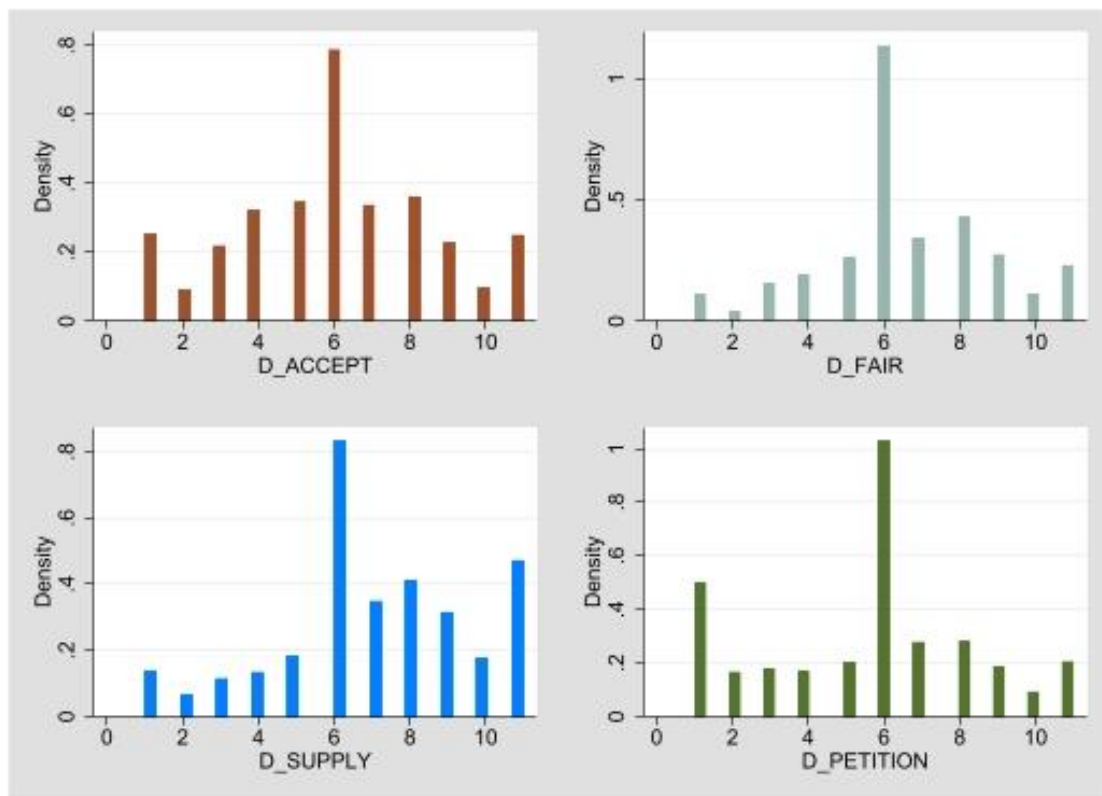
How happy would you be for Ms. M to supply you (through a shop or market) with **lamb**?

	1: Very unhappy	2	3	4	5	6: Neither happy nor unhappy	7	8	9	10	11: Very happy
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not buy or eat lamb	<input type="checkbox"/>										

Imagine that a **government income support scheme for farmers** similar to Ms. M would be **discontinued**. How willing would you be to write to your local MSP to lobby on behalf of this farmer for the continuation of their support payments?

1: Not willing at all	2	3	4	5	6: Neither willing nor unwilling	7	8	9	10	11: Very willing
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix 3. Histograms showing distribution of response variables for four measures of social acceptance (see Appendix 4 for details on variables)



Appendix 4. List of variables included in models based on factorial survey data

Label	Description	Coding
D_ACCEPT	How acceptable are the described changes in payments to this farmer for you? (1: Fully unacceptable; 11: Fully acceptable)	1 to 11
D_FAIR	The farmer described, farmer X, will obtain Y per year in support payments. Do you think this amount is an unfairly low level of income support, a fair level of income support, or an unfairly high level of income support? (reverse coded; 1: Unfairly high level of income support; 11: Unfairly low level of income support)	1 to 11
D_SUPPLY	How happy would you be for farmer X to supply you (through a shop or market) with Y? (1: Very unhappy; 11: Very happy)	1 to 11
D_PETITION	Imagine that a government income support scheme for farmers similar to farmer X would be discontinued. How willing would you be to write to your local MSP to lobby on behalf of this farmer for the continuation of their support payments? (1: Not willing at all; 11: Very willing)	1 to 11
Female	Gender: female (ref: male)	0,1
Experience	Experience in years	5,10,20
AgriQual	Agricultural qualification (ref: no relevant qualification)	0,1
BuinessQual	Business degree (ref: no relevant qualification)	0,1
Size_mod	Size of farm: moderately sized (ref: small)	0,1
Size_large	Size of farm: large (ref: small)	0,1
Organic	Production type: organic (ref: conventional)	0,1
ProdLevel_average	Production level: average (ref: lower than average)	0,1
ProdLevel_high	Production level: above average (ref: lower than average)	0,1
AW_ProdQual_good	Animal welfare: good (ref: standard)	0,1
AW_ProdQual_exceptional	Product quality: decent with some used for livestock feed and some for human consumption (ref: poor and is mainly used for livestock feed) Animal welfare: exceptional (ref: standard)	0,1
Biodiversity_moderate	Product quality: exceptional and is mainly used for human consumption (ref: poor and is mainly used for livestock feed) Biodiversity: moderate conditions for wildlife (ref: poor conditions for wildlife)	0,1
Biodiversity_good	Biodiversity: good conditions for wildlife (ref: poor conditions for wildlife)	0,1
CarbonFarm_average	Carbon footprint – whole farm: average (ref: among the lowest)	0,1
CarbonFarm_high	Carbon footprint – whole farm: amongst the highest (ref: amongst the lowest)	0,1
CarbonUnit_average	Carbon footprint – intensity per unit of output: average (ref: low)	0,1
CarbonUnit_high	Carbon footprint – intensity per unit of output: high (ref: low)	0,1
Finance_coping	Financial situation: coping (does not make a profit, does not make a loss) (ref: not profitable (makes a loss))	0,1
Finance_profit	Financial situation: making a profit (ref: not profitable (making a loss))	0,1
Payment	Percentage change in income support payments to farmer	-0.5,-0.25,0,0.1, 0.25, 0.5
Constant	Constant – value of dependent variable when all independent variables equal 0	-

Appendix 5. Model results based on factorial survey data

	Acceptance of changes in payments (D_ACCEPT)		Fairness of payments (D_FAIR)		Intention to consume (D_SUPPLY)		Intention to petition (D_PETITION)	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Female	-0.09	-1.78	0.01	0.32	-0.04	-1.2	0.00	-0.13
Experience	0.00	-0.34	0.00	-0.7	0.01	2.05	0.00	1.53
AgriQual	-0.06	-1.02	-0.01	-0.2	0.12	2.59	0.07	1.87
BuinessQual	0.11	1.62	-0.05	-1.08	0.06	1.29	0.02	0.52
Size_mod	-0.05	-0.71	-0.29	-6.69	-0.03	-0.58	-0.08	-1.92
Size_large	-0.09	-1.21	-1.10	-25.76	-0.23	-5.02	-0.35	-8.93
Organic	0.06	1.08	0.10	2.84	0.15	4.08	0.11	3.34
ProdLevel_average	0.03	0.43	0.08	1.9	0.07	1.43	0.05	1.35
ProdLevel_high	0.07	1.02	0.07	1.67	0.16	3.51	0.12	3.16
AW_ProdQual_good	0.14	1.73	0.15	3.55	0.32	7.07	0.16	4.04
AW_ProdQual_exceptional	0.13	1.42	0.21	5	0.60	13.07	0.29	7.26
Biodiversity_moderate	0.00	-0.02	0.31	7.2	0.86	18.97	0.48	12.19
Biodiversity_good	0.00	-0.05	0.45	10.6	1.26	27.61	0.74	18.75
CarbonFarm_average	0.28	3.06	-0.12	-2.74	-0.18	-4.02	-0.09	-2.33
CarbonFarm_high	0.19	1.61	-0.30	-6.98	-0.51	-11.17	-0.35	-9.06
CarbonUnit_average	-0.18	-2.15	0.04	0.83	-0.03	-0.65	-0.04	-1.09
CarbonUnit_high	0.12	1.7	-0.07	-1.69	-0.20	-4.33	-0.13	-3.27
Finance_coping	-0.11	-1.26	-0.07	-1.69	-0.09	-2.07	-0.14	-3.59
Finance_profit	0.19	2.73	-0.56	-13.07	-0.02	-0.36	-0.32	-8.23
Payment	0.76	1.4	-1.96	-36.4	-0.07	-1.28	-0.35	-7.13
Constant	5.67	30.07	6.09	69.93	6.23	64.53	5.29	57.74
Female x Payment	0.18	0.84						
Experience x Payment	0.02	0.98						
AgriQual x Payment	-0.02	-0.07						
BuinessQual x Payment	-0.37	-1.49						
Size_mod x Payment	-0.93	-3.76						
Size_large x Payment	-1.40	-5.53						
Organic x Payment	-0.16	-0.79						
ProdLevel_average x Payment	0.07	0.27						
ProdLevel_high x Payment	0.52	2.36						
AW_ProdQual_good x Payment	0.12	0.38						
AW_ProdQual_exc x Payment	1.42	5.05						
Biodiversity_mod x Payment	0.71	2.66						
Biodiversity_good x Payment	1.42	5.1						
CarbonFarm_average x Payment	0.05	0.12						
CarbonFarm_high x Payment	-1.07	-3.35						
CarbonUnit_average x Payment	0.30	1.08						
CarbonUnit_high x Payment	-0.42	-1.43						
Finance_coping x Payment	-0.39	-1.35						
Finance_profit x Payment	-2.24	-6.79						
Number of Vignettes	12066		12066		12066		12066	
Number of respondents	2011		2011		2011		2011	
R-sq overall	0.04		0.13		0.07		0.02	

Note: coefficients significant at the 10% level ($z \geq 1.645$) are highlighted in bold



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