Ending Live Animal Exports

Primary Authors: V. Cox, J. Finetti
Review: K. Sarek, L. Platt

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Final Report: Ending Live Animal Export from the UK

Executive summary

We find that the UK public would support a ban on live exports, both for slaughter and fattening. 66% of the British public would prefer British farm animals to be slaughtered in the UK and exported as meat, and many find the export of British farm animals to other countries to be reared under conditions illegal in the UK unacceptable.

We recommend a complete ban on live animal transport, including to the RoI, as the most impactful policy. It would spare 559,298 animals from experiencing the long, stressful journey abroad and ensure they are slaughtered and raised according to the high welfare standards of the UK. However, this policy risks introducing capacity issues that could worsen animal welfare in the short term, and would be less likely to be accepted due the political nature of the border with RoI. As such, it needs to be designed carefully and alternatives should be considered. A ban excluding the RoI would carry less risk and would be more likely to pass, but it would reduce the number of animals affected to 35,545.

A partial ban on export for slaughter including exports to RoI would spare more animals from long journeys than one on export for fattening, affecting 457,619 animals for slaughter compared to 101,679 for fattening. However, it would not ban the worst journeys to Spain, which are the long 60-hour journeys made by young calves intended for veal production. If RoI were excluded, an export ban for fattening would lead to a greater impact, with 31,941 animals affected compared to 3,604 for slaughter.

We considered additional reforms informed by the welfare issues identified that could be introduced to improve welfare during any live animal transport. We find that limiting journey length, mandating better and more rest stops, reducing stocking density, introducing a minimum age for transport, improving transport conditions, and improving enforcement of current laws, would be particularly beneficial to adopt along with the ban.

It is clear that a ban on live exports will have huge welfare benefits for the animals who experience this horrific practice. With a ban in place these animals would instead be slaughtered and/or raised within the UK and their meat exported. As a result they will experience much shorter journeys to the location of slaughter or fattening, resulting in a significant improvement in welfare. Shorter transport times means that they will be less at risk of the potentially severe harms faced by transported animals due to stress, injury, disease, and maltreatment. Moreover, these animals will no longer be at the mercy of other countries' welfare laws and practices during raising and slaughter, which may be significantly worse than our own.

When comparing the socio-economic and environmental externalities of transporting live animals compared to meat, we find less clear evidence and are less confident in these effects compared to the welfare implications of this policy. A cost-effectiveness study conducted for other European countries demonstrates the efficiency gains from transporting meat compared to live animals. For almost every aspect of their analysis, we find suggestive evidence that the model would apply to the UK. We find some evidence of overcapacity in slaughterhouses in the UK, indicating that demand for slaughter could be absorbed under a ban and that economies of scale could ensure profits are gained from this change. In terms of other socio-economic implications, we find that the evidence for employment gains is weaker, and tariffs on meat export after Brexit might lead farmers to lose profits. These dynamics should be carefully examined, anticipated, and addressed. Finally, we find that through increased numbers of trucks and animals living on ships, the environmental impact of transporting live animals in terms of emissions and ocean pollutants is moderately higher than with the transport of meat.

We are confident that a complete ban on live animal transport would meaningfully improve animal welfare. However, our research is limited by a number of factors. In particular, we did not conduct deep research into the broader political context, focusing instead on evidence for the welfare, socio-economic, and environmental implications of the policy. As such, our policy recommendations should be taken as a guide rather than a definitive conclusion.

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1 Introduction

Background

Every year, the UK exports over half a million live animals to other countries on very long journeys typically lasting between 18 hours to several days. Brexit presents an opportunity for the UK to maintain its status as a role model for animal welfare, by raising the standards above what was agreed upon among the countries of the European Union (EU). This report presents evidence for the impact a ban on live animal export would have if adopted by the UK.

Political context for farm animals

The United Kingdom (UK) is a role model for animal welfare, systematically implementing better standards than other countries in its region and the world. However, some inhumane practices persist, and taking steps towards eliminating them would allow the country to maintain its positive influence. Brexit presents an opportunity to do that by raising the standards above what was agreed upon among the countries of the European Union (EU).

This report focuses on one of the worst practices still in place in the UK: the export of live animals. The Conservative Party already announced its commitment to improving this trade, and the Prime Minister Boris Johnson himself has promised measures: *"We will end excessively long journeys for slaughter and fattening – one of the many benefits of leaving the European Union."* [1]. Through evidence and careful analysis, we argue in this report that following through on these commitments would have a large positive impact for UK citizens and animals.

The problem

Every year, the UK exports over half a million live animals to other countries. A great number of these animals are sheep transported in long journeys to France, the Netherlands, and Belgium to be fattened or slaughtered. Additionally, calves are transported at a very young age when they are still extremely vulnerable, all the way to Spain for fattening (see Table A1 in Appendix). These journeys typically last between 18 hours and several days.

A large majority of UK citizens and consumers believe in the importance of protecting animal welfare, in particular during transport. Yet, there is an abundance of evidence that these animals experience horrific conditions throughout these journeys. Animals transported across borders for long hours or even days have a high chance of dying, and are vulnerable to a number of infectious diseases like

conjunctivitis and salmonellosis. Animals often arrive injured and their weight loss is telling of the great amount of stress they have endured. Added to the harm of the journey itself, once abroad, animals are no longer under UK jurisdiction, which is much more welfare friendly than other neighbouring countries.

Beyond welfare concerns, the transport of animals compared to meat is economically and environmentally inefficient. Indeed, things like welfare control points, cleaning requirements, the number of trucks required to transport animals compared to meat which can be more densely loaded, leads to higher costs and emissions. Although there might be transition costs of shifting activities from live animal export to meat processing, the animals exported in proportion to all animals farmed in the UK indicates this would be feasible, and beneficial to the industry overall.

Scope of the report

The goal of this report is to present evidence for the impact of a ban on live animal export in the UK under different scenarios. In the rest of this report, we first go over the evidence of welfare issues related to the trade of live animals, including that of the UK citizens and farm animals. We then provide an overview of its socio-economic and environmental externalities. Finally, we describe the impact different policy scenarios for the ban on live animal export would have and make a recommendation.

We consider different policy scenarios based on our understanding of the main oppositions to the ban, and which one the UK government is more likely to review in order to address these oppositions. We assess the impact of a complete ban of all live animal exports and a partial ban on either export for slaughter or fattening, both with variation in the geographical scope, including or excluding exports to the Republic of Ireland (RoI). Our impact assessment focuses on the number of animals, welfare conditions during the journeys banned, risks associated with the policy, and level of acceptance.

After a brief discussion of the limitations of our research, the report ends with a summary conclusion.

2 Evidence of the impact on welfare

2.1 Impact on human welfare

Banning live exports would have a positive impact on human welfare, through meeting UK consumers' expectations of high animal welfare and by reducing the risk of animal diseases that impact human health.

Citizen and consumer preferences

98% of UK consumers think that it is important to protect the welfare of farmed animals and 76% believe that the welfare of farmed animals should be better protected than it is now [2]. It is clear that one area where UK consumers wish to see an improvement is in the welfare of animals during transport through an end to live exports.

UK respondents rated transport as the greatest welfare issue facing UK cattle and sheep, listing it as a greater welfare concern than their housing, health, slaughter, nutrition, and stockmanship/management [3]. UK animal experts (from veterinarians and industry representatives to academics), not just UK consumers, also share a similar concern, ranking the welfare of cattle and sheep in transport as the highest priority welfare issue facing these animals due to its severity, duration, and prevalence [4]. Banning live exports is an obvious first step to improving the welfare of animals during transport and raising UK welfare law to match the expectations of UK consumers.

There would be strong support for a ban on live exports for slaughter. Two-thirds (66%) of the British public would prefer British farm animals to be slaughtered in the UK and exported as meat, with just 6% thinking they should be exported live [5]. Moreover, there would also be strong support for a ban on live exports for fattening as many members of the public find the export of calves to other countries to be reared under conditions illegal in the UK unacceptable [6].

Direct benefits for human health

Banning live exports will not only be a positive for consumers through meeting their expectations for high welfare conditions in the UK. There are also various other human-related factors to consider when advocating for this legislation. The most important of these is the disease spread, and subsequent concern for human health, that can be caused by the export of live animals.

When cattle are kept off food and water for periods longer than 24 hours, which is often the case when cattle are exported to continental Europe, the population of potentially lethal pathogens increases exponentially in the gastrointestinal tract, leading to a major risk of carcass contamination [7]. The pathogen load builds up rapidly in an animal's empty gastrointestinal tract and can contaminate the carcass if slaughter occurs before the rumen has had a chance to reestablish its normal flora and fauna. This is likely to take about 2 weeks, given suitable feed and environmental conditions [8]. It is clear that these two weeks will not be met when cattle are exported for slaughter in Europe. Banning live exports will reduce the risk of carcass contamination as journeys inside of the UK do not exceed 24 hours, preventing the growth of the potentially lethal pathogens that cause this contamination.

The more you move animals, the more you run the risk that diseases will spread through these animals. Although there are other routes to transmission (for example, viruses can be transmitted in meat products), disease transmission is much more efficient via live animals [9]. Therefore, replacing the export of live animals with a meat carcass only trade will reduce the spread of disease.

2.2 Impact on animal welfare

There is good evidence that live export has significant negative impacts on animal welfare, and that a shift to carcass trade would be beneficial for the welfare of the animals involved. This report will describe the literature on the welfare impact of live transport.

Measures of welfare for transported animals

There are no universally agreed-upon measures for the welfare of animals during transport. However, Pines et al. 2007 surveyed relevant knowledgeable stakeholders to determine that mortality, clinical disease incidence, respiration rate, space allowance, and ammonia levels are among the best indicators [10]. We also believe that as a simple rule of thumb, the longer the journey, the worse the welfare of the animals being transported as there will be more time, and therefore more opportunities, for the numerous welfare risks of transport to take hold.

Mortality

Data for mortality of live export animals from the UK is not available, but Australian live export mortality from 2000-2012 was, on average, 0.98% for sheep, and 0.14% for cattle [11]. There have also been instances of high mortality for UK live export animals, such as the euthanasia of 45 sheep in September 2012, which have caused

public concern [12]. If we naively assume that live export mortality is the same for UK export as it is in Australia, this would mean up to 5,153 individual sheep and 47 individual cattle die in transit from the UK each year.

Causes of mortality vary for cattle and sheep. For cattle, the main causes of mortality are respiratory disease (~50% of deaths), heat stroke, trauma (incl. lameness), and other diseases such as enterotoxaemia and septicaemia [8,13–15]. For sheep, mortality is mainly caused by inappetance (refusal to eat, usually due to a switch from pasture to pellet-based food; ~50% of deaths), salmonellosis (~20% of deaths), and trauma (~10% of deaths) [8,15,16]. Deaths of this nature seem at least in the majority significantly worse for animal welfare than slaughter, so a switch to a carcass trade would be better for the welfare of thousands of animals yearly.

Disease

Animals being exported are susceptible to many diseases, which can be causes of poor welfare. Moore et al. 2014 found that in Australian live animal exports, two thirds of their sample of transported cattle had indications of infectious lung disease, 72% showed evidence of bacterial infection, and bovine coronavirus[1] was present in up to 13% of the cattle [13]. Conjunctivitis is common on transport ships, with one paper estimating that between 5-10% of the stock have the disease (also known as pinkeye) which causes irritation and reduced welfare [8,15]. Since approximately 20% of sheep mortality is due to salmonellosis, we can assume that the disease is also prevalent, causing poor welfare outcomes (see above on mortality).

Injury

Injuries may be sustained by animals in live export such as bruising, limb abrasions, and lameness [13,17,18]. Animals are particularly at risk for injury during loading and unloading, where slips and falls become likely if ramps are steep or wet. Animals may sustain bruises from bracing due to the motion of the ship, though robust studies do not exist for this claim, unlike for road transport where the evidence for bruising is clear [8]. Injury may also occur in agonistic interactions between animals, which become more common at the higher stocking densities and with the poor management of social mixing on transport vehicles [8].

[1] Note that bovine coronavirus (BCoV) is a different virus from that which has caused the ongoing COVID-19 pandemic (SARS-CoV-2).

Stress

Stress, anxiety, and fear can be evidenced by both behavioural and clinical outcomes. Animals undergo significant social stress due to high stocking densities and being intermixed with unfamiliar animals [8]. Higher stocking densities can make animals less likely to lie down, possibly due to a fear of being trampled (ibid.). Agnes et al 1990 indicates that 'loading and noise have an important role in transport stress', and noise levels of 96 dB can induce hormonal stress responses [19]. The practice of 'curfewing' (restricting or removing food and water from animals before they are transported) likely also induces stress as the gastrointestinal tract empties, and this can increase the harmful pathogen load [8]. It is thought that neophobia and handling by humans could be significant contributors to stress, but no robust measurement of this exists. Clinical outcomes thought to be linked to stress include 'dehydration, bruising, weight loss, salmonellosis in sheep and respiratory disease in cattle.' (ibid.), which as illustrated in the subsections above, appear to be quite common, suggesting that stress is a common welfare issue for transported animals.

Heat stress

Overheating has been identified as a major cause of poor welfare in live export. Caulfield et al. 2014 write '[Temperatures] routinely experienced during live export are associated with core temperatures and respiratory rates that indicate failure to cope and therefore poor welfare.' [20] Models such as those by Carnovale et al. 2020 and Pines et al. 2013 show that this is a pervasive welfare issue in live export, which may be exacerbated by high ammonia concentrations due to excreta [21,22]. However, the literature is based once again on Australian export, which is likely to involve much more extreme temperatures than UK export, so this may not be as much of a concern for UK animals.

Welfare concerns specific to calves and lambs

Young calves and lambs are exported from the UK for fattening and slaughter, which presents particular welfare problems. Knowles 1995 found that young calves cannot cope with long journeys and are at particular risk of poor welfare outcomes from transport. Their immune systems are not fully developed and are vulnerable to heat and cold stress [23]. Moreover, calves often 'succumb, usually within four weeks, to secondary disease as a consequence of their inability to respond appropriately to transport.' (ibid.). Weeks 2007 also found that calves are vulnerable to stress from vibration and acceleration, and suffer weight loss due to stress [24]. As well as this, the transport of calves and lambs who are unweaned poses particular problems, as cold water is an inappropriate liquid for their digestive

system. Unweaned animals should be given electrolytes or milk substitutes. However, milk replacer cannot realistically be offered on board a vehicle.

Inadequacies and noncompliance with welfare laws

Welfare laws governing live export are in place to mitigate some of these animal welfare concerns. However, across Europe and in the UK there are widespread problems with the efficacy of this legislation: '[I]nconsistencies in enforcement of transport legislation within the EU and/or ineffective penalties for non-compliance mean that legislation is all too often ignored with serious welfare implications for the transported animals. Reports of welfare infringements en route are not uncommon and include: overstocking; illegal route plans; inadequate road vehicles; and sick, injured and dead animals.' [8] Moreover, a 2011 review of the live export regulation notes major problems with enforcement including falsified journey logs, inconsistency of penalties between member states, and 'recurring examples of poor compliance' such as overstocking, transport of sick animals, and insufficient access to water [25]. After being taken to court by Compassion in World Farming [26], the Scottish government have halted live calf exports after conceding that this trade was being conducted in breach of the legislation on the protection of animals during transport [26].

Quantitatively, EU data on 2018 inspections of transport consignments show that non-compliance is a serious problem [27,28]. These inspections report on consignments that have animals unfit to travel, do not respect proper conditions of transport, and lack welfare provisions for animals transported such as feeding and water. Although consignments leaving the UK have a non-compliance rate of 1% or under, in France 16% of bovine inspections have been found to be non-compliant, and 10% of ovine-caprine [sheep and goat] inspections have been found to be non-compliant (Tables A2-A4). Because of this, we cannot be confident that welfare laws are being followed once the animals leave the UK.

Poor slaughter and production conditions in country of destination

In the UK, laws that apply at slaughter and during the raising of animals provide protection of animal welfare. However, when we export animals for slaughter or fattening, we leave them at the mercy of the laws of their country of destination. This may lead to significant loss of welfare if the laws in those countries are weaker or are less well enforced. EU countries we export to such as Spain and France have weaker animal welfare laws than the UK, both scoring a C to Britain's B in World Animal Protection's Animal Protection Index, a holistic measure of legal protections for animals [29]. Slaughter practice may lead to poor welfare in these countries; for

example, in Spain up to half of animals are slaughtered without prior stunning due to the greater proportion of animals slaughtered in line with religious doctrine [30].

Depending on the final destination of exported animals, they could suffer very significant welfare losses. It is possible that animals who have been exported to the EU, where welfare laws are at least moderately effective, are then taken further to other destinations such as African countries, as Boris Johnson has claimed [31]. In many of these countries, welfare regulations are minimal, including no requirement for stunning prior to slaughter [32], and enforcement of extant welfare laws is severely lacking as highlighted by the scores given to the African countries rated in World Animal Protection's Animal Protection Index. The index ranks a majority of African countries F (where G is the lowest possible score), with the highest score being D, accorded to two East African countries [29].

3 Externalities

We expect the replacement of the live animal trade with a meat carcass-only trade to have an impact outside of its direct effects on UK citizens and animal welfare. These externalities are socio-economic and environmental in nature.

3.1 Socio-economic impact

Banning live animal export between the UK and European countries would have a number of socio-economic externalities.

Cost-effectiveness of transporting meat

This policy is likely to lead to cost savings for the industry. Indeed, there is evidence that transporting meat is more cost-effective than transporting live animals. Baltussen et al. (2017) conducted an comparative analysis of the transport of lambs from Hungary to Italy and found that slaughtering the animals in Hungary and transporting the meat to Italy as opposed to transporting animals alive to be slaughtered in Italy was €0.34 cheaper per kg of meat sold [33]. This is explained by the additional costs and loss that come with the transport of live animals, in particular transport costs, slaughter costs, and technical costs.

Transport costs

In their analysis, they found two main channels driving the transport costs higher for live animals. Firstly, there is a higher number of trucks required for the same amount of meat because meat can be loaded more densely in a truck than animals alive. This means there are higher costs related to truck drivers, fuel, and to the depreciation, maintenance, and interest of trucks. Note that in the analysis for lamb transport from Hungary to Italy, this was partly but not fully compensated by refrigerated trucks using more diesel than trucks transporting animals [33]. A report by the Sustainable Food Trust on the evolution of abattoirs and its consequences for producers in the UK highlights that these costs are applicable to the UK context too, and that there are potentially others such as the upgrade of trucks to those that are a better fit for travelling in traffic heavy roads and longer distances: "All this has caused a huge increase in our costs, both in relation to the abattoirs' charges to return carcases to us over considerable distances, and in terms of the cost of transporting the live animals so much further, which in addition to fuel and maintenance costs has included the repeated scaling-up of our 4-wheel drive vehicle and livestock trailer so that it is now suitable for the speeds and stress

of motorways and rush hour traffic, as well as larger loads to help reduce the cost per animal." [34].

Secondly, transporting animals involves additional charges related to animal health, cleaning, and animal welfare control, which are not required for the transport of meat. Animal welfare control posts can involve fines if trucks are stopped at departure for animals being unfit to travel. For example, in the 2012 Ramsgate accident in the UK, the "*Director of Channel Livestock had been given a suspended prison sentence and ordered to pay £5,000 in costs by Dover Magistrates. The company was also fined £4,000 and ordered to pay £10,000 in costs" [35].*

Slaughter/production costs

While transport costs always seem to be lower for meat compared to live animals, it is unclear whether profits would be higher or lower if slaughter (or production in the case of calves) took place in the origin country instead of destination countries. In the Baltussen et al. analysis, profits were higher for lamb slaughter in Hungary instead of Italy, but they were not for their second case study comparing hen slaughter in Netherlands instead of Poland [33]. One would have to compare the slaughter and production costs in the UK with its destination countries, as well as the selling value of deadweight compared to liveweight on the market.

The value of meat significantly increases after slaughter [36]. However, it is unclear whether the slaughter and butcher costs in the UK are lower than the difference between the price of live and dead animals sold to EU countries. We remain uncertain as to whether this increase in value leads to the transport of meat being more cost-effective for the UK industry. It may be that profit would only occur if animals are slaughtered in larger abattoirs compared to small abattoirs because they have higher margins [37]. A deeper analysis of the market prices in France, the Netherlands, Belgium and Spain for both slaughter and fattening would be needed to fully assess the profits and losses.

When looking only at the slaughterhouses' profit, the increase in demand for slaughter is likely a benefit since larger slaughterhouses report lack of economies of scale as one of the reasons why their margin remains tight [34]. It is clear that the UK has the slaughter capacity to absorb an increase in demand this policy would have. Indeed, banning the live export of sheep would increase the local slaughter demand by less than 3.6% given that the UK already slaughters over 14 million head per year. In the case of cattle, the ban on live animal export would lead to a 1.3% increase in UK slaughter demand. This percentage is lower than the variation we can see between years – for example, between 2019 and 2020 an increase in cattle

slaughter demand of 9% occurred [38] (see calculations in Tables A5 and A6). It seems largely feasible, especially if the policy is introduced gradually. The Sustainable Food Trust report highlights that there would indeed be capacity in some large abattoirs: "Due to the construction of mega-slaughter houses there is significant overcapacity in Welsh abattoirs of 24,000 cattle and over 1.2 million extra sheep annually could be slaughtered" [34].

Technical loss

As described in earlier sections of this report, the transport of live animals can be dangerous to their health and their own life, which beyond the concern for their welfare would lead to economic loss. Below are some examples of these losses.

- Weight loss

Immediately post transport calves show a significant decrease in body weight that averaged 1.4kg in summer and 2kg in winter [24]. Looking at the liveweight price/ kg, this average corresponds to a £3 loss per head, or £26,000 loss counting only cattle exported for slaughter. There is certainly a loss for calves transported for fattening as well, though it may not be a direct loss in price but an increase in time spent on the farm to compensate for the weight loss.

In a study carried out on the transport of lamb, authors found that for over a hundred lambs transported for 6 to 16 hours for slaughter, body weight loss was 4-5% [39]. This is not an isolated case study, as it is common for sheep to spend an additional day or two after transport and before slaughter, to allow animals to regain weight [40]. In terms of direct price impact using the liveweight price/ kg, this loss corresponds to a loss of £2.9 per head, or £1.3 million loss.

- Disease

We compared a list of some of the diseases caused by transportation to a list of the diseases that cause meat to be classified as unfit for human consumption [13,41], and found no crossover between the two. The list is not exhaustive, so it may be possible (but unlikely) that disease caused by transport can make meat unfit for human consumption. As such, live animal transport is not likely to result in a loss of profit through meat deemed unfit for consumption when compared to transporting meat.

- Deaths

As mentioned in the previous section, we can estimate using data from Australian exports that around 5,153 individual sheep and 47 individual cattle die in transit

from the UK each year (see section on animal welfare). Economically this accounts for about £340,000 lost per year.

Employment and gains to the local economy
Given the increase in demand for slaughter and production will be marginal, it is unlikely there will be a large increase in employment as a result of this policy. Although the contribution in terms of employment is fairly small, with only a few additional jobs created through the ban of live exports, it will benefit the sector as the demand for slaughter will increase and there will be economies of scale if the animals are slaughtered in large abattoirs.

Potential negative impact on socio-economic outcomes for farmers
The live animal export trade represents a substantial economic activity for the UK. It is particularly important for Northern Ireland, as 98% of its animal export relies on the transport of live animals to the Republic of Ireland. Banning live export would therefore put a stop on this economic activity. However, it seems likely that the UK and Northern Ireland in particular will just shift from a live export trade to a carcass or chilled meat trade, which would also require creating jobs and trading goods.

Producers are also worried that they would benefit lower margins from selling live animals to UK slaughterhouses compared to selling them for exports. This was raised by members of the National Sheep Association (NSA), who highlighted that processed meat may be subject to tariffs after Brexit, making the profits smaller for them compared to selling live animals [42].

Although it may be true that the tariffs for meat would increase more than for live animals, we believe one argument could be made to address this concern. The EU's exports into the UK will also face tariffs, so the farming sector may have more money to cover these tariffs. "If tariffs were applied on both UK beef exports and imports, as the UK is a net importer of beef, the overall effect would be an increase in domestic beef prices and so lead to improved margins, if all else remained equal." [43] That being said, this is unlikely to be the same for sheep, as the UK does not import as much sheep meat as it exports (European Commission, 2018). The government would therefore have to take the necessary measures to compensate farmers who might be losers of this transition. Given the increase in margin from beef producers, additional resources would be available to do so in the medium term.

Other potential negative impacts and how they can be addressed are outlined in this Eurogroup for Animals report.

3.2 Environmental benefits

Based on the analysis conducted by Baltussen et al., 2017 it seems clear that the transport of live animals emits more CO_2 and NO_x per kg of meat compared to transporting meat. They found that in the case of transport from Hungary to Italy, live animals cost around 100g per kg of meat, and these distances are typically shorter than the routes from the UK to France or Spain. It is again related to the fact that animals cannot be loaded as densely as meat, meaning that live animal transport requires more movement of trucks. Finding from the study: "*CO_2, and NO_x emissions were about 85% higher in the case of long-distance transport of animals compared to long-distance transport of meat. This was because one consignment with a truck carries about five times more meat when carrying carcasses than when carrying live animals. This was partly compensated by a refrigerated truck using about 20% more diesel than a truck transporting live animals.*". It is worth noting, however, that though these gains are evident, they do not correspond to a very large impact when put in monetary terms and compared to the other gains from transport and technical loss.

Live export vessels generally discharge untreated effluent into the ocean, which likely has negative effects on the marine environment. A report focused on Australian live animals exports predicts that for a standardised ship with 1,000 cattle, daily effluent production could be as high as 600-800kg per day [44]. Ships transporting chilled meat would discharge effluent only from their human staff members, which is significantly less damaging to the marine ecosystem. This negative externality is particularly relevant to the trade of live cattle between the UK and Spain, and a complete ban would therefore lead to significant environmental benefits.

4 Policy comparison and recommendation

This section goes over and compares the different policy scenarios for banning live animal exports, offers a policy recommendation, and lists other transport welfare reforms to consider.

4.1 Policy scenarios

The policies explored below have been chosen based on their ability to affect a large number of animals and from our research for the previous sections above. The existing literature mostly debates whether an exemption for genuine cross-border trade should be included in a live export ban, so we mostly focus on this distinction.

These policies all seek to improve the welfare of the many individuals that are currently exported live from the UK. Banning these live exports will mean that instead of being transported overseas, these animals would be slaughtered and/or raised within the UK and their meat exported. Their journey times to the location of slaughter or fattening will be greatly reduced. Not undergoing these long journeys overseas will be a significant improvement in welfare, since they will avoid the potentially severe harms faced by transported animals due to stress, injury, disease, and maltreatment. They will also in the majority of cases not have to travel over the sea, meaning they do not have to undergo stressful loading and handling at port. Since these animals will be slaughtered and raised in the UK, they will not be at the mercy of other countries' welfare laws and practises during raising and slaughter, which may be significantly worse than our own.

1. Ban live animal export, including to the Republic of Ireland (RoI)

Description
Exporting live animals outside of the UK for both slaughter and fattening will be banned, including to the Republic of Ireland. This policy is the most inclusive of all bans, and if passed would lead to the largest number of animals affected.

Welfare impact
This policy would spare 559,298 animals from experiencing the long, stressful journey abroad and instead they will be slaughtered and raised according to the high welfare standards of the UK.

More specifically, this will mean that the 454,015 animals currently exported to the RoI for slaughter and 69,738 animals exported for fattening would be spared the

estimated 9.5 hour journey from the UK to the Republic of Ireland. Additionally, 3,604 animals exported to Europe for slaughter and 31,941 animals for fattening would be spared the journey. These journeys to mainland Europe range from a duration of 18 hours for the journey to France, to 60 hours to Spain.

Risks and mitigation

Although this policy would affect the largest number of animals, it carries some risks of negative externalities on animal welfare. All the risks associated with the different policy scenarios are summarized in Table A7.

- Overall capacity issues - High impact, Medium risk

The main risk with a ban on live animal export that includes the Republic of Ireland is the increase in slaughter and production demand in the UK, potentially beyond its current capacity. Over 500,000 sheep would have to be slaughtered in the origin location, corresponding to a 3.6% increase in sheep slaughter demand, and over 30,000 cattle would have to be slaughtered, or a 1.3% increase in cattle slaughter demand. In terms of production, close to 25,000 cattle and over 75,000 sheep would have to be raised and fattened in the origin location, corresponding to a 0.3% and 0.2% increase in production respectively (see calculations in Tables A5 and A6). Even if these seem like small increases from the status quo, it is possible that this would worsen the animals' welfare conditions during slaughter and production if they are geographically concentrated. This would be true if there is little extra capacity in slaughter houses or farms, and the increase results in higher density of animals. This could be especially bad if instead of building new slaughterhouses or increasing the capacity of existing slaughterhouses, slaughterhouse line speeds are increased. This could result in fewer animals being effectively stunned before slaughter, increasing the risk of poor welfare at the time of killing.

- Capacity for calves - High impact, Low risk

An additional but less likely risk with the ban on export for fattening of young calves, is the increase in the killing of these animals at birth. Rearing beef from these dairy calves is uncommon in the UK and there may be a lack of specialized farms to do so if they are not exported. That being said, this is a less likely risk given that there has been a trend of producers successfully rearing dairy calves for beef as in the past seven years *"the number of dairy calves being retained for rearing in Great Britain has increased by 58 percent and the number of calves being killed on farm has declined by 36 per cent" [45].* It is likely that they would be able to absorb the relatively small number of animals concerned by this practice (~24,000 per year).

To counter these risks, the policy could be accompanied by measures to protect the welfare of animals. New slaughterhouses may be opened to ensure there is enough capacity in the UK to absorb the increase in demand. The process could also be done progressively to ensure that it is well managed. Finally, a monitoring system could be put in place in slaughterhouses and farms that have increased their scale and absorbed part of the demand to ensure that they have maintained their welfare standards.

Level of acceptance
This policy would receive strong opposition from advocates for maintaining economic activities between Northern Ireland and the Republic of Ireland, as 98% of the total value of Northern Ireland's animal exports comes from live animals traded with the RoI [46]. By including the Republic of Ireland in the ban, this policy would be a step away from a soft border. People may especially advance these arguments for animals raised very close to the border and only transported for a few hours, though we do not know the proportions of animals traded that come from mainland UK, then to Northern Ireland and on to the Republic of Ireland.

The measures taken to protect animal welfare in the UK as a result of an increase in slaughter and production demand might be perceived as expensive and restrictive. They would add monitoring costs and regulations for slaughterhouses and farms absorbing the demand, which they did not have when running at smaller capacity.

This policy does have economic advantages in terms of employment creation and increase in economic activities around the production and slaughter of animals.

Overall it seems like a hard sell and we expect that there is a lower chance of this policy passing compared to other policies excluding the Republic of Ireland.

2. Ban live animal export, excluding to the Republic of Ireland (RoI)

Description
Exporting live animals outside of the UK for both slaughter and fattening will be banned, with an exception for genuine cross-border trade between Northern Ireland and the Republic of Ireland. This policy will ban the longest, and therefore the worst, export routes (those from the UK to mainland Europe), but will allow Northern Ireland and the Republic of Ireland to continue their important cross-border trade (with 98% of the total value of Northern Ireland's animal exports going to the Republic of Ireland).

Welfare impact

This policy would spare 35,545 animals from experiencing the long, stressful journey to mainland Europe. Instead they will face shorter journey times and will be slaughtered and fattened closer to where they were raised (either in the UK or RoI).

More specifically this will mean 3,604 animals exported to Europe for slaughter and 31,941 animals exported for fattening would be spared the long and stressful journey from the UK. These journeys to mainland Europe can range from a duration of 18 hours to France and 60 hours to Spain.

Risks and mitigation
This policy carries some risk of enforcement and additional risks for animal welfare.

- Soft border used as trade passage - High impact, Low risk

Under this policy scenario, there is a risk that the transport of live animals to other European countries continues legally by using the border between Northern Ireland and the Republic of Ireland as a trade passage. Aside from the risk of practical enforcement of the ban, this could lead to animals being transported for even longer journeys, as they would go through the Irish border first instead of being transported directly from England. It would therefore worsen the conditions for animals compared to before the ban.

This risk can be mitigated by introducing stricter control at the border to ensure that the Republic of Ireland is the final destination. This could take the form of documentation transporters are required to carry, that specifies who the animals are sold to and certifies it is their final country destination.

- Non-compliance with World Trade Organization (WTO) - High impact, Low risk

The exclusion of the Republic of Ireland from the ban could be perceived as non-compliant with the WTO trade rules, and the UK would have to justify the specific conditions that would permit a trade restrictive measure not to apply to Ireland, but to all other countries. This type of exemption has never been argued or defended before at the WTO.

For several reasons, we think it unlikely that the EU would dispute a ban on live exports with an exemption for Ireland. The shorter journey length between the UK and RoI means that the welfare concern is less acute than for the much longer journeys to the EU mainland, and the high concern for animal welfare in the EU reduces the likelihood that it will dispute a measure that aims to protect welfare. Finally, there is a unique and politically delicate relationship between the RoI and

the UK, and we expect that the EU would understand the need to protect this. As such, we consider the risk that the EU will dispute a ban on live exports that exempts the RoI to be low.

- Capacity for calves (see under policy 1) - High impact, Low risk

As with policy 1, there could be a concern about the lack of capacity to rear calves. Overall capacity and capacity for slaughter in particular is less of an issue here given the smaller number of animals that would have to be slaughtered in the UK.

Level of acceptance

This policy would not disrupt Ireland's trade with its neighbouring country, which would be a big advantage and selling point, while still banning the worst journeys. The risk of using this as a trade passage to legally ship animals to other European countries seems easier to advocate for as well, as it seems to be a cross-applicable issue for a lot of goods crossing the border after Brexit. Overall, we believe this policy has a medium chance of passing.

3. Ban live animal export for slaughter but not for fattening
    a. *If including RoI*

Description

Exporting live animals outside of the UK for slaughter will be banned, including to the Republic of Ireland. This policy will impact the majority of animals exported live: those that are destined for slaughter.

Welfare impact

This policy would spare 457,619 animals exported for slaughter from experiencing the long, stressful journey abroad. Instead, they will be slaughtered according to the high welfare standards of the UK.

More specifically this will mean that 454,015 animals currently exported from the UK to the Republic of Ireland for slaughter would be spared the estimated 9.5 hour journey. The 3,604 animals exported to other European countries for slaughter would be spared the journey. These journeys to mainland Europe can range from a duration of 18 hours to France, to 60 hours to Spain.

This will result in a significant welfare gain from avoiding long distant transport and the associated welfare harms. Moreover, as these animals will be slaughtered in the UK they will be more likely to be slaughtered humanely. Evidence has been found to suggest that welfare law is better enforced in the UK than in France or

Spain (as seen in these country's rankings on World Animal Protection's Animal Protection Index) [29].

However, only banning exports for slaughter will mean that 101,679 animals will still be exported for fattening. This will mean that these 101,679 animals will still be subjected to long journeys overseas and the welfare losses that come with these long and stressful journeys: stress, injury, disease, and maltreatment. In fact, these animals are the ones who likely experience the longest, and therefore worst, journeys as many of them undergo the 60 hour transport to Spain. Moreover, these animals may be exported to systems used in mainland Europe which would be illegal under UK law (such as white veal crates).

Risks and mitigation
This policy carries some risk of enforcement and additional risks for animal welfare.

- Overall capacity issues - High impact, Medium risk

As with the first policy scenario, because animals exported for slaughter account for the majority of this trade, this would result in a large increase in demand for slaughter in the UK.

- Slaughter ban bypass - Medium impact, Medium risk

Because exports for fattening would still be allowed, it may still be possible for producers to export live animals previously transported for slaughter under a production (fattening) health certificate. This is already done for sheep slaughtered a few days after arriving at their final destination, due to abattoirs not being able to slaughter them immediately or to allow the animals to regain their weight [40]. It is therefore very plausible that producers would use this label to continue exporting live sheep to be slaughtered abroad.

It seems like there are easy measures that could be taken to reduce the risk of using production certificates for slaughter purposes. For example, there could be a new requirement for production certificates to be granted only for exporting animals below a certain age. With strong monitoring of the certificate distribution to ensure its implementation, this would prevent the export of older sheep exported and taken to production farms for a few days before slaughter.

Level of acceptance
In terms of trade between Northern Ireland and Republic of Ireland, this policy would have a slightly greater chance of being accepted than the total ban as it does not have as many restrictions as a full ban. For example, it would still allow for over

70,000 animals to be traded between the two countries. That being said, the majority of the trade between Northern Ireland and Republic of Ireland would have to stop, as exports for slaughter represent over 80% of live animals exported at the border.

New requirements to ensure animals are transported for legal purposes would also receive opposition. They would introduce additional costs and may leave less flexibility for producers who previously used production certificates for other reasons, such as allowing animals to regain weight before slaughter.

Overall, this policy would therefore receive the same level of opposition and risks as with policy one.

b. *If excluding RoI*

Description

Exporting live animals outside of the UK for slaughter will be banned, excluding genuine cross-border trade between Northern Ireland and the Republic of Ireland. Most animals that are exported for slaughter are exported to the Republic of Ireland, so if we exclude RoI from an export ban then the number of animals spared substantially decreases, making this the least impactful policy considered.

Welfare impact

This policy would still spare 3,604 animals from experiencing the long, stressful journey abroad. Instead they will be slaughtered according to the high welfare standards of the UK.

Currently, 3,604 animals are exported from the UK to other European countries for slaughter. These journeys to mainland Europe can range from a duration of 18 hours to France, to 60 hours to Spain..

However, as with policy 3a, this would not improve the lives of the 101,679 animals who will still be exported for fattening, where the majority suffer the longest journey of any animal exported from the UK: the 60 hour transport to Spain.

Risks

This policy carries the following risks previously discussed:

- Soft border as trade passage - High impact, Low risk
- Non-compliance with World Trade Organization (WTO)
- Slaughter ban bypass - Medium impact, Medium risk

Level of acceptance
This policy would have a higher chance of passing given that it would not restrict trade at the Irish border. The policy itself and additional requirements introduced to ensure its enforcement would overall represent a very small restriction on trade with other European countries given that exports for slaughter to countries outside of the Republic of Ireland account for less than 1% of all animals traded.

4. Ban live animal export for fattening but not for slaughter
    a. *If including RoI*

Description
Exporting live animals outside of the UK for fattening will be banned, including to the Republic of Ireland. Although more animals are exported for slaughter than for fattening, there are still substantial welfare gains created by banning export for production, the most important of which is that many long and stressful journeys and the associated welfare issues will be avoided.

Welfare impact
This policy would spare 101,679 animals from experiencing the long, stressful journey abroad for fattening. Instead they would be raised according to the high welfare standards of the UK.

More specifically, 69,738 animals exported from the UK to the Republic of Ireland for fattening would be spared the estimated 9.5 hour journey, and 31,941 animals exported to other European countries would be spared the long journeys to mainland Europe. These journeys can range from a duration of 18 hours to France, to 60 hours to Spain, with Spain making up the majority of exports.

The elimination of these long and stressful journeys is especially beneficial for the younger animals (unweaned calves and lambs) who are exported for fattening as they cannot cope with long journeys and are at particular risk of poor welfare outcomes from transport as their immune systems are not fully developed, making them more vulnerable to heat and cold stress, stress from truck vibration, weight loss, and disease. Unweaned animals are also denied access to an appropriate milk replacer whilst being transported as electrolytes or milk substitutes cannot realistically be offered on board a vehicle. Moreover, a ban on exports for fattening will mean that these animals will no longer be exported to systems used in mainland Europe which would be illegal under UK law (such as white veal crates), and instead they will be raised under the UK's high welfare conditions.

Risks

This policy carries the following risks previously discussed:

- Overall capacity issues - Medium impact, Low risk

These concerns are likely smaller for this policy, involving a smaller increase in demand.

- Capacity for calves - High impact, Low risk

Level of acceptance

Even if this policy involves reducing part of the economic activities between Northern Ireland and the Republic of Ireland, people are more likely to be favourable to this partial ban given it only stops the smallest proportion of the trade at the border.

b. If excluding RoI

Description

Exporting live animals outside of the UK for fattening will be banned, excluding genuine cross-border trade between Northern Ireland and the Republic of Ireland. If we make an exemption for genuine cross-border trade between Northern Ireland and the Republic of Ireland, then we would actually affect more animals if we were to only ban exports for fattening (rather than only banning exports for slaughter, as of course banning both would affect more animals and such would be the ideal policy option). Although animals can still be exported to the Republic of Ireland, this policy will see the ban of the longest, and worst, journeys to the mainland (those of cattle sent for fattening in Spain), creating a significant welfare gain for these animals that no longer have to suffer these long and stressful journeys and the associated welfare issues that come with them.

Welfare impact

This policy would spare 31,941 animals from experiencing the long, stressful journey abroad. Instead, they would be raised according to the high welfare standards of the UK.

More specifically, this will mean that 31,941 animals exported from the UK to other European countries for fattening would be spared the journey to mainland Europe. These journeys can range from a duration of 18 hours to France, to 60 hours to Spain.

As with policy 4a, the elimination of these long and stressful journeys is especially beneficial for the younger animals (unweaned calves and lambs) who are exported for fattening.

Risks
This policy carries the following risks previously discussed:

- Soft border used as trade passage - High impact, Low risk
- Capacity for calves - High impact, Low risk
- Non-compliance with World Trade Organization (WTO)

Level of acceptance
The chance of this policy passing is higher overall than for other policies, as it imposes less restrictions on trade and no restriction on the Irish border. There could be some opposition related to the production capacity, but less so than for policy 4a including demand increase from RoI.

Policy recommendation

Based on the findings presented in the summary table overleaf we recommend advocating for policy 1 or 2, as a full ban will lead to the greatest impact. Though including RoI will affect more animals and ensure legal enforcement, it carries the risk of introducing capacity issues and will be much less likely to pass due to the political nature of the border between NI and RoI.

Additionally, we believe that if a compromise is to be made in terms of a partial ban, focusing on banning exports for slaughter in a scenario where the RoI is included will lead to a greater number of animals spared from transport compared to exports for fattening, but will not ban the worst journeys that result in the most suffering. If RoI were excluded, an export ban for fattening would lead to a greater impact in terms of animals affected compared to exports for slaughter, and would still ban the worst journeys. Overall, bans on exports for fattening have lower risks and a higher chance of being accepted, due to capacity and enforcement issues related to the large volume of sheep exported for transport.

Table 1: Summary table: animals affected, risks, and chance of success

Colour coding in the table reflects the impact of each factor on the policy's ability to meet its goal of protecting animal welfare. For example, a low level of acceptance is coded red, as this factor risks the policy's failure; while a low likelihood of the risk occurring is coded green, as this factor improves the chance that the policy should pass successfully.

Policy	Number of animals	Welfare impact*	Impact of risks	Likelihood of risk	Level of acceptance
1 - Complete ban incl RoI	559,298	3	High	Medium	Low
2 - Complete ban excl RoI	35,545	3	High	Low	Medium
3a - Slaughter ban incl RoI	457,619	1	High	Low	Low
3b - Slaughter ban excl RoI	3,604	1	High	Medium	High
4a - Fattening ban incl RoI	101,679	2	High	Low	Medium
4b - Fattening ban excl RoI	31,941	2	High	Low	High

* We evaluate the welfare impact of each policy by the type of journeys that will be banned and the level of suffering that corresponds to these journeys, where the longer the journey the worse it is for welfare. As such, 1 denotes the least suffering alleviated and 3 denotes the most suffering alleviated, defined as follows:
1 - The longest journeys are still happening (60 hour transport to Spain). These journeys are likely to be especially bad for welfare as these are young calves being exported for fattening, and younger animals are more susceptible to the stress of transport.
2 - Long journeys to the mainland are still happening, but the longest journeys have been banned.
3 - All exports to the mainland have been banned, sparing animals these long journeys.

4.2 Additional welfare reforms

Alongside a ban on live exports, additional welfare reforms could be made to make transport inside the UK more welfare friendly.

1. Limit journey length to 8 hours

Lawmakers and animal advocates seem to agree that journeys lasting longer than 8 hours can be significantly detrimental to animal welfare; EU law stipulates that journeys over this threshold meet more stringent welfare requirements, and that rest stops occur for some species.

Straightforwardly, if live transport entails risks of welfare loss, shorter journeys should mean fewer welfare losses. However, welfare losses due to transport can compound over long distances, getting worse per hour on long journeys compared to shorter ones. This is especially likely if the animals have been undergoing curfewing (restricting or removing food and water) or have been unable to lie down due to lack of space, social stress, or neophobia.

We should therefore expect that limiting journey length is better for welfare in that it a) means animals undergo fewer hours of transport overall, and b) ensures shorter journeys which reduces the risks of compounding welfare problems from hunger, stress, and fatigue.

2. Mandate more and better rest stops

Welfare losses due to transport can compound over long distances. Some welfare laws and leading experts suggest that animals in transport should be rested after a certain amount of time in transport which may vary by species - e.g. the Sustainable Food Trust suggests rest after 4 hours for pigs but 8 hours for sheep and cattle [47]. While resting, animals would have respite from the stress of transport caused by the many new sensations, sounds, sights, etc. and would be held in more familiar conditions. They may also be given food and water, and allowed to lie down, which transport conditions sometimes do not allow.

Rest stops sometimes already occur, but they could be made more regular and could be in better conditions, e.g. providing higher-welfare housing, food, etc.

3. Limit stocking density of transport vehicles

Stocking densities can be very high during transport, which can lead to welfare losses from stress, injury, social stress, and fatigue. Higher stocking densities can result in animals being unable to lie down due to fear of being trampled.

Limiting stocking density would mitigate some of these harms by reducing the stress animals are subject to, reducing risk of injury from crushing, bruising, or adverse social interaction, and reducing fatigue by allowing animals to lie down.

4. Introduce a minimum age for live export

Young, unweaned calves and lambs face particularly acute risks of welfare losses from transport. Their immune systems are not fully developed and are vulnerable to heat and cold stress. Moreover, calves often 'succumb, usually within four weeks, to secondary disease as a consequence of their inability to respond appropriately to transport.' (ibid.). Weeks 2007 also found that calves are vulnerable to stress from vibration and acceleration, and suffer weight loss due to stress [24]. Unweaned animals can also not usually be provided with appropriate food (milk or milk replacer).

Introducing a minimum age for transportation would mitigate these harms by ensuring that only animals equipped to handle the stress of transport are transported. Young animals who would have been transported may be slaughtered in the UK, avoiding these welfare losses, or they may be raised to the appropriate age before being transported.

5. Introduce more stringent legislation on transport conditions (e.g. temperature and ventilation)

Some welfare losses from transport occur due to poor conditions on the vehicle or ship used for transport. For example, excessively high temperatures lead to ill health and death from heat stress, and poor ventilation can exacerbate heat stress and intensify other problems such as respiratory disease. Introducing legislation that mandates better conditions would mitigate these problems and therefore reduce welfare losses from these sources.

6. Improve enforcement of current laws

Although the UK already adheres to EU legislation safeguarding the welfare of animals in transport, these laws have seen repeated noncompliance and violation. Measures to improve enforcement would reduce the frequency of noncompliance and therefore improve conditions for the animals currently mistreated due to violations of these laws.

One major problem with assessing the welfare improvement provided by this intervention is that it is not clear what proportion of shipments from the UK currently violate existing legislation. In the UK in 2018, of 12,361 bovine shipments

inspected, only 2 were found to be in violation of welfare laws, or about 0.02% [27,28] However, two reviews of the EU legislation note that welfare infringements are 'not uncommon' [8] and that there are 'recurring examples of poor compliance' [25], which would seem to imply a much greater rate of noncompliance.

5 Limitations of the research

The limitations of this research are listed below, roughly in order from most to least important.

- This report does not include deep research into the broader political context of these policies, and rather focuses on evidence for its direct and indirect impacts. As such, you should see our policy recommendations as tentative and use this as a guide rather than a definitive conclusion. For example, the debate over the implications of the Good Friday Agreement for Brexit will be particularly relevant to the question of live animal export to the Republic of Ireland. The feasibility of such a ban will depend on how hard or soft the border may become.
- When assessing the impact that banning live animal exports would have on animal welfare, we were unable to find data on mortality and disease rates in animals exported from the UK so we had to use Australian data. As such, it is likely that the stated mortality and disease rates are inaccurate, although we expect the UK figures to be in the same order of magnitude.
- When assessing the potential risks that could result from our policy recommendations it was difficult to fully evaluate the extent of the issue of the soft border between Northern Ireland and the Republic of Ireland potentially being used as a trade passage, in the event that live animal exports are banned with an exemption for cross-border trade between NI and the RoI, as we do not know the proportion of animals that are currently traded that come from mainland UK, then to Northern Ireland and on to the Republic of Ireland.
- This research does not consider exports for breeding as it only reflects a tiny fraction of the UK's live exports. Therefore it is important to note that when we refer to a complete ban on live exports, we are excluding breeding.
- We are unsure whether profits would be higher or lower if slaughter (or production in the case of calves) took place in the UK instead of destination countries. A deeper analysis of the market prices in France, the Netherlands, Belgium and Spain for both slaughter and fattening would be needed here to fully assess the profits and losses.
- Our estimate of the slaughter capacity needed to absorb an increase in demand does not take into account geographical dispersion, which could neglect larger localized increases.
- For our analysis of the environmental impact coming from road transport, we merely extrapolated from the analysis done by Baltussen et al (2017) for

other countries so this might not be a totally accurate representation of the impacts we would expect to see in the UK.

- For our analysis of the environmental impact coming from sea transport, we could also only find data from Australia and so these findings might not be completely representative of the UK's live exports.

6 Conclusion

As the UK leaves the EU, we will no longer be bound by the EU's free trade rules. This presents the opportunity for the UK Government to ban the live export trade for slaughter and fattening.

This report has highlighted the impact that this ban would have on welfare, including that of UK citizens and animals. It will be positive for human welfare because it meets consumer expectations for high welfare, and has direct benefits for their health. It clearly improves animal welfare as journey times are shortened, reducing the welfare loss caused by stress, injury, disease, and maltreatment. The externalities explored in the report are less clearly benefits, but switching to a meat carcass only trade seems overall more cost efficient and environmentally efficient with little socio-economic risks.

The report ends with a policy comparison and recommendation. We recommend that the UK government enforce a full ban on live exports for both slaughter and fattening, as this will affect the greatest number of animals and prevent all of the long journeys to mainland Europe. We have considered the impact of this policy both with and without an exemption for genuine cross-border trade between Northern Ireland and the Republic of Ireland. Although including the Republic of Ireland in this ban will affect the highest number of animals, there appears to be a compelling political advantage in maintaining a soft border between these two countries while banning the worst journeys.

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Appendix

Table A1: Breakdown of animals transported alive per year to other European countries

	Cattle		Sheep	
	Slaughter	Production	Slaughter	Production
Republic of Ireland	8,672	0	445,343	69,738
Spain	0	24,770	0	0
France	0	0	3,604	1,934
Netherlands	0	0	0	2,912
Belgium	0	0	0	2,325
Total	8,672	24,770	448,947	76,909

Source: 2018 TRACES data

Note: trade of less than 1,000 animals per year have not been reported here.

Table A2: Instances of non-compliance during live animal transport inspections in the UK

UK inspections 2018				
Type of animal	Bovine		Ovine-Caprine	
Type of inspection	Numbers	%	Numbers	%
Number of inspections	12,361	100	26,087	100
Fitness for transport	34	0.28%	130	0.50%
Transport practices	14	0.11%	22	0.08%
Means of transport	12	0.10%	58	0.22%
Welfare	2	0.02%	0	0.00%
Transport documentation	18	0.15%	40	0.15%
Other	13	0.11%	17	0.07%
Total Non-compliances	93	0.75%	267	1.02%

Table A3: Instances of non-compliance during live animal transport inspections in France

France inspections 2018				
Type of animal	Bovine		Ovine-Caprine	
Type of inspection	Numbers	%	Numbers	%
Number of inspections	1,167	100	113	100
Fitness for transport	13	1.1%	0	0.0%
Transport practices	42	3.6%	2	1.8%
Means of transport	30	2.6%	3	2.7%
Welfare	18	1.5%	1	0.9%
Transport documentation	70	6.0%	6	5.3%
Other	22	1.9%	0	0.0%
Total Non-compliances	195	16.7%	12	10.6%

Table A4: Instances of non-compliance during live animal transport inspections in Spain

Spain inspections 2018				
Type of animal	Bovine		Ovine-Caprine	
Type of inspection	Numbers	%	Numbers	%
Number of inspections	718	100	652	100
Fitness for transport	68	5.8%	0	0.0%
Transport practices	3	0.3%	2	1.8%
Means of transport	3	0.3%	0	0.0%
Welfare	1	0.1%	0	0.0%
Transport documentation	99	8.5%	18	15.9%
Other	2	0.2%	0	0.0%
Total Non-compliances	176	15.1%	20	17.7%

Table A5: Slaughter demand increase under full ban including RoI

	Number	Percentage

Cattle slaughtered/ year	2,712,000	100%
Sheep slaughtered/ year	14,500,000	100%
Extra cattle slaughter demand	33,442	1.2%
Extra sheep slaughter demand	525,856	3.6%

Table A6: Production demand increase under full ban including RoI

	Number	Percentage
Cattle alive on farms in UK	9,450,000	100%
Sheep alive on farms in UK	33,580,000	100%
Extra cattle production demand	24,770	0.26%
Extra sheep production demand	76,909	0.23%

Table A7: Risk analysis

Name	Risk	Impact	Level of risk > with mitigation
Overall capacity issues	Lack of slaughterhouses and fattening capacity leads to lower animal welfare conditions	High	High > Medium
Capacity for calves	Lack of specialized capacity for fattening calves leads to more killing at birth	High	Low > Low
Soft border as trade passage	Soft border between NI and ROI used as trade passage maintains live animal export and lengthen journeys	High	Medium > Low
Slaughter ban bypass	Production certificate used as justification for live animal export maintains live animal export for slaughter	Medium	High > Medium