Mandatory Labelling

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Executive summary

A good label is credible, useful, valuable, and accurate. Voluntary labels for animal welfare currently available fail to meet this definition. Frustration and confusion over labelling of animal products has been a consistent issue for British consumers. Over 80% of UK consumers have expressed a preference for methods of production to be labelled clearly on animal products. The introduction of mandatory labelling will promote the interests of consumers, the British farming sector, and farmed animal welfare.

Although much more research is necessary, we tentatively suggest that the three most promising pathways for mandatory labelling would be as follows:

1. Animal welfare labelling for chickens (akin to the Etiquette Bien-Être Animal).
2. Methods of production labelling for broiler chickens (akin to LIDL's label).
3. Nonstunned and stunned slaughter labelling for sheep, poultry, and cattle.

Mandatory labelling of eggs allowed free range egg sales to double; expanding mandatory labelling to methods of production and slaughter for all chickens could replicate this success. A conservative estimate suggests that labelling methods of production of broilers could move 4 million chickens from conventional to free-range production systems.

The alignment of will and opportunity suggests that now may be an optimal time for the introduction of mandatory labelling of animal products. Public opinion is on the side of animal welfare, and labelling has historically been an area of EU competence. With Britain leaving the European Union, before us lies the chance to overhaul the current misleading labelling system and affirm our reputation on the world stage as a leader in animal welfare.

The COVID-19 pandemic has even more deeply underscored the importance of transparency in animal agriculture. Evidence suggests that COVID-19 is a zoonotic disease, linked to a food market in Wuhan, and slaughterhouses and meat

processing plants have been described as a "front line in the COVID-19 pandemic" [1]. In this context, consumers must be able to make informed choices in their purchases.

Estimates of willingness to pay for farmed animal welfare combined with public interest in better labelling suggest the promise of a mandatory labelling policy. However, it is important to note that providing information is an indirect method of creating change. Consumers more readily express concern for animal welfare in the abstract than when choosing between a cheaper or a more expensive product in the supermarket [17]. When weighing up the costs of this policy, we must bear in mind the space between the outcome (i.e. labelling) and the goal – better animal welfare.

For mandatory labelling to effectively improve animal welfare, concern for animal welfare needs to be more salient for consumers than price. With the economy ravaged by COVID-19 and unemployment high, consumers will look for the cheapest prices for their food. In this context, it is worth exploring policy tools that address price, such as reevaluating subsidies and taxation.

Mandatory labelling is no silver bullet for protecting animal welfare. Yet it is an important element of our policy toolbox as we seek to continue our "long tradition of protecting animals".

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1 Introduction and background

While the UK has some of the strongest animal welfare policies in the world, around 80% of legislation comes from the European Union. In a YouGov poll [2], 81% of respondents across the political spectrum (and 86% of Conservative respondents) wanted animal welfare laws in the UK to be maintained or made more extensive after Brexit. Recognising these values, Boris Johnson observed in his first speech as prime minister that animal welfare "has always been so close to the hearts of the British people" [3].

It is vital that we act quickly to conserve Britain's high animal welfare standards and safeguard the priorities of the British public. A raft of policies can support us in this goal. This report examines the introduction of mandatory labelling of methods of production and slaughter for animal products.

A credence attribute, animal welfare standards cannot be distinguished by the consumer. This makes transparency all the more essential. Golan et al. (2001) [4] observe that labelling is an appropriate policy tool when information is not sufficient to allow consumers to make choices in line with their preferences (i.e. asymmetric information), or when consumption generates social harms not reflected in the market (i.e. externalities): both of these apply to the case of animal welfare labelling.

A Qa report from 2013 found that 83% of UK consumers wanted methods of production to be labelled clearly on animal products [5]. Surveying British consumers about dairy products and their marketing, Ellis et al. (2009) [6] found a lack of understanding of labels and a desire for easier-to-read labelling. Although over 90% of respondents would pay more for dairy produced to higher welfare standards, recognition of quality assurance labels was low. Their survey found Red Tractor to be the best known label, and even this was recognised by only 38% of respondents.[1]

[1] Since this data is from 2009 it should be interpreted with caution. Given the animal abuse scandals that embroiled Red Tractor-certified farms in 2017-9, it is plausible that consumers today are more familiar with the label – though not for the right reasons.

Although a plethora of voluntary labels exists in the UK market, lack of clarity on the intricacies of their various standards can prevent consumers from making fully informed decisions. A report by Compassion in World Farming and OneKind [7] lays out the extraordinary range of welfare standards spanned by the major quality assurance schemes. At one end of the spectrum, the Soil Association scores most highly, frequently surpassing the minimum standards set by legislation. At the other, the Red Tractor schemes score poorly, permitting more controversial practices such as farrowing crates. To a consumer choosing between a Red Tractor and a Soil Association product, these differences are problematically veiled.

Voluntary rather than mandatory labelling means that, while higher welfare carries a premium, low-welfare products can bend the truth through their choice of terms (e.g. "farm fresh"). Quality assurance labels are far from the only packaging signals that shape consumer purchasing decisions. Images or words that evoke a life lived on a farm can mislead consumers. Tesco's Willow Farm chicken or Richmond pork (whose label depicts a rural scene) disingenuously conjure a bucolic setting with higher welfare standards. Yet the Red Tractor certification of Willow Farm chickens allows them to spend their lives indoors, while the Richmond brand only meets the even lower EU minimum standards. Although the Advertising Standards Agency acts as a watchdog to protect consumers from misleading labels (e.g. this ASA Adjudication), a look at the online storefronts of the major UK supermarkets shows that misleading labels are nonetheless rife. A mandatory universalised labelling scheme is needed to correct misinformation within the sector.

As trends in ethical consumerism and plant-based eating continue to rise, information about production and slaughter methods of animal products becomes increasingly necessary so that consumers can access the fullest picture of their purchases.

1.1 Mandatory labelling and how it works

Numerous possible versions exist of a policy introducing mandatory labelling on animal products. For methods of production and slaughter respectively, the most likely scenarios are plausibly as follows:

- Methods of slaughter (nonstun vs stun).[2]

[2] Another possibility is to label the meat with the method of slaughter itself (gas stunning, electrical stunning, etc). Although some stakeholders have presented arguments in favour of this level of detail [8], we expect that there would be resistance to such labelling.

    - Meat from broiler chickens only. *Focusing initially on one animal only could test the waters, and broiler chickens are affected by non-stun slaughter in the greatest numbers (100 million per year).*
    - Meat from sheep, poultry, and cattle. *Roughly 104 million animals are slaughtered each year without stunning.*
- Methods of production (e.g. tiered system).
    - Meat from broiler chickens only. *As well as providing an exploratory test of consumer response, methods of production labelling may be simpler to achieve for chickens than for other animals, who move through a greater variety of production systems.*
    - Meat from sheep, poultry, cattle, and pigs.
    - Meat from sheep, poultry, cattle, and pigs, plus dairy products.

It is likely that ready-made meals would initially be excluded from the requirement for a mandatory label, due to the difficulty of conveying information on multiple animal products. For example, Tesco's carbonara includes five dairy products (two cheeses, milk, and single and soured cream) and two meat products (bacon and pork gelatine).

Information provision is the key channel through which mandatory labelling creates change. A clear, simple label will allow consumers to make purchases in line with their ethics and improve awareness of the animal welfare stakes at point of purchase. Consumers will therefore purchase fewer welfare-poor animal products. Most consumers will replace welfare-poor animal products with higher welfare animal products. Given recent trends in flexitarianism and ethical consumerism, it seems plausible that some consumers may turn to plant-based alternatives, increasingly popular and widely available in British supermarkets. Changing demand will ultimately lead to fewer animals born and raised in welfare-poor conditions and slaughtered without stunning.

Note that the same mechanism for change underpins both voluntary and mandatory labelling of animal products. However, there are several issues with voluntary labelling, such as the lack of harmonisation and clarity. Additionally, whereas voluntary labels include only positive framing, a mandatory label would incorporate both positive and negative framing. Since negatively framed labels are more effective at creating behaviour change [9] [10], mandatory labelling is plausibly a more effective way of protecting farmed animal welfare.

2 Human benefits

In addition to the many animals who stand to benefit from the introduction of mandatory labelling, such a policy would benefit consumers, the farming sector, and society more broadly (e.g. through positive externalities). The details of these benefits are explored in the three sections below.

2.1 How much do British consumers value better animal welfare?

There is a strong cultural narrative that Britons are animal lovers. However, it is important to go beyond this simple statement and try to understand the economic value that consumers place on animal welfare.

One way of capturing how Britons feel about animal welfare is through analysing consumer willingness to pay (WTP) for higher standards. Putting a dollar cost on animal welfare can contextualise it for consumers and thus more accurately quantify how much they value it. Although figures must be interpreted with caution, consumer preferences and willingness to pay estimates present a favourable picture:

- A meta-analysis of willingness to pay studies [11] found that the weighted mean WTP for animal welfare in the UK was €1.72 (£1.57).
    - The weighted mean WTP for broiler chicken welfare specifically was €1.24. (Note that this figure is not specific to the UK, whose WTP was above average and may thus be higher than this figure suggests.)
- McVittie et al. (2006) [12][3] found that UK consumers were willing to pay £3.89/kg to reduce stocking density from 38 to 30 kg/m^2, and £3.01/kg to reduce the percentage of flocks failing the footpad lesion standard from 15% to 5%.
- A study of the Broiler Directive (2007/43/EC) [13] found that consumers would be willing to pay as much as 5% of the annual sum they spent on chicken meat, to improve welfare. This implies that the benefit-cost ratio of the directive (where costs include enforcement and inspection costs) is 23:1 (or 15:1 if a more conservative estimate is used).

[3] Note that this study was included in the Clark et al. (2017) meta-analysis [11]. Estimates have been included separately as they offer a more granular perspective on consumer willingness to pay, which can be helpful in contextualising the numbers.

- Of the 1,321 UK participants in the 2016 Eurobarometer survey [14], 72% of UK consumers were willing to pay more for products sourced from animal welfare-friendly production systems. 47% of consumers would pay less than 5% more; 16% of consumers would pay 6-10% more; 6% would pay 11-20% more; and 3% would pay greater than 20% more.
- A survey in Scotland conducted by Akaichi, Glenk and Revoredo-Giha (2016) [15] found that "participants were willing to pay price premiums for animal-friendly... pork of £0.97," where the range of prices for pork is between £3.19 and £5.29.
    - The survey also found that 72% of participants believed farmers should be financially compensated for higher production costs from higher animal welfare standards, a figure that supports the "public money for public goods" model of the new Agriculture Bill [16].

Estimates of willingness to pay vary and are difficult to pinpoint, in part due to effects such as social desirability bias, which unconsciously cause consumers to overestimate the amount they would pay for higher animal welfare products. Equally, consumers are tempted to free-ride in cases such as this, where the public good (animal welfare) and private benefits (out-of-pocket expense) are imbalanced [17]. Miele (2010) notes that "what people say about their shopping for animal friendly products indicates much higher levels of purchase than any market share for welfare friendly labels might indicate," [18] suggesting that consumers do not always make decisions at the grocery store that are in line with their stated preferences.

Although these effects might decrease our faith in the above willingness to pay estimates, an alternative explanation for the imbalance Miele observes may be that it reflects a lack of information and understanding of welfare labels. This is backed up by the findings of Ellis et al. (2008) [6], which found that the most common reason consumers cited for not looking for labels was "do not know meaning" (36%). If consumers are indeed willing to pay premiums for animal welfare standards, but currently do not pay as high premiums as we can expect due to lack of transparency, mandatory labelling looks a promising means of correcting the market failure of inadequate information that could provide benefits to both consumers and animals.

2.2 How do UK farmers feel about animal welfare?

In line with the broader national character and the sense that it is British to respect animals, farmers in the UK are concerned about animal welfare. For example, Hubbard, Bourlakis & Garrod (2007) quote a farmer's assertion that "Farmers have the obligation to their animals to provide high welfare." [19] Similarly, the National Farmers' Union ("the voice of British farming") emphasises the significance of animal welfare to the sector: "British farmers are rightly proud of the high animal welfare standards they adhere to on a daily basis." [20]

Although both farmers and the general public in the UK express concern for animal welfare, this concern is differently inflected. A review by Cornish, Raubenheimer & McGreevy (2016) [21] finds that whereas the public associates animal welfare with the ability to express natural behaviours and greater space, farmers focus more on the physical condition and productivity of their animals. This different understanding of animal welfare as a concept is important to be aware of when exploring mandatory labelling, as it reflects a disconnect between different conceptions of animal welfare and methods of production.

Despite the evidence that British farmers care about animal welfare, they have long faced economic pressures to lower their standards. A long-standing concern for British farmers is how to maintain higher-welfare domestic products in the face of cheap, welfare-poor imports. In a 2007 study of European pig farmers, a British farmer said that supermarkets "will buy anywhere they can more cheaply without insisting on standards being maintained." [22] As a member of the EU single market, Britain has grappled with imports of lower welfare products. The vital importance of the free movement of trade has prevented Britain from protecting its own higher welfare standards, well above the EU minimum legal requirements. Yet the EU's standards, while lower than the UK's own, are among the best in the world [23] – particularly in comparison to other potential post-Brexit trading partners such as the USA.

With the Brexit transition period coming to an end and few trade deals yet struck [24], British farmers fear a race to the bottom on animal welfare standards. The NFU has sought assurances from the government that Britain's high welfare standards will be protected after we leave the European Union, urging the Prime Minister in a letter signed by a broad coalition to enshrine in law the government's spoken commitments to high standards [25]. One way of ensuring that the higher welfare

standards of UK farmers are protected post Brexit is through regulating imports (e.g. the conditional liberalization of trade [26]). Article XX of the General Agreement of Trade and Tariffs makes provision for exemptions to trade restrictions based on "public morals" [27] [28], and recent case law (e.g. the ruling in the EC-Seal Products case [29]) supports the possibility of regulating imports on the basis of animal welfare. However, although the House of Lords voted to amend the Agriculture Bill to protect Britain's animal welfare standards, the House of Commons rejected this amendment, asserting that they "do not consider it appropriate to create new requirements for imports to meet particular standards." [30] The 2020 National Food Standards report sums up the issue: "Negotiating trade deals is hard. Any blanket legislation requiring other countries to meet our own food guidelines would make it nigh-on impossible." [31]. The Government placed the Trade and Agriculture Commission on a full statutory footing to bolster parliamentary scrutiny of free trade agreements.

Mandatory labelling can return some agency to the consumer, allowing them to make informed decisions and support the higher welfare standards of which the UK is so proud.

2.3 What broader social benefits might accompany this policy?

A mandatory labelling policy would create positive externalities, in particular for public health and the environment. Extensive evidence emphasises the relationship between farming practices and public health [32–35]. Although animal welfare does not seem to impact the healthfulness of the consumed final product, lower standards harm human health outcomes in several ways. The first is through disease. Welfare-poor conditions overcrowd animals, leading to a filthy environment and an increased spread of diseases. The associated use of antibiotics then contributes to antibiotic resistance, a huge public health concern that may kill an estimated ten million people every year by 2050 [36]. Furthermore, the introduction of mandatory labelling may cause the public to cut down on their consumption of animal products. This may reduce the incidence of diseases including coronary heart disease, type 2 diabetes, and some cancers, reducing their burden on the National Health Service. (For context, the total annual cost to the UK of coronary heart disease alone has been estimated at over £7 billion [37].) Reduced

meat consumption would also have positive externalities for the environment given the significant contributions of animal agriculture to global greenhouse gas emissions and deforestation [32].

The Agriculture Bill enshrines animal welfare as a public good [16]. Given that public goods are susceptible to market failures such as free-riding, market-based solutions like labelling reform may not be sufficient to ensure that animal welfare is protected. However, in so far as labelling presents a step towards better animal welfare through information provision, it benefits British society broadly through protecting this public good.

In addition to animals consumed in the UK, animals consumed in other countries could benefit through the replication of mandatory labelling in other countries. Progress in the policy space can be replicated in other countries: New Zealand and several countries in the European Union share Britain's concern for animal welfare [23], and could follow suit in establishing mandatory labels should it prove a successful means of safeguarding animal welfare.

3 Impact on animals

In theory, the introduction of mandatory labelling on all animal products would touch the lives of an enormous number of animals. However, estimating the precise number of animals whose living and slaughter conditions would change for the better is difficult. The direct effect of mandatory labelling is transparency, so the impact on animals occurs entirely through indirect effects that require complex analysis of market dynamics not feasible to conduct in a report of this length. Additionally, evidence on the relationship between information provision and behaviour change with respect to animal welfare is both limited and susceptible to biases.

Annual figures for the UK on consumption of animal products and on animals farmed and slaughtered offer a sense of the scope of the problem:

- 14.4 million sheep, 11 million pigs, 1.1 billion chickens, and 2.8 million cows were slaughtered in the UK in 2018.
    - A quarter of sheep (i.e. around 3.5 million animals), one tenth of broilers (i.e. around 100 million animals), and 1.1% of cows (around 28,110 animals) were slaughtered without stunning.
- There were around 10 million cattle, 34 million sheep, 5 million pigs, and 190 million chickens on farms in the United Kingdom as of December 2019.
    - 73% of animals farmed in the UK are kept in factory farms.
    - In the UK in 2019, only 3.1% of cattle, 1.9% of chickens, 2.3% of sheep, and 0.7% of pigs were reared in organic conditions, which require higher standards of animal welfare.
- In 2019, the 66.8 million people in the UK consumed on average over 60 kg of meat per person. Of this, 30 kg was chicken, 16 kg pork, 11.4 kg beef and veal, and 4 kg sheep. Converting from kg weights into lives lost, these numbers sum to over thirteen animals consumed per person each year.

The number of animals whose welfare this policy improves is much smaller than the above figures. A back-of-the-envelope assessment conducted using willingness to pay estimates among British consumers from McVittie et al. (2006) [12] found that the introduction of methods of production labelling on chicken meat would move just over 4 million broiler chickens from indoor to free range production systems.

This is a conservative estimate, in part due to the paucity of available evidence. Lack of data leads us to underestimate the improvement in broiler welfare involved in

moving from indoor to free range production system, and therefore underestimate the amount that British consumers would be willing to pay for higher-welfare products. Related to this, we are comparing current British indoor standards to British free range standards. The concern that welfare-poor imports will flood the UK market post Brexit further underestimates the gulf between welfare standards. Several discounts have also been applied (e.g. for social desirability bias).

Other limitations of our estimate may slightly overstate impact, although overall we have erred on the side of under- rather than overestimation. Our estimate assumes that the label would be clear and effective in conveying information, and thus succeed in its goal of permitting consumers to make purchases in line with their ethics. Due to the level of uncertainty involved, our estimate does not attempt to quantify the differences in information availability between the current system of voluntary labelling and the proposed mandatory labelling.

As our calculation is approximate and suffers from a number of unavoidable limitations, further quantitative analysis of the impact of a mandatory labelling policy will be vital.

The following subsections seek to provide a softer sense of the impact of this policy. Section 3.1. examines the concept of animal welfare and how it relates to methods of production and slaughter. 3.2. looks at the animal welfare impact of mandatory labelling of shell eggs, as the most plausible analogue to this policy.

3.1 Farmed animal welfare

At the most basic level, welfare can be defined as "good health and animals having what they want" [38]. It is a deceptively simple concept that strays into the unmapped territory of subjective experience. Discussions of farmed animal welfare therefore tend to focus on a narrower definition, that skews towards the first aspect of Stamp's definition – "good health" rather than "animals having what they want". For the purposes of this report, we focus primarily on a more restrictive definition of animal welfare, more Five Freedoms than contrafreeloading.

Welfare concerns relating to methods of production are species-specific. Broadly, however, major issues include overcrowding, mutilations (e.g. castration, tail docking, horn removal), and congenital health disorders from breeding.

Welfare profile: Production systems for broiler chickens

Among broiler chickens, overcrowding leads to a host of problems including lameness (exacerbated by their size), foot and hock burns, and aggression (e.g. feather pecking, although this is more common among layer hens than broilers). Bred to grow quickly and grow large, broiler chickens suffer from cardiovascular issues – a major cause of mortality. In addition to these and other physical harms that broiler chickens undergo, their natural behaviours are often frustrated. Crowded conditions prevent them from establishing a social hierarchy and can restrict their access to the outdoors, even where access is theoretically available. Higher welfare production systems may offer limited enrichment materials or opportunities for perching and dustbathing; conventional farming systems do not.

The table below compares elements of the Soil Association's standards for broiler welfare to those of the UK minimum standard.

	Soil Association	Conventional
Stocking density	Maximum of 21 kg/m^2 in fixed or 30 kg/m^2 in mobile housing	Maximum of 39 kg/m^2 with records kept (33 kg/m^2 without records)
Breed	Slower-growing	Fast-growing
Mutilations	Prohibited	Permitted
Outdoor access	Required	None

Note that although UK legislation permits stocking densities of up to 39 kg/m^2, a report from the EU Scientific Committee on Animal Health and Animal Welfare asserts that "stocking density must be 25 kg/m2 or lower for major welfare problems to be largely avoided and that above 30 kg/m2, even with very good environmental control systems, there is a steep rise in the frequency of serious problems." [39]

The UK conventional standards look poor in comparison to the Soil Association's welfare standards, but it is worth considering the broader context. For example, the US has been cited as a central post-Brexit trading partner. Yet the US has no federal regulations that protect farmed animal welfare. In 2012, the *average* stocking density in the US was 36 kg/m^2 – almost as high as the maximum permitted under the UK minimal standards [40].

In the case of slaughter, key concerns include stress involved with handling and restraint; how long it takes for an animal to lose feeling; and failure rates [41]. A number of animal welfare organizations, including the Farm Animal Welfare Council, the Humane Slaughter Association, Farmwel, the British Veterinary Association, and the RSPCA, believe that all animals should be stunned before slaughter [42]. The pain of the neck cut, delayed loss of consciousness of up to 2 minutes, and the suffering caused as the animals bleed out are cited as significant welfare concerns. But under UK law, a religious exemption enables animals to be killed without stunning.[4] The number of animals killed without stunning in the UK exceeds the needs of UK religious communities, and instead contributes to Britain's export market [43].

Welfare profile: Methods of slaughter (non-stun versus stun)

The sections below offer a brief overview of stun and non-stun methods used in the slaughter of sheep, cattle, and poultry. The most common methods of stun by species are penetrative captive bolt for cattle, electric stunning for sheep and goats, and gas stunning for poultry [42]. As far as possible, methods of slaughter seek to accommodate the species-specific needs of the animals. For example, chickens find handling extremely stressful: killing the birds through gas means they can remain within their transport crates [44].

Note that information on time taken for an animal to fall insensible does not account for failure rates and other problems that may arise (e.g. due to lack of training for slaughterhouse workers).

1. *Poultry – 10% not stunned before slaughter*
   Barnett et al (2007) found that chickens lose consciousness approximately 14 seconds after their throats are cut[5], but one of the birds in their sample lost consciousness only after 26 seconds [45]. In contrast, captive bolt stunning leads to instantaneous loss of consciousness when implemented correctly [46].

[4] While non-stun slaughter is permissible for religious purposes, not all religious slaughter is non-stun. Over 75% of cattle slaughtered according to halal methods are reversibly pre-stunned, for example [42]. All kosher meat undergoes non-stun slaughter, although post-cut stunning (whereby animals are stunned after their throats are cut) is permissible [41].
[5] Where loss of posture is used as an indication of loss of consciousness.

Gas stunning minimizes handling of birds, reducing their stress. Grandin (2013) [47] notes that there is controversy surrounding the amount of suffering that the poultry experience due to the gases (e.g. see Sandilands et al. [48]). Once the poultry are stunned, the concentration of gas is increased to kill the animals. This takes around 2.5 minutes [49].

Another common method of stunning poultry is electrical stunning. Some forms of religious slaughter permit electrical stunning before the birds' throats are cut. However, electrical stunning presents a welfare concern.

Unlike gas stunning, electrical stunning requires chickens to be restrained and inverted [50]. Handling can cause stress for the animals, and shackling can be painful and damage the bones in their legs. UK regulation stipulates that broilers must not be shackled for more than one minute while conscious [51]. Electrical stunning also does not always properly stun birds, and can subject birds to prestun shocks [52] [53]. After electrical stunning, birds' throats are cut.

Due to the stress of restraint for poultry, it has been suggested that non-stun methods may be more humane than certain stun methods. In the case of shechita slaughter, for example, birds are killed individually rather than processed mechanically [54].

Detailed figures on failure rates for various methods of stunning and slaughter were not found. However, the UK government permits the slaughter of poultry by dislocating their necks as a backup method "up to a maximum of 70 birds a day per person" [51]. That explicit provision is made in the guidance suggests that backup methods are frequently necessary, i.e. that failure rates for stunning and slaughter of poultry are high.

2. *Sheep – 25% not stunned before slaughter*
   Electric stunning and penetrative captive bolt stunning are commonly used to render sheep insensible before slaughter, and take effect instantaneously. In contrast, it can take up to twenty seconds after a sheep's throat is cut for it to fall unconscious [55]. Non-penetrative captive bolt stunning has been described as inappropriate as a method of stunning sheep. This method is permitted in the UK for sheep under ten kilograms [56].

   As well as the difference in time until insensibility, cutting the throats of sheep requires that they be individually loaded and restrained for slaughter. Since sheep

are flock animals and find the presence of their fellow sheep calming, individual rather than group restraint adds to the stress of slaughter for sheep [57].

3. *Cattle – 1.1% not stunned before slaughter*
Although cattle and sheep are anatomically similar, time to insensibility after the throat is cut lasts longer for cattle than for sheep [55]. Gregory et al (2010) found that loss of posture (a common proxy for unconsciousness) took place after between 17 and 85 seconds – almost a minute and a half [58]. The average time to collapse was 20 seconds, but among 8% of cows it took over a minute.

   Data on failure rates are available for cattle. Penetrative captive bolt stunning has much lower rates of failure than non-penetrative captive bolt stunning, at 2% compared to 46% – penetrative is therefore more widely permitted [59] [56]. Failure to cut a carotid artery was found to be 6% during shechita slaughter and 1% during halal slaughter [59].

   We can use the above data to get a highly approximate estimate of the welfare impact of non-stun slaughter. Overall, these data suggest that methods of slaughter impact farmed animals as follows:
   - fourteen seconds of the lives of 100 million chickens (or in aggregate, over 44 years of suffering per year);
   - twenty seconds of the lives of 3.5 million sheep (over 2 years suffering per year);
   - twenty seconds of the lives of 28,110 cows (6.5 days of suffering per year).

   While these figures may seem high, it is worth bearing in mind that slaughter is an acute rather than a chronic welfare issue, affecting animals at one specific point in their lives rather than throughout. In this sense, the magnitude of suffering caused by welfare-poor methods of production dwarfs suffering caused by methods of slaughter.

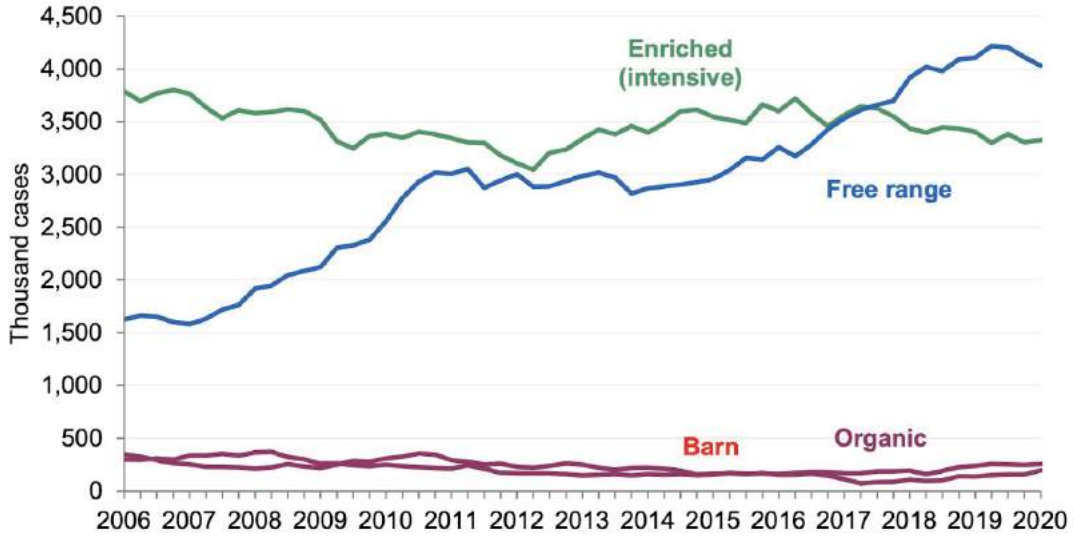
3.2 Case study: Mandatory labelling of eggs

Responding to growing consumer interest in farming systems and laying hen welfare, the European Commission introduced mandatory labelling for shell eggs [60] (see further discussion in Buller et al. 2012 [61]). Examining the animal welfare impact of this mandatory label can provide insight into the potential impact of mandatory labelling of methods of production and slaughter.

The introduction of the label caused sales of free range eggs to rise sharply, more than doubling from 32% of retail egg sales in 2004 to 67% in 2019 [62]. Akaichi et al. (2016) [15] found that free-range eggs were an especially common choice among the 75% of survey respondents who purchased animal-friendly foods, demonstrating the usefulness of labels for consumers – those concerned with animal welfare know to look for the free range label on eggs.

This Defra graph shows the prevalence of different production systems over time [63]:

Figure 2: UK egg throughput by production method



In the past few years, free range production has overtaken intensive farming as the most common method of production. To contextualise some of the differences for hen welfare:

- Enriched cage systems have a maximum stocking density of almost seventeen birds per square metre [64] [65].
- Barn and free range systems both have a maximum stocking density of nine birds per square metre; free range systems provide access to outdoor runs, and the British Lion Quality standard stipulates a maximum flock size of 16,000 birds [65].
- Organic systems provide outdoor access, a maximum stocking density of six birds per square metre, and a maximum flock size of 3,000 [65].

The graph above shows that although free range has steadily increased, the highest welfare standard – organic – makes up only a very small (and steadily low) proportion of the overall market. Even so, the spike in sales of free range eggs seems

an encouraging sign for the positive impact of mandatory labelling on consumer behaviour change. Two key questions follow: (1) to what extent does the shift toward free range entail a meaningful improvement in hen welfare? And (2) how far might trends shown in the case of eggs generalise to other animal products affected by the introduction of mandatory labelling?

1. It is important not to conflate the intermediate output (i.e., increase in sales of free range eggs) with the final outcome (i.e., better welfare for laying hens). While standards are higher in free range, barn, and organic systems than in enriched cage systems, there are still significant welfare concerns, and mortality rates may even be higher in free range than in cage systems.[6]

   Scrinis, Parker & Carey (2017) [66] note that controversies have arisen over overcrowding and lack of meaningful access to the outdoors in supposedly higher-welfare systems, including on farms that have received CIWF's "Good Egg Award". Harmful feather-pecking affects a majority of flocks in the UK [67], and is a leading cause of mortality in non-cage systems. To reduce feather-pecking, hens are subjected to beak trimming, a painful mutilation: only the Soil Association's organic standards (higher than the standard EU organic standards) ban the practice. Yet a 2015 survey [67] of UK consumers found that respondents held free range to be a 'gold standard' for welfare. In light of this belief, they were shocked to learn about feather-pecking and expressed willingness to pay more for better systems.

   As well as illustrating the disconnect between free range standards and hen welfare, the 2015 study [67] reveals a gap between consumer perceptions and realities that a label has failed to correct. Distilling the complexities of a concept such as animal welfare into a simple, friendly label necessarily involves a loss of detail: information asymmetry endures.

   Sales of free-range or organic eggs do not necessarily translate to happy hens. However, we can argue that incremental progress towards a better life for laying hens is worthwhile despite its flaws. Consumers are not ready to forego animal products entirely, so working to improve the system is necessary. In the absence of strong evidence that the legitimating effect of humane washing harms

[6] More in-depth comparison of the welfare stakes in various laying hen production systems (covering rates of mortality, disease, injury, stress, and behavioural restriction) can be found in our report on banning cages.

animal welfare more than small welfare improvements benefit it, inaction in favour of waiting for seismic change seems unwise.

In response to the first key question, therefore, perhaps we can say that, while free range and organic standards leave much to be desired in terms of hen welfare, a step in the right direction is better than no step at all.

2. Methods of production labelling for eggs and other animal products creates change for farmed animals through allowing consumers to make purchases in line with their values. Given that the underlying mechanism for change is the same in both cases, it seems plausible that the same trends and successes witnessed with mandatory labelling for eggs would apply to other animal products.

   This said, the difference between one small price increase and many may pose an issue. Studying UK consumers' willingness to pay for hen welfare, Bennett and Blaney (2003) [68] found a common response to be: "20p extra for a dozen eggs is not much to pay to improve hen welfare, especially since I don't buy many eggs". Egg info estimates that UK consumers eat around two eggs each week [62], while a BBC survey found that UK adults eat meat as often as twice each day [69].

   Speculatively, consumers may be more willing to pay a small price increase on a less frequently consumed product such as eggs, than many small price increases on numerous products consumed multiple times per day. This point may be worth further exploring, and could shape the trajectory of mandatory labelling. For instance, it may therefore be preferable to introduce mandatory labelling on one product at a time – say, chicken meat – so that consumers adjust.

4 Counterarguments and concerns

From the point of view of feasibility, the key criticisms that face the introduction of mandatory labelling boil down to concerns over cost and complexity. While these concerns are legitimate, none present insuperable barriers, as discussed below. A final crucial issue is the potential for labels to be misleading.

4.1 Costs of a mandatory labelling policy

The main costs of mandatory labelling involve auditing, certification, infrastructure, repackaging, and enforcement. Key upfront costs would involve research, design, and potentially consumer education campaigns; key ongoing costs include implementation and enforcement. An increase in the price of animal products can arguably be seen as a benefit rather than a cost, as a price increase effectively internalises some of the negative externalities of animal agriculture [70] [71] and protects the public good of farmed animal welfare. Further research is necessary to precisely quantify the costs of introducing mandatory labelling.

A 2009 EU report on animal welfare labelling [72] notes that mandatory labelling would cause "some additional certification costs" for farmers and "(moderate) additional labelling costs" for producers. The report notes that tracking and tracing along with separation of batches necessary with mandatory labelling may also increase prices. However, increasing consumer demand for traceability (e.g. the farm to fork movement) and developments in technology such as the IBM Food Trust blockchain may suggest that additional costs are worthwhile and becoming increasingly simple to achieve. The Livestock Information Programme, a multi-species traceability tool currently being unrolled in the UK, will be useful in ensuring that mandatory labelling is accurate.

Even if the costs of mandatory labelling seem reasonable, particularly given the extensive benefits of such a policy, it is worth noting that small and medium enterprises (SMEs) would face the greatest difficulties from a moderate increase in costs. Depending on what one values as most integral to animal welfare, there may be a concern that if enormous concentrated animal feeding operations (CAFOs) are best able to absorb the cost increase, animal welfare may ultimately and paradoxically suffer from this policy. The size of an enterprise does not necessarily map onto its animal welfare standards – a 2016 review [73] argues that there are tradeoffs in both cases. For example, larger farms are better able to provide more specialised professional attention to the health of the animals, but may provide less

outdoor access than smaller farms. But since consumers tend to value naturalness highly in the context of animal welfare [21], harming SMEs could jeopardise the expectations of the British public.

That cost increases disproportionately impact SMEs is not necessarily an argument against the introduction of mandatory labelling, but rather a consideration that underscores the importance of providing support to these businesses. At this point it is worth touching on the new Agriculture Bill, tentatively a promising move in this direction. In contrast to the EU CAP, under whose terms the size of a farm determines the level of support, the lodestar of Britain's new agricultural policy is public funds for public goods. This move away from farm size and towards provision of public goods may shift the status quo in favour of rewarding SMEs.

4.2 Feasibility of implementation

In response to a 2013 petition [74], the UK government argued that method of production labelling would be too logistically complicated. "Standards covering methods of production do exist (often through industry assurance schemes) but incorporating these into a standard method of production on a 'one size fits all' basis would be hard given the variety of breeds, geographical situations and rearing conditions." (Note that the government response also cites the need for EU-wide agreement as a key complicating factor. In this sense, Brexit may present an opportunity.)

Given that animals move between different systems over the course of their lives, the NFU [75] and the UK government [74] have argued that creating a simple, informative label is difficult to accomplish. However, this argument is somewhat species dependent, and to a certain extent may overstate both the complexity of movements and the level of information needed for a useful label. Methods of production labelling does not necessarily need to encapsulate all stages of an animal's life. It could plausibly reflect, for example, the conditions in which an animal has spent the majority of his or her life. The current label "outdoor bred" is disingenuous precisely because it eclipses the conditions in which an animal was raised: arguably, incorporating the first brief months of an animal's life into a methods of production label is not necessary.

The number of movements between production systems that a farmed animal undergoes depends on the species.

- Broiler chickens are slaughtered less than six weeks after they are born in intensive farming (twelve weeks in organic systems) [76]. In their brief lives they experience little variety in production systems.
- Beef cattle may experience different production systems as they progress through the stages of rearing, growing, and fattening. Some cattle are raised entirely indoors, while others are moved seasonally, spending the summer months outside and the winter indoors [77].
- Like cattle, pigs may encounter a range of production systems at various stages in their lives, from birth, through weaning, to rearing (first as "growers" and then as "fatteners") [78]. A report by the Bureau of Investigative Journalism describes an intensification of pig farming, with a rise in megafarms and indoor production [79].

Expressing the different production systems involved in raising an animal for slaughter is difficult but plausibly not impossible. A label distinguishing "pasture access" from "raised indoors", for example, would provide useful information. As another option, methods of production labelling could initially be trialled for animals who experience fewer moves in their lives (e.g. poultry), and extended to other animals (e.g. cattle and pigs) as appropriate.

If it were deemed too difficult to accurately present the methods of production on a single label, a case can perhaps be made for instead creating an animal welfare label that incorporates multiple metrics into a simple overall ranking. This would entail greater expense and complexity than a focus purely on methods of production. However, it would certainly be feasible, and could countermand the industry's concerns that labelling methods of production is too reductive an approach to welfare. Ground in this area has already been broken. In France, Etiquette Bien-Être Animal, an ambitious project to create a label presenting different levels of animal welfare, took under two years to develop, and incorporates almost 230 criteria. Building off this work and in collaboration with the many UK-based nonprofits engaged with farmed animal welfare (such as the RSPCA, which runs its own quality assurance schemes), could lower the initial costs associated with creating a label.

A label presenting methods of production or slaughter alone would be much simpler than a specific animal welfare label, and would provide consumers with information that they care about (Miele 2010 [18]). Nonetheless, the possibility merits further exploration. In the meantime, method of slaughter labelling certainly affects an animal's welfare and presents none of the complexities of methods of production

labelling: an animal may be raised in multiple systems, but we all have only one death.

4.3 Labels can be misleading

That labels can mislead consumers is certainly an important consideration: indeed, this is why a harmonised, clear, informative label is so vital. At its heart, this objection should not lead us to reject mandatory labelling, but rather to ensure that the labels are created with care, transparency, and with the interests of the consumer always in view.

With reference to method of production labelling specifically, the NFU has expressed concern that labelling products according to methods of production is not only logistically complicated, but also can mislead consumers. They contend that this system would conflate production system with welfare standards, while the two do not map onto one another perfectly. For example, deleterious feather-pecking behaviours can increase among free-range systems compared to cages, due to the combination of overcrowding and stress with access to a greater number of birds. There are several possible responses to this concern. The first is that while methods of production are imperfect reflections of animal welfare, they are nonetheless a sufficiently good proxy in the absence of a better option. The second response (touched on in section 4.2) would explore the possibility of creating a mandatory label capable of holistically incorporating animal welfare – for example, one that examined outcomes for animals as well as production systems.

Taking a different angle to the same issue, there may be concerns about mandatory labelling from an animal advocacy perspective. Parker, Carey, De Costa, and Scrinis (2017) [80] assert that it is "increasingly important to look behind the label... at the network of regulation and governance that influences what is put on the label. Which stakeholders are most vocal? What interests and regulatory policy options do they represent? And how do they interact to influence and change the choices put to consumers in the market over time?"

Partisanship on both sides may sway the final design of the label. For example, Compassion in World Farming has proposed a labelling matrix to clearly indicate for consumers the various methods of production across eight farmed animals. However, it is hard to picture such a label achieving widespread acceptance: stakeholders in the farming and supermarket sectors will be involved in the creation

of a mandatory label, and may argue against the forthright depiction of the caged animal. Depending on how the label is designed, it could lead consumers to believe that animal welfare standards are higher than is the case. There is precedent for this with, for example, free range labels on eggs (discussed in Scrinis, Parker & Carey (2017) [66]), and the use of terms like "outdoor bred", "enriched", and "conventional" – all of which could be interpreted as reflecting a higher standard of welfare. Consumers are accustomed to the notion that a label indicates a higher welfare standard, further muddying the waters on this point. Although the introduction of a mandatory label aspires to clearly convey information to consumers, there is therefore a risk that it fails in this aim.

Of course, this is not an argument against mandatory labelling per se. It does, however, underscore the notion that an unclear label may be useless and counterproductive, and the importance of ensuring that the label be clear, transparent, credible[7], and informative. The concern of misleading labels could also lead us to consider, for example, an information campaign to ensure that consumers understand. This risks increasing costs, but could be effectively run by a nonprofit, thus avoiding the need to pass on further costs to consumers or other parties.

[7] When considering the credibility of a label, it is worth considering public perceptions of the comparative trustworthiness of different bodies. For example, Ellis et al (2009) [6] find that the British public believes that veterinarians are most reliable as a source of information about animal welfare.

5 Conclusion and recommendations

There are several promising versions of a mandatory label, which could provide useful information to consumers and mitigate the risks to animal welfare posed by welfare-poor imports post Brexit. However, as information provision is an indirect method of creating change, the impact on animal welfare of mandatory labelling is limited. As such, it is best considered as part of a raft of measures to protect animal welfare, and must not be used as an excuse to water down animal protection in other areas.

This report has several limitations. Various aspects rely on speculative estimates of impact, so further research is vital. In particular, a more in-depth analysis of the costs and benefits of mandatory labelling would be useful in determining the promise of such a policy. Additionally, our report does not examine the possibility of introducing mandatory labelling to improve the welfare of fish – a significant oversight, given the extraordinary numbers of fish who are slaughtered each year. However, our research provisionally suggests that the most promising versions of a mandatory labelling policy may be as follows:

1. Animal welfare labelling for chickens, similar to the Etiquette Bien-Être Animal
2. Methods of production labelling for broiler chickens, akin to LIDL's label
3. Non-stunned and stunned slaughter labelling for sheep, poultry, and cattle

These recommendations represent possible starting points rather than end goals, in the sense both of the amount of further research needed, and of their broader role as policy tools. The more restricted versions of a mandatory labelling policy could act as stepping stones, allowing us to assess impact and build the case for expanding labelling to address the more complicated situations. For example, if labelling methods of production for broilers provides useful information to consumers and thus improves welfare, tackling a methods of production label for cattle and pigs could be justified. Expanding mandatory labelling to fish would be another important next step, particularly in light of increasing consumer interest in fish welfare [85].

Our priority recommendation favours the more holistic approach of labelling animal welfare over the narrower option of labelling methods of production and slaughter. Methods of production and slaughter can act as proxies for animal welfare. However, an animal welfare label that takes into account a broader range of

considerations (e.g. outcomes) can offer a more accurate picture. In this sense, it can provide more meaningful welfare improvements for farmed animals, and better encapsulates what consumers care about and wish to pay for.

Both our first and second recommendations would introduce labelling on broiler chickens specifically. There are several reasons behind this focus. Of all farmed animals, broiler chickens are farmed and slaughtered in the highest numbers. Consumers have relatively high willingness to pay for their welfare compared to that of other farmed animals (Clark et al. 2017 [11]). Methods of production labelling is simpler for broilers than for other farmed animals, and there is precedent and thus a guideline (in the form of the Etiquette Bien-Être Animal) for a more holistic animal welfare label.

Our third recommendation is for labelling to distinguish non-stunned from stunned slaughter. As an acute rather than chronic welfare issue, non-stun slaughter is plausibly a lower stakes welfare concern than methods of production, which impact the welfare of farmed animals over their whole lives rather than at one distinct moment. Yet its acute nature also offers the benefit of greater simplicity in labelling. However, there is evidence that consumers are less interested in the slaughter than in the production of animal products [81], due to the discomfort and guilt associated with confronting the death of the animal. "The only area that consumers do know – and want to know about – is the rearing and living stage prior to slaughter." On this basis, method of slaughter labelling may not significantly benefit British consumers. This said, a petition to end non-stun slaughter received almost 120,000 signatures [82], demonstrating that Britons feel strongly about this issue.

With concerns on the threat of welfare-poor imports in future trade deals, information and transparency for consumers will become ever more necessary. Yet while information provision can certainly be useful to consumers, it is important to underscore the limitations of the mechanisms that drive change here. The argument in favour of the introduction of mandatory labelling assumes that information – more specifically, information about the conditions in which an animal was raised and slaughtered – is a key barrier to dietary change (where "dietary change" is defined to cover either a switch to higher-welfare animal products, or to plant-based products).

While this seems plausible given the level of concern Britons express for animal welfare [14], evidence for this mechanism nonetheless lea es something to be desired. Further research on the impact of humane-washing would be valuable, for

example, revealing the extent to which consumers buy into the farmyard imagery employed on current labels. It may be that consumers are aware of the welfare concerns associated with their purchases, but that they rationalise away their choices. Cognitive dissonance can be a powerful force [83], and it may be that consumers identify as animal lovers despite an awareness of the poor welfare conditions that confronted the animals they consume.

The key barriers to higher welfare purchases may be price and taste rather than information. Food products that are cheaper and more nutritionally complete than welfare-poor meat certainly exist [84]. However, price increases resulting from mandatory labelling could nonetheless disproportionately affect low-income consumers, and could be interpreted as an unfair attempt to guilt-trip consumers less able to purchase meat in line with their values.

Although mandatory and voluntary labelling differ from each other in several crucial aspects, it is worth briefly mentioning a key limitation of voluntary labelling, as similar concerns may apply in both cases. Where there is an imbalance between a public and a private good, individuals are more likely to underpay. In a study of how such free-riding affects animal welfare labels, Uehleke and Hüttel (2018) [17] found that more people would vote for animal welfare improvements leading to a 60% price increase, than would pay just 10% more on an individual basis. They also found that 40% of consumers believed that eating conventionally produced meat is ethically acceptable. This data suggests that improving welfare across the board is preferable to providing information through labelling.

Providing information to consumers will not in itself be enough to create meaningful change for farmed animals. In light of the market failures that endanger animal welfare, other options worth exploring at the crucial juncture of Brexit include re-evaluating subsidies and taxation, as well as introducing bans such as on live transport and cages. However, mandatory labelling can be a useful component of our policy toolbox. Faced with new trade deals that may impact animal welfare and compel British farmers to lower their standards to remain competitive, informing consumers is one of several ways we can act to protect animal welfare.

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