Social Sciences & Humanities Open 10 (2024) 101171

Contents lists available at ScienceDirect

Social Sciences & Humanities Open

journal homepage: www.sciencedirect.com/journal/social-sciences-and-humanities-open

Short communication

The economic standing of animals☆

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ARTICLE INFO

JEL classification:
D61
H23
I30
N50
Q18

Keywords:
Animals
Animal welfare
Cost-benefit analysis
Standing

ABSTRACT

This article considers how cost-benefit analyses of farm animal policy would be altered if animal interests were to be directly included in the computations. Currently, animals lack standing, their preferences for improved living conditions are not considered in the calculation of costs or benefits of farm policies. While animal welfare receives consideration to the extent that humans value it, human preferences are not fully revealed due to incomplete information and the public good nature of animal welfare. Uncertainty associated with the proper role of farm animal standing in cost-benefit analysis validates the avoidance of policies that would be undesirable if animals possessed standing in cost-benefit analyses.

Cost-benefit analysis (CBA) serves as a primary mechanism for evaluating regulatory decisions: a policy reform passes the cost-benefit test if its aggregate benefits exceed its aggregate costs. But costs and benefits for whom? Traditionally, nonhuman animals are excluded: only humans are granted "standing" in cost-benefit analyses, even for projects where animal interests are at stake.

In the US, at any one time (according to a 2022 USDA farm inventory) there are in existence more than 1.7 billion broilers, chickens raised for meat. These chickens are typically killed after about six weeks of life: over 9 billion broilers are slaughtered in the US annually (United States Department of Agriculture, 2024, p. 23).

In late-2022, the US human population was about 333 million; the snapshot population of chickens raised for meat alone comes to more than 5 times that number. Globally, the number of land animals killed for food every year exceeds 70 billion: with a human population of approximately 8 billion, about 9 land animals are killed for food each year for every human.[1] Hundreds of billions of fish, some farmed, some caught wild, are captured and killed every year, too.

About 99% of the US farm (land) animal population resides in factory farm settings called Concentrated Animal Feeding Operations (CAFOs) (Anthis, 2019). Confining a large number of animals – 100 or more cows, or 125,000 or more chickens, or 500 or more horses, for instance – qualifies a farm as a CAFO, though smaller farms that present environmental risks also receive the CAFO designation.[2] More than 21,000 US facilities meet the requirements for CAFO status.[3] A large majority of land farm animals in the US are not only raised on CAFOs, they are raised in "mega" CAFOs, which include chicken facilities with more than half a million chickens produced in a year, and dairy farms with one thousand or more cows, for example (Bolotnikova & Torrella, 2024).

The living conditions provided by CAFOs vary with respect to the species that is housed, duration of confinement, outdoor access, the use and size of cages or crates, and so on. Animal health and welfare are

☆ An earlier version of this paper entitled "The Economic Standing of Animals" was presented at the International Atlantic Economic Society meetings, May 2021. Thanks to Felipe A. Gómez Trejos and conference participants for helpful comments.

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[1] See "Global Animal Slaughter Statistics & Charts: 2022 Update" at https://faunalytics.org/global-animal-slaughter-statistics-charts-2022-update/. For the global human population, see the Worldometer website at https://www.worldometers.info/world-population/world-population-by-year/.

[2] See the U.S. Environmental Protection Agency "Regulatory Defintions of Large CAFOs, Medium CAFOs, and Small CAFOs" at https://www.epa.gov/sites/default/files/2015-08/documents/sector_table.pdf.

[3] See the U.S. Environmental Protection Agency, "NPDES CAFO Permitting Status Report" at https://www.epa.gov/system/files/documents/2024-06/cafo-status-report-2023.pdf.

https://doi.org/10.1016/j.ssaho.2024.101171
Received 9 June 2024; Received in revised form 28 August 2024; Accepted 8 October 2024
Available online 13 October 2024

implicated among all of these dimensions. Breeding for characteristics that promote rapid weight gain, for instance – an important element in controlling the cost of animal husbandry – can come at the expense of the overall health of the animal, especially with respect to adequate bone and leg strength (Rioja-Lang et al., 2020, pp. 11–13).

Farm animals raised for meat are brought into this world with the intention that their stay should be brief (relative to the lifespans typically available for their non-food conspecifics) and that they will be slaughtered when the economic interests of their owners are best served. For pigs, chickens raised for meat, and turkeys, a severely truncated existence mostly or fully inside a crowded CAFO building is the normal practice in the US. Dairy cows and laying hens also predominantly exist in CAFOs. Most cattle raised for beef eventually end up in CAFO feedlots, though some have access to months of outside grazing.[4]

CAFO-style animal agriculture offers some health and welfare advantages to the animals. They are generally well protected against predators and adverse weather, and for the most part they do not suffer from hunger or thirst. The animals are readily accessible for feeding and for monitoring. Nonetheless, the extremely close quarters contribute to severe welfare issues (Maes et al., 2019, pp. S19-S20; Grethe, 2017, p. 78).

Those relatively few farm animals who are not raised in CAFOs do not necessarily live an idyllic existence – they might be more exposed to predators and pathogens, for instance – though generally they are not tightly squeezed into large warehouses. Nevertheless, in terms of animal welfare, farm size is not determinative: fewer animals does not imply better animal living conditions (Lindena & Hess, 2022; Robbins et al., 2016). But in any event, small farms form an almost negligible portion of the US animal agriculture industry.

Unanesthetized surgeries such as beak trimming in chickens and tail docking in pigs are standard procedures in CAFOs, in part because the imposed crowding leads to aggression among the animals (D'Silva, 2016). Normal behaviors such as rooting by pigs or dust bathing by chickens cannot be undertaken in CAFOs. The space available to some hens does not allow them to fully spread their wings, and for sows, gestation crates are so small that turning around is not an option. Concrete or slatted floors contribute to lameness in chickens, pigs, and dairy cows. Early weaning of piglets and calves leads to stress and health problems, and, more generally, pain management is unavailable or neglected. Opportunities for positive experiences, for animal flourishing, are conspicuous only by their absence. While there are better and worse facilities in terms of animal welfare, speaking generally, the prevailing situation is that factory farms are not happy places for US farm animals.[5] Would these conditions have arisen if animals possessed standing in CBAs?

Standing is a legal term that occasionally finds its way into discussions of cost-benefit analysis. In the law, to have standing in a case is to be able to seek redress for an injury through the courts, to bring a lawsuit against the injurer that a court will entertain.[6] In cost-benefit analysis, to have standing means that the gains and losses imposed upon you through the proposed policy will be counted among the aggregate net benefits. "Bentham's dictum," as described by John Stuart Mill, is for "everybody to count for one, nobody for more than one," and both Jeremy Bentham and Mill are inclined to include nonhuman animal interests in their utilitarian, greatest happiness calculations.[7] In modern CBA, animal interests are generally not directly included: an animal does not "count for one."[8] Economic evaluations of the value of wildlife (Martino & Kenter, 2023), for instance, or of dogs (Weimer & Vining, 2024), typically consider only the value of these animals for people, with no direct accounting of the preferences of the animals themselves. Granting standing to animals would allow changes to their welfare to directly affect CBAs.

Further, providing CBA standing to animals would be an economic parallel to ongoing efforts in law, political science, and other fields. The legal strategies include seeking to recognize animals as legal persons (as opposed to property), with rights to bring suits against harmful treatment.[9] In political theory, Donaldson and Kymlicka (2017) argue that animals should be treated as political actors with specific rights depending on their relationship with human societies. In this framework, domesticated animals are considered to be co-citizens of our shared communities, with rights to protection and care and participation in decisions that affect their lives. The multidisciplinary approaches to recognizing the interests of animals are well-reflected in the work of Animals in the Room, "an international collaboration of philosophers, scientists, and animal welfare specialists working together to devise and test models for representing non-human animals in decision-making."[10]

For an individual (animal or human) who does possess CBA standing, the benefit from a policy change that improves his or her welfare is typically measured by a monetary compensation test, by how much the individual would be willing to pay for the changed circumstances. For those who would be harmed by the proposal, the relevant question is how much they need to be paid to voluntarily accept the change. If the sum of the willingness-to-pay amounts from "winners" exceeds the aggregate sum that "losers" would require to willingly accept the reform, the cost-benefit criterion is satisfied – though if the project does not actually mandate that the losers receive the requisite compensation, they will indeed be losers should the reform proceed.[11]

Not everything that is important is quantifiable, and not everything that is quantifiable can be valued in monetary terms. Further, large disparities in income undermine the connection between overall welfare and willingness-to-pay (Sunstein, 2018, pp. 67–77). These shortcomings of CBA are recognized, and now it is standard to at least note non-quantifiable policy impacts in conducting CBAs (Office of Information and Regulatory Affairs, n.d., p. 12).

Farm animals have interests. The sentience of chickens, pigs, and cows, for instance, is well-established, and hence it is sensible to talk of changes in their welfare (Rowan et al., 2021).[12] Recognizing the interests of nonhuman animals in CBAs does amplify measurement challenges, but in recent decades animal welfare science has made

[4] See the Cattle & Beef "Sector at a Glance" webpage of the Economic Research Service of the US Department of Agriculture at https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/.

[5] CAFOs also create sizable negative externalities for the environment. The potential for zoonoses to emerge and spread, and the build-up of antimicrobial-resistant bacteria, are other significant costs associated with CAFOs; see, for example, Anomaly (2015, pp. 246–249).

[6] On legal standing, see Sunstein (2000, pp. 1342–1343).

[7] Mill notes "Bentham's Dictum" in his 1861 essay, *Utilitarianism* (Mill (2006 [1861], p. 257)); Mill's own inclusion of animals in the overall happiness is trumpeted in an 1852 essay, "Whewell on Moral Philosophy," Mill (2006, pp. 185–187).

[8] CBA standing controversies tend to focus on certain segments of humans or proto-humans: foreigners, future human generations, and criminals, for instance. See Whittington and MacRae (1986), and Zerbe (1998; 2018). Blackorby and Donaldson (1992) and Lusk and Norwood (2012) are predecessors in looking at the implications of directly including animal preferences in social welfare assessments. See also Norwood and Lusk (2011, pp. 214–219), Carlier and Treich (2020), Johansson-Stenman (2018), Espinosa (2022), and Kuruc and McFadden (2021).

[9] See The Nonhuman Rights Project, https://www.nonhumanrights.org/and Francione and Charlton (2017).

[10] See Animals in the Room https://animalsintheroom.org/.

[11] For a more detailed presentation, see Zerbe (2001, pp. 4–8).

[12] "Sentience" is used here as the ability to experience pain or pleasure (Singer (2023, pp. 5–6)). Sentience does not require consciousness (Dawkins, 2017).

significant strides in understanding animal wellbeing. Physiological and biological correlates such as illnesses, stress hormones, and stereotypic behavior can be used to gauge animal contentment. Experiments have been structured offering animals the choice of living conditions. What types of flooring materials do pigs find most amenable? Do hens prefer round or peaked roosts?[13] Maes et al. (2019) goes beyond preference rankings of options, measuring trade-offs between goods that animals value. Tracking how much food consumption by pigs will fall, for instance, as the effort required to obtain a unit of food increases, can yield a type of price elasticity of demand for food, a willingness-to-pay (in terms of effort) for more food (Maes et al., 2019).

The issue of determining preferences and valuations when conducting a CBA arises for humans as well as for nonhuman animals. Infants and young children, for instance, are not positioned to clearly communicate their desires, nor do they directly possess any willingness-to-pay (Sunstein, 2024, pp. 5–6). Nonetheless, we can make reasonable guesses as to what serves their interests, and in court situations, their appointed guardians do just that. We can make similar, and increasingly well-informed, judgments about the preferences of farm animals.

Granting animals standing in economic cost-benefit analyses would inundate the calculations with a cascade of new, very poor economic agents. For farm animal welfare reforms that would be costly to humans but would improve animal lives, the animals will not be in a position to compensate the monetary losses of those humans who bear them. With willingness-to-pay as the measure of benefits, potential gains to those who are impecunious carry little sway in CBAs.

For policy reforms that would lead to a diminution in farm animal welfare, however, the grant of standing to the animals could prove decisive. The decline in welfare would make animals the losers in such a reform – how could they be compensated? Consider a reform where the conditions of confinement would become more onerous, where animals would be even more packed together. Perhaps the animals would be "willing to accept" this new deprivation if they were provided with tastier food, say, or better veterinary care. But in current factory farms in the US the crowding already is so intense (and, apparently, so unpleasant for the animals) that the marginal disutility of further degradation in living conditions would presumably be quite serious. Would any feasible improvement in food quantity or quality be able to offset the decline in non-food conditions, and if such a tradeoff were available, would the requisite increased expenditure by humans be worth it? (One might liken this to animals giving consent to serve in a laboratory experiment, like the consent required for humans in experiments, which might only be forthcoming with some compensation.) Without more specificity, the answer to this question remains indeterminate, but it is likely that the gains to humans from more intense crowding would not be sufficient to compensate for the animals' increased suffering. Note also that if some humans are distressed by the animal welfare decline, then that distress would help to offset any gains other humans might garner from the reform: standing for animals does not disenfranchise human allies in the CBA calculus (Zerbe (2001, pp. 7–9) and Markovits (1984, pp. 1185–1187)).

The presumption that emerges is that, with CBA standing for animals, reforms that benefit some humans at the expense of farm animal welfare would fail a CBA, as the animals could not be adequately compensated (even hypothetically) out of the gains accruing to humans. Simultaneously, however, the highly restricted willingness-to-pay by animals for better living conditions would preclude CBA-imprimatur for reforms that would improve animal welfare but only do so at a non-negligible cost to humans. This exercise results in a sort of status quo bias, though not a new one: a similar bias would have existed prior to the adoption and expansion of factory farming in recent decades (Lusk & Norwood, 2012, pp. 197–198).

CBAs are often complemented with an accounting of distributional consequences, where reductions in inequality are taken to be a positive contribution of a proposed project (Office of Information and Regulatory Affairs, n.d., p. 7). Were CBAs to utilize the widely accepted notion that the marginal utility of income falls as income rises, even interpersonally, or confer an advantage to inequality-reducing measures, then the multitudinous, impecunious animals would receive enhanced weight in CBAs. Further, as noted, CBA is itself a proxy for informing broader questions of social welfare – a proxy that becomes less reliable when there are vast wealth inequalities among affected subjects. These additional considerations suggest that a status quo bias is a lower bound on the protection of animal welfare that would come from recognizing animal standing in CBAs.

Without animal standing, the influence of animal welfare on CBA calculations arises only indirectly, through human interest in animal wellbeing. This interest can be considerable. People often, for instance, lavish attention on their pets and hold low opinions of people who are cruel to animals. But it has been widely observed that human support for animal welfare is not fully reflected in food purchase decisions.[14] That is, it might be the case that current farm animal welfare conditions are suboptimal, even if animals themselves possess no economic standing.

Why might human animal-welfare preferences be less than fully revealed in economic markets? One possibility is that people know that their own purchasing decisions (say, of high welfare chicken) will have little to no impact on the overall state of animal welfare – and hence, they are not willing to pay much of a premium for high welfare meat. Under these circumstances, a voter referendum that raised minimum welfare standards might achieve broad support, even if the food purchases by the referendum supporters did not reveal a substantial interest in animal welfare.[15]

Animal products like meat and milk are standard private consumption goods: if I eat a chicken wing, you cannot eat the same wing, there is *rivalry* in consumption; and, if I legally possess the wing, you can be kept away from it, others can be *excluded* from a chicken wing provided to me. A legislated, widely supported animal welfare standard takes on the quality of a public good, however. If I enjoy the "consumption" of living in a land of decent animal welfare, you can enjoy it simultaneously, it is a *non-rival* "good"; and if the government provides to me a decent level of farm animal welfare, then you receive it as well, it is *non-excludable*. (A similar situation exists for other types of legislated production features, such as being free of the use of child labor.) Individual decision making generally leads to the underprovision of public goods like animal welfare, as "consumers" have an incentive to free ride: if good animal welfare is provided, they can benefit from it, even if they made no contribution to having it brought about.[16]

Imagine that you avoid personal free-riding and are willing-to-pay for higher welfare animal products. When you are in a grocery store, is it easy to identify products that match your preferences? Do you know if "cage-free" implies non-CAFO conditions (it does not), or if "free range" holds animal welfare implications (for the most part, it does not)? The current combination of a lack of comprehensible or standardized and verified labels and ambiguous terminology renders it hard for someone to understand the welfare conditions experienced by the animals who are the sources of the products they are purchasing. The difficulties tend to be more severe at restaurants or in other outside-of-the-home settings. And unlike the situation with "experience goods," you will not learn the animal welfare attributes of your food even after you

[13] Fraser and Nicol (2018) summarize and analyze the literature on experimental determinations of animal preferences.

[14] See, for example, Clark et al. (2017, p. 113), Hubbard et al. (2020, p. 39), Paul et al. (2019), and Norwood et al. (2019).

[15] See, for example, Norwood (2020, p. 136).

[16] The public good-like features of animal welfare are complex; they can derive from various channels and potentially hold differing implications for desirable policy. See, for example, Harvey and Hubbard (2013, pp. 108–109) and Espinosa and Treich (2024).

consume it (Hestermann et al., 2020, pp. 3–5, and Epperson & Gerster, 2024, pp. 17–19).

Continuing to restrict CBA standing to humans, current animal welfare remains inefficiently low: overall human preferences would be better served by the provision of higher animal welfare. One of the barriers to improved efficiency in farm animal welfare is a lack of actionable information, about both current levels of animal welfare and the welfare implications of our animal product purchase decisions. So, there is much to be said for the collection and dissemination of accurate information concerning farm animal welfare and how it varies with alternative farming practices, and for providing salient, easily comprehensible welfare information on animal product labels.

Why don't high-animal-welfare producers credibly signal their (relatively) animal-friendly policies? To some extent they do, of course. But the interest in profit might not constitute much of a spur to producer provision of animal welfare information. Consumers might prefer not to be reminded that their food derives from the raising and killing of captive sentient beings – even when the animals are well treated. They might prefer to remain ignorant, or at least to possess a sort of plausible deniability of their knowledge of animal living conditions (Ceryes & Heaney, 2019). Nor is the low-information situation easy for a single producer to dislodge, as non-standard or confusing labelling can lead to a distrust by consumers, even of truthful claims. The current situation seems to combine too little accurate information on animal welfare with a widespread desire not to provide or acquire better information. State laws that criminalize unauthorized videos from animal agriculture facilities help to cement this informational dearth (Marceau, n.d.).

It might be possible to regulate for better animal welfare in a manner that also promotes transparency, improving access to knowledge of animal welfare. Legal mandates for better animal living conditions typically are enacted with a long lead time, so that producers have years to institute the production changes necessitated by the new law. One could imagine a legal provision that would extend the deadline, or offer a temporary opt-out, for CAFOs that install and maintain webcams offering good and continuous views of their indoor operations. The resulting improved information accruing from opting-out CAFOs could be used to induce both purchasing and voting decisions that have a better claim to represent underlying human preferences, promoting (anthropocentric) efficiency in economic and political marketplaces.

In summary, no inherent barriers preclude directly including animal interests in cost-benefit analyses. There are practical difficulties of measuring animal welfare and quantifying compensation, but these issues arise with some elements of human-restricted CBAs, too, and they are not insuperable. When decisions about farm animal welfare have to be made, including our best guesses about the views of the affected animals would lead to better decisions. If the animals were human, those views would be included – and it is hard to see how not being of our species should mandate that their interests are excluded (Singer, 2023, pp. 4–9).

Uncertainty about the proper approach to animal standing further motivates the need for policy change. Policy paths that would be horrific if animal CBA standing turns out to be appropriate should be avoided even if it is likely – but not certain – that denial of standing to animals is indeed proper. Sizable investments to avoid catastrophes and mitigate disasters are sensible, even if the likelihood of catastrophe or disaster is low. Appropriate responses to the uncertainty about animal standing involve improving farm animal welfare, increasing our knowledge about the relationship of farm animal practices to animal welfare, enhancing labeling to convey accurate welfare information on animal products, and further investigating the inclusion of animal interests into economic analyses.

The conceptual approach taken here to both granting standing to nonhuman animals in CBAs and to fully reflecting human interest in animal welfare in choice behavior necessarily elides many barriers to full "animal-inclusive welfare economics" (Gersony, 2023). Quantification of welfare is hard within a given species, much less when looking at tradeoffs between species: is a reform desirable, for instance, if it helps egg-laying hens quite a bit but imposes significant costs on middle-income humans? An initial step would be simply to make explicit the situation of animals within CBAs or similar analyses. For policy proposals that impact the interests of animals, a paragraph explaining that animal welfare will be affected but not directly included in the analysis (as is the usual case) could be required, along with some rough suggestions about the number of animals who would be affected and, if nothing more, whether the reform will (on average) benefit or harm these animals. When the bottom-line is revealed, again, an explicit statement of how valuable the animal welfare effects would have to be to alter the outcome could become standard. Highlighting animal interests in such a fashion, saying the currently quiet part out loud, might alter human attitudes, and spur further work into more precise quantification.

CRediT authorship contribution statement

Jim Leitzel: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Sabina Shaikh:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis.

Declaration of competing interest

No funding was received for this research. We are unaware of any conflicts of interests for the authors. No human or animals subjects were part of this research.

References

Anomaly, J. (2015). What's wrong with factory farming? *Public Health Ethics, 8*(3), 246–254. https://doi.org/10.1093/phe/phu001

Anthis, J. R. (2019). *US factory farming estimates*. Sentience Institute. Available at: https://www.sentienceinstitute.org/us-factory-farming-estimates.

Blackorby, C., & Donaldson, D. (1992). Pigs and Guinea pigs: A note on the ethics of animal exploitation. *The Economic Journal, 102*(415), 1345–1369. https://doi.org/10.2307/2234794

Bolotnikova, M., & Torrella, K. (2024). 9 charts that show US factory farming is even bigger than you realize. *Vox*. https://www.vox.com/future-perfect/24079424/factory-farming-facts-meat-usda-agriculture-census.

Carlier, A., & Treich, N. (2020). Directly valuing animal welfare in (environmental) economics. *International Review of Environmental and Resource Economics, 14*, 1–40. https://doi.org/10.1561/101.00000115

Ceryes, C. A., & Heaney, C. D. (2019). 'Ag-Gag' laws: Evolution, resurgence, and public health implications. *New Solutions: A Journal of Environmental and Occupational Health Policy, 28*(4), 664–682. https://doi.org/10.1177/1048291118808788

Clark, B., Stewart, G. B., Panzone, L. A., Kyriazakis, I., & Frewer, L. J. (2017). Citizens, consumers and farm animal welfare: A meta-analysis of willingness-to-pay studies. *Food Policy, 68*, 112–127. https://doi.org/10.1016/j.foodpol.2017.01.006

Dawkins, M. S. (2017). Animal welfare with and without consciousness. *Journal of Zoology, 301*(1), 1–10.

D'Silva, J. (2016). Adverse impact of industrial animal agriculture on the health and welfare of farmed animals. *Integrative Zoology, 1*(1), 53–58.

Epperson, R., & Gerster, A. (2024). Information avoidance and moral behavior: Experimental evidence from food choices. https://doi.org/10.2139/ssrn.3938994.

Espinosa, R. (2022). Animals and social welfare. Available at: https://ssrn.com/abstract=4113271 https://doi.org/10.2139/ssrn.4113271.

Espinosa, R., & Treich, N. (2024). Animal welfare as a public good. *Ecological Economics, 216*, Article 108025. https://doi.org/10.1016/j.ecolecon.2023.108025

Francione, G. L., & Charlton, A. E. (2017). Animal rights. In L. Kalof (Ed.), *The oxford handbook of animal studies* (pp. 25–32). Oxford University Press.

Fraser, D., & Nicol, C. J. (2018). Preference and motivation research. In M. C. Appleby, I. A. S. Olsson, & F. Galindo (Eds.), *Animal welfare* (3rd ed., pp. 213–231). CABI. https://doi.org/10.7120/S0962728600010836.

Gersony, L. (2023). Meet the economists trying to put a price on animal suffering. *Sentient Media*. https://sentientmedia.org/animal-welfare-economics/.

Grethe, H. (2017). The economics of farm animal welfare. *Annual Review of Resource Economics, 9*(1), 75–94. https://doi.org/10.1146/annurev-resource-100516-053419

Harvey, D., & Hubbard, C. (2013). Reconsidering the political economy of farm animal welfare: An anatomy of market failure. *Food Policy, 38*, 105–113.

Hestermann, N., Yaouanq, Y. L., & Treich, N. (2020). An economic model of the meat paradox. *European Economic Review, 129*, Article 103569. https://doi.org/10.1016/j.euroecorev.2020.103569

Hubbard, C., Clark, B., & Harvey, D. (2020). Farm animal welfare: Do free markets fail to provide it? In B. V. Ahmadi, D. Moran, & R. D'Eath (Eds.), *The economics of farm animal welfare: Theory, evidence and policy* (pp. 30–52). CABI. https://doi.org/10.1079/9781786392312.0075.

Johansson-Stenman, O. (2018). Animal welfare and social decisions: Is it time to take Bentham seriously? *Ecological Economics, 145*, 90–103. https://doi.org/10.1016/j.ecolecon.2017.08.019

Lindena, T., & Hess, S. (2022). Is animal welfare better on smaller dairy farms? Evidence from 3,085 dairy farms in Germany. *Journal of Dairy Science, 105*(11), 8924–8945. https://doi.org/10.3168/jds.2022-21906

Lusk, J. L., & Norwood, F. B. (2012). Speciesism, altruism and the economics of animal welfare. *European Review of Agricultural Economics, 39*(2), 189–212. https://doi.org/10.1093/erae/jbr015

Maes, D. G. D., Dewulf, J., Piñeiro, C., Edwards, S., & Kyriazakis, I. (2019). A critical reflection on intensive pork production with an emphasis on animal health and welfare. *Journal of Animal Science, 98*(Suppl. 1), S15–S26. https://doi.org/10.1093/jas/skz362

Marceau, J. (n.d.). Food transparency & ag-gag laws. Brooks Institute. https://thebrooksinstitute.org/sites/default/files/presentations/Food/20Transparency/20/26/20Ag-Gag/20Laws.pdf.

Markovits, R. S. (1984). Duncan's do nots: Cost-benefit analysis and the determination of legal entitlements. *Stanford Law Review, 36*(5), 1169–1198. https://doi.org/10.2307/1228644

Martino, S., & Kenter, J. O. (2023). Economic valuation of wildlife conservation. *European Journal of Wildlife Research, 69*(2), 32.

Mill, J. S. (2006). *Essays on ethics, religion and society. Collected Works of John Stuart Mill, volume x*. Liberty Fund. Available at: http://oll.libertyfund.org/titles/mill-the-collected-works-of-john-stuart-mill-volume-x-essays-on-ethics-religion-and-society.

Norwood, F. B. (2020). The economics of intensive animal agriculture. In B. Fisher (Ed.), *The Routledge handbook of animal ethics* (pp. 127–140). Routledge.

Norwood, F. B., & Lusk, J. L. (2011). *Compassion, by the pound: The economics of farm animal welfare*. Oxford University Press. https://doi.org/10.1093/acprof:osobl/9780199551163.001.0001

Norwood, F. B., Tonsor, G., & Lusk, J. L. (2019). I will give you my vote but not my money: Preferences for public versus private action in addressing social issues. *Applied Economic Perspectives and Policy, 41*(1), 96–132. https://doi.org/10.1093/aepp/ppy002

Office of Information and Regulatory Affairs (n.d.) *Regulatory Impact Analysis: A Primer*. Office of Management and Budget. https://www.reginfo.gov/public/jsp/Utilities/circular-a-4_regulatory-impact-analysis-a-primer.pdf.

Paul, A. S., Lusk, J. L., Norwood, F. B., & Tonsor, G. T. (2019). An experiment on the vote-buy gap with application to cage-free eggs. *Journal of Behavioral and Experimental Economics, 79*, 102–109. https://doi.org/10.1016/j.socec.2019.02.005

Rioja-Lang, F. C., Connor, M., Bacon, H. J., Lawrence, A. B., & Dwyer, C. M. (2020). Prioritization of farm animal welfare issues using expert consensus. *Frontiers in Veterinary Science, 6*(495). https://doi.org/10.3389/fvets.2019.00495

Robbins, J. A., von Keyserlingk, M. A. G., Fraser, D., & Weary, D. M. (2016). Farm size and animal welfare. *Journal of Animal Science, 94*, 5439–5455. https://doi.org/10.2527/jas2016-0805

Rowan, A. N., D'Silva, J. M., Duncan, I. J. H., & Palmer, N. (2021). Animal sentience: History, science, and politics. *Animal Sentience, 31*(1). https://doi.org/10.51291/2377-7478.1697. https://www.wellbeingintlstudiesrepository.org/animsent/vol6/iss31/1/

Singer, P. (2023). *Animal liberation now: The definitive classic renewed*. Harper Perennial.

Sunstein, C. R. (2018). *The cost-benefit revolution*. MIT Press.

Sunstein, C. R. (2024). Regulators should value nonhuman animals. *Journal of Benefit-Cost Analysis*, 1–13. https://doi.org/10.1017/bca.2024.15

United States Department of Agriculture. (2024). *Census of agriculture 2022. (United States summary and state data, volume 1, geographic area series, Part 51, AC-22-A-51)*. U.S. Department of Agriculture. https://www.nass.usda.gov/Publications/AgCensus/2022/index.php#full_report.

Weimer, D. L., & Vining, A. R. (2024). *Dog economics*. Cambridge University Press.

Whittington, D., & MacRae, J. D. (1986). The issue of standing in cost-benefit analysis. *Journal of Policy Analysis and Management, 5*(4), 665–682.

Zerbe, R. O. (1998). Is cost-benefit analysis legal? Three rules. *Journal of Policy Analysis and Management, 17*(3), 419–456.

Zerbe, R. O. (2001). *Economic efficiency in law and economics*. Edgar Elgar.

Zerbe, R. O. (2018). The concept of standing in benefit-cost analysis. In S. Farrow (Ed.), *Teaching benefit-cost analysis* (pp. 58–68). Edward Elgar.