In Defense of, or Offensive to Farms? Hog Farming and the Changing American Agricultural Industry

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Abstract

American agriculture is inexorably concentrating into the hands of a small number of large conglomerates. Expanding farms pursuing scale economies would also normally have to abide by a system of environmental and other laws that would, in theory, require farms to account for negative externalities. If those laws were observed and enforced, they would help strike a balance between the greater profitability and the larger externalities of larger farms. But these laws are not widely observed and not rigorously enforced, upsetting this balance and giving large-scale farms a cost advantage while insulating them from corresponding responsibilities.

Perhaps nowhere in agriculture is this more visible than in the hog industry, which has dramatically transformed itself from one based on small-scale, localized production to one based on large-scale and far-flung production. Ninety-six percent of all hogs raised in the United States are now raised on farms of 1,000 or more hogs. Lax enforcement of environmental laws against large hog farms has allowed them to grow and realize scale economies without accounting for their exponential increase in water and air pollution. The same can be said for state Right-to-Farm laws, which insulate many large hog farms from nuisance lawsuits. Reckless practices in concentrated animal feeding operations contribute to the development of dangerously antibiotic-resistant bacteria and heighten the risk of a transfer of zoonotic diseases to humans, potentially helping to set the stage for next pandemic. Finally, the concentration of hog farming imposes economic costs by reducing competition and by marginalizing small farmers. Large conglomerates should be held to account for these enormous costs, not only because these costs vastly outweigh the productivity benefits, but also because it is important to preserve an industrial capacity to produce food in an alternative manner that generates far fewer and lower costs.

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Introduction

Even if many farmers would disagree vigorously, there is a very strong and prevailing notion among economists that American agricultural policy centering upon subsidies in the form of price supports and outright grants is allocatively inefficient.¹ Not only

¹ See, e.g., Daron Acemoglu and James A. Robinson, *Inefficient Redistribution*, 95 AM. POL. SCI. REV. 649, 649 (2001) (“In all these cases, it is difficult to argue that the particular form of the policy is correcting a market failure. Rather, it seems aimed simply at redistributing income. For instance, no scholars appear to argue that price supports for farmers, which have the effect of increasing farm output, promote efficiency because without them there would be too few resources in agriculture…. Instead, it is widely agreed that price supports are simply a way to raise farmers’ incomes. If this is correct, then they are Pareto inefficient in the sense that farm incomes could be maintained, and everyone else made better off, by a form of redistribution that did not involve resource misallocation. A simple transfer to raise the income of the farmers by as much as the inefficient policy yields would constitute an actual Pareto improvement.”); Wilfrid Legg, *Agricultural Subsidies: Measurement and Use in Policy Evaluation*, 54 J. AGRIC. ECON. 175, 177 (2005) (“The result was a major OECD study, National Policies and Agricultural Trade, published in 1987, which led to Ministers agreeing in that same year to a set of actions and principles for the reform of agricultural policies. Countries agreed to progressively reduce agricultural subsidies and allow for a greater influence of market signals in guiding production decisions, while recognising that countries might also need to take non-economic objectives into account. Forging consensus among countries on the sensitive issue of agricultural policy reform in an international context is a painstaking process. The agreement to cut subsidies, coupled with the powerful signal to increase the ‘market orientation’ of agriculture was qualified by the potential catch-all of the option to take ‘non-economic objectives’ into account.”); Gordon C. Rausser, *Predatory
that, the same set of distortionary agricultural policies is believed to be contributing to an historic concentration in the agricultural sector, as small-scale farms are replaced by larger, scale-intensive farms.\textsuperscript{2} As farms inexorably consolidate into large, sprawling agricultural conglomerates,\textsuperscript{3} so too do agricultural subsidies.\textsuperscript{4} But the concentration of subsidy payments in fewer hands is not simply the logical result of there being fewer hands to receive their larger share. Rather, agricultural subsidies themselves are actively precipitating the rise of the mega-farm, at the expense of small farms.\textsuperscript{5} An authoritative economic study found that from a third to one-half of all of the farm concentration between 1987 to 2002 could be attributed to government subsidies.\textsuperscript{6} That is to say, without government subsidies, farm concentration would still be occurring, but more slowly.

\textit{Versus Productive Government: the Case of U.S. Agricultural Policies,} \textit{6 J. ECON. PERSP.} 133, 135 (1992) ("[M]uch of this [agricultural] legislation became a vehicle for codifying rent-seeking behavior. Examples of such agricultural policy evolution briefly described here include western resource and water development, soil conservation, environmental pesticide policy, and farm credit.").


\textsuperscript{3} See e.g. Justin Spittler, Robert Ross, & Walter Block, \textit{The Economic Impact of Agricultural Subsidies in the United States}, 36 J. SOC. POL. & ECON. STUD. 301 (2011).


\textsuperscript{5} Nigel D. Key & Michael J. Roberts, \textit{Do Government Payments Influence Farm Size and Survival?} 32 J. AGRIC. & RES. ECON. 330, 346 (2007) ("Government payments were found to be positively associated with the likelihood of farm survival, and the magnitude of this association was generally greater for larger farms. Also, a small but statistically significant positive association was found between payments and farm size growth, and the magnitude of this effect increased with the size of the operation."); Roberts & Key, supra, note 2, at 627.

\textsuperscript{6} Roberts & Key, supra, note 2, at 640.
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If agricultural subsidies account for a third to one-half of concentration, what accounts for the rest? Certainly part of it is the natural economic evolution of an industry, as it realizes efficiencies and economies of scale. But a big missing part of this economic discussion is the role of law in creating an increasingly concentrated agricultural sector. Generous and inefficient federal subsidies are only a part of the policy machinery that grinds small farms down to curio status and allows large agricultural conglomerates to take up the lost productive capacity. Farms pursuing scale economies to boost profits would also normally have to abide by a system of land use, environmental and other laws that would, in theory, require farms to account for negative externalities. If those laws were observed and enforced, they would help strike a balance between the greater profitability and the larger externalities of larger farms. But these laws are not widely observed and not rigorously enforced, upsetting this balance and giving large-scale farms cost advantages while insulating them from corresponding responsibilities.

Perhaps nowhere in agriculture is this more visible than in the hog industry. Over the past two decades, the American hog industry has undergone a remarkable transformation from one based on small-scale, localized production to one based on large-scale and far-flung production. American hog farming has become vertically integrated, with a handful of large corporations now owning the vast majority of hogs raised in the United States. Rather than raise a hog from birth to slaughter, large livestock conglomerates contract out different phases of hog production to individual hog farms, while maintaining tight control over the entire process, from birth to slaughter to processing to marketing. Most individual hog farmers have become outside contractors, providing the large firms with facilities and waste management services, but little of the know-how and animal husbandry that characterized traditional hog farming. Apart from producing record-low consumer prices, the modern and newly-efficient American hog industry has become an export juggernaut, elevating the United States from a bit player in international markets to the largest pork exporter in the world.  

7 PUTTING MEAT ON THE TABLE: INDUSTRIAL FARM ANIMAL PRODUCTION IN AMERICA, REPORT OF THE PEW COMMISSION ON INDUSTRIAL ANIMAL PRODUCTION 5-6 (2008)  
8 Id. The chicken industry is even more integrated and concentrated, while the dairy and beef cattle industries are less so. Id.  
10 McBride and Key, supra, note 9, at 33-34.  
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The massive scaling-up of hog production, however, has come with a heavy environmental and social price tag. The restructuring of hog production to occur almost exclusively on large, industrialized, "concentrated animal feeding operations," or "CAFOs" has introduced a number of environmental problems that were insignificant when production was dispersed on many smaller farms. The forgiveness of these environmental insults is a matter of common agricultural and environmental policy, and is an obvious subsidy for large hog CAFOs. What is less obvious is that this environmental laxity as applied to large hog CAFOs actually injures smaller hog farms, and is driving them out of existence. Under the patina of defending the bucolic farm life, large agricultural conglomerates have actually decimated farming life in favor of CAFOs. Nowhere has this been more sharply illustrated than in hog farming.

Farms, especially livestock operations, expand to take advantage of economies of scale, in which marginal (and average) costs of production diminish as volume increases. But harm from pollution increases with volume, and generally in exponential fashion, so that marginal harm from the 5000th cow, hog, or chicken is greater than that from the tenth cow, hog or chicken. So expansion is a mixed bag of higher profits and greater harms. Environmental and land use laws are supposed to provide a check on the uncontrolled growth of livestock operations, ensuring that the

12 The U.S. Environmental Protection Agency has working definitions of what constitutes a CAFO. U.S. Environmental Protection Agency, Regulatory Definitions of Large CAFOs, Medium CAFO, and Small CAFOs (no date) online: http://www.epa.gov/npdes/pubs/sector_table.pdf (retrieved January 5, 2015, on file with author).

13 Discussed in section II below.

14 Discussed in section II below.


negative externalities of large hog farms are commensurate with the economic benefits of efficient large-scale farming. But with these environmental and law use laws neutered and their countervailing influence absent, large livestock operations such as hog CAFOs have thrived, and have squeezed out smaller, less intensive farms through market pressures. The implicit legal bias towards large CAFOs has marginalized all operations that are not large CAFOs.

This paper examines five areas of law which have biased hog production towards larger, more intensive farms: (1) State Right-to-Farm laws, (2) The Clean Water Act, (3) the Clean Air Act, (4) Food and Drug Administration oversight of the administration of antibiotics to farm animals, and (5) The Packers and Stockyards Act. Each of these areas of law has its own focus, with its own regulatory sphere that somehow touches on the production of livestock. And in each of these areas agricultural interests have successfully lobbied to essentially be left alone, carrying out agricultural operations as they see fit without regulatory or private interference. The resulting free-for-all in a regulatory vacuum has created a hog industry that is highly concentrated and politically organized, and brutal in defending its economic position.

This paper proposes a reform agenda centered upon the economic effects that each of these five areas of law have on the industrialization of hog production. Part I of this Article sets out a brief description and history of the hog industry, with attention towards productivity as well as externalities. Part II of this Article sets out the five different areas of law in which concentration in the hog industry has been abetted by legal policy tending to overlook the harms from large hog farms. Part III of this Article presents some normative arguments for not only halting, but reversing some of the concentration that has occurred in the hog industry over the past two decades. This Article then concludes with some general observations about hog farming, agriculture, and general trends towards industry concentration.

I. The Hog Industry

The hog industry has never been glamorous, but it has long been an important component of the American livestock industry. In 2012, over 23 billion pounds of

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pork and pork products were produced\textsuperscript{18} from hogs raised on about 60,000 hog farms in the United States.\textsuperscript{19} American pork production, taking into account the cyclical nature of agricultural commodities, has increased fairly steadily at an average rate of 1.25\% per year from 1970.\textsuperscript{20} Inventory of live hogs in the United States has also ticked upward, from about 53 million in 1969\textsuperscript{21} to just over 66 million in 2012, an average annual increase of about 0.54\%.\textsuperscript{22} That production has increased more quickly than inventory reflects the industrial trend of producing larger hogs for slaughter.\textsuperscript{23}

These unspectacular trend figures, however, mask the stunning transformation of the hog industry from small-scale production to very-large-scale production. In 1969, only seven percent of all hogs were on farms of 1,000 or more hogs;\textsuperscript{24} in 2012, that figure had risen to almost 96\%.\textsuperscript{25} From 1969 to 2012, the number of hog farms in the United States fell by \textit{seven-eighths}, all the while steadily increasing hog production.\textsuperscript{26} Hog farming has become intensely concentrated: almost 3,000 farms had 5,000 or more hogs – a category that did not even exist in 1992.\textsuperscript{27} 130 hog owners – 0.2\% of all hog owners – collectively own 57\% of all hogs.\textsuperscript{28}

\begin{footnotesize}
\begin{itemize}
\item\textsuperscript{21} USDA 2012 Census, supra, note 19. Calculations derived from the data are on file with the author.
\item\textsuperscript{22} USDA 2012 Census, supra, note 19.
\item\textsuperscript{23} USDA 2012 Census, supra, note 19.
\item\textsuperscript{24} USDA 2012 Census, supra, note 19.
\item\textsuperscript{25} USDA 2012 Census, supra, note 19.
\item\textsuperscript{26} In 1969, there were over 532,000 hog farms in the United States; in 2012 there were about 63,000, USDA 2012 Census, supra, note 19.
\item\textsuperscript{27} McBride and Key, supra, note 9, at 10.
\item\textsuperscript{28} McBride and Key, supra, note 9, at 4.
\end{itemize}
\end{footnotesize}
Perhaps nothing symbolizes the industrialization and concentration of hog farming as much as the trend towards contract farming. Most individual hog farmers no longer own the hogs they handle. In 1992, only three percent of all inventoried hogs in the United States were being raised under a contractual arrangement; now that number is seventy-one percent. Vertically-integrated corporations own the hogs (in the case of the largest hog conglomerate, Smithfield Foods, about 900,000 breeding sows and 15 million hogs overall), and contract with individual farmers (Smithfield has 2,100 contracts) to handle one particular phase of hog-rearing under very specific parameters set out by the corporation. A typical production contract might provide that an integrated firm will deliver a certain number of pigs on a certain date, and that the firm will provide "general instructions with respect to the care and husbandry of pigs." It typically requires the contractor to agree to acknowledge receipt of, and comply with the requirements of a hog "handbook." The firm retains rights of inspection, and contractors agree to forbid access to the pigs unless approved by the firm. Feed and veterinary services are supplied to the contractor from the firm, and only the firm. Contractors are prohibited from going outside of the firm or the firm's practices for anything affecting the welfare of the pigs. Unmistakably, large livestock conglomerates have taken charge of the production process. For their efforts, they have been able to achieve clear gains in efficiency.

Contract farming implies a vertically-integrated production process. The point of contract farming from the perspective of the integrated firm is to eliminate the variability in production, pool risks, and to be able to optimize production from start

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29 McBride and Key, supra, note 9, at 14.
32 Barclay, supra, note 31.
34 See, eg., Christensen Farms & Feedlots, Independent Contractor Agreement (sample), retrieved September 12, 2014 (on file with author).
35 Id.
36 Id.
37 Id.
38 Id.
to finish, from birth to slaughter to processing to marketing. A vertically-integrated firm pools information in a way that would be impossible for a network of hog farmers. It is difficult for an individual hog farmer to find the best breeding boars and sows from among hundreds of thousands, translate anticipated future market conditions into production decisions, and shuttle hogs among a network of farms to minimize transportation costs and to adjust to farm-level changes, such as disease or under- or over-production. Vertically-integrated firms exercise tight control over feed administered to its hogs, providing uniformity, and also allowing for experimentation with feed mixtures and sometimes with the use of administration of antibiotics not for treating infection, but for growth promotion.

By virtue of their size, vertically-integrated firms are able to ferret out the best price for feed, the largest cost of hog farming. Finally, vertical integration ironically breaks up hog farming into different stages. Traditional "farrow-to-finish" hog farms birthed piglets on the farm and raised them to slaughter weight, feeding them corn and soybean that was grown on the farm itself. Hogs were traditionally sold at local markets (which were connected to larger distribution networks). A modern, vertically-integrated farming operation may have one type of hog farm that breeds hogs, another that farrows piglets and weans them, another that fattens them up to slaughter weight, and an in-house slaughterhouse that is operated to accept hogs at just the right time so as operate at near capacity. This separation of hog-raising phases has allowed livestock conglomerates to realize efficiencies by specialization. Individual hog farmers have, by specializing in a particular phase, become marginally more proficient at breeding, weaning, or

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40 Id.
41 Discussed below in section II.D. below.
43 Farrow-to-finish is typically a confinement operation where pigs are bred and raised to their slaughter weight, usually 225-300 pounds. Facilities with a capacity of 2,500 or more swine are considered by the EPA to be concentrated animal feeding operations (CAFOs) subject to point source pollution permit requirements. Other types of hog operations include farrow-to-feeder pig, feeder pig-to-finish, weanling-to-feeder pig, and farrow-to-weanling. WILLIAM D. McBRIE & NIGEL KEY, USDA ECONOMIC RESEARCH SERVICE, ECONOMIC AND STRUCTURAL RELATIONSHIPS IN U.S. HOG PRODUCTION (Economic Research Service, Agricultural Economic Report No. 818, U.S. Department of Agriculture, 2003), online: http://www.ers.usda.gov/media/488755/aer818_1_.pdf.
44 McBride and Key, supra, note 9, at 5.
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finishing, and thus marginally more effective as hog farmers.\textsuperscript{46} Slaughterhouses, as well, have grown in size and specialization – segregating slaughter into different types of pork cuts and products – to further take advantage of economies of scale, further reducing costs.\textsuperscript{47} Notoriously volatile spot markets, the traditional means of marketing finished hogs, now account for only eight percent of sales, down from 62% in 1994.\textsuperscript{48} Spot markets happen to be how most small hog farms market their finished hogs.\textsuperscript{49}

At bottom, all of this supersizing and specialization of hog operations is driven by the pursuit of economies of scale.\textsuperscript{50} The difference can be dramatic: among "farrow-to-finish" operations that raise pigs from birth to slaughter, a farm of less than 500 head incurred operating expenses more than twice that of farms with 5,000 or more head.\textsuperscript{51} That large of a gap effectively consigns anything less than a mega-farm, or very large CAFO, to supplying "niche" pork markets, much smaller markets where consumers pay a premium for pork derived from hogs that were raised in more humane conditions and that produce fewer environmental problems than CAFOs.\textsuperscript{52}

In most cases, margins in hog farming are tantalizingly small, but narrow advantages multiplied over large volumes of hogs translate into potentially decisive competitive advantages. For "feeder-to-finish" operations that take weaned hogs and fatten them up to slaughter weight, that same comparison of operations with 5,000 or more head with those with fewer than 500 head yields a much smaller cost advantage: roughly a 20% cost savings. But that is enough to have driven most production on feeder-to-finish farms onto very large farms.\textsuperscript{53}

\begin{itemize}
\item \textsuperscript{46} McBride and Key, supra, note 9, at 1.
\item \textsuperscript{47} MacDonald, supra, note 45, at 5-6.
\item \textsuperscript{49} DOUG GURION-SHERMAN, CAFOs UNCOVERED: THE UNTOLD COSTS OF CONFINED ANIMAL FEEDING OPERATIONS 22 (Union of Concerned Scientists, 2008), online: http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food_and_agriculture/cafos-uncovered.pdf.
\item \textsuperscript{50} McBride and Key, supra, note 43, at 1 ("Economies of size are a form of cost variation among farms based on the premise that larger farms have lower per unit costs than smaller farms. Therefore, farms will become larger over time as smaller farms exit the industry or expand to take advantage of lower costs.").
\item \textsuperscript{51} McBride and Key, supra, note 9, at 12.
\item \textsuperscript{52} Peter J. Lammers, David R. Stender, and Mark S. Honeyman, \textit{Niche Pork Production} 1 (Iowa State University, 2007); online: http://www.ipic.iastate.edu/publications/IPICNPP.pdf.
\item \textsuperscript{53} McBride and Key, supra, note 9, at 11 (Table 2, showing that feeder-to-finish hog farms \textit{averaged} 7,222 hog sales or removals in 2009).
\end{itemize}
The late Nobel Laureate economist Ronald Coase wrote in 1937 that the nature of a firm was to reduce the transaction costs of doing business.\textsuperscript{54} Internalizing different aspects of production could save a firm costs by dispensing with bilateral with partners that may or may not be reliable or forthright, or may harbor different assumptions about the transaction.\textsuperscript{55} Coase almost certainly did not have the hog industry in mind, but its evolution serves as an elegant example of the field of transaction cost economics\textsuperscript{56} that Coase's works have spawned.\textsuperscript{57} While the hog industry has not become one gigantic firm, it has moved in that direction with the contracting and vertical integration model. At bottom, the hog industry is an apt example of an industry trying to minimize transaction costs. The hog industry will never be able to insulate itself from commodity price fluctuations or weather-induced losses, but it can diversify its risk and control just about every aspect of hog production by integrating production under one central clearinghouse. Livestock conglomerates, possessing a menu of productivity-improving techniques, have sought to implement them by either bringing far-flung operations in house, or contractually securing their cooperation in incorporating those techniques into hog production. The result is an industry that, in its brutal efficiency, has drastically reduced the uncertainty involved with hog raising, and lowered a wide array of transaction costs associated with the production of a notoriously volatile commodity.

At first glance, the newly-efficient and highly concentrated hog industry would appear to have a smaller footprint than the traditional, small-scale farrow-to-finish farm. The loss of almost half of a million hog farms has likely released hundreds of thousands of acres of land to other uses, some of them other farm uses.\textsuperscript{58} But the impacts of the new, supersized CAFOs extend well beyond their property lines. Whereas the traditional farrow-to-feed farm fed pigs surplus crops that were grown on that very same farm, the vertically-integrated hog industry relies on a sophisticated and...
calibrated system of feed supply that produces feed offsite and transports them to individual contract hog farmers, generating a different mix for each different stage of hog production.\(^\text{59}\) That system of industrial feed production, which requires energy-intensive fertilizer and generates a transportation footprint, produces a wider and more harmful array of environmental effects.\(^\text{60}\) Traditional farrow-to-finish farms were part of a larger, crop-growing farm, raising a relatively small number of hogs and disposing of the manure by spreading it on the nearby crops. At small scales, manure can be applied to growing crops without producing an excess amount of polluted runoff during rains. But the modern large CAFO generates far more manure than could be safely applied to onsite crops.\(^\text{61}\) Special handling is generally required, and CAFOs may or may not fully comply with local, state or federal laws regulating agricultural runoff.

Large CAFOs are a creature not only of economics, but also legal policy. As they have emerged in the last four decades, they have not only transformed production and consumption of meat but also created a widening circle of environmental and social impacts. This Article catalogs those outsized environmental and social impacts, and shows how legal rules and institutions have largely given CAFOs a pass, in the meantime allowing them to swallow up smaller farms.

II. Legal Policies Leading to Larger CAFOs

A. State Right-to-Farm Laws

\textit{Spur Industries v. Del E. Webb}\(^\text{62}\) held, unsurprisingly, that a property developer could recover successfully claim a nuisance against a foul-smelling cattle feedlot,\(^\text{63}\) was routine. It was not particularly surprising, from a jurisprudential point of view, that the plaintiff developer won despite actively expanding his retirement community towards the cattle feedlot, which had been operating for years. The "coming to the nuisance" defense has long been declared, in most states, to be an incomplete defense to a
nuisance claim. But the legislative backlash following *Spur* took everyone by surprise. It was as if some inchoate discomfort with nuisance laws on the part of farmers suddenly exploded into plain view, and the *Spur* case became a fulcrum for political action to reverse, state-by-state, its holding.

Between 1976 and 1991, every single state plus Puerto Rico passed some form of a "Right-to-farm" law ("RTF law"). To widely varying degrees, RTF laws provide farms with a defense to nuisance claims brought by plaintiffs that migrate toward (or "come to") any allegedly nuisance-creating farm. RTF laws thus reverse a trend towards diminishing the importance of the coming to the nuisance defense. While most commonwealth jurisdictions have relegated the coming to the nuisance defense to being just one factor in a multi-factor analysis, RTF laws resurrect it as an absolute defense. At least with respect to farms, nuisance lawsuits have become considerably more difficult to win.

RTF laws commonly set out some definition of the agricultural operations that can raise the defense, a list of permitted operational changes that can be undertaken without losing the defense, and some time limit that serves as an effective statute of limitations on any claims of nuisance against a farm. The stated purpose of RTF laws is to preserve agricultural lands, protecting them against the encroaching sprawl of residential development. Why should a cattle feedlot or hog farm that started out in the middle of nowhere have to continually worry about the approaching advance of property developers? It seemed not only grossly unfair but counterproductive to make them dance around the whim and caprice of developers.

But RTF laws do not protect all agricultural lands. In *Parker v. Obert's Legacy Dairy*, an Indiana court rejected a nuisance claim against a hog farm with over a thousand hogs. But the plaintiff's property was also a farm, albeit a much smaller one.

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64 See, e.g., *Jacques v. Pioneer Plastics, Inc.*, 676 A.2d 504, 508 (Me. 1996); *Mark v. Oregon ex rel. Dep't of Fish & Wildlife*, 84 P.3d 155, 163 (Or. 2004).
66 See *Jacqueline P. Hand, Right to Farm Laws: Breaking New Ground in the Preservation of Farmland*, 45 *U. PITT. L. REV.* 289, 305 (1984) (“In enacting the right-to-farm laws, the various state legislatures have made the policy judgment that the social benefits of retaining land in agriculture are so critical that, rather than allowing courts to decide on a case-by-case basis whether an agricultural use is reasonable, the balance between agriculture and other uses should always be tipped toward agriculture.”).
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It is just that defendant's hog farm was large enough to be a nuisance; plaintiff's was not. In fact, most serious nuisance lawsuits are filed against large and very large CAFOs. RTF laws wield their greatest significance when they protect these large-scale farms from nuisance suits; they do not play a significant role in protecting the vast majority of the smaller-scale farms, which emit noxious odors in much smaller doses, or discharge smaller amounts of water pollution.

The most common complaint triggering a nuisance complaint seems to be that large hog CAFOs generate odors. The odors from hog CAFOs are particularly strong – studies have decomposed hog manure odors into over 300 discrete compounds, the vast majority of which pose no health risk or present any unreasonable odors. But a handful of these components are in fact harmful to human health and some score very

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high on tests of subjective assessments of odor strength.\textsuperscript{71} Even if odors stop short of causing health problems, their persistence inhibits outdoor activity.\textsuperscript{72}

Should large or very large CAFOs enjoy an absolute coming to the nuisance defense? Lockean concepts of property ownership, vesting property rights in those that have mixed their labor with the land, lend an appeal to the defense of farmers in particular. And a first-in-time, first-in-right rule offers simplicity and predictability. But a coming to the nuisance defense is a form of grandfathering, a practice of exemption from regulation which derives from its mere pre-existing use, and differentiates a use of the property from subsequent plans for adjoining property. Allocating a property priority to first settlers is to choose a particular point in time – the establishment of a CAFO – as the time for a baseline condition. But that is an arbitrary choice. There is no reason to allow noxious land uses to continue just because they were there first. The first land use, in some cases begun hundreds of years ago, says little about the highest and best current land use.

This line of argument has particular relevance in critically considering RTF laws. The prevailing evidence suggests that CAFOs cause significant devaluation of neighboring properties.\textsuperscript{73} While neighboring farms might suffer some harms from CAFOs, residential properties suffer a great deal more. Not only does the ubiquitous odor of hog CAFOs cause houses for sale to show poorly every single day of the year, but air

\textsuperscript{72} K.M. Thu, Public Health Concerns for Neighbors of Large-Scale Swine Production Operations, 8 J. AGRIC. SAFETY & HEALTH 175.
pollutants pose significant health problems for neighboring residents. RTF laws rob residential neighbors of a common law remedy. Finally, it is worth noting that some RTF laws do not stop at protecting existing CAFOs. *Parker v. Obert's Legacy Dairy* upheld a fairly long-standing interpretation of Indiana’s Right-to-Farm law as protecting not only existing farms but farms that expands operations. As long as a farm’s operational changes are not “fundamental” or “significant,” RTF laws preserve its grandfathered status. The defendant Obert's Legacy Dairy expanded from about 100 cows to over 1,000 (not a large CAFO by today's standards but a dramatic upsizing), holding that such a change was not a "significant change" in the type of agricultural operation, and could therefore not be the subject of a nuisance lawsuit brought by neighbors. The Indiana RTF law not only grandfathers in every farm, but grants it license to expand apparently without limit, so long as it does not dramatically change the "type” of operations. If expanding from 100 to 1,000 is not a significant change, then one imagines that only a change from a hog farm to a dairy farm would rob a farm of its privileged status under Indiana's RTF law.

RTF laws do not protect small farms. Despite the label, RTF laws are an implicit subsidy for large CAFOs, and as such, are an assault on small farms. In creating a legal right to farm, state legislatures have unwittingly helped create economic conditions that have made it impossible for most farmers to exercise that right.

**B. Failure to Regulate CAFOs Under the Clean Water Act**

Traditional, small-scale hog production applies the hog manure to adjacent crops, saving on the need for synthetic, commercial fertilizers. Large CAFOs produce more

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74 See, notes 127-140 and text accompanying, infra.
77 988 N.E.2d at 320.
manure than can be applied to adjacent crops, so manure is stored in tanks or lagoons, for future application on nearby land – it is hoped. Unless manure is treated or moved off-farm, available cropland and pasture can only accept a fraction of the amount of manure that is produced before excess nitrogen and phosphorus "loading" occurs, degrading water quality. The seepage and runoff from manure lagoons cause water bodies to experience algal blooms (sometimes toxic) and oxygen depletion, degrading aquatic habitat for fish and other wildlife. Nitrogen is also released indirectly into water bodies by the air emissions of ammonia, which is redeposited onto land and water. EPA estimated in 2003 that five percent of all CAFOs produced 50 percent of the animals (hog, cow, chicken) and 65 percent of the excess nutrient runoff.

Large CAFOs commonly store manure in pits directly beneath the slatted floors of a hog barn, where they will remain until it is pumped out to be spread onto crops at the right time. However, the manure may remain in the storage pit for as long as one year, during which time it is emitting odors, harmful air pollutants, and the powerful


79 RIBAUDE ET AL., supra, note 78, at 5-6.

80 RIBAUDE ET AL., supra, note 78, at 5-8.

81 Hog manure causes pollution to surface waters by discharging ammonia, which reduces the amount of oxygen in water, killing fish and plant life. Over time, ammonia also converts into nitrates which cause algal blooms which in turn create a variety of other ecological problems, including the further oxygen depletion, the blocking of sunlight and prevention of photosynthesis, and when algae die, they often emit toxins such as Pfisteria, which kill fish and wildlife, and fecal pathogens such as Giardia and Cryptosporidium which render fish unfit for consumption. CARRIE HRIBAR & MARK SCHULTZ, UNDERSTANDING CONCENTRATED ANIMAL FEEDING OPERATIONS AND THEIR IMPACTS ON COMMUNITIES, 4-5 (National Association of Local Boards of Health (2010); online: http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf.


85 RIBAUDE, ET AL., supra, note 78, at 9.

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greenhouse gas methane.\textsuperscript{87} More commonly, and even more environmentally offensive, is the practice of simply storing hog manure in an open-air surface lagoon, where it runs off into waterways during rains.\textsuperscript{88} Heavy rain events create large spills of hog manure into waterways, killing thousands of fish and shellfish at a time, and necessitating the closure of several fisheries for weeks or months.\textsuperscript{89} There is also the strong suggestion that the application of hog manure on crops have also polluted groundwater supplies.\textsuperscript{90}

Under hog contract arrangements, it is usually the contract growers and not the conglomerates that are responsible for the manure management, and for disposing of it properly.\textsuperscript{91} Conglomerates have used their market power over contract growers to devolve themselves of the major pollution control expense.\textsuperscript{92} Individual contract growers usually do not have sufficient margins to adequately treat pollution.\textsuperscript{93} Contract growers, lacking deep pockets, are also more sympathetic regulatory

\begin{itemize}
  \item \textsuperscript{87} Id.
  \item \textsuperscript{88} Id.
  \item \textsuperscript{89} See, e.g. Michael Mallin, \textit{Impacts of Industrial-Scale Swine and Poultry Production on Rivers and Estuaries}, 88 AM. SCIENTIST 26, 26 (2000); Michael A. Mallin, \textit{et al.}, \textit{Comparative Effects of Poultry and Swine Waste Lagoon Spills on the Quality of Receiving Streamwaters}, 26 J. ENVTL. QUAL. 1622, 1622 (1997).
  \item \textsuperscript{91} See, e.g., \textit{Pew}, supra, note 7, at 6; Christensen Farms, \textit{supra}, note 34.
  \item \textsuperscript{92} KATHRYN COCHRAN, JOSEPH RUDER & DANIEL WHITTLE, \textit{AN ECONOMIC ANALYSIS OF ALTERNATIVE HOG WASTE MANAGEMENT TECHNOLOGIES} 17 (Environmental Defense Fund, 2000).
\end{itemize}
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targets, and are thus used by the conglomerates as de facto human shields in the regulatory war it wages with environmental regulators.

The cost of controlling hog manure-created water pollution is not very high. For large CAFOs to comply with EPA standards for manure lagoons and sprayfield systems, are about $3.72 per finished hog, which, for a 250-pound hog translates into 1.6 cents per pound of pork. Additional techniques, such as construction of a wetland with specialized plants and soil to act as a filter, cost virtually nothing. But in an industry with tight margins, even small costs are at least perceived to be an existential threat to business, and sometimes actually are.

The mass production of hog manure also introduces the opportunity to profit: "anaerobic digesters" not only capture odors and air pollutants, but produce methane, which has the dual benefit of sequestering a powerful greenhouse gas and saving it as an energy source. Several different types of anaerobic digesters now

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96 Cochran et al, supra, note 92, at 19.

97 Cochran et al, supra, note 92, at 19-20.


99 Methane is a greenhouse gas that contributes to global warming, that is approximately 20 times as powerful as carbon dioxide in trapping heat. Andrew E. Dessler, Introduction to Modern Climate Change 77-79 (2012). Hog manure produces emissions of methane that, if harnessed, can also be a source of energy. See, e.g., S.M. Tauseef, M. Premalatha, Taneem Abbasi & S.A. Abbasi, Methane Capture from Livestock Manure, 117 J. ENVTL. MGMT. 187, 187 ("Manure-based methane has been estimated to contribute 4% of all
exist, but the basic process is the same: hog manure is pumped into a container that creates a zero-oxygen environment (hence the term anaerobic), which allows the natural bacterial decomposition process to convert the manure and emitted gases into a solid organic waste and a gaseous mixture of methane, carbon dioxide, and trace amounts of other gases. The resulting solid waste is a fertilizer, but is much less volatile and thus less polluting than the unprocessed hog manure, and the resulting gas can be combusted to generate electricity. Eliminated from the process are the byproducts of the odor that has spawned so many nuisance lawsuits, the air pollutants that are harmful to human health, the nutrients that pollute waterways, the emission of a greenhouse gas, and added to the process is a source of electricity.

It is hard to overstate how colossal of a market failure it is for CAFOs to create as much pollution as they do. Ten million hogs in the North Carolina coastal plain generate more excrement than the populations of New York City, Los Angeles, and Chicago combined. Hundreds of millions of dollars are spent in wastewater treatment in these three cities (combined). Just some modest pollution control costs spent by CAFOs could generate enormous savings in avoided water treatment and countless environmental and ecological benefits; to say this is low-hanging fruit is a gross understatement.

anthropogenic methane that is presently being added up to other natural and anthropogenic sources of global warming.”).

100 CIBOROWSKI, supra, note 98, at 14.
101 Cochran et al, supra, note 106, at 22.
102 CIBOROWSKI, supra, note 98, at 18.
103 Supra, note 70.
104 See, notes 127-140 and text accompanying, infra.
106 KATHRYN COCHRAN, JOSEPH RUDEK & DANIEL WHITTLE, AN ECONOMIC ANALYSIS OF ALTERNATIVE HOG WASTE MANAGEMENT TECHNOLOGIES 7 (Environmental Defense Fund, 2000).
And yet regulation of the water pollution emanating from CAFOs was a long-delayed, and still highly contested process. The EPA is charged with limiting discharges of pollution into "waters of the United States," under the National Pollution Discharge Elimination System under the Clean Water Act. EPA's mandate under the NPDES program was clear enough with respect to CAFOs: the original passage of the Clean Water Act in 1972 used included the specific words "concentrated animal feeding operations" in the definition of "point source" to indicate that Congress intended that EPA should regulate CAFOs just as it should regulate industrial sources of pollution with outflow pipes. In 2001, nine years after a consent decree required EPA to develop NPDES permitting regulations for CAFOs, EPA proposed a rule that would require, for the first time, CAFOs to obtain a National Pollutant Discharge Elimination System permit under the Clean Water Act. Two more years of controversy and produced a final rule in 2003. However, this was challenged by environmental organizations on the grounds that the rule did not require that actual nutrient management plans be a part of NPDES permit applications. Since the term "effluent limitation" is defined as a limit on "quantities, rates, and concentrations of chemical, physical, biological and other constituents" discharged, an NPDES permit without even a statement of how CAFOs intended to limit the amount nutrients escaping into waterways (never mind an actual limit on quantities, rates or concentrations) was not an effluent limitation at all.

It is certainly true that regulating the water pollution resulting from the inappropriate handling of hog manure is a much less exact science than even the inexact sciences of regulating industrial discharges from an outflow pipe. By its nature, farm pollution is more diffuse, and its inputs – livestock manure, pesticides, eroding soil – less susceptible of quantification, and thus less susceptible of a quantity, rate or concentration regulation. It is thus understandable that EPA might want to tackle other

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112 Id.  
113 Id.  
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regulatory challenges first. But the protracted and litigation-driven nature of the process suggests that EPA never, as a political matter, wished to impose any burdens on farmers. But to make its first proposed rule in 2001, almost thirty years after Congress instructed EPA to regulate CAFO discharges, is a bit ridiculous. It could well have been longer if it were not for a lawsuit by an environmental organization against EPA. That 2001 rule was so weak, however, that another lawsuit filed by another environmental organization, finally forced EPA, after another seven years, to finally develop a final rule, a total of 36 years after Congress gave EPA its explicit marching orders.

Why has EPA been so reluctant to regulate CAFOs when Congress spoke so clearly? This Article is not a descriptive account of the politics of agricultural law or policy. That is well-plowed ground better left to political scientists and political economists. Rather, this Article is a description of the extent to which law and policy has been bent to the will of certain agricultural interests. To be sure, it has not been the will of the majority of farmers, the vast majority of which have small farms. It is not a coincidence that a regulation limiting discharges resulting from hog manure would be costly to large CAFOs and much less so than small ones. A USDA study found that only 46 percent of small farms (defined as less than 300 animal units, or 750 hogs weighing more than 55 pounds) would comply with EPA's 2003 proposed regulations, but only 18 percent of large farms (defined as more than 2,500 hogs of at least 55 pounds) would meet the same standard.

118 EPA's final rule in 2008 was challenged by the National Pork Producers Council, and resulted in another change to the 2008 rule, to exempt CAFOs that were only "proposing" to discharge water pollutants, National Pork Producers Council v. U.S. EPA, 635 F. 3d 738 (5th Cir. 2011).
119 See, e.g., Robert Paarlberg, The Political Economy of American Agricultural Policy: Three Approaches, 71 Am. J. Agric. Econ. 1157, 1157 (1989) ("U.S. policy is said to protect agriculture because of something distinctive in our nation's ideology, a Jeffersonian belief in the unique virtue of small yeoman farmers"); David Freshwater, An Interview with Lee Hamilton, 9 Choices 32, 34 (1994) ("[E]ven though farmers are a very small percentage of the population, and one that is getting smaller every year, they retain political clout that far exceeds their numbers."); Raussner, supra, note 1 (discussing inefficient "predatory" government policy as opposed to efficient "productive" agricultural practices).
120 RIBAUDO, ET AL., supra, note 78, at 14.
121 2003 CAFO Rule, supra, note 111.
122 RIBAUDO, ET AL., supra, note 78, at 14.
Similarly skewed numbers existed for the EPA phosphorous standard: 69 percent for small farms, 20 percent for large farms. The net costs of properly disposing of hog manure – paying crop farmers to accept it as fertilizer – depends on how much excess manure is generated and also whether there are nearby crop farmers that can use it without creating nutrient overloading problems of their own. Large farms will generally pay significantly higher costs for disposal on a per-unit basis, if one subtracts out the one-time plan development costs that are required. Given these cost dynamics, it seems clear that large farms have been the source of greatest resistance to EPA water pollution regulation of hog farming.

**C. Failure to Regulate Air Emissions from CAFOs**

Pollution from hog manure is not limited to runoff. Much less appreciated, but still quite costly, is the air emissions from hog manure. Volatilized ammonia, the gaseous form of nitrogen emanating from hog excrement, pollutes in two ways: (1) by deposition onto land or water, reaching land and waterbodies beyond a spill range, and (2) while airborne, acting as a source of air pollution.

Ammonia emitted from hog manure and deposited onto land or water will assume the form of ammonia ions, which acidify soils and receiving waterbodies. An estimated 430,000 tons of ammonia emitted in 2002, enough to make over 37 billion 32-ounce bottles of Windex. Deposit after emissions tends to occur relatively locally.

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123 Ribaudo, et al., supra, note 78, at 17 (Table 3-1).
124 Ribaudo, et al., supra, note 78, at 17 (Table 3-1).
125 "Excess" means the amount of manure that can be applied on adjoining crops without causing nutrient overloading. Ribaudo, et al., supra, note 78, at 10.
126 Ribaudo, et al., supra, note 78, at 18-25. Plan development costs are high for small farms that do not already have them, and would fail to meet the standard, such that net disposal costs are actually higher for small farms than large farms. Id., at 20.
129 The Material Safety and Data Sheet for Windex Powerized Glass Cleaner indicates that it is 0.1% to 1.5% ammonia by weight. JohnsonDiversey, Windex Powerized Glass Cleaner Material Safety and Data Sheet (2005), online: http://www.foothill.edu/printmaking/msds/windex_mds.pdf. The shipping weight of a 32-ounce glass is 2.3 pounds. Amazon.com, Windex Powerized Glass Cleaner (search conducted March 3, 2015, printout on file with author).
within 30 miles of the emitting CAFO.\textsuperscript{130} In addition to presenting ecological threats through land or water deposition, ammonia also presents a public health threat. Airborne ammonia is a fine particulate matter\textsuperscript{131} (defined as airborne solids less than 2.5 microns in diameter\textsuperscript{132}) which causes respiratory problems ranging from irritation and asthma to premature death.\textsuperscript{133} Ammonia has been estimated to be about half of all fine particulate matter emitted in the eastern US.\textsuperscript{134}

CAFOs also emit hydrogen sulfide,\textsuperscript{135} which causes health effects ranging from temporary moodiness and depression to long-term moodiness and depression\textsuperscript{136} and in more serious cases, severe debilitation and even death in cases of spikes.\textsuperscript{137} The most prevalent health effects of emissions are non-lethal, but still costly and susceptible of epidemiological proof. A number of studies have shown that CAFO emissions lead to

\textsuperscript{130} DOUG GURION-SHERMAN, CAFOs UNCOVERED: THE UNTOLD COSTS OF CONFINED ANIMAL FEEDING OPERATIONS 54 (Union of Concerned Scientists, 2008), online: http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food_and_agriculture/cafos-uncovered.pdf.


\textsuperscript{132} U.S. Environmental Protection Agency, Particulate Matter (PM) (March 18, 2013), online: http://www.epa.gov/pm/.

\textsuperscript{133} U.S. Environmental Protection Agency, Particulate Matter (PM), Health Effects (May 6, 2014), online: http://www.epa.gov/pm/health.html.

\textsuperscript{134} Natalie Anderson, Ross Strader & Cliff Davidson, Airborne Reduced Nitrogen: Ammonia Emissions from Agriculture and Other Sources, 29 ENVMT. INT'L. 277 (2003).

\textsuperscript{135} GURION-SHERMAN, supra, note 49, at 55.


significant increases in cases of asthma and nasal allergies. Effects are more acute among adolescents attending school near large hog CAFOs, who suffer a higher incidence of asthma, and more acute still for children living on hog farms.

Like water pollution regulation under the Clean Water Act, air pollution regulation under the Clean Air Act would be challenging from an administrative perspective. Unlike the Clean Water Act, the Clean Air Act contains no explicit inclusion of CAFOs into a regulatory definition like "point source," so EPA could more defensibly avoid the task. Regulating emissions from manure from hog farms means a regulation applied to requires some regulation as applied to over 50,000 hog farms. Regulating each one as a "source" of pollution, much like one would regulate a fossil-fueled power plant or a refinery, would be an enormous challenge for the EPA. Indisputably, however, emissions pose public health threats. Just as EPA, when forced by litigation, developed a program to permit discharges of water pollution from these 50,000 hog farms, it can find the tools to address air pollution from these same sources. And just as EPA can target its regulatory efforts towards the largest hog CAFOs, it can target its air emissions regulation in large part toward the same hog CAFOs. After all, the source of the water pollution and air pollution are the same: the manure.

D. Lack of Oversight of Administration of Antibiotics to Livestock

For decades, scientists have tracked the emergence of bacteria that are resistant to antibiotics used to treat them. Between 1940, when the first antibiotic-resistant strain


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was discovered, and 1996, eight major strains have been discovered.142 That number has doubled from 1996 to the present.143 Every time a person or animal is administered an antibiotic – needed or not – bacteria have an opportunity to develop a resistance to that antibiotic. Those bacteria are then transmitted. Those resident in the stomach of livestock administered antibiotics are excreted in manure, and then propagate to wherever the manure is permitted to go. The same is true of humans.144 The overuse of antibiotics in both humans and livestock has led to an alarming uptick in new antibiotic-resistant bacteria. The Centers for Disease Control estimate that every year, over two million Americans become sickened with a bacterial infection that is resistant to one or more common antibiotics that have been previously used to treat the infection.145 Of those, about 23,000 die.146

About eighty percent by volume of the antibiotics administered in the United States are given to livestock.147 Some CAFOs use antibiotics solely to promote animal growth, giving animals an added boost in fighting infection and freeing up bodily resources to add weight.148 It is especially harmful when CAFOs mix antibiotics in with feed,149 as if it were a vitamin supplement. The problem with this kind of subtherapeutic administration is that these low-level doses are high enough to affect bacteria, but not high enough to kill them all off, giving bacteria the maximum chance to adapt, become antibiotic-resistant, and multiply.150

143 Id.
144 Supra, note 142, at 14.
145 CDC supra, note 142, at 11.
146 Id. See also, WORLD HEALTH ORGANIZATION, THE EVOLVING THREAT OF ANTIMICROBIAL RESISTANCE: OPTIONS FOR ACTION 28 (2009) (estimating 63,000 deaths worldwide and 25,000 in the United States).
147 David Kessler, Antibiotics and the Meat We Eat, N.Y. TIMES, March 27, 2013, at A27; Ezekiel J. Emanuel, How to Develop New Antibiotics, N.Y. TIMES, February 24, 2015, at A23.
148 Nigel Key and William D. McBride, Subtherapeutic Antibiotics and the Efficiency of U.S. Hog Farms, 96 AM. J. AGRIC. ECON. 831, 839 (2014) (Table 1, showing 3.3 percent of feeder-to-finish farms using antibiotics for a single purpose, “growth promotion.”).
149 Key and William D. McBride, supra, note 148, at 841 (fn. 13).
Exactly how common this practice is and who uses them is hard to say, as farmers large and small are reluctant to share information that might aid competitors. In the most authoritative study of hog farmers, USDA researchers reported that only 16 percent of surveyed hog farms did not use antibiotics at all. The subtherapeutic use of antibiotics was statistically much more frequent on large farms under a production contract. It is not as if small hog farms avoid the use of antibiotics altogether. But the nature of hog farming is such that antibiotic use only makes sense in the context of very large-scale farming. Some contract hog farmers receive incentive payments based on feed conversion or low mortality rates. So while livestock farming's share of the rise of antibiotic-resistant bacterial cannot be laid entirely on large hog CAFOs, the failure to regulate the administration of antibiotic for livestock fits very neatly into the game plan of large, vertically-integrated livestock conglomerates.

While the epidemiological link between the use of antibiotics in livestock and the emergence of antibiotic-resistant bacteria is not concrete, the evidence is strongly suggestive: antibiotic-resistant bacteria are commonly found onsite at CAFOs, found downwind and downstream, but not found at all upwind. Some antibiotics administered to livestock are in fact the same ones used to treat humans for life-threatening infections, and which have now lost their effectiveness. Following a ban in the European Union on the use of antibiotics for growth promotion, levels of antibiotic-resistant bacteria decreased.


151 Key & McBride, *supra,* note 148, at 843 (Table 4).

152 Key & McBride, *supra,* note 148, at 843 (Table 4).


human illness and death, there is very good reason to believe that the practice is a very significant contributing cause.\textsuperscript{157}

Even if antibiotic use for livestock is only weakly linked to the emergence of antibiotic-resistant bacteria, the shame is that this use is so unnecessary. In the 2009 survey of hog farmers by USDA researchers, almost half of those responding reported that they administered antibiotics at least in part for "growth promotion."\textsuperscript{158} This practice is a reckless endangerment of human health. But to put an exclamation point on the multidimensional foolishness of this practice, its contribution to productivity is paltry: the most recent study estimated a gain of about 1.0 to 1.3\% on hog farms.\textsuperscript{159} Hogs are scarcely one percent fatter for this practice. Bearing in mind that this small percentage is a much larger chunk out of profit margins,\textsuperscript{160} it is still a vanishingly small advantage for hog farming, when weighed against with the harm. Indeed, the effectiveness of antibiotics in boosting hog growth is highest in the presence of poor nutrition and otherwise poor conditions for pigs, simply because there is more disease for the antibiotics to treat.\textsuperscript{161} Antibiotics, as it turns out, work best as a substitute for competent management and humane treatment of animals.

While a strict pro rata 80\% (the fraction of antibiotics in the United States used for livestock) attribution of antibiotic resistance to livestock is inappropriate, certainly the administration of antibiotics to livestock has played a very significant role in the emergence of resistant strains. If even a small fraction of those two million Americans


\textsuperscript{158}Key & McBride, supra, note 148, at 839 (Table 1).


\textsuperscript{160}Feeder-to-finish hog farms, those less likely to be part of vertically-integrated operations, had average profit margins of 11\% in 2009. Key and McBride, supra, note 159, at 17. A one percent reduction in productivity would thus translate into a nine percent decrease in profit.

\textsuperscript{161}Virgil W. Hays, Effectiveness of Feed Additive Usage of Antibacterial Agents in Swine and Poultry Production 31-40 (1977), online: https://archive.org/stream/effectivenessoff00hays#page/n11/mode/2up.
sickened and 23,000 dying every year from antibiotic-resistant bacterial infections could be attributed to hog farms, a cost-benefit analysis would expose a vast differential between huge costs and miniscule benefits.\footnote{The Centers for Disease Control estimate that the national cost of antibiotic-resistant bacteria may be as high as $20 billion in direct health care costs, and an additional $35 billion in lost productivity. CDC, \textit{supra}, note 142, at 11. These numbers do not include the value of statistical lives lost to infection by antibiotic-resistant bacteria.}

The most damaging strain of antibiotic-resistant bacteria is Methicillin-resistant Staphylococcus Aureus, or MRSA, which accounts for 11,000 deaths per year.\footnote{CDC, \textit{supra}, note 142, at 16.} MRSA infections seem to have a special link with the use of antibiotics in livestock, as new strains of MRSA have emerged that are uniquely endemic to pigs and pig farmers.\footnote{T. Khanna, R. Friendship, C Dewey & J.S. Weese, \textit{Methicillin-resistant Staphylococcus Aureus Colonization in Pigs and Pig Farmers}, 128 \textit{VETERINARY MICROBIOLOGY} 298 (2007); Inge van Loo, \textit{et al}, \textit{Emergence of Methicillin-resistant Staphylococcus Aureus of Animal Origin in Humans}, 13 \textit{EMERG. INFECTIOUS DISEASES} 1834 (2007).} The link to livestock use is particularly strong, as some of these new strains of MRSA have emerged solely from farm animals.\footnote{Khanna, \textit{supra}, note 164, at 299 (finding that pig farmers never tested positive for a specific strain of MRSA unless the pigs also tested positive).}

Perhaps even more alarming than the emergence of antibiotic-resistant bacteria is the introduction of risk of inter-species pathogen transfer, for which pigs seem to serve as particularly helpful hosts.\footnote{Kendall P. Myers \textit{et al}, \textit{Are Swine Workers in the United States at Increased Risk of Infection With Zoonotic Influenza Virus?} 42 \textit{CLIM INFECT DISEASE} 14 (2006); Kendall P. Myers, Christopher W. Olsen & Gregory C. Gray, \textit{Cases of Swine Influenza in Humans: A Review of the Literature}, 44 Clin. Infect. Dis. 1084 (2007).} The confinement of a large number of animals to a small area provides an excellent breeding ground for new viruses. Not only does the tight confinement of livestock make transmission more likely, but it makes life stressful for animals and increase their vulnerability to disease.\footnote{Pew, \textit{supra}, note 7, at 13.} Moreover, farmers and farmworkers in CAFOs routinely deal with thousands of animals daily, as opposed to the much less frequent interactions typical of small farms.\footnote{Id.} The health threats to workers posed by CAFOs, combined with the higher likelihood of animal sickness in CAFOs, produces an especially heightened risk of inter-species transfer.\footnote{Roberto A. Saenz, Herbert W. Hethcote & Gregory C. Gray, \textit{Confined Animal Feeding Operations as Amplifiers of Influenza}, 6 \textit{VECTOR BORNE ZOONOTIC DIS.} 338 (2006);
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The evolution of zoonotic disease into forms that infect humans has always been a game of chance, but the intense concentration of animals in tight quarters and the exposure of workers to new viruses is the equivalent of thousands of additional rolls of the dice.

This wanton overuse and misuse of antibiotics, and the crowded, industrialized farming it engenders, is a conscious policy choice. Banning the use of antibiotics in livestock, as hog-export power Denmark has done, would not only eliminate whatever responsibility hog farming bears for antibiotic-resistant bacteria, but also make considerably less profitable the overcrowded conditions that incubate dangerous zoonotic diseases that could transfer to humans. The Food and Drug Administration (FDA) has legal authority to regulate "new animal drugs" if they are "unsafe." The FDA considered doing so, going so far in 1977 as to require antibiotic manufacturers to provide any test results and "[b]y April 20, 1975, data satisfying all other specified criteria for safety and effectiveness," and threatening the firms with withdrawal of approval of the drugs. This initiative went nowhere. It was not until 2012 – thirty-seven years later – that EPA announced a plan to work with drug makers to phase out the most dangerous practices, a plan that was promptly struck down by a federal court as being insufficient. As the case awaits appeal, it would appear that the use of antibiotics for livestock not only continues, but shows an alarming increase.

An additional question should be asked: even if the FDA somehow overcomes its long history of delaying regulation on the subtherapeutic use of antibiotics in livestock, and even if the FDA moves more quickly than did the EPA in its long effort to regulate water pollution discharges from CAFOs, is it worth allowing livestock in CAFOs to receive antibiotics at all? In the 2011 survey, hog farmers could have reported that, in addition to or instead of "growth promotion," they used antibiotics for "disease

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It is easy to imagine that when asked, hog farmers might minimize their guilt feelings by shading their responses away from the naked "growth promotion" answer. But even if these responses were to be taken at face value, so what? Separating out these responses creates distinctions without differences. Even "disease treatment" is a use of antibiotics that would not be necessary if hogs were not raised in the crowded, confined conditions of CAFOs, where animals are in more stressful conditions and suffer more illness, and where infectious disease is transmitted so much more easily than on traditional, small-scale farms. In a sense, almost all administration of antibiotics to hogs in CAFOs is productivity enhancement. The point of administering antibiotics to hogs in large CAFOs is to take a traditional mortality that was low, and squash that rate down to zero, even as the conditions for sickness intensify. That is a trivial benefit when compared to the potential risks to the human population, particularly when the alternative is the raising of hogs on much less intense, small-scale farms, in which the use of antibiotics is largely unnecessary and ineffective. Again, in leaving hog farming alone, we have left hog farming to the large conglomerates.

E. Failure to Prevent Market Concentration Through Trade Regulation

It should not be a surprise that a problem of industrial concentration in hog farming would have a substantial antitrust component. In many ways, hog farming is no different from other industries that have consolidated in recent years, such as commercial airlines, accounting firms, law firms, office supply retailers, consumer electronics, or broadband providers. But whereas the trade regulation of most other industries are primarily governed by the Sherman Antitrust Act, trade practices in livestock are governed by the 1921 Packers and Stockyards Act (PSA). The PSA replaces, not supplements, the Sherman Antitrust Act by excluding meatpacking from the terms of the Sherman Act.

Sherman Act jurisprudence took a sharp laissez faire turn with Reiter v. Sonotone Corp., in which the United States Supreme Court declared that the Act was intended

177 Key & McBride, supra, note 148, at 839 (Table 1).
178 Pew, supra, note 7.
180 H.R. Rep. No. 85-1048, at ___ (1957) ("To justify its removal of the meatpacking industry from these [antitrust] statutes and from the jurisdiction of the Federal Trade Commission, the Packers and Stockyards Act provided additionally a substitute regulation under the jurisdiction of the United States Department of Agriculture.").
to be a "consumer welfare prescription." Citing Robert Bork's influential book, The Antitrust Paradox, the Court brushed aside nearly seven decades of jurisprudence and antitrust policy that was oriented towards preserving competition, rather than maximizing consumer welfare. Under this new view, as long as consumer welfare is not reduced, almost any business practice survives Sherman Act scrutiny. Bork's noninterventionist view of the Sherman Act, strongly taken up by scholars at the University of Chicago, has been vigorously contested on normative grounds, but everyone agrees that they have mostly won. Analysis under the Sherman Act is welfarist in nature, intervention has been infrequent, and consumer welfare has served a dominant criterion for evaluating the legality of trade practices. The question has been whether or not the Packers and Stockyards Act (PSA) should be administered with the same lenience. If consumer surplus were the touchstone, then the consolidation of the hog industry, having produced more pork at lower prices, would clearly be viewed as benign.

In form, there appears to be less emphasis on consumer surplus under PSA than is the case under the Sherman Act. Case law arising under section 202 of the PSA prohibits any "unfair, unjustly discriminatory, or deceptive practice or device," any undue or

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184 Eleanor M. Fox, Against Goals, 81 Fordham L. Rev. 2157, 2159 (2013) ("The operational goal … is to let business be free of antitrust unless its acts will decrease aggregate consumer surplus.").
unreasonable preference or advantage … or … any undue or unreasonable prejudice or disadvantage," 190 or "any course of business or … any act for the purpose or with the effect of manipulating or controlling prices, or of creating a monopoly… or of restraining commerce." 191 The question that has arisen under this section is whether a violation of section 202 has occurred if there has been no injury to competition. 192 Most courts have held that an injury to competition must be found in order for an action under section 202 to be maintained, 193 which makes it harder to bring an enforcement action against some anticompetitive practice. But at least the inquiry focuses on the competition itself, rather than consumer surplus.

In practice, the PSA has not served as much of a restraint on anticompetitive activity in the livestock industry. The Grain Inspection, Packers and Stockyards Administration (GIPSA), and its predecessor, the Packers and Stockyards Administration, agencies charged with administering the PSA and policing anticompetitive practices in the livestock industry, have been uninterested in challenging the consolidation of the livestock industry. The PSA was passed at a time in which five meatpacking companies had established an oligopsony (buying finished livestock for slaughter) and oligopoly (selling cuts of meat to distributors and supermarkets) that had the effect of raising meat prices. 194 In 1991, the General Accounting Office (GAO) noted that the meatpacking industry had become even more concentrated than the oligopsonist and oligopolist conditions in 1921 that gave impetus to the PSA: a mere four firms controlled 70 percent of the entire meatpacking industry. 195 The GAO had stern words for the Packers and Stockyards Administration, the predecessor to GIPSA charged with investigating and preventing anticompetitive practices. 196 The GAO strongly recommended that in light of the rapidly changing livestock industry, the agency quickly develop programs for monitoring and analyzing livestock industry practices, such as price manipulation and the apportioning of

190 7 U.S.C. §192(b).
193 Shively & Roberts, supra, note 192, at 423-34.
194 Shively & Roberts, supra, note 192, at 422-23.
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territory among meatpackers. The Packers and Stockyards Administration was not even collecting data on prices.

Six years later, the GAO, in following up on its 1991 report, noted that concentration had increased to 81 percent in 1995. It reiterated its 1991 recommendations, noting that the newly-formed agency GIPSA "has begun reallocating its resources to place more emphasis on detecting anticompetitive violations," but that progress was disappointingly slow. Another ten years later, an audit by the USDA Inspector General not only found shockingly little progress by GIPSA in setting up monitoring and data collection systems, but found a treasure trove of new instances of incompetence and indifference to anticompetitive behavior: out of the listed 1,842 investigations on file, GIPSA could not even identify the location of the investigation in 1,799 of those files. Apparently, it could with the remaining 43. The Inspector General found that the relationship between management and staff was strained, "significantly contributing to the agency not being able to ensure open and competitive markets for livestock, meat, and poultry." Shockingly and tellingly, staff economists, who should be at the forefront of an agency charged with analyzing markets, were marginalized and frozen out of investigations into anticompetitive practices and effects on trade. This was true despite the 1997 recommendation that had specifically suggested that economists be brought into the investigative processes and policy.

200 U.S. GENERAL ACCOUNTING OFFICE, supra, note 199, at 3.
201 U.S. GENERAL ACCOUNTING OFFICE, supra, note 199, at 4-6.
204 USDA Inspector General, supra, note 203, at 5.
205 USDA Inspector General, supra, note 203, at 2-3.
While the 1994 reorganization that created GIPSA must have been disruptive, it is hard to explain away the subsequent two-decade-long chaos that has reigned over the agency since. Certainly, a trade regulation agency that has marginalized its economists would appear to be one that is uninterested in carrying out its economic mandate. Under the watch of GIPSA and its predecessor agency, the market share of the top four pork packers increased from 40 percent in 1990 to 66 percent in 2007.\textsuperscript{207} Beef packing is even more concentrated, with the top four owning 85.5 percent of the market in 2007.\textsuperscript{208} Three of the top four hog packers are also the top three beef packers – Tyson Foods, Swift & co., and Cargill – while the top pork packer is the behemoth Smithfield Foods, which slaughters over 27 million hogs per year, good for 26% of the total market.\textsuperscript{209}

The legislative history of the PSA suggests that Congress was concerned with protecting competition, not consumer surplus.\textsuperscript{210} In going beyond the Sherman Act, the PSA can be read as encompassing a broader set of values than just the consumer surplus standards that dominates Sherman Act jurisprudence.\textsuperscript{211} It is true that the Sherman Act has become a welfarist statute despite a legislative history that is lacking in any hint of a Congressional welfarist concern.\textsuperscript{212} But as opposed to the Sherman Act's primary purpose of assuring fair competition and fair trade practices in livestock marketing and the meatpacking industry,\textsuperscript{213} the fundamental goal of antitrust law is to protect consumers.\textsuperscript{214}

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\item \textsuperscript{207} Mary Hendrickson & William Heffernan, \textit{Concentration of Agricultural Markets}, April 2007, Department of Rural Sociology, University of Maryland (2007), online: \url{http://www.foodcircles.missouri.edu/07contable.pdf}.
\item \textsuperscript{208} Id.
\item \textsuperscript{209} Id.
\item \textsuperscript{210} H.R. REP. No. 85-1048, at 1 ("The primary purpose of this Act is to assure fair competition and fair trade practices in livestock marketing and in the meatpacking industry.").
\item \textsuperscript{212} See, e.g., John B. Kirkwood & Robert H. Lande, \textit{The Fundamental Goal of Antitrust: Protecting Consumers, Not Increasing Efficiency}, 84 NOTRE DAME L. REV. 191, 192 (2008) ("The conventional wisdom in the antitrust community today is that the antitrust laws were passed to promote economic efficiency. This view, held by most economists, conservative scholars, federal enforcers, and practicing lawyers, is incorrect. Neither the sole nor even the primary purposes of these laws is, or ever has been, to enhance efficiency…. Instead, … the fundamental goal of antitrust law is to protect consumers."). Most sponsors of the Sherman Act were more concerned with the effective wealth transfer from consumers to monopolist producers. Senator George Frisbie Hoar, one of the key shepherds of the Act, complained of "transaction[s] the only purpose of which is to extort from the community … wealth which ought … to be generally diffused over the whole community." 21 CONG. REC. 2728 (1890).
\end{itemize}
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Act, Congress had an important constituency in mind in passing the PSA: small farms. Courts and most of the Federal Trade Commissioners over the last four decades have decided, rightly or wrongly, that the Sherman Act can best protect trade by maximizing consumer surplus. But unlike general antitrust problems, the livestock industry has a long-standing and identifiable group with a vested interest and articulable interest in competitive markets for their own sake. While "consumers" may be too large and nebulous a group to have a proxy, small farms are not. The existence of small farms throughout the course of passage and amendment of the PSA demands recognition that Congress recognized the interests of this constituency and passed the PSA with that group in mind.

III. Why Saving Small Farms Matters

The intensification and concentration of agriculture has clearly produced gains for both producers and consumers. A farmer in 1940 did well to harvest 70-80 bushels of corn per acre, but corn farmers today routinely harvest 200 acres per acre. Livestock farming has seen even more impressive gains. In 1950, it took an average of 84 days for a chicken to grow to five pounds, and by 2005, that period had shortened to 45 days. And this has translated into boons for consumers: in 1970, the average American spent over four percent of her income on 194 pounds of meat; by 2005, she spent about two percent of her income on 221 pounds. But in addition to increasing air and water pollution and contributing to public health risks, an intensified and concentrated agricultural sector imposes other costs on society that would be avoided by a more diffuse sector that decentralizes production on a larger number of smaller farms.

On one level, saving small farms is just a proxy for reducing the enormous environmental and social costs of large-scale farming. Whether or not small farms could be saved from the rigors of competition, it is worth forcing large farms to internalize the environmental and social costs they impose on society. However

(statement of Sen. Hoar). Senator Sherman fumed "[i]f we will not endure a king as a political power we should not endure a king over the production, transportation, and sale of any of the necessaries of life." 21 CONG. REC. 2457 (statement of Sen. Sherman).

213 H.R. REP. No. 85-1048, at ___ ("It is this area which most concerns small packer competitors and various other small business men who are links in the meat business.... It is this area which most requires effective regulation.").

214 Hovenkamp, supra, note 187, at 2471; Orbach, supra, note 187, at 136.

215 Pew, supra, note 7, at 3.

216 Pew, supra, note 7, at 5.

217 Pew, supra, note 7, at 3.
impressive are the gains in productivity and profit, they are still swamped by the heartbreakingly large numbers of human deaths and illnesses, the frighteningly catastrophic health risks, and large variety of mundane costs of large-scale farming. The regulatory gaps that allow CAFOs to thrive in such great numbers are egregiously inefficient, in that consumers, if they could choose, would be willing to pay more for meat in exchange for relief from the panoply of problems generated by industrialized agriculture. But this Article only parenthetically reiterates this point, already made by others. Rather, the point of this Article is to underscore the point that along with exacerbating environmental and social ills, we are destroying a much more benign model of food production, and losing the human and social capital that is required to maintain it. There are significant irreversibilities in going down this path.

Conglomerates have essentially become more efficient by substituting capital for labor, employing fewer people at the local level and substituting some different management techniques that save on labor costs. What little labor industrialized agriculture adds is apt to be resident in some central headquarters where complex decisions are made regarding inventory, flow, feedstock, and other factors that are efficiently woven together. But this concentration of productive inputs away from the individual and toward the centralized conglomerate reduces the demand for labor at the local level and the human capital traditionally required to farm. There may be a great many other factors, but as large employers in agricultural communities, farms clearly exert an influence on employment patterns, and there is no doubt that part of the efficiencies realized by large conglomerates is the ability to pay fewer people at the local level. To a great extent, this is the normal evolution of an industry as it reduces costs. There is no denying that more people have more access to meat than was the case just a few decades ago. However, a hidden cost that in the process is the loss of social and human capital in those rural agricultural communities.

221 PFEW, supra, note 7, at 43.
The human capital of farming on a small scale may seem anachronistic, but it remains an important and vital part of a functioning economy. The groundbreaking human capital scholar Theodore Schultz noted that farmers made extremely efficient utilization of the technologies available to them.222 In Schultz's 1979 Nobel Prize lecture, *The Economics of Being Poor*, he denounces what he perceives as the widespread condescension toward farmers:

People who are rich find it hard to understand the behaviour of poor people. Economists are no exception, for they too find it difficult to comprehend the preferences and scarcity constraints that determine the choices that poor people make.223

Being a farmer is not only hard physical work, but requires underappreciated ingenuity in the face of binding economic constraints and a great deal of inherent commodity risk.224 For decades, fewer people have chosen this line of work.225 To be sure, the migration of jobs and people from agricultural communities has a multitude of macroeconomic causes well beyond the scope of this Article, and having nothing to do with concentration in agriculture.226 But the rise of industrialized agriculture is predicated on the replacement of the human capital of traditional farming. That is the source of the cost savings. Concentrated livestock operations with market power drive down the wages that need to be paid to contract growers, who no longer make the farm management decisions.227 But this model of agricultural production ignores a wide variety of broader societal considerations, reviewed in this Article and externalized by large agricultural conglomerates. What we are losing is the human capital of internalizing the potential costs of agriculture. If anything, the human capital of farming has become less accessible and more important, as integration of

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226 The literature is far too voluminous to review, but for a few exemplary articles, see, generally, Wallace E. Huffman, Farm and Off-Farm Work Decisions: the Role of Human Capital, 62 REV. ECON. & STAT. 14 (1980), and Robert Tamura, Human Capital and the Switch form Agriculture to Industry, 27 J. Econ. Dyn. & Control 207 (2002).

227 PW, supra, note 7, at 42.
ecological and health considerations should play a larger role in farm management if we are to reign in the social and environmental costs of farming.

Another thing that agriculture's march toward concentration will destroy is the social capital resident in traditionally agricultural communities. Social capital is the network of interpersonal and intra-organizational bonds that are formed through cooperation or expected cooperation. Robert Putnam's pioneering *Bowling Alone*, argues that social capital enhance political and civic life without consciously having these outcomes as objectives. But possibly even more important, social capital can play a vital role in increasing productivity in poor, resource-based communities such as fishing communities. In poor, resource-based communities that lack either physical and human capital, social capital provides valuable informational benefits and lubricates merchantile relations and dispense with the need for expensive and perhaps futile monitoring. To the extent that large agricultural conglomerates are drying up agricultural communities, they are wasting this reserve of social capital.

Finally, there is one more vital role for small farms to play, that must be preserved: the presentation of choice to consumers. With almost 90 percent of chickens produced under contract and 90 percent of hogs slaughtered by large plants, it has become

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232 Rural areas have always tended to be poorer than urban areas, but studies suggest that agricultural communities with CAFOs are poorer than those without. See, e.g., E. Paul Durrenberger & Kendall M. Thu, *The Expansion of Large Scale Hog Farming in Iowa: The Applicability of Goldschmidt's Findings Fifty Years Later*, 55 Human Org. 409, 413 (Table 4, showing higher rates of food stamp participation in CAFO communities than agricultural communities without) (1996).
233 *Pew*, supra, note 7, at 21-22.
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increasingly difficult for meat consumers to obtain meat that is anything but low-quality and low-cost, and produced under poor conditions. Markets for premium meat products exist, but are consigned to niche market status.\(^{234}\) It is important to learn lessons from concentration in other industries that have consolidated and generated tremendous consumer displeasure. Complaints about commercial air travel in an industry dominated by three legacy carriers only increase, as the industry marches inexorably towards a duopoly. If livestock conglomerates are following the example of the commercial airlines, they are clearly misguided, to say the least. But the greatest costs will take the form of lost consumer surplus resulting from the loss of choice.

Saving small farms matters because agricultural production by large agricultural conglomerate carries price tags that are too high for the value it adds. But saving small farms also matters because it is important to maintain an agricultural industry that is robust and healthy. A concentrated agricultural industry is not only unhealthy, but visit scores of insults upon consumers, and imposes unacceptably high costs and grave risks upon a broader public.

Conclusion

It would appear that wealth and power in the agricultural sector has become increasingly concentrated, much the way that wealth has concentrated generally in most developed economies.\(^{236}\) The external costs imposed by large agricultural conglomerates, and hog CAFOs in particular, are shocking and should be a policy reform priority. Hog CAFOs are a bane of any community; they cause property devaluation of any land within several miles. They pollute water in unacceptable quantities, and pollute air enough to pose a significant threat to public health, especially to its workers. And it is nothing short of disgraceful to have allowed CAFOs to impose health risks upon the broader public by incubating the development of antibiotic-resistant bacteria and zoonotic viruses that may transfer to humans.

But this Article emphasizes not these costs external to CAFOs, but a broader question of what kind of industry structure best serves both consumers and the general public.


\(^{236}\) See, e.g., THOMAS PIKETTY, CAPITAL IN THE TWENTY-FIRST CENTURY (Harvard Univ. Press, 2014).
Industry concentration commonly increases consumer surplus. But this is a very narrow benefit, and a variety of other social and environmental considerations belong in the calculus of any production decision in any industry. The problem with industry concentration, and particularly the concentration of hog CAFOs, is that the parsimony of cost minimization has driven out all other considerations, many of them vastly more important than just consumer price.

What kind of an agricultural industry can better internalize its social and environmental costs? It would be a trap to romanticize the bucolic farm life. Agricultural communities have always been poor, and college-educated individuals have always been more rare on farms than in other places in American industry. But this is a social construct: low commodity prices means low pay, which means that young workers have a higher payout if they leave the farm to pursue higher education. What this social construct elides is the need to produce food without also producing a panoply of other problems. That is a more demanding task, one which requires a more developed human capital, building on an existing base of farming know-how that already embodies far more wisdom in environmental stewardship than agricultural conglomerates collectively possess. And yet more is required to place agriculture in a larger social context of a more complex menu of needs other than just food provision. Reform of public policy to avoid excusing insults from agriculture would represent a much-needed start to the long but necessary process of re-assembling an agricultural industry that has lost its way.

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237 See, e.g., Abler & Sukhatme, supra, note 224, at 339-40.