

The Economic Cost of **Food Monopolies**

About Food & Water Watch

Food & Water Watch works to ensure the food, water and fish we consume is safe, accessible and sustainable. So we can all enjoy and trust in what we eat and drink, we help people take charge of where their food comes from, keep clean, affordable, public tap water flowing freely to our homes, protect the environmental quality of oceans, force government to do its job protecting citizens, and educate about the importance of keeping shared resources under public control.

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Executive Summary

The agriculture and food sector is unusually concentrated, with just a few companies dominating the market in each link of the food chain. In most sectors of the U.S. economy, the four largest firms control between 40 and 45 percent of the market, and many economists maintain that higher levels of concentration can start to erode competitiveness.¹ Yet according to data compiled by the University of Missouri-Columbia in 2012, in the agriculture and food sector, the four largest companies controlled 82 percent of the beef packing industry, 85 percent of soybean processing, 63 percent of pork packing, and 53 percent of broiler chicken processing.²

Consolidation is not isolated to farms and processing. In 1998, the four biggest food retailers sold about one-fifth (22 percent) of groceries.³ By 2010, retail concentration had more than doubled and over half of grocery sales went to the four largest companies.⁴ Walmart became the nation's largest food retailer within a dozen years of opening its first supercenter in the late 1990s.⁵

The concentration of economic power in every segment of food and agriculture can harm both farmers and consumers. Farmers can pay more for supplies when only a few firms sell seeds, fertilizer and tractors. They also sell into a highly consolidated market, and the few firms bidding for crops and livestock can drive down the prices that farmers receive. Consumers have fewer choices at the supermarket, and food processors and retailers are quick to raise prices when farm prices rise (as is anticipated as a

result of the 2012 drought) but are slow to pass savings on to consumers when farm prices fall.

Rural communities often bear the brunt of agribusiness consolidation. For nearly 80 years, academic studies have documented the negative impact of agriculture's consolidation and industrialization, which aligns farms more closely with food manufacturers than their local communities. The rising economic concentration has contributed to the decline in the number of farms and the increased size in the farms that remain. Communities with more medium- and smaller-sized farms have more shared prosperity, including higher incomes, lower unemployment and lower income inequality, than communities with larger farms tied to often-distant agribusinesses.

Agribusiness concentration works in many ways, all with same objective: to move income from farmers and rural economies to Wall Street. In this report, we examine five case studies of agribusiness concentration.

Pork Production in Iowa: Food & Water Watch found that over the past three decades, the Iowa counties that sold the most hogs and had the largest farms had declining county-wide incomes, slower growth in median household income and declining numbers of local businesses compared to the statewide average. Iowa farmers sold twice as many hogs in 2007 (47.3 million) as in 1982 (23.8 million), but the total real value of Iowa's hog sales was 12 percent lower in 2007. As pork packing consolidated and hog farms in Iowa became larger and more integrated with

the pork processing companies, the value of hogs to the local economy declined. These trends were confirmed by an econometric analysis by the University of Tennessee's Agricultural Policy Analysis Center.

Dairy Farming in New York: Milk processors and handlers in New York have come under such concentrated and coordinated ownership that the prices farmers receive for their milk have been pushed lower than what they would have received in a competitive economic system with more independent buyers. Food & Water Watch compared two New York dairy counties that experienced different trends in the size and structure of their dairy sector. St. Lawrence County has ranked among the counties with the most dairy farms in New York for 30 years but has shifted to fewer, larger farms. Yates County started with very few dairy farms but was the only dairy county in New York to have an increase in the number of farms. Yates County had stronger economic performance than St. Lawrence County, despite St. Lawrence's status as a dairy leader.

Poultry Production on Maryland's Eastern Shore: The rise of the industrialized poultry industry eventually transformed the entire Eastern Shore region from a diverse agricultural mix to one dominated by vertically integrated chicken production. Food & Water Watch estimates that if the farms on Maryland's Eastern Shore cultivated the same proportion of fruits and vegetables in 2007 as 1940, total farm sales would have been \$137 million higher — 65 percent more than what contract poultry growers received for raising chickens in 2007.⁶

The Organic Soybean Market: In 2009, the company that owns Silk-brand soymilk, Dean Foods, shifted the formerly organic product to a "natural" label that required no organic soybeans. The impact of this change from organic to conventional soybeans is magnified because of Dean's market dominance in soymilk production, and had substantial ramifications for farmers. The change from organic to natural reduced the market for organic soybean farmers by 1.2 million bushels of food-grade soybeans in the first year.

Fruit and Vegetable Production in California's Central Valley: The global reach of transnational agribusiness giants can serve to drain wealth from rural economies, as seen in the case of fruit and vegetable production in California's Central Valley. Food & Water Watch found that between 1992 and 2007, as imports rose, one out of eight (12.7 percent) of the large freezing and canning plants in California closed.⁷ Fewer plants meant fewer workers but also fewer outlets for California farmers to sell their crops.

Conclusions

For decades, the U.S. Department of Justice and the U.S. Department of Agriculture (USDA) have taken a hands-off approach to consolidation in the food system. The economic harm caused by the concentration of the food system is real, but often neglected. Federal regulators must strengthen the oversight of this highly consolidated sector that affects every member of society every day. Fair markets will require new rules and better oversight that:

- **Collects and disseminates information about concentration throughout the food chain:** The federal government should determine the levels of concentration in the various sectors of the food system from farm inputs, food processing, marketing and retailing.
- **Coordinates competition and antitrust policy for the entire food and farm sector:** The USDA should have a special counsel's office on agricultural consolidation in the food and farm sector to effectively coordinate between the agencies with jurisdiction over competition policy.
- **Remedies and prevents distortions in the hog and cattle markets:** Currently, several common practices allow meatpackers to avoid buying hogs and cattle on public markets, which reduce competition and lower the price that farmers receive. These practices, including meatpackers that buy cattle and hogs with opaque contracts that do not give farmers firm prices when the contracts are negotiated (known as captive supplies) or meatpackers that own their own livestock to avoid auction markets when prices are higher, should be prohibited.
- **Prevents unfair and deceptive practices in agricultural contracting:** Many farmers raise livestock or crops under contract with large agribusinesses, but because the few firms have tremendous leverage, farmers are often forced into take-it-or-leave-it contracts that can be unfair or abusive. Fair contract practices should be spelled out in regulation and law.

Future farm policy should focus on access to fair and open markets that benefit farmers, workers, consumers and the marketplace. At every point in the food chain, there are a handful of companies squeezing profits out of farmers, wages out of workers and choices out of eaters. A more vibrant marketplace with more choices for farmers and consumers is essential, but it cannot happen without breaking up the agribusiness cartels.

Introduction

Consolidation in the food and farm sector can sap the economic vitality of rural communities. Fewer national companies selling farm inputs and buying crops and livestock means that there are fewer small agricultural businesses providing products and services to farmers. Independent agricultural producers — and the feed and equipment dealers, locally owned grain elevators, small slaughterhouses and medium-sized food processing firms that they do business with — are the economic engine that drives economic stability in rural communities. Consolidation has disabled that engine, draining wealth and people out of rural communities.

In a freely functioning market system, a balance will be struck between the incomes of farmers, rural economies and distant investors who furnish technologies not easily provided in rural areas. Agribusiness concentration works to change that balance in favor of Wall Street. As global agribusiness interests grow and become more powerful, the income of rural farm and non-farm residents declines.

Consolidation in the Food System

The agriculture and food sector is unusually concentrated, with just a few companies dominating the market in each link of the food chain. In most sectors of the U.S. economy, the four largest firms control between 40 and 45 percent of the market, and many economists maintain that higher levels of concentration can start to erode competitiveness.⁸ Yet according to data compiled by the University of Missouri-Columbia in 2012, in the agriculture and food sector, the four largest companies in agriculture and food controlled 82 percent of the beef packing industry, 85 percent of soybean processing, 63 percent of pork packing and 53 percent of broiler chicken processing.⁹ These national concentration measurements can conceal even higher levels of concentration at the regional or local level.

Consolidation is not isolated to farms and processing. In 1998, the four biggest food retailers sold about one-fifth (22 percent) of groceries.¹⁰ By 2010, retail concentration had more than doubled, and over half (53 percent) of grocery sales went to the four largest companies.¹¹ Walmart became the nation's largest food retailer within a dozen years of opening its first supercenter in the late 1990s.¹²

Large retailers now have so much buying power that they have considerable influence over which foods are available to the public, the methods in which the foods are produced and the prices paid to their suppliers. Walmart is now the biggest customer for many of the top food producers

and processors in the country, including dairy giant Dean Foods, General Mills, Kraft Foods and Tyson Foods,¹³ which can create uneven power dynamics even for these large companies.

The Impact of Consolidation on Rural Economies

For nearly 80 years, academic studies have documented the negative impact of agriculture's consolidation and industrialization, which aligns farms more closely with food manufacturers than their local communities. Communities with more medium- and smaller-sized farms have more shared prosperity, including higher incomes, lower unemployment and lower income inequality, than communities with larger farms tied to often-distant agribusinesses.

Economically viable independent farms are the lifeblood of rural communities,¹⁴ and farms have a greater impact on local economies than the retail or service sectors.¹⁵ Historically, rural economies have rested on a foundation of many mid-sized farms and local agricultural processing.¹⁶ The earnings from locally owned and locally controlled farms generate an economic "multiplier effect" when farmers buy their supplies locally and the money stays within the community.¹⁷ Larger, industrialized farms are more likely to purchase farm supplies from outside the local community, and non-local farm owners siphon off a larger share of the profits from these operations.¹⁸

Among the first studies to examine the impact of larger, industrialized farms on local communities was a comparison of two rural towns in California in the 1940s. Rural anthropologist Walter Goldschmidt found that the town with more small and moderate-sized farms had higher



overall income and education levels and more civic and social organizations.¹⁹ In contrast, the community with a higher prevalence of larger farms had worse economic outcomes and a lower standard of living than when the agricultural economy was spread out among many smaller farms.²⁰ The U.S. Department of Agriculture originally suppressed the findings of Goldschmidt's research, and the study was even burned in public in California.²¹

Most studies testing the Goldschmidt hypothesis since the Depression found that large, industrialized farms had a detrimental effect on economic, social and environmental community outcomes. A 2007 analysis of 51 studies found that 82 percent showed some detrimental impacts of industrialized agriculture in local communities, and more than half (57 percent) had predominantly negative findings.²² Only 6 percent of studies had largely positive findings from the impact of industrialized agriculture.²³

Household income, poverty and inequality

Larger-scale industrialized farms tended to reduce the economic well-being of neighboring families, reduce household incomes, increase poverty and exacerbate economic inequality. A 2001 study found that counties with more large farms had lower median family incomes, whereas counties with a stronger farming middle class had lower poverty rates, lower levels of unemployment, less violent crime and fewer low-weight births.²⁴

Several studies have shown rising income inequality in communities with larger, industrialized farms.²⁵ A 2004 study found that the concentration of farmland ownership was associated with higher levels of income inequality.²⁶ A 1990 study found that areas with more moderately sized farms had lower poverty and unemployment rates, higher household income and a more stable and large middle class.²⁷ In contrast, the study found that communities where larger, industrial farms predominated had higher income inequality and contributed to the long-term decline of household incomes and rising poverty rates.²⁸

Local spending

A more vibrant farming middle class pumps money into rural economies and Main Street businesses. Small farms spend more locally than large farms, both for farm supplies and household purchases that have a multiplier effect on local economies.²⁹ A 1994 detailed examination of line-item expenditures by Minnesota farms found that smaller farms spent twice as much locally as large farms (based on the share of their purchases).³⁰ Smaller livestock operations (less than \$400,000 in income) spent between 60 and 90 percent

of their purchases locally compared to less than 50 percent of the purchases by farms with income over \$600,000.³¹ The erosion of farm numbers may have the largest effect on communities that rely on farms and the rural population to support local businesses in small towns.³² Many rural communities worry that the growing size of farms threatens the survival of small towns and their small businesses.³³

Negative non-economic impacts

Consolidation in the farm sector and tight agribusiness linkages can also fray the civic fabric of rural communities, detrimentally impact the health and educational well-being of rural residents and pollute the local environment. As mid-sized family farms disappear, so do people who fill church pews, attend schools, join civic organizations and provide local government leadership.³⁴ Industrial farming can increase community stress, crime, teenage birth rates and in-migration of low-wage workers, while overburdening local schools, worsening health outcomes and reducing civic participation and voting.³⁵ Many communities face increased environmental impacts from manure spills, declining air quality and reduced quality of life from odors from large livestock operations.³⁶

Food & Water Watch's Analysis

Agribusiness concentration works in many ways, all with the same objective: that of moving income from farmers and rural economies to Wall Street. In this report, we examine five case studies of agribusiness concentration.

Pork Production in Iowa

In Iowa, over the last three decades, massive amounts of outside money created processing plants that became so large that many smaller plants have been forced out of business. Gradually, enormous processing plants were matched by super-sized factory farms favored by outside agribusiness interests. Food & Water Watch has found that over the past three decades, the Iowa counties that sold the most hogs and had the largest farms had declining county-wide incomes, slower growth in median household income and falling numbers of local businesses compared to the statewide average.

Iowa farmers sold twice as many hogs in 2007 (47.3 million) as in 1982 (23.8 million), but the total real value of Iowa's hog sales was 12 percent lower in 2007. As pork packing consolidated and hog farms in Iowa became larger and more integrated with the pork processing companies, the value of hogs to the local economy declined. These trends were confirmed by an econometric analysis by the University of Tennessee's Agricultural Policy Analysis Center.

Dairy Farming in New York

This case study examines a “textbook” case of market interference. Milk processors and handlers in New York have come under such concentrated and coordinated ownership that the prices farmers receive for their milk have been pushed lower than what they would have received in a competitive economic system with more independent buyers. In 2009, dairy farmers in New York and other Northeast states filed an antitrust suit alleging that the biggest milk processor and biggest milk handling cooperative worked in concert to effectively lower the prices that farmers receive.

Food & Water Watch compared two New York dairy counties with different trends in their dairy farms. St. Lawrence County has ranked among the counties with the most dairy farms in New York for 30 years but has shifted to fewer, larger farms. Although St. Lawrence lost 77 percent of its dairy farms between 1982 and 2007, it remained tied for the county with the most dairy farms in the state in 2007. Yates County started with very few dairy farms but during the period we studied, many small-scale Mennonite dairy farmers migrated to the county.³⁷ Yates County was the only dairy county in New York to have an increase in the number of farms and had stronger economic performance than St. Lawrence County, despite St. Lawrence’s status as a dairy leader.

The Yates County experience is more a cautionary tale than a model for most farmers to emulate. Mennonite farmers use fewer inputs and expensive equipment, rely on plenty of low-cost family labor and typically have little farm debt. These are pre-conditions that most farmers and communities will be unable to replicate, and it is striking that the only county to have growth in the number of dairy farms had these unusual characteristics.

Poultry Production on Maryland’s Eastern Shore

Sometimes a particular agribusiness interest can take over an entire economy before any competitors can enter. The resulting situation is one of such economic dominance that large regions can become, essentially, “company stores” in which all economic activity is guided by a single interest. On the Eastern Shore of Maryland, the rise of the industrialized poultry industry eventually transformed the entire region from a diverse agricultural mix that primarily grew vegetables and fruits to sell to Philadelphia, Baltimore and Washington, D.C., into a region that raised more than 300 million chickens that produce over half a million pounds of chicken manure per square mile every year.³⁸

Food & Water Watch estimates that if the farms on Maryland’s Eastern Shore cultivated the same proportion of fruits and vegetables in 2007 as in 1940, total farm sales would have been \$137 million higher — 65 percent more than the estimated \$83 million that contract poultry growers received for raising chickens for the poultry companies in 2007.³⁹

The Organic Soybean Market

Some cases of agribusiness consolidation are quite simple: the power that comes with concentration can be used to change the rules in such a way as to eliminate farming opportunities altogether. In 2009, the company that owns Silk-brand soymilk, Dean Foods, shifted the formerly organic product to a “natural” label that required no organic soybeans. The impact of this change from organic to conventional soybeans is magnified because of Dean’s market dominance in soymilk production and had substantial ramifications for farmers. The change from organic to natural reduced the market for organic soybean farmers by over 1.2 million bushels of food-grade soybeans in the first year.



Fruit and Vegetable Production in California's Central Valley

The global reach of transnational agribusiness giants can serve to drain wealth from rural economies, as seen in the case of fruit and vegetable production in California's Central Valley. Food & Water Watch found that between 1992 and 2007, as imports rose, one out of eight (12.7 percent) of the large freezing and canning plants in California closed.⁴⁰ Fewer plants meant fewer workers but also fewer outlets for California farmers to sell their crops. Consolidation and globalization in the canned and frozen fruit and vegetable industries allowed the fewer firms to reduce the prices they paid to farmers and shift production overseas to take advantage of lower wages and weaker environmental protections.

Conclusions

For decades, the U.S. Department of Justice and the USDA have taken a hands-off approach to food system consolidation, on the grounds that increased concentration has not directly harmed consumers. Agribusiness companies contend that through mergers and acquisitions, they can provide efficiencies of scale that benefit consumers. But in reality, consumers rarely see a decrease in what they pay for food at the grocery store.

The economic harm caused by the concentration of the food system is real, but is often neglected. The largest players in agribusiness have been providing most of the data, allowing them to perpetuate the myth that the economy has benefited from the efficiency offered by the industrialized agriculture system. Meanwhile, independent, small and mid-sized producers offer first-hand examples of the sorely needed competition-related reforms.

Fair markets will require new rules and better oversight that:

- **Collects and disseminates information about concentration throughout the food chain:** The federal government should determine the levels of concentration in the various sectors of the food system — from farm inputs (including seeds, agrochemicals, equipment and credit), to food processing (grain handling, slaughter and processing of livestock and poultry as well as food manufacturing), to marketing and retailing (from distribution to grocery stores).
- **Coordinates competition and antitrust policy for the entire food and farm sector:** Currently, several agencies have overlapping antitrust jurisdiction over different elements of the agriculture and food industry,

which has hampered effective enforcement. The USDA should have a special counsel's office on agricultural consolidation in the food and farm sector to effectively coordinate between the agencies with jurisdiction over competition policy.

- **Remedies and prevents distortions in the hog and cattle markets:** Currently, several common practices allow meatpackers to avoid buying hogs and cattle on public markets, which reduce competition and lower the price farmers receive. Some companies own their own livestock for long periods prior to slaughter, which allows them to slaughter their own livestock when auction prices are high and buy on public markets when prices are low, which drives down the prices farmers receive over the long term. Some meatpackers press farmers to sell their livestock through opaque contracts that do not disclose the price farmers will receive (farmers only learn what they will get for their hogs or cattle when they are delivered to the meat-packer). The contracts typically are based on auction prices (known as formula pricing), and since meatpackers have considerable livestock secured through these captive supply contracts and packer-owned livestock, the cash auction prices that are the basis for formula prices are often very low. These strategies that reduce the number of publicly traded livestock makes the marketplace subject to distortion or manipulation that harms all farmers. The captive supply arrangements and packer-ownership of livestock should be prohibited.
- **Prevents unfair and deceptive practices in agricultural contracting:** Many farmers raise livestock or crops under contract with large agribusinesses, but because the few firms have tremendous leverage, farmers are often forced into take-it-or-leave-it contracts that can be unfair or abusive. Fair contract practices should be spelled out in regulation and law.

Future farm policy should focus on access to fair and open markets that benefit farmers, workers, consumers and the marketplace. The goal should be policy that allows there to be enough buyers of the crops and livestock and sellers of agricultural inputs that the competitive benefits of markets can work for farmers.

At every point in the food chain, there are a handful of companies squeezing profits out of farmers, wages out of workers and choices out of eaters. A more vibrant marketplace with more choices for farmers and consumers is essential, but it cannot happen without breaking up the agribusiness cartels.

Consolidation in Iowa's Hog Sector Erodes Rural Economies

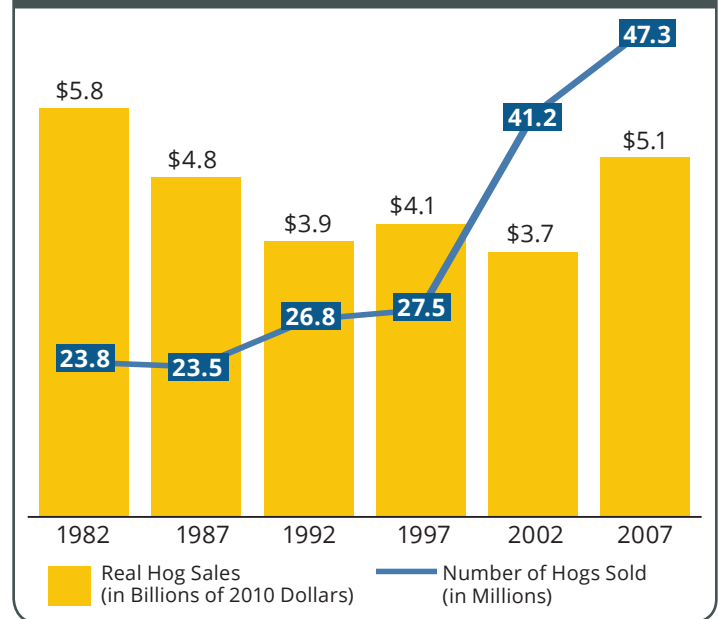
Since the 1980s, the U.S. pork packing and processing industry has gained a dominant position over hog farmers through mergers, acquisitions and the emergence of contractual relationships between packers and producers. The hog production sector is concentrated horizontally (only a few companies buy, slaughter and process the majority of hogs) and vertically integrated (hog packers have tight contractual relationships with hog producers throughout the stages of production).

Iowa has long been a major player in U.S. hog and pork production. Since there are fewer buyers for hogs and many packers procure hogs primarily through contracts with large hog producers, independent farmers often cannot get fair or competitive prices for their hogs. The long-term downward trend in real hog prices has forced some producers off their farms and other farmers to massively expand their hog operations. Consolidation in the pork packing industry has contributed to the 82 percent decline in the number of hog farms in Iowa between 1982 and 2007.⁴¹ The average-sized Iowa hog farm ballooned more than 10-fold between 1982 and 2007. The shift to larger hog farms tightly integrated with the pork processing industry has caused a concentration of economic benefits to fewer farmers and firms in rural communities.⁴²

The debate over whether large hog farms are a benefit or a curse to communities is controversial. Proponents contend that very large, industrial-style hog operations are more efficient and productive and generate wealth and prosperity.⁴³ Industrial-scale hog production is purported to create jobs, strengthen local tax bases and provide a multiplier effect through local economies.⁴⁴ A 1998 study found that larger hog farms are associated with higher income and employment levels.⁴⁵ Iowa State University estimated that the Iowa hog industry's \$4.3 billion in gross sales generated \$2.2 billion in personal income, 60,500 jobs and \$3.86 billion in gross state product in 2005.⁴⁶

It is indisputable that hog production has a significant impact on Iowa's economy. Hog farms provide farm jobs, hog sales supply the meatpacking sector that employs additional workers, and the farms themselves generate income. These hog-related workers in turn induce additional activity by spending their earnings on goods and services, theoretically multiplying economic activity in the local community. Hog production also drives demand for Iowa's corn and soybean production, which benefits farmers and drives employment and income throughout the community.

Figure 1. Value of Real Hog Sales Falls as Total Number of Hogs Sold Doubles



SOURCE: USDA

But Food & Water Watch has found that as pork packing consolidated and hog farms became larger and more integrated with the pork processing companies, the value of hogs to the local economy declined. Over the past three decades, the number of hogs sold by Iowa farmers doubled to 47.3 million in 2007, but the total real value of Iowa's hog sales was 12 percent lower in 2007 than in 1982, even though Iowa farmers sold 23.5 million more hogs. (See Figure 1.) As the value of hogs reverberates through the economy, the economic ripples of hog production in Iowa are becoming smaller and less valuable.

Description of Study

Food & Water Watch analyzed the impact of consolidation in the pork packing sector on Iowa hog farms and rural economies from 1982 to 2007. The hog sector exemplifies the industrialization of farming, with the rapid decline in the number of hog producers, the sharp increase in the size of hog operations and tighter ties between farms and specific pork processors.⁴⁷

Iowa is the largest hog-producing state in the country⁴⁸ and has about one-quarter of the nation's hog slaughter capacity.⁴⁹ (See Table 1 on page 9.) The transformation of the Iowa hog sector is representative of changes in the hog sector throughout the United States. Historically, independent hog producers were a foundation of Iowa's agriculture sector.⁵⁰ But over the past three decades, hog production changed significantly. Instead of being based on independent family farm, small-scale production, larger hog

firms that are closely integrated with pork production and distribution chains became dominant in hog production.⁵¹

Food & Water Watch analyzed county-level hog farm, economic and demographic data between 1982 and 2007 in the five-year intervals corresponding with the USDA Census of Agriculture. The analysis builds on years of academic research and provides a more extensive longitudinal examination of the impact of larger farms on the local economy spanning the rise of industrial-scale hog farms and contract integration with pork packers. We analyzed the economic trends in the counties with the most hogs, the largest hog farms and the most rural areas. Food & Water Watch also commissioned the Agricultural Policy Analysis Center at the University of Tennessee to perform a multivariate regression analysis to measure the impact of agribusiness concentration in hog production on the Iowa economy.

Food & Water Watch found that each hog sold was making a smaller contribution to the economy in 2007 than in 1982, measured by both county real total personal income and real median household income. Moreover, growing hog production appears to increase income inequality, as the number of hogs sold has a bigger negative impact on real household median income over time than on real per capita income. Finally, the decline in the number of hog farms and rising average number of hogs sold per farm has a negative impact on the number of retail stores, as there are fewer independent family farms to patronize Main Street businesses. Food & Water Watch’s findings are in line with

the Federal Reserve Bank of Kansas City’s 1993 prediction that, “Many rural communities will face a decline in local economic activity as the number of small, independent hog farmers erodes.”⁵² (See methodology and data section, page 41, and Appendix I, page 42, for description of variables, economic model and regression analysis.)

Meatpacker Consolidation, Control and Market Power

Pork packers and processors are the gatekeepers of the hog and pork sector. Nationally, more than 70,000 hog farmers sold most of their hogs to only a handful of firms in 2007.⁵³ The limited market opportunity forces farmers to take whatever prices meatpackers offer for their hogs.

Over the past few decades, the biggest firms also have pushed farmers to become more closely aligned with packers through marketing agreements and production contracts. These arrangements between producers and packers, known as vertical integration, have encouraged farmers to increase in size.

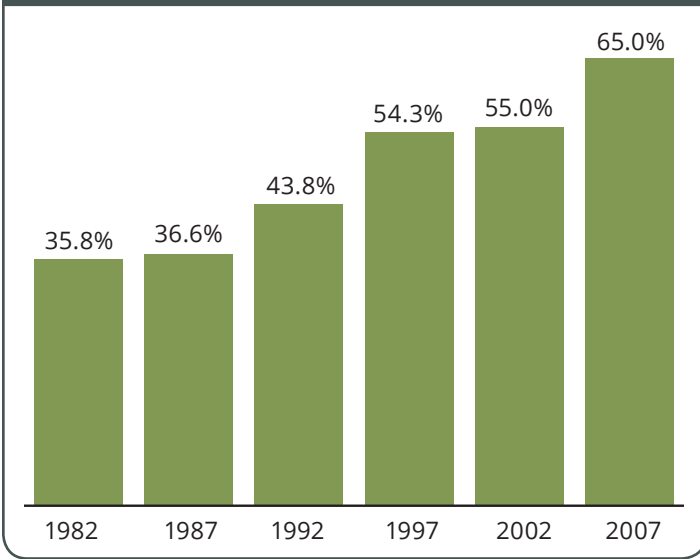
Consolidation in the hog slaughter industry has nearly doubled over the past three decades as mergers significantly reduced the number of competitors and increased market concentration. In 1982, the four largest firms slaughtered one out of three hogs (35.8 percent) nationally, but by 2007, the four biggest companies slaughtered two out of three hogs (65.0 percent).⁵⁴ (See Figure 2 on page 10.) Mergers in the Iowa hog processing sector have

Table 1. Iowa Hog Slaughter Facility Capacity, 2005–2011 (HEAD PER DAY)

PLANT	LOCATION	2005	2007	2009	2011
IOWA TOTAL		117,800	117,050	124,950	112,050
Morrell (Smithfield)	Sioux City	14,500	11,200	14,000	Closed
Farmland (Smithfield)	Denison	9,200	9,200	9,300	9,400
Tyson Foods/IBP	Waterloo	19,200	19,350	19,350	19,350
Tyson Foods/IBP	Storm Lake	15,000	15,500	15,500	16,500
Tyson Foods/IBP	Colorado Junction	9,800	9,500	10,000	9,850
Tyson Foods/IBP	Perry	6,800	7,400	7,400	7,750
Swift (JBS)	Marshalltown	18,500	18,500	18,500	18,500
Excel (Cargill)	Ottumwa	18,000	18,000	18,500	18,400
Sioux-Preme Packing	Sioux Center	3,500	3,500	4,200	4,200
Pine Ridge Farms	Des Moines	2,500	2,500	2,850	3,200
Premium Iowa Pork	Hospers		1,600	2,400	2,500
Dakota Pork	Estherville			1,500	1,200
Vershoor Meats	Sioux City	800	800	1,200	1,200
VanDeRose Farms	Wellsburg			250	Closed

SOURCE: National Pork Board 2009–2012

Figure 2. National Market Share of Top Four Hog Packers



SOURCE: USDA GIPSA

reduced the number of buyers. Since the 1990s, Smithfield absorbed competitors including John Morrell and Farmland, which had facilities in Iowa.⁵⁵ In 2001, Tyson Foods bought IBP, which has four hog packing plants in Iowa.⁵⁶

National concentration measurements can conceal much higher market concentration that farmers face at the regional or local level.⁵⁷ Between 2004 and 2011, the plants owned by the top four pork packing firms slaughtered nine out of 10 hogs in Iowa.⁵⁸ (See Figure 3.) Iowa farmers may sell their hogs over the state line, but even including the packing plants in Minnesota, Nebraska, northern Missouri and western Illinois, Iowa farmers sold their hogs into a market where the four largest firms slaughtered four out of five hogs (79 percent on average between 2004 and 2011).⁵⁹

The rise of contracting and vertical integration

Mergers have concentrated the market power of pork packers, but they also exert considerable power through vertical integration. Pork packers often secure livestock through contract marketing arrangements with farmers. Farmers agree to deliver a certain number of hogs at a future date (typically, the price is to be determined at delivery). These contracts give farmers a guaranteed market for their hogs, but large contract buyers can extract lower prices and distort and conceal prices. (In another type of contract arrangement, known as a production contract, pork packers own the hogs and hire farmers to raise them. Production contracts are more common in the Southeast, such as in hog-powerhouse North Carolina, and can often impose exploitative contract terms on farmers.)

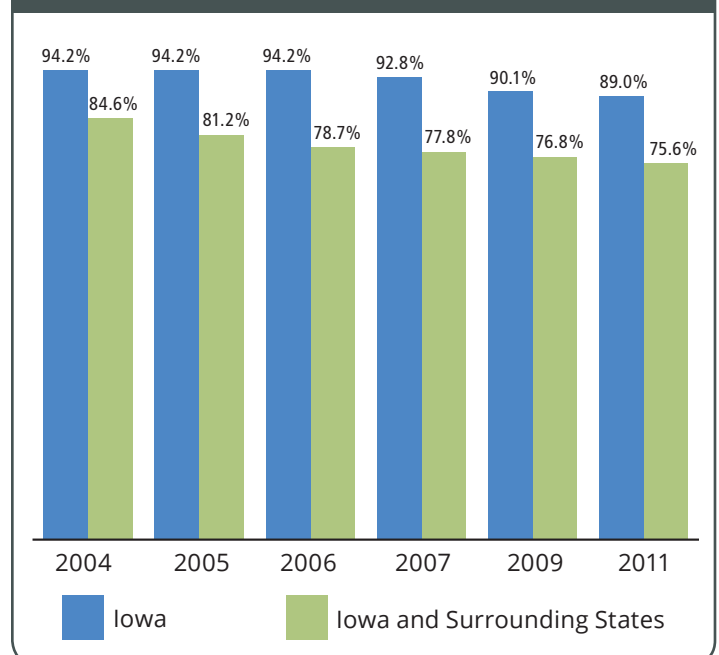
Pork packers can use marketing contracts to secure live-stock without having to bid against other packers to buy hogs at auction.⁶⁰ Contracts also reduce transaction costs for packers because contract hog farms tend to be much larger. Pork packers would prefer to have fewer, larger purchases instead of many transactions necessary to buy smaller volumes of hogs from more, independent farmers.⁶¹

Contracts have been commonplace in some agricultural sectors, such as poultry, for decades but have been a relatively new phenomenon in the hog sector. Between 1991 and 1993, there were too few hog contracts for the USDA to count; by 2008, two-thirds of hogs were delivered under contract.⁶² (See Figure 4 on page 11.) This industrialization — larger farms with tighter marketing relationships with processors — weakens the economic links between farms and local communities.⁶³

Vertical integration and contracts encourage larger hog farms

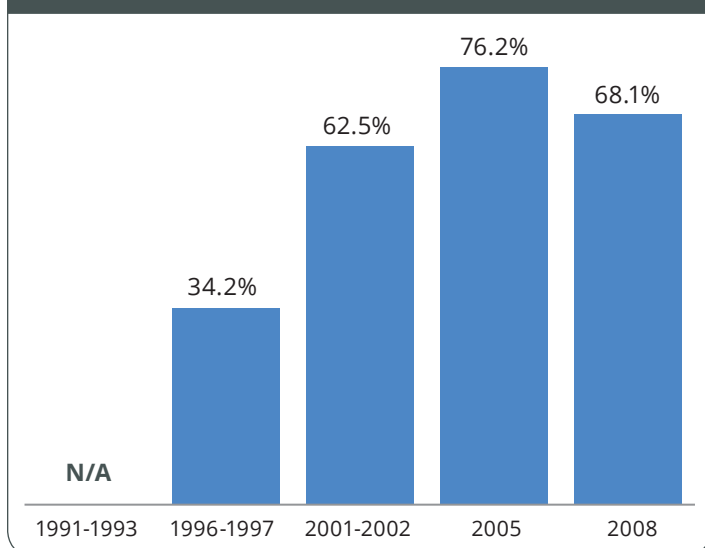
Larger pork processors tend to contract with the largest farms, and, over time, this drives all farmers to increase the number of hogs they raise and market. The USDA found that larger meatpackers' reliance on contracting "[m]ay also encourage larger farms."⁶⁴ The Federal Reserve Bank of Kansas City reported, "The shift toward a more integrated industry works hand-in-hand with the trend toward fewer and larger hog farms."⁶⁵

Figure 3. Market Share of Top Four Hog Packers in Iowa and Surrounding States



SOURCE: Food & Water Watch analysis of National Pork Board 2009-2012 data

Figure 4. Percent of Hogs Delivered Under Marketing or Production Contracts



SOURCE: USDA

Consolidated meatpackers primarily do business with the largest operations and are reluctant to deal with medium-sized or smaller producers.⁶⁶ The results of a 1993 survey of hog farmers and processors suggested that the largest packers contract “almost entirely” with the largest hog producers and may not even offer contracts to small producers.⁶⁷ Half of the pork packers that used marketing contracts in 1994 required hog producers to deliver a minimum supply of hogs.⁶⁸

Often meatpackers offer sweetheart deals with higher prices to larger, favored firms, irrespective of the number of hogs that are delivered to the slaughterhouse. Theoretically, meatpackers pay farmers based on quality using a carcass merit pricing system (known as a grid), but this system gives meatpackers the discretion to pay premiums and discounts that can provide wide variations in payment — more than 25 percent — for hogs of the same quality.⁶⁹ As Chris Peterson, President of the Iowa Farmers Union and a hog producer, reported at a 2010 livestock competition workshop held by the U.S. Department of Justice and the USDA:

The packers routinely pay \$0.05 to \$0.06 more per pound or more in volume-based premiums to the largest hog producers simply because they’re large. \$0.06 may not sound like much of a discount. But I tell you what, for an independent producer, the guy with 150 sows, farrow-to-finish operation, trying to market on a yearly basis, that equals \$56,000 of income.⁷⁰

Lower Hog Prices, Farm Losses and Increasing Farm Size

Buyer power

Consolidation gives the biggest firms more bargaining power over the many farms they buy from and can have a significant impact on farmers’ market access.⁷¹ This anticompetitive buyer power is known as “monopsony.” The decline in the number of hog buyers has left fewer selling options for hog producers, which puts them under increased pressure to take whatever price they can get, even if it does not cover their costs. When there are only a few buyers, there are not enough competing buyers to bid up prices.⁷²

A 1999 economic model by Purdue University estimated that a marketplace with 20 equally sized pork packers (akin to the national market in the late 1980s) would pay about 5 percent less than a perfectly competitive marketplace; a marketplace with eight firms would pay 18 percent less, and if there were only four firms, they would pay 28 percent less than a perfectly competitive market.⁷³ The authors concluded, “We have shown that greater consolidation in the meat packing and processing industry creates a markdown effect on the prices farmers receive for live animals.”⁷⁴

Thinning the market

Contracting can further depress hog prices. Contracts short-circuit the price discovery functions of the marketplace by securing supplies outside of the public auctions or spot markets where hogs (or other commodities) are sold for cash for immediate delivery.⁷⁵ The price for contract hogs is typically tied to the spot or futures market prices, so meatpackers benefit when futures and spot prices decline.

The rise of vertical integration and livestock contracting thins the open-auction market for hogs.⁷⁶ Since fewer livestock are sold on the open market, the number of public transactions and reportable sales prices that are the basis for many livestock contracts declines.⁷⁷ This creates the potential for pork packers and processors to manipulate hog prices across the industry. For example, the basis price for hog contracts is typically the prevailing mid-morning upper Midwest market price, which allows pork-processor buyers to withhold their purchases until the afternoon to drive down prices paid under contract.⁷⁸

Smaller farms face fewer options to market their hogs and can become the suppliers of last resort when large packers need extra hogs for their slaughter facilities.⁷⁹ Since most hogs are delivered to packers under contract arrangements,

the hogs sold by independent farmers effectively are sold on markets that have “the characteristics of a salvage market,” as economists from Purdue University noted.⁸⁰

Fewer public transactions leave the markets susceptible to volatility, distortion and manipulation, since even a few sales can have a significant impact on the prices that farmers receive. The rise of hog contracting can contribute to the long-term downward pressure on price and increase

price volatility.⁸¹ The hog market was twice as volatile in the 1990s than in the previous two decades.⁸² Over the past 25 years, real hog prices fell by 55 percent, from \$241 per head in 1982 to \$109 in 2007, in real inflation-adjusted 2010 dollars.⁸³ (See Figure 5.) After the hog market crashed in 1998, the price has continued to fluctuate by as much as a third every few months.⁸⁴ (See Figure 6.)

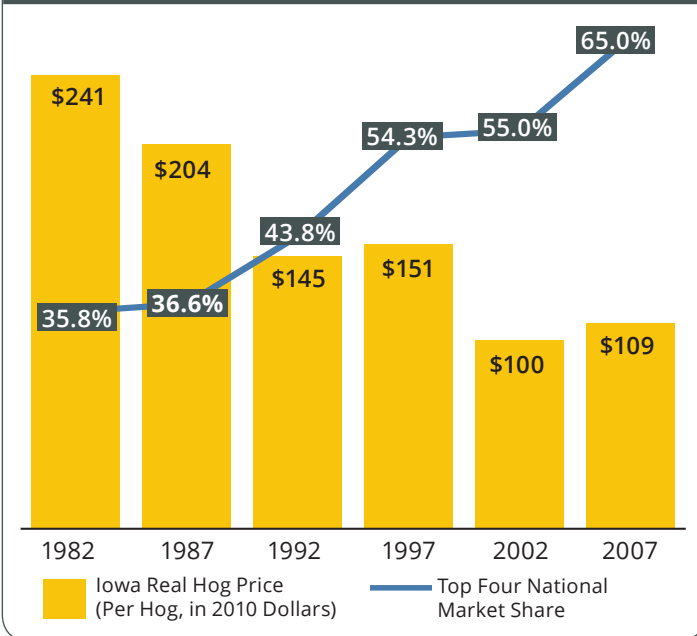
Hog farm loss and increase in hog farm size

Farmers receiving lower prices for hogs often face the stark choice of going out of business or selling more hogs to earn the same income. These pressures of low prices combined with contracts that encouraged larger-scale hog production contributed to the decline in the number of hog farms in Iowa and the growth in the size of the remaining farms.

Nationally, the number of farms selling hogs has plummeted 76 percent from 315,000 in 1982 to 74,800 in 2007.⁸⁵ In Iowa, the number of farms marketing hogs dropped faster, falling 82 percent from 49,000 in 1982 to 8,760 in 2007. (See Figure 7.)

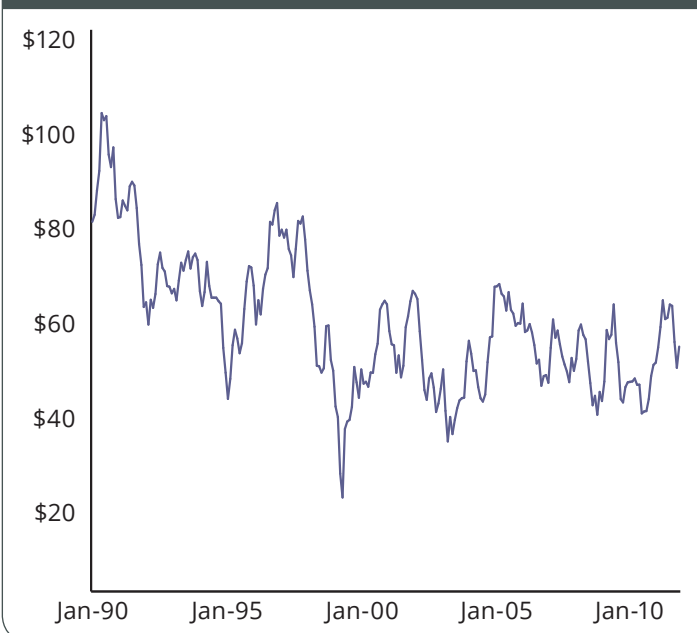
Fewer farms did not mean fewer hogs. In fact, the total number of hogs marketed annually in Iowa doubled between 1982 and 2007, meaning that the size of the remaining hog farms expanded dramatically. Nationally, the average number of hogs sold by each farm has ballooned over the past three decades, growing ninefold to an average of 2,765 hogs in 2007.⁸⁶ In Iowa, the number of hogs sold from average hog farms surged more than 10-fold over the past

Figure 5. Real Iowa Hog Price and Market Share of Top Four Firms



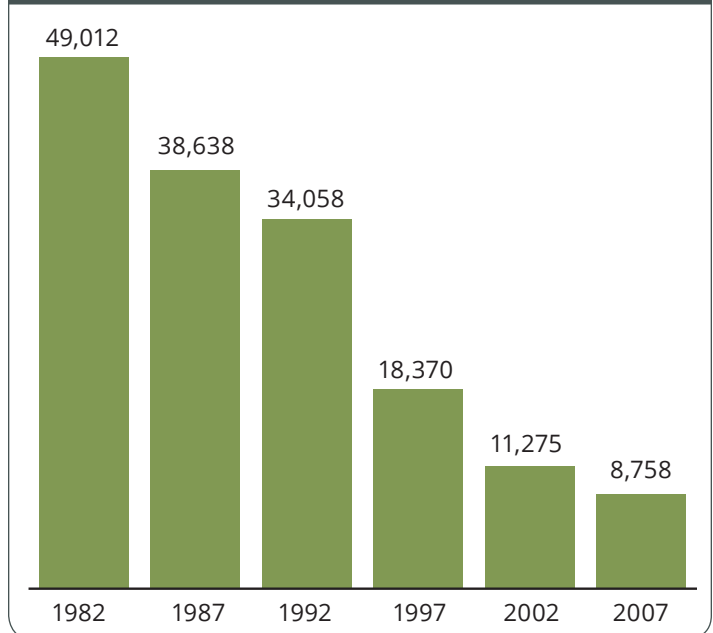
SOURCE: USDA; GIPSA

Figure 6. National Real Farmgate Hog Prices (IN 2010 DOLLARS PER HUNDREDWEIGHT)



SOURCE: USDA NASS

Figure 7. Number of Iowa Hog Farms



SOURCE: USDA Census of Agriculture

three decades, and by 2007 the average Iowa hog farm sold nearly twice as many hogs as the national average. In 1982, the average Iowa farm sold 470 hogs, but by 2007 the average farm marketed more than 5,000 hogs. (See Figure 8.)

In the last two decades, hog production has become concentrated into farms that specialize in a single stage of production (farrowing, nursery pigs and finishing hogs) that are linked together by pork processing integrators through contracts.⁸⁷ In 1992, more than half (54 percent) of hog operations were farrow-to-finish farms that sold the hogs that were born on their farms; by 2004, less than a third (31 percent) were farrow-to-finish.⁸⁸ Feeder-to-finish operations that fatten hogs for slaughter provided a fifth (22 percent) of market hogs in 1992, but three-quarters (77 percent) in 2004.⁸⁹

Many academic, government and industry observers suggest that bigger farms are more efficient because of economies of scale. However, these advantages are significantly overstated. Most of the economies-of-scale efficiency gains occur when small farms grow to be mid-sized, but these gains taper off rapidly as the farms get larger, so increased size provides a diminishing efficiency and cost advantage. Hog farms with the lowest cost of production per hog market about 1,000 hogs a year.⁹⁰

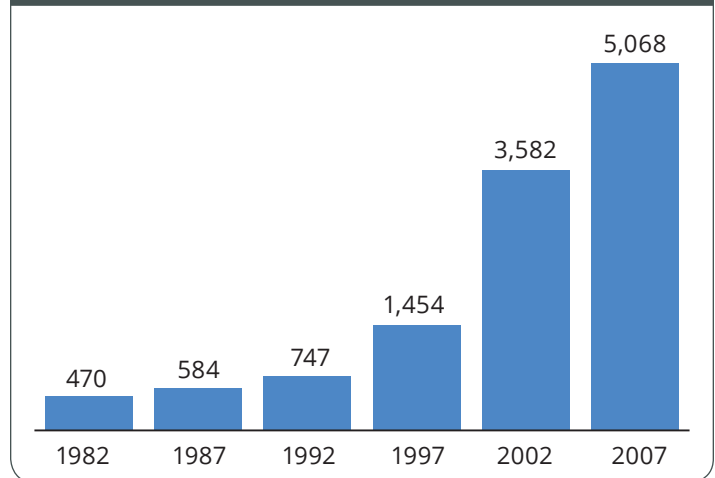
Efficiency gains from increasing size beyond a certain point are modest. An analysis of hog production in Iowa found that large hog farms had only small labor advantages over medium-sized farms. Whereas it took three workers to market 10,000 hogs on medium-sized farms (with inventory between 2,000 and 5,000 hogs), it took only slightly fewer workers (2.88) on farms with more than 5,000 head.⁹¹

The Declining Impact of Large-scale Hog Farms on Iowa's Economy

Although the number of hogs sold in Iowa has doubled over the past three decades (see Figure 9), Food & Water Watch has found that hogs are providing a diminished benefit to Iowa's economy. These findings support nearly a century of academic and public policy studies that have found that larger, industrial farms have lowered the economic and social vitality of local communities.

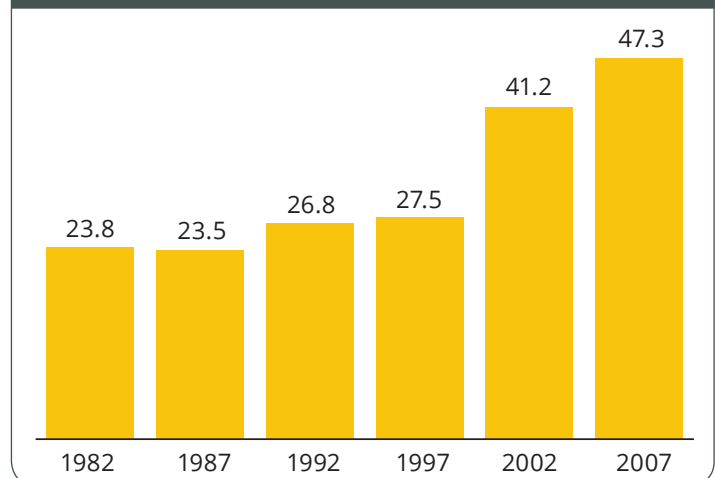
The literature on the impact of large, industrial farms on economic growth, household economic well-being, jobs and unemployment, local purchases by farms as well as non-economic indicators including health, educational and pollution outcomes includes several studies that examine the hog sector in particular. These studies generally support Food & Water Watch's findings that more hogs are providing a

Figure 8. Average Number of Hogs Sold per Iowa Farm



SOURCE: USDA Census of Agriculture

Figure 9. Total Hogs Sold by Iowa Farmers (IN MILLIONS)



SOURCE: USDA

diminishing benefit to Iowa's economy. For example, a 1996 study of Iowa hog production found that the number of hogs is not as important as the number of hog farms to the economic well-being of local communities.⁹²

Economic growth and inequality

Several academic studies have documented that economic growth is more sluggish in communities with a higher prevalence of large, industrialized farms. A 2003 study of nearly 2,250 rural counties nationwide found that counties with larger farms had lower levels of economic growth, suggesting that larger farms make smaller contributions to local economies.⁹³ The counties that were most economically reliant on agriculture and the counties with the largest farms had slower per capita income growth.⁹⁴

A 2000 Illinois State University study of 1,100 Illinois towns found that larger hog farms did not "contribute

The Statistical Story of Hog Concentration

A statistical analysis conducted by the Agricultural Policy Analysis Center (APAC) at the University of Tennessee confirmed what economic theory, common sense and the graphs from this report all say: agribusiness concentration drains value from rural economies. (See Appendix I, page 42.)

What Was Analyzed

The APAC study analyzed these five variables for all 99 Iowa counties for 1982, 1987, 1992, 1997, 2002, and 2007:

1. Real county-level total personal income
2. Real county-level median household income
3. Percent of county residents with a B.A. degree or higher
4. Percent of county residents in the prime working age range of 25–64
5. The number of hogs sold in each county

What Was Done

Each of the last three variables above (education, age and hog production) should affect the first two variables on the list. Econometrics is a powerful statistical technique that allowed APAC to analyze the hundreds of data observations in this study and gain insight into the quantitative effect that each of the last three variables had on the first two.

The APAC analysis was done in two stages. The first stage investigated the degree to which education, age and hog production affected real county-level total personal income and real county-level median household income. The second stage examined how the contribution of hog production to the two income variables had shifted over time to determine whether producing additional hogs in 1982 had the same effect on local income variables as it did in 2007.

Snapshot of Results

As expected, education and age played important positive roles in explaining local income in every year. But the story with hog production was much different. In 1982 and 1987, adding more hog production to a local economy had a strong positive effect. But beginning in 1992, the local economic benefits of additional hog production began to decline. For 1997, 2002 and 2007, local economies gained far less value from additional hog production than they had gained in 1982 and 1987. In fact, the results of the analysis strongly suggest that adding more hogs to rural Iowa counties *lowered* real county-level personal income in 1997, 2002 and 2007.

Additional hog production had a positive effect on real median household income for Iowa counties, but the magnitude of the contribution declined over time. The contribution of a given level of additional hog production in 1992 was 59 percent lower than it was in 1982–1987. The contribution of additional hog production further declined during 1997–2007 and was 76 percent lower than it was in 1982–1987.

The story was the same for real total personal income, with one significant exception: the contribution of additional hog production in 1997–2007 was negative. The contribution of additional hog production was positive in 1982–1987 and in 1992. The 1992 contribution, however, was 91 percent lower than it was in 1982–1987. By 1997–2007, the contribution of additional hog production to real total personal income had turned negative. Adding an additional 1,000 hogs in a county reduced total personal income in that county by \$592.

Conclusion

Hog production can contribute to, or detract from, the level of overall economic activity in a rural county. In 1982 and 1987, the contribution of hog production to Iowa's rural economies was positive. But as time went on, and agribusiness concentration increased, the flow of economic benefits reversed. Growth in the consolidated hog industry became a mechanism for draining value from, and not adding to, Iowa's rural economies.



to the vitality of local economies” and instead tended to hamper rural economic growth.⁹⁵ The rural towns where hog farms became significantly larger between the 1980s and 1990s appear to have had slower economic growth than towns with less-rapid hog production increases.⁹⁶ A 2000 University of Minnesota doctoral thesis found that small hog-finishing operations contributed more to the value-added income of local economies than large hog-finishing operations.⁹⁷ The 1996 Iowa study found that the counties with more hog producers had fewer people relying on food stamps and that counties with more large-scale hog farms (over 1,000 head) had higher levels of food stamp use.⁹⁸

Local purchase

Large-scale livestock operations are more likely than smaller livestock farms to bypass local suppliers for inputs like feed and equipment. Although larger farms make a smaller share of their purchases locally, it could still amount to more local spending since large farms have higher total expenditures. But the same number of hogs raised on a larger number of small- and medium-sized farms would spend more locally than a few giant farms.

These trends have been confirmed by academic studies. A 1993 survey of Iowa hog producers found that as farms got larger, they were less likely to buy feed within 10 miles of their farms. More than three-fifths of medium-sized and small hog producers bought feed within 10 miles (62.0 and 68.8 percent, respectively), compared to 41.7 percent of large farms.⁹⁹ The newer, larger, specialized hog operations are most likely to make purchases outside the local area.¹⁰⁰

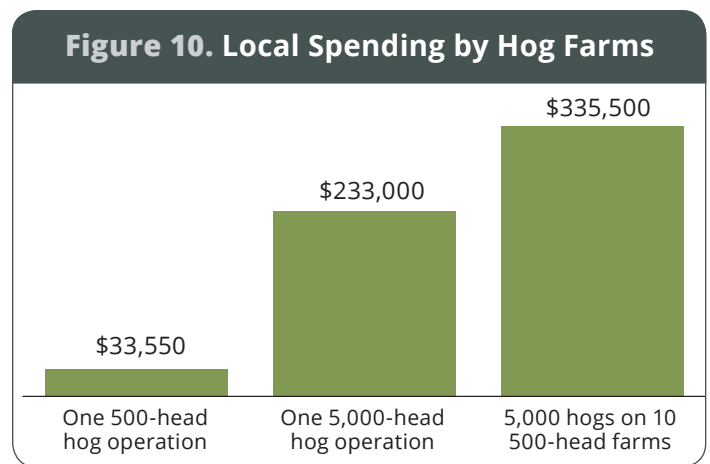
A 1990 study found that larger Michigan hog operations spent less locally than smaller farms. Farms with 500 hogs spent \$67 per head locally compared to \$46 per head spent by farms with 5,000 hogs.¹⁰¹ Using these values, a larger farm would spend \$230,000 locally compared to the \$33,550 by the smaller farm. But ten 500-head farms would spend \$100,000 more locally than a single 5,000-head farm. (See Figure 10.)

Income Lower in Counties With Higher Hog Sales and Larger Hog Farms

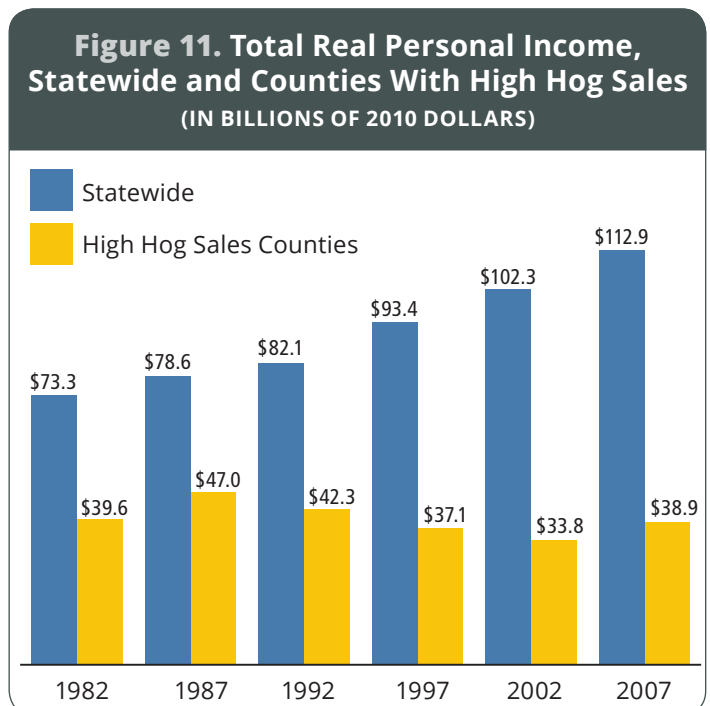
Economic studies of hog farming in Iowa often focus only on the farm impacts or only on the meatpacking and processing industries. While valuable, such studies miss an important point: agribusiness concentration in Iowa is so widespread that it ripples throughout the entire rural economy. Food & Water Watch found that the counties with the highest levels of hog sales (the top half of counties based on the number of hogs sold for each year) and the largest hog farms (the top half of counties based on the average number of hogs

sold per farm for each year) in Iowa had lower county real personal income, real median household income and real per capita income than the state’s total income measurements.

Although the real total personal income in Iowa grew steadily over the past three decades, it declined in the counties where hog production was the highest. Total statewide real personal income grew by half (53.9 percent), from \$73.3 billion in 1982 to \$112.9 billion in 2007, in inflation-adjusted 2010 dollars.¹⁰² (See Figure 11.) In contrast, total county real personal income declined by 1.7 percent in the counties with the highest number of hog sales, from \$39.6 billion in 1982 to \$38.9 billion in 2007. Almost all of Iowa’s increase in total real personal income occurred in the counties with the lowest level of hog sales; real total personal income more than



SOURCE: Albeles-Alison & Conner 1990



SOURCE: Food & Water Watch analysis of USDA Census of Agriculture, Commerce Department Bureau of Economic Analysis data.

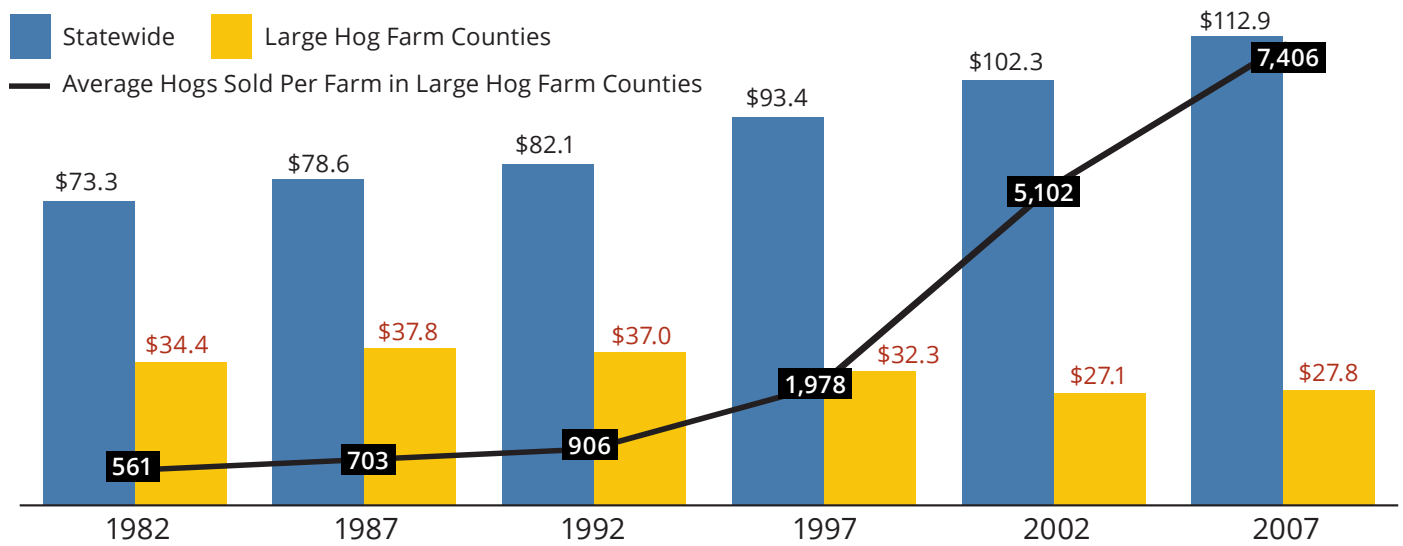
doubled in the half of the counties with the lowest level of hog sales.¹⁰³

Although total real personal income dropped slightly in counties with high hog sales, the decline was significantly steeper in counties with large hog farms. Since 1982, the total real personal income dropped 19.1 percent in large hog farm counties, from \$34.4 billion to \$27.8 billion in 2007. (See Figure 12.) Hog farm size in the half of counties with the largest farms increased 13-fold from an average of 561 hog sales per farm in 1982 to 7,400 in 2007.

Real household median income shows a similar pattern. Median household income measures the economic well-being of households at the midpoint of the earnings curve and is a good representation of the economic success of ordinary families. Statewide, the county real median household income rose 14.5 percent, from \$41,186 in 1982 to \$47,177 in 2007, in 2010 inflation-adjusted dollars.¹⁰⁴ (See Figure 13.)

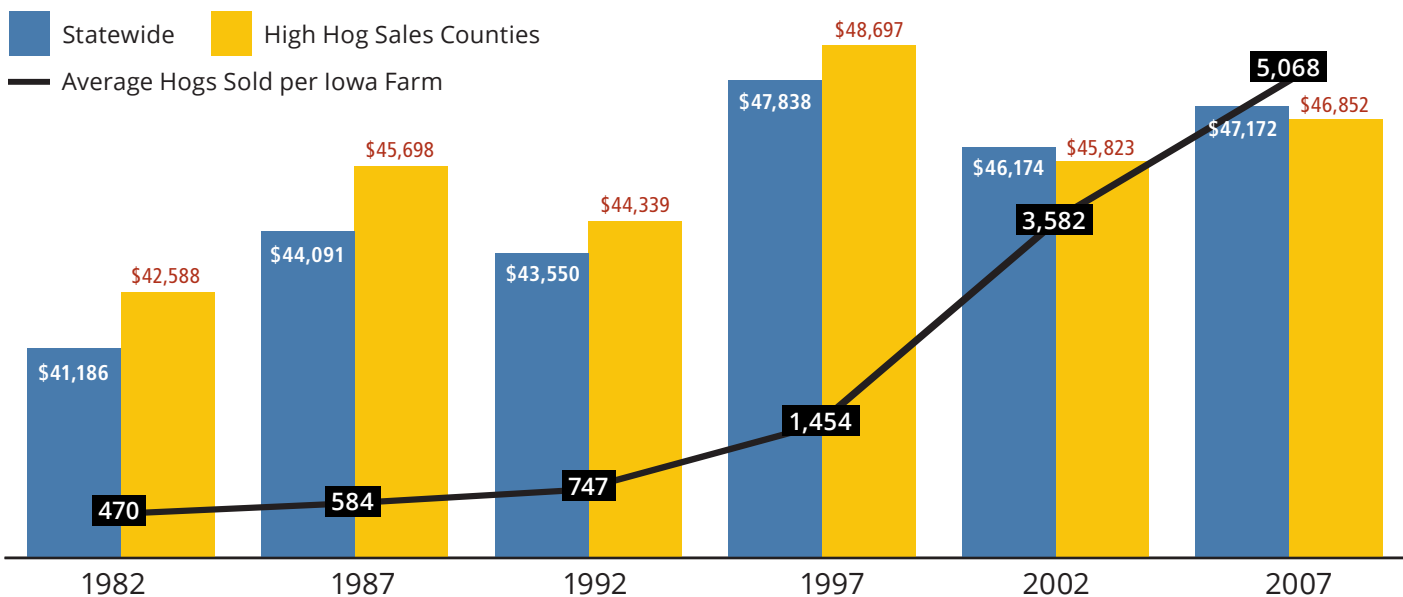
Counties with the largest hog sales saw smaller increases in real median income. Real median household income

Figure 12. Total Real Personal Income, Statewide and Counties With Large Hog Farms
(IN BILLIONS OF 2010 DOLLARS)



SOURCE: Food & Water Watch analysis of USDA, Bureau of Economic Analysis data

Figure 13. Real Median Household Income, Statewide and Counties With High Hog Sales
(IN 2010 DOLLARS)



SOURCE: Food & Water Watch analysis of USDA, BEA data

increased only 10.0 percent for counties with the highest number of marketed hogs. There was a similar trend for large hog farm counties, which had real median household income increase only 8.7 percent between 1982 and 2007.

The economic downturn in the early 2000s drove median incomes down, but the weak economic recovery between 2002 and 2007 still left median household incomes lower than in 1997. From 1982 to 1997, when the average-sized farm sold fewer than 1,500 hogs a year, the real median income was higher in the counties with the highest hog sales than the state average. But after the 1998 crash in hog prices, the number of farms fell further and the size of farms swelled considerably. From 2002 to 2007, when the average farm size topped 3,500 hogs sold annually, the statewide real median income exceeded the largest hog-producing counties. Statewide, real median household incomes declined 3.5 percent between 1997 and 2002, but the decline was nearly twice as steep (5.9 percent) in the largest hog-producing counties.

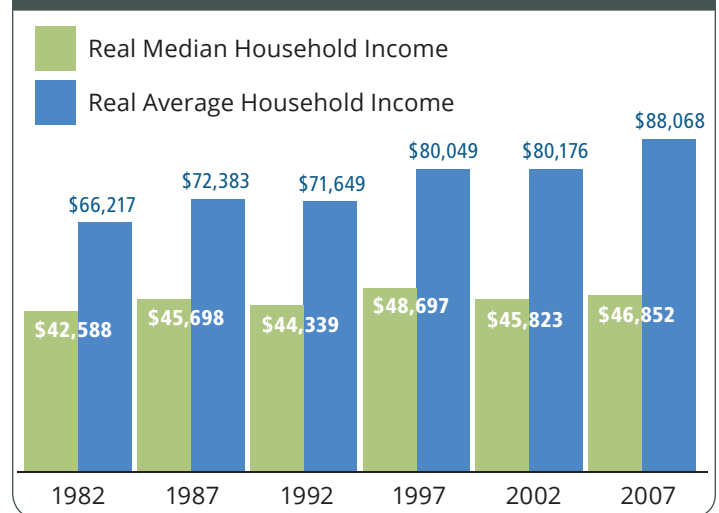
The real per capita earnings are growing in the counties with the largest hog sales while the real household median incomes are declining, which suggests that income inequality is growing in the counties selling the most hogs. (See Figure 14.) Income inequality can be demonstrated when average income growth exceeds median income growth.¹⁰⁵ Between 1982 and 2007, the real average household income (based on per capita income and household size) rose by 33.0 percent from \$66,217 in 1982 to \$88,068 in 2007, but the real median household income rose by only 10.0 percent, about a third as fast as the average household income. The rise in real per capita income alongside a less robust increase in median household income suggests that earnings are being captured by a smaller portion of more-well-off people in counties with high hog sales.

Retail and Small Businesses Decline in Counties With Higher Hog Sales and Larger Hog Farms

Food & Water Watch’s analysis of Iowa small business and retail patterns and hog farms confirms that larger farms and increased numbers of hog sales are associated with declining numbers of small businesses, fewer retail establishments and lower retail sales. High hog sales counties and large hog farm counties had a sharp decline in small businesses (based on the Census Bureau’s county business survey number of non-farm establishments), retail sales establishments (based on Iowa Department of Revenue sales tax records) and total retail sales. (See methodology and data section, page 41.)

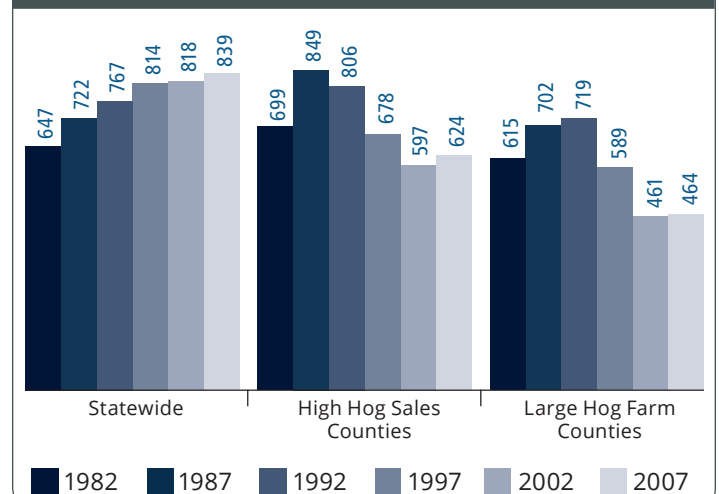
Over the last three decades, the total number of small businesses in Iowa (non-farm establishments) increased by 29.7 percent, from 64,000 in 1982 to 83,000 in 2007. In contrast, the number of small businesses in the counties with the top half of hog sales fell by 10.8 percent. (See Figure 15.) The decline also shows a statewide relocation of small businesses away from areas with the most hog sales. In 1982, more than half of small businesses (54.6 percent) were located in high hog sales counties, but by 2007, only a third (37.5 percent) of small businesses were located in the top hog sales counties.

Figure 14. Real Median Household Income and Real Average Household Income, Counties With High Hog Sales (IN 2010 DOLLARS)



SOURCE: USDA, BEA, Census Bureau; average household income based on per capita income and household size.

Figure 15. Average Number of Non-Farm Establishments per Iowa County



SOURCE: Food & Water Watch analysis of USDA, Census Bureau data

There is a similar pattern for the counties with the largest average hog farm size, which confirms the findings from the academic literature that smaller farms are more likely to buy and shop locally and that this local purchasing reverberates throughout Main Street business communities. The large hog farm counties lost a quarter (24.4 percent) of their small businesses over the past three decades (again, while the number of small businesses statewide increased).

A similar pattern holds true for retail establishments (businesses that file state sales tax receipts) and real retail sales. Although the number of retailers in Iowa declined by 2.7 percent between 1982 and 2007, the high hog sales and large hog farm counties had a much sharper decline in retailers. High hog sales counties lost 29.0 percent of retail establishments, and large hog farm counties lost 38.0 percent of retailers. (See Figure 16.)

Much of the decline in retailers may be the result of superstores driving out independent grocery, hardware and other independent retailers,¹⁰⁶ but theoretically the level of retail sales should continue to grow with the broader economy. Iowa statewide real retail sales increased by 11.4 percent from \$29.7 billion in 1982 to \$33.0 billion in 2007, but real retail sales dropped by a third (35.3 percent) in high hog sales counties and by half (53.5 percent) in large hog farm counties. (See Figure 17.) By 2007, consumers were spending \$5.5 billion less in high hog sales counties and \$7.3 billion less in large farm counties than they spent in 1982, in inflation-adjusted 2010 dollars. This supports the Illinois State University study that found that towns surrounded by larger hog farms had lower levels of retail spending.¹⁰⁷

Total Employment and Farm Jobs Decline in Hog Counties

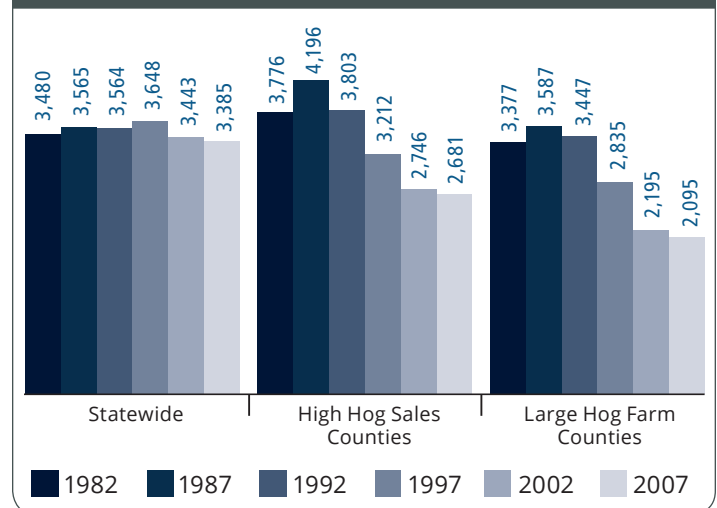
The value of hog sales contributes to employment on farms, in meatpacking plants and throughout the economy. But the levels of local employment and the quality of the jobs are interrelated with the strength of independent family farms in rural areas.¹⁰⁸ More workers would be employed if the same number of hogs were raised on smaller farms.¹⁰⁹ Fewer, but larger, farms reduce the number of farm job opportunities in rural communities.¹¹⁰

Farm jobs in Iowa have declined steadily, and most of these losses are likely on hog farms. In the Midwest, hog farms (and dairy farms, a minor factor in Iowa) employ the majority of farm workers because beef cattle and crop operations require less labor.¹¹¹ Statewide, Iowa lost 41.6 percent of its farm jobs between 1982 and 2007, shedding almost 64,000 jobs. Most of the farm job losses were in the counties with the highest levels of hog sales. (See Figure

18 on page 19.) High hog sales counties lost 42,600 farm jobs (46.0 percent), and large hog farm counties lost almost 36,400 (44.3 percent).

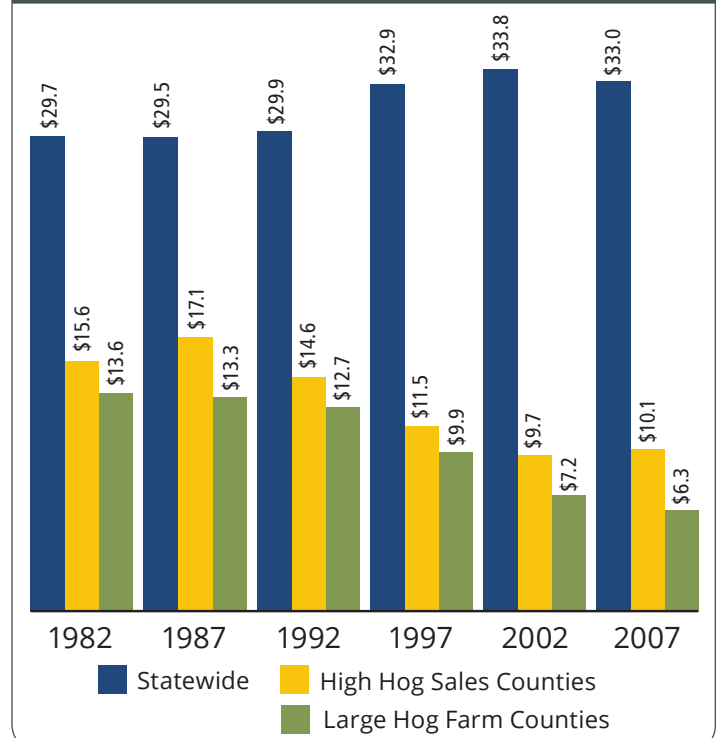
Food & Water Watch found that the rising number of hog sales has not increased total employment. High hog sales counties and large hog farm counties had declining numbers of wage and salary jobs. Statewide, Iowa gained nearly half

Figure 16. Average Number of Retail Establishments per Iowa County



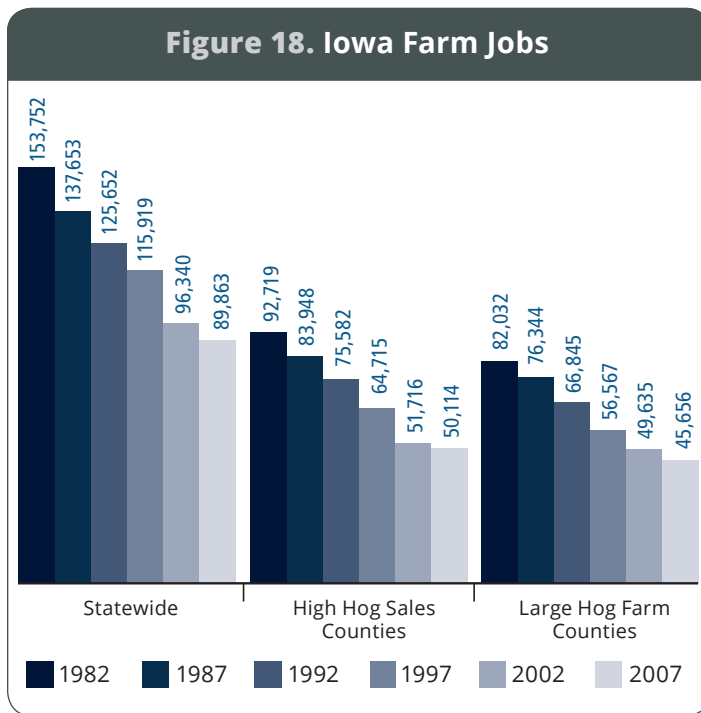
SOURCE: Food & Water Watch analysis of USDA, Iowa Department of Revenue data

Figure 17. Iowa Real Retail Sales (IN BILLIONS OF 2010 DOLLARS)

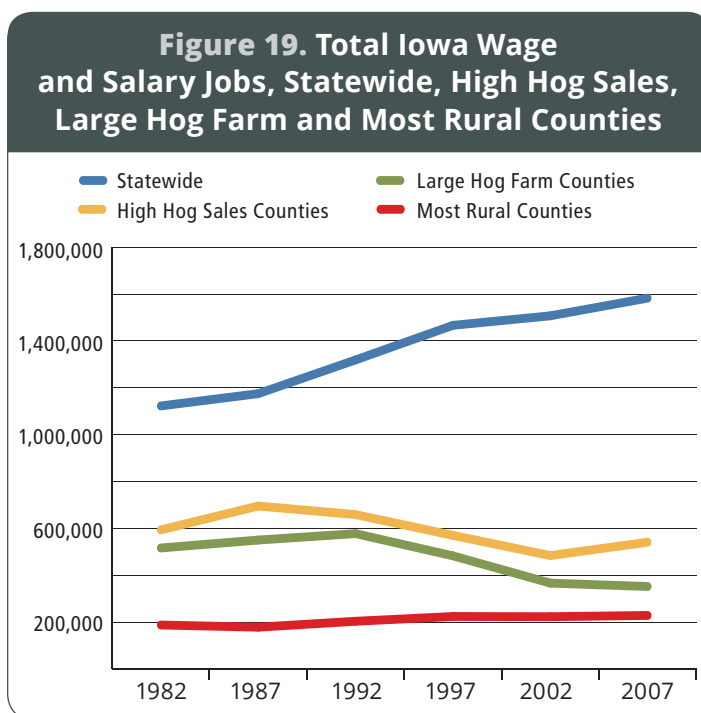


SOURCE: Food & Water Watch analysis of USDA, Iowa Department of Revenue data

a million (460,000) wage and salary jobs between 1982 and 2007, a 41.0 percent increase. But high hog sales counties lost 52,300 jobs (an 8.8 percent drop), and large hog farm counties lost 164,400 jobs (a 31.8 percent drop). (See Figure 19.) In contrast, the most-rural half of counties with the lowest population density gained 40,700 jobs (a 21.6 percent increase). The counties with the most hogs and largest hog farms have lower or negative job growth, even compared to the most rural counties without major hog production.



SOURCE: Food & Water Watch analysis of USDA and BEA data



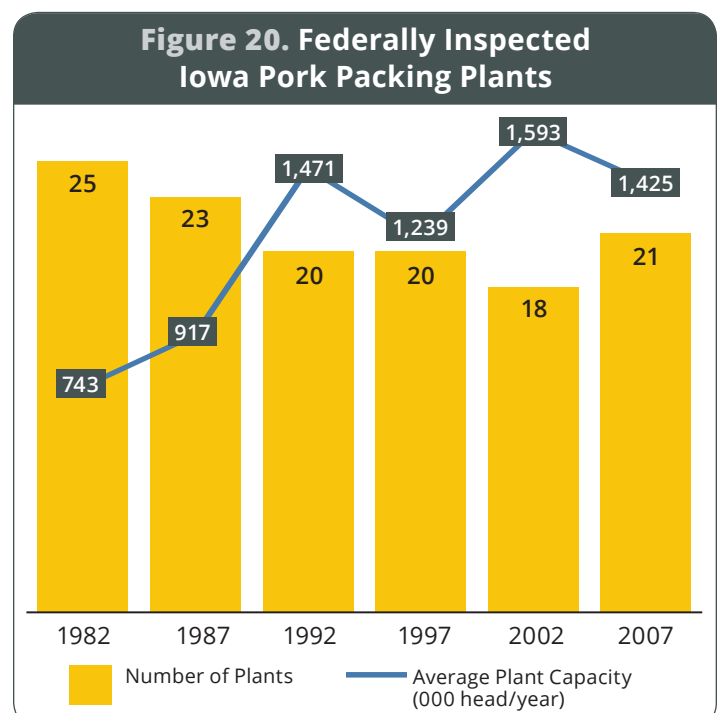
SOURCE: Food & Water Watch analysis of USDA and BEA data

Meatpacking

The meatpacking and processing industry provides jobs in rural areas, including for farm family members, and these workers spend their earnings at local retailers and on local services.¹¹² Although Iowa State University attributed a considerable portion of the impact of the hog sector on personal income to workers in the meat processing sector,¹¹³ the total real earnings of meatpacking and processing workers declined 16 percent between 1982 and 2007.¹¹⁴

The meatpacking industry has shifted to fewer, larger and more remote plants.¹¹⁵ The number of federally inspected hog packing plants (typically, the largest plants that can ship pork nationwide) in Iowa fell by about a sixth (16 percent) between 1982 and 2007.¹¹⁶ (See Figure 20.) In 2010, Smithfield closed a 14,000-hog per day John Morrell plant in Sioux City.¹¹⁷ The total number of Iowa pork packing and processing plants with at least 20 employees declined slightly (by 4 percent) over the same period, according to U.S. Census Bureau figures (which do not separate hog and beef plants).¹¹⁸ The modest decline conceals a sharp decline in packing plants, which dropped 42 percent between 1982 and 2007, while the number of processing plants grew. (Packing plants handle and slaughter live animals and end up with a carcass. Processing plants turn carcasses into other processed products.)

A larger impact to the economies of rural communities has been the decline in real wages for meatpacker and processing workers. Meat manufacturers paid sharply lower



SOURCE: USDA NASS

Tax Revenue and Property Values

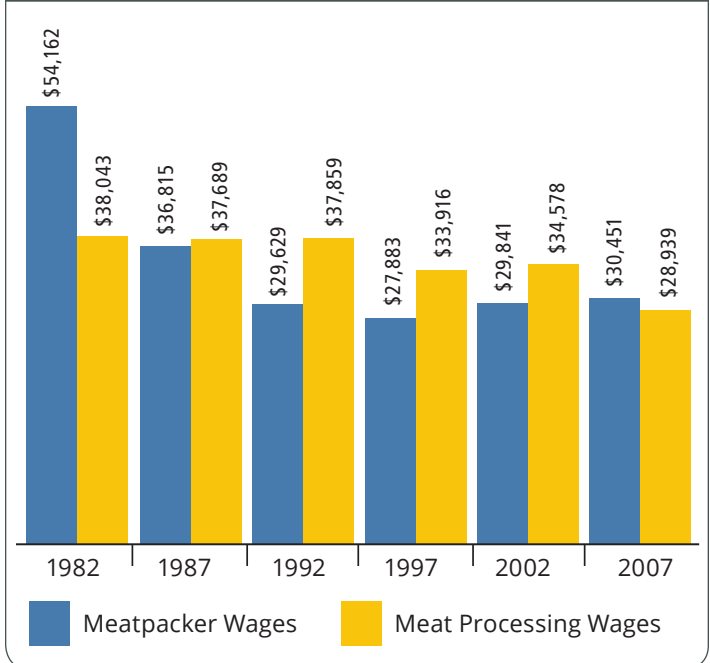
Larger or more vertically integrated hog farms can undermine property values — and the local tax base. Proponents of large-scale hog operations contend that livestock operations can be associated with generally higher property values in a region or county.¹²³ Theoretically, the increased housing demand from additional hog farm workers helps to drive up property values. But in Iowa, the counties with the highest hog production lost almost half the farm workers between 1982 and 2007, which suggests a reduced demand for housing.

Several studies have found that large hog operations can have significant negative effects on local property values. A 1997 study of home sales in high hog-producing North Carolina counties found that homes sold for 9.5 percent less if there were 5,000 hogs within half a mile (or 15,000 hogs within a mile) than homes with only a few hogs within half a mile.¹²⁴ A 1990 Michigan study found that home sales within 1.6 miles of hog operations would reduce home prices by \$1,740 for every 1,000 hogs.¹²⁵ This might not seem like a big impact, but a \$1,700 drop in price is a 2 percent decline in the average Michigan home price in 1990¹²⁶ — and that is for every 1,000 hogs.

The studies also found that the addition of new hog operations reduced the property values of neighboring homes. The North Carolina study found that adding a new 2,400-head hog operation within half a mile of a community without hog farms would reduce property values by 8.4 percent.¹²⁷ A 2003 Iowa State University study found that a new, large livestock operation could reduce nearby and downwind property values by about 10 percent.¹²⁸



Figure 21. Average Real Iowa Meatpacker and Processor Annual Earnings (IN 2010 DOLLARS)



SOURCE: U.S. Census Bureau

wages as the sector consolidated and focused on larger manufacturing plants in more rural areas.¹¹⁹ With declining real wages, workers at meatpacking plants provide less of a boost to local economies.¹²⁰

In Iowa, real meatpacker and processor (both beef and pork) wages have fallen steadily over the past three decades. (See Figure 21.) Real, inflation-adjusted meatpacker wages dropped 44 percent between 1982 and 2007, and meat processing wages dropped by 24 percent (in real 2010 dollars).¹²¹ Even with a rise in meat processing workers and the slight decline in packing plant workers, the total real earnings from meat manufacturing workers dropped by 16 percent, from \$853.9 million in 1982 to \$720.2 million in 2007 (in 2010 dollars). Some large meatpackers had hostile relationships with unions representing packing plant and meat processing workers, and broke strikes and cracked unions to drive down wages to 25 percent below average manufacturing wages by 2002.¹²²

Conclusion

A 2006 Iowa State University report described the changes in Iowa's hog production sector over the past decades as dramatic and profound.¹³⁵ The number of Iowa hog farms plummeted, production had shifted from farms that raised hogs from birth (farrow-to-finish operations) to farms that fattened hogs for slaughter (finishing operations), and contract hog production became more prevalent.¹³⁶

The Myth of Consumer Benefit

Although pork packer consolidation has pushed down the real prices that farmers receive for their hogs, few of these savings are passed on to consumers; the meatpackers and retailers are pocketing the difference. The USDA found that although large-scale hog farms and processor efficiency gains may have reduced the cost of production between 1992 and 2004, consumer prices for retail pork nonetheless “increased substantially.”¹²⁹

Because pork is a small share of food expenditures, even a 5 percent reduction of production costs on industrial-scale hog operations would reduce total food expenditures by only 0.2 percent.¹³⁰

Although the price of hogs has been trending downward, the consumer price of pork products has been less responsive to the declining hog prices. Some studies have found that increases in farmgate prices are passed on to consumers completely and immediately, but when farmgate prices fall, the grocery store prices do not fall as rapidly or completely.¹³¹

When the prices that farmers received for hogs plummeted in 1998, the prices that consumers paid at the supermarket for pork products in 1998 and 1999 did not decline very much.¹³² Real hog prices dropped by about two-thirds between June and December of 1998, but real pork chop prices fell by only 8 percent and bacon prices actually rose by 5 percent.¹³³ (See Figure 22.)

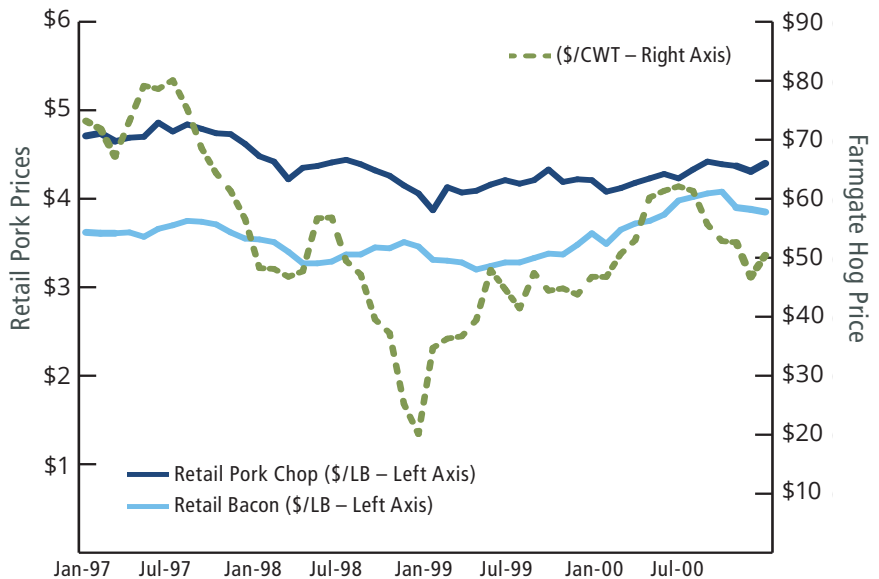
Increased consolidation in the pork industry nationwide means that consumers face not only rising prices but also diminishing choices at the supermarket. Although consumers see a wide variety of brands at the meat counter, many large meatpackers market a range of brands that all come from the same company. For example, Smithfield Foods sells pork products under the brand names Smithfield, Farmland, John Morrell, Gwaltney, Armour, Eckrich, Margherita, Carando, Kretschmar, Cook’s, Curly’s and Healthy Ones, as well as under private-label brands.¹³⁴

This marketing effort to maintain multiple brands and labels obscures the reality of the increasing control of the meat case by just a few players and makes it hard — or impossible — for consumers to understand the dramatic structural changes that have taken place in the pork industry over the last three decades.

Food & Water Watch found that as consolidation has risen, the contribution of the hog sector to overall economic activity in Iowa has declined. Counties with more hog sales and larger farms tend to have lower total incomes, slower income growth, fewer Main Street businesses and less retail activity. General employment levels have suffered, wages in meatpacking have declined and farm job opportunities are more difficult to find. In spite of what Big Pork boosters have said, there is little evidence that the trends in Iowa hog production have been good for Iowa’s rural economies.

The most likely culprit for the decline in economic well-being in the face of steeply rising hog production is the significant consolidation in the pork packing industry. Today, the biggest four Iowa packers slaughter nine out of every 10 hogs produced. Iowa’s pork economy has devolved from one that supported rural communities to one that extracts value and fuels profits for firms far from the Iowa countryside. Rebalancing the value of hog production back to farms and rural communities will require restoring genuine competition to the hog sector.

Figure 22. Real Farmgate Hog and Retail Pork Prices (IN 2010 DOLLARS)



SOURCE: USDA, U.S. Bureau of Labor Statistics

Consolidation and Collusion in the New York Dairy Industry

The U.S. dairy industry has experienced increasing turmoil for several decades. Farm numbers have fallen dramatically; new farms are often mega-dairies many times larger than traditional farms; and prices are frequently too low and too unstable to support family-sized operations. Although the number of farms has fallen dramatically, because many farms have grown to gargantuan proportions, U.S. dairy farms continue to produce large volumes of milk.

Milk is sold into a system that is dominated by fewer and larger processors that in turn sell milk to a highly consolidated retail industry. The U.S. General Accounting Office reported in 2001 that, “At each level of the marketing chain, including dairy farms, cooperatives, wholesale milk processors, and retail grocery stores, there are fewer, but larger, players in the industry.”¹³⁷

This agribusiness concentration endangers the future of independent dairy farmers nationwide, including in upstate New York, the focus of this analysis. New York’s independent dairy farmers have long been the foundation of a dairy industry that provided 6,000 jobs in the state and generated \$300 million in sales in the mid-2000s.¹³⁸ Consolidation was accelerated in the late 1980s when New York eliminated New Deal-era rules designed to safeguard local milk processors.¹³⁹ The deregulation brought new, out-of-state milk processors into New York supermarkets and spawned a price war that initially reduced prices, but consumer savings evaporated as big processors consolidated their market power and extracted more of the value between dairy farmers and consumers.¹⁴⁰

Individual firms pursuing market power over competitors, customers, suppliers and farmers have largely driven the consolidation throughout the food and farm sector. But in some circumstances, competitors work with one another to squeeze greater profits from the other steps in the food chain. Federal antitrust law prohibits the collusion between competitors to subvert the marketplace or suppress competition, including price-fixing agreements, dividing up geographic or consumer markets, or coordinated boycotts or blacklists against suppliers or consumers.¹⁴¹

A lawsuit brought in 2009 by Vermont and New York dairy farmers alleges just such coordination between some of the largest players in the dairy industry.¹⁴² The class-action antitrust suit contended that the nation’s largest milk processor, Dean Foods; the largest co-operative, Dairy Farmers of America; and Dairy Marketing Services (a milk



marketing partnership between DFA and New York-based Dairylea Cooperative) were colluding to control access to milk processing through mergers, plant closings and effectively requiring farmers to market their milk through DFA and DMS.¹⁴³ The allegations mirror how Dean Foods Chief Executive Gregg Engles described the company’s strategy in 2002: “We acquire (rivals), we close smaller plants and consolidate their operations into our large, more efficient facilities.”¹⁴⁴

In August 2011, Dean settled its case with many of the dairy farmers (a few asked to be excluded from the class) for \$30 million without admitting any wrongdoing.¹⁴⁵ Although Dean initially consented to buy 10 to 20 percent of its milk from non-DFA sources for 30 months, the final settlement deleted this injunctive relief.¹⁴⁶ (Similar claims against milk processor HP Hood were dismissed.¹⁴⁷) Some of the claims filed against both DFA and DMS were still pending as of summer 2012.

Consolidation and Concentration

In 2010, a third of all milk produced in the United States came from industrial dairies with over 2,000 cows, about 14 times larger than the national average herd size.¹⁴⁸ The number of farms with over 2,000 cows more than doubled between 2000 and 2006,¹⁴⁹ while smaller farms were lost at an alarming rate. Between 2000 and 2010, an average of 3,850 U.S. dairy farms were lost each year, for a total loss of over 42,500 dairies in just a decade.¹⁵⁰

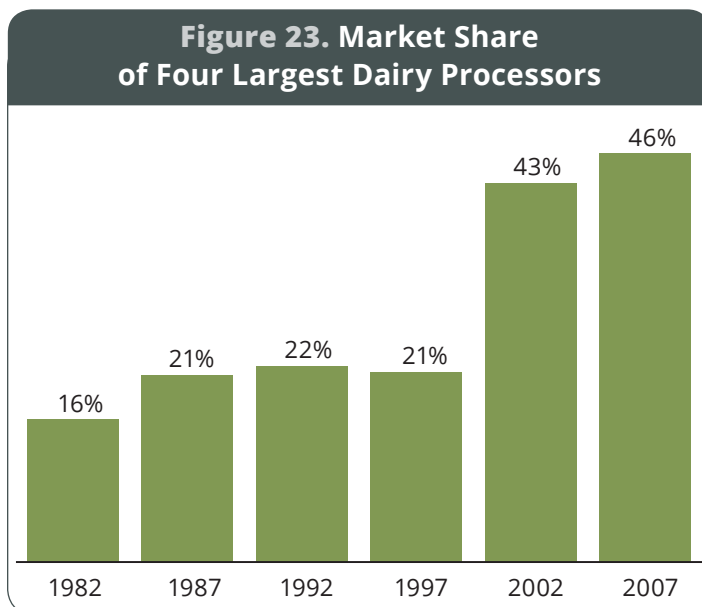
In spite of those losses, milk production remained constant because the scale of the farms increased significantly.¹⁵¹ From 1980 to 2010, the average size of a dairy farm more than quadrupled, from 32 to 146 cows.¹⁵² As late as 1998,

the majority of milk was produced on small farms with fewer than 200 cows; by 2007, the majority of milk was produced on large dairies with over 500 cows.¹⁵³

The milk produced by dairy farms, with very few exceptions, is not sold directly to consumers. It must first be processed into cheese, butter, ice cream and other products. Even the fluid milk on grocery store shelves is processed before it is sold to consumers. Some farmers sell their milk directly to processors, but it is more common for dairy farmers to join cooperatives that handle (or deliver) their milk from the farm to the milk processing plant. Some of these farmer-owned cooperatives own processing plants, some collect members' milk and sell it to other processors, and some do both.¹⁵⁴

The number of dairy cooperatives has fallen dramatically over the last half-century, from 2,300 in the early 1940s to 155 in 2007.¹⁵⁵ Historically, the so-called “brick and mortar” cooperatives that owned processing plants and processed most of their members' milk were intended to give farmers a share of processing profits. This worked well for decades, but now the cooperatives have in large part given way to privately owned processors. In 1995, dairy cooperatives accounted for 43 percent of milk sales, but by 2010 cooperatives processed only 20 percent of the milk.¹⁵⁶

As the milk processing industry has consolidated and specialized, farmers have fewer and fewer options for selling their milk. Milk is heavy to ship, which makes it uneconomical to truck long distances. Since dairy cows produce a constant supply of perishable new milk, dairy farmers are uniquely vulnerable to taking whatever price they are offered if they have few marketing options in their area.



SOURCE: Government Accountability Office; U.S. Census Bureau

Today, a tiny handful of companies buy the majority of milk from farms and process it into dairy products and industrial food ingredients. The four-firm concentration of fluid milk manufacturers doubled in the past decade, rising from 21 percent in 1997 to 46 percent in 2007.¹⁵⁷ (See Figure 23.) Between 1972 and 1992, the number of fluid milk processing plants fell by 70 percent and the average plant size doubled.¹⁵⁸ The number of plants declined by an additional 35 percent between 1992 and 2007.¹⁵⁹ At the local level, concentration can be considerably higher. The four largest firms processed two-thirds of the milk (66.2 percent) in the Boston metropolitan area in 1997, but the top four processed 88.1 percent of the milk by 1999.¹⁶⁰

Of course, these plants sell milk to a retail sector that is also tremendously concentrated. (See Introduction, page 4). When more than 62,000 dairy farmers sell into a supply chain with several, consolidated interests between farmers and consumers, they are unlikely to receive the best deal for their milk. Retailers buy three-quarters of fluid milk, giving them significant leverage over milk processors who in turn consolidate and put pressure on dairy farmers.¹⁶¹

Agribusiness Concentration

In many parts of the country, the price that dairy farmers receive is regulated by what are called Federal Milk Marketing Orders.¹⁶² Most of the northeastern United States, including most of the New York counties studied here, is covered by what is called “Order 1.” The Federal Milk Marketing Orders determine a minimum price at which dairy farmers must be paid. It is common for farmers to be paid more than the minimum (known as an “over-order premium”) as competing buyers within the marketing order seek to secure supplies.¹⁶³

Federal Milk Marketing Orders are notoriously arcane, but basically, if the marketing order sets a minimum price of \$15 per hundredweight (100 pounds) of milk, and buyers are willing to pay \$17, the over-order premium is \$2. The formulas used to calculate price do not include any information on what it cost to produce the milk, and family farm advocates criticize the formulas as being designed in a way that allows big processors and dairy product manufacturers to manipulate the price paid to farmers.¹⁶⁴

The Northeast dairy lawsuit alleged that over-order premiums were fixed and suppressed by Dairy Farmers of America and its marketing partnership Dairy Marketing Services because of the large market share of milk they collected.¹⁶⁵ In competitive markets, these premiums can be substantial and provide the income margin necessary for

farmers to stay in business. At the same time, paying above the order minimum prices is understandably seen by processors as undesirable. The cost of milk makes up about half of the cost of selling a gallon of milk,¹⁶⁶ making it the single biggest factor in determining processor profits. Because of this, there is an incentive for processors to act in ways that lower the over-order premiums that farmers receive.

Dairy Farmers of America is the nation's largest dairy cooperative and marketer of milk from farm to processing plant.¹⁶⁷ Although it is a co-op, it regularly describes itself as more of a business. In 2006, its Northeast regional chief operating officer told New York's *Watertown Daily News* that "DFA is a \$6 billion-in-sales company that happens to be an agricultural cooperative."¹⁶⁸ It was created in 1998 out of the merger of four large cooperatives.¹⁶⁹ As a result of the merger, DFA had more than 18,000 members.¹⁷⁰ By 2009, DFA reported sales in excess of \$8 billion and marketed about one-third of the nation's milk.¹⁷¹

At the time DFA was formed, the two largest milk processors in the United States were Suiza and Dean.¹⁷² Within a few years of the formation of DFA, two important developments had taken place in dairy markets. The first was that Suiza and Dean completed a merger in 2001, making the new Dean Foods the largest dairy processor in the country, with 129 plants in 39 states delivering milk to 150,000 customers including supermarkets and school cafeterias.¹⁷³ DFA already had a joint venture with Suiza for all of Suiza's milk processing (as the result of Suiza's acquisition of Southern Foods in 1999).¹⁷⁴

The second event was that DFA and a large Syracuse-based cooperative, Dairylea, formed the joint milk-marketing venture Dairy Marketing Services LLC in 1999.¹⁷⁵ The new DMS would market milk from 6,000 dairy farmers from New England through Maryland and West Virginia to 90 milk processors.¹⁷⁶ DMS would handle the delivery and marketing for 10 billion pounds of milk annually.¹⁷⁷

The years under study here also saw processing plants in the Northeast change ownership and, in some cases, close altogether. The number of fluid milk manufacturing plants in New York dropped 39.3 percent from 61 in 1992 to 37 in 2007.¹⁷⁸ In the 2000s, Kraft Foods closed or sold two New York plants receiving milk from DMS.¹⁷⁹

These changes in the distribution of processing plants further consolidated the already strong positions held by Dean Foods and DFA. Dean controlled 70 percent of the milk bottling market in the Northeast, and DFA/DMS were Dean's exclusive suppliers, which the farmer plaintiffs alleged allowed these firms to drive down the prices they

paid to dairy farmers.¹⁸⁰ The plaintiffs contended that the dairy farmers and independent cooperatives were effectively pressured to either join DFA directly or market their milk through DMS.¹⁸¹

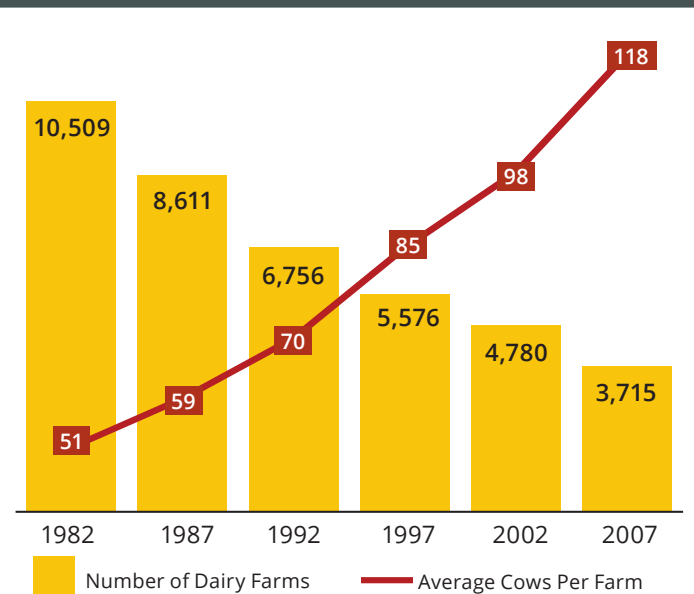
The Impact of Consolidation on New York Dairy Counties

Food & Water Watch analyzed the economic and dairy performance of 24 rural New York counties. The counties were outside of Metropolitan Statistical Areas (as designated by the U.S. Census Bureau) and excluded USDA-designated recreational counties, to exclude as much of New York's non-agricultural activity as possible.

Dairy farming in the 24 counties mirrored national trends. The number of dairy farms dropped 64.6 percent from 10,500 in 1982 to 3,700 in 2007. (See Figure 24.) The average number of farms in each county dropped from 438 to 155 over the period. But milk production continued to grow, partly because of increased productivity per cow, and partly because average farm size more than doubled from 51 cows per farm in 1982 to 118 in 2007. Some New York cooperatives pay dairy farmers volume premiums for delivering more milk, which can encourage dairy farmers to expand.¹⁸²

While the forces of agribusiness concentration were at work in New York as well as the rest of the country, the effects in New York are different and more difficult to measure than in our previous case study of the hog industry in Iowa. The conventional dairy industry does not employ marketing

Figure 24. Number of Dairy Farms and Average Farm Size, 24 New York Dairy Counties



SOURCE: USDA

contracts to the same extent as the hog industry (since these functions are largely performed by cooperatives) and has yet to consider the kinds of production contracts used universally in the poultry industry and increasingly in the hog industry.

Measuring and isolating the economic effects of consolidation in the New York dairy industry is complicated by the state's more diverse and complex economy, which can mask the impact of agribusiness concentration. Moreover, the number and homogeneity of rural counties in Iowa allows for a more complex analysis of agricultural and economic trends. Counties in Iowa are more uniformly shaped, making the economic output more comparable than in New York where the size of counties, and thus population, is much more varied. Even the peripheral, non-metropolitan counties are likely to be more tightly linked with large cities, and tourism and larger second homes of wealthier New York City metro-area residents can have a considerable economic impact on the state's rural counties.

Because of these considerations, Food & Water Watch examined a pair of counties (Yates and St. Lawrence) that mirrored the original Goldschmidt study that started the examination of the impact of larger, industrial farms on rural economies in the 1930s. (See Introduction, page 4, and Table 2.) St. Lawrence County has ranked among the counties with the most dairy farms in New York for 30 years, in part because it is the largest county in New York.¹⁸³ Although St. Lawrence lost 77 percent of its dairy farms between 1982 and 2007, it remained tied as the county with the most dairy farms in the state in 2007, and the remaining farms have grown quite large.

Yates County started with very few dairy farms, but during the period we studied, many small-scale Mennonite dairy farmers migrated to the county.¹⁸⁴ These farmers remained small, but the number of farms became plentiful. The number of dairy farms and cows more than doubled in

Yates County, but farm size remained small and stable. Yates County also had stronger economic performance with incomes and small business numbers increasing faster than in St. Lawrence County.

St. Lawrence County had 1,115 dairy farms in 1982, the most in New York; Yates had 124, the third fewest among rural counties. But as the number of dairy farms in Yates County grew and the number in St. Lawrence fell, the number of dairy farms in the two counties converged. By 2007, both counties were tied for the most dairy farms in the state, with 262. However, the size of the farms in the counties diverged. The average size of Yates County farms grew modestly, rising 10 percent from 42 dairy cows per farm in 1982 to 46 cows in 2007. The average farm size in St. Lawrence County nearly tripled, rising from 43 to 120 over the period. Moreover, a third of the dairy cows (37 percent) in St. Lawrence County were on farms with over 500 head in 2007, which make up just 4 percent of the dairy farms in the county, while none of the Yates County farms had more than 500 head.¹⁸⁵

As these changes unfolded on the dairy farm landscape in these counties, economic trends emerged that were consistent with the findings on the consolidation of the hog sector from Iowa. Both counties began with similar real median household incomes (\$41,420 in Yates County and \$41,192 in St. Lawrence County, in inflation-adjusted 2010 dollars). But real median household income rose nearly 4 percent in Yates County and declined slightly in St. Lawrence County. Real total personal income (the total personal income for the entire county) grew more rapidly in Yates County, although the farms were larger and sold more milk in St. Lawrence County. The number of small businesses in Yates County increased five times more than in St. Lawrence County, which is consistent with the literature that found higher levels of commercial activity in areas with more, smaller farms.

Table 2. A Tale of Two New York Dairy Counties

	YATES COUNTY			ST. LAWRENCE COUNTY		
	1982	2007	CHANGE 1982-2007	1982	2007	CHANGE 1982-2007
Dairy Farms	124	262	111%	1,115	262	-77%
Dairy Cows	5,250	12,150	131%	47,485	31,525	-34%
Cows per Farm	42	46	10%	43	120	183%
Real Median Household Income	41,420	42,970	3.7%	41,192	40,987	-0.5%
Real Total Personal Income	\$463,155	\$702,486	56%	\$2,071,389	\$2,991,917	43%
Non-Farm Establishments	422	550	30%	1997	2115	6%

SOURCE: USDA, Census Bureau, BEA

Conclusion

Over the past three decades, the number of dairy farms in upstate New York has dropped dramatically while the size of the remaining farms has surged. The consolidation in the dairy industry contributed to the pressures on dairy farmers that manifest these trends. The recent class-action antitrust suit brought against Dean Foods, DFA and DMS describes how these aggregate concentration levels can be leveraged at the farmgate. The suit alleged that dairy farmers were effectively required to market their milk through DFA/DMS in order to access the processor market. The loss of dairy farms in New York was 50 percent faster when these alliances were fully in place between 2002 and 2007 (a 22 percent decline in dairy farms) than during the previous five-year period (a 14 percent drop).

The claims in the Northeast are not unique. In 2011, Dean Foods agreed to settle a similar suit in the Southeast for \$140 million that alleged that Dean, DFA and other parties used mergers, plant closures and exclusive supply contracts to reduce competition and fix prices.¹⁸⁶ Also in 2011, Dean agreed to sell a Wisconsin processing plant and the Golden Guernsey dairy brand after the U.S. Department of Justice brought a suit contending that a 2009 Dean acquisition had reduced competition for single-serve milk cartons in convenience stores and schools in Illinois, Michigan and Wisconsin where Dean controlled 57 percent of the fluid milk market.¹⁸⁷

The one exception to the trend of declining farm numbers was Yates County, which had growth in the number of dairy farms. There are several notable characteristics of the dairy farms in Yates County: they are small, with 46 cows on the average farm. Additionally, the overwhelming majority (an estimated 90 percent or more) of the dairy farms in the county are owned by Mennonite families.¹⁸⁸ Because of their religious and cultural beliefs, Mennonite farms are considered to run with lower costs, especially for labor.¹⁸⁹ Additionally, many of these families moved to Yates County to buy farmland from central Pennsylvania, where farmland was much more expensive.¹⁹⁰

It is striking that the only exception to the trend of declining dairy farm numbers in a major dairy state like New York comes from a county that has experienced an in-migration of farmers who operate differently (and more cheaply) than conventional dairy production, which perhaps allowed them to survive and grow in the face of economic trends that have proved devastating for dairy farms in the rest of the state.



Recently, the widely publicized growth in sales of Greek-style yogurt has been heralded as the savior of the dairy sector in New York.¹⁹¹ In 2012, the New York dairy processing industry invested in new manufacturing plants to capitalize on the rising consumer demand for Greek-style yogurt that was hoped to increase demand for milk and shore up dairy farms.¹⁹² But Greek yogurt is unlikely to escape the consolidation that has swept the rest of the dairy sector. One of the biggest Greek yogurt manufacturers buys its milk only from DFA, DMS and Dairylea (DFA's partner in DMS), which prevent independent farmers and cooperatives from capitalizing on the Greek yogurt boom.¹⁹³

Corporate Capture of Maryland's Eastern Shore

The broiler chicken industry is the most vertically integrated segment of agriculture.¹⁹⁴ Virtually all of the chicken sold in grocery stores (98.9 percent) is raised by farmers who produce broilers under a contract with poultry companies.¹⁹⁵ The companies own the birds, supply the feed and micromanage the farms' operations; the farmers merely provide the service of raising the chickens. These poultry production contracts are among the most draconian contracts used in the U.S. economy. The companies cancel contracts without warning, force farmers to make expensive upgrades to facilities and retaliate against farmers who raise objection to unfair treatment.¹⁹⁶ Although poultry processors view growers as "independent contractors,"¹⁹⁷ Auburn University professor Robert Taylor accurately notes that the relationship "can best be described as feudal."¹⁹⁸

Chickens were not always raised this way. Prior to World War II, most chicken flocks were small and produced eggs for the local market. Chicken meat was a byproduct of egg production.¹⁹⁹ Chicken meat was considered a luxury because broiler chickens were not raised on a large scale.²⁰⁰ Starting in the 1920s and 1930s, the contract poultry industry evolved on the eastern shore of the Chesapeake Bay, the peninsula encompassing the state of Delaware and the Eastern Shore of Maryland and Virginia. By the 1960s, almost all broilers nationwide were raised by contract poultry growers, and a small number of poultry processing companies came to dominate the Eastern Shore.

The industrialized poultry industry eventually transformed Maryland's Eastern Shore from a diverse agricultural region that primarily grew vegetables and fruits to sell to Philadelphia, Baltimore and Washington, D.C., into a region that raised more than 300 million chickens that produce over half a million pounds of chicken manure per square mile every year.²⁰¹

The Rise of the Vertically Integrated Poultry Industry

The contract poultry production system was invented on the Delmarva Peninsula. Mrs. Cecile Steele of Delaware first profitably raised and sold chickens solely for meat in 1923; other farmers swiftly followed suit.²⁰² By the 1930s, broilers became a separate segment of the poultry industry, and farmers began to produce broilers year-round instead of seasonally.²⁰³ The Delmarva region produced two-thirds of U.S. broilers by 1935.²⁰⁴

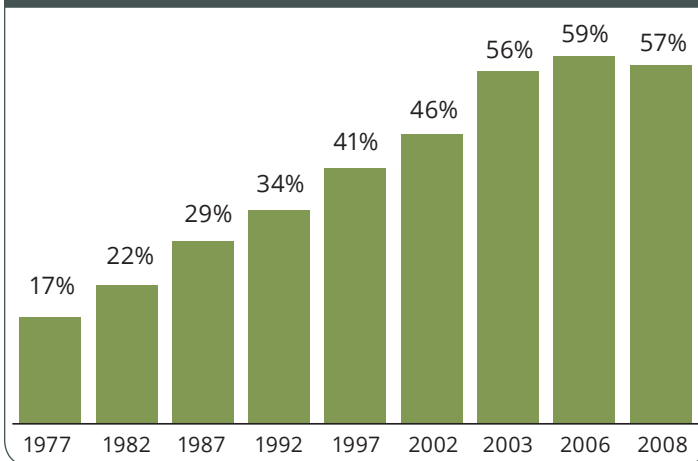


Food demand during World War II, both for troops and civilians, helped to industrialize the broiler industry. The military gave the armed forces first crack at purchasing all Eastern Shore broiler production, isolating the region from the domestic market and accelerating investments in the broiler production and processing industry.²⁰⁵ Wartime beef rationing also encouraged more chicken consumption, which nearly tripled Delmarva broiler production between 1940 and 1945.²⁰⁶

The three elements of vertically integrated poultry processing companies — chick hatcheries, feed mills and processing plants — emerged as wartime demand ramped up. By 1943, there were 171 hatcheries that produced about 15 million eggs for broiler farms in Delaware and Maryland.²⁰⁷ About a dozen poultry feed mills were established on the Delmarva Peninsula during the war as farmers who were focused on broiler production shifted from raising their own feed to buying pre-packaged feed.²⁰⁸ Some Delmarva vegetable canneries were converted to poultry processing plants as about 10 new plants were established between 1930 and the end of the war.²⁰⁹

These new companies made production contracts commonplace within a decade of the war's end. Prior to 1950, most broilers were raised on small farms close to cities where broilers were sold on open markets, such as live auctions (like other livestock) and terminal markets (like fruits and vegetables).²¹⁰ But by 1955, 85 percent of broiler production was carried out under contracts between feed companies and growers.²¹¹ Eventually, the feed companies, hatcheries and processing plants combined to form integrated companies that controlled the entire broiler production process. Today, the integrators own the birds and the feed, as well as control the breeding stock and chicks, the delivery of feed, the timing of the delivery of chicks and when the flocks are picked up to be processed.²¹²

Figure 25. Market Share of Four Largest Poultry Companies



SOURCE: Hendrickson Heffernan 2007; MacDonald & McBride 2009; USDA GIPSA

The integrators exert tremendous leverage over farmers through take-it-or-leave-it contracts that farmers have to accept in order to get new flocks of chicks. This power is magnified when there are few poultry integrators. Initially, there were numerous integrators in competition, providing options for growers.²¹³ Over the past 30 years, the market share of the top four poultry integrators has doubled. In 1987, the four largest firms slaughtered less than a third (29 percent) of broilers, but by 2006 the big four slaughtered three out of five (59 percent).²¹⁴ (See Figure 25.) In Delmarva, the number of integrators fell from 16 in 1969 to 5 in 1998, which left growers on the Eastern Shore with few options and limited their ability to switch to another company.²¹⁵ In 2012 there were only four integrators on the Delmarva Peninsula: Allen Harim Foods, LLC, Amick Farms, Inc., Mountaire Farms, Inc. and Perdue Farms, Inc.²¹⁶

The few integrators that do operate in the same region rarely compete for growers. Because growers have so few alternatives, they generally are tied to a single integrator as long as they raise chickens.²¹⁷ At the May 2010 Department of Justice/USDA poultry competition workshop in Normal, Alabama, one poultry grower noted, “In our area we have more than one company, but it seems to be a written rule that if you grow for one company, you really don’t have the opportunity to even cross those lines to go to another company.”²¹⁸

Unfair and abusive contracts

The terms of production contracts can be severe. Many of the contracts effectively shift the cost and risk from the integrator to the poultry growers.²¹⁹ Poultry growers are responsible for constructing and upgrading the chicken houses as well as disposing of the chicken manure and dead birds. A lawyer that has represented growers noted,

“virtually every contract I’ve ever seen used by the poultry industry is inherently unfair.”²²⁰

Farmers need to make significant investments in chicken houses just to start growing broilers for the poultry companies. The specialized chicken houses cannot really be used for other purposes, and the hundreds of thousands of dollars in investments mean that new growers start the contract relationship burdened with significant debt. New broiler houses are extraordinarily expensive. On the Delmarva Peninsula, it costs about \$585,000 to construct two broiler houses (most farms need at least two houses to minimize delivery and broiler transportation costs).²²¹

Growers who rely on a steady contract relationship with a processor cannot object to shoddy treatment or unfair terms for fear of retaliation that could end their business.²²² About half (45 percent) of the contracts are for a single flock of birds — about seven weeks — and are automatically renewed as new flocks are delivered, but these flock-to-flock arrangements do not guarantee any future flock deliveries.²²³ The dependency on the integrator to deliver the next flock of birds leaves growers vulnerable to mistreatment. Some companies have manipulated the scales where birds are weighed or the weighing process that determines how growers are paid, such as leaving the broilers on hot trucks for hours where the birds lose weight before getting weighed.²²⁴

Many integrators also demand that poultry growers invest in improvements to broiler houses and other equipment in order to secure contracts.²²⁵ In 2005, half (49 percent) of poultry growers were required to make these capital upgrades.²²⁶ Nationally, growers spent \$650 million in capital upgrades between 2004 and 2006.²²⁷ Servicing hundreds of thousands — or millions — of dollars of debt keeps contract poultry growers dependent on the integrators, no matter how undesirable the terms of the relationship are.

Contract serfdom

Poultry is big business on Maryland’s Eastern Shore, but little of the earnings go to the poultry growers. According to the USDA, total poultry and egg sales on the Eastern Shore amounted to \$848 million in 2007.²²⁸ But farmers were paid about \$280 for every thousand birds on the Delmarva Peninsula, meaning that the 296 million broilers raised on Maryland’s Eastern Shore in 2007 earned farmers \$82.9 million.²²⁹

Gross earnings by poultry farmers greatly overstate their bottom line. Because contract poultry growers have such high debt loads, University of Maryland Extension estimates that growers typically owe \$70,000 annually to

service the debt on their poultry houses, leaving farmers with earnings of just over \$31,000 a year.²³⁰ Even these modest earnings estimates may be overly rosy. Nationally, poultry growers lost money 10 years of the 15 years from 1995 and 2009.²³¹ A 2001 study by the National Contract Poultry Growers Association and the USDA found that more than two-thirds (71 percent) of poultry growers without off-farm jobs lived below the poverty line.²³²

Contract Poultry Displaced Diverse, Profitable Farms on the Eastern Shore

Before the poultry companies dominated the agricultural landscape, Maryland’s Eastern Shore had a wide variety of agricultural production. Although many farms have become more specialized over the past half century, the diversity of production in the region once was rooted in fruit and vegetable production for urban markets that could potentially be replicated today and provide better earnings for farmers than being dependent on low-earning contract poultry production.

In the 1920s, the agriculture of the Eastern Shore was diverse and consisted of growing staple crops, dairy cows, livestock, orchard fruits and large amounts of vegetables and berries.²³³ In 1940, fruit and vegetable crops made up more than a quarter of farm sales (26.3 percent).²³⁴ Farmers grew a variety of produce, often called “truck crops,” including sweet potatoes, tomatoes, green peppers, snap beans, lima beans, cucumbers, watermelons, sweet corn, cabbage, strawberries and spinach.²³⁵ Orchard fruits like apples, peaches and pears were produced throughout the peninsula.²³⁶ Livestock were produced on most farms as well. (See Table 3.) About half the farms on the Eastern Shore raised hogs, dairy cows or broilers in 1940.²³⁷ By 2007, only 17.5 percent of farms raised broilers on the Eastern Shore because poultry production had become concentrated on fewer, larger farms.²³⁸

The waters surrounding the Delmarva Peninsula provided moderate temperatures, and the region’s favorable soil for early crop growth was especially suited to growing vegetables and small fruits.²³⁹ The conditions allowed truck crops to be planted several weeks earlier than farms further north or more inland, which gave farmers a jump on the market in early spring.²⁴⁰

Farmers delivered their fruit and vegetable crops to nearby urban centers including Baltimore, Washington, D.C., Philadelphia and New York.²⁴¹ A large cannery sector supplemented the demand for fresh vegetables and absorbed excess supply. Truck crops from the shore supplied

canneries in Baltimore and throughout the Delmarva Peninsula.²⁴² Decades before the Depression, Delmarva thrived as transportation linked the cash fruit and vegetable crops to cities and the cannery sector developed, fueling the growth of other local businesses and the further expansion of the local economy.²⁴³

But the rise of big poultry drove agricultural diversity off of the Eastern Shore. Production of corn and soy for poultry feed replaced the production of truck crops between the 1930s and 1950s.²⁴⁴ In 1937, the first broiler processing plant was built from a former tomato cannery, and other cannery conversions followed.²⁴⁵ By the turn of 21st century, the majority of cultivated crops on the Eastern Shore were corn and soybeans destined for poultry feed, and broilers had replaced almost all other livestock.²⁴⁶

A New Way Forward

The rising awareness and interest in local foods and a growing consumer food movement has changed the food landscape. More supermarkets feature local produce, and many consumers are seeking local foods. Farmers on the Eastern Shore could capitalize on the growing interest in local foods by re-emphasizing the fruit and vegetable sector that once provided significant earnings for the region.

A University of Maryland report on the long-term sustainability of the Delmarva poultry industry suggests that farmers that grow corn and soybeans for feed on the Eastern Shore could switch to growing higher-value vegetables, fruits and other specialty crops if the broiler industry declined.²⁴⁷ Another University of Maryland study found that fruits and vegetables could provide higher value-

Table 3. Share of Eastern Shore Farms Producing Selected Crops and Livestock 1940 AND 2007

	MARYLAND		EASTERN SHORE	
	1940	2007	1940	2007
Beef Cattle	2.9%	19.7%	2.0%	9.0%
Hogs	54.7%	3.5%	50.3%	2.0%
Dairy	65.5%	5.2%	61.0%	2.5%
Broilers	45.4%	6.3%	47.7%	17.5%
Vegetables	30.9%	7.3%	59.5%	6.4%
Corn	76.3%	21.8%	84.7%	32.0%
Wheat	40.7%	11.7%	38.4%	18.0%
Orchards	13.2%	3.7%	3.5%	2.2%

SOURCE: Food & Water Watch analysis of 1940 and 2007 Census of Agriculture data



added earnings for Maryland farmers than conventional commodity crops like corn and soy.²⁴⁸

A shift back to fruit and vegetable production on the Eastern Shore could increase farm sales significantly.²⁴⁹ In 1940, 11.5 percent of cropland in the region was planted in vegetables, but by 2007, only 3.2 percent was in vegetables, and produce sales dropped to only 2.9 percent of total farm sales in the region.

Food & Water Watch estimates that farm sales on the Eastern Shore in 2007 could have been about \$137 million higher if the region cultivated the same proportion of land in vegetables, melons and strawberries as was cultivated before the rise of the poultry integrators. This would shift about 60,000 acres from corn and soybeans to fruit and vegetables. The loss in feed crop sales would be offset and exceeded by an additional \$29 million in strawberry, \$19 million in sweet corn (fresh and processed), \$18 million in watermelon and \$15 million in tomato sales. The additional earnings from fruit and vegetable sales would exceed the \$83 million that contract poultry growers are estimated to have received in 2007.²⁵⁰

To reach this figure, Food & Water Watch applied the 1939 share of vegetable acreage to the total 2007 cropland and vegetable acreage and determined the additional acreage of vegetables, melons and berries in each county on the Eastern Shore that would be cultivated (the 1939 proportion less the amount cultivated in 2007).²⁵¹ The additional acreage was based on the current distribution of produce acreage and yield for each county; Food & Water Watch used state prices where available or the national price. Food & Water Watch assumed that the displaced acres would come from corn and soybean cultivation and deducted the lost value from those feed crops based on their county acreage distribution, yield and statewide farmgate price.

This kind of transition is not as simple as farmers waking up and switching from feed corn to sweet corn. A stronger regional food system requires the infrastructure and capacity to deliver fruit and vegetable crops to the existing consumers within a short drive of the Eastern Shore. This could involve new terminal collection points, delivery options, developing contracts between groups of farmers and the supermarkets that operate in nearby metropolitan areas (including Baltimore, Philadelphia, Trenton, Washington, D.C. and Wilmington) and reinvesting in a vegetable cannery sector.

Although these increases represent a significant change in cultivated acreage, they are unlikely to increase produce supplies enough to significantly affect prices given the increased demand for fresh and local produce. For example, the 200,000 pounds of additional strawberry production would satiate the per capita strawberry demand of an additional 27,000 people, something that the market from Philadelphia to Washington, D.C. could likely absorb.²⁵²

Conclusion

As the poultry integrators on Maryland's Eastern Shore, including Perdue, Mountaire, Allen Harim and Amick Farms, continue to dominate the debate over agricultural and environmental policy in the Delmarva region, it is critical to remember that the Eastern Shore has other options for agriculture. Chicken is not the only thing that will grow in Delmarva. Shifting some portion of this once-diverse agricultural region to a mix of fruits and vegetables destined for regional markets could increase the economic health of farmers and Delmarva communities. Policymakers who are often blinded to other options by the political pressure from the poultry integrators should investigate policy and financial measures to support this transition, as an investment in a more diverse agricultural system and healthier agricultural economy.

Monopoly Control of Organic Soy milk

The early organic pioneers could not have foreseen the day when consumers could buy organic junk food at their local supermarkets.²⁵³ In 2011, organic food sales exceeded \$31 billion and grew by nearly 10 percent over the previous year, despite the economic downturn.²⁵⁴ Farmers who produce organic crops and livestock receive higher prices, but they also face higher costs to meet the requirements of organic production that prohibit genetically engineered seeds, synthetic pesticides or fertilizers, and many other practices used in conventional production. Many organic farmers believed that the organic sector was immune to the effects of consolidation, but the movement that was once formed as an alternative to agribusiness-as-usual is now in danger of being absorbed by the system it was intended to replace.

The consolidation strategies that are commonplace in conventional agriculture are industrializing organic farming as well. Organic farms are rapidly getting significantly larger, more organic foods are produced under contract, and food companies are importing cheaper organic inputs to compete with U.S. farmers. Further, mainstream food companies are diluting the organic brand by slipping undefined “natural” substitutes for organic foods into the marketplace.

Consolidation Comes to Organic

The growth of organic has not gone unnoticed by corporate America. The *New York Times* noted that “organic food has become a wildly lucrative business for Big Food and a premium-price-means-premium-profit section of the grocery store.”²⁵⁵ In the past decade, the organic food sector has consolidated rapidly, and it now closely resembles the conventional food industry. Major food companies have snapped up organic brands and launched their own organic versions of popular foods.

By 2008, organic food processors were being absorbed into conventional food companies or competing with these companies.²⁵⁶ Between 1997 and 2007, 10 of the 30 largest food-processing companies purchased organic brands, and 15 introduced organic versions of their conventional food brands.²⁵⁷ Companies like General Mills, Kellogg’s, Cargill and Dean Foods are now selling organic products.²⁵⁸ The corporate ownership of organic brands is rarely displayed on the label, perhaps to prevent dedicated organic consumers from associating their organic food with big agribusiness.²⁵⁹

The distribution of organic foods is also highly consolidated, making it more difficult for smaller organic food proces-



sors to get their products on supermarket shelves. United Natural Foods, Inc. (UNFI) is the single largest supplier of organic foods, with revenues 21 percent higher than the number two and three organic distributors combined.²⁶⁰ In 2010, UNFI distributed 60,000 organic and “natural” products to more than 17,000 customers, including a long-term contract with Whole Foods Market.²⁶¹

Traditional supermarkets have largely eclipsed food cooperatives and specialty stores as primary outlets for organic food. In 2009, more than half of organic food (54 percent) was sold at mass-market retailers.²⁶² Many of the largest grocery retailers and distributors also offer private-label, store-brand organic processed foods.²⁶³ As the original system of locally owned cooperatives, small specialty stores and direct-to-consumer sales gives further ground to conventional food manufacturers, big retailers and large distributors, the opportunities for value extraction by big agribusiness will expand.

Scaling Up

Organic farms may be smaller than their conventional counterparts, but they are getting larger fast. Between 1997 and 2005, the size of an average organic farm in the United States increased from 268 acres to 477 acres.²⁶⁴ In 2007, most organic farms were small, less than 50 acres, but the largest 900 farms (4 percent of all organic farms) cultivated more than 60 percent of organic farmland.²⁶⁵ The average-sized organic dairy farms in Texas have more dairy cows than average-sized conventional dairies in California, home of some of the largest dairy farms in the country.²⁶⁶

Contracts are often used to secure supplies for organic crops or products that are in short supply.²⁶⁷ Large manufacturers, processors and handlers of organic crops were more likely to use contracts to secure organic supplies than smaller firms.²⁶⁸ In 2004, two-thirds (66 percent) of

organic soybeans were secured through contracts, making them among the main contracted organic crops.²⁶⁹ While contracts provide organic farmers a guaranteed market for their crops and livestock, they also can reduce options for producers. Contracts have contributed to long-term downward pressure on the prices that conventional farmers receive, which could provide a warning for organic producers over the long term.

The Corporate Push to Weaken the Organic Label

The largest food processing companies have worked to weaken the rules governing organic food. Giant traditional food manufacturers and agribusinesses with valuable organic lines (like General Mills, Campbell's Soup and Driscoll Strawberry Associates) have had company representatives on the USDA advisory board that establishes the standards for organic farming and food manufacturing, and over the past decade the number of approved non-organic substances allowed in organic food has jumped from 77 in 2002 to more than 250 in 2012.²⁷⁰ Once standards are put in place, USDA's lackluster enforcement further dilutes the organic label.²⁷¹

Another example demonstrates the wide-ranging impact that weakening organic standards can have on the entire organic agricultural sector. In 2003, a little-noticed amendment to a Congressional appropriations bill allowed feeding conventional feed to "organic" chickens.²⁷² Although the amendment was rescinded after significant public opposition,²⁷³ the elimination of the requirement that organic livestock eat only organic feed would have devastated organic grain and soybean farmers, since organic animal feed use dwarfs the demand for those crops by organic food manufacturers.

In 2008, 907,916 acres of U.S. farmland were planted in certified organic grain crops.²⁷⁴ Not all certified organic cereals and soybeans are sold for livestock feed; some goes to the food market. Nonetheless, all of the organic grain acres are part of an interdependent system in which the profits from one part (organic food crops) depend on those from the others (organic livestock feed) as farmers plan their crop mix and rotation, a critical part of organic production. Eliminating a profitable organic feed grain from a rotation that also produces organic food grains could encourage farmers to revert to conventional cultivation on all of their land, with the significant environmental impact of reverting potentially thousands of acres to agrochemical cultivation, genetically engineered crops and poor soil management practices.

The "Natural" Threat to Organic

Large food manufacturers are also trying to capitalize on consumer enthusiasm for organic without doing all the work required to live up to the organic standards. Typically, that effort involves substituting a self-defined "natural" brand for the more tightly regulated "organic" counterpart. The USDA found that the "natural" label was the second most commonly used label (after organic) on deliveries by organic food handlers.²⁷⁵ Dean Foods and its WhiteWave-brand Silk Soymilk provide an example of how costly such actions can be to the organic sector.

In the 1970s, Steve Demos incubated the idea for WhiteWave at a Buddhist retreat, driven by a vision that soy foods could contribute to solving world hunger problems.²⁷⁶ WhiteWave stumbled upon soymilk after tofu and other soy-based foods failed to galvanize Americans' taste buds.²⁷⁷ When medical research found that soybeans could reduce high cholesterol,²⁷⁸ and WhiteWave repositioned soymilk to be marketed in the refrigerated dairy case, soymilk sales took off. WhiteWave projected its sales would exceed \$140 million by 2002.²⁷⁹

Soymilk became one of the only grocery products where organic was the norm, not a niche.²⁸⁰ Organic soymilk was the third largest segment of organic food sales in 2007, behind only dairy and fresh produce.²⁸¹ Demos sold WhiteWave to Dean Foods to expand the soy "milk" market with a conventional dairy partner.²⁸² Dean finalized the \$192.8 million WhiteWave purchase in 2002.²⁸³





In 2009, Dean launched a lower-priced “natural dairy” category designed to compete with organic milk.²⁸⁴ That year it also began offering soymilk made with non-genetically engineered soybeans, and the new non-organic soymilk line “shifted a substantial portion of our raw material requirements from organic to non-GMO soybeans.”²⁸⁵ Although Dean changed its ingredient list and removed the word organic from the label, most consumers and retailers didn’t know the difference because Dean used the same blue Silk packaging and the same universal product code.²⁸⁶ Retail giant Target even mistakenly advertised Silk Soymilk as organic after the formula change.²⁸⁷

The impact of this change from organic to conventional soybeans is magnified because of Dean’s market dominance. By 2004, Silk brand constituted three-quarters (76 percent) of all soymilk sales.²⁸⁸ Dean supplemented Silk by purchasing European-based Alpro in 2009, which made Dean a global leader in soy-based beverages.²⁸⁹

Dean’s decision to reformulate Silk as “natural” had substantial ramifications for farmers and consumers. In 2008, U.S. consumers drank an estimated 67.2 million

gallons of organic soymilk, but by 2009 consumption dropped to 17.9 million gallons.²⁹⁰ This cannot be attributed entirely to the economic downturn, because overall soymilk (organic and nonorganic) sales declined by only 11.4 percent between 2008 and 2009, much smaller than the 73.4 percent decline in organic soymilk.²⁹¹ The change is most likely explained by Dean’s move to “natural.”

The economic loss to organic farmers was significant. It takes 1.5 pounds of soybeans to make one gallon of soymilk, meaning that the 49 million gallon decline in organic soymilk reduced the market for organic soybean farmers by 1.2 million bushels of food-grade soybeans the first year.²⁹² Those organic food-grade soybeans were replaced in the soymilk sector by conventionally grown soybeans. Perhaps not coincidentally, the cultivation of non-genetically engineered soybeans increased by nearly 1 million acres in 2009, a 16.9 percent increase.²⁹³

These changes make a real difference for organic farmers. Non-biotech soybeans cost about \$11 to \$12.50 per bushel in 2009 versus \$19 for organic soybeans.²⁹⁴ Assuming an average price differential of \$7.25, Dean saved — and organic farmers lost — an estimated \$8.7 million dollars that year.

There are also environmental costs to consider. Organic soybeans yield about 37 bushels per acre, according to USDA figures.²⁹⁵ The loss in food-grade organic soybean demand from 2008 to 2009 would therefore translate into a loss of 32,400 acres of organic production. Those acres could revert to non-organic soybeans. Without the need to comply with organic standards, even non-genetically engineered soybeans may rely on pesticides and herbicides. Dean tried to reassure consumers that it tests its non-genetically engineered soybeans for agrochemical residues and even suggested that the soybean pod “naturally shields” it from pesticides.²⁹⁶

Conclusion

The Silk Soymilk saga is a cautionary tale of the impact of concentrated agribusiness power on the organic sector. As John Bobbe, Executive Director for Organic Farmers Agency for Relationship Marketing, Inc., said, “Losing the organic integrity and standards shakes the very foundations of the system and has the potential for dire consequences for organic soybean producers’ profitability and long-term sustainability.”²⁹⁷ Dean has described its specialty, organic and soybean-based beverages as “a \$2 billion brand powerhouse.”²⁹⁸ In the case of soymilk, that power was used to undermine organic foods, farmers and consumers.

Consolidation and Globalization in California's Processed Fruit & Vegetable Industry

California is the largest producer of fresh and processed fruits and vegetables in the country. Almost a quarter of U.S. vegetable production takes place in California on close to 3,900 farms cultivating more than 1.1 million acres.²⁹⁹ Over 32,000 farms cultivate one-third of the citrus and three-fifths of the non-citrus fruit crop in California on 1.6 million acres.³⁰⁰ California also dominates the processed produce sector, with processing done by both the farmers that cultivate the fruits and vegetables and the state's freezing or canning manufacturing plants.³⁰¹ In 2005, California produced 63 percent of U.S. processed vegetable output.³⁰²

The economic impact of these farms and factories ripples throughout California's rural economies. Although U.S. consumers are eating more fresh produce, the total share of canned and frozen vegetables has remained steady over the past four decades (43 percent of all vegetable consumption), and processed fruit has declined from 13 percent in 1970 to 8 percent in 2008.³⁰³

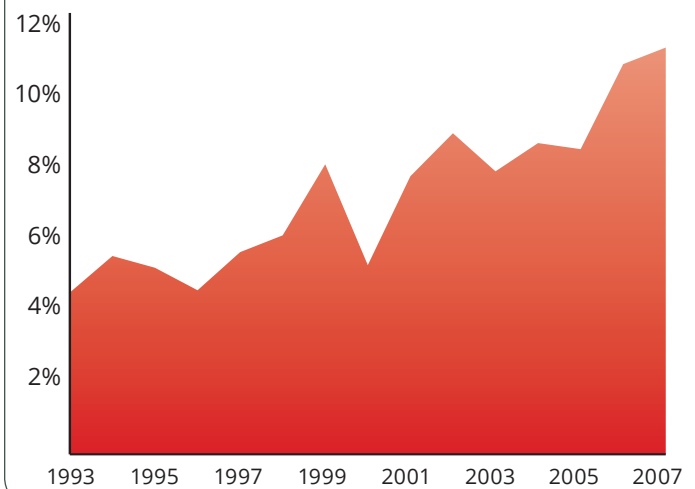


Processed Produce: For purposes of this report, processed produce includes only frozen, canned and bottled, shelf-stable manufactured fruit and vegetable products. It does not include fresh-cut produce or bagged salads.

Unfortunately, the twin trends of consolidation in packing, processing and distribution and globalization have dramatically increased the share of imported processed fruits and vegetables on grocery store shelves. The U.S. consumption of imported processed fruits and vegetables more than doubled from 4.9 percent in 1993 to 12.3 percent in 2007, according to Food & Water Watch's analysis of import and consumption trends of a dozen processed California fruits and vegetables.³⁰⁴ (See Figure 26.) If consumers continued to buy American grown and processed produce, the economic output from the sector would increase demand for farm supplies as well as provide jobs to cannery workers and to downstream distributor businesses. Rising levels of imports contribute to declines in these sectors.

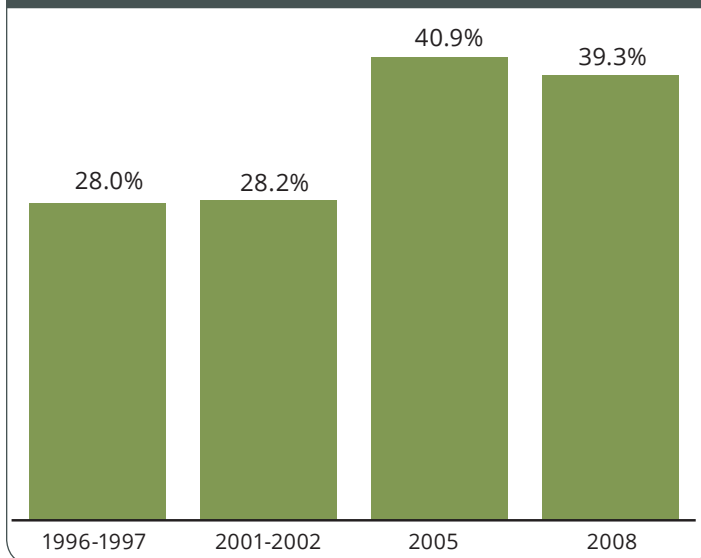
The processed fruit and vegetable sector has suffered from some of the same impacts of consolidation as other farm sectors. Processed fruits and vegetables pass through a series of chokepoints where consolidation exerts tremendous economic pressure on farmers. Farmers who grow produce for the processing market either sell directly to manufacturers or to grower-shippers that act as wholesale distributors, who in turn deliver the crop to manufacturers.

Figure 26. Import Share of Processed Fruit & Vegetable Consumption
(DOZEN CALIFORNIA CROPS)



SOURCE: Food & Water Watch analysis of USDA data. Crops include frozen asparagus, frozen broccoli, frozen carrots, frozen cauliflower, canned olives, canned peaches, canned pears, canned and frozen snap beans, frozen spinach and processed tomatoes.

Figure 27. Percent of Fresh & Processed Vegetables Delivered Under Contract



SOURCE: USDA

The players in both of these sectors have gotten larger, merged or formed partnerships to increase their buyer power over farmers and to be large enough to sell to an increasingly consolidated processing and retail grocery industry. This consolidation means that farmers face fewer buyers and that there is significant vertical integration and coordination between manufacturers, grower-shippers and farmers. A significant portion of fresh fruits and vegetables and virtually all processed vegetables nationwide are grown under contract.³⁰⁵ (See Figure 27.)

Globalization and international trade deals have facilitated many of these trends. Large fruit and vegetable manufacturers can relocate food processing plants to countries with lower labor, environmental compliance and agricultural costs and then ship the canned and frozen foods back to the United States. Imports of processed fruits and vegetables have surged since the United States inked a series of regional and international trade pacts in the mid-1990s, including the North American Free Trade Agreement (NAFTA) and joining the World Trade Organization (WTO).

Between 1992 and 2007, as imports rose, one out of eight (12.7 percent) of the large freezing and canning plants in California closed.³⁰⁶ Fewer plants meant fewer workers but also fewer outlets for California farmers to sell their crops. The global leverage exerted by processors and shippers has helped to drive down the prices farmers receive for their crops. Nonetheless, consumers continue to pay more despite the lower input costs for processors. The consumer price index for canned and frozen fruits and vegetables rose by about 30 percent between 1998 and 2007.³⁰⁷

California's economy is complex, and the effects of agricultural concentration can be difficult to disentangle from the state's broader economic activity. Even California's agricultural Central Valley abuts high-growth, high-technology regions like the Silicon Valley. It is difficult to measure the impact of the changes in the corporate control of the fruit and vegetable sector in isolation. The globalization and consolidation that have transformed the canned and frozen vegetable manufacturing industry do not reflect a decline in consumption of processed produce; these foods are just increasingly grown and manufactured somewhere else.

The Role of Retailers

Retailers play a considerable role in the consolidation and globalization of the entire fruit and vegetable industry. The grocery industry has become increasingly concentrated over the past few decades. (See Introduction, page 4).

Larger retailers can exert considerable power over suppliers and extract price concessions from food processors.³⁰⁸

A 2000 survey found that 40 percent of frozen fruit and vegetable suppliers reported a declining number of retail buyers.³⁰⁹ Large retailers can represent between 10 and 30 percent of a supplier's sales, which gives the retailer significant bargaining power.³¹⁰ Walmart alone buys more than a third (34 percent) of the sales from Del Monte,³¹¹ a quarter (25 percent) of the sales from Pinnacle (owner of Bird's Eye Frozen Vegetables)³¹² and 17 percent of the sales from Campbell's Soup Company.³¹³

The small number of retailers can leverage their buyer power over the many produce growers who are price-takers because they have little bargaining power to market highly perishable produce before it spoils.³¹⁴

Even processors of fruits and vegetables are vulnerable to retailer pressure. In the late 1990s, Walmart asked Vlastic to sell gallon pickle jars for \$2.97 at every one of its stores.³¹⁵ This price provided only 1¢ of profit on each sale, but sales were so strong that consumers stopped buying the company's other-sized jars. Profits for Vlastic dropped 25 percent.³¹⁶

Many suppliers in the fruit and vegetable supply chain have consolidated in order to be on a stronger footing in negotiations with retailers. The downward price pressures from retailer consolidation encouraged frozen fruit and vegetable manufacturers to merge with competitors.³¹⁷ Although some large suppliers merge to strengthen their position with large retail buyers, smaller food processors and manufacturers may fold if they cannot get fair prices from the major buyers.³¹⁸

Consolidation in Produce Supply and Vertical Integration

Fruits and vegetables are typically delivered to retailers or processing plants by a wholesaler known as a shipper. These firms usually grow large acreages of crops themselves and have affiliations with other growers to arrange harvesting, prepare crops for shipping and market the crops to buyers year-round.

Shippers have gotten larger, especially through marketing alliances, in order to sell into a more consolidated retail marketplace³¹⁹ and meet the volume and service requirements of the national retail chains.³²⁰ In 1999, there were only 54 bagged salad shippers, but the top two bagged salad companies accounted for three-quarters (76 percent) of grocery sales.³²¹

Shippers also negotiate and arrange fruit and vegetable contracts with farmers. Contracting has been used to secure supplies of processing vegetables since the 1950s.³²² Both grower-shippers and processors can contract for fruits and vegetables destined for canneries and freezing plants.³²³ The processing industry is extremely vertically integrated, with virtually all processed vegetables raised under contracts.³²⁴

Some contracts can be quite explicit and constrain farmers' options. The majority of processing contracts set the inputs farmers can use and set payment schemes that award bonuses and impose penalties based on quality.³²⁵ Tomato processing contracts prescribe acreage, tomato varieties and premiums or discounts to secure supplies that are timed to ensure a steady stream of deliveries throughout the 20-week harvest season.³²⁶

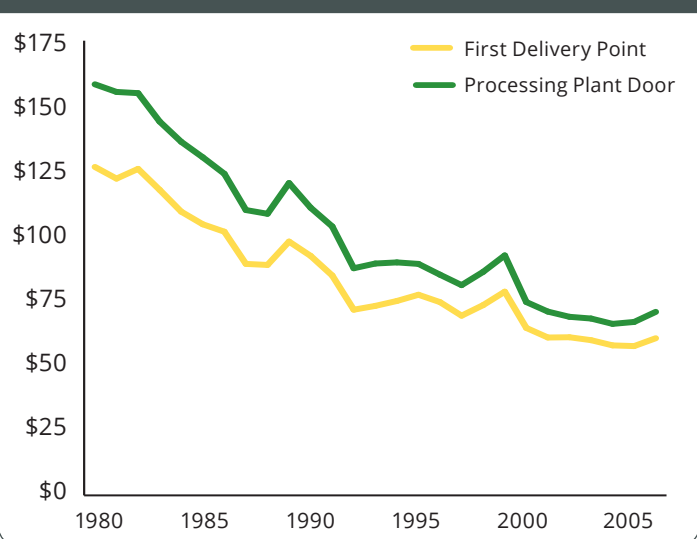
Shipper consolidation, vertical integration and import competition can contribute to long-term price declines. The prices that farmers received from shippers for processing tomatoes were 25 percent lower between 2001 and 2006 than they were between 1990 and 1994, according to USDA California field office figures.³²⁷ (See Figure 28.) The prices that tomato processing plants paid to shippers or farmers under contract directly with the manufacturers fell by 29 percent over the same period.

Bargaining cooperatives that negotiate contracts between farmers and shippers or manufacturers are common in the California processed produce sector.³²⁸ The California Canning Peach Association negotiates a single contract for all processing peaches.³²⁹ This can help farmers balance the power of consolidated shipping and processing, but some co-ops have gone under over the past decade, including Tri Valley Growers, a co-op founded in 1932 and once the largest fruit processor in California, which declared bankruptcy in 2000.³³⁰

Consolidation in the Processing Sector

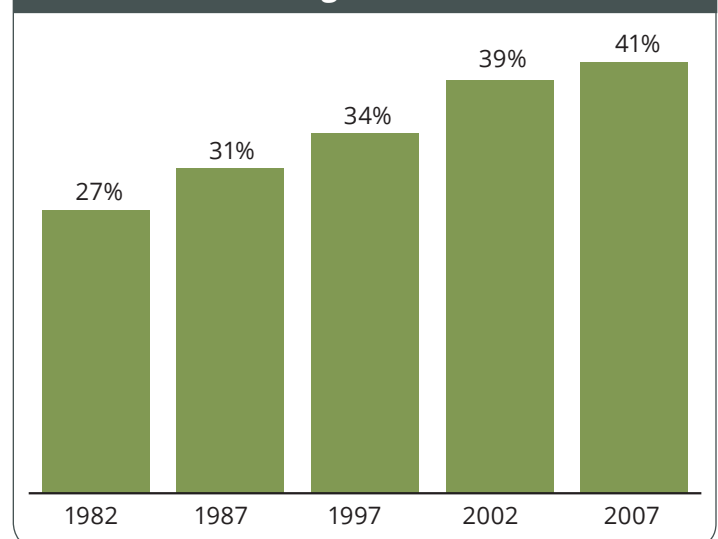
The number of independent and regional fruit and vegetable freezing and canning firms has declined over the past decades as mergers and industry restructuring has reduced the number of major, brand-name companies. The USDA noted that financial stresses from low prices during the 1990s caused several vegetable processing firms to close and others to consolidate.³³¹ According to the industry analyst firm IBISWorld, the processed fruit and vegetable industry has experienced “a large degree of industry-wide consolidation and merger activity,” with even major compa-

Figure 28. Real Processing-Tomato Prices
(2010 DOLLARS PER TON)



SOURCE: USDA NASS California Field Office

Figure 29. Market Share of Top Four Frozen Fruit & Vegetable Manufacturers



SOURCE: U.S. Census Bureau

nies seeking partners to increase efficiency in the early 2000s.³³² In some cases, processors own farmland and grow the fruits and vegetables they process.³³³

In 1982, the top four frozen fruit and vegetable manufacturers sold one-quarter (27 percent) of all frozen produce, but by 2007 the concentration in the industry increased by half and the top four firms sold two out of every five packages of frozen produce (41 percent).³³⁴ (See Figure 29.) Concentration in the canning industry has remained steady, with the largest four firms selling one-quarter (24 percent) of canned fruits and vegetables. The stability in the canning concentration levels may be due to the rise of private-label (generic and grocery store-branded) canned foods, which compete directly with national brands for market share.³³⁵

Concentration levels are much higher for specific categories of processed fruit and vegetables. For instance, the top four mixed-vegetable canneries had 59.7 percent of market; and the top four firms sold half (53.6 percent) of the frozen mixed vegetables in 2010.³³⁶ (See Table 4.)

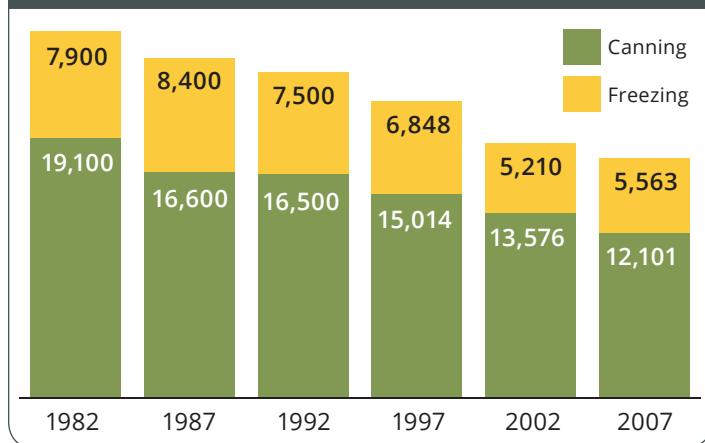
The increasingly concentrated processing sector can significantly disadvantage growers.³³⁷ For example, the biggest five firms in the U.S. processed-tomato industry controlled between 75 and 80 percent of the market as of 2009.³³⁸ Processing tomatoes are shipped less than 150 miles, and typically there are few processors within that radius for farmers to sell their tomatoes to and sometimes there is only a single plant, which gives processors considerable leverage over farmers.³³⁹

The long-term consolidation and globalization trends have shuttered processing plants across California. Del Monte closed half of its California food processing plants over the past decade, dropping from six in 1998 to only three in 2010.³⁴⁰ Dole Foods, which had 23 food processing plants

located in California in 1994, had only nine remaining by 2010.³⁴¹ Some firms consolidated their operations into bigger plants and many opened plants overseas. Heinz had an equal number of U.S. and overseas plants in 1994 (44), but by 2012, there were just 19 Heinz plants in North America and 51 overseas.³⁴²

The number of plants rose slightly before the trade deals of the mid-1990s, but between 1992 and 1997, the number of large freezing and canning plants (with 20 or more workers) dropped by 12.7 percent in California.³⁴³ The number of production workers at these plants dropped by more than 6,300 (26.4 percent) between 1992 and 2007, and the total real earnings by workers at these plants fell by \$231 million, in inflation-adjusted 2010 dollars.³⁴⁴ (See Figures 30 and 31.)

Figure 30. Workers at California Processed Fruit & Vegetable Plants



SOURCE: U.S. Census Bureau
(only includes plants with 20 or more workers)

Figure 31. Total Real Wages of Fruit & Vegetable Manufacturing Workers (IN MILLIONS OF 2010 DOLLARS)



SOURCE: U.S. Census Bureau
(only includes plants with 20 or more workers)

Table 4. Top Four Firm 2010 Market Share: Processed Vegetables

PRODUCT	MARKET SHARE
Frozen Mixed Vegetables	53.6%
Canned Mixed Vegetables	59.0%
Canned/Bottled Green Beans	51.2%
Canned Beans	46.1%
Pickles	60.2%
Condensed Wet Soup	83.4%
Ready-to-Serve Soup	89.7%

SOURCE: Grocery Headquarters, 2010

Globalization and Free Trade Pacts Facilitate Consolidation

The processed fruit and vegetable industry is highly globalized, and international trade makes up a growing share of the sector.³⁴⁵ International companies, based primarily in the United States, operate facilities worldwide, source and manufacture frozen and canned goods worldwide, and ship the processed food back to the United States where it competes directly with U.S. farmers and workers.

This trend has been going on for decades, but it was accelerated and cemented when the United States pursued a series of regional and international trade pacts, including NAFTA and the WTO. The Mexican frozen vegetable industry was established largely by American food manufacturers including Heinz, Del Monte, Campbell's and others before these trade agreements were signed.³⁴⁶ By the late 1980s, the biggest American food manufacturers had a tighter grip on the Mexican vegetable processing industry than on the American market.³⁴⁷

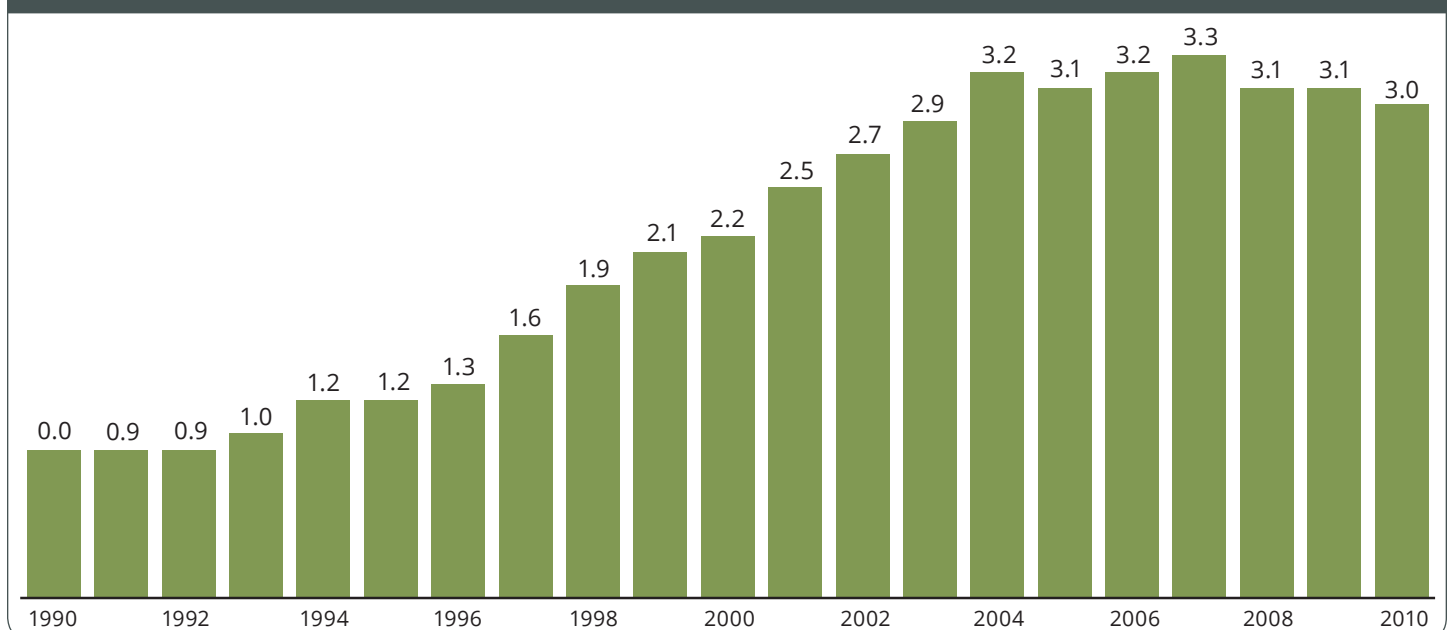
Trade agreements that facilitated lower U.S. tariffs, combined with loosened investment rules for U.S. companies operating in other countries, encouraged U.S. food processing companies to invest in factories overseas and shutter plants in the United States. These foreign investments expanded significantly after these trade deals went into effect. Between 1993 and 1999, U.S. private investment in Mexico's food processing industry doubled from

\$2.3 billion to \$5.3 billion.³⁴⁸ Between 1999 and 2006, U.S. companies and individuals quadrupled this investment again by pouring another \$13 billion into Mexico's food industry.³⁴⁹ For example, Del Monte Foods Company, which owns the Del Monte processed produce brand and the Contadina processed-tomato brand, operates a food processing plant in Venezuela and two processing plants in Mexico, as well as a fruit-packing operation in Mexico.³⁵⁰

Companies can source and manufacture processed fruits and vegetables in developing countries where prices and costs are lower, and then sell the food in higher-cost markets in the industrialized world.³⁵¹ Foreign plants operate under generally weaker environmental and workplace safety regulations in the developing world, which reduces production costs for American-owned factories. Lower labor costs in developing countries have been a key factor in U.S. food processing companies' foreign investments and plant relocations.³⁵²

Once NAFTA, the WTO and other trade deals went into effect, U.S. imports of processed fruits and vegetables surged. In the early 1990s, the United States annually imported around 1 billion pounds of processed produce that competed with U.S. farmers and workers (including canned and frozen temperate fruits and vegetables).³⁵³ (See Figure 32.) But these imports tripled to 3 billion pounds in recent years and peaked at 3.3 billion in 2007, before the economic downturn and the declining value of the dollar reduced imports.

Figure 32. U.S. Imports of Selected Processed Produce (IN BILLIONS OF POUNDS)



SOURCE: USDA Global Agricultural Trade System. Includes processed apricots, asparagus, green beans, cherries, cucumbers (pickles), olives, peaches, pears, peas, potatoes, strawberries, sweet corn, tomatoes (paste, sauce and whole), and canned and frozen mixed vegetables

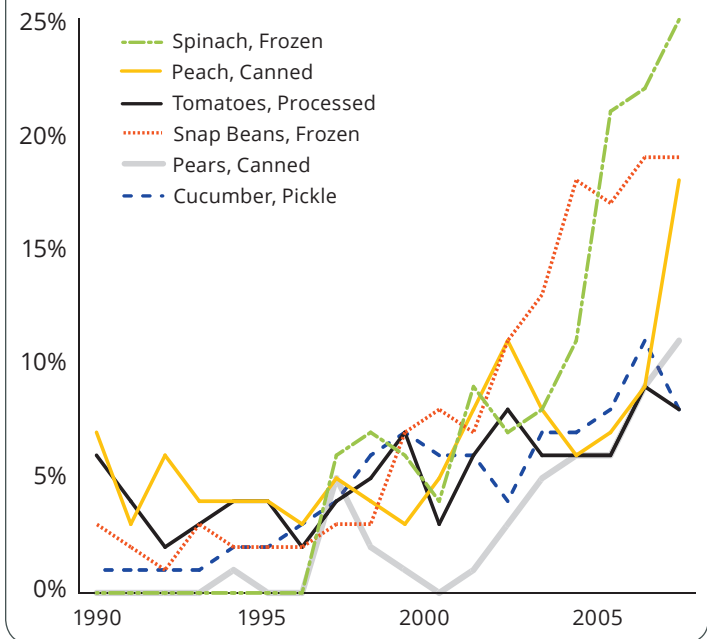
These imports competed head-to-head with products from the United States. The share of imported processed fruits and vegetables that U.S. consumers eat has risen sharply for many crops raised in California. In 1993, all of the frozen spinach and canned pears eaten by U.S. consumers was grown and manufactured in the United States; by 2007, a quarter of frozen spinach (25.5 percent) and a tenth of canned pears (10.8 percent) was imported.³⁵⁴ (See Figure 33.) The share of imported canned peaches and pickles increased fivefold and the share of imported processed tomatoes tripled.³⁵⁵

Rising imports have contributed to declines in processed fruit and vegetable acreage and the shuttering of manufacturing plants in California. Increasing processed vegetable imports had the largest impact on independent California processors, reducing their profits and ultimately the size of their workforce.³⁵⁶ During the 1990s, when NAFTA was debated, passed and went into effect, four frozen vegetable plants in Watsonville, California, were shuttered.³⁵⁷ Green Giant began to shift its production from California to Mexico in 1990, eventually closing a Watsonville, California frozen food factory in 1993 as NAFTA was being debated in Congress.³⁵⁸ Green Giant's Mexican workers earned about \$4.30 each day compared to the \$7.60 an hour that workers earned in the Watsonville plant.³⁵⁹ By 1996, the unemployment rate in Watsonville reached 20 percent, which undermined the town's small businesses and economic stability.³⁶⁰

Rising imports also harm the farmers that supply the manufacturing plants. Farmers raising dual-use vegetables like broccoli and cauliflower that can be sold fresh or processed can be harmed when processing plants disappear because the processing market had previously provided an alternative when the price for fresh products fell.³⁶¹ Although cauliflower and broccoli freezing plants were among the earliest U.S. processor investments in Mexico, imports continued to grow after the trade deals of the mid-1990s, pushing more farmers out of production. Cauliflower production in California dropped by a quarter, from 266 farms growing 46,000 acres in 1992 to 194 farms and 32,000 acres in 2007.³⁶²

The California processed-tomato industry leads the nation and the world. Almost all (95 percent) of U.S. processing tomatoes were grown in California in 2010.³⁶³ The consumer demand for canned processed tomatoes has continued to grow even as the demand for canned vegetables declines.³⁶⁴ California processed-tomato cultivation has grown to meet this rising demand, but imports have grown as well.

Figure 33. Import Share of U.S. Consumption, Selected Processed Fruits & Vegetables



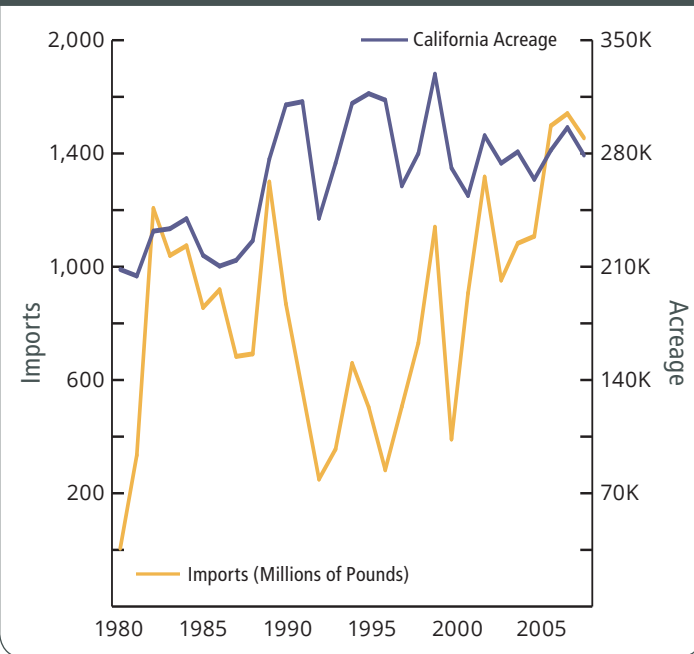
SOURCE: USDA



Between 1980 and the mid-1990s, California processed-tomato acres increased nearly 50 percent, from 208,000 acres to over 310,000 acres.³⁶⁵ (See Figure 34.) But imports tripled from 555.7 million pounds in 1993, before NAFTA and the WTO went into effect, to 1.7 billion pounds in

2008.³⁶⁶ California acreage slowly declined as imports rose, averaging about 275,000 acres since 2000.³⁶⁷ California lost 18 percent of the farms that grew processed tomatoes between 2002 and 2007, and those remaining farms got almost 25 percent larger, increasing from an average of 488 acres in 2002 to over 600 acres in 2007.³⁶⁸

Figure 34. Processed-Tomato Imports and California Acreage



SOURCE: California Department of Agriculture; USDA FAS

Canned peaches continue to make up about a fifth of U.S. canned fruit consumption,³⁶⁹ but imports are displacing U.S. production. Canned peach imports nearly quadrupled from 48.3 million pounds in 1993 to 185.5 million pounds in 2007. Over the same period, California clingstone peach acres fell from 70,672 acres to 59,822 acres, and the number of peach farms dropped by a third.³⁷⁰

Conclusion

Fruits and vegetables are not immune to the consolidation pressure that plagues other sectors of agriculture. In California, this consolidation was apparent as the number of shippers and processors went down but, in many cases, their size went up. On top of this traditional pattern of consolidation, the produce industry is also subject to growing pressure from the import of products from places where the U.S. companies that once operated plants in California can now operate more cheaply. This combination has proved devastating for farmers, workers and rural economies in the state's produce region.



Methodology and Data

This report combines statewide and county-level data from the five-year U.S. Department of Agriculture's Census of Agriculture, the five-year U.S. Census Bureau's Economic Census, and the U.S. Commerce Department's Bureau of Economic Analysis Local Area Personal Income and Employment dataset for the years 1982, 1987, 1992, 1997, 2002 and 2007. All real dollar values were adjusted to 2010 dollars using the U.S. Bureau of Labor Statistics (BLS) consumer price index inflation calculator. These data were supplemented with other longitudinal data (described below) for farmgate prices, number of businesses and retail sales, international trade flows and consumer prices.

Census of Agriculture: The number of farms, average size of farms (hogs per farm, dairy cows per farm or acres per farm), farm sales and distribution of farms was all taken from five-year USDA Census of Agriculture data for the state and county. The poultry section compares the distribution of production from the 1940 Census of Agriculture to the 2007 Census of Agriculture, but in all other cases the data are between 1982 and 2007. In later years, as the number of farms declined, the USDA does not always disclose the size of operations but always discloses the number of farms in each county. In some cases, we used a statewide residual average (by subtracting the disclosed farm attributes from the state total and dividing the remainder by the number of farms with undisclosed data to get a state average for the non-disclosed farms) to estimate the number of hogs sold or acres of cultivated crop by county.

Counties With Largest Hog Sales/Counties With Largest Hog Farms in Iowa: The top half of the counties for hogs sold or the top half of counties with the most average hog sales per farm was calculated for each of the years 1982, 1987, 1992, 1997, 2002 and 2007. Each year was calculated separately for each measurement.

Manufacturing Jobs, Plants and Wages: The U.S. Census Bureau collects data on the number of establishments, production workers and wages by industrial classification. For the hog processing sector, we used both slaughter and meat processing (meatpacking plants Standard Industrial Classification 2011, for 1982 through 1992, and North American Industrial Classification System 311611, for 1997 through 2007) and meat processing plants (SIC 2013 and NAICS 311612). For processed fruit and vegetable manufacturing, we used frozen fruit and vegetable manufacturing plants (Standard Industrial Classification 2037, for 1982 through 1992, and North American Industrial Classification System 311411, for 1997 through 2007) and fruit and vegetable canning processing plants (SIC 2033 and NAICS 311421).

Real Median Household Income: Data are from the U.S. Census Bureau for nominal median household income for 1979, 1989, 1993, 1997, 2002 and 2007. Data for nominal median household income for 1982, 1987 and 1992 were interpolated linearly from 1979, 1989 and 1993 data. Real dollar adjustments were made with the BLS consumer price index dollar deflator. The statewide county real median income is an average of the county median incomes and the counties identified as those with the largest hog sales or largest hog farms.

Real Total Personal Income, Real Per Capita Income, Total Wage and Salary Jobs and Farm Jobs: County-level data were downloaded from the U.S. Bureau of Economic Analysis Local Area Personal Income and Employment dataset. Nominal data for total personal income and per capita personal income by county were from the CA1-3 personal income summary table, and real dollar adjustments were made with the BLS consumer price index dollar deflator. Wage and salary jobs came from the CA04 personal income and employment summary. Farm jobs data came from the CA25/CA25N full-time and part-time employment by industry.

Real Average Household Income: Real average household income was calculated by multiplying the real per capita income (above) by the average number of people per household. The number of households by county came from the U.S. Census Bureau's decennial census and was interpolated to the 1982, 1987, 1992, 1997, 2002 and 2007 years. The number of people per household was determined by dividing the number of households into the total county population from the annual U.S. Census Bureau population estimates.

Small Business/Retail Data: U.S. Census Bureau's County Business Patterns annual survey provided the number of non-farm establishments by county for Iowa and New York. The Iowa retail establishments and retail sales data were collected from the Iowa Department of Revenue's annual Iowa Retail Sales & Use Tax Report. Retail sales were deflated with the BLS consumer price index deflator. All data collected were for 1982, 1987, 1992, 1997, 2002 and 2007.

Measurements of Ruralness: Measuring the most rural counties in Iowa was done by population density, based on the U.S. Census Bureau's population estimates for counties for 1982, 1987, 1992, 1997, 2002 and 2007 and the area of each county from the State and County QuickFacts database. The USDA's County Typology Code 2004 provided the New York recreational counties, and the non-metropolitan area counties were collected from the U.S. Census Bureau and the U.S. Office of Management and Budget's lists of Metropolitan Statistical Areas for 1983, 1990, 1993, 1999 and 2003.

Appendix I. Agricultural Policy Analysis Center at University of Tennessee Analysis

In this appendix, we report the results of an econometric analysis of hog production in Iowa. Economic theory tells us that increasing agribusiness concentration brings with it the possibility that a small number of large processing firms can extract economic surplus from hog producers and, in turn, from rural economies in general. Our hypothesis was that this has been happening in Iowa. To test this hypothesis, we estimated the contribution made by hog production to Iowa's economy at the county level during the period 1982–2007. Our results showed that, as agribusiness concentration increased over time, the contribution of hog production to rural economies declined.

Method

Our econometric analysis used two important measures of rural economic well-being as dependent variables: real median household income (RMHHI) and total real personal income (RPINC). We further selected three independent variables that should, at least in part, explain the variation in the two dependent variables. The first of these (BA) was the percentage of people with a baccalaureate or graduate degree in each of Iowa's 99 counties. The second (Age) was the percentage of people between the ages of 25 and 64 in each county. The third (HG) was the number of hogs sold in each county. Our expectation was that BA, Age and HG would each have a positive impact on both RMHHI and RPINC. We further expected the contribution of HG to decline over time.

Hogs are by no means Iowa's only major agricultural enterprise, nor is hog production the only economic activity affected by agribusiness concentration. For example, corn and soybean production occur in each of Iowa's 99 counties. However, data for corn production, soybean production, and hog production are so highly correlated that it is difficult to separate their effects on rural economies. For this reason, and because this study was focused on the changing impact of hog production on income in Iowa's 99 counties over time, we decided to acknowledge the potential for omitted variable bias in order to look at the impact of hog production. Furthermore, measures that have a high degree of correlation with population like number of wage jobs, manufacturing jobs, retail establishments and non-farm establishments were not used because of their high degree of correlation with RPINC.

Data for each variable were collected for all 99 Iowa counties for the six agricultural census years of 1982, 1987, 1992, 1997, 2002, and 2007. We then estimated coefficients for equations of the following two types:

- (1) $RMHHI = \beta_1 + \beta_2 BA + \beta_3 Age + \beta_4 HG + \varepsilon$
and
 (2) $RPINC = \beta_1 + \beta_2 BA + \beta_3 Age + \beta_4 HG + \varepsilon$

Model parameters were estimated in two stages. In the first, ordinary least squares regressions were run on equation (1) separately for each of the six years. The independent variables were generally significant at the .05 level, and the coefficient for HG declined over time. The same was done for equation (2), and the results were consistent with those for equation (1). The coefficients for hogs sold in 1982 and 1987 did not significantly differ from each other. Likewise, the coefficients of hogs sold in 1997, 2002, and 2007 were of similar magnitude. The intervening year, 1992, appeared to be a transition year.

We therefore, in the second stage of analysis, estimated this equation:

$$(3) \quad RMHHI_{82-07} = \beta_1 + \beta_2 BA_{82-07} + \beta_3 Age_{82-07} + \beta_4 HG_{82-07} + \beta_5 HG_{92} + \beta_6 HG_{97-07} + \varepsilon$$

where $RMHHI_{82-07}$ = Real median household income in each of Iowa's 99 counties in each of the years 1982, 1987, 1992, 1997, 2002, and 2007

BA_{82-07} = Percentage of people with a baccalaureate or graduate degree in each of Iowa's 99 counties in each of the years 1982, 1987, 1992, 1997, 2002, and 2007

Age_{82-07} = Percentage of people between the ages of 25 and 64 in each of Iowa's 99 counties in each of the years 1982, 1987, 1992, 1997, 2002, and 2007

HG_{82-07} = Number of hogs sold (in 1,000 hogs) in each of Iowa's 99 counties in each of the years 1982, 1987, 1992, 1997, 2002, and 2007.

HG_{92} = Number of hogs sold (in 1,000 hogs) in each of Iowa's 99 counties in 1992. Zeros were used for the other years.

HG_{97-07} = Number of hogs sold (in 1,000 hogs) in each of Iowa's 99 counties in each of the years 1997, 2002, and 2007. Zeros were used for the other years.

ε = The error term which is assumed to be homoskedastic (normally distributed).

Similarly, equation (2) was respecified as shown in equation (4):

$$(4) \quad RPINC_{82-07} = \beta_1 + \beta_2 BA_{82-07} + \beta_3 Age_{82-07} + \beta_4 HG_{82-07} + \beta_5 HG_{92} + \beta_6 HG_{97-07} + \varepsilon$$

where $RPINC_{82-07}$ = Real total personal income (in \$1,000) in each of Iowa's 99 counties in each of the years 1982, 1987, 1992, 1997, 2002, and 2007

and all other variables are as defined for equation (3).

Ordinary least squares regressions were run for models (3) and (4). In both cases, all of the independent variables were significant at the .001 level. Tests for homoskedasticity indicated that the error terms (ϵ) were heteroskedastic in both equations. The regressions were run again, this time using an SPSS macro (Hayes and Cai 2007) that adjusted the error terms for heteroskedasticity.

Results

The results for model (3), that is, for real median household income, are shown in Table 1. Signs for education, age and hog production were all positive, as expected, and significant at the .001% level. In addition, the coefficients of the dummy variables HG_{92} and HG_{97-07} were negative and statistically significant at the .001% level. This indicates a declining contribution of hog production to real median household income for both for 1992 and 1997–2007.

Table 1.

Dependent Variable: $RMHHI_{82-07}$				
Model Fit:				
R-sq	F	df1	df2	p
.5162	65.3561	5.0000	588.0000	.0000
Observations: 594				
Heteroscedasticity-Consistent Regression Results				
	Coeff	SE(HC)	t	P> t
Constant	-19561.369	4831.1271	-4.0490	.0001
BA_{82-07}	41577.4611	4389.0169	9.4731	.0000
Age_{82-07}	118072.626	9733.4623	12.1306	.0000
HG_{82-07}	13.4596	1.4809	9.0889	.0000
HG_{92}	-7.5994	1.4715	-5.1643	.0000
HG_{97-07}	-10.2768	1.4865	-6.9136	.0000

Table 2.

Dependent Variable: $RPINC_{82-07}$				
Model Fit:				
R-sq	F	df1	df2	p
.3321	10.2541	5.0000	588.0000	.0000
Observations: 594				
Heteroscedasticity-Consistent Regression Results				
	Coeff	SE(HC)	t	P> t
Constant	-8767892.1	2081177.10	-4.2129	.0000
BA_{82-07}	13649005.8	2045226.23	6.6736	.0000
Age_{82-07}	15909541.0	4017598.74	3.9600	.0001
HG_{82-07}	1985.8849	390.5737	5.0845	.0000
HG_{92}	-1621.9619	416.1590	-3.8975	.0001
HG_{97-07}	-2578.3228	483.1143	-5.3369	.0000

The results for estimating equation (4) are shown in Table 2. The story for real total personal income is similar to that for real median household income: signs for education, age and hog production are as expected, and the contribution of hog production declines beginning in 1992. All coefficients estimated are significant at the .001% level.

Discussion

Our analysis of equations (3) and (4) is consistent with the hypothesis that the contribution of additional hogs sold to rural economies in Iowa declined as agribusiness concentration increased during the years 1982–2007.

The coefficients for the HG variables in equation (3) can be interpreted as follows: Additional hog production had a positive effect on real median household income for Iowa counties, but the magnitude of the contribution declined over time. The contribution of a given level of additional hog production in 1992 was 59 percent lower than it was in 1982–1987. The contribution of additional hog production further declined during 1997–2007 and was 76 percent lower than it was in 1982–1987.

Estimating the HG coefficients for equation (4) showed similar results for real total personal income, with one significant exception: the contribution of additional hog production in 1997–2007 was negative. The contribution of additional hog production was positive in 1982–1987 and in 1992, but the 1992 contribution was 91 percent lower than it was in 1982–1987. By 1997–2007, the contribution of additional hog production to real total personal income was negative.

Conclusion

Hog production can contribute to, or detract from, the level of overall economic activity in a rural county. In 1982 and 1987, the contribution of hog production to Iowa's rural economies was positive. But as time went on, and agribusiness concentration increased, the flow of economic benefits reversed. Growth in the hog industry became a mechanism for draining value from, and not adding to, Iowa's rural economies.

Reference

Hayes, Andrew F. and Li Cai. "Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation," *Behavioral Research Methods*, vol. 39, iss. 4. 2007 at 709 to 722.

Appendix II.

Estimating Net Gain From Shifting to Increased Fruit & Vegetable Production on Maryland's Eastern Shore

Estimated Gain From Cultivating Fruits and Vegetables on the Same Share of Farmland as Before Poultry Industry										
	Eastern Shore Total	Eastern Shore Counties								
		Caroline	Cecil	Dorchester	Kent	Queen Anne's	Somerset	Talbot	Wicomico	Worcester
Acres in Cropland 1939	600,558	73,170	68,625	68,020	70,574	90,017	34,496	68,973	62,891	63,792
Vegetable Farm Acres 1939	68,892	10,968	2,754	14,985	3,576	3,467	7,197	6,468	11,769	7,708
Share of Acres in Vegetables (1939)	11.5%	15.0%	4.0%	22.0%	5.1%	3.9%	20.9%	9.4%	18.7%	12.1%
Acres in Cropland 2007	733,567	107,137	60,147	94,901	101,394	120,336	35,392	87,107	51,748	75,405
Vegetable Farm Acres 2007	23,735	6,687	92	8,933	1,365	2,847	243	1,287	1,835	446
Share of Acres in Vegetables (2007)	3.2%	6.2%	0.2%	9.4%	1.3%	2.4%	0.7%	1.5%	3.5%	0.6%
2007 Acres at 1939 Produce Share of Cultivation	83,500	16,060	2,414	20,907	5,138	4,635	7,384	8,169	9,684	9,111
2007 Modeled Acreage Shift to Produce	59,765	9,373	2,322	11,974	3,773	1,788	7,141	6,882	7,849	8,665
2007 Model – Additional Produce Acres By Crop										
Bell Pepper Additional Acres	383	10	-	5	-	14	231	36	49	38
Cabbage Additional Acres	976	26	-	-	83	4	141	-	25	697
Cantaloupe Acres	1,433	214	14	2	23	36	584	177	340	43
Cucumber Additional Acres	5,523	1,715	531	1,400	14	11	140	705	931	77
Green Pea Additional Acres	6,669	1,973	190	1,153	378	152	-	605	111	2,106
Lima Bean Additional Acres	1,311	512	-	37	550	27	-	147	-	38
Non-Bell Pepper (Chili Pepper) Additional Acres	522	3	-	408	-	-	50	12	9	41
Potato Additional Acres	5,350	278	21	3,051	55	1	214	101	223	1,407
Pumpkin Additional Acres	1,747	64	139	15	-	74	-	707	596	154
Snap Bean Additional Acres	8,601	237	14	1,445	14	400	2,305	817	527	2,843
Spinach Additional Acres	1,536	44	-	43	1,075	-	374	-	-	-
Squash Additional Acres	882	31	-	15	298	22	23	120	296	77
Strawberry Additional Acres	5,245	429	-	190	-	-	1,699	-	2,173	754
Sweet Corn (Fresh) Additional Acres	6,269	1,524	512	1,334	425	385	288	1,316	248	237
Sweet Corn (Processed) Additional Acres	9,403	2,286	768	2,002	637	578	432	1,974	372	355
Tomato Additional Acres	2,567	89	28	7	55	69	1,915	33	178	192
Watermelon Additional Acres	5,787	345	13	1,035	28	15	280	132	3,796	143
Additional Production (CWT except where noted)										
Bell Pepper Additional Production	103,456	2,683	-	1,228	-	3,771	62,438	9,837	13,126	10,373
Cabbage Additional Production	340,604	8,989	-	-	29,095	1,404	49,301	-	8,551	243,264
Cantaloupe Additional Production	114,642	17,150	1,108	184	1,838	2,873	46,718	14,132	27,225	3,415
Cucumber Additional Production	331,360	102,897	31,837	83,996	827	638	8,409	42,284	55,860	4,610
Green Pea Additional Production (ton)	14,005	4,144	399	2,422	794	320	-	1,271	233	4,423

(Appendix II continued from page 44)

Lima Bean Additional Production (tons)	1,770	691.87	-	49	743	36	-	198	-	52
Non-Bell Pepper Additional Production 2007	88,812	483	-	69,336	-	-	8,509	2,011	1,476	6,998
Potato Additional Production	1,712,092	89,041.27	6,650.11	976,211	17,645	426	68,423	32,340	71,204	450,152
Pumpkin Additional Production	143,271	5,239	11,361	1,243	-	6,053	-	57,940	48,835	12,601
Snap Bean Additional Production	301,043	8,297.93	485	50,589	482	13,989	80,666	28,594	18,434	99,505
Spinach Additional Production	116,713	3,344.73	-	3,246	81,718	-	28,404	-	-	-
Squash Additional Production	66,127	2,342	-	1,119	22,386	1,620	1,752	8,964	22,181	5,763
Strawberry Additional Production	220,275	17,999	-	7,972	-	-	71,350	-	91,283	31,670
Sweet Corn (Fresh) Additional Production	376,124	91,449	30,724	80,061	25,475	23,112	17,267	78,960	14,877	14,200
Sweet Corn Processing Additional Production (ton)	78,986	19,204	6,452	16,813	5,350	4,853	3,626	16,582	3,124	2,982
Tomato Additional Production	295,156	10,285	3,187	792	6,341	7,878	220,273	3,809	20,500	22,091
Watermelon Additional Production	1,388,938	82,795	3,103	248,352	6,617	3,511	67,273	31,796	911,067	34,423
Additional Farm Sales (in Millions)	Eastern Shore Total	Caroline	Cecil	Dorchester	Kent	Queen Anne's	Somerset	Talbot	Wicomico	Worcester
Bell Pepper Additional Farm Sales	\$3.30	\$0.09	-	\$0.04	-	\$0.12	\$1.99	\$0.31	\$0.42	\$0.33
Cabbage Additional Farm Sales	\$5.59	\$0.15	-	-	\$0.48	\$0.02	\$0.81	-	\$0.14	\$3.99
Cantaloupe Additional Farm Sales	\$3.44	\$0.51	\$0.03	\$0.01	\$0.06	\$0.09	\$1.40	\$0.42	\$0.82	\$0.10
Cucumber Additional Farm Sales	\$16.57	\$5.14	\$1.59	\$4.20	\$0.04	\$0.03	\$0.42	\$2.11	\$2.79	\$0.23
Green Pea Additional Farm Sales	\$3.58	\$1.06	\$0.10	\$0.62	\$0.20	\$0.08	-	\$0.33	\$0.06	\$1.13
Lima Bean Additional Farm Sales	\$0.75	\$0.29	-	\$0.02	\$0.31	\$0.02	-	\$0.08	-	\$0.02
Non-Bell Pepper Additional Farm Sales	\$2.54	\$0.01	-	\$1.98	-	-	\$0.24	\$0.06	\$0.04	\$0.20
Potato Additional Farm Sales	\$17.63	\$0.92	\$0.07	\$10.05	\$0.18	\$0.00	\$0.70	\$0.33	\$0.73	\$4.64
Pumpkin Additional Farm Sales	\$4.87	\$0.18	\$0.39	\$0.04	-	\$0.21	-	\$1.97	\$1.66	\$0.43
Snap Bean Additional Farm Sales	\$15.05	\$0.41	\$0.02	\$2.53	\$0.02	\$0.70	\$4.03	\$1.43	\$0.92	\$4.98
Spinach Additional Farm Sales	\$4.07	\$0.12	-	\$0.11	\$2.85	-	\$0.99	-	-	-
Squash Additional Farm Sales	\$2.51	\$0.09	-	\$0.04	\$0.85	\$0.06	\$0.07	\$0.34	\$0.84	\$0.22
Strawberry Additional Farm Sales	\$28.64	\$2.34	-	\$1.04	-	-	\$9.28	-	\$11.87	\$4.12
Sweet Corn Model Value 2007	\$13.16	\$3.20	\$1.08	\$2.80	\$0.89	\$0.81	\$0.60	\$2.76	\$0.52	\$0.50
Sweet Corn Processing	\$5.77	\$1.40	\$0.47	\$1.23	\$0.39	\$0.35	\$0.26	\$1.21	\$0.23	\$0.22
Tomato Additional Farm Sales	\$15.05	\$0.52	\$0.16	\$0.04	\$0.32	\$0.40	\$11.23	\$0.19	\$1.05	\$1.13
Watermelon Additional Farm Sales	\$18.06	\$1.08	\$0.04	\$3.23	\$0.09	\$0.05	\$0.87	\$0.41	\$11.84	\$0.45
Total Additional Produce Sales (Millions)	\$160.58	\$17.52	\$3.96	\$27.99	\$6.69	\$2.94	\$32.91	\$11.97	\$33.93	\$22.67
Reduction in Corn Acres	31,258	4,445	1,276	5,572	2,252	927	3,673	3,550	4,406	4,686
Reduction in Soybean Acres	28,507	4,928	1,046	6,402	1,521	861	3,468	3,332	3,442	3,979
Displaced Corn/Soybean Sales (Millions)	\$23.66	\$3.33	\$1.15	\$5.21	\$1.48	\$0.74	\$3.48	\$2.30	\$2.67	\$3.28
Additional Produce Sales Net of Displaced Feed (Millions)	\$136.92	\$14.19	\$2.81	\$22.77	\$5.21	\$2.20	\$29.43	\$9.67	\$31.26	\$19.39

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