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Washington, DC 20530

The Honorable Tom Vilsack
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From: Timothy A. Wise
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Tufts University, Medford, MA 02155

August 23, 2010

In re: Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy

Dear Attorney General Holder and Secretary Vilsack:

On behalf of the Global Development and Environment Institute (GDAE) at Tufts University, please accept the following comments to the U.S. Department of Justice and U.S. Department of Agriculture on Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy (74 Fed. Reg. 165 43725-43726). We commend U.S. Departments of Justice and Agriculture for initiating this public process. We hope that these comments, based on our new working paper, "Buyer Power in U.S. Hog Markets: A Critical Review of the Literature," will prove helpful as the DOJ and USDA convene the fourth hearing in Colorado on concentration in the livestock industry.

We particularly welcome the explicit consideration of buyer power in concentrated livestock markets. As our research confirms, the issue of buyer power in hog markets has been studied less thoroughly than other livestock sectors, and the studies that exist have often been misinterpreted to suggest that buyer power does not pose significant problems for competition and the viability of independent hog producers. In these comments, we summarize the main findings of our study then include the full text of our paper.

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U.S. hog markets have undergone rapid concentration in the last twenty-five years, with the top four packers now controlling two-thirds of the market. Mergers and acquisitions have left Smithfield Foods, the industry leader with 31 percent of the market, as the only buyer in the Southeastern part of the country. While President Bush's Justice Department approved the 2007 merger that allowed such concentration, questions remain about how independent hog farmers in the region can receive a fair-market price for their animals in such concentrated buyer markets.

Buyer power can operate in many ways. With one or two buyers, farmers may have little competitive bidding for their animals. Direct packer ownership or control of hogs through production contracts may thin the spot market to the point that packers can manipulate prices to their advantage through their own sales and purchases. Packers may offer lower prices to farmers delivering smaller loads of hogs. Bank financing may become harder to secure without a contract from a packer, and contracts themselves present a variety of issues, as they can become take-it-or-leave-it propositions for farmers lacking other offers.

Despite the rapid structural changes in the U.S. hog industry, the literature on buyer power in hog markets is quite limited. In our paper, we review the available literature, which has generally been presented as demonstrating that buyer power is not yet a significant problem. We find that interpretation to be poorly justified.

The U.S. General Accounting Office (GAO) contributed to the problem with its 2009 study, "Agricultural concentration and agricultural commodity and retail food prices." Though the authors concluded from the six studies reviewed that there was little cause for concern, several of the studies presented evidence of market power on both the seller and the buyer sides of the market. While the studies were less clear on the specific causes, there seemed little basis for drawing such a firm conclusion from such a limited literature.

The GAO also excluded from its review one of the most comprehensive and recent examinations of the issue. RTI International, in an exhaustive report for the USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA), found:

- Unusually large variation in the prices paid for live hogs, often a sign of buyer power.
- Clear evidence of buyer power in hog markets, though they could not conclusively determine if that was caused by the rise in marketing contracts.
- Clear evidence that spot market prices dropped as packer-owned or contract production increased.

Of particular relevance to the DOJ/USDA public hearings, we found several consistent methodological problems with many of these studies, with GAO's interpretation of them, and with the ways in which DOJ has analyzed evidence in its anti-trust-related merger reviews:

- Researchers and regulators often discount buyer power using standards and methodologies more appropriate to seller power, when the power to set selling prices in national markets is quite different from the power to force down producer prices in buying markets.
- Researchers and regulators often dismiss findings of seller power by pointing to offsetting "efficiency gains" from concentration. Yet such apparent efficiency gains in seller markets can include reductions in the prices concentrated firms pay for animals through their exercise of buyer power.
- Researchers and regulators generally treat the live hog market as a national market, while most independent producers experience the market as local or regional. The DOJ allowed

the 2007 Smithfield-Premium Standard Farms merger even though it left farmers in Virginia, North Carolina and South Carolina with one buyer. DOJ argued that a second buyer 400 miles away would ensure competitive pricing.

- Researchers and regulators have generally ignored reports that contract production has thinned spot markets to the point that packers can influence prices through the timing of their own purchases as well as the sales of packer-owned animals. Just in the last fifteen years, the share of hogs sold on open markets has declined from 62 percent to 8 percent.
- Researchers and regulators often ignore the interactions between buyer power in increasingly concentrated retail markets and buyer power by packers. The top four food retailers went from 19 percent control of the market in 1997 to 59 percent in 2009. We see evidence that retail buyer power may compound the packer buyer power, with hog farmers losing out in an uncompetitive market environment.

The paper concludes with a set of recommendations for further research, including the refinement of methodologies for the study of buyer power and improved public access to market information. No market can function competitively without transparency, and the current levels of concentration and the prevalence of proprietary information in livestock markets threaten to undermine true price discovery.

Given the high levels of concentration and the evidence of anti-competitive practices, regulatory action is urgently needed. We conclude with a brief assessment of proposed new USDA regulations on packer buying practices, which represent a good first step toward better regulation of highly concentrated livestock markets.

Following is “Buyer Power in U.S. Hog Markets: A Critical Review of the Literature,” by Timothy A. Wise and Sarah E. Trist, *GDAE Working Paper No. 10-04*, August 2010, accessed on the web at:

<http://www.ase.tufts.edu/gdae/Pubs/wp/10-04HogBuyerPower.pdf>

Sincerely,

A handwritten signature in black ink that reads "Timothy A. Wise". The signature is written in a cursive style with a large initial 'T' and 'W'.

Timothy A. Wise

GLOBAL DEVELOPMENT AND ENVIRONMENT INSTITUTE

WORKING PAPER NO. 10-04

**Buyer Power in U.S. Hog Markets:
A Critical Review of the Literature**

Timothy A. Wise and Sarah E. Trist

August 2010

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Abstract

The U.S. Departments of Justice and Agriculture have focused attention recently on rising levels of corporate concentration in agricultural markets and the challenges that may pose to U.S. anti-trust enforcement and agricultural policies. Both agencies have raised particular concerns about dominant firms' exercise of buyer power over farmers, especially in livestock markets controlled by a shrinking number of large multinational meat packers. U.S. hog markets have undergone rapid concentration in the last 25 years, with the top four packers now controlling two-thirds of the market and Smithfield Foods, the industry leader, commanding 31 percent.

Despite the rapid structural changes in the U.S. hog industry, the literature on buyer power in hog markets is quite limited. In this paper, we review the available literature, which has been generally presented as demonstrating that buyer power is not a significant problem. We find that interpretation to be poorly justified. Researchers have found well-documented evidence of market power on both the seller and the buyer sides of the market, though the studies have been less clear on the specific causes. Mirroring prevailing practices in Justice Department merger reviews, researchers have often discounted buyer power using methodologies more appropriate to seller power, then dismissed findings of seller power by pointing to offsetting "efficiency gains" from concentration. Yet such apparent efficiency gains in seller markets can include reductions in the prices concentrated firms pay for animals through their exercise of buyer power. We also raise the question of how buyer power in concentrated retail markets may compound the exercise of buyer power by packers. The paper concludes with a set of recommendations for further research, including the refinement of methodologies for the study of buyer power, and an assessment of proposed new USDA regulations on packer buying practices.

Keywords: market concentration, livestock, hogs, anti-trust, monopsony, market power.

Buyer Power in U.S. Hog Markets: A Critical Review of the Literature

By Timothy A. Wise and Sarah E. Trist

Introduction

In 2009 the Department of Justice (DOJ) and United States Department of Agriculture (USDA) announced a series of workshops to examine the effects of concentration of agriculture on farmers, ranchers, producers, and consumers (Federal Register 2009). As USDA's Secretary of Agriculture Tom Vilsack stated at the first workshop in Ankeny, Iowa, "these are workshops that have been long overdue." (DOJ USDA 2010b)

U.S. Attorney General Eric Holder opened the workshop remarking, "We've learned the hard way that recessions and long periods of reckless deregulation can foster practices that are anticompetitive and even illegal. So we have to ask, is today's agriculture industry suffering from a lack of free and fair competition in the marketplace? That's the central question." (DOJ USDA 2010b)

The workshops are designed to address a variety of concerns along the food chain, examining issues that are especially important to livestock agriculture: the presence of buyer power (monopsony), vertical integration, forward contracting, and the ownership of livestock by packers prior to purchase (DOJ USDA 2010b). They are addressing these issues through five workshops, each with its own focus, to take place around the country. The first workshop, held in Ankeny, Iowa focused on "issues of concern to farmers," specifically, concentration in the seed market and challenges faced by hog producers. The second workshop held in Normal, Alabama on May 21 examined the poultry industry. The June 25 workshop in Madison, Wisconsin covered issues related to the dairy industry, while the workshop in Fort Collins, Colorado on August 27 will focus on livestock (hogs and cattle). The final workshop, to be held in Washington DC on December 8, will explore the changing margins in agriculture (Department of Justice 2010b).

There is a great deal of interest in these hearings. In response to the announcement of the hearings, over 15,000 comments were submitted (Department of Justice 2010b). On March 12 over 800 people assembled for the first of the five public hearings. With a focus on the seed and hog industries, farmers and state-level representatives discussed their concerns that concentration was contributing to the decline in livelihoods and communities in rural America. Some producers and seed dealers touted the benefits they felt they had gained from using biotech products, yet they reiterated the importance of having a choice in what they produced, where their inputs came from, and their options for marketing (DOJ USDA 2010b). Hog producers acknowledged some of the benefits of changes to their industry, such as marketing contracts, but still expressed

their desire to get a fair market price for their animals and maintain some independence in their work.

At the outset, the USDA and the DOJ were clear that these hearings would examine not just the effects of concentration on firms' ability to overcharge consumers but also their power to underpay producers. DOJ reviews of mergers in agriculture tend to focus on whether a merger would have a negative impact on consumers, with significantly less attention to concerns regarding buyer power – the ability of a packer to drive down the prices it pays to farmers because the farmers lack other markets for their animals.

Further attention to these issues has been generated by the June 2010 issuance by USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA) of long-awaited regulations governing unfair practices in livestock buying markets (Federal Register 2010). The proposed rules, which restrict packer use of "undue preferences" in purchasing and establish clearer guidelines for contract livestock production, have generated an outcry from packers, heated discussions in Congress, and support from many farm-advocacy groups (see, for example, Farm Organizations 2010).

Smithfield's 2007 acquisition of Premium Standard Farms is indicative of the concerns farmers express about the anti-competitive impacts of concentration. The DOJ gave its stamp of approval to allow the recognized industry giant to take over a company that was at the time the sixth largest hog packer and the second largest hog producer in the country. In its final report DOJ stated, "the merged firm is not likely to harm competition, consumers or farmers." (Department of Justice 2007) The Antitrust Division came to this conclusion despite complaints from farmers in the Eastern Seaboard that the merger would leave independent hog farmers in North Carolina, South Carolina, and Virginia with only one major buyer – Smithfield – if they could not afford to ship their hogs outside the region. To find a competitive bid for their animals, farmers would have to ship their market-weight hogs 400 miles to the nearest major packer, well beyond the 150 miles hog farmers ship on average to market (Buhr 2010). This is precisely the kind of situation that gives buyers undue leverage over sellers.

"When agribusiness purchasing power is reduced to a small number of companies, does that create such an unlevel playing field that it compels those in the middle to either get bigger or get out?" asked U.S. Secretary of Agriculture Tom Vilsack at the start of the first DOJ/USDA hearing (DOJ USDA 2010b).

The purpose of this paper is to provide a thorough review of the current literature on the hog industry to assess the evidence that concentrated ownership of production and packing has resulted in the exercise of buyer power by pork packers. Hog markets have not been studied as thoroughly as other livestock sectors. A 2009 Government Accountability Office (GAO) report on concentration in agricultural markets concluded that for hogs there was little cause for concern about anti-competitive practices (GAO 2009). As we will show, the GAO focused more on seller power than buyer power,

ignored significant evidence of both in the literature on hog markets, and overlooked key studies that suggest ample cause for concern.

The paper is divided into five parts. Section 1 provides background describing the major changes in the pork industry over the last thirty years and presents the reasons concentration is a cause for concern. Section 2 discusses issues faced by producers when packers have buyer power. Section 3 reviews the current literature on buyer power in the hog industry and discusses deficiencies in the literature and the reading of it. Section 4 considers the interaction of concentration in food retail and buyer power in the hog market, and section 5 provides policy implications and conclusions we can draw from this review. This includes an examination of the recently proposed rule from GIPSA, which has the expressed goal of addressing some of these issues.

1. Changing Structure in U.S. Hog Production

The pork industry has seen dramatic changes over the last thirty years in both packing and production. Concentration in packing has been accompanied by increased packer ownership of livestock (for more background, see Starmer and Wise 2007).

The U.S. pork packing industry has moved to rely on larger plants that take advantage of economies of scale. As larger plants have been built, companies relying on smaller plants have gone bankrupt or been acquired by larger packing companies. In 1976, only 12 plants slaughtered more than one million hogs and hogs slaughtered by those large plants accounted for 27 percent of the U.S. supply. By 1998 the larger plants slaughtering over one million hogs had increased to 30, and by 2006, nearly 95 percent of U.S. hogs were slaughtered in plants that handled over one million head annually (GIPSA 2008).

Table 1.

Top Four Hog Packers in U.S. (CR4) 2010		
Hog Packer	Daily Capacity	Market Share
Smithfield Foods	122,688	31%
Tyson Foods	72,800	17%
Swift & Co	46,000	11%
Cargill	36,000	8%
Total	277,488	67%

Source: GAO, 2009; Smithfield 2010

Commonly Used Measures of Concentration

Concentration Ratio Is commonly used by economists to describe the level of concentration in a market. The concentration ratio is the market share of the top 4, 8, or 20 firms in an industry by sales. Often used to examine the market share of the top four firms, it is commonly referred to as the CR4. The concentration ratio as a measure of concentration is comparable over time and across industries, but is not recognized on its own as evidence of an adverse impact of concentration (Greer 1980; Baumol and Blinder 2006). When reviewing potential mergers, the Federal Trade Commission (FTC) examines an industry’s current concentration ratio and predicts how this might change if the merger took place. (Federal Trade Commission 2010) Generally, when a four-firm ratio reaches 20 percent a market is considered concentrated, 40 percent highly concentrated, and when the ratio reaches 60 percent it is considered likely that firms exercise market power. Currently, the CR4 for hog packing is 66 percent (Hendrickson and Heffernan 2007).

HHI: The Herfindalh-Hirshman Index This widely accepted measure of market concentration is calculated by taking the square of each firm’s market share in a market and summing the results. It is a measure of the relative size and distribution of firms in the market. When the index approaches zero, the market is made up mostly of a larger number of firms equal in size. A perfectly monopoly (or monopsony) would have an HHI of 10,000.

Both the FTC and DOJ examine the change in an industry’s HHI at the time of a proposed merger,. They consider markets with an HHI below 1,000 to be unconcentrated, those with an HHI between 1,000 and 1,800 to be moderately concentrated, and those above 1,800 to be highly concentrated. When considering a merger in a moderately concentrated market, the DOJ guidelines require review if the post merger increase in the HHI is predicted to be 100 points or greater. When considering a merger in a highly concentrated market this review is triggered when the increase is predicted to be 50 points or higher (Department of Justice 2010a; Federal Trade Commission 2010). Taylor (2002) points out serious flaws in the methodology underlying the HHI, noting that the measure underestimates market power because it does not account for alliances, partial ownership and other means of control.

Last measured in 2006, the HHI for the hog market was about 1,200. Obtaining all the information necessary to calculate this measure is one of the greatest challenges to its use, because many of these firms are privately held and market information is not readily available (Paarlberg 2010). With Smithfield’s acquisitions in recent years pushing its market share to 31 percent, the HHI in 2010 just for the top four firms would be 1,445 (see Table 5 below).

Table 5.

Top Four Hog Packers: Market Share and HHI 2010		
Firm	Market Share (MS)	HHI (MS Squared)
Smithfield	31	961
Tyson	17	289
Swift	11	121
Cargill	8	64
HHI-Top 4 Firms	67	1435

Source: GAO, 2009; Smithfield 2010

HHI & Symmetric Firms: In 1999 Paarlburg and colleagues used the HHI to examine concentration in another way. Following Helpman and Krugman (1985), they took the inverse of the HHI to estimate how many equal-sized firms would make up such a market (Symmetric Firms = 10,000 x 1/HHI). In 1985, they calculated that the hog market behaved as if there were 22 symmetric firms. In 1997, market concentration had reduced the number of symmetric firms to ten. The authors came to the conclusion that in the hog market, any fewer than eight to ten symmetric firms would be cause for concern about anti-competitive practices

(Paarlberg, Boehlje et al. 1999). Hog packing has gotten considerably more concentrated since 1999. The HHI for the top four firms, listed above, would yield a Symmetric Firm estimate of fewer than seven.

Lerner Index: The index is the price minus the marginal cost of production over price. Under perfect competition there would be no difference between price and the marginal cost. The Lerner Index is a conventional measure of monopoly or monopsony price distortion, essentially a measure of the ability of a firm to charge selling prices beyond marginal costs. A major challenge in using this index in agriculture is discovering the actual conduct of a firm, since much of the pricing and cost data is proprietary.

For a more complete discussion of the way economists measure and consider concentration see Greer Industrial Organization and Public Policy (Greer 1980).

In 1982, the top four hog packing firms (CR4) controlled 36 percent of the market. (See text box on common measures of concentration.) By 2006, their share had risen to 62 percent. Since then, with the merger of Smithfield Foods with Premium Standard Farms in 2007, the CR4 has risen to 67 percent (see Table 1) (GAO 2009; Smithfield Foods 2010).

In addition to packing pork, the top four pork packers are also involved in other areas of agribusiness. Tyson entered pork production through the purchase of a production facility in North Carolina in 1977 and that year became the nation's top hog producer, though not the top packer. It entered poultry processing in 1986 and by 2001 it was the largest processor and marketer of chicken and red meat with its purchase of IBP, Inc. (Tyson 2009). Similarly, Swift was purchased by JBS, a Brazilian packing company in 2007. JBS also moved into poultry, purchasing a major stake in Pilgrim's Pride when it emerged from bankruptcy. The Brazilian company now dominates beef packing in South America, the United States, and Europe (Swift & Co 2005; Chasan and Burgdorfer 2009; Johnson 2009). Cargill, long known for its processing of grains, entered the pork business in 1987 with the purchase of a plant from Oscar Mayer Foods and the lease of a processing plant from Hormel. Growing over time, it acquired one of Tyson's pork packing divisions in 1995 (Cargill 2010).

Taking a closer look at the largest pork packer and producer, Smithfield Foods controls 31 percent of hog packing and 20 percent of production. (Duke University 2004; Smithfield Foods 2010). Starting in the late 1980s, the company rapidly underwent both horizontal and vertical mergers that allowed it to swallow some of the other giants it competed with, including Carroll Farms in 1990, Murphy Farms in 1994, Farmland Foods in 2003 and Premium Standard Farms in 2007 (Smithfield 2009).

While Smithfield took over other packers, it also vertically integrated. The company moved to control the entire farm-to-table supply chain, from production, packing, and processing to branding a final retail product. Additionally, they expanded their scope to develop and own the very genetics of the hogs they pack (Smithfield 2009).

Changes in the U.S. packing industry, well documented by Azzam (1998) and McDonald (2000), were accompanied by and helped drive changes in hog production. Over the last 30 years, fewer farms produced more hogs, with the number of hog farms dropping significantly from 346,090 in 1986 to 75,350 in 2002 – a decline of more than 78 percent (Mattera 2003). In 2002, nearly half the U.S. hog inventory was held by operations with more than 5,000 head (Meyer 2006). In 2007, the USDA Economic Research Service found that the largest 110 hog farms, with more than 50,000 hogs each, held over 54 percent of the entire U.S. hog inventory (Key and McBride 2007).

Farms grew in size and also moved between regions. In the 1990s, production shifted from the Midwest to the Eastern Seaboard, largely due to large facilities such as Smithfield's Tar Heel Plant in North Carolina, the largest packing house in the world, which opened in 1994 (Smithfield 2009). The mega-plant, which slaughters more than 8 million hogs annually, was part of a shift from smaller farms in the Midwest to large

contract production in this region (Duke University 2004). While feed was more expensive to ship from the Corn Belt, the warmer weather and tight supply chain created by contracts offered new efficiencies that favored production in the Eastern Seaboard. This shift halted in 1997 when North Carolina put a moratorium on the construction of new operations with over 250 hogs. Interviews with industry leaders suggested that hog production, a major source of pollution resulting from hog manure, is now moving to the arid West as a response to lax environmental regulation in that region (McBride and Key 2003; Duke University 2004). As of 2005, 62 percent of hog production occurred in Corn Belt States, 15 percent in North Carolina, and 7 percent in Western States (Key and McBride 2007).

Table 2.

Top Four Hog Producers (CR4) in U.S. 2007		
Hog Producer	Number of Sows	Market Share
Smithfield	1,200,115	19.7%
Triumph Foods	399,800	6.6%
Seaboard Corporation	213,600	3.5%
Iowa Select Farms	150,000	2.5%
Total	1,963,515	37.3%

Source: Freese & Johnson 2007; IPPA 2008

Similar to trends in the poultry industry, contract production of hogs is now occurring all over the United States. Instead of producers marketing hogs at hog buying stations or auction barns, packers may own the hogs from farrow-to-finish with producers contracted for the labor and fixed infrastructure needed for production. Alternately, producers who own their own hogs may enter into advanced marketing agreements that guarantee the sale of their hogs based on a formula for price that may include variables such as weight, quality, and the day's spot market price.

USDA reports significant improvements in productivity with the increases in scale and in the use of production contracts, though there is evidence that scale efficiencies may stop when plants reach a capacity of 2,000 head (McBride and Key 2003). Between 1992 and 2004, total factor productivity rose over six percent per year, and real production costs declined 4.7 percent per year. The same study reports a 30 percent reduction in the price of hogs at the farm gate (Key and McBride 2007).

2. Buyer Power on the Farm

Before examining the evidence that hog markets are concentrated to the point that buyers have and exercise power over farmers, it is important to understand the many ways in which buyer power can decrease competition. As a farmer at the first DOJ

hearing in Iowa told officials, it all comes down to whether an independent hog farmer can maintain some level of freedom in terms of his/her decisions about what to produce, under what conditions, whom to sell it to, and at a fair price (DOJ USDA 2010b).

Buyer power is known as monopsony or oligopsony, distinct from monopoly and oligopoly, which generally refer to the ways in which market concentration gives dominant firms the ability to manipulate the prices they charge for their products. Under monopsony conditions, market concentration has reduced the number of potential buyers of a product to the point that the seller is forced to accept the buyer's terms for the sale. In a well functioning market, price is generally determined by both supply and demand, therefore market power requires that the buyer have control of one or both of these functions (Greer 1980; Zheng and Vukina 2009). Buyer power can affect not only the price producers receive for their products but also the conditions under which they produce, the quality of the contracts they receive for production or marketing, and the distribution of risk between the buyer and the seller.

Farmers are particularly vulnerable to buyer power because many are selling perishable goods (e.g. live animals) or products that would require large storage capacity (e.g. several tons of corn). For hog farmers, this can be particularly problematic because they operate on very tight margins, rely on selling their animals at optimum weight, and need to bring in the next litter on a fixed schedule. Having just one buyer, or even just two or three, can allow the buyer to take advantage of the farmer's need to sell. Hog farmers also have limited options for shipping their animals to a distant buyer who might offer a more competitive price. Shipping live animals long distances is expensive, causes high levels of mortality, and can reduce the quantity ("shrinkage") and quality of the meat (Buhr 2010).

The most egregious form of buyer power occurs when a single buyer offers a take-it-or-leave-it price to a farmer. But buyers can exercise market power in other ways as well. Packers are known to offer lower prices to farmers who do not deliver a fully loaded trailer of hogs, a form of "undue preference" based on volume (Perry 2010).

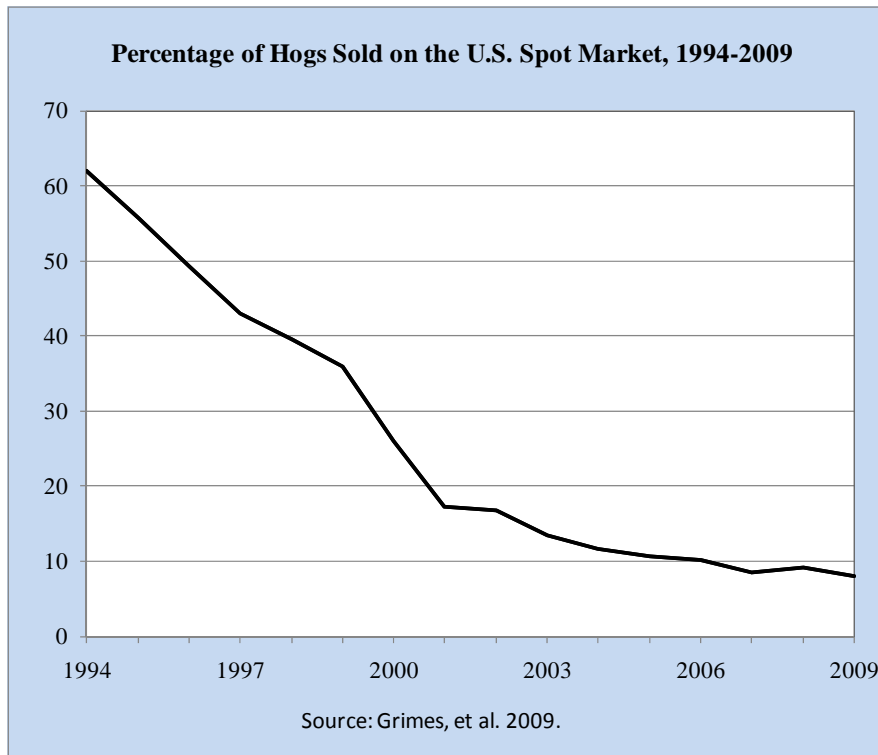
There are documented reports of packers paying lower prices even when smaller-scale farmers team up to deliver a fully loaded trailer of animals, a form of discrimination based on the buyer's preference to deal with only a few large suppliers (Federal Register 2010). Because many packers' disassembly lines are highly automated to cut perfectly uniform animals, buyers can also offer lower prices for hogs that do not meet standards of uniformity, or refuse to buy them altogether (Martinez and Zering 2004). With only one buyer, farmers can see the value of their animals driven below production costs.

Another well-documented form of buyer power derives from so-called captive supply, when a packer also owns large volumes of livestock or controls livestock through contracting. Smithfield, the largest hog producer and also the largest contractor, held 800,000 sows in 2004. In 2005, GIPSA estimated that packers owned 20-30 percent of the U.S. hog inventory (Key and McBride 2007). This can eliminate effective price discovery, as the firm's price for that livestock is internal to the firm. The packer can also

manipulate its own supply of animals to flood the market, driving down prices when it is favorable to the firm. It is common for independent hog farmers to find their few potential buyers telling them they do not need more animals when farmers need to sell. As farmer Larry Schroder testified at the DOJ/USDA hearing in March, “When they have 90 to 95 percent of their supply lined up, why would they ever bid hard for that last 5 percent? They would rather let those slots stay empty rather than increase the price on the rest of the 95 [percent].” (DOJ USDA 2010a)

Finally, there is the related problem of packer-controlled production (through direct ownership or contracts) reducing the share of animals traded on the open market, the so-called spot market that traditionally takes place at auction houses. The decline in spot market sales raises concerns about true price discovery and the potential for large buyers to manipulate markets through spot market purchases (Zheng and Vukina 2009). As Figure 1 shows, the share of hogs sold on the spot market has declined from 62% in 1994 to just 8% in 2009 (American Antitrust Institute 2008; Grimes and Plain 2009; Grimes, Plain et al. January 2004). When the spot market is thinned to this level, concerns grow about whether the prices offered represent fair market prices. In part, this is because large buyers can exert undue influence on prices with their purchases, and they have an interest in doing so because the spot price plays a significant role in determining the prices buyers pay to growers under contract. The smaller the volume of sales on the spot market, the easier it is for buyers to time their purchases to hold down prices.

Figure 1.

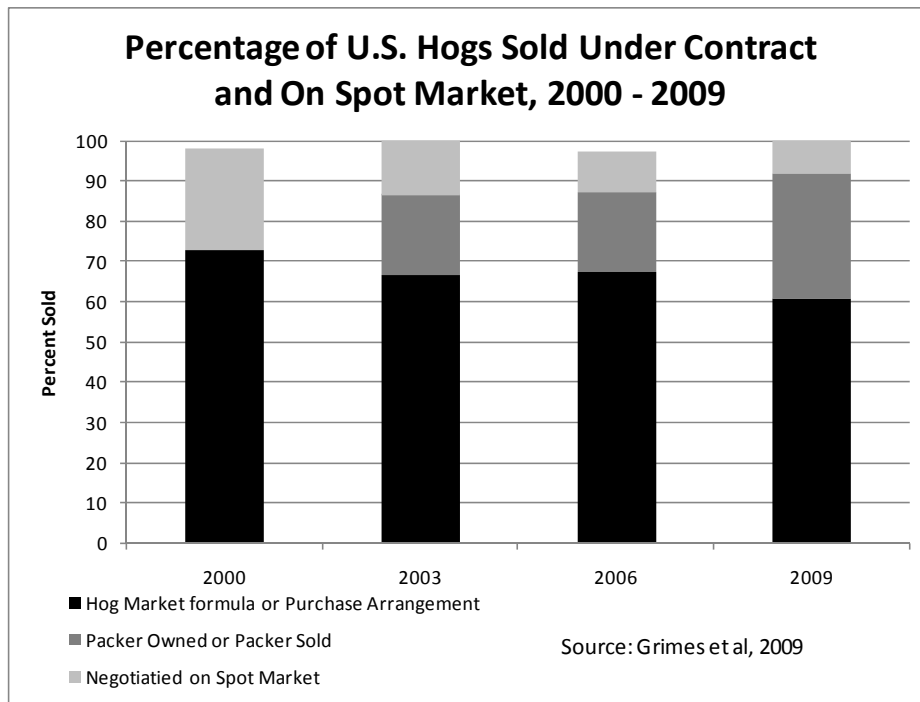


Prices are reported to the Agriculture Market Service of the USDA three times a day, with the mid-morning price reported at 9:30 am CST and again at 1:30 pm CST. The rest of the day’s sales are reported at 8 am the following day. Prices are reported by region and for the entire nation. These published prices signal to others in the market the supply and demand of hogs that day (Grimes, Plain et al. March 2004). Buyers can hold their bids until just after these times to drive down the reported market price.

As hog farmer Chuck Wirtz testified at the March DOJ/USDA hearing, “If they're going to ... buy something from you in the afternoon, they'll come at 1:31 because 1:30 is the cutoff for the afternoon report..... So when they need pigs, they know how to buy them so as not to influence the cost of all their pigs.” (DOJ USDA 2010a)

Of course, all of these market pressures on independent hog farmers have led many of them to give up their independence by entering production or marketing contracts with one of the few large packers in their area. Farmers testified that they were now finding it difficult to get bank financing unless they had a contract with a packer in hand (DOJ USDA 2010b). The rise of contract production in hogs is recent and rapid, with an estimated 90 percent of U.S hog production now under some form of contract, direct ownership, or advance marketing arrangement (See Figure 2, Grimes and Plain 2009). Contract farming raises an additional set of concerns about buyer power.

Figure 2.



Contract Hog Production

Contracts in the hog market take two forms: production contracts and advanced marketing agreements. Similar to arrangements that dominate the poultry industry, production contracts are agreements between farmers, also known as growers, and their contractors. Under these agreements contractors retain ownership of hogs. Growers build facilities, often to contractors' specifications, and receive all inputs from contractors: feeder pigs, feed, transport, veterinary services, and many supplies. Packers may provide technical advice, dictate management techniques, and monitor the compliance of the grower. In return, the grower receives a fee for service, in an economic relationship some have likened more to wage labor (Hendrickson, Heffernan et al. 2008). These contracts covered only five percent of production in 1992, but grew to include 28 percent of operations and 67 percent of hog inventory in the United States by 2004 (Key and McBride 2007).

Advanced marketing agreements (AMAs) specify terms of a future sale. The producer retains ownership of the hogs and is responsible for more management decisions, although some contracts will specify standards for management. Details of the contract will dictate the quantity of hogs delivered, their quality, the location and timing of delivery, and a formula for payment. This formula to calculate payment is often tied to the thin spot market and based on the packer's quality assessment. A farmer may hold a production contract, an advanced marketing contract, or both. In 2004, nearly 90 percent of hogs were sold and or produced through one or more forms of contract (Key and McBride 2007).

Contracts present a number of opportunities for packers to exercise buyer power. The first is the power imbalance between the contracting parties. Packers have a large number of farmers to choose from, while many farmers have just one or two packers offering them contracts. Under such conditions, farmers often have to accept the contract terms the packer is offering, particularly if the same packer is the only buyer on the local or regional spot market. As poultry farmer Mickey Block testified to the DOJ hearing in May 2010, "The lack of competition of given geographic regions has led to the integrators with all of the power, this leaves the grower with little or no choice. The grower is given a contract, it's one sided, it's a take it or leave it situation. Companies should not have that much control in a region." (DOJ USDA 2010b)

Second, contracts significantly limit transparency in the market. Strict confidentiality clauses in contracts prevent growers from sharing the terms and conditions of contracts with other producers. The packer, of course, knows the terms of all the contracts it is signing, leaving farmers at a disadvantage (McBride and Key 2003).

Third, contract enforcement is difficult. Farmers justifiably fear retaliation by packers if they bring suit for breaches of the contract, because they know they have few buyers and they can't afford to alienate one. This leaves packers with an unfair advantage in complying with the terms of contracts. In fact, there is evidence that a producer who declines a contract with one packer may have trouble finding another, as the few packers

the area may collude to blacklist the farmer (DOJ USDA 2010a).

Fourth, widespread contract production creates potential barriers to entry for new producers. As noted earlier, contracts can become a requirement for bank financing, and larger financing is needed because of packer preferences for large-scale, capital-intensive production. Generally, the terms of the contract do not guarantee income for the useful life of the equipment needed to produce hogs. Producers may gain the security of a guaranteed buyer for the animals on their farms, but that security does not extend for the life of their investments, nor their debt obligations. This leaves producers under additional pressure to accept the contract terms dictated by the packer when it comes time to renew the contract. As one poultry producer testified, “When you have that kind of debt load over you, of course, you’re going to choose to sign the contract. You feel that there’s no other option when you owe ... a half a million or a million dollars” (DOJ USDA 2010a). Producers also take on the liabilities associated with environmental compliance, which contracts generally assign to the farmer (Hendrickson, Heffernan et al. 2008).

Finally, contracts can create barriers to entry for competing packers. The ease of entry and exit into an industry is often part of the Federal Trade Commission (FTC) and DOJ analysis when reviewing potential mergers, because it is one of the signs of a well-functioning market. The higher the barriers to entry into a market, the more power those already in the business have (MacDonald 2006; Department of Justice 2010a; Federal Trade Commission 2010). Packers hoping to enter a new market need a large plant that they can run at capacity, which requires access to many more hogs than they may find on the spot market. With most local hog production tied up in multi-year contracts, new market entrants can have a more difficult time competing with those already in the market. A dominant packer can also shut out competition by buying up competitors and shuttering their operations. Some have theorized that packers may have even agreed amongst themselves to compete in different regions. Since the merger of Smithfield and PSF, Smithfield has remained the only major packer on the Eastern Seaboard despite the presence of millions of hogs in that region (Carstensen 2008b). Why is no other packer competing with Smithfield for that market?

3. Review of the Literature

In contrast to the relatively well-documented research on buyer power in beef and poultry markets, agricultural economists have built a significantly smaller literature on the hog industry. In 2009, the Government Accountability Office (GAO) published a study on concentration in agriculture markets with the stated goal of reviewing “trends in concentration, expenditures, and commodity and food prices” from evidence in peer-reviewed literature, government, and industry sources (GAO 2009). The GAO report, which included a review of just six academic publications on hog markets, has come to serve as the benchmark for DOJ’s reviews of the impacts of mergers and acquisitions on competition. While the GAO detailed the dramatic rise in market concentration and the increase in the price spread between farm gate and retail outlets, the authors focused

more on seller power and concluded that buyer power is not a concern in the hog industry:

“The empirical economic literature has not established that concentration in the processing segment of the beef, pork, or dairy sectors or the retail sector overall has adversely affected commodity or food prices. Most of the studies that we reviewed either found no evidence of market power or found efficiency effects that were larger than the market power effects of concentration. While a few studies found some evidence of market power, it is unclear whether this market power was caused by concentration or some other factor.” (GAO 2009, p. 3)

In this section, we examine the GAO’s review of the literature on market power in hogs. As we show, the GAO not only mischaracterized the few studies it included in its review, it omitted important studies using data more relevant to current levels of concentration. This closer examination of the evidence of buyer power in hog markets suggests that there is cause for concern.

Most studies rely on econometric modeling, which allows researchers to model the impact of several variables that might influence market power. Various types of models have been used to examine the presence of buyer power. Establishing a causal link between the presence of buyer power and concentration or contracts is a challenging problem for researchers given the limited and imperfect data available to them (Zheng and Vukina 2009).

The GAO study included six peer-reviewed studies published between 1990 and 2009 based on data collected between 1972 and 2007. Three of the studies focused exclusively on oligopoly power and its effects on uncompetitive pricing faced by the consumer. Overall, they found that to the extent concentration allowed packers to increase selling prices, those higher prices were more than offset by the efficiency gains from concentration. Reed and Clark of the USDA Economic Research Service examined the markets of seven different agricultural products. In their paper they make different assumptions about how markets work and with their methods find no evidence of buyer power in the hog market. They acknowledge that an increase in the price spread is in fact occurring between the farm gate and retail, however they attribute the increase to changing consumer demand, innovation, and efficiencies gained by concentration (Reed and Clark 2000). Similarly, Morrison Paul attributes the changes in market structure and pricing to cost efficiencies gained by increasingly large packing plants and tight supply chains (Morrison Paul 1999).

A third study reviewed by the GAO, based on a non-random group of North Carolina producers under contract to one packer, found no statistically significant buyer power in the market (Inoue and Vukina 2006). The authors caution readers that the sample they analyzed was not random and cannot be generalized to the hog market in North Carolina or the nation as a whole. It is unclear why the GAO included the study as

support for its conclusion that there was no buyer power in hog markets.

This is particularly striking because the three remaining studies reviewed by the GAO found evidence of buyer power. Zheng and Vukina (2009) use an econometric model for the national market using mandatory price reporting data from 2001 through 2007. They were looking specifically for evidence that buyer power resulted from the increased utilization of advanced marketing agreements (AMAs). They report clear evidence of buyer power, but their analysis failed to prove that this was caused by AMAs. This was apparently the reason the GAO dismissed the findings as irrelevant to concentration, but the authors could hardly have been clearer in their conclusion. They state that there was “a statistically significant presence of market power in the procurement of live hogs on the spot market. However, the source of that market power cannot be narrowed down to the industry’s advanced marketing agreement (AMA) but is likely to be related to classical oligopsony (concentration) issues.” They further state, “The problem seems to be coming from the ever-increasing industry concentration and not from the increasing use of AMAs” (Zheng and Vukina 2009, p. 262).

In another study reviewed by the GAO, Schroeter and Azzam (1990) examine the market in a way that takes into account the relationship between different meat markets. A packer with enough power in either market, or some in both, may have incentive to manipulate either market to clear both products at a favorable price. Schroeter and Azzam examine the beef and pork industries, creating a model that tests the possibility that a packer may exert buyer power in both the inputs of their industry (live animals) and the market power in selling the outputs (meat). Using data collected between 1976 and 1986, they find that “the evidence suggests that 55 percent and 47 percent of the farm-to-retail price margins for beef and pork, respectively, can be attributed to market power in the meat industry.” (Schroeter and Azzam 1990, p. 1373) Interestingly, the authors note the importance of looking at packer concentration in regional, not national markets. (More on that later.)

The GAO reviewed a second paper by Schroeter and Azzam that did just that, with interesting but less definitive findings. Using weekly data from 1972-1998 from the National Provisioners’ reported price quotes, the authors assume that producers sell hogs in regional markets rather than one national market. They find statistically significant evidence of buyer power in the early period of the study, showing that “oligopsony distortions are significantly positive at the 5 percent level in seventeen of the sample’s eighteen initial quarters.” (Schroeter and Azzam 1991, p. 996) But they find the effect diminished as the period went on, and they offer a caution about their methodology related to their assumptions about packer behavior when prices are low.

From the GAO’s small sample of papers, it is difficult to support the conclusion that buyer power is not a concern in hog markets. Additional studies omitted from the GAO’s review suggest ample cause for concern.

Beyond the Literature Reviewed by the GAO

As noted earlier, the literature on market power in the hog industry is limited, which we confirmed with our own literature review.¹ Azzam, Pagoulatos, and Schroeter (1988) offer some historical perspective, finding non-competitive prices for live hogs from 1972 through mid-1979 followed by a return to competitive pricing in 1986. Sperling (2002), in a study of live hog prices in Iowa and southern Minnesota from 1988 through 2000, found no statistically significant evidence that processing firms engaged in anticompetitive behavior.

Most important, though, the GAO omitted from its review the most comprehensive research report, and one of only four that relies on data after 2000. Ironically, the report was commissioned by the government's own Grain Inspection, Packers and Stockyards Administration (GIPSA) in 2003. GIPSA contracted North Carolina-based RTI International to conduct a multi-million dollar study on the marketing practices of the livestock industry, including all the steps along the food system. Researchers examined the practices of farmers, ranchers, retailers, and exporters. Published in 2007, the RTI study presents compelling evidence of buyer power in hog markets (RTI International 2007a).

With a volume of the study devoted entirely to the hog industry, researchers collected confidential data directly from packers. This data, not available to the public due to confidentiality agreements, was published in the report only in summary form. RTI complimented this with Mandatory Price Reporting data to examine the spot market from October 2002 through March 2005. One of their goals was to determine if the spread of AMAs had thinned the spot market to the point that packers could manipulate prices.

RTI found clear evidence of market power but was unable statistically to determine if the cause was the increase in AMAs. But RTI's findings are directly relevant to the question of market concentration and buyer power in hog markets. RTI found that prices packers paid for hogs, based on live weight, varied by as much as 40 percent, a large variation that remained even when researchers controlled for transportation, quality, and regional differences (RTI International 2007b). Variability of this magnitude is often a sign that a market is not functioning competitively, suggesting that buyers and sellers are not both working with adequate information to allow supply and demand to settle around one price. This situation may be the result of buyer power.

More troubling, they found clear evidence that packer control of live animals, either through contracts or direct ownership, depressed spot market prices. They state,

¹ This review of the literature was completed in March 2010 using Econolite, LexisNexis, and Tufts University Library's MultiDatabase Search. Search terms included "hog production," "pork production," "Smithfield," "marketing hogs," "marketing pork," and "monopsony livestock". Only articles specific to the U.S. hog market analyzing data after 1985 were reviewed. Commonly cited articles found in the literature resulting from this search were also reviewed.

“An increase in either contract or packer-owned hog sales decreases the spot price for hogs.” (RTI International 2007b, p. ES-3). For every one percent increase in contract hog quantities used by packers, the spot price paid to producers dropped by 0.88 percent. Every one percent increase in the proportion of packer-owned hogs in a given plant reduced the price paid to producers on the spot market by 0.28 percent. Given the tight margins producers manage today, these are significant price impacts that can mean the difference between profitability and insolvency. RTI further showed that packers that used a combination of contracts, other marketing arrangements, and spot markets paid lower prices to farmers than packers that relied exclusively on the spot market (RTI International 2007b). This certainly raises questions about whether contracts and marketing arrangements facilitate buyer power.

Certainly any review of the evidence on buyer power in hog markets needs to go beyond the GAO study, and it should begin with a close examination of RTI’s findings. New research is needed that focuses on hog farmers’ economic gains and losses within this rapidly integrating industry. A good model is Domina and Taylor’s (2009) recent study of Alabama contract poultry farmers. Using detailed farm-level data, they found that poultry farmers saw net negative returns to labor (assuming a \$7 hourly cost of labor) in ten of the fifteen years from 1995-2009, with losses totaling \$182,000. They attribute a significant portion of these losses to integrator demands for capital improvements and producers’ declining bargaining power as they sought to pay off large loans for such investments. They note that these findings are in line with the USDA’s own surveys, which show producers suffering real losses of 1.2 percent per year during the same period (Domina and Taylor 2009).

Other Important Issues for Consideration

As the studies reviewed above indicate, two methodological considerations are important in determining whether economists find evidence of buyer power. One derives from the confusion between buyer and seller power and the tendency by DOJ and many agricultural economists to focus more on packers’ ability to collude on selling prices. As we have shown, many of those studies find evidence of market power but they dismiss its impacts because they often find that the efficiency gains from concentration outweigh the losses from the exercise of seller power. The net impact on consumer prices may indeed be favorable in the short run, but this in no way disproves the existence of seller power. In fact, many economists assume some level of oligopoly price-setting power in concentrated markets.

More important, though, such studies say nothing about packers’ ability to offer unfair prices to farmers. Most obviously, a packer could lack the market power as a seller to manipulate prices but could still have the buyer power to drive down producer prices. Smithfield, for example, might not be able to raise the prices it charges Walmart for its pork, but it may still wield the power to squeeze the prices it pays for North Carolina hogs.

Perhaps more to the methodological point, the very “efficiency gains” that offset packers’ market power as sellers can derive from those same packers’ power as buyers to depress the prices they pay for animals. In such cases, studies that justify further concentration through mergers on the basis of net efficiency gains may well be indicators that uncompetitive practices exist in the prices paid to producers. As Taylor pointed out in an exploration of so-called “all-or-nothing supply markets”:

A monopsonist’s exploitation of the competitive industry’s all-or-nothing supply is shown to lead to a competitive allocation of resources; however, the monopsonist expropriates producers’ surplus in the competitive supply industry. To the extent that the competitive market allocation of resources and income is used as a standard for social welfare, as in some antitrust law, the exploitation of the all-or-nothing supply by the monopsonist results in an efficient allocation of resources, but the allocation of income is unfair (Taylor 2003, p. 2).

Market efficiency should not be reduced to a question of the lowest possible price.² Gains related to scale, technology or management practices are true efficiencies, but lower producer prices due to the lack of competition can appear as efficiencies as well. An uncompetitive market is not an efficient market (Taylor 2007).

This distinction between seller and buyer power has led some to argue that different standards and measures are needed for each. Simply put, if only one measure of power is examined, conclusions will not necessarily be valid for other parts of the production chain (Carstensen 2008a; Domina and Taylor 2009). There is certainly no reason to assume that market power for buyers and sellers will mirror one another (Carstensen 2008a).

Unfortunately, while buyer power and monopoly work differently, the tools used to measure them are the same. Domina and Taylor point out that the GAO report lists a CR4 of 57 percent in broiler production and an HHI of 1,200, suggesting high levels of concentration but perhaps not enough to allow seller power in wholesale markets. These same standards “are absolutely inappropriate for analyzing buyer power of the poultry companies (known as integrators). The integrators have nearly absolute control of their respective growers” (Domina and Taylor 2009, p. 6). They argue that the thresholds for anticompetitive concentration should be lower in buyer markets, suggesting that the HHI threshold for concern of 1,600 is too high and that the elasticity in the Lerner Index is inappropriate for agriculture (Domina and Taylor 2009).

This relates directly to the second important methodological consideration, the assumption that the hog market is one national market rather than many regional markets. Undoubtedly, the seller market for pork is a national (or international) market in which prices are set beyond the region in which production takes place. But there is ample

² It is beyond the scope of this paper to examine the ways in which strict definitions of efficiency may obscure attention to important market failures related to energy use, environmental sustainability, etc.

reason to question whether packers' buying markets are national in scope. The "nearly absolute control" of integrators over producers that Domina and Taylor referred to above derives from the limited number of buyers available to local producers for the sale of perishable goods.

Still, there is research backing the claim of one national market for hogs. GIPSA conducted a study in 1996 on concentration in the red-meat packing industry. The study, made up of several 'projects' or research questions, looked at hog procurement in the Eastern Corn Belt. Using confidential, plant-level data collected by the agency along with public information collected by the Agricultural Marketing Service, researchers found little price variation between regions, accounting for transportation costs. They found evidence, in fact, that packers absorbed some of producers' transportation costs. They concluded that their findings "were consistent with the existence of a single national market for pricing of slaughter hogs" (GIPSA 1996).

Heyer and Hill (2008) studied mergers approved by the DOJ in 2007 and 2008, including the DOJ-approved Smithfield-PSF merger. They conclude that the merger did not, in fact, leave North Carolina producers with one buyer, because independent hog sellers had access to a national market. Area hog producers had pointed out that the next closest potential buyer was some 400 miles away. Transporting live hogs is expensive, with a load of 200 hogs averaging \$1.50/head per 100 miles shipped. Long shipments of live animals can also compromise the quality of the product (Stender 2010).

A great deal rests on the assumption of a national hog market. And it changes how the indices and other measures common to the study of concentration and competitiveness look (Greer 1980). Schroeter and Azzam (1990), in the study reviewed by GAO, raised the issue of regional markets. Earlier, Ward had shown that of the ten leading hog slaughtering states, nine of them had a state-level CR4 of over 72 percent and seven had a CR4 of 98 percent or higher (Ward 1988). Given the dramatic concentration that has occurred in hog packing since 1985, regional concentration calculations would be even higher today. For example, in 1985 the HHI for the national market was around 1200, but it would be over 8000 if one looked at the Eastern Seaboard Region as its own market. Which presents a more accurate picture of the concentration among buyers that farmers face in the marketplace? (See Taylor 2007 for a discussion of HHI and captive supply.)

A related methodological issue is whether it still makes sense to define distinct markets for each type of meat, since vertical integration is the new standard and most large packers are involved in the slaughter of a variety of 'proteins' that can substitute for one another (Schroeter and Azzam 1990; Azzam 1998). This is certainly true in pork: the top four pork packers also currently pack poultry and beef products (Hendrickson and Heffernan 2007).

These methodological issues need further study.

4. Clean-up on Aisle Three: Retail Compounds Buyer Power

The last USDA/DOJ hearing this year will look at the impact of concentration on the consumer. A workshop dedicated to margins will likely include the role of food retail, another area in the food chain where it is suspected that concentration has led to an uncompetitive market situation. Like pork production and packing, food retail has undergone concentration in the last 20 years with multinational retailers taking increasing large shares of not just the U.S. but international retail markets. Between 1982 and 2005 the share of sales by the four largest grocery retailers doubled. (Hendrickson and Heffernan 2007; GAO 2009; Martinez and Kaufman 2008) The CR4 was a moderate 19 percent in 1997 rising steadily to 30 percent in 2002. By 2009 it had reached 51 percent. (See Table 3) (GAO 2009; Supermarket News 2010)

Table 3.

Concentration Ratios, U.S. Food Retailers, 1982-2009		
Year	CR4	CR20
1982	16%	35%
1987	17%	37%
1992	17%	39%
1997	19%	46%
2002	30%	56%
2005	36%	62%
2009	51%	82%

Source: GAO, 2009; Supermarket News, 2009

Rising concentration in retail is cause for particular concern when it comes to packer buyer power. Increasingly large food retailers prefer to deal with few large suppliers, an advantage for large packers such as Smithfield. Large retailers and wholesalers drive a hard bargain with packers, which yield to this pressure in order to gain large orders from these major firms, especially if they are trying to market a branded product that requires high visibility in national retail outlets. In response to this price squeeze from retailers, packers with monopsony buying power can pass the tighter margin on to producers. Farmers ultimately bear the brunt of this compounded buyer power in the retail and wholesale sectors.

Empirically, there is evidence that rising grocery concentration was accompanied by an increase in the gap between farm gate and consumer prices. In 2004 Marsh and Brester examined wholesale and farm gate livestock prices for beef and pork and found that the difference between the price paid farmers and the prices faced by consumers increased by 149 percent between 1970 and 1998. Less of the food dollar spent at the grocery store on pork made it back to the producer while more of it was captured by the

retailers and wholesalers. Marsh’s model did not allow him to explain the cause of these changes in margins, yet he offers two potential explanations. The first is that intense concentration in retail allows for collusion between firms. An alternative hypothesis is that concentration allows for intense negotiation with suppliers, and with it efficiency of scale (Marsh and Brester 1999; Marsh and Brester 2004). Either of these mechanisms allows the retailers and wholesalers to control a share of demand that gives them buyer power over producers.

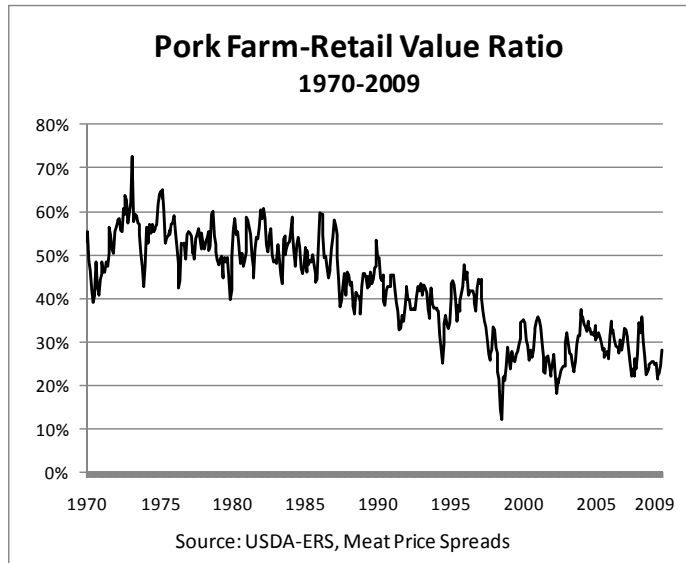
Table 4.

Sales of the Top Four Grocery Retailers in U.S. 2005	
Grocery Retailer	USD (Billions)
Walmart	\$98.70
Kroger	\$58.50
Albertsons, Inc	\$36.30
Safeway, Inc	\$32.70

Source: Martinez & Kaufman, 2008

The Economic Research Service of the USDA has also been tracking the share of the retail dollar farmers take home. They too report that the price spread between farm gate and retail is growing. The farm share of retail pork sales was above 50 percent through the mid-1980s, but declined significantly since then. It now ranges between 20 and 40 percent depending on the year (USDA-ERS 2010, see Figure 3).

Figure 3.



5. Conclusions

This examination of the issues related to concentration in the hog packing sector and evidence of resulting buyer power suggests that the topic requires additional research, with a review of the methodologies used to determine the presence of buyer power. The literature is scarce and some of it has been misinterpreted, by government researchers among others. Other literature, such as the important study by RTI, has been ignored. Some of the literature shows clear indications of buyer power in hog packing. While further study is needed to determine the extent of the problem and the ways in which rising levels of concentration in hog packing are impacting producers, the available evidence – and the advanced levels of concentration – call for swift regulatory action to restore competitive conditions.

Research should be farm-centered and should rely on detailed economic data, as Domina and Taylor did for poultry contracting. In the DOJ-USDA hearings, farmers have repeatedly voiced concerns about the lack of transparency in the marketplace and about unequal access to market information. Asymmetric information is a market failure that harms producers and creates market inefficiencies (Marsh and Brester 1999). The same issues plague the production of reliable research on this issue. Greater transparency is needed from packers, many of which are privately held companies and so disclose little information.

Researchers and regulators must also address the methodological issues that contribute to the misinterpretation of results on buyer power. These include:

- Whether hog buying markets are national or regional markets, where there may be a national sellers' market but regional buyers' markets.
- The standards used to determine evidence of buyer vs. seller power, with the strong suggestion that tighter standards (e.g. HHI) should apply in buyer markets.
- The ways in which apparent efficiency gains in seller markets, generally interpreted by DOJ as offsetting market power, may in fact derive from buyer power in these same concentrated markets. In other words, to what extent are lower consumer prices the product of buyer power forcing down producer prices?
- The compounding of buyer power by an increasingly concentrated retail sector, such that retailers use their buyer power to squeeze suppliers' margins and those suppliers use their own buyer power to lower prices paid to producers.
- The interactions among different meat markets, and the implications of those interactions for the analysis of buyer power by packers of various types of meat.
- The ways in which buyer power and the thinning of spot markets allows packers to influence prices through the timing of their own purchases as well as the sales of packer-owned animals.

As for the policy implications of this review, there is a need to review both the DOJ approach to anti-trust enforcement in agricultural markets and USDA policies in livestock sectors. In that regard, the 2010 DOJ/USDA public hearings are timely and

important, and the voluminous testimony and comments gathered in the process should guide these departments in evaluating their policies and practices. Given how advanced the concentration of these markets has become during a period of lax anti-trust enforcement, it is important for DOJ to follow through on its promise to review past decisions, including the 2007 Smithfield-Premium Standard Farms merger. Stricter enforcement now would be welcome but it may do little to restore competitive balance to an industry already so concentrated.

The USDA's recently proposed GIPSA rule on "undue preferences" could address some of these issues. Mandated by the 2008 Farm Bill, the proposed rule addresses many predatory and anticompetitive practices in livestock and poultry markets. It is not within the purview of this paper to provide a comprehensive analysis of the proposed rule's impacts on uncompetitive practices in hog markets, but it is worth noting that the proposed rule could help address:

- contracts that do not cover required investments;
- fairer contract arbitration;
- the lack of contract transparency, by requiring the posting of sample contracts;
- rights of producers to file suit against packers who engage in unfair practices without an undue burden of proof previously required by courts;
- protection from packer retaliation;
- price discrimination against group deliveries of animals;
- the impact of packer-to-packer sales on market prices;
- conflicts of interest when agents represent more than one packer.

According to some advocates, the rule does not go far enough. First, the proposed rule does nothing to address marketing agreements, forward contracts, or formula pricing, all of which are prevalent in hog markets. Second, it does not adequately address the anti-competitive impacts of packer ownership of livestock.

The renewed attention to these issues, from USDA and DOJ, is welcome and very much needed. Hopefully, the hearings and the proposed GIPSA rule generate a close examination of the existing evidence of buyer power and the methodologies used to evaluate it, and prompt action to restore competitive balance to livestock markets.

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