

Concentration and Consolidation in the U.S. Food Supply Chain: The Latest Evidence and Implications for Consumers, Farmers, and Policymakers

By Tina L. Saitone and Richard J. Sexton

Today's global food system faces the challenge of feeding a population of 7.4 billion that is expected to grow to 11.2 billion by 2100 while supplying an important and perhaps increasing proportion of our fuel needs. Further, modern agriculture is being asked to provide an increasingly complex suite of differentiated products that address issues rarely considered not long ago, such as the nature of inputs into the production process (for example, whether to use genetic engineering), the location of production, the environmental implications of production, the treatment of livestock used in production, and the "fairness" of marketing arrangements to farmers and farm workers.

Despite the seeming potential for today's multicharacteristic agriculture to create profitable niches for small-scale food marketers, food manufacturers in many industries are highly concentrated. This is especially true for farm-product procurement, joined more recently by significant consolidation among grocers and high concentration in local retail markets. These structural conditions are concerning because of their possible implications for market power abuses, the viability of small farms, and overall system performance.

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In addition, the food system has seen increasing vertical coordination across the stages of the supply chain. Such coordination is tied inexorably to the capital intensity of agriculture, processors' needs to secure stable supplies of farm inputs *ex ante*, and the market's demands for increasingly complex, multidimensional products that require close coordination across stages in the supply chain. Contract production dominates modern agriculture in key sectors such as fruit, vegetable, nut, and livestock production. These developments, too, have been a concern for some farm groups and policymakers due to farmers being locked in to particular buyers and to the implications of contract agriculture for small farmers and the vitality of rural America.

In this paper, we assess the current structure of the U.S. food and agriculture supply chain, focusing on concentration at the food manufacturing and retailing levels and coordination across vertical stages. We evaluate the performance of the food-marketing sector in meeting the challenges facing it and consider the implications of various policy proposals that have been put forth to guide the industry's evolution. Our focus throughout is on sectors downstream from the farm, namely food processing, distribution, and retailing. Although our analysis has implications for the structure of farming itself, we do not directly address structural changes at the farm level. Finally, we do not address the input-providing sectors upstream from the farm, even though the power of these firms, most notably in the seed sector, has been a point of contention. The issues here are highly complex, including intellectual property rights, and worthy of a separate treatment.

I. Some Historical Perspective

Textbook characterizations of agricultural industries as competitive based on large numbers of farmers and consumers ignore conditions in the food marketing sector, which determines on average 80 percent or more of product value. Issues pertaining to concentration and competition have long been important dimensions of agricultural markets, as have policymakers' concerns about powerful market intermediaries exploiting farmers and consumers. A key early example is a 1919 U.S. Federal Trade Commission (FTC) study of the red-meat packing industry and its so-called "big five" processing firms. The report accused the industry of manipulating markets, restricting throughput, harming

producers and consumers, and eliminating competition. It provided a direct impetus for the Packers and Stockyards Act of 1921.

Research on concentration and market power in agriculture, however, began in earnest with Clodius and Mueller's influential article applying the structure-conduct-performance (SCP) framework to food industries. Clodius and Mueller identified the key strategic structural characteristics of markets as (i) the number and size distribution of buyers and sellers, (ii) the extent of product differentiation, and (iii) the conditions of entry. They then presumed structure to determine market conduct, defined to include price and output decisions, the determination of product characteristics, policies on product promotion, and nature of interactions with rival firms or entrants. Conduct, in turn, was presumed to determine market performance, including the price-average cost margin, production efficiency, relative promotion expenditures, the design/quality of products, and industry innovation.

The causal linkage from structure to conduct to performance was theorized to hold broadly across industries. In contrast to the early research that focused predominantly on the influence of buyer power on farmers, researchers using the SCP framework were more interested in seller power and its influence on consumers. The pinnacle of these analyses was the publication of books by Connor and others and by Marion. Both books advocated extensive government regulation and oversight of the food industry. Connor and others concluded that food manufacturers' oligopoly power caused consumers to pay from six to 10 percent more for food due in roughly equal parts to overcharges, excessive selling costs, and excessive factor payments.¹

The next wave of research on competition in agricultural markets focused on estimating structural models of single industries hypothesized to be characterized by market power—a stark contrast to the cross-industry approach used by practitioners of the SCP paradigm. These so-called “new empirical industrial organization” studies sought to estimate the key parameters characterizing an industry's behavior, including its extent of buyer and seller market power. In marked contrast with the SCP paradigm, these studies generally found quantitatively small departures from competition in both procurement and selling in agricultural markets and concluded that the efficiency advantages of consolidation outweighed any negative implications due to the exercise of modest market power (Azzam and Schroeter; Morrison-Paul).

Sheldon and Sperling, Suzuki and Kaiser, and the U.S. Government Accountability Office (GAO) echo this conclusion. In the words of the GAO:

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.

These conclusions should not, however, be accepted uncritically. The econometric methodologies underlying many of the single-industry studies have received significant criticism (Corts; Perloff, Karp, and Golan). The “industries” analyzed were often based on conveniently available data rather than any serious attempt to identify relevant geographic and product markets. Furthermore, researchers often began with a maintained hypothesis of perfect competition, which the weak significance of empirical results failed to reject (Saitone and Sexton).

Recommendations for competition policy in agriculture that emerged during this era tended to be more modest than the activist policy recommendations that emerged from the SCP framework. For example, in 1996, the primary recommendation of the USDA Advisory Committee on Agricultural Concentration was for enhanced disclosure and reporting of information. However, other recommendations have been debated in the past several farm bills, most notably those that would restrict vertical relations between farmers and downstream buyers (Saitone and Sexton). These policies could have significant effects on markets, a topic we address later in this paper.

II. What is the Latest Information on Market Structure in Agriculture?

Crespi, Saitone, and Sexton use Economic Census data to distill trends in concentration in food manufacturing industries from 1997 to 2007. Their study updates earlier work on this topic by Rogers and Sexton. In Table 1, we update the Crespi, Saitone, and Sexton analysis to 2012 using the most recent quinquennial Census report on concentration in manufacturing. The most disaggregated industry classification

Table 1
 2012 Values and Changes since 2007 in Six-Digit NAICS Industry Sales and Concentration

Code	Industry	2012 Values				2007-12 Change			
		Firms (number)	Sales (billions)	CR4 (percent)	HHI (value)	Firms (percent)	Sales (percent)	CR4 (percent)	HHI (percent)
311111	Dog and cat food manufacturing	233	21.5	67.8	2,019	17	48	-5	-13
311119	Other animal food manufacturing	876	36.4	24.3	228	-12	47	-19	-20
311211	Flour milling	168	15.1	50.3	772	-2	54	-8	-7
311212	Rice milling	49	3.9	46.6	778	-16	39	2	0
311213	Malt manufacturing	19	1.4	71.2	-	12	75	-3	-
311221	Wet corn milling	31	13.0	86.4	2,163	-6	8	3	-7
311225	Fats and oils refining and blending	89	16.8	55.3	1,098	19	25	2	7
311230	Breakfast cereal manufacturing	37	10.8	79.2	2,333	6	9	-1	-4
311313	Beet sugar manufacturing	14	4.7	77.5	-	17	47	-5	-
311340	Nonchocolate confectionery manufacturing	423	7.7	40.9	585	3	35	7	17
311351	Chocolate and confectionery manufacturing from cacao beans	156	4.3	54.7	998	1	-2	-7	-22
311352	Confectionery manufacturing from purchased chocolate	1,086	10.5	57.7	1,332	3	8	-8	-14
311411	Frozen fruit, juice, and vegetable manufacturing	144	12.2	45.5	739	-3	14	11	26
311412	Frozen specialty food manufacturing	400	18.1	35.1	567	11	27	19	52
311421	Fruit and vegetable canning	571	23.5	20.4	226	6	12	-16	-11
311422	Specialty canning	100	9.5	74.4	3,149	-1	4	-2	9
311423	Dried and dehydrated food manufacturing	169	6.6	35.0	570	13	18	-3	17

Table 1 (continued)

Code	Industry	2012 Values				2007-12 Change			
		Firms (number)	Sales (billions)	CR4 (percent)	HHI (value)	Firms (percent)	Sales (percent)	CR4 (percent)	HHI (percent)
311511	Fluid milk manufacturing	248	36.7	46.3	1,205	-11	10	1	12
311512	Creamery butter manufacturing	29	2.9	74.6	2,245	26	38	-5	-2
311513	Cheese manufacturing	390	41.2	29.9	374	14	24	-5	-1
311514	Dry, condensed, and evaporated dairy product manufacturing	133	19.5	44.0	687	-6	40	5	5
311520	Ice cream and frozen dessert manufacturing	343	7.0	45.9	666	-1	-20	-13	-30
311611	Animal (except poultry) slaughtering	1,420	91.8	60.7	1,085	-7	33	2	4
311612	Meat processed from carcasses	1,204	44.4	32.8	332	-3	19	18	29
311613	Rendering and meat byproduct processing	115	5.3	44.5	673	-10	43	4	4
311615	Poultry processing	319	58.0	39.8	600	-2	16	-13	-19
311811	Retail bakeries	6,339	3.1	4.7	12	4	-9	27	66
311812	Commercial bakeries	2,342	28.1	41.2	637	2	8	10	41
311813	Frozen cakes, pies, and other pastries manufacturing	210	5.6	30.3	389	2	14	-6	-4
311821	Cookie and cracker manufacturing	301	11.5	59.8	1,357	-1	6	-14	-16
311830	Tortilla manufacturing	334	3.7	60.2	1,970	2	42	5	6
311911	Roasted nuts and peanut butter manufacturing	215	11.1	31.0	400	14	63	-7	-3
311919	Other snack food manufacturing	303	20.6	73.9	4,262	6	18	-	-
311920	Coffee and tea manufacturing	417	13.2	57.5	1,283	24	69	33	68
311930	Flavoring syrup and concentrate manufacturing	131	8.8	74.6	4,047	-13	-4	-	-
311941	Mayonnaise, dressing, and other prepared sauce manufacturing	283	10.0	39.8	555	0	47	10	15

Table 1 (continued)

Code	Industry	Firms (number)	Sales (billions)	CR4 (percent)	HHI (value)	Firms (percent)	Sales (percent)	CR4 (percent)	HHI (percent)
311942	Spice and extract manufacturing	334	9.2	32.4	559	8	23	9	16
311991	Perishable prepared food manufacturing	640	10.2	29.6	338	5	23	6	24
311999	All other miscellaneous food manufacturing	537	11.5	27.8	284	-29	6	49	69
Average		542.4	17.2	48.8	1,122.1	0.7	22.7	2.8	13.2
Minimum		14.0	1.4	4.7	11.6	16.7	75.0	27.0	65.7
Maximum		6,339.0	91.8	86.4	4,262.0	3.9	33.2	3.1	47.7
Median		283.0	11.1	45.9	687.0	0.4	14.4	6.0	-6.9

Source: Economic Census of the United States (2007: ECO731SR12, 2012: EC1213SR2).

statistics for which detailed concentration data are available are six-digit North American Industrial Classification System (NAICS) codes. One problem in working with these national Census data is that the six-digit NAICS codes may not comprise relevant geographic or product-form markets for studying competition in either farm or consumer products.²

Table 1 includes the 2007 and 2012 values and 2007–12 percent changes by industry for number of firms, total value of shipments, four-firm concentration ratio (CR4), and Herfindahl-Hirschman Index (HHI).³ The bottom of the table includes summary statistics on concentration measures to facilitate comparison with Crespi, Saitone, and Sexton.

From 1997 to 2007, food manufacturing concentration stabilized, as Crespi, Saitone, and Sexton noted, and the subsequent five years have followed a similar pattern. In 2012, the average CR4 and HHI across agricultural manufacturing industries in the United States were 48.8 and 1,122.1, respectively. Based on simple averages across the 37 NAICS-6 industries, the HHI increased by 13.2 percent and CR4 by only 2.8 percent.

The U.S. Department of Justice (DOJ) Horizontal Merger Guidelines (2010b) classify industries according to HHI as follows: (i) unconcentrated—HHI of less than 1,500, (ii) moderately concentrated—HHI between 1,500 and 2,500, and (iii) highly concentrated—HHI above 2,500. Based on these guidelines, 29 of the 37 industries included in Table 1 would be considered unconcentrated, five would be considered moderately concentrated (dog and cat food manufacturing (311111), wet corn milling (311221), breakfast cereal manufacturing (311230), creamery butter manufacturing (311512), and tortilla manufacturing (311830)), and only three would be considered highly concentrated (specialty canning (311422), flavoring syrup and concentrate manufacturing (311930), and other snack food manufacturing (311919)).⁴ The largest increases in HHI from 2007 to 2012 occurred in coffee and tea manufacturing (311920) and all other miscellaneous food manufacturing (311999).

The animal (except poultry) slaughtering industry (NAICS 311611) illustrates the perils of using straightforward national Census statistics to analyze market power and market concentration in agriculture. That industry experienced a small (2 percent) increase in its HHI from 2007

to 2012 and had a HHI (CR4) of 1,085 (60.7) in 2012. Concentration in poultry processing declined from 2007 to 2012 and had a HHI (CR4) of 600 (39.8) in 2012. Both industries thus appear to be relatively unconcentrated. However, both poultry and non-poultry slaughtering have been the subject of much debate regarding producer-processor relationships, with several policy recommendations and proposed regulations designed to restrict the purchasing practices of these processors.

The national measures of concentration provided by the NAICS-6 statistics are likely irrelevant to any agricultural product procurement market. Most farm products are bulky and perishable, making them difficult and expensive to transport; as a result, most procurement markets are local or, at best, regional in geographic scope. National concentration measures may drastically understate concentration in specific procurement markets.

The NAICS-6 codes also usually fail to identify relevant markets for procurement in terms of product form. Plants are highly specialized to particular products, so while there is at least the possibility that meat products emanating from NAICS 311611 substitute significantly enough on the consumer side to be classified in the same market, the animals entering these facilities—cattle, hogs, and sheep and lambs—do not substitute as inputs into the plant.

Better concentration statistics are available on livestock through the Packers and Stockyards Annual Report. Statistics for 2012 indicate steer and heifer slaughter had a CR4 of 85, cow and bull slaughter a CR4 of 56, hog slaughter a CR4 of 64, and sheep and lamb slaughter a CR4 of 62.⁵ In three of the four cases, the CR4 was higher than the composite CR4 of 60.7 reported for NAICS 311611 in Table 1. The national Packers and Stockyards statistics do nothing, however, to address the issue that relevant procurement markets for livestock are likely less than national in geographic scope.

Concentration in food retail is another area of concern. The supermarket revolution has taken place in waves—first in the United States, with major consolidation and structural change through mergers, acquisitions, and internal growth in the mid-to-late 1990s (Elitzak), next in Western Europe, and then spreading quickly across the world including Central and Eastern Europe (Dries, Reardon, and Swinnen), Latin America (Reardon and Berdegué), Central America (Berdegué

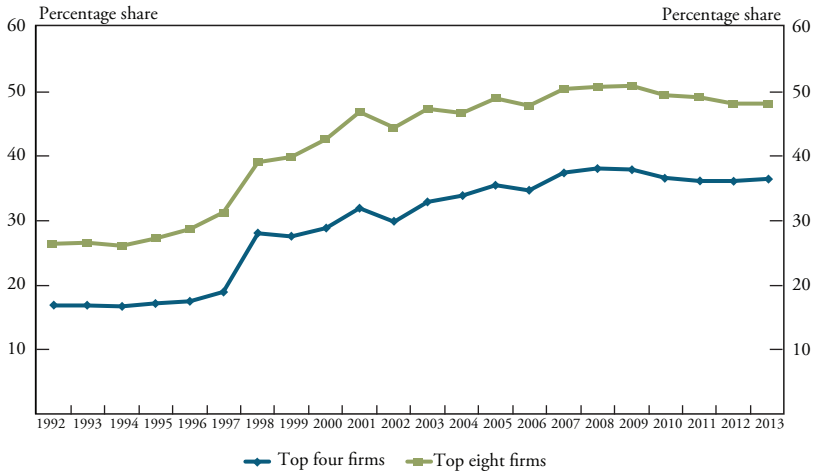
and others), Africa (Reardon and others), and Asia (Reardon, Timmer, and Berdegué; Hu and others). These profound changes in the food-retailing sector have precipitated rapid centralization of procurement systems, an erosion of the role of the traditional wholesaler in favor of direct marketing, increased vertical coordination through contracts with suppliers, and the implementation of private standards to regulate product quality and safety (Dries, Reardon, and Swinnen; Reardon and Timmer) and, increasingly, proscribe farm production practices (Saitone, Sexton, and Sumner). Overall these developments have made large multinational retailers the dominant players in the food chain.

In the United States, sales by the 20 largest food retailers totaled \$449.3 billion in 2013, accounting for 63.8 percent of U.S. grocery store sales (Elitzek). Chart 1 depicts the share of grocery sales for the top four and top eight retailers in the United States from 1992 to 2013. While the CR4 for supermarket and supercenter retailers has declined slightly since 2008, the longer-term trend shows increased concentration among the largest grocery retailers, with the CR4 increasing by more than 110 percent from 1992 to 2013. One contributing factor to such increases over the past decade has been the steady growth of Walmart Supercenters. Walmart is the world's largest food retailer despite having only entered food retailing in the mid-1980s. Although its national market share in U.S. food and beverage sales was only 17.3 percent in 2013, it is nearly double the 8.9 percent share of second place Kroger (Statistica).

National statistics on food retailing, although interesting, say nothing about concentration in local markets, which is the relevant geographic dimension when considering food retailers' market power over consumers. Concentration measures for food retailing in localized markets are challenging to come by, given that sales data for grocery retailers are not publicly available. The handful of estimates on local concentration that are available have been compiled by individual researchers. For example, Richards and Pofahl use Nielsen Trade Dimensions data to estimate the CR4 in five cities: Atlanta (81.9 percent), Chicago (60 percent), Dallas (63.7 percent), Los Angeles (59.1 percent), and New York (63.8 percent). The most recent estimate of the U.S. average MSA-level CR4 for food retail is 63 percent for 2014 (Volpe and others).

Chart 1

Concentration of Top Four and Top Eight U.S. Grocery Retailers



Source: USDA-ERS calculations using data from U.S. Census Bureau, Monthly Retail Trade Survey, company annual reports, and industry sources.

In a more nuanced analysis, Hoskin, Olson, and Smith analyze how prices are affected in regional markets following grocery retail mergers. Within their sample, eight of the 14 markets where mergers occurred were highly concentrated according to DOJ merger guidelines (HHI > 2,500), while the remaining markets were unconcentrated (HHI < 1,500).⁶ Two control groups also had high average degrees of concentration of 3,368 and 2,914. Although these concentration measures are likely to be more accurate than those evaluated at the national level, they are likely still too broad to constitute a relevant geographic market. From a consumer perspective, grocery markets are highly localized, with evidence suggesting that consumers typically travel at most a few miles to shop for groceries.⁷

III. What Are the Key Concerns about Concentration and Market Power in the Food Sector?

In the United States, the pendulum has swung dramatically away from the SCP era and its accompanying concerns about market intermediaries' influence on food costs and consumer welfare. Today, food comprises a low average share of U.S. consumers' disposable incomes, around 11 percent since 2000 (11.4 percent in 2014). Lower shares of

income spent on food at home have been offset by higher shares spent on food away from home. The share spent on food consumed at home is most relevant to discussions of how food costs affect consumers; in 2014, this figure was 6.0 percent.

In addition, the United States, relative to almost any other country, has an abundance of feeding programs intended to support the dietary needs of the poor. In 2016, over 44 million Americans participated in the Supplemental Nutrition Assistance Program (SNAP), with an average monthly benefit of \$125.50 and a total program expenditure of \$66.6 billion. In addition, the Women, Infants, and Children (WIC) and school lunch programs contribute to the dietary needs of millions. Food costs appear to be a minor consideration among advocates for the poor in the presence of these programs.

An additional consideration in the waning importance of food costs from a consumer's perspective is the emergence of discounters, most notably Walmart, as key players in food retailing. Walmart's rapid emergence as the country's leading food retailer has had three salutary effects on food prices. First, Walmart has set low prices for food as it sought to expand its market share and enter new markets.⁸ Second, conventional retailers often charge lower prices when confronted with head-to-head competition from Walmart (Hausman and Leibtag; Volpe and Lavoie). And third, Walmart has ruthlessly driven costs out of the supply chain and forced its rivals to attempt to match its procurement strategies. Beyond introducing efficiencies into food marketing, Walmart and other increasingly powerful food retailers are also likely able to reduce food costs by countervailing the market power of food manufacturers (Calvin and Cook).

In the next decade, online food retailing has the potential to disrupt food retailing and inject new competition similar to Walmart's entry in the 1980s. While generous estimates from the U.S. Dept. of Commerce indicate that online grocery retailing accounted for only 2 percent of total sales in 2015, these national averages fail to reflect online grocery retailers' penetration in specific urban geographic markets or the substantial growth predicted over the next five to 10 years. *Bloomberg Businessweek*, for example, predicts online grocery retailing will be 11 percent of total sales by 2023 (Steinman).

Amazon topped *Supermarket News's* list of the top 10 digital food retailers with \$2.1 billion in sales in 2015 (Springer). But four of the

remaining top 10 digital food retailers were conventional brick-and-mortar stores, including Kroger (\$650 million in sales), Walmart (\$350 million), Albertsons (\$250 million), and Costco (\$170 million).⁹ The potential of online sellers to enhance competition in food retailing is substantial. Given that online retailers apparently do not calibrate their prices to localized market conditions, brick-and-mortar retailers with market power in local markets are subject to being undercut by online retailers if they attempt to raise prices to capture monopoly profits.¹⁰

Farm-product markets and buyer power

As interest in food intermediaries' power to raise prices to consumers wanes, the policy focus at both the state and federal level has shifted back to the effects of concentration and market power in food processing and retailing on farmers, with particular emphasis on the procurement arrangements these buyers use and the ability of small farmers to compete and participate in modern supply chains (Saitone and Sexton). On the surface, these concerns are justified. As noted, national concentration rates seldom represent relevant agricultural product procurement markets and thus likely dramatically understate concentration in the local or regional markets relevant for procurement.

Indeed, a common complaint among U.S. farmers is the absence of selling opportunities. Producers often have only one—or at most, a few—willing buyers for their products. This complaint was a recurring theme at the joint USDA-DOJ listening sessions conducted across the United States in 2010. The following comment from a cattle producer is representative:

While potentially there are four market participants, what we see typically region by region is that there are really one to two meaningful participants, rarely three, and four meaningful participants is very much an oddity (U.S. DOJ 2010a, p. 211).

The role of contracts and vertical coordination in farm-product procurement

High buyer concentration in local procurement markets, increased vertical coordination and vertical restraints, and the emergence of dedicated supply arrangements, whether codified through formal contracts or not, have combined to generate considerable concern among

some farm groups and policymakers about the buying power of food manufacturers and retailers. The use of contracts in U.S. farm-product markets has expanded rapidly over time, though it appears to have stabilized in recent years. In 1969, only 5 percent of farms engaged in contracting, with those contracts covering roughly 11 percent of the value of production (MacDonald and Korb). In 2013, 35 percent of the production value of all commodities was transacted via contracts (MacDonald 2015). Contracts are the dominant form of exchange in the United States for most livestock, produce commodities, and fruits and nuts. The aggregate percentage share for contracts is depressed due to the importance in the United States of major grains that are the remaining bastions for cash markets.¹¹

Contracts in U.S. agriculture differ greatly in their format across industries. Resource-providing contracts introduce substantial buyer decision-making into the farm production process, thereby reducing farmer autonomy. Broiler and hog contracts are key examples: in these contracts, the downstream buyer supplies chicks or piglets, feed, and medication, while the farmer mainly supplies labor and capital in the form of growing houses. In other instances, buyers do not directly provide inputs but dictate what types of inputs can and cannot be used. A key example is the prohibition of antibiotics for growth promotion and disease prevention (Saitone, Sexton, and Sumner). Marketing contracts, on the other hand, may provide little more detail than the price or a basis for setting the price and volume to be exchanged.

One policy concern with expanding contract production and increasing the degree of buyer control written into some contracts are that such contracts lock sellers into a particular buyer, creating in essence a monopsony procurement situation with the potential for opportunistic behavior. A second concern is that small producers will be disadvantaged in terms of securing contracts, perhaps leaving them with no home for their production. These concerns are not without merit.

Generally, livestock production has shifted over time toward large and specialized confinement and feeding operations, which typically use a variety of contractual arrangements (MacDonald and Korb). In 2008, nearly 53 percent of total livestock production was elicited under contract. However, within the livestock sector, these percentages vary substantially. While large cattle-feeding operations are likely to have

production contracts with cattle ranchers and marketing arrangements with meat packers, only 29.4 percent (by value) of cattle production in 2008 took place under a contractual arrangement (MacDonald and Korb). Focusing on steers and heifers, 46 percent of cattle in 2008 were transacted with forward or formula contracts (U.S. Congressional Research Service).

Both the hog and dairy industries have higher contract shares relative to cattle at 68 and 54 percent, respectively. In 2009, only 8 percent of hogs were transacted via spot or cash markets; the rest were sold via forward or formula contract (49 percent), production contract (12 percent), packer/processor owned (26 percent), and packer sold (6 percent) (U.S. Congressional Research Service). Nearly 90 percent of all poultry and egg production in the United States (by value) takes place under contract (MacDonald and Korb). In 2006, 98 percent of the 17,440 broiler farms surveyed had production contracts in place with an integrator (MacDonald 2008).

Broiler producers make substantial investments in growing houses but are then dependent upon a single buyer or “integrator” to supply chicks. These arrangements have resulted in litigation and proposed regulations under the Packers and Stockyards Act to restrain buyer behavior in these settings. Moreover, a number of lawsuits (for example, *John Gross and Company, Inc. v. Koch Foods, Inc. et al.*; *Shelia Adams and James Adams et al. v. Pilgrim’s Pride Corporation*) have been filed alleging that an integrator or group of integrators manipulated production to increase processed chicken prices. These lawsuits allege that integrators reduced production by reducing the number of growers’ flocks and eliminating grower relationships. In addition, in a recently filed case (*Haff Poultry Inc. et al. v. Tyson Foods Inc. et al.*), contract growers allege that major integrators (for example, Tyson, Pilgrim’s Pride, and Perdue Farms) shared confidential production and grower payment records to fix and suppress the prices paid to broiler contract growers while also agreeing to not solicit other integrators’ contract growers.

“Lock in” need not involve the physical capital that is typical in these livestock settings. For example, Adjemian, Saitone, and Sexton discuss a case of U.S. malting barley production wherein most brewers have proprietary varieties of barley for their beer production, effectively locking in farmers to a single brewer or maltster because fields must be fallowed to prevent contamination if an alternative variety is to be planted.

Small farmers may indeed be disadvantaged in securing a contract. First, it is in buyers' interest to engage with the most efficient producers. This will increase the total available surplus associated with the transaction, which ultimately will be shared between buyer and producer. Small-scale farmers will seldom be the most efficient, regardless of industry. Second, the transaction costs of executing and enforcing contracts may be high, and executing agreements with a handful of large-scale producers will always be less costly than doing so with many small producers. With justification, the viability of farmers is generally linked to the health of rural America and, more specifically, concerns that trends in U.S. agriculture will result in the depopulation of rural America.

Grain Inspection, Packers, and Stockyard Administration (GIPSA) rules and similar regulations

In 2010, the USDA promulgated regulations that would define an array of commercial practices as violating the Packers and Stockyards Act of 1921 (P&S Act, 7 U.S.C. §181 et seq.). These regulations were written in response to the Food, Conservation, and Energy Act of 2008 (also known as the 2008 farm bill). These so-called "GIPSA rules" (also known as Farmer Fair Practices Rules) were promulgated specifically with the goal of protecting small livestock farmers in markets dominated by contract production. As Edward M. Avalos, Undersecretary for Marketing and Regulatory Programs at the time, stated in congressional testimony, the goal of the regulations was to "improve fairness and transparency in marketing of livestock and poultry . . . What is driving the need to use [USDA-GIPSA's] authority under the Packers and Stockyards Act is our concern about the loss of farmers and the depopulation of rural America" (Hearing).

The original proposed regulations (9 CFR 201) were expansive and detailed. Then-USDA Secretary Vilsack commented on the reach of the regulations, "I think it's fair to say that what we're proposing is aggressive" (Drovers). The critical provisions of the originally proposed regulations fell into four broad categories, and the specific subsections of the proposed regulations along with a brief description are provided in Table 2. The first category of regulations was geared toward eliminating the need to prove actual or potential competitive injury to establish a violation of the P&S Act (§201.2(t), §201.2(u), §201.210(a)). The

Table 2
Summary of Proposed and Finalized GIPSA Rules

Section	Proposed rule	Final rule
§201.3 Applicability of regulations	(a) Poultry: pullets, laying hens, breeder, and broilers; (b) Contracts: swine production contracts, poultry growing arrangements, and livestock production and marketing contracts; (c) Scope: adversely affect or likely to adversely affect competition without being required to show harm or likely harm	Finalized except (c)
§201.94 Record retention	Requires a packer, swine contractor, or live poultry dealer to maintain written records that provide legitimate reasons for differential pricing or any deviation from standard price or contract terms offered to poultry growers, swine production contract growers, or livestock producers.	Not finalized
§201.210 Unfair, unjustly discriminatory and deceptive practices or devices	Provides examples of conduct that would be considered unfair, unjustly discriminatory and deceptive practices.	Not finalized
§201.211 Undue or unreasonable preferences or advantages; undue or unreasonable prejudice or disadvantages	Establishes criteria the Secretary may consider in determining if these actions have occurred under the P&S Act.	Not finalized
§201.212 Livestock purchasing practices	Bans packer-to-packer sales and places restrictions on packer-dealer (buyers), i.e., they cannot represent more than one packer.	Not finalized
§201.213 Livestock and poultry contracts	Requires packers, swine contractors and live poultry dealers to provide GIPSA with a sample copy of unique types of contracts. With the exception of certain information, the contracts may be publicly distributed.	Not finalized
§201.214 Tournament systems	If a poultry dealer is paying growers on a tournament system (where some portion of growers' payments are based on comparisons with other poultry growers' performance), dealers are required to pay the same base pay to those raising the same type/kind of poultry (with no grower paid below the base). Live poultry dealers would be required to rank growers with others with like house types.	Not finalized
§201.215 Suspension of delivery of birds	Establishes criteria to consider when determining whether or not reasonable notice has been given for suspension of delivery of birds to a poultry grower. (a) requires a 90-day notification, (b) requires suspension reason, length, and resumption date, and (c) provides waivers in cases of disasters or emergencies.	Finalized but (a) was rescinded. USDA removed the provision from regulations in February 5, 2015 (80 Federal Register 6430).
§201.216 Capital investment criteria	Establishes criteria to consider whether or not additional capital investments required of a poultry grower or swine producer constitute an unfair practice in violation of the P&S Act.	Finalized. Renamed "Additional capital investments criteria."

Table 2 (continued)

Section	Proposed rule	Final rule
§201.217 Capital investments requirements and prohibitions	Requires a production contract to be of sufficient length to allow poultry or swine growers to recoup 80 percent of investment costs related to the capital investment. Adequate compensation incentives are required for additional equipment investments, if existing equipment is in good working order.	Not finalized
§201.218 Reasonable period of time to remedy a breach of contract	Establishes criteria for determining whether a packer, poultry dealer, or swine contractor has provided a producer a reasonable period of time to correct a breach of contract.	Finalized. Became §201.217 in the final rule.
§201.219 Arbitration	Establishes criteria to consider when determining whether the arbitration process in a contract provides a meaningful and fair opportunity for the poultry grower, livestock producer, or swine contract grower to participate fully in the arbitration process.	Finalized. Became §201.218 in final rule.

Source: Adapted from Greene.

second category was associated with requiring standardization and uniformity of animal procurement to preclude discrimination (§201.210(a)(1)-(7), §201.94(b), §201.211). Regulations in the third category attempted to govern the relationships between packers, producers, and dealers either by specifying permissible contract terms (§201.212, §201.218), mandating that all non-unique contracts be filed and disclosed as samples (§201.213), classifying processor and packer actions as retaliatory, (201.210(a)(2)), stipulating how poultry processors can pay growers when using “tournament”-style pricing (§201.214), requiring 90-days notice of the suspension of live bird delivery (§201.215), or limiting packer/processor influence on producer/grower capital investments (§201.216, §201.217). The fourth and final category included regulations attempting to govern relationships between packers and dealers and precluding the transfer of live animals between packers (§201.212).

Following an extensive comment period wherein 61,000 comments were submitted, the USDA issued a final rule December 9, 2011. The final rule, a significant modification of the proposed rule, included only four provisions: suspension of the delivery of birds, additional capital investments, remedy of breach of contract, and arbitration (see Table 2). However, in November 2011, before the rule was finalized, Congress passed the Consolidated and Further Continuing Appropriations Act, 2012, which prohibited the USDA from finalizing

or implementing the most contentious parts of the rule. Congress continued to enact such appropriations riders in 2013, 2014, and 2015.¹²

However, the Consolidated Appropriations Act of 2016 did not include a rider prohibiting the USDA from finalizing and implementing the rules. The USDA hence published the interim rules on December 20, 2016, and scheduled implementation for February 21, 2017. The rules were again placed in limbo when on January 20, 2017, President Trump signed an executive order freezing pending regulations from the Obama administration.

Both preceding and following the promulgation of the GIPSA regulations, various jurisdictions (federal and state) have written and lobbied for similar legislation. A recent example is Senator Grassley's reintroduction of a bill that would amend the Packers and Stockyard Act to make it unlawful for a packer to own, feed, and control livestock intended for slaughter. Some states, including Nebraska (under the Competitive Livestock Markets Act), prohibit packers from owning cattle and hogs more than five days prior to slaughter.

IV. What Are the Efficiency and Distributional Consequences of Consolidation, Vertical Coordination, and Market Power in the U.S. Food Sector?

As we have shown in the prior sections of this paper, relevant measures of market concentration are elusive given the manner in which such statistics are compiled and reported, as is evidence on the importance of market power in the food chain. A third, less frequently discussed but contentious issue is the consequences of market power when it is present. Economists' traditional thinking about the consequences of buyer or seller market power is based on a simple partial equilibrium microeconomic model that may not be realistic for most modern markets. The standard model prescribes that a firm with market power strategically reduces its sales (seller power) or purchases (buyer power) in recognition that its actions influence price. Thus, quantities get reduced below the socially optimal (specifically, competitive) level, creating a deadweight or efficiency loss also known as the Harbarger triangle. However, the magnitude of these triangles is very small relative to the market's total surplus for moderate levels of market power of the

magnitude found in most empirical studies of specific food industries (Alston, Sexton, and Zhang; Sexton 2000).¹³

A second point is that these deadweight or efficiency losses emerge only because firms with market power are presumed to be constrained to charge or pay a simple linear (nondiscriminatory) price to all customers or suppliers. Such pricing schemes reflect traditional spot or cash markets that are in decline or nonexistent in many of today's agricultural markets and becoming rarer in retail markets. Deadweight losses represent "money left on the table" that a firm with market-power access to multiple pricing instruments can reduce or eliminate. Examples of multipart pricing at retail are membership fees, price discounts associated with club or loyalty cards, and even strategic use of sales, coupons and pricing for similar products with perceived heterogeneous qualities such as store versus national brands. These are all examples of what economists call *price discrimination*. The multitude of information on consumers that retailers now gather and analyze—and improved technologies for tailoring prices to specific customer segments—facilitate such practices. Retailers extract more surplus from consumers, but they also diminish any deadweight or efficiency losses associated with market power.

In agricultural product procurement markets, contracts often specify both prices and quantities and also contain provisions for price premiums or discounts for a variety of factors. Contracts may also tailor individualized prices to specific producers. Such devices attenuate the traditional link between price paid and quantity received.

Given evidence that market power in agriculture is modest at best—and the various mechanisms available to firms to obviate deadweight or efficiency losses—the inescapable conclusion is that efficiency losses in the United States due to agricultural market intermediaries' market power are inconsequential and of no policy relevance.

Implications for distribution of welfare

What remains, then, are concerns about market power's implications for the distribution of welfare across farmers, intermediaries, and consumers in the food chain. The distributional consequences of market power exercised by market intermediaries can indeed be much greater than the pure efficiency consequences and, in some cases, may provide a legitimate basis for policy concern. Even modest seller or

buyer power that reduces farm-product purchases and final outputs can transfer significant shares of market surplus from farmers and consumers to intermediaries' profits relative to the benchmark competitive equilibrium. A corollary to this point is that market intermediaries with even modest amounts of market power can capture large shares of the benefits from policies intended to benefit farmers, such as price supports or reductions in tariff barriers (Russo, Goodhue, and Sexton; Sexton and others).

To illustrate these points, we parameterize a prototypical agricultural product market with linear farm supply and consumer demand curves where farm value is 50 percent of retail value at a competitive equilibrium. Our example assumes the absolute values of the price elasticities of consumer demand and farm supply are each 0.5 at the competitive equilibrium, reflecting the stylized fact that both farm supplies and consumer demands for food tend to be price inelastic.

We introduce both buyer and seller market power into this market using standard methods, as discussed, for example, in Sexton and Lavoie. Without any loss of generality, the extent of market power can be parameterized on the interval $[0, 1]$, with 0 denoting perfect competition, 1 denoting pure monopoly or monopsony, and intermediate values representing oligopoly and oligopsony, with increasing values representing increasingly severe market power. Most empirical studies of market power in the food sector have found values of buyer and seller power to be in the range of 0.2 or less.

We can freely choose units to measure money and output, and thus set the consumer price under perfect competition to be $P^C = 1.0$ and both the farm-product and final-product output to be $Q^C = 1.0$. Given our assumption about farm share, the farm price in perfect competition is $W^C = 0.5$. Under perfect competition, the total economic surplus in our hypothetical market is 1.50, with farmers getting one-third (0.50) and consumers getting two-thirds (1.00). The competitive marketing sector earns zero economic profits in this example. The absolute levels of surplus and the share distribution across farmers, consumers, and marketers is a function of the underlying structure of the example and of no particular importance. What is important is to see relative changes as we introduce market power.

Suppose we set intermediaries' power as both buyers and sellers to 0.2. Although this value represents modest market power, it is still at the upper end of what most empirical studies have found. This market power causes retail prices to rise to $P^o = \$1.33$, farm prices to fall to $W^o = \$0.33$, and the quantity produced and sold to decline to $Q^o = 0.83$. The deadweight or efficiency loss created by this market power is only 2.8 percent of the total economic surplus at the competitive equilibrium, but consumers' and farmers' welfare both decline by more than 30 percent relative to the competitive outcome; the market intermediaries capture more than 31 percent of the available surplus. Although this specific outcome is a function of the parameters chosen for the example, it nonetheless illustrates that even modest market power can have a significant effect on the distribution of welfare. This is an important observation for policy purposes, as much of farm policy is geared toward the welfare of farmers, especially smaller farmers.

Chart 2 extends this example by plotting consumer surplus, farmer surplus, marketing sector profits, and efficiency losses over the full range of possible values for market power. Notably, it doesn't take much intermediary market power for intermediaries' share of the market surplus to farmers' or consumers' shares. Deadweight or efficiency losses increase at an increasing rate as a function of intermediary market power; however, as noted, no evidence currently supports such high levels of market power in the United States. Furthermore, this example is for a spot market with simple linear prices, so real-world pricing devices that might reduce deadweight losses are absent.

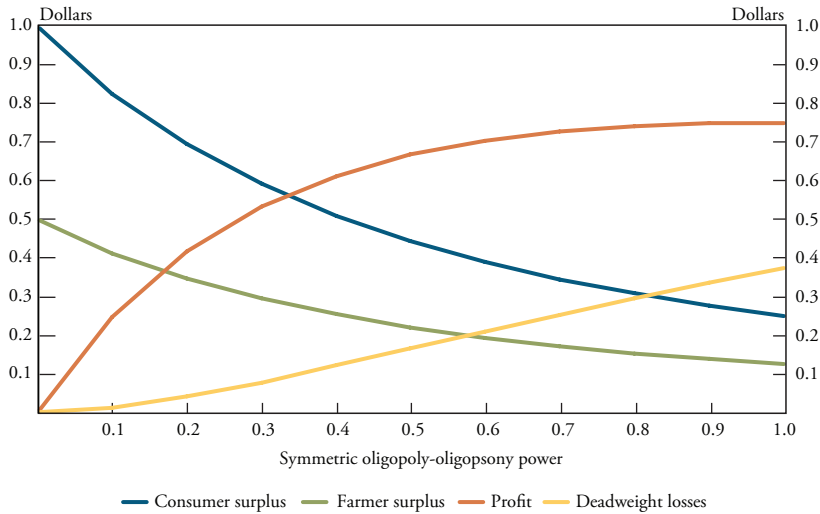
Implications for the efficiency of American agriculture

We believe that any discussions of efficiency and productivity in U.S. or world agriculture should be conducted in the context of the challenges facing world agriculture moving forward. The United Nation's Food and Agriculture Organization (FAO) projects global food demand to grow by 70 percent from 2005 to 2050 (Alexandratos and Bruinsma). Other analysts (for example, Tilman and others; Ray and others) predict even greater growth in demand in the range of 100–110 percent over the same period.

Regardless of the specific demand-growth estimate, most researchers agree that increased agricultural productivity is the key to global food

Chart 2

Effects of Symmetric Oligopoly-Oligopsony Power



security in the future (Tilman and others; Leifeld). However, growth in crop yields has slowed over the past two decades, with global yield growth for key grains and oilseeds, maize, rice, wheat, and soybeans slowing substantially from 1990 to 2007 compared with the prior 30 years (Alston, Beddow, and Pardy; Grassini and others).

Productivity is also critical to the environmental consequences of food production. This debate centers on the environmental effects of intensive versus extensive expansion of agricultural production to meet global food needs. Given that the leading cause of anthropogenic greenhouse gas emissions is converting land to agriculture, strategically intensifying existing agricultural lands to increase production will lead to greater reductions in greenhouse gas emissions and nitrogen fertilizer use than clearing more land to expand food production (Tilman and others).

As an earlier quote from the U.S. GAO illustrates, considerable evidence supports the efficiency benefits of consolidation in the food chain. Although evidence for the efficiency benefits of vertical coordination is less extensive, it also creates a clear picture. Vertical coordination between producers and downstream buyers enhances efficiency for both buyer and seller. Advantages for the buyer include the ability to operate processing facilities at efficient capacities by securing

necessary supplies of the farm product through contracts or vertical integration, with the characteristics and timing needed to operate highly capital-intensive plants efficiently.¹⁴ The GAO makes this point as well in describing hog processing:

Large processing plants achieved cost economies by ensuring a smooth and uninterrupted flow of hogs so they could operate their plants at near full capacity. Therefore, their desire to continue purchasing hogs to achieve these cost savings could overwhelm any incentives to exercise market power by restricting purchases.

Efficiency gains to farm production from vertical coordination and contracting also appear likely, though the evidence for these is more scant. Key and McBride provide one key example about implementing contract production for hogs. The rapid adoption of resource-providing contracts in hog production in the 1990s provided an unusual natural opportunity to compare the efficiency of contract versus independent production systems. Key and McBride found the contract production system yielded efficiency gains of 20 percent due to improved factor productivity attributed primarily to the transfer of knowledge from processors to producers.

Consequently, regulations such as the GIPSA rules and, indeed, any restrictions on contracting and vertical coordination practices must be evaluated in light of their implications for economic efficiency. If the primary motivation for regulating or proscribing various marketing arrangements is to enhance efficiency by enabling plants to operate at efficient capacity, improve information flows, and reduce the transaction costs of marketing, then regulations that impede these objectives will—under the ordinary transmission of cost and price changes through the marketing channel back to the farm or ranch and forward to consumers—reduce farm prices and producer welfare on net and cause higher consumer prices and reduced consumer welfare. To offer just one example, Brester and Marsh find that technological changes in meatpacking contributed to proportionately greater reductions in marketing margins and increases in real hog prices over time—specifically, they estimate a 1 percent increase in meatpacker productivity reduced the pork farm-wholesale margin by 1.43 percent.

V. Farmer-Buyer Relationships in Modern Agricultural Markets

Given concerns expressed in the United States and elsewhere, the buyer power of food-market intermediaries has been a key research focus for us in recent years, often in conjunction with colleagues (Crespi, Saitone, and Sexton; Sexton 2013; Adjemian, Saitone, and Sexton; and Mérel and Sexton). Our argument, which we develop briefly here, is that the standard economic theories of buyer power and its treatment for antitrust purposes—as, for example, practiced by the DOJ and FTC—may in many cases be fundamentally incorrect. Moreover, under certain conditions that we make explicit, buyer concentration and close vertical coordination between buyers and sellers can unambiguously be in farmers' best interests and improve overall economic welfare.

The standard antitrust treatment is to regard buyer power as basically symmetric to seller power. In other words, input purchasers with power to influence the input's price will respond by strategically reducing purchases to reduce the input's price, thereby increasing the buyer's profits. This reasoning is codified into the merger guidelines issued jointly by the DOJ and FTC. Following a lengthy discourse on mergers among sellers, the guidelines dispatch mergers among competing buyers (section 12) in just 395 words, noting "the Agencies employ essentially the framework . . . for evaluating whether a merger is likely to enhance market power on the selling side of the market."

Our fundamental argument is that there is a short-run versus long-run trade-off regarding the exercise of buyer power that is normally not present regarding seller power. By definition, the exercise of buyer market power depresses an input's price below its value of marginal product—specifically, below the competitive return. It is axiomatic that resources that earn a return below the competitive rate exit the industry in the long run. As we have noted, modern food processing and distribution are highly capital intensive, and it is imperative for plants to operate at efficient capacity. A buyer who depresses prices to its farm suppliers by exercising its market power thus risks causing its suppliers to exit the market and deterring other suppliers from entering it, undermining the buyer's ability over time to source the farm products it needs to operate efficiently and meet its downstream selling obligations.

As a result, buyers operating in a given procurement area who value the future have a mutual incentive to pay suppliers a sufficient return to remunerate their capital investments—that is, at least what economists term a “normal” return on investment—so as to preserve the “stock” of suppliers into the future. The problem is that in the oligopsony procurement environment typical of many modern agricultural markets, each buyer internalizes this incentive only to the extent that it affects the buyer’s own future profits. Effects on other buyers operating in the same market are an externality and not considered. The situation is closely analogous to a tragedy of the commons: here, the common or shared resource is not a grazing range or a fishery, but rather a collection of farmers producing an agricultural product required for the buyers’ operations.

This means that the market environments most conducive to the exercise of buyer market power are loose oligopsonies operating in spot markets where individual buyers have power to influence the farm price but are unable to internalize a substantial share of the benefits from paying a price sufficient to sustain or expand the stock of production. Similarly dangerous are settings in which buyers highly discount the future—for example, due to severe financial stress or operating in a declining industry—and are thus motivated to increase short-run profits by exercising their buyer power.

In contrast, in environments in which buyers highly value the future and can internalize much of the benefits of supporting the viability of their suppliers, buyers have incentive to pay farm prices sufficient to enable farmers to earn at least normal returns on their capital investments to preserve this stock of suppliers into the future. Students of economic theory will recognize that this outcome is analogous to the long-run equilibrium in a competitive industry, wherein all active participants earn normal returns on their investments. It is important to recognize, however, that the market process at work here is fundamentally different from the tatonnement process of entry and exit that brings a competitive industry to this equilibrium. Here, the outcome is due to buyers rationally paying a return high enough to preserve their stock of suppliers into the future. Farmers earn a satisfactory return on their investments even though they may have few or only one selling option.

It is both ironic and unfortunate, then, that public policies and regulations that are either in place or actively being pursued, such as the

GIPSA regulations, may prevent these types of symbiotic relationships between buyers and sellers and thus operate at cross purposes from what their proponents seek to achieve. In terms of merger policy, the DOJ is most likely to challenge mergers that cause markets to go from loose oligopsonies to tight oligopsonies or monopsony. But as Mérel and Sexton demonstrate analytically—and illustrate using recent anti-trust actions by the DOJ—such mergers enable buyers to more fully internalize the benefits from paying returns necessary to preserve the stock of suppliers in the long run. Thus, preventing such mergers preserves the “tragedy of the commons” effect and may well be detrimental to farmer welfare.

The GIPSA regulations and related policies are designed to proscribe contracting practices, specifically for livestock, to create a “level playing field,” especially for small farmers, such that any producer has an opportunity to obtain a contract. However, by restricting the types of contract arrangements that can be executed between a buyer and sellers or by requiring in effect an “open market” for contracts, such regulations impede the emergence of the symbiotic relationships essential to guaranteeing producers prices that enable a competitive return on investment.

VI. Conclusion

We survey the latest evidence on concentration and consolidation in the food processing and distribution and retailing sectors. We find the pace of consolidation appears to have stabilized in recent years, but because the publicly available data often do not conform to relevant product or geographic markets, it is not easy to distill implications for market power and policy from such data.

Our view is that on balance, consolidation of food marketing has benefited consumers. Food costs are a small and stable share of budgets for most Americans, with increased spending on food consumed away from home preventing what otherwise would be a declining food budget share. Consumers also have a remarkable array of choices, due at least in part to the size of modern groceries and their global procurement strategies. We conclude that food costs are no longer a major policy concern—indeed, today’s food consumers are practically

encouraged to pay more for food intended to contribute to an array of social and environmental goals.

The policy focus instead has shifted to farm-product procurement markets and intermediaries' power as buyers. Unquestionably, many U.S. farmers have few (and perhaps only one) sales outlets today, which justly triggers some alarm bells—as does the increasing vertical control, manifested mainly through contracts, that has swept through procurement markets for many commodities. We show that these developments unquestionably enhance efficiency, a point that should not be disregarded as we face the challenge of feeding a rapidly rising world population during a time of rather stagnant agricultural productivity growth.

We set forth a model for agricultural product procurement markets that we have developed in detail in a series of recent journal papers. This work runs counter in its predictions and policy implications to the standard paradigm that equates concentration with market power and efficiency losses. Farmers can fare very well in modern procurement markets if conditions are right for them to establish a symbiotic relationship with a downstream supplier. However, we discuss various policies and regulations in place or being contemplated that are likely to interfere with forming such arrangements. This is an ironic outcome, given that the proponents of such policies intend for them to benefit farmers, especially small farmers. Our framework also provides a basis for predicting market settings when buyer power concerns are most pronounced, namely when symbiotic relationships are unlikely to emerge because of high discount rates or buyers' inability to internalize the benefits of forging such relationships with suppliers.

Small farmers have a difficult role in modern agricultural supply chains. An abundance of small farmers no doubt contributes to populating and preserving the vitality of rural America, but small farms are likely to be inefficient in multiple dimensions compared with larger operations, and the supply chain ruthlessly seeks out the most efficient operators. Policies intended to promote small farms mostly do so by trying to curtail efficiency-enhancing marketing arrangements. We do not think such policies are wise in light of the challenges facing global agriculture. Better policies with spillover benefits for rural America would support small farmers directly without disrupting market forces that enhance efficiency.

Endnotes

¹SCP theorists believed that product differentiation and expenditures to promote it were wasteful and an artifact of the power of food manufacturers. Today, some 30 or more years later, most view variety and differentiated products as something consumers value.

²Another problem is that the NAICS system replaced the Standard Industrial Classification (SIC) system that was the basis, for example, of Rogers and Sexton's (1994) work, making direct comparisons across longer periods difficult.

³CR4 is the sum of the market shares of the largest four firms in the industry. HHI is the sum of every firm's squared percentage share of market value in the industry. HHI measures give proportionally greater weights to firms with larger market shares relative to CR4 and incorporates information beyond the four largest firms.

⁴Typically, industries that are classified as unconcentrated are not subject to DOJ scrutiny. However, in industries classified as moderately concentrated, mergers that would increase the HHI by 100 points or more raise competition concerns and are often evaluated (DOJ 2010b).

⁵HHI statistics are not included in the report.

⁶The sample of markets was very heterogeneous, encompassing both medium-sized U.S. markets and substantial markets (for example, New York, Philadelphia, and Detroit).

⁷For example, a nationally representative survey of SNAP-eligible consumers by Ohls and others found that among program participants, the average distance to the nearest supermarket was 1.8 miles, but the average distance to the store used most often by participants and eligible nonparticipants was 4.9 miles. It should be noted that shopping patterns and access to transportation may differ for SNAP participants relative to the general populations. Our own work for WIC recipients in the greater Los Angeles area (Wu, Saitone, and Sexton) shows average travel distances of 3.2 miles for participants living outside of food-desert areas and 3.59 miles for food-desert residents.

⁸Even though Walmart has accomplished substantial share growth in becoming the largest food retailer in the United States, its cost-cutting continues apace. Its current pricing strategies are believed to be designed to ward off competition from Amazon and European discount grocery retailer Aldi (PYMNTS).

⁹Given that two-thirds of the population in the United States lives within 5.3 miles of a Walmart store, online retailing has the potential to extend Walmart's reach and low prices beyond simply the local markets where it has brick-and-mortar stores (Perez).

¹⁰Although little is known about how food retailers set prices geographically, large retailers appear to use pricing zones, which often coincide with a metropolitan area. Thus, prices for a chain are normally the same across a metropolitan

area. This, of course, means that localized pockets of monopoly power due to high concentration would not be exploited. Similarly, evidence suggests brick-and-mortar retailers generally have the same prices in store as online, although there may be a delivery charge.

¹¹MacDonald and colleagues at the USDA periodically update information on contract production in U.S. agriculture. Small year-to-year fluctuations in the percentages are mainly due to changes in the value of production for cash-market grains relative to the other commodities for which contracting dominates.

¹²The 2013 and 2015 appropriations acts included language to rescind three provisions that the USDA had finalized in 2011. These were a definition of the “suspension of delivery of birds,” a 90-day notification period required when a poultry company suspends the delivery of birds to a grower, and a provision that made the rule applicable to live poultry. In February 2015, the USDA removed these three provisions from the regulations.

¹³The triangle increases at an increasing rate as a function of the degree of market power exercised, so if market power is severe or is exercised at multiple stages along the market chain, deadweight losses become large and consequential (Sexton and others). There is no evidence to support such occurrences for food in the United States.

¹⁴A point worth emphasizing is that for these same reasons, a processor’s demand for farm products is very inelastic in the range of its plant capacity. Once a firm has secured a supply sufficient to operate at efficient capacity, additional farm product is of little value. This point is relevant to the recurring theme from the joint USDA-DOJ listening sessions in 2010 that farmers had few selling opportunities. In modern agricultural markets, buyers are unlikely to be interested in sourcing additional product once they have supply commitments in place.

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