



May 31, 2016

Renata Hesse
Principal Deputy Assistant Attorney General
U.S. Department of Justice Antitrust Division
950 Pennsylvania Avenue, N.W.
Washington, D.C. 20530

Re: The Proposed Dow-DuPont Merger

Dear Principal Deputy Assistant Attorney General Hesse:

The American Antitrust Institute (AAI), Food & Water Watch (F&WW) and the National Farmers Union (NFU) have long advocated for competition, farmers and consumers in American agriculture. This includes analysis and commentary on mergers affecting critical agricultural input markets such as fertilizer, biotechnology, seed and chemicals.¹ In this letter, AAI, F&WW and NFU offer our analysis of the proposed merger of Dow Chemical and DuPont, currently under review by the U.S. Department of Justice (DOJ) Antitrust Division. While the transaction has competitive implications in several sectors, our analysis is limited to agricultural input markets.

Much of AAI's research and analysis in this important area centers on the intersection between competition law and intellectual property (IP) law in agricultural biotechnology and the detrimental effects of consolidation in the food supply chain. NFU has advocated for more than a century for vigorous antitrust enforcement against agribusiness monopolies that disadvantage farmers. F&WW has researched and advocated for more competitive markets for consumers and farmers. All of our organizations are deeply connected to farmer and consumer communities and are particularly mindful of the importance of a competitive agricultural market to farmers, rural communities, consumers and the many regional and local economies that depend on farming.

¹ The American Antitrust Institute (AAI) is an independent, nonprofit organization devoted to promoting competition that protects consumers, businesses and society. For more information, see www.antitrustinstitute.org. Thanks to AAI Research Fellows Kyle Virtue, Arthur Durst and Jonathan Wright for research assistance. Food & Water Watch (F&WW) is a national consumer organization dedicated to ensuring the food, water and fish we consume is safe, accessible and sustainably produced. For more information, see <http://www.foodandwaterwatch.org>. National Farmers Union (NFU) advocates for the economic and social well-being and quality of life of family farmers, ranchers, fishermen and consumers and their communities through education, cooperation and legislation. NFU advocates for the sustainable production of food, fiber, feed and fuel. For more information, see nfu.org.

I. Overview of the Proposed Merger of Dow and DuPont

Recent merger proposals in the agricultural biotechnology, seed, and chemicals sectors follow two previous waves of consolidation—one in the mid-1980s and a second from the late 1990s through the late 2000s.² In the second wave, Monsanto alone acquired almost 40 companies, including agricultural biotechnology firms and independent seed companies that had historically held the substantial base of germplasm needed by biotechnology developers to breed new varieties.³ Between 1985 and 2000, the Big 6 firms—Monsanto, Syngenta, Bayer, DuPont, Dow and BASF—acquired about 75 percent of small to medium-size enterprises engaged in biotechnology research.⁴ When the largest companies absorbed the majority of independent conventional and hybrid seed breeders, they captured their seeds and germplasm and significantly constrained non-biotechnology (i.e., conventional) commodity crop seed lines. Among other adverse effects, this foreclosed choice for farmers who often cannot find conventional seeds and, in turn, for consumers that may prefer non-genetically engineered foods.

Now comes the merger of Dow and DuPont in what would be a third wave of consolidation.⁵ The “merger trees” below show consolidation involving the parties, particularly in the second wave that substantially eliminated biotechnology innovators and seed companies. In 2014, the ranking of the Big 6 in total global agriculture-related revenue was: Monsanto (\$16 billion), Syngenta (\$14 billion), Bayer (\$12 billion), DuPont (\$11 billion), Dow (\$7 billion) and BASF (\$7 billion).⁶ The proposed merger of Dow and DuPont would combine the 4th and 5th largest rivals, creating a firm that would surpass Monsanto as the current leader.⁷ It is also important to note that any prospective merger of Monsanto and Bayer would combine the 1st and 3rd largest firms. The two mergers together would therefore create a Big 4, dominated by a Monsanto-Bayer and Dow-DuPont duopoly.

² The second wave brought a number of large mergers, including the formation of Syngenta from AstraZeneca and Novartis Seeds (2000), Bayer’s acquisition of Aventis Crop Sciences (2002) and BASF’s takeover of Cyanamid (2000). Seed companies such as Pioneer, DeKalb, Trojan, Northrup-King, Cargill and Golden Harvest were also acquired during this period. See Diana L. Moss, *Transgenic Seed Platforms: Competition Between a Rock and a Hard Place?* American Antitrust Institute (Oct. 23, 2009), http://antitrustinstitute.org/sites/default/files/AAI_Platforms%20and%20Transgenic%20Seed_102320091053.pdf. See also Gregory D. Graff, Gordon C. Rausser & Arthur A. Small, *Agricultural Biotechnology’s Complementary Intellectual Assets*, Calif., mimeo at 19-20 (Aug. 2001).

³ Monsanto acquired biotechnology firms and seed companies such as Agregetus, Calgene, Holdens, Asgrow and Delta & Pine Land. See Carl Pray, James F. Oehmke & Anwar Naseem, *Innovation and Dynamic Efficiency in Plant Biotechnology: An Introduction to the Reasrachable Issues*, 8 *AgBioForum* 52, 60 (2005); U.N. Conf. on Trade and Dev., *Trading the Trend Towards Market Concentration: The Case of the Agricultural Input Industry*, 5, 9-10 (Apr. 2006).

⁴ Keith Fuglie, John King, Paul Heisey & David Schimmelpfennig, *Rising Concentration in Agricultural Input Industries Influences New Farm Technologies*, 10 *Amber Waves* 4, 4 (Dec. 2012), <http://www.ers.usda.gov/media/960711/risingconcentration.pdf>.

⁵ See, e.g., Mike Verdin, *Bayer Unveils \$62bn offer for ‘perfect match’ Monsanto*, *Agrimoney.com* (May 23, 2016, 11:14 UK), [http://www.agrimoney.com/news/bayer-unveils-\\$62bn-offer-perfect-match-monsanto--9576.html](http://www.agrimoney.com/news/bayer-unveils-$62bn-offer-perfect-match-monsanto--9576.html).

⁶ *DuPont and Dow to Combine in Merger of Equals*, (Dec. 15, 2015), at 8. Presentation can be found at <http://www.dow.com/en-us/investor-relations/investor-presentations>.

⁷ See Lydia Mulvany, Sara Forden & Patrick Gower, *Dow-DuPont Merger Likely to Face Antitrust Scrutiny Worldwide*, *Bloomberg* (Dec. 11, 2015, 1:36 PM), <http://www.bloomberg.com/news/articles/2015-12-11/dow-dupont-merger-likely-to-face-antitrust-scrutiny-worldwide>; see also Jacob Bunge and Brent Kendall, *Merger of Dow, DuPont Likely to Get Close Antitrust Scrutiny* (Dec. 9, 2015), <http://www.wsj.com/articles/merger-of-dow-dupont-likely-to-get-close-antitrust-scrutiny-1449709088>.

The proposed Dow-DuPont merger occurs against a complex industry backdrop, marked by concentrated agricultural biotechnology and seed markets, increasingly high prices paid by farmers for technology, reduced seed choices and growing evidence of flagging innovation. As with many recent, large mergers that antitrust enforcement authorities have opposed, a Dow-DuPont combination is likely to substantially lessen competition in markets in the U.S., to the detriment of farmers and consumers. Two farmers succinctly described their concerns in the course of our interviews: “*We need more competition to keep prices down*” and “*We don’t like to see more consolidation; it means higher prices [costs] for farmers.*”

The proposed merger of Dow and DuPont is likely to adversely affect competition in three ways. First, it will eliminate head-to-head competition in markets for crop seed and chemicals. Second, the proposed merger will eliminate head-to-head competition in agricultural biotechnology innovation markets and reduce opportunities for pro-competitive research and development (R&D) collaborations. Third, the merger would create substantial vertical integration between traits, seeds and chemicals. The resulting “platform” could be potentially engineered for the purpose of creating exclusive packages of traits, seeds and chemicals that do not “interoperate” with rival products. This will likely raise entry barriers for smaller rivals and increase the risk that they are foreclosed from access to technology and other resources needed to compete effectively.

The reduction in competition that would be wrought by a Dow-DuPont merger could result in myriad adverse effects, including: less innovation, higher input prices and less choice for farmers, fewer non-biotechnology options available to farmers and consumers and higher food prices for consumers. Our review of publicly available information strongly suggests that the competitive harm potentially posed by the proposed merger cannot be ameliorated by any merger-specific and cognizable efficiencies. Investor documents indicate that elimination of “duplicative R&D programs including breeding, traits and chemical discovery” are a key component of the \$1.3 billion in cost synergies claimed by the parties.⁸ We note that that Dow and DuPont appear already to be winding down substantial R&D capabilities, well in advance of any conclusion to an antitrust merger review.⁹ But eliminating duplicative R&D programs is inextricably intertwined with the very anticompetitive effects on innovation markets that are likely to result from the merger. And claims that the merger will simply package “complementary” Dow and DuPont product offerings divert attention from the likely adverse impact of integration on competition, farmers and consumers.¹⁰ We encourage the DOJ to view these efficiencies claims with great skepticism.

In light of these concerns, the likely harmful effects of the proposed merger cannot be effectively remedied in a way that fully restores competition and adequately protects consumer interests. Indeed, crafting relief is inherently difficult in a merger of this size and impact and in a market with few, if any, viable buyers of assets. AAI, F&WW and NFU therefore urge

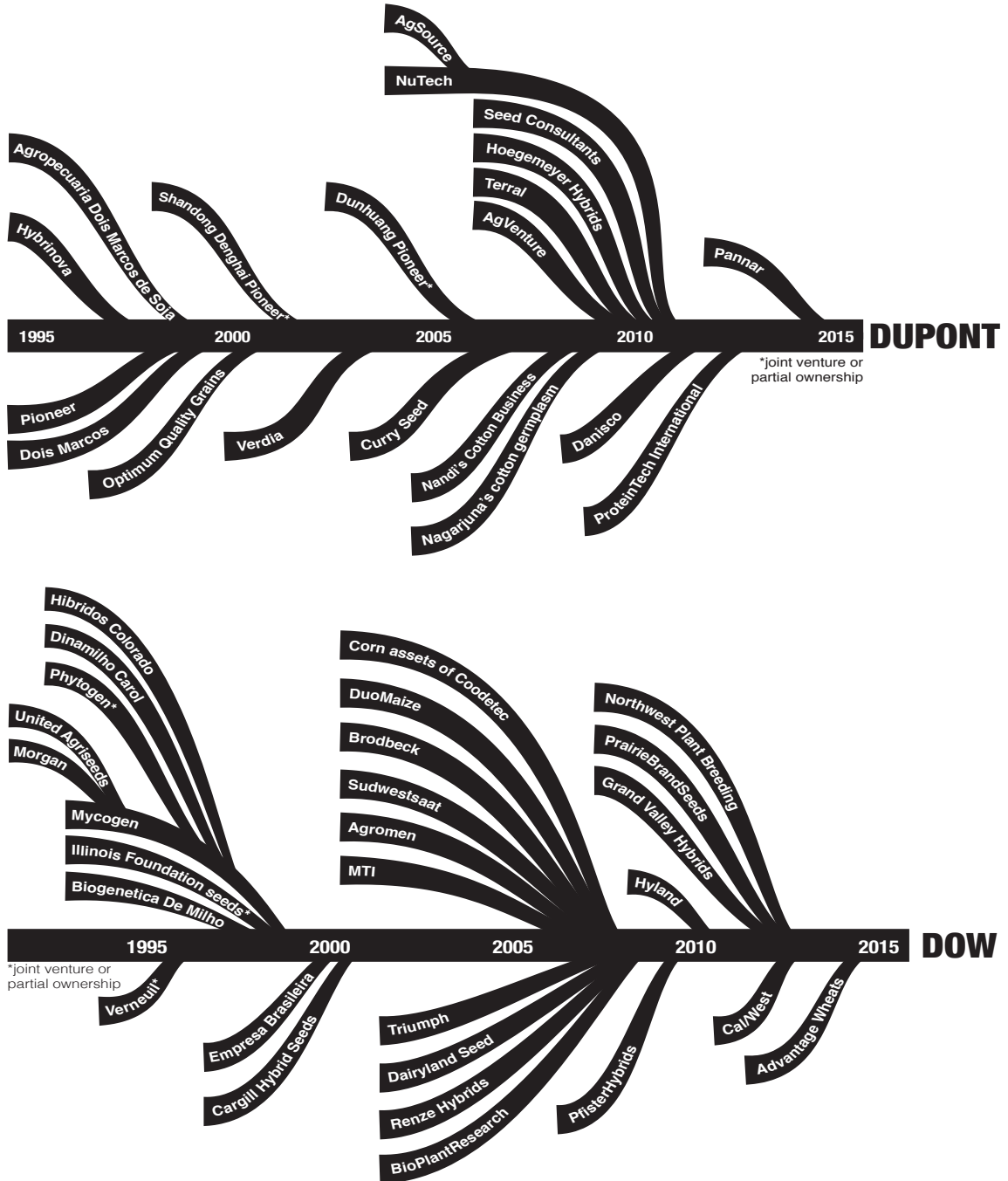
⁸ *Supra* note 6 at 7. Agrochemicals and seeds are estimated to account for the major portion of the Dow and DuPont R&D budgets. See John Abbink, *Dow DuPont Do What? The Outlook for the Post-Merger Companies*, The Motley Fool (Dec. 25, 2015, 6:10 PM), <http://www.fool.com/investing/general/2015/12/25/dow-dupont-do-what-the-outlook-for-the-post-merger.aspx>.

⁹ Alexander H. Tullo, *DuPont Will Dissolve Central Research*, Chem. and Eng’r News (Dec. 18, 2015), <http://cen.acs.org/articles/93/web/2015/12/DuPont-Dissolve-Central-Research.html>.

¹⁰ *Supra* note 6 at 9.

the DOJ to challenge the proposed merger of Dow-DuPont, a combination that would fundamentally restructure the nation's markets for agricultural inputs, with likely adverse effects on competition, farmers and consumers.

Mergers and Acquisitions Involving Dow and DuPont (1995-2015)



II. The Challenges of Agricultural Biotechnology

A. Transgenic Seed and Trait Stacking

Transgenic seeds have been genetically engineered to withstand or resist environmental or human factors, or to display enhanced qualities. Plants grown from transgenic seed can, for example, tolerate being sprayed by herbicides designed to kill weeds (herbicide-tolerance (“Ht”)) or insects that ingest plant material (insect resistance (the most common of which is “Bt”)). Often, the seed company sells the transgenic seed *and* the affiliated herbicide, forcing farmers to purchase both patented seeds and agrichemicals. Biotechnology firms are developing other similar “input” traits, including efforts to engineer drought resistance, as well as “output” or value-added traits such as corn with superior amino-acid balance and soybean oils with more shelf life.¹¹

The percentage of acreage planted with transgenic seed has increased dramatically since its introduction in the 1990s.¹² In 2015, almost all corn, cotton and soybean acreage was planted with transgenic varieties (92%, 94% and 94%, respectively).¹³ Even more notable is the rapid increase in acreage planted with seed containing multiple or “stacked” transgenic traits. These combinations are created through (1) “intra-firm” stacking, or a single innovator combining its own traits, and (2) “inter-firm” stacking, or rival innovators combining traits through joint R&D programs and cross-licensing agreements. The U.S. Department of Agriculture (USDA) predicted several years ago that “stacking traits will become increasingly complex as multiple GM traits from a variety of firms are inserted into individual varieties.”¹⁴

Seed companies promote stacking to address a number of concerns. One is to generate higher yields from multiple modes of action (e.g., Bt and Ht, or Ht and Ht). Another is to combat growing resistance of weeds and insects to an aging mode of action, addressed through “refuge” requirements, whereby growers must plant both conventional and non-transgenic seed. Stacking is also a function of supply “push” by the biotechnology industry to introduce newer, purportedly higher value products with commensurately higher profit margins. Between 2000 and 2015, the percentage of U.S. acreage planted with stacked gene varieties increased remarkably, from 1% to 77% for corn and from 20% to 79% for cotton.¹⁵

B. Market Concentration, Biotechnology Prices and Innovation

Advances in biotechnology have come with a high price tag. The U.S. Government Accountability Office (GAO) observed significant price differentials between transgenic and conventional seed over 15 years ago, noting that “Monsanto’s U.S. patents for Roundup

¹¹ Marvin L. Hayenga, *Structural Change in the Biotech Seed and Chemical Industrial Complex*, 1 AgBioForum 43, 48 (1998).

¹² Jorge Fernandez-Cornejo, *The Seed Industry in U.S. Agriculture*, U.S. Dep’t of Agric., Econ. Res. Serv., Agric. Info. Bull. No. 786 at 4 (2004).

¹³ U.S. Dep’t. of Agric., Nat’l Agric. Stat. Serv., Acreage, June 29, 2001 through June 30, 2015 Reports, <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1000>.

¹⁴ Keith O. Fuglie, et al., *Research Investments and Market Structure in the Food, Processing, Agricultural Input and BioFuels Industries Worldwide*, U.S. Dep’t of Agric., Econ. Res. Serv. Rep. No. 130 (Dec. 2011), http://www.ers.usda.gov/media/193646/eib90_1_.pdf.

¹⁵ *Supra* note 13.

Ready soybean seeds have given it and the companies to whom it has licensed the technology greater control over seed prices and has enabled them to restrict the availability and use of seeds.”¹⁶ This a troubling dynamic in markets with few rivals and where competition is shaped by strategic decisions about how, when and to whom they license their IP.¹⁷

It is accepted that concentrated markets are more conducive to the exercise of market power. Relative to other agricultural input sectors, the level of concentration and increases in concentration over time are the highest in crop seed.¹⁸ For example, the market share of the four largest firms more than doubled to 54% between 1994 and 2009.¹⁹ In 2007, the four largest companies accounted for an estimated 72% of the U.S. market for corn seed and 55% of soybean seed, with Monsanto’s share in corn and soybeans close to 65%.²⁰ In 2009, the top four companies held 95% of the U.S. market for cottonseed, with Monsanto and Bayer accounting for the lion’s share.²¹ In the traits markets in 2009, the Big 6 held greater than 95% of trait acres for corn, soybeans and cotton in the U.S., with Monsanto alone accounting for 90% of these acres.²²

Technology fees represent a significant proportion of seed costs. USDA notes that the prices of farm inputs, led by crop seed, generally have risen faster over the last 20 years than the prices U.S. farmers have received for their crops and livestock.²³ Were that not enough, seed price increases have outpaced yield increases over time—the very problem that biotechnology is purportedly designed to solve.²⁴ The “disconnect” between increases in biotechnology prices and crop yields is particularly concerning in light of more recent evidence on R&D trends.

For example, USDA observed in 2012 that spending on R&D in crop seed and biotechnology between 1994 and 2010 grew 138%—the most significant rate observed across major agricultural input sectors.²⁵ USDA noted that R&D intensity (measured as a percentage of industry sales) increased from the late 1990s to early 2000s as biotechnology crops were introduced. But by the late 2000s, R&D intensity had dropped to the mid-1990s level, leading the agency to note that increasing levels of concentration in agricultural input markets are no

¹⁶ See U.S. Gen. Acct. Off., *Information on Prices of Genetically Modified Seeds in the United States and Argentina* 12 (Jan. 2000), <http://www.gao.gov/products/GAO/T-RCED/NSIAD-00-228>.

¹⁷ See Peter Carstensen, *Post-Sale Restraints via Patent Licensing: A “Seedcentric” Perspective*, 16 *Fordham Intell. Prop. Media & Ent. L.J.* 1053, 1073 (2006) and Diana L. Moss, *Competition, Intellectual Property Rights and Transgenic Seed*, 58 *S. Dakota L.R.* 543 (2013). See also U.S. Dep’t of Agric., Econ. Res. Serv., *Adoption of Genetically Eng’r Crops in the U.S.*, <http://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us.aspx> and *supra* note 3.

¹⁸ USDA (2011), *supra* note 14 at vi.

¹⁹ *Id.* at 14.

²⁰ *Id.* at 35 and Moss, *supra* note 2 at 13-14.

²¹ *Id.*

²² USDA (2012), *supra* note 4 at 4.

²³ *Id.* at 12-13.

²⁴ See Moss *supra* note 17. Data are derived from U.S. Dep’t of Agric., Econ. Res. Serv., *Commodity Costs and Returns*, <http://www.ers.usda.gov/data-products/commodity-costs-and-returns.aspx> and U.S. Dep’t of Agric., Nat’l Agric. Stat. Serv., *Quick Stat.*, <http://quickstats.nass.usda.gov>. While the yield data is for all crop seed, penetration rates for transgenic varieties are high and provide a fairly accurate indication of transgenic yields.

²⁵ USDA (2011), *supra* note 14 at 16.

longer generally associated with higher R&D or a permanent rise in R&D intensity.²⁶ This conclusion calls into question long-standing arguments that concentration is needed to generate economies of scale in R&D.²⁷

C. Farmers Already Bear the Brunt of Limited Competition

Our interviews with U.S. farmers indicate that high prices and the waning effectiveness of biotechnology weigh heavily on them. In the course of our research, farmers highlighted a number of concerns that are highly relevant to the potential adverse effects of further consolidation in biotechnology. First, the costs of early generation corn technologies remain high, despite farmers' perception that biotechnology companies should already have recouped their R&D investments. More generally, seed costs have not fallen, despite lower commodity prices. For example, corn seed prices have been flat for the last year. Moreover, farmers see little price transparency. Technology fees, which in the past were a line item on the bill, are now rolled into the total cost of the seed. Farmers find it very difficult to compare seed costs over time because of the variability in traits offered and the complex rebate system used by large firms.

Second, farmers expressed significant concern about the reduction in innovation due to a lack of competition. For example, they are considerably frustrated that as a result of evolving Roundup-resistant weeds, the herbicide Roundup is no longer as effective as it once was. The seed companies have fostered a dependence on seed and chemical cropping systems with declining effectiveness—and the industry's response has been to develop newer and more expensive traits. The declining performance of some of these biotechnology traits appears largely related to the widespread adoption of herbicide-tolerant and insect-resistant crops that has fostered growing and expensive emergence of weeds and insects that have developed resistance to these traits.

The industry response to growing resistance has been to promote a new generation of crops tolerant to different herbicides, which, in turn, will likely foster resistant weeds. Because of consolidation in the seed industry, there are few alternatives for farmers other than buying high-priced patented seeds and affiliated patented herbicides. As a result, farmers now spend more time and money on weed control. And while newer generation technology such as SmartStax (corn) addresses the Roundup resistance problem, farmers note that it does not produce a yield bonus over that. They also explain that it sometimes takes years for the promises of a new technology to catch up with reality. Even then, some of the yield boosts are a result of harvesting practices rather than the technology itself.

Third, reductions in seed options weigh heavily on producers' minds. As Dow and DuPont (and others remaining from the Big 6) look to leverage any efficiencies from a merger, there will undoubtedly be reductions in seed portfolios. While both companies have extensive

²⁶ *Id.* at 2, 15. USDA examined whether market concentration was correlated with the share of industry revenues invested in R&D.

²⁷ See e.g., Nicholas Kalaitzandonakes, *Biotechnology and the Restructuring of the Agricultural Supply Chain*, 1 *AgBioForum* 40, 40 (1998); Rachel E. Goodhue, et al., *Biotechnology, Intellectual Property and Value Differentiation in Agriculture*, Department of Agricultural and Resource Economics, Calif., Working Paper 901R at 15 (2002); Graff, et al., *supra* note 2; USDA (2012), *supra* note 14 at 16 and 36.

portfolios of seed corn traits, consolidation of those traits on a geographic basis would be more detrimental for farmers in areas outside the Corn Belt. Additionally, there are other crops in other geographic regions where a *single* reduction in seed lines would significantly reduce available options.

Publicly available information on the Dow and DuPont websites shows that Dow's roughly 330 commercially available genetic traits for corn appear throughout their different brands and DuPont-Pioneer has 300 different traits. It is important to note, however, that all traits are not available in all areas. For example, Pioneer-branded seed corn has 29 available traits in Turtle Lake, North Dakota. A reduction in portfolios due to the merger would therefore be felt more keenly in that region. Similarly, North Dakota is a strong canola producing area. But Dow—which only sells canola through its Mycogen brand—has four traits, while Pioneer only has three traits. The number of available traits is arguably already far fewer than farmers would prefer in order to meet their varying needs relative to growing season length, weed and pest pressure, soil types and moisture availability.

III. The Proposed Merger Will Eliminate Head-to-Head Competition in Corn and Soybeans

Dow and DuPont sell seeds containing their own biotechnology traits as well as traits cross-licensed from other firms. Both Dow and DuPont identify corn, soybean and cotton seeds as markets in which they have “established strengths.”²⁸ As the Division is undoubtedly aware, however, the companies have emerging competencies in wheat, canola and fruits and vegetables that could also be adversely affected by the proposed deal. The proposed merger would eliminate head-to-head competition in corn and soybean seeds, as shown in the table below. Monsanto currently holds 35% of the market for corn, while DuPont has 35% and Dow has 6%. In soybeans, Monsanto has a 28% share, while DuPont has 33% and Dow has 5%. The merger would therefore give Dow-DuPont about 41% of the market for corn seeds and 38% of the market for soybean seeds.

The merger would increase market concentration in corn by just over 400 HHI points, for post-merger concentration of over 3,000. In soybeans, the merger would increase market concentration by about 350 points, for a post-merger level of about 2,700. Under the government's HORIZONTAL MERGER GUIDELINES (GUIDELINES), these post-merger markets would be considered highly concentrated. Merger-related increases in concentration exceed levels that are “presumed to be likely to enhance market power.”²⁹ Perhaps more importantly, the merger would fundamentally restructure seed markets. Together, Monsanto and Dow-DuPont would control 76% of the market for corn and 66% of the market for soybeans. This concentration of market share in the hands of two companies would create a duopoly between Monsanto and Dow-DuPont.

²⁸ *Supra* note 6 at 7.

²⁹ U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Mergers Guidelines, §5.3 (Aug. 2010).

Market Shares for Corn and Soybeans (2014)³⁰

Company	Corn		Soybeans	
	Pre-Merger	Post-Merger	Pre-Merger	Post-Merger
Monsanto	35.5	35.5	28.0	28.0
DuPont Pioneer	34.5	40.5	33.2	38.4
Dow AgroSciences	6.0		5.2	
Syngenta	5.7	5.7	9.8	9.8
AgReliant	7.0	7.0	3.1	3.1
Local & Regional Cos.	11.3	11.3	18.3	18.2
Public and Saved Seed	0.0	0.0	2.4	2.4
Pre-Merger HHI	2,696	2,696	2,360	2,360
Change in HHI	-	414	-	345
Post-Merger HHI	-	3,110	-	2,705

IV. The Merger Will Eliminate Competition in Biotechnology Innovation

The GUIDELINES take seriously the potential adverse effect of a merger on innovation competition. They note that competition “often spurs firms to innovate” and that a merger may diminish innovation competition through curtailment of “innovative efforts below the level that would prevail in the absence of the merger.”³¹ The GUIDELINES go on to explain that adverse effects on innovation competition are particularly likely when the merging firms are each other’s close competitors. In other words, a merger is more likely to harm innovation competition “by combining two of a very small number of firms with the strongest capabilities to successfully innovate in a specific direction.”³²

The antitrust agencies have opposed mergers on the basis of eliminating innovation competition. In the proposed merger of Applied Materials and Tokyo Electron, for example, the DOJ noted that the deal “would have combined the two largest competitors with the necessary know-how, resources and ability to develop [next-generation] and supply high-volume non-lithography semiconductor manufacturing equipment.”³³ Similarly, Dow and DuPont are two of a very small number of rivals in the market for agricultural biotechnology. This feature is exacerbated by the fact that strategic competitive incentives affect firms’ decisions to make essential inputs and resources available to rivals. These include seed germplasm for breeding new traited varieties and licensing patented technology for the purposes of stacking traits.

³⁰ Verdant Partners, *Seed Competition Heats Up*, (July 28, 2015), <http://www.verdantpartners.com/seed-competition-heats-up/>.

³¹ Guidelines, §6.4.

³² *Id.*

³³ See Press Release, U.S. Dep’t of Justice, Applied Materials Inc. and Tokyo Electron Ltd. Abandon Merger Plans After Justice Department Rejected Their Proposed Remedy (Apr. 27, 2015), <https://www.justice.gov/opa/pr/applied-materials-inc-and-tokyo-electron-ltd-abandon-merger-plans-after-justice-department>; see also Andrew Barlow, *Mergers that Diminish Innovation Present Deal Risk*, Antitrust Lawyer Blog (May 7, 2015 11:40 AM), <http://www.antitrustlawyerblog.com/mergers-that-raise-future-competition-concerns-present-deal-risk/>.

Waves of prior mergers in the seed industry have already stifled innovation and competition in the conventional and hybrid seed industry as the biggest seed companies have reduced non-biotechnology research efforts. This has resulted in fewer seed choices appropriate to specific regional conditions or climate. AAI, F&WW and NFU believe that additional merger activity, including Dow-DuPont, could harm innovation competition in two fundamental ways: by eliminating head-to-head competition in important parallel-path R&D and by reducing the field of rivals needed for pro-competitive stacking.

A. The Merger Would Eliminate Head-to-Head Innovation Competition

The Dow and DuPont biotechnology pipelines compete head-to-head. They contain overlapping input and output traits in development for corn, soybeans and cotton, as well as crop protection.³⁴ Maintaining this standalone competition is essential for ensuring that incentives remain strong to continue existing and prospective product development programs. Such competition is particularly crucial for innovation in an industry where the probability of commercial success is relatively low. The time and cost associated with performing R&D and field-testing and obtaining regulatory approvals create a long pipeline to commercialization. And once through the pipeline, biotechnology firms must market new technology to farmers where crop planning and switching costs increase the time associated with adoption of new technology on a larger scale.

Support for the importance of maintaining multiple, parallel innovation paths in R&D comes from the pharmaceutical industry. Leading economists Comanor and Scherer note, for example, that: “Technological progress is best achieved in a field like pharmaceuticals when there is widespread dispersion of R&D initiatives both across companies and within them through the exploration of multiple technical paths.”³⁵ As one farmer put it: “*The more people you have researching, the better off you are at finding something.*”

The unique nature of collaborative R&D across firms and crops makes measuring concentration in biotechnology innovation markets difficult. Economic analysis indicates that traditional HHI measures may understate concentration in biotechnology innovation markets.³⁶ To illustrate the importance of overlaps in biotechnology innovation between Dow and DuPont, we collected data from the GM Crop Database for genetic corn, soybean and cotton “events” approved in the U.S. over the 24-year period from 1991 to 2014.³⁷ A total of 33 events were approved for corn, 19 for soybeans and 18 for cotton.³⁸ Over this period, DuPont accounted for 12%, 16% and 6% of events for corn, soybeans and cotton, respec-

³⁴ Dow, Seed & Traits Pipeline, <http://www.dowagro.com/en-us/innovation/our-pipeline/seeds-pipeline>; DuPont, Specific Sheets, <https://www.pioneer.com/home/site/about/research/pipeline/specification-sheets/>. See also Jim Borel, *Bank of American Merrill Lynch Global Agriculture Conference 2015*, DuPont (Feb. 26, 2015), http://s2.q4cdn.com/752917794/files/doc_presentations/2015/BAML-Conference-2015-FINAL.pdf.

³⁵ William S. Comanor & F.M. Scherer, *Mergers and innovation in the pharmaceutical industry*, 32 J. of Health Econ., 106, 108 (2013).

³⁶ James F. Oehmke & Christopher A. Wolf, *Measuring Concentration in the Biotechnology R & D Industry: Adjusting for Interfirm Transfer of Genetic Materials*, AgBioForum (2003), <http://www.agbioforum.org/v6n3/v6n3a07-oehmke.htm>.

³⁷ Ctr. for Env'tl. Risk Assessment, GM Crop Database, <http://cera-gmc.org/GMCropDatabase>. Database queried for corn, soybeans and cotton.

³⁸ *Id.*

tively. Dow accounted for 6%, 5% and 22% of events for corn, soybeans and cotton, respectively. Together, Dow and DuPont introduced 18% of genetic events for corn from 1991 to 2014, 21% for soybeans and 28% for cotton.

While the foregoing percentages may seem small, the importance of rivalry between Dow and DuPont in traits innovation is magnified by the fact that in any given year, the number of firms obtaining approvals is very low. For example, in most of the years between 1991 and 2014, only one or two firms obtained approvals for corn, soybeans and canola. In cotton, over 90% of approvals during the period were obtained by just one firm. In canola, there have been few new events introduced since 1999, and DuPont is one of two firms that has entered. This very limited rivalry highlights the likely harm to actual and potential innovation competition from a Dow-DuPont merger, even when using a simple count of technologies introduced. *Any* reduction in competition is therefore likely to harm innovation, farmers, and consumers. In light of this, the AAI, F&WW and NFU encourage the DOJ to view the elimination of “duplicative” R&D in breeding, traits and chemical discovery not as an efficiency generated by the merger but as a distinctly anticompetitive effect.

B. The Merger Would Reduce Opportunities for Pro-Competitive R&D Collaborations

Innovation in biotechnology depends critically on maintaining a “field” of rivals, each with strong pro-competitive incentives to collaborate to form new stacked trait profiles. In eliminating one of only a few competitors in biotechnology markets, the proposed merger will therefore reduce opportunities for pro-competitive collaborations between rivals in developing stacked trait profiles. As of 2009, there were 44 total profiles for corn, soybeans and cotton on the market, 67% of which were stacked traits.³⁹ Sixty-two percent of all stacks on the market were inter-firm stacks, highlighting an important avenue for generating new biotechnology products.⁴⁰ Herculex I-Liberty Link-Roundup Ready 2 for corn is, for example, an inter-firm stack with Bayer, Dow and Monsanto traits for glufosinate herbicide tolerance, corn borer resistance and glyphosate herbicide tolerance, respectively.⁴¹ Likewise, the WideStrike-Roundup Ready cotton stack is collaboration between Dow and Monsanto, which combines worm resistance and glyphosate herbicide resistance.

Farmers benefit most when there are competing stacks to choose from. Competition maximizes the potential for numerous collaborations and minimizes incentives to refuse to license or to impose discriminatory restrictions in technology licensing agreements. Moreover, competition limits incentives for just a few large players in a tight oligopoly to tacitly or even explicitly “agree” not to compete. Such agreements could range from deciding which firms specialize in certain crops or traits, to coming to agreement on market “rules,” such as anti-

³⁹Corn, Cotton and Soybean Trait Profiles, DMRKYNETEC and Monsanto (2009), http://www.monsanto.com/newsviews/documents/corn_and_soybean_agronomic_traits.pdf.

⁴⁰ Intra-firm stacking is inherently limited by the ability of a single innovator to combine its own traits into commercially viable stacks. No biotechnology innovator possesses a full portfolio of traits comparable to Monsanto’s. Monsanto traits appear in 72 percent of intra-firm stacks because of the firm’s dominance in biotechnology markets. For the same reason, Monsanto traits appear in 91 percent of inter-firm stacks. *All* stacked traits in soybeans and cotton involve a Monsanto trait whereas 50 percent of corn stacks involve Monsanto traits.

⁴¹ *Supra* note 39.

competitive cross-licensing terms and conditions.⁴²

Trait profile data show stacking between a number of the Big 6 firms, including: Syngenta-Bayer, Syngenta-BASF, Monsanto-Dow, Monsanto-DuPont, Monsanto-Bayer, BASF-Dow and BASF-Bayer. Importantly, Dow and DuPont are involved in more than 50% of inter-firm stacks. Since the mid 2000s, biotechnology innovators have agreed to cross-license their technologies in numerous instances for corn, soybeans, cotton and canola.⁴³ This includes

⁴² See, e.g., Robert H. Lande and Howard P. Marvel, *Collusion Over Rules*, 16 Antitrust 36 (2002).

⁴³ See, e.g., Arcadia Biosciences, Monsanto Company announce commercial licensing deal for Nitrogen Use Efficiency Technology in canola (Sept. 20, 2005), <http://www.arcadiabio.com/news/press-release/arcadia-biosciences-monsanto-company-announce-commercial-licensing-deal-nitrogen->; Monsanto, Dow AgroSciences and Monsanto Reach Global Agreement, Creating New Choices for Farmers (Jan. 18, 2006), <http://news.monsanto.com/press-release/dow-agrosciences-and-monsanto-reach-global-agreement-creating-new-choices-farmers>; Monsanto, Dow Agreement Paves the Way for Industry's First-Ever, Eight-Gene Stacked Offering in Corn (Sep. 14, 2007), <http://news.monsanto.com/press-release/monsanto-dow-agreement-paves-way-industrys-first-ever-eight-gene-stacked-offering-corn>; Bayer CropScience and Monsanto Enter Agreement for New Fungicide Seed Treatment Option for Corn Farmers (Apr. 8, 2008), <http://news.monsanto.com/press-release/bayer-cropscience-and-monsanto-enter-agreement-new-fungicide-seed-treatment-option-corn>; Monsanto and Syngenta Reach Royalty-Bearing Licensing Agreement on Roundup Ready 2 Yield Soybean (May 23, 2008), <http://news.monsanto.com/press-release/monsanto-and-syngenta-reach-royalty-bearing-licensing-agreement-roundup-ready-2-yield->; Syngenta, Dow AgroSciences Agree to Cross License Corn Traits (Apr. 1, 2009), <http://www.syngenta.com/global/corporate/en/news-center/news-releases/Pages/en-090401.aspx>; Monsanto and Bayer CropScience Sign Cross-Licensing Agreement on Herbicide Tolerance Traits in Canola (June 29, 2009), <http://news.monsanto.com/press-release/monsanto-and-bayer-cropscience-sign-cross-licensing-agreement-herbicide-tolerance-trait>; Monsanto and Bayer CropScience sign cross licensing agreement on herbicide tolerance traits in canola (Jul. 29, 2009), <http://www.monsanto.ca/newsviews/Pages/June29,2009.aspx>; Syngenta, Dow AgroSciences Sign Cotton Technology Licensing Agreements (Jan. 5, 2010) <http://newsroom.dowagro.com/press-release/2010/syngenta-dow-agrosciences-sign-cotton-technology-licensing-agreements>; New Dow AgroSciences Herbicide Tolerant Trait Technology Stays On Schedule (Mar. 03, 2010), <http://newsroom.dowagro.com/press-release/new-dow-agrosciences-herbicide-tolerant-trait-technology-stays-schedule>; Dow AgroSciences, Bayer CropScience Sign Global Cotton Technology Cross-Licensing Agreements (May 20, 2010), <http://newsroom.dowagro.com/press-release/dow-agrosciences-bayer-cropscience-sign-global-cotton-technology-cross-licensing-agree>; Monsanto and Dow AgroSciences Reach New Licensing Agreement on Roundup Ready 2 Yield® Soybean Technology (June 2, 2010), <http://news.monsanto.com/press-release/monsanto-and-dow-agrosciences-reach-new-licensing-agreement-roundup-ready-2-yield-soybean>; BASF and Monsanto Take Dicamba Tolerant Cropping System Collaboration to the Next Level (Mar. 14, 2011), <http://news.monsanto.com/press-release/basf-and-monsanto-take-dicamba-tolerant-cropping-system-collaboration-next-level>; Bayer CropScience and DuPont Announce Canola Trait Licensing Agreement (April 18, 2011), <https://www.cropscience.bayer.ca/en/News/2011/News144.aspx?overviewId=4B8E36F2-C34D-42B1-8573-8894864C8229>; Delta Farm Press, Syngenta announces VipCot cotton trait stack approval (Oct. 13, 2011), <http://deltafarmpress.com/syngenta-announces-vipcot-cotton-trait-stack-approval>; Syngenta and Bayer CropScience Submit New Herbicide-tolerant Soybean Product for Regulatory Review (Mar. 1, 2013), http://www.syngenta-us.com/newsroom/news_release_detail.aspx?id=171999; DuPont and Monsanto Reach Technology Licensing Agreements on Next-Generation Soybean Technologies (Mar. 26, 2013), <http://www.monsanto.com/global/uk/newsviews/pages/dupont-and-monsanto-reach-technology-licensing-agreements.aspx>; Dow AgroSciences, Monsanto Cross-License Advanced Corn Trait Technology, Designed To Provide Exceptional New Tools For Weed and Insect Management (Apr. 11, 2013), <http://news.monsanto.com/press-release/corporate/dow-agrosciences-monsanto-cross-license-advanced-corn-trait-technology-desig>; Bayer CropScience and Monsanto Enter Into Cross-Licensing Agreements For Next-Generation and Enabling Technologies (Apr. 16, 2013), <http://news.monsanto.com/press-release/corporate/bayer-cropscience-and-monsanto-enter-cross-licensing-agreements-next-generat>; Dow AgroSciences, Arcadia Biosciences and Bioceres Collaborate to Develop and Commercialize Soybean Traits

collaborations among firms within the Big 6 and between Dow and smaller biotechnology innovators. Opportunities for pro-competitive collaborations in biotechnology will necessarily shrink with the elimination of competition between Dow and DuPont as standalone rivals, with the effect of raising prices for biotechnology and reducing choice for growers.

V. The Proposed Merger Would Raise Entry Barriers Through the Creation of a Vertically Integrated Platform of Traits, Seeds and Chemicals

Past mergers in biotechnology have increased vertical integration among traits, seeds and chemicals. Current merger proposals involving the Big 6 are arguably even more motivated by the drive to develop integrated portfolios of traits, seeds and chemicals. This theme motivates Bayer's recent offer to buy Monsanto; and it was assuredly behind Monsanto's failed bid for Syngenta, which would have combined the former's strengths in traits and seed with Syngenta's leading chemicals portfolio. For example, in a June 6, 2015 letter from Monsanto's CEO Hugh Grant to Syngenta's Board of Directors, Grant articulated the supposed benefits of a merger for innovation: *"This would enable the combined company to deliver integrated and sustainable solutions across all the major technology-driven platforms of breeding, biotechnology, crop protection, microbials and precision agriculture in a more efficient manner than either company can do on a standalone basis."*⁴⁴

There is no reason to expect that a Dow-DuPont merger is not motivated by the same drive for integration. The proposed merger would vertically integrate traits, seeds and chemicals currently produced independently by Dow and DuPont. The result will be a more tightly integrated platform of components that are bound together both economically and technologically for the potential purpose of creating exclusive packages of traits, seeds and chemicals that do not "interoperate" with rival products. One farmer we interviewed highlighted the constraints of being locked into a single traits-seeds-chemicals platform *"[I] can't mix chemicals with other companies' products to remedy Roundup resistance."*

The genesis of integrated traits-seed-chemicals "platforms" was evident as early as first-generation transgenic soybean technology. Monsanto's glyphosate herbicide Roundup and Roundup Ready 1 (RR1) soybeans are a case in point. So lucrative are platforms of traits, seeds and chemicals that long before RR1 soybeans went off patent in 2014 and the window opened for generic competition, Monsanto attempted to switch farmers to Roundup Ready 2 (RR2) soybeans. This "hard switch" strategy met with some resistance, but apparently was successful. One generic soybean using the RR1 trait was introduced in 2015.⁴⁵ Monsanto has plans to extend the RR2 soybean platform to encompass more complex traits and herbicides.⁴⁶

(Apr. 28, 2015), <http://www.arcadiabio.com/news/press-release/dow-agrosciences-arcadia-biosciences-and-bioceres-collaborate-develop-and-0>; Dow AgroSciences and Arcadia Biosciences Form Strategic Collaboration to Develop and Commercialize Corn Traits (Dec. 2, 2015), <http://www.dowagro.com/en-us/newsroom/pressreleases/2015/12/arcadia-collaboration#.V0SE4Fcqiud>.

⁴⁴ Letter from Hugh Grant, CEO, Monsanto (June 6, 2015), <https://www.syngenta.com/global/corporate/SiteCollectionDocuments/pdf/media-releases/en/monsanto-letters-2015.pdf>.

⁴⁵ The University of Arkansas released UA 5414RR. See one.Seed World (June 2015), http://www.seedworld.com/flipbook_june2015//files/inc/c409c86a78.pdf.

⁴⁶ See, e.g., *Get Ready for Next Level Weed Control*, <http://www.roundupreadyxtend.com/Pages/default.aspx>.

A vertically integrated Dow-DuPont traits-seeds-chemicals platform would likely raise entry barriers for smaller rivals and increase the risk that they are foreclosed from access to technology and other resources needed to compete effectively. This type of hurdle is similar to the requirement of two-level entry described in the government’s non-horizontal merger guidelines.⁴⁷ Moreover, economic evidence from soybeans and cotton indicates that seed prices under vertical integration tend to be higher than under licensing arrangements across firms. This suggests that vertical integration by biotechnology firms may increase the exercise of market power and firms’ ability to extract economic benefits from seed dealers and farmers.⁴⁸

This evidence should bear importantly on the DOJ’s analysis of the vertical effects of the proposed Dow-DuPont merger. Claims that the merger will simply package “complementary” Dow and DuPont assets divert attention from the likely adverse impact of integration on competition, farmers and consumers. The AAI, F&WW and NFU therefore encourage the DOJ to fully assess the likely anticompetitive effects of creating a large, highly integrated biotechnology player. There is decidedly insufficient competition *between* platforms to ameliorate these concerns in Dow-DuPont. Such a problem would be worsened by other mergers involving the Big 6 (e.g., Bayer and Monsanto).

VI. The Proposed Merger Would Be Difficult, If Not Impossible, to Remedy

The DOJ has permitted two major biotechnology mergers in the last decade—Monsanto’s mergers with *DeKalb* and cotton giant *Delta & Pine Land*. These transactions arguably enhanced Monsanto’s dominant platforms in corn and cotton. In crafting remedies in both cases, the DOJ recognized the importance of innovation markets and the importance of licensing patented technologies.⁴⁹ The proposed merger of Dow-DuPont presents an entirely different animal. It would reduce an already small field of large, integrated competitors. Such a merger would be difficult, if not impossible, to remedy. The parties have proposed up-front to spin off their materials science and specialty products divisions.⁵⁰ But the company’s seed and crop protection businesses would remain integrated in an agriculture division. Such a proposal completely fails to address competitive concerns relating to the agricultural input markets affected by the proposed merger.

⁴⁷ U.S. Department of Justice, Non-Horizontal Merger Guidelines, §4.2.1.1, <https://www.justice.gov/atr/non-horizontal-merger-guidelines>.

⁴⁸ Kyle W. Stiegert, Guanming Shi & Jean Paul Chavas, *Innovation, Integration and the Biotechnology Revolution in U.S. Seed Markets*, Choices Magazine (2nd Q. 2010), <http://farmdoc.illinois.edu/policy/choices/20102/2010202/2010202.pdf>.

⁴⁹ For example, in *DeKalb*, the agency required the divestiture of Monsanto’s agrobacterium-mediated transformation technology for corn and required the company to enter into binding commitments to license corn germplasm to seed company customers for the purpose of introducing new transgenic traits in corn. See Press Release, U.S. Dep’t of Justice, Justice Department Approves Monsanto’s Acquisition of DeKalb Genetics Corporation: Divestiture of Transformation Technology Rights and Licensing of Corn Germplasm Implemented (Nov. 30, 1998), https://www.justice.gov/archive/atr/public/press_releases/1998/2103.htm. In *Delta & Pine Land*, the DOJ had similar concerns, requiring the divestiture of cotton seed assets, divestiture of several lines of cotton germplasm and the removal of restrictive provisions in Monsanto technology licenses that would prohibit rivals biotech developers from stacking Monsanto with non-Monsanto traits. *United States v. Monsanto Company, et al.*, No. 1:07-cv-00992, at 12-21 (D.C.Cir. 2007).

⁵⁰ *Supra* note 6 at 5.

Any remedy would require significant divestitures of a number of different assets in order to fully restore competition lost by the merger. Any reallocation of share within the large incumbents through divestitures would only result in a game of market concentration “musical chairs,” or even further increase concentration. Such an approach would not effectively address potential harm to competition and consumers. Moreover, a viable buyer would be difficult to find outside the Big 6. Such a buyer would need to be national, if not global, in scale and scope in order to compete effectively post merger. Lack of scale and scope in R&D, financing, marketing and distribution would necessitate cobbling together a package of assets to create and potentially prop up a national competitor.

The importance of preserving competition, farmers and consumers should take precedence over trying to craft an ineffective remedy. Indeed, there is mounting evidence of remedies in previous merger consent decrees that have failed to fully restore competition, either because of the non-viability of the buyer of the divested assets or inadequacy of related relief.⁵¹ These failures have been particularly apparent in highly concentrated markets, as is the case in Dow-DuPont. They include: UnitedHealth Group-Sierra (prices increased post-divestiture); Safeway-Albertsons (buyer Haggen filed for bankruptcy and stores were sold back to Albertsons); and Hertz-Dollar Thrifty (buyer Advantage filed for bankruptcy).⁵² This expanding record on failed remedies should bear importantly on the DOJ’s decision in Dow-DuPont.

⁵¹ See generally John Kwoka, *Mergers, Merger Control, and Remedies: A Restrospective Analysis of U.S. Policy* (2014).

⁵² Premium increases were observed relative to a control group. José R. Guardado et al., *The Price Effects of a Large Merger of Health Insurers: A Case Study of UnitedHealth-Sierra*, 1 Health Mgmt., Pol’y & Innov. 16 (2013); see also Press Release, UnitedHealth Grp., UnitedHealth Group Completes Acquisition of Sierra Health Services (Feb. 25, 2008), <http://www.reuters.com/article/idUS17532+26-Feb-2008+BW20080226>; Shannon Firth, *Health Policy Experts Fear the Worst with Payer Mergers*, MedPage Today (Oct. 9, 2015), <http://healthleadersmedia.com/content/HEP-321488/Health-Policy-Experts-Fear-the-Worst-With-Payer-Mergers>. The FTC allowed such a return in cases where there were no competing buyers for the particular store. Brent Kendall & Peg Brickley, *Albertsons to Buy Back 33 Stores It Sold as Part of Merger With Safeway*, Wall St. J. (Nov. 24, 2015), <http://www.wsj.com/articles/albertsons-to-buy-back-33-stores-it-sold-as-part-of-merger-with-safeway-1448411193>; see also Brent Kendall, *Haggen Struggles After Trying to Digest Albertsons Stores*, Wall St. J. (Oct. 9, 2015, 1:06 PM), <http://www.wsj.com/articles/haggen-struggles-after-trying-to-digest-albertsons-stores-1444410394> (reporting that soon after Haggen acquired 164 stores because of the merger, it filed for bankruptcy and closed 26 stores). Press Release, FSNA, Franchise Services of North America Inc. Announces Bankruptcy Filing by Simply Wheelz LLC (Nov. 4, 2013), <http://www.fsna-inc.com/newspdfs/115201391920.PDF>.


We appreciate the opportunity to share our views on the proposed merger and would be happy to discuss our analysis or answer any questions that you and your staff might have.

Sincerely,

Diana L. Moss

Wenonah Hauter

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