

# ARTICLES

## OWNING ALL THE SEEDS: CONSOLIDATION AND CONTROL IN AGBIOTECH

BY  
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*Agricultural companies are merging at a remarkable rate. The ensuing ag-biotech behemoths will have unprecedented control over global food production. The companies claim that this industry consolidation will not only benefit shareholders, but will serve the public by promoting food security and environmental sustainability. This Article tests those claims and finds them wanting.*

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*“For the public and nature such mergers are marriages made in hell”<sup>1</sup>*

## I. INTRODUCTION

What if one company owned all the seeds for all the food crops planted around the world—all the corn, all the soy, all the wheat, all the rice—all owned by one corporation? What if that same company also owned all the fertilizer and all the pesticides? Would it matter? Would that kind of consolidation make food security more or less likely? What if it were two corporations instead of one? What if it were four companies instead of one? We are about to find out.

In the space of roughly one year, the so-called “Big Six” ag-biotech companies announced three mega-mergers.<sup>2</sup> First, in December 2015, Dow and DuPont announced a “merger of equals” combining the two United States-based chemical firms into a new \$130 billion company.<sup>3</sup> In February 2016—less than two months later—Basel, Switzerland-based Syngenta announced that it had agreed to be purchased by the Chinese National Chemical Corporation (ChemChina) for \$43 billion.<sup>4</sup> Syngenta made the ChemChina agreement after fending off repeated purchase offers from Monsanto.<sup>5</sup> Then, in mid-September 2016, Monsanto announced its own deal—the company had accepted a \$66 billion merger proposal from Bayer.<sup>6</sup>

<sup>1</sup> Foo Yun Chee, *Asset Sales Plan Secures EU Backing for \$130 Billion Dow, DuPont Merger*, REUTERS, Mar. 27, 2017, <https://perma.cc/LP32-LDCQ> (quoting Adrian Bebb, Friends of the Earth Europe).

<sup>2</sup> Civil society groups have coined the term “the Big Six” to refer to Dow, DuPont, Bayer, Monsanto, Syngenta, and BASF. See, e.g., Hope Shand, *The Big Six: A Profile of Corporate Power in Seeds, Agrochemicals & Biotech*, HERITAGE FARM COMPANION, Summer 2012, at 10, 10, <https://perma.cc/MWF3-QGLX>; “Big Six” Pesticide and GMO Corporations, SOURCEWATCH, <https://perma.cc/4ZMC-GC6J> (last modified Mar. 25, 2014). The term has been picked up by the popular press. See, e.g., *Controversial Hybrids*, ECONOMIST (Apr. 29, 2015), <https://perma.cc/P2B8-WT9S>; Jenny Hopkinson, *Biotech’s Big Six Were Generous to Grassley*, POLITICO (Nov. 15, 2016), <https://perma.cc/X29P-E6K5>.

<sup>3</sup> News Release, Dow, DuPont and Dow to Combine in Merger of Equals (Dec. 11, 2015), <https://perma.cc/ZNF7-EAPN>.

<sup>4</sup> Syngenta International AG, *ChemChina Cash Offer to Acquire Syngenta at a Value of Over US\$43 Billion*, CISION PR NEWSWIRE (Feb. 3, 2016), <https://perma.cc/Z2KE-N56S>.

<sup>5</sup> Alison Rice, *Syngenta, Monsanto in Merger Standoff*, AGWEB (June 24, 2015), <https://perma.cc/VCM2-KZSP>. Monsanto apparently wanted Syngenta pretty badly—making three take-over offers over the course of four years. Jack Kaskey, *Monsanto to Focus on Technology as Syngenta Merger Slips Away*, BLOOMBERG (Feb. 3, 2016), <https://perma.cc/Q6HP-58WR>.

<sup>6</sup> News Release, Monsanto, Bayer and Monsanto to Create a Global Leader in Agriculture (Sept. 14, 2016), <https://perma.cc/CV3J-YY59>.

When the dust settles, the world will be left with four extremely large ag-biotech companies: Dow/DuPont, ChemChina/Syngenta, Monsanto/Bayer, and BASF. As the lone non-merging company, BASF is the most likely purchaser of any agricultural units the other companies are forced to spin off in order to obtain regulatory approval for their proposed mergers.<sup>7</sup>

The primary justifications advanced for these mergers are efficiency and enhanced shareholder value.<sup>8</sup> Dow and DuPont, in particular, focused largely on the relatively prosaic business justifications of “synergies” and “strong industrial logic” for their merger.<sup>9</sup> However, the other companies were not above suggesting that these mergers were necessary to feed a growing global population. For example, Bayer CEO Werner Bauman characterized his company’s proposed merger with Monsanto as “the kind of revolutionary approach to agriculture that will be necessary to sustainably feed the world.”<sup>10</sup> Similarly, Monsanto’s press release announcing the merger described it as responsive to “one of the greatest challenges of our time: how to feed an additional 3 billion people in the world by 2050 in an environmentally sustainable way.”<sup>11</sup> The media conference call announcing the Bayer-Monsanto merger explicitly linked the merger to food security, describing the combined company as “benefiting from macro trends,” including rapid population growth and “biophysical effects of climate change shocks on yields.”<sup>12</sup> One Monsanto spokesman took this save-the-world rhetoric up a notch, commenting, “I find it difficult to see how an acquisition of a company whose seeds help feed the world by a company whose products help keep us all healthy longer could be anything less than saintly.”<sup>13</sup>

Striking a similar note, ChemChina described its merger with Syngenta as “not confined to our mutual interests” but also as a way to “respond to and maximize the interests of farmers and consumers around the world” and “deliver safe and reliable solutions for the continued growth in global food

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<sup>7</sup> *Bayer Monsanto Start \$2.5 Bln Asset Sale to Get Merger Clearance—Sources*, REUTERS AFR., Mar. 9, 2017, <https://perma.cc/8APU-MGHM>. Syngenta has also expressed an interest in Bayer’s seed assets if Bayer is forced to divest. *Spinoff Opportunities About Amid Ag’s Merger/Acquisitions*, AGPRO (Mar. 29, 2017), <https://perma.cc/7DYL-5MHG>.

<sup>8</sup> See, e.g., News Release, Dow, *supra* note 3 (describing the businesses’ ability to “allocate capital more effectively” while also “driving value for all of [its] shareholders”).

<sup>9</sup> See DOW CHEM. CO., DOWDUPONT MERGER OF EQUALS UPDATE 15, 22–24 (2016), <https://perma.cc/X2ST-FUBL> [hereinafter DOW/DUPONT MERGER OF EQUALS UPDATE].

<sup>10</sup> Presentation by Werner Baumann, Chairman of the Bd. of Mgmt., Bayer AG, Liam Condon, Member of the Bd. of Mgmt, Bayer AG & Johannes Dietsch, Chief Fin. Officer, Bayer AG 6–7 (May 23, 2016), <https://perma.cc/736T-8347>.

<sup>11</sup> News Release, Monsanto, *supra* note 6.

<sup>12</sup> Presentation by Werner Baumann, Chairman of the Bd. of Mgmt., Bayer AG, Hugh Grant, Chairman and Chief Exec. Officer, Monsanto & Liam Condon, Member of the Bd. of Mgmt. & Head of the Crop Sci. Div., Bayer 7 (Sept. 14, 2016), <https://perma.cc/RAF4-EGA6>.

<sup>13</sup> Aoife White, *Bayer, Monsanto Must Overcome Incredible Hulk, Regulators*, BLOOMBERG (Aug. 23, 2016), <https://perma.cc/C277-PH2B> (quoting Brandon Mitchener, spokesman for Monsanto).

demand.”<sup>14</sup> This framing seeks to advance a narrative of social necessity—that feeding the world in an era of climate change requires the products these companies produce and the level of consolidation these companies represent.

But this “our products will save the world” narrative is characterized by some as a myth,<sup>15</sup> and there is another narrative emerging—one that places the kind of industrial agriculture these companies represent squarely on the problem side of the ledger, rather than on the solution side. In this alternative narrative, the industrial-scale monoculture that these companies represent helps drive climate change rather than combat it and stands as an obstacle to food security rather than as its mainstay. Glimmers of this alternative narrative are increasingly common in official reports. For example, the author of a major international report on agriculture recently characterized the extravagant, save-the-world-esque claims made for the genetically engineered (GE) crops these companies produce as “unproven.”<sup>16</sup> The United Nations Conference on Trade and Development expressed concern that “concentration in agricultural biotechnology is giving the largest corporations unprecedented power vis-à-vis growers and other stakeholders” with “far-reaching implications for food security.”<sup>17</sup> Similarly, the Food and Agriculture Organization of the United Nations recently noted that the more compelling advances claimed on behalf of this technology have “been anticipated several times . . . [but have] had very limited impact so far.”<sup>18</sup> Writing specifically about pesticide use, Hilal Elver, the United Nations Special Rapporteur on the Right to Food, recently lambasted the very products these companies are touting as “solutions,” on the ground that pesticides are “undermin[ing] the rights to adequate food and health for present and future generations.”<sup>19</sup> Indeed, Elver cautioned that the model of agriculture these companies represent “is highly problematic, not only because of damage inflicted by pesticides, but also their effects on climate

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<sup>14</sup> *ChemChina Cash Offer to Acquire Syngenta at a Value of Over US\$43 Billion*, *supra* note 4 (quoting Ren Jianxin, Chairman of ChemChina).

<sup>15</sup> See, e.g., ETC GRP., *PUTTING THE CARTEL BEFORE THE HORSE . . . AND FARM, SEEDS, SOIL, PEASANTS, ETC.* 4 (2013), <https://perma.cc/QKV5-NQ8T> (making the case that small holder farmers, using traditional methods, not only feed most of the world but also represent the best hope to continue to do so in an era of climate change).

<sup>16</sup> E. Toby Kiers et al., *Agriculture at a Crossroads*, 320 *SCI.* 320, 320 (2008) (describing the benefits to subsistence farmers from the use of genetically modified food technologies as “unproven”). See also INT’L ASSESSMENT OF AGRIC. KNOWLEDGE, SCI. & TECH. FOR DEV., *AGRICULTURE AT A CROSSROADS: SYNTHESIS REPORT 8* (2009), <https://perma.cc/ZCH8-757Z> (“[D]ata based on some years and some [genetically modified] crops indicate highly variable 10%–33% yield gains in some places and yield declines in others.”).

<sup>17</sup> U.N. CONFERENCE ON TRADE & DEV., *TRACKING THE TREND TOWARDS MARKET CONCENTRATION: THE CASE OF THE AGRICULTURAL INPUT INDUSTRY*, at iv, 1 (2006), <https://perma.cc/959H-8JR3>.

<sup>18</sup> HUGH TURRAL ET AL., *FOOD & AGRIC. ORG. OF THE U.N., CLIMATE CHANGE, WATER AND FOOD SECURITY*, at xxiii (2011), <https://perma.cc/4AEN-FCNN>.

<sup>19</sup> Human Rights Council, Rep. of the Special Rapporteur on the Right to Food, U.N. Doc. A/HRC/34/48, at 3 (2017), <https://perma.cc/B8E8-YJ4G>.

change, loss of biodiversity and inability to ensure food sovereignty.”<sup>20</sup> She described the industry as an oligopoly with enormous power and highlighted the conflict of interest in allowing the same handful of companies to dominate global seed and pesticide sales.<sup>21</sup>

This competing agricultural narrative adds a compelling social justice edge to the ongoing antitrust examination of these mergers. The United Nations Conference on Trade and Development expressed a concern that “concentration in agricultural biotechnology is giving the largest corporations unprecedented power vis-à-vis growers and other stakeholders”<sup>22</sup> as the privatization and patenting of agricultural innovation (e.g., gene traits, transformation technologies, and seed germplasm) increasingly supplants traditional agricultural understandings about farmers’ rights, and breeders’ rights.<sup>23</sup> Yet, most of these weighty questions will not be directly on the table in the myriad of reviews these mergers will face. There will be no wide-ranging inquiry into the public’s interest in environmental sustainability concerns and food security issues, despite the urgency of those questions.

Regulators deciding whether to approve these mergers have a relatively narrow purview. The Clayton Act<sup>24</sup> requires that regulators focus exclusively on whether the effect of the mergers “may be substantially to lessen competition, or to tend to create a monopoly.”<sup>25</sup> In other words, the focus of the antitrust regulator is on making sure that “[m]ergers should not be permitted to create, enhance, or entrench market power or to facilitate its exercise.”<sup>26</sup> As a result, regulatory analysis of these mergers will focus on arcane calculations of market concentration. While wading through technical analyses of the Herfindahl-Hirschman Index<sup>27</sup> (HHI), “small but

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<sup>20</sup> *Id.* at 22.

<sup>21</sup> *Id.* at 18.

<sup>22</sup> U.N. CONFERENCE ON TRADE & DEV., *supra* note 17, at iv.

<sup>23</sup> *Id.* at 1.

<sup>24</sup> 15 U.S.C. §§ 12–27 (2012); 29 U.S.C. § 52 (2012).

<sup>25</sup> 15 U.S.C. § 18. Section 7 of the Clayton Act prohibits mergers if “in any line of commerce or in any activity affecting commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.” *Id.*

<sup>26</sup> U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, HORIZONTAL MERGER GUIDELINES 2 (2010), <https://perma.cc/B3G9-QZPZ>.

<sup>27</sup> The Herfindahl-Hirschman Index (HHI) is a commonly accepted measure of market concentration. *Id.* at 18. “HHI is calculated by summing the squares of the individual firms’ market shares, and thus gives proportionately greater weight to the larger market shares.” *Id.* “When using the HHI, the [DOJ and other regulatory agencies consider both the post-merger level of the HHI and the increase in the HHI resulting from the merger.” *Id.* at 18–19. “Based on their experience,” markets are generally classified into three types: “[1] Unconcentrated Markets: HHI below 1500; 2] Moderately Concentrated Markets: HHI between 1500 and 2500; and 3] Highly Concentrated Markets: HHI above 2500.” *Id.* at 19. According to the American Antitrust Institute, the pre- to post-merger increase in concentration in corn seed for the Dow/DuPont merger will be over 400 HHI points, producing a post-merger concentration of over 3,000 HHI; for soybeans it will be a 350 HHI point increase, resulting in a post-merger level of about 2,700 HHI. *Consolidation and Competition in the U.S. Seed and Agrochemical Industry: Hearing Before the S. Comm. on Judiciary*, 114th Cong. 6 (2016) [hereinafter Moss Testimony] (statement of Diana L. Moss, President, American Antitrust Institute). The Monsanto-Bayer

significant and non-transitory increase in price”<sup>28</sup> (SSNIP), and concentration ratios<sup>29</sup> (CRs) that make up an antitrust assessment, it can be easy to lose sight of what is at stake—whether three or four companies should be permitted to control global agriculture and determine the priorities and direction of agricultural research.

Yet, even for the questions that are central to antitrust laws—the impacts on competition and innovation—the answers seem troubling. In general, when four firms control 80% or more of a market, that market is no longer considered competitive.<sup>30</sup> By that matrix, seed markets in the United States are already not competitive. In 2014–2015, the share of seed sales in the United States controlled by the four largest firms was “91% for cotton, 82% for corn, and 76% for soybeans.”<sup>31</sup> The numbers are not much better on the global scale. A combined Bayer/Monsanto would single-handedly control 29% of the world’s seeds and 24% of its pesticides.<sup>32</sup> This level of concentration creates real concerns about the effects these mergers will have on farmers and on those of us who eat food. Among the concerns are the possibility of price increases and loss of choice, both for farmers and consumers, as well as the ramifications of increasingly consolidated control over the production of agricultural knowledge.<sup>33</sup>

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merger would produce a 1600 HHI point increase in concentration in the cottonseed market, for a post-merger level of about 3,750 HHI. *Id.* at 7.

<sup>28</sup> SSNIP stands for “a small but significant and non-transitory increase in price” and is a methodological tool for identifying the relevant products and market to be used to test post-merger market power. U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *supra* note 26, at 8–9.

<sup>29</sup> Concentration ratios are used to demonstrate market control and to identify oligopolies. *Oligopoly*, ECON. ONLINE, <https://perma.cc/BAQ7-883R> (last visited July 22, 2017).

<sup>30</sup> See, e.g., FREDRIC M. SCHERER & DAVID ROSS, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 465 (Rand McNally Coll. Publ’g Co. 1970) (explaining “unreasonable market power” and the relevant calculus to that determination).

<sup>31</sup> Henry Bryant et al., *Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices* 5 (Texas A&M Univ., Agric. Food & Policy Ctr., Working Paper No. 16-2, 2016), <https://perma.cc/V9CY-7LHZ>. For perspective, in 1998, the four-firm concentration ratio was 67% for corn seed, 49% for soybean seed, and 87% for cottonseed. *Agriculture Market Concentration: Hearing Before a Subcomm. of the Comm. on Appropriation*, 107th Cong. 10 (2001) [hereinafter Collins Testimony] (statement of Keith Collins, Chief Economist, U.S. Department of Agriculture).

<sup>32</sup> Brad Plummer, *Why Bayer’s Massive Deal to Buy Monsanto Is So Worrisome*, VOX (Sept. 15, 2016), <https://perma.cc/5G2Y-LGAT>.

<sup>33</sup> This is not an exhaustive list of the range of concerns raised by these mergers. There are real concerns about the effect these mergers will have on food security, sustainability, and biodiversity. Sadly, these questions are not even on the radar screen of the antitrust regulators who will approve or reject the mergers. I have written elsewhere about the role that GE crops and pesticides play in food security and environmental sustainability. See generally Rebecca Bratspies, *Hunger and Equity in an Era of Genetic Engineering*, 7 U.C. IRVINE L. REV. (forthcoming 2017) (arguing that GE crops have not only failed to contribute to food security, but have also diverted research dollars away from less glamorous but more sustainable methods of achieving that goal); Rebecca Bratspies, *Food, Hunger and Technology*, 19 LAW CULTURE & HUMAN. 212 (2014) (arguing that food insecurity is due to political manifestations rather than on technological insufficiency). This Article will, instead, focus on the competition and innovation concerns within the purview of antitrust regulators.

This Article will consider each of these concerns in turn. Part II offers a general background on the rise of GE crops and the accompanying consolidation in the agricultural industry. Part III then describes the three merger proposals, surfacing some of the key regulatory concerns. Part IV draws on past experience with agricultural mergers to demonstrate how these mergers will negatively impact the ability of farmers to select and plant non-GE seeds. This Part makes the point that loss of farmer choice will result in a concomitant loss of choice for consumers and will tighten the grip that the remaining agribusiness conglomerates will have on the production and circulation of agricultural knowledge. Again drawing on past experience, this Part shows how this consolidation of knowledge is contrary to the public interest. Finally, in Part V, the Article concludes that should these mergers go through as proposed, the resulting consolidation may jeopardize the burgeoning agroecology movement and will make food security and sustainability even more difficult to achieve, resulting in a net loss of public welfare.

## II. A BRIEF HISTORY OF AG-BIOTECH MERGERS

Until fairly recently, seeds were considered a common resource, and there were thousands of relatively small seed companies.<sup>34</sup> A few key legal and technical milestones marked the end of this era and the beginning of consolidation. In 1980, the Supreme Court of the United States began allowing patenting of GE organisms.<sup>35</sup> A few years later, the United States Patent Office followed up by extending those same intellectual property rights to plant varieties—giving patent holders the ability to curtail the traditional farmer's right to save seeds.<sup>36</sup> These legal and scientific developments unleashed a flood of new GE crops.<sup>37</sup> Within a decade, roughly 52% of all the corn, 79% of all the cotton, and 87% of all the soybean acreage in the United States was planted with new GE seeds.<sup>38</sup>

These new products, in turn, sparked a wave of mergers. At the same time Monsanto was applying for approval of *Bacillus thuringiensis* (*Bt*) corn<sup>39</sup> and Roundup Ready soybeans,<sup>40</sup> it was also purchasing nearly forty

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<sup>34</sup> Philip H. Howard, *Intellectual Property and Consolidation in the Seed Industry*, 55 CROP SCI. 2489, 2489 (2015).

<sup>35</sup> See *Diamond v. Chakrabarty*, 447 U.S. 303, 308–18 (1980) (holding that a human-made, GE bacterium is patentable under section 101 of the Plant Patent Act).

<sup>36</sup> See *Ex Parte Hibberd*, 1985 WL 71986 (B.P.A.I. Sept. 24, 1985). The Supreme Court ultimately upheld this decision. *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc.*, 534 U.S. 124, 127 (2001).

<sup>37</sup> See CLIVE JAMES & ANATOLE F. KRATTIGER, GLOBAL REVIEW OF THE FIELD TESTING AND COMMERCIALIZATION OF TRANSGENIC PLANTS: 1986 TO 1995, THE FIRST DECADE OF CROP BIOTECHNOLOGY 5, 7, 9 (1996) (documenting thousands of field trials).

<sup>38</sup> NAT'L AGRIC. STATISTICS SERV., ACREAGE 24–25 (2005), <https://perma.cc/M7H9-L9W9>.

<sup>39</sup> Monsanto Co.; Addition of Two Genetically Engineered Insect Resistant Corn Lines to Determination of Nonregulated Status, 61 Fed. Reg. 10,720, 10,720 (Mar. 15, 1996).

<sup>40</sup> Availability of Determination of Nonregulated Status of Monsanto Co., Genetically Engineered Soybean Line, 59 Fed. Reg. 26,781, 26,781 (May 24, 1994).

seed and biotech companies, including industry giants Asgrow Agronomics, DeKalb Genetics, and Delta and Pine Lands (DPL).<sup>41</sup> Dow Chemical began purchasing seed companies, including the seed biotech company Mycogen, before reforming itself as Dow Agrosciences.<sup>42</sup> DuPont responded by acquiring Pioneer Hi-Bred International, the world's largest seed company at the time.<sup>43</sup> Hoechst and Rhone Poulenc merged to form Aventis.<sup>44</sup> After the StarLink corn fiasco,<sup>45</sup> Aventis merged with Sanofi-Synthelabo,<sup>46</sup> selling off its agricultural unit, Aventis CropScience, to Bayer.<sup>47</sup> Chemical conglomerates AstraZeneca and Novartis merged and spun off their agricultural division as Syngenta.<sup>48</sup> Cumulatively, this wave of mergers transformed what had been a sector composed primarily of small, family-owned firms into a \$100 billion global industry that integrated seeds, fertilizers and pesticides.<sup>49</sup> Thus, the current crop of mergers must be evaluated against the backdrop of an already concentrated industry.

The new merger proposals differ from the past wave of mergers in that the primary drivers are external to the companies themselves. Over the past four years (2013–2016), farmers around the world have produced record harvests of corn, soybean, and wheat.<sup>50</sup> As a result, food stockpiles have risen, and prices have fallen dramatically.<sup>51</sup> Current prices for these commodities are less than half the prices the crops commanded during the 2008 food crisis.<sup>52</sup> These low prices are good news for consumers but have cut farmers' profits, "forcing [them] to cut back their spending on seeds and pesticides."<sup>53</sup> Those farmer cutbacks, in turn, dragged down profit margins

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<sup>41</sup> Barnaby J. Feder, *Monsanto to Acquire 2 Seed Companies*, N.Y. TIMES (May 12, 1998), <https://perma.cc/M6XA-RYTB>; Reuters, *Monsanto to Buy Asgrow Agronomics Unit*, N.Y. TIMES (Sept. 25, 1996), <https://perma.cc/N4KA-LZCX>.

<sup>42</sup> *About Dow Agrosciences*, DOW, <https://perma.cc/GRB6-5N4X> (last visited July 22, 2017) (providing a "view our timeline" hyperlink to view major mergers throughout its history).

<sup>43</sup> Steven Lipin et al., *DuPont Agrees to Purchase of Seed Firm for \$7.7 Billion*, WALL STREET J. (Mar. 15, 1999), <https://perma.cc/LU56-AFHN>.

<sup>44</sup> *Hoechst and Rhone-Poulenc to Merge Pharmaceutical and Agricultural Businesses*, LABORATORY NETWORK (Dec. 2, 1998), <https://perma.cc/PD2U-P5EK>.

<sup>45</sup> See Rebecca Bratspies, *Myths of Voluntary Compliance: Lessons from the StarLink Corn Fiasco*, 27 WM. & MARY ENVTL. L. & POL'Y REV. 593, 593–95 (2003); *Aventis to Dump AgBiotech in Wake of StarLink Corn Scandal*, ORGANIC CONSUMERS ASS'N (Nov. 15, 2000), <https://perma.cc/V7RR-8L5S>.

<sup>46</sup> Nita Raghavan et al., *Sanofi to Swallow Aventis in a Deal Set at \$65 Billion*, WALL STREET J. (Apr. 26, 2004), <https://perma.cc/VT2T-FXND>.

<sup>47</sup> *Bayer Buys CropScience*, CNRMONEY (Oct. 2, 2001), <https://perma.cc/D8DK-C5NX>.

<sup>48</sup> Steven Lipin et al., *AstraZeneca, Novartis Confirm Plans to Merge, Spin Off Agrochemical Units*, WALL STREET J. (Dec. 2, 1999), <https://perma.cc/R56Z-5F7S>.

<sup>49</sup> See MICHAEL KELLEHER, AGRICULTURAL FERTILIZER INDUSTRY 1 (2014), <https://perma.cc/BUP3-58NK>; Dean V. Cavey, *Reflections on Consolidation in the Seed Industry*, VERDANT PARTNERS (June 13, 2016), <https://perma.cc/E9M5-VZLN> (explaining that the merger creating Syngenta set off a wave of mergers in the seed industry).

<sup>50</sup> Andrew Hecht, *Consolidation in the Agricultural Sector*, BALANCE (Dec. 5, 2016), <https://perma.cc/B3BE-WBXP>.

<sup>51</sup> *Id.*

<sup>52</sup> *See id.*

<sup>53</sup> Brooke Sutherland, *It's Hard to Be a Saint in M&A, But Bayer-Monsanto Is Trying*, BLOOMBERG (Sept. 15, 2016), <https://perma.cc/KSM6-NDUV>.



for agricultural companies.<sup>54</sup> The lower sales and reduced margins created a downward pressure on Big Six stocks.<sup>55</sup> It is this vulnerability of stock prices to weak commodity prices, coupled with pressure from activist investors to take steps to maximize shareholder value, that is driving these mergers.<sup>56</sup> It turns out that ownership of these companies had been consolidating too. In 2016, large asset management firms owned anywhere from 14.65% to 33.36% of the Big Six companies.<sup>57</sup> These institutional investors, along with hedge fund activist investors,<sup>58</sup> pushed the companies for mergers as a way to boost returns.<sup>59</sup>

If these mergers go forward, Dow/DuPont and Monsanto/Bayer will have a duopoly that controls 75% of the U.S. market for corn seeds, 65% of the market for soybeans, and more than half of the market for crop chemicals.<sup>60</sup> ChemChina/Syngenta will hold 8% of the seed market and 25% of the agrochemical market.<sup>61</sup> While the extreme level of consolidation these mergers would represent is unprecedented, it continues two decades of agricultural companies merging to form ever-larger agricultural conglomerates.

Before the latest merger proposals, the market was already astonishingly consolidated, both horizontally and vertically. Just six companies controlled 75% of the global agrochemical market, 63% of the global seed market, and conducted more than 75% of private sector agricultural research on seeds and pesticides.<sup>62</sup> The proposed mergers would reduce that number even further—down to four. The companies looking to merge are currently in the same market, thus the mergers would increase

<sup>54</sup> Nate Birt, *Top Producer: Why Agriculture is Consolidating*, VERDANT PARTNERS (Nov. 18, 2016), <https://perma.cc/S9ZM-6NTE>.

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

<sup>57</sup> See Jennifer Clapp, *Bigger Is Not Always Better: Drivers and Implications of the Recent Agribusiness Megamergers* 18 tbl.2 (Univ. of Waterloo Glob. Food Politics Grp., Working Paper, 2017), <https://perma.cc/XB88-EQE2>.

<sup>58</sup> James Fontanella-Khan et al., *Dow Races to Fend Off Loeb with DuPont Merger*, FIN. TIMES (Dec. 9, 2015), <https://perma.cc/797N-QECQ>; Stephen Gandel, *Why Dow and DuPont Have to Merge*, FORTUNE (Dec. 8, 2015), <https://perma.cc/6HQU-EACT> (asserting that “[t]he market wasn’t prepared to wait”).

<sup>59</sup> See, e.g., Jackie Pucci, *The Path Ahead for M&A*, AGRIBUSINESS GLOBAL (Dec. 29, 2016), <https://perma.cc/24TK-RUS2> (referencing agricultural consultant Partner Garrett Stoerger in his assertion that shareholders demanded mergers as a means of improving earnings).

<sup>60</sup> David McLaughlin, *Bayer, Monsanto Confront Global Review as Farm Options Shrink*, BLOOMBERG (Sept. 14, 2016), <https://perma.cc/RT5B-JD4B>.

<sup>61</sup> Clapp, *supra* note 57, at 23 fig.3. It is worth noting that the precise estimates of market share differ between sources, but regardless of the specific numbers, the theme of market dominance remains constant. Compare *id.* at 23, with ETC GRP., BREAKING BAD: BIG AG MEGAMERGERS IN PLAY DOW + DUPONT IN THE POCKET? NEXT: DEMONSANTO? 1, 4–5 (2015), <https://perma.cc/3WW3-V7C8> [hereinafter ETC GRP., BREAKING BAD], and Sarah Chen et al., *ChemChina Buys Syngenta in Record Deal*, NAT’L POST (Feb. 4, 2016), <https://perma.cc/45R5-643C>.

<sup>62</sup> ETC GRP., BREAKING BAD, *supra* note 61, at 4; see Philip H. Howard, *Visualizing Consolidation in the Global Seed Industry: 1996–2008*, 1 SUSTAINABILITY 1266, 1267 (2009) (noting that the entire seed industry is dominated by a few large companies); Clapp, *supra* note 57, at 7 (stating that beginning in 2009, the Big Six controlled 75% of the agrochemical market).

horizontal control.<sup>63</sup> The deals would also extend control vertically along the supply chain by integrating within the remaining companies a vast array of intellectual property rights over traits, germplasm, breeding programs, technologies, and crop protection products.<sup>64</sup> Describing the newest consolidation wave as a “tsunami,” Iowa Senator Chuck Grassley mused in hearings before the Senate Judiciary Committee about “when does the size of companies and concentration in the market reach the tipping point, so much that a market becomes anti-competitive.”<sup>65</sup> In the European Union, the Green Party was more blunt, characterizing the ostensible aim of the mergers to be market dominance.<sup>66</sup>

### III. DETAILS OF THE MERGER PROPOSALS

#### *A. Dow/DuPont*

The Dow/DuPont “merger of equals” would result in the two chemical giants combining into one even more gigantic company.<sup>67</sup> The plan is that within two years, the company would then redivide into three separate companies. With regard to the ag-biotech holdings of both companies, this merger would result in the spin-off of a “pure-play agriculture company” that would combine DuPont and Dow’s seed and crop protection businesses.<sup>68</sup> This new agriculture company is projected to have \$16 billion in revenue<sup>69</sup> and to control 40% of the U.S. corn and soybean markets.<sup>70</sup> The agricultural share of the merger synergies—projected to be \$1.3 billion<sup>71</sup>—will be achieved through elimination of “duplicative [research and development (R&D)] programs including breeding, traits and chemical discovery,”<sup>72</sup> even as the companies tout the combination of their germplasm, traits, and crop protection portfolios.<sup>73</sup> At the same time, the merger would “rationalize and prioritize spending as it relates to breeding, biotechnology and discovery

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<sup>63</sup> See Howard, *supra* note 62, at 1270–71 (discussing the potential fallout from the predicted horizontal integration of six companies to four).

<sup>64</sup> *Id.* at 1271.

<sup>65</sup> *Consolidation and Competition in the U.S. Seed and Agrochemical Industry: Hearing Before the S. Comm. on Judiciary*, 114th Cong. 2 (2016) (statement of Sen. Chuck Grassley, Chairman, S. Comm. on Judiciary).

<sup>66</sup> White, *supra* note 13 (quoting Richard More O’Ferrall, spokesman for the Green Party).

<sup>67</sup> Jack Kasky & Simon Casey, *DuPont, Dow Chemical to Combine in Merger of Equals*, BLOOMBERG (Dec. 11, 2015), <https://perma.cc/2D2S-LJJN>.

<sup>68</sup> News Release, Dow, *supra* note 3.

<sup>69</sup> DOW/DUPONT MERGER OF EQUALS UPDATE, *supra* note 9, at 15.

<sup>70</sup> John Cassidy, *A Dow-DuPont Merger Would Raise Big Questions*, NEW YORKER (Dec. 9, 2015), <https://perma.cc/BW5E-B7RW>.

<sup>71</sup> DOW/DUPONT MERGER OF EQUALS UPDATE, *supra* note 9, at 20.

<sup>72</sup> DOW & DUPONT, DUPONT AND DOW TO COMBINE IN MERGER OF EQUALS: WILL CREATE HIGHLY FOCUSED LEADING BUSINESSES IN AGRICULTURE, MATERIAL SCIENCE AND SPECIALTY PRODUCTS 7 (2015), <https://perma.cc/NT42-L6AQ> [hereinafter DOW & DUPONT TO COMBINE IN MERGER OF EQUALS].

<sup>73</sup> *Id.* at 4.

programs” while “increas[ing] cross-sell opportunities.”<sup>74</sup> Overall, the merger projects a 10% decrease in R&D spending.<sup>75</sup>

European Union regulators raised serious concerns about the Dow/DuPont merger, focusing specifically on the merger’s impact on R&D, concerns about higher prices for consumers, and the potential for unreasonably high barriers to entry.<sup>76</sup> Indeed, in December 2016, the European Commission presented Dow/DuPont with an 800-page statement of objections.<sup>77</sup> In response, Dow and DuPont committed to asset sales and the transfer of R&D activities.<sup>78</sup> These efforts paid off, and the European Union granted conditional approval on March 27, 2017.<sup>79</sup> The conditions focused on divestments intended to “preserv[e] price and innovation competition in pesticide markets.”<sup>80</sup> Among the more notable requirements is the sale of DuPont’s global R&D organization.<sup>81</sup> The Commission concluded that this set of divestments would adequately preserve competition on price and choice, and would maintain innovation.<sup>82</sup> Surprisingly, the European Union did not require any divestitures in the combined seed holdings of the two companies.<sup>83</sup> However, India’s antitrust regulator, the Competition Commission, has raised similar concerns and instituted a full comment process after concluding that the Dow/DuPont merger was “likely to have an appreciable adverse effect on competition.”<sup>84</sup>

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<sup>74</sup> DOW/DUPONT MERGER OF EQUALS UPDATE, *supra* note 9, at 22.

<sup>75</sup> DOW & DUPONT TO COMBINE IN MERGER OF EQUALS, *supra* note 9, at 6.

<sup>76</sup> European Union Press Release IP/16/2784, Mergers: Commission Opens In-Depth Investigation into Proposed Merger Between Dow and DuPont (Aug. 11, 2016), <https://perma.cc/Z48V-2L62>.

<sup>77</sup> Natalia Drozdiak & Jacob Bunge, *Dow-DuPont Merger Probe Hinges on Innovation Concerns*, WALL STREET J. (Jan. 17, 2017), <https://perma.cc/76XZ-EBAF>.

<sup>78</sup> On March 31, 2017, DuPont announced it will sell most of its R&D pipeline to chemical giant FMC. Joyce Hanson, *DuPont Divests Crop Unit in \$1.6B Asset Swap with FMC*, LAW360 (Mar. 31, 2017), <https://perma.cc/4BW5-E5UY>.

<sup>79</sup> European Union Press Release IP/17/772, Mergers: Commission Clears Merger Between Dow and DuPont, Subject to Conditions (Mar. 27, 2017), <https://perma.cc/E86R-D9W9>.

<sup>80</sup> *Id.* “Commissioner Margrethe Vestager, in charge of competition policy said: . . . [The conditional approval] ‘ensures that the merger between Dow and DuPont does not reduce price competition for existing pesticides or innovation for safer and better products in the future.’” *Id.*

<sup>81</sup> *Id.*

<sup>82</sup> The Commission noted that this transaction was one of three proposed mergers in this industry. *Id.* However, according to its practices, the Commission assessed the proposed Dow/DuPont merger independently, based on the current market situation because the Commission uses a priority rule to assess parallel transactions. *Id.* In other words, “first come, first served.” *Id.*

<sup>83</sup> Yun Chee, *supra* note 1 (quoting Bernstein analysts as saying that “[t]he main surprises here are the inclusion of the pesticides and the exclusion of any kind of seed assets”).

<sup>84</sup> Press Information Bureau, India, Press Release ID:159736, (Mar. 22, 2017), <https://perma.cc/VFE9-SDWD>.

*B. Bayer/Monsanto*

The Bayer/Monsanto merger raises similar concerns about overlap, even though the merger is pitched as combining Bayer's expertise in pesticides with Monsanto's capacity in seed genetics and biotechnology. Throughout the promotional literature, Monsanto and Bayer have been careful to describe the merger, which they project will save the combined company \$1.5 billion per year by combining complementary rather than competitive businesses.<sup>85</sup> Indeed, Monsanto CEO Hugh Grant even went so far as to claim that there is "very little overlap" between the two companies.<sup>86</sup> And yet, one need barely scratch the surface to find serious antitrust and anticompetitive ramifications from this proposed merger.

For example, Bayer and Monsanto use soybeans in Brazil as an example of how the combination will "[f]ully [a]ddress [f]armers' [n]eeds" at every stage of the growth cycle.<sup>87</sup> They provide a horizontal timeline mapping agricultural inputs at various stages of crop growth. This presentation shows no overlapping Monsanto/Bayer products, but instead suggests that complementary products currently sold by one company or the other could, in a combined company, meet farmer needs at each stage of the process.<sup>88</sup> Yet, only a year ago, Bayer was making headlines with its plan to "take on Monsanto in Brazil."<sup>89</sup> At the time, Bayer's spokesman asserted that "[f]armers need alternative tools."<sup>90</sup> Indeed, past interactions between Bayer and Monsanto have given Brazilian antitrust regulators pause. In 2014, Brazilian regulators required revisions to a licensing agreement between Bayer and Monsanto because of concerns that the terms would have given Monsanto too much control over Bayer's conduct in the Brazilian soybean market.<sup>91</sup> The loss of competition this merger represents in this one market is emblematic of the broader concerns raised by this proposed merger. Indeed, Monsanto itself notes that a "combined company with strong positions across all technologies offers high value capturing opportunity in corn and soy in key growing regions."<sup>92</sup>

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<sup>85</sup> BAYER, TRANSCRIPT: BAYER AND MONSANTO JOINT INVESTOR CONFERENCE CALL 5 (2016), <https://perma.cc/3FKZ-APKD> [hereinafter BAYER/MONSANTO JOINT INVESTOR CONFERENCE TRANSCRIPT]. "By pairing Bayer's crop protection portfolio with [Monsanto's] seeds, traits and digital agriculture tools, [the merger] will accelerate pipeline advancements, driving a faster discovery and delivery rate of improved solutions." *Id.* at 4.

<sup>86</sup> BAYER/MONSANTO JOINT INVESTOR CONFERENCE TRANSCRIPT, *supra* note 86, at 15.

<sup>87</sup> *Id.* at 6.

<sup>88</sup> Presentation by Baumann, Grant & Condon, *supra* note 12, at 10–11.

<sup>89</sup> Gerson Freitas Jr., *Bayer Plans to Take On Monsanto in Brazil with GMO Soybean Seeds*, BLOOMBERG (Mar. 9, 2016), <https://perma.cc/Q4KF-WZTH>; Linda Kiernan, *Bayer, BASF to Challenge Monsanto's Reign Over Brazilian Seed Market*, OILSEED & GRAIN NEWS (Mar. 15, 2016), <https://perma.cc/875Q-64PK>.

<sup>90</sup> Freitas Jr., *supra* note 89 (quoting Eduardo Mazzieri, Bayer's Brazilian seed unit director).

<sup>91</sup> Melissa Lipman, *Brazil Puts Limits on Monsanto-Bayer Licensing Deal*, LAW360 (Jan. 23, 2014), <https://perma.cc/X6VD-TAHE>.

<sup>92</sup> Presentation by Baumann, Grant & Condon, *supra* note 12, at 11.

Consolidation in the cottonseed market in the southern United States raises an even bigger concern. Roughly a decade ago, in the context of another merger—this one between Monsanto and DPL—the United States Department of Justice (DOJ) found that a proposed merger “would likely lessen competition in the near, medium and long term,” in violation of the Clayton Act.<sup>93</sup> The combined company would have controlled 95% of cottonseed sales in key U.S. markets.<sup>94</sup> Using accepted measures of market concentration, DOJ determined that the merger would produce a highly concentrated market, presumptively raising antitrust concerns.<sup>95</sup> DOJ concluded that the merger would substantially lessen competition<sup>96</sup> and that, as a result, “farmers likely will have fewer choices . . . and face higher prices.”<sup>97</sup>

In order to prevent a post-merger monopoly over cottonseeds in key markets, regulators required that Monsanto spin off another of its acquisitions—Stoneville Seed—to a company deemed capable of competing effectively with Monsanto in the region.<sup>98</sup> The purchaser was Bayer.<sup>99</sup> Indeed, DOJ approved the Monsanto/DPL merger partly on the strength of Bayer’s capacity to compete against Monsanto in key cotton growing regions,<sup>100</sup> and Bayer proved itself an effective competitor—capturing nearly 40% of the total U.S. cottonseed market in 2015, to Monsanto’s 32%.<sup>101</sup> The newly-proposed Bayer/Monsanto merger would reunite those divested assets, recreating the monopoly that U.S. regulators previously found to be a violation of the Clayton Act. Indeed, in 2016, Bayer and Monsanto

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<sup>93</sup> United States v. Monsanto Co. and Delta and Pine Land Company; Public Comments and Response on Proposed Final Judgment, 73 Fed. Reg. 18,612, 18,614 (Apr. 4, 2008). On May 31, 2007, DOJ filed a complaint in the United States District Court for the District of Columbia alleging that the proposed merger “would substantially lessen competition in violation of Section 7 of the Clayton Act, 15 U.S.C. § 18.” Complaint at 3, United States v. Monsanto Co., 2007 WL 2273004 (D.D.C. May 31, 2007) (No. 07CV00992). The complaint more specifically alleged that the proposed merger would “eliminat[e] competition between these firms in the sale of cottonseed . . . [and] will also eliminate DPL as a partner independent of Monsanto for competing trait developers, substantially delaying or preventing the development and introduction of cottonseed containing non-Monsanto traits.” *Id.*

<sup>94</sup> *Id.* at 11.

<sup>95</sup> *Id.*; see also *id.* at app. A (explaining that any increase of more than 100 on the Herfindahl-Hirschman Index raised presumptive antitrust concerns, and the Monsanto-DPL merger would raise the index by 3310 in one key cottonseed market and by 1489 in another).

<sup>96</sup> *Id.* at 12.

<sup>97</sup> *Id.*

<sup>98</sup> United States v. Monsanto Co. and Delta and Pine Land Company; Public Comments and Response on Proposed Final Judgment, 73 Fed. Reg. at 18,614. Monsanto also had to divest another smaller brand, NexGen. Press Release, Monsanto, Monsanto Company Reaches Agreement with U.S. Department of Justice on Elements of Consent Decree, Set to Complete Its Acquisition of Delta and Pine Land Company (May 31, 2007), <https://perma.cc/YS5Y-UN8H>.

<sup>99</sup> United States v. Monsanto Co. and Delta and Pine Land Company; Public Comments and Response on Proposed Final Judgment, 73 Fed. Reg. at 18,615.

<sup>100</sup> *Id.*

<sup>101</sup> Jack Kaskey, *Bayer-Monsanto Combination Likely Too Big in U.S. Cottonseed*, BLOOMBERG (Sept. 15, 2016), <https://perma.cc/92PU-UC2X>. Bayer’s share for 2016 was lower, down to roughly 25%, but which is still a major hold on the market. *Id.*

collectively held more than half of the total U.S. cottonseed market.<sup>102</sup> Even Bayer's CEO Liam Condon concedes that the combined market share is "quite high."<sup>103</sup>

Another area of dramatic overlap between the two companies is canola seed. Canola is Canada's second most valuable crop.<sup>104</sup> Bayer and Monsanto are currently the two biggest suppliers for canola seed—each holding roughly half the market.<sup>105</sup> A combined Bayer-Monsanto would thus have a monopoly on this market. Despite the companies' general commitment to a narrative that the two companies do not overlap, Bayer CEO conceded that canola divestments would be necessary,<sup>106</sup> and Bayer has already begun the process of selling some of these assets.<sup>107</sup>

### C. ChemChina/Syngenta

The ChemChina/Syngenta merger is on slightly different footing. ChemChina does not have any stake of the global seed industry, so its merger with Syngenta will not increase market consolidation there.<sup>108</sup> For this merger, concerns focus on overlap in their pesticide holdings and about using tying tactics to dominate markets.<sup>109</sup> Of course, the fact that ChemChina is a state-owned entity adds an additional regulatory wrinkle.<sup>110</sup> In the United States, two approvals are needed whenever a foreign-owned company seeks to merge or buy a domestic company. First, there must be a national security clearance before antitrust regulators can reach the second question of market dominance.<sup>111</sup> ChemChina received that first approval

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<sup>102</sup> *Id.*

<sup>103</sup> Pucci, *supra* note 59.

<sup>104</sup> Jennifer Clapp et al., *Bigger Isn't Always Better: What the Proposed Agribusiness Mega Mergers Could Mean for Canada*, FOOD SECURE CAN. (Sept. 14, 2016), <https://perma.cc/AP3Q-RZ43>.

<sup>105</sup> See *id.* (indicating that "47% of canola seeds contained genetically modified traits developed by Monsanto . . . and 46% contained genetically modified traits developed by Bayer" (citing *Estimated Percentage of Ht and Conventional Canola*, CANOLA COUNCIL CAN., <https://perma.cc/2DLC-5TWW> (last visited July 22, 2017))).

<sup>106</sup> Pucci, *supra* note 59.

<sup>107</sup> *Bayer Monsanto Start \$2.5 Billion Asset Sale to Get Merger Clearance*, REUTERS, Mar. 10, 2017, <https://perma.cc/N484-P4MV>.

<sup>108</sup> *About Us: Introduction*, CHINA NAT'L CHEMICAL CORP., <https://perma.cc/383J-LJWC> (last visited July 22, 2017) ("ChemChina specializes in six business segments—new chemical materials & special chemicals; basic chemicals; oil processing; agrochemicals; tire & rubber products; [and] chemical equipment.").

<sup>109</sup> Letter from Food & Water Watch and Nat'l Farmers Union to Jacob Lew, Sec'y, U.S. Dep't of Treasury, et al. 2–3 (July 21, 2016), <https://perma.cc/Z4S2-GB3P>. Tying tactics are defined as "a seller condition[ing] the sale or lease of one product or service on the customer's agreement to take a second product or service." U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 103 (2007), <https://perma.cc/VM99-ARED>. Tying tactics are per se illegal but only under certain conditions (e.g., market power over the tying product). *Id.* at 104.

<sup>110</sup> *About Us: Introduction*, *supra* note 108.

<sup>111</sup> *Resource Center: The Committee on Foreign Investment in the United States (CFIUS)*, U.S. DEP'T TREASURY, <https://perma.cc/36P4-YSM4> (last updated Dec. 20, 2012).

from the Committee on Foreign Investment in August 2016.<sup>112</sup> This approval came over heavy objections from farmers, conservationists,<sup>113</sup> and politicians from farming states,<sup>114</sup> who argued that food security was a component of national security.<sup>115</sup> In February 2017, the United States Federal Trade Commission asked for more time to review the deal.<sup>116</sup>

Responding to the antitrust aspects of the proposed ChemChina/Syngenta merger, both E.U. and U.S. regulators have requested additional information, with the European Union signaling concerns that the merger “might raise prices or reduce choice from crop protection products sold to farmers.”<sup>117</sup> The E.U. regulators noted that ChemChina and Syngenta have overlapping portfolios of “herbicides, insecticides, fungicides, and plant growth regulators,” and in some markets the two companies may be direct competitors.<sup>118</sup> Regulators also noted that the parties have relatively high combined market shares in many markets.<sup>119</sup> However, Syngenta and ChemChina remain confident that they will receive the necessary approvals in the very near future.<sup>120</sup> Australia has already granted ChemChina the necessary antitrust approval.<sup>121</sup>

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<sup>112</sup> Press Release, Syngenta, ChemChina and Syngenta Receive Clearance from the Committee of Foreign Investment in the United States (CFIUS) (Aug. 22, 2016), <https://perma.cc/ZK8N-VKJN>.

<sup>113</sup> See, e.g., Letter from Food & Water Watch and Nat’l Farmers Union to Jacob Lew et al., *supra* note 109.

<sup>114</sup> *Senators Call On Treasury Department to Review ChemChina’s Acquisition of Syngenta*, U.S. SENATE COMMITTEE ON AGRIC., NUTRITION, & FORESTRY (Mar. 24, 2016), <https://perma.cc/PHL6-QTCF> (providing, in full, Michigan Senator Sabenow’s letter, which was cosigned by Iowa Senators Chuck Grassley and Joni Ernst, and Ohio Senator Sherrod Brown).

<sup>115</sup> *Id.* Reportedly, the Committee explicitly bracketed any concerns about the impact the deal would have on farmers. See Benjamin Horney, *3 Takeaways from CFIUS’s OK of ChemChina-Syngenta Deal*, LAW360 (Aug. 23, 2016), <https://perma.cc/B9XZ-RYN4> (describing Senator Grassley’s statement that “the approval was ‘alarming’ and ‘raises questions about national security because of the need to ensure a safe food supply in the U.S.’”). Opposition to this merger was so strong that it prompted proposed legislation to change the composition and charge of the committee approving such mergers. See Security American Food Equity Act of 2016, S. 3161, 114th Cong. (2016).

<sup>116</sup> Alice Baghdjian et al., *Syngenta Says U.S. Extends ChemChina-Deal Antitrust Review*, BLOOMBERG (Feb. 13, 2017), <https://perma.cc/QT9P-N68C>. On April 4, 2017, the Federal Trade Commission announced that ChemChina and Syngenta had “agreed to divest three types of pesticides, in order to settle Federal Trade Commission Charges that their proposed merger would harm competition.” *FTC Requires China National Chemical Corporation and Syngenta AG to Divest Assets as a Condition of Merger*, FED. TRADE COMMISSION (Apr. 4, 2017), <https://perma.cc/5VM8-HZKV>.

<sup>117</sup> *Syngenta Takeover Hits Another Snag*, BLOOMBERG (Feb. 14, 2017), <https://perma.cc/J32P-5YW6>. See European Union Press Release IP/16/3579, *Mergers: Commission Opens In-Depth Investigation into Proposed Acquisition of Syngenta by ChemChina* (Oct. 28, 2016), <https://perma.cc/U6HH-URFJ>.

<sup>118</sup> European Union Press Release IP/16/3579, *supra* note 117.

<sup>119</sup> *Id.*

<sup>120</sup> Rochelle Toplensky, *Syngenta and ChemChina Deal to Complete by Summer, Says Chief*, FIN. TIMES (Mar. 29, 2017), <https://perma.cc/5KHJ-RR2A>.

<sup>121</sup> Baghdjian et al., *supra* note 116.

## IV. SYSTEM-WIDE CONCERNS RAISED BY THESE MERGERS

DOJ's *Horizontal Merger Guidelines* (DOJ Guidelines) make it clear that, under section 7 of the Clayton Act, regulators should not permit mergers that "create, enhance, or entrench market power or . . . facilitate its exercise."<sup>122</sup> These Guidelines explain that a merger is deemed to enhance market power if it "encourage[s] one or more firms to raise price, reduce output, diminish innovation, or otherwise harm customers as a result of diminished competitive constraints or incentives."<sup>123</sup> In other words, this body of law is "intended to protect customers from the potential for diminished competition."<sup>124</sup> To assess the likelihood of this outcome, regulators consider, inter alia, the impact of recent mergers in the relevant market, and both the level of concentration and the change in concentration caused by the merger.<sup>125</sup>

Even before these mergers, the HHI index for corn seed and cottonseed were above 2,500—the threshold for considering a market to be highly consolidated.<sup>126</sup> Soy was at 2,360—pretty close to that threshold.<sup>127</sup> The projections for concentration after these mergers are even higher—with all three markets well above the threshold to be considered highly consolidated, with the HHI index for cottonseed at a staggering 5,205.<sup>128</sup>

Given the extraordinary number of mergers in this industry, there is a wealth of evidence about the market impacts of past mergers for regulators to consider. Over the past two decades, this industry has been consolidating—driven largely by new technologies and new intellectual property rights over seeds.<sup>129</sup> A few industry giants emerged from the consolidation of hundreds of smaller firms.<sup>130</sup> Companies merged or purchased rivals to acquire access to technology and to share the large cost of obtaining regulatory approval for new products.<sup>131</sup> Using the experiences from these past mergers as a guide for predicting impacts of the currently proposed mergers, it seems clear that their cumulative effect, and possibly their individual impacts, will violate section 7 of the Clayton Act.

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<sup>122</sup> U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, *supra* note 26, at 2.

<sup>123</sup> *Id.*

<sup>124</sup> Bill Baer, Acting Associate Attorney General Bill Baer Delivers Remarks at American Antitrust Institute's 17th Annual Conference (June 16, 2016), <https://perma.cc/DR9X-2P9N>.

<sup>125</sup> See U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, *supra* note 26, at 3.

<sup>126</sup> Bryant et al., *supra* note 31, at 24 & tbl.7 (providing that, specifically, corn was at 2696, and cotton was at 2804).

<sup>127</sup> *Id.*

<sup>128</sup> *Id.* The post-merger figures for corn and soybean would be 3,100 and 2,705, respectively. *Id.*

<sup>129</sup> Ann Thayer, *Owning Agbiotech: Consolidation, Significant Investments in R&D, and Savvy Market Development Have Created Just a Few Major Forces in Agbiotech*, CHEMICAL & ENGINEERING NEWS, Sept. 17, 2001, at 25, 25–26.

<sup>130</sup> See *id.* at 25 ("For example, during a spate of activity from 1995 to 1998, . . . the five leading companies acquired or allied with nearly 70 different seed companies.")

<sup>131</sup> *Id.* at 26; Keith Fuglie et al., *Rising Concentration in Agricultural Input Industries Influences New Farm Technologies*, U.S. DEP'T AGRIC., (Dec. 3, 2012), <https://perma.cc/PPX2-FATU>.



Collectively, these mergers will reduce farmer choice and will likely lead to higher prices for farmers and consumers, while producing less investment in innovation.

#### *A. Anticompetitive Behavior: Raising Prices*

In evaluating the likely antitrust implication of a merger, one red flag that regulators look for is “[e]xplicit or implicit evidence that the merging parties intend to raise prices, reduce output or capacity.”<sup>132</sup> Describing her role in investigating these mergers, European Union Commissioner for Competition, Margrethe Vestager, echoed this concern stating: “The livelihood of farmers depends on access to seeds and crop protection at competitive prices. We need to make sure that the proposed merger does not lead to higher prices or less innovation for these products.”<sup>133</sup> This focus on how a proposed merger will impact prices echoes the concern expressed in the DOJ Guidelines, which cautions that when mergers result in enhanced market power, “sellers often elevate[] the prices charged to customers.”<sup>134</sup> This is because reduced competition allows them to charge higher prices than their products would command in a more competitive market.<sup>135</sup> The challenge here is that there are three, nearly simultaneous mergers. Analyzing the effects on pricing that each merger might have individually fails to capture their cumulative impacts.

Greater market power resulting from the structural changes in agricultural input industries has already resulted in higher prices for farmers.<sup>136</sup> For example, farmers planting GE soybeans in 2010 paid 143% more for those seeds than they had paid for GE seeds a decade earlier.<sup>137</sup> These price increases meant that purchasing these seeds cost farmers 16.4% of their crop’s ultimate sale price, twice the historic norm of 4%–8%.<sup>138</sup> The prices farmers received for their crops did not keep pace—indeed, the cost of seeds more than doubled relative to the price of harvested crops.<sup>139</sup>

Between 1994 and 2010, the cost of a bag of corn seed in the United States has more than quadrupled, and soybean has more than quintupled.<sup>140</sup> Between 1995 and 2015, as the seed industry consolidated dramatically,

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<sup>132</sup> U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *supra* note 26, at 4.

<sup>133</sup> European Union Press Release IP/16/2784, *supra* note 79 (referring specifically to the Dow/Dupont merger).

<sup>134</sup> U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *supra* note 26, at 2.

<sup>135</sup> *Id.*

<sup>136</sup> Bryant et al., *supra* note 31, at 13, 27 (“Seed prices in the U.S. have increased by larger percentages than other farm inputs in recent years.”).

<sup>137</sup> CHARLES BENBROOK, THE ORGANIC CTR., THE MAGNITUDE AND IMPACTS OF THE BIOTECH AND ORGANIC SEED PRICE PREMIUM 1 (2009).

<sup>138</sup> *Id.* at 2.

<sup>139</sup> Shand, *supra* note 2, at 12.

<sup>140</sup> Specifically, a bag of seed corn went from \$65 to \$300, and soybean from \$12–\$15 to \$70. Cavey, *supra* note 49.

prices for corn and soy seeds increased more than 300%.<sup>141</sup> In recent years, the combined impact of “a diminished ability to save seeds and fewer options in the market,” has led to seed prices increasing “as much as 30% annually[,] . . . significantly higher than the rate of inflation.”<sup>142</sup> Critics have been claiming for years that market consolidation has meant that there are no longer any competitive restraints on price increases,<sup>143</sup> aside from what one Monsanto official described as “pass[ing] the red-faced test from the Panhandle of Texas to McLean County, Ill[inois].”<sup>144</sup>

Farmers opposed to these mergers have vocally expressed their concerns about price increases.<sup>145</sup> And, they have reason to be concerned. A recent study by Texas A&M University projected that the proposed mergers will likely cause increases in seed prices that range from roughly 2% for corn and soybeans to just over 18% for cotton.<sup>146</sup> However, the study gives pretty good odds (one in four) of a 20% cottonseed price increase as a result of the mergers.<sup>147</sup> Past experience with mergers in the agricultural industry suggests that regulators should take these projections seriously.<sup>148</sup>

### *B. Anticompetitive Behavior: Reducing Choice*

Another red flag that antitrust regulators look for is explicit or implicit evidence that proposed mergers will “reduce product quality or variety, withdraw products[,] or delay their introduction.”<sup>149</sup> The regulatory focus here is on the impact a merger will have on customers, both direct and final.<sup>150</sup> The DOJ Guidelines note that “[e]nhanced market power may . . . make it more likely that the merged entity can profitably and effectively engage in exclusionary conduct.”<sup>151</sup> Speaking for the European Union,

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<sup>141</sup> Dan Nosowitz, *How Will the Monsanto-Bayer Merger Affect Everyday Farmers?*, MOD. FARMER (Oct. 20, 2016), <https://perma.cc/VG25-VYGZ> (citing Alicia Harvie, Food Aid’s advocacy and issues director).

<sup>142</sup> Bryant et al., *supra* note 31, at 13 (citing KRISTINA HUBBARD, OUT OF HAND: FARMERS FACE THE CONSEQUENCES OF A CONSOLIDATED SEED INDUSTRY 35–36 (2009), <https://perma.cc/V3L8-8AR3>).

<sup>143</sup> See, e.g., Mike Callicrate, *Monsanto Corn Seed Price Hikes a Threat to Agriculture*, ORG. FOR COMPETITIVE MKTS. (July 24, 2008), <https://perma.cc/56NE-TKBV>.

<sup>144</sup> Alan Guebert, *Farm & Food: The Seeds of Farm-Input Inflation*, LINCOLN J. STAR (Aug. 8, 2008), <https://perma.cc/5TTW-552Z> (quoting Monsanto executive John Jansen).

<sup>145</sup> Chris Clayton, *AG Policy Blog: Groups Write to AG Opposing Seed-Chemical Mergers*, DTN PROGRESSIVE FARMER (Feb. 13, 2017), <https://perma.cc/6F76-HEXV> (noting that consumer, food, farm, and anti-pesticide “[g]roups stated the mergers would end up increasing both food and farming costs, threaten global food security, curtail innovation, threaten the health of farm workers and limit farmer choices”).

<sup>146</sup> Bryant et al., *supra* note 31, at 26.

<sup>147</sup> *Id.* at 26 tbl.8.

<sup>148</sup> *Id.* at 4–7, 26–27.

<sup>149</sup> U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *supra* note 26, at 4.

<sup>150</sup> *Id.* at 2.

<sup>151</sup> *Id.*

Margrethe Vestager also emphasized that “farmers must continue to have a choice.”<sup>152</sup>

Each of the three proposed agribusiness mergers emphasizes farmer choice as a justification. Indeed, Bayer CEO Werner Baumann addressed this issue directly, stating “it is not our plan or our ambition or our intent to prevent farmers from having choice.”<sup>153</sup>

Yet, the overwhelming evidence shows that past consolidation in the industry has reduced, rather than increased, farmer choice.<sup>154</sup> Farmers have expressed concern that even before the mergers they had very little choice when purchasing inputs like seeds and chemicals.<sup>155</sup> Indeed, as early as 2000, the United States General Accounting Office was cautioning about Monsanto’s use of intellectual property rights to obtain “greater control over patented seed prices” and “to restrict the availability and use of seeds” by limiting the traditional farmer practice of seed saving.<sup>156</sup>

Experience bears out this caution. Consolidation in the seed industry has generally led to reductions in farmer choice.<sup>157</sup> Recent studies have documented that consolidation had decreased the number of available cultivars (especially non-GE options),<sup>158</sup> had shifted focus to those crops and hybrids more profitable to the companies,<sup>159</sup> and had resulted in the termination of breeding programs for regionally relevant crops.<sup>160</sup> By contrast, in markets without significant consolidation, where local seed companies and breeding organizations retain significance, farmers have wider options and choices.<sup>161</sup> Studies from the United States,<sup>162</sup> India,<sup>163</sup> and

<sup>152</sup> *Farmers Must Have Choice Post Bayer-Monsanto Merger: EU’s Vestager*, REUTERS, Sept. 15, 2016, <https://perma.cc/88SD-X7FQ>.

<sup>153</sup> Christopher Doering, *Monsanto, Bayer Deal Raises Farmers’ Anxiety Level*, DES MOINES REG. (Sept. 14, 2016), <https://perma.cc/JKC7-PRQC>.

<sup>154</sup> Moss Testimony, *supra* note 27 (“Past mergers in biotechnology have increased vertical integration among traits, seeds, and chemicals.”).

<sup>155</sup> *See, e.g.*, Nosowitz, *supra* note 141 (quoting Kansas farmer Tom Giessel as saying: “There is no choice, they own me.”).

<sup>156</sup> U.S. GEN. ACCOUNTING OFFICE, GAO/T-RCED/NSIAD-00-228, BIOTECHNOLOGY: INFORMATION ON PRICES OF GENETICALLY MODIFIED SEEDS IN THE UNITED STATES AND ARGENTINA 3 (2000), <https://perma.cc/W9RQ-F6A6>.

<sup>157</sup> Angelika Hilbeck et al., *Farmer’s Choice of Seeds in Four EU Countries Under Different Levels of GM Crop Adoption*, ENVTL. SCIS. EUR., May 20, 2013, at 9, <https://perma.cc/9R75-4GE2> (documenting that European countries permitting the sale of GE seeds have experienced a decline in available seed crop diversity, while that same measure of diversity has either remained the same or increased in countries that prohibit GE seeds).

<sup>158</sup> *See generally id.*

<sup>159</sup> Soy farmers in Brazil and South Africa allege that the Big Six dictate what seeds will be available and refuse to make significant quantities of non-GE seeds available. Ken Roseboro, *The GMO Seed Monopoly: Fewer Choices, Higher Prices*, FOOD DEMOCRACY NOW! (Oct. 4, 2013), <https://perma.cc/MXR7-NYJW> (referencing Ricardo Tatesuzi de Sousa, Executive Director of ABRANGE, the Brazilian association for producers of non-GE grains).

<sup>160</sup> *Id.*; Svein Øivind Solberg & Line Breian, *Commercial Cultivars and Farmers’ Access to Crop Diversity: A Case Study from the Nordic Region*, 24 AGRIC. & FOOD SCI. 150, 159–60 (2015).

<sup>161</sup> Solberg & Breian, *supra* note 160, at 159–61.

<sup>162</sup> *E.g.*, HUBBARD, *supra* note 143, at 15–17, 19–21, 29–30.

<sup>163</sup> *E.g.*, Glenn Davis Stone, *Field Versus Farm in Warangal: Bt Cotton, Higher Yields, and Larger Questions*, 39 WORLD DEV. 387, 390–93, 393 fig.3 (2011).

South Africa<sup>164</sup> have shown that market consolidation leads, in particular, to decreased availability of non-GE crop cultivars,<sup>165</sup> and in extreme situations, has resulted in farmers only having access to GE cultivars.<sup>166</sup> Indeed, the National Research Council has raised concerns that market concentration of seed suppliers has negatively affected farmer planting options and cultural diversity.<sup>167</sup>

The United States' recent experience with sugar beets offers a clear example of how market dominance can entirely eliminate farmer choice. In 2005, the United States Department of Agriculture (USDA) deregulated GE sugar beets.<sup>168</sup> Despite lengthy litigation challenging the adequacy of the environmental analysis accompanying this decision,<sup>169</sup> within five years, approximately 95% of the sugar-beet crop was genetically engineered.<sup>170</sup> One consequence of this market domination was that non-GE seeds were next to impossible to obtain.<sup>171</sup> That meant when major food companies decided to eliminate GE ingredients, including sugar, from their consumer products,<sup>172</sup> U.S. sugar beet farmers were stuck—they were unable to switch to non-GE sugar beets because the seeds were unavailable.<sup>173</sup> As a result, these sugar

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<sup>164</sup> *E.g.*, Harald Witt et al., *Can the Poor Help GM Crops? Technology, Representation & Cotton in the Makhathini Flats, South Africa*, 33 REV. AFR. POL. ECON. 497, 507 (2006).

<sup>165</sup> See *Finding Non-GMO Soybean Seed Becoming More Difficult*, ORGANIC & NON-GMO REP., <https://perma.cc/DV3M-97FS> (last visited July 22, 2017).

<sup>166</sup> See, e.g., *Sugar Beet Industry Converts to 100% GMO, Disallows Non-GMO Option*, ORGANIC & NON-GMO REP. (June 2008), <https://perma.cc/ZQ8L-M9AE>.

<sup>167</sup> NAT'L RESEARCH COUNCIL, *THE IMPACT OF GENETICALLY ENGINEERED CROPS ON FARM SUSTAINABILITY IN THE UNITED STATES 12–13* (2010).

<sup>168</sup> Monsanto Co. and KWS SAAT AG; *Determination of Non-Regulated Status for Sugar Beets Genetically Engineered for Tolerance to the Herbicide Glyphosate*, 70 Fed. Reg. 13,007 (Mar. 17, 2005). For background information on the determination, see U.S. DEP'T OF AGRIC. ET AL., *USDA/APHIS ENVIRONMENTAL ASSESSMENT 3* (2004), <https://perma.cc/DZ94-EL72>.

<sup>169</sup> See *Ctr. for Food Safety v. Vilsack*, 753 F. Supp. 2d 1051, 1053 (N.D. Cal 2010), *vacated and remanded*, 636 F.3d 1166 (9th Cir. 2011), *aff'd*, 502 F. App'x 647 (9th Cir. 2012). For a detailed discussion of this litigation, see Rebecca M. Bratspies, *Is Anyone Regulating? The Curious State of GMO Governance in the United States*, 37 VT. L. REV. 923, 948–51 (2013).

<sup>170</sup> *U.S. Sugar Production*, U.S. DEP'T AGRIC., <https://perma.cc/VA94-S93C> (last visited July 22, 2017).

<sup>171</sup> See Barry Estabrook, *Sugar-Beet Flip-Floppers, and Other Sustainability News*, ATLANTIC (Nov. 2, 2010), <https://perma.cc/JZ9R-WSFR>.

<sup>172</sup> The list of major companies making this choice includes General Mills, Post, Hershey's, Unilever, and Pepsi. *The Tipping Point Is Here on GMOs, with 10 Major Companies Shifting to Non-GMO Products*, GREEN AM. (Jun. 7, 2016), <https://perma.cc/PE64-365B>. Del Monte is also eliminating GE ingredients. See Lucinda Shen, *Del Monte Is Making This Huge Change to Its Products*, FORTUNE (Mar. 29, 2016), <https://perma.cc/5SMF-2D86>.

<sup>173</sup> *About Roundup Ready Sugar Beet*, U.S. DEP'T AGRIC., <https://perma.cc/A8YJ-5CAD> (last modified Jan. 26, 2016) (“[Roundup Ready Sugar Beets are] genetically engineered to be tolerant to the herbicide glyphosate . . . . In 2009–2010 . . . [their] varieties accounted for about 95 percent of planted sugar beet crop.”); Dan Charles, *As Big Candy Ditches GMO, Sugar Beet Farmers Hit a Sour Patch*, NAT'L PUB. RADIO (May 12, 2016), <https://perma.cc/F4YJ-5XX3> (“[G]rowing non-GMO beets[, compared to growing sugar cane, can be difficult because] there aren't enough non-GMO seeds to go around.”).

beet farmers lost market share to sugar cane producers.<sup>174</sup> USDA was forced to raise sugar imports quotas by 200,000 tons in order to meet demand that could no longer be filled by domestic farmers because the necessary seeds were no longer available.<sup>175</sup>

Aside from directly eliminating cultivars, the Big Six have used two other tactics that limit farmer choice. First, a great deal of R&D has focused on creating “platforms” of traits, seeds, and chemicals.<sup>176</sup> With this style of product development, one purchase locks a farmer into the entire platform.<sup>177</sup> These tactics have been very profitable for the companies deploying them, but those profits come at the expense of reduced farmer options.<sup>178</sup> The companies’ intention is clear—to create even more tightly tied products.<sup>179</sup> For example, Bayer and Monsanto make no secret of the fact that their goal in “combining both companies’ commitment to quality and passion for innovation” is to “provide [their] customers with a highly-integrated product,”<sup>180</sup> and the message to shareholders is that these

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<sup>174</sup> See, e.g., Tom Meersman, *Hershey Dumps Sugar Beets Because of GM Concerns*, SPOKESMAN-REV. (Jan. 10, 2016), <https://perma.cc/2KAZ-C3MZ>; Colleen Scherer, *GM Concerns Lead Hershey to Reject Sugar Beets*, AGPRO (Jan. 4, 2016), <https://perma.cc/RU6W-DYRA>.

<sup>175</sup> Ron Sterk, *U.S.D.A. Raises Sugar Import Quota 200,000 Tons*, BAKING BUS. (Apr. 26, 2010), <https://perma.cc/HP9G-QJZF>. See *USDA Increases FY 2016 U.S. Sugar Overall Allotment Quantity and Raw Cane Sugar Import Access*, U.S. DEP’T AGRIC. (May 17, 2016), <https://perma.cc/JQB3-MWXL> (“America’s beet sugar producers have made significant investments in a strong 2016 crop, but they continue to face uncertainty.”).

<sup>176</sup> A seed platform generally refers to proprietary “genetic traits that are expressed in plant agronomics, including insect resistance (*Bt*) and herbicide tolerance (*Ht*); . . . state-of-the-art seeds containing those genetic traits,” and accompanying tied chemical inputs like pesticides and fertilizers. DIANA L. MOSS, *TRANSGENIC SEED PLATFORMS: COMPETITION BETWEEN A ROCK AND A HARD PLACE?* 2–4 (2009), <https://perma.cc/FU8N-7V7N>; Moss Testimony, *supra* note 27, at 2–3 (“Between 1985 and 2000, the Big 6 firms . . . acquired about 75 percent of small to medium-size enterprises engaged in biotechnology research.”); Shand, *supra* note 2, at 10–11 (“Together these six companies account for almost \$50 billion per annum in sales of seeds, biotech traits and agrochemicals; they spend about \$4.7 billion annually on ag[ricultural] R&D. . . . The Big Six corporations overwhelmingly dominate global R&D for seeds and pesticides—accounting for over three-quarters of total private sector agricultural R&D spending in the seed sector (76%) and the same share (76%) in the agrochemical sector in 2010.”); *id.* at 12 (“From 1995–2010, the Big Six commercialized six GE crop species (soybean, cotton, maize, canola, sugarbeet, [and] alfalfa). These six crops were engineered for just two genetic traits: 1) herbicide tolerance; 2) insect resistance.”).

<sup>177</sup> Nosowitz, *supra* note 141 (explaining that business consolidation of previously separate businesses such as tractors, seeds, and fertilizers has led to selling of, what amounts to be, an integrated agricultural product). As such, farmers have limited purchase options. For example, farmers may need to buy seeds and fertilizers, rather than just seeds. *Id.*

<sup>178</sup> Howard, *supra* note 34, at 5 (noting that, farmers “may not have the option to avoid purchasing [seed of multiple transgenic traits]” due to large firms having reduced availability and increased price of nontransgenic seeds).

<sup>179</sup> Moss Testimony, *supra* note 27, at 10 (stating that “[p]ast mergers in biotechnology have increased vertical integration among traits, seeds and chemicals. Current merger proposals involving the Big 6 . . . would vertically integrate traits, seeds and chemicals currently produced independently by Dow and DuPont and Monsanto and Bayer. The result will be more tightly integrated platforms of components.”).

<sup>180</sup> Press Release, Bayer, Value for our Farmers, Shareholders and Employees (2016), <https://perma.cc/TR5Z-2QS8> (last visited July 22, 2017).

integrated platforms will be highly profitable for the combined company.<sup>181</sup> Critics argue the “platforms” that result from these mergers “are likely to be engineered for the purpose of creating exclusive packages of traits, seeds, and agrichemicals that are less likely to interoperate with rival products.”<sup>182</sup> This kind of integration should be of concern to antitrust regulators because it squeezes out competitors and creates enormous barriers to entry for new innovators.<sup>183</sup>

Even when engineering does not lock in farmers and seed distributors, these companies have deployed their patent rights to obtain market dominance through adhesion licenses. Farmers can no longer purchase seeds outright but are, instead, offered the opportunity to license seeds for a single growing season.<sup>184</sup> Among the license conditions are clauses barring seed saving<sup>185</sup> and limiting any warranties to the use of associated brand-named herbicides.<sup>186</sup> These licensing restrictions are designed to create adverse incentives in order to discourage seed companies and farmers from distributing or planting anything but a single company’s products.<sup>187</sup> Regulators have already found that Monsanto’s use of these tactics with regard to cottonseed was an antitrust violation. In particular, regulators singled out Monsanto’s use of its licensing agreements to penalize seed companies for incorporating non-Monsanto traits into their seeds and to prohibit stacking of Monsanto and non-Monsanto traits.<sup>188</sup>

### *C. Anticompetitive Behavior: Decreased Innovation (and Why It Matters)*

Specifically focusing on the seed and agricultural chemical markets, USDA has cautioned that market concentration must be measured “not only in terms of [a company’s] share of product sales but [also] in [that company’s] share of new innovations.”<sup>189</sup> The concern is that as agricultural markets concentrate, the Big Six will be able to maintain market share without product improvement, reducing or eliminating the incentive to “invest in research and product development.”<sup>190</sup> The DOJ Guidelines recognize this problem. The Guidelines caution that mergers can adversely affect customers beyond price and choice, specifically directing regulators to consider whether a merger is likely to diminish innovation competition

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<sup>181</sup> *Id.*

<sup>182</sup> Diana L. Moss, *Mergers, Innovation, and Agricultural Biotechnology: Putting the Squeeze on Growers and Consumers?*, TRUTH ON MKT. (Mar. 31, 2017), <https://perma.cc/6SCG-GVDL>.

<sup>183</sup> *Id.*

<sup>184</sup> See, e.g., MONSANTO, 2015 TECHNOLOGY/STEWARDSHIP AGREEMENT, ¶ 5(d), <https://perma.cc/JE2X-44NG> (limiting use of the licensed seeds to the 2015 growing season).

<sup>185</sup> *Id.* ¶ 4(g).

<sup>186</sup> *Id.* ¶ 4(r).

<sup>187</sup> See DIANA L. MOSS, TRANSGENIC SEED PLATFORMS: COMPETITION BETWEEN A ROCK AND A HARD PLACE 9 (2009).

<sup>188</sup> *United States v. Monsanto Co. and Delta and Pine Land Company*; Public Comments and Response on Proposed Final Judgment, 73 Fed. Reg. 18,612, 18,614–15, 18,625 (Apr. 4, 2008).

<sup>189</sup> Fuglie et al., *supra* note 131.

<sup>190</sup> Collins Testimony, *supra* note 31, at 13.

“by encouraging the merged firm to curtail its innovative efforts below the level that would prevail in the absence of the merger.”<sup>191</sup> This concern about reduced innovation competition is heightened when a merger involves “combining two of a very small number of firms with the capabilities to successfully innovate in a specific direction.”<sup>192</sup> Vestager also flagged this concern about the relationship between concentration and innovation saying: “We need to make sure that the proposed merger does not lead to . . . less innovation for these products.”<sup>193</sup> For example, one concern the European Union flagged about the Dow/DuPont merger is that it might reduce incentives to license “gene editing” technologies to competitors and might prompt the combined company to take steps to “make the development of competing technologies more difficult.”<sup>194</sup> Syngenta acknowledged that E.U. regulators “want to make sure there’s innovation competition.”<sup>195</sup>

This concern about innovation is heightened by the reality that the Big Six companies dominate global agricultural R&D.<sup>196</sup> For perspective, in 2013, the combined R&D budgets of the Big Six were twenty times greater than spending at the international crop breeding institutes operated by the Consultative Group on International Agricultural Research and fifteen times higher than the U.S. government’s—USDA Agriculture Research Service (ARS)—crop science R&D spending.<sup>197</sup> Thus, slowdowns in privately funded R&D have serious repercussions for innovation in agriculture.

Testifying before the Senate Judiciary Committee, Monsanto’s Chief Technology Officer spun the Bayer/Monsanto merger as a way to invest more in new technology.<sup>198</sup> Indeed, Bayer and Monsanto have characterized their merger as creating an “innovation engine” that could more quickly develop products.<sup>199</sup> Their shareholder information is replete with references to innovation and statements touting the combined company’s ability to engage in “R&D aimed at finding more innovative solutions for farmers.”<sup>200</sup> Similarly Dow’s CEO claims that the merger will “bring together these two

<sup>191</sup> U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *supra* note 26, at 23.

<sup>192</sup> *Id.*

<sup>193</sup> European Union Press Release IP/16/2784, *supra* note 79 (referring specifically to the Dow/DuPont merger).

<sup>194</sup> *Id.*

<sup>195</sup> Gaspard Sebag, *Dow-DuPont Shows How Innovation Is EU’s New M&A Battleground*, BLOOMBERG (Mar. 28, 2017), <https://perma.cc/ASQ8-CR8N>; see Drozdiak & Bunge, *supra* note 77.

<sup>196</sup> See KEITH O. FUGLIE ET AL., RESEARCH INVESTMENT AND MARKET STRUCTURE IN THE FOOD PROCESSING, AGRICULTURAL INPUT, AND BIOFUEL INDUSTRIES WORLDWIDE 18 (2011), <https://perma.cc/973Q-BTFA>.

<sup>197</sup> ETC GRP., MEGA-MERGERS IN THE GLOBAL AGRICULTURAL INPUTS SECTOR: THREATS TO FOOD SECURITY & CLIMATE RESILIENCE 11 (2015), <https://perma.cc/7FSF-ZNHX>.

<sup>198</sup> *Consolidation and Competition in the U.S. Seed and Agrochemical Industry: Hearing Before the S. Comm. on Judiciary*, 114th Cong. 2 (Sept. 20, 2016) (statement of Dr. Robert T. Fraley, Exec. Vice President & Chief Technology Officer, Monsanto); Chase Purdy, *Six Companies Are About to Merge into the Biggest Farm-Business Oligopoly in History*, QUARTZ (Sept. 20, 2016), <https://perma.cc/BC6N-3G2W>.

<sup>199</sup> News Release, Monsanto, *supra* note 6.

<sup>200</sup> Press Release, Bayer, *supra* note 180.

powerful innovation and material science leaders” in order to “apply its powerful innovation more productively.”<sup>201</sup>

By contrast, merger opponents assert that the “synergies” repeatedly claimed by the companies are actually the “elimination of parallel paths [of research and development, and] the elimination of head-to-head competition in research and development.”<sup>202</sup> As such, opponents claim these mergers will amount to a “radical contraction” in a field that already has “enormous barriers to entry.”<sup>203</sup> This concern is a real one. More than a decade ago, USDA’s Chief Economist expressed concern about continuing investment in agricultural research as markets concentrated. He noted that “product improvement may not be as necessary to maintain market share, so firms may not be as inclined to invest in research and product development.”<sup>204</sup> Experience has born this out. Past consolidation in the industry has been directly correlated with decreasing intensity of private research spending relative to what would have occurred without consolidation, at least for corn, cotton, and soybeans, as there seems to be an inverse relationship between consolidation and innovation in the seed industry.<sup>205</sup> Experience has shown that “[a]s these industries have consolidated, [the remaining companies] have spent less on research.”<sup>206</sup>

But, mergers affect innovation in an even more profound fashion than mere declines in investment. The corporations that dominate the industrial food system define the agenda for agricultural R&D. Private sector research is directed overwhelmingly to new proprietary seeds—predominantly GE seeds.<sup>207</sup> This private sector research is not primarily directed toward issues of high public concern “like food safety, genetic resource conservation, and farming practices to conserve natural resources.”<sup>208</sup> Instead, consolidation has focused research ever more narrowly on a small set of commodity crops, with companies devoting most of their energy toward creating exclusive platforms that integrate their proprietary chemicals, seeds, and other inputs.<sup>209</sup> More fundamentally, it represents an enclosure of knowledge—with R&D focused on proprietary information that does not contribute to the broader knowledge commons.

This dynamic has prompted critics to caution that the proposed mergers “will not speed up innovation” because their “aim is market

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<sup>201</sup> News Release, Dow, *supra* note 3.

<sup>202</sup> David J. Lynch & Guy Chazan, *Bayer-Monsanto Sows Seeds of Doubt Among Regulators*, FIN. TIMES (May 30, 2016), <https://perma.cc/U35H-7VLM> (quoting Diana Moss, American Antitrust Institute).

<sup>203</sup> *Id.* (quoting Peter Carstensen, Professor of Law Emeritus at the University of Wisconsin).

<sup>204</sup> Collins Testimony, *supra* note 31, at 13.

<sup>205</sup> David Schimmelpfennig et al., *The Impact of Seed Industry Concentration on Innovation: A Study of US Biotech Market Leaders*, 30 AGRIC. ECON. 157, 164 & tbl.3 (2004).

<sup>206</sup> Brad Plumer, *Why Bayer’s Massive Deal to Buy Monsanto Is So Worrisome*, VOX (Sept. 15, 2016), <https://perma.cc/X64W-8VX3> (quoting Phil Howard, Professor at Michigan State University).

<sup>207</sup> See FUGLIE ET AL., *supra* note 131, at 4, 7, 8 tbl.4.

<sup>208</sup> *Id.* at 10.

<sup>209</sup> See Plumer, *supra* note 206.



control.”<sup>210</sup> Rather, consolidation of ownership over knowledge production has resulted in what the ETC Group calls “the invisible hold” over the market for seeds.<sup>211</sup> As this “invisible hold” tightens, it becomes more difficult to access all kinds of information. For example, until recently, Monsanto’s technology/stewardship agreements explicitly prohibited seed purchasers from conducting any research on the seeds.<sup>212</sup> The agreements also prohibited a purchaser from supplying seeds to someone else for research purposes.<sup>213</sup> As a result, there was no way for researchers to legally acquire seeds or conduct research without the explicit permission of the company involved. Researchers complained about needing to have “written permission from the companies for any science involving their seed, even if it was commercially available.”<sup>214</sup> To obtain this permission, researchers had to get the company to sign off on the research design.<sup>215</sup> That gave the companies the power to choose who could study the crops and to dictate how the research would be conducted, giving them unfettered power to shape the information that would be available.<sup>216</sup> As a result, “[n]o truly independent research [could] be legally conducted on many critical questions, . . . unduly limit[ing]” the data that regulators had before them in making decisions about GE crops.<sup>217</sup>

Even more astonishing than the prior restrictions on academic research is the fact that these same research limitations extended to regulators.<sup>218</sup> Indeed, it was only in 2010 that Monsanto and ARS negotiated a license that allowed the government—i.e., the regulators overseeing Monsanto—the freedom to conduct research without first asking Monsanto’s express permission for each individual experiment.<sup>219</sup>

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<sup>210</sup> ETC GRP., *supra* note 15, at 3.

<sup>211</sup> *Id.*

<sup>212</sup> MONSANTO, *supra* note 184, ¶ 4(j); Emily Waltz, *Under Wraps*, 27 NATURE BIOTECHNOLOGY 880, 880 (2009), <https://perma.cc/FGT9-2J2E>.

<sup>213</sup> MONSANTO, *supra* note 184, ¶ 4(j); Waltz, *supra* note 212.

<sup>214</sup> Nathanael Johnson, *Genetically Modified Seed Research: What’s Locked and What Isn’t*, GRIST (Aug. 5, 2013), <https://perma.cc/HZ7L-JYVX> (quoting Elson Shields, corn-insect scientist at Cornell University).

<sup>215</sup> In an unprecedented 2009 letter to EPA, twenty-six entomologists complained that the agricultural biotechnology companies were thwarting independent research on the effects of their GE crops. *See* Anonymous, Comment on FIFRA Scientific Advisory Panel; Notice of Public Meeting (Feb. 10, 2009), <https://perma.cc/HHG7-XK2Y>; *see also* Andrew Pollack, *Crop Scientists Say Biotechnology Seed Companies Are Thwarting Research*, N.Y. TIMES, Feb. 19, 2009, at B3.

<sup>216</sup> *See* Waltz, *supra* note 212, at 880–81 (“Seed companies can refuse a research request for any reason, and they get fairly inventive.”).

<sup>217</sup> Anonymous, Comment on FIFRA Scientific Advisory Panel, *supra* note 215.

<sup>218</sup> *See* Emily Waltz, *Monsanto Relaxes Restrictions on Sharing Seeds for Research*, 28 NATURE BIOTECHNOLOGY 996, 996 (2010), <https://perma.cc/B6CG-SYLP> (indicating the 2009 anonymous public comment was, at least in part, comprised of ARS scientists).

<sup>219</sup> *Id.*

## V. CONCLUSION

Antitrust laws in both the United States and European Union focus regulatory attention on the market consequences of mergers, with an eye toward preventing mergers that will reduce competition. It is worth remembering that “certainty about [whether mergers will have an] anticompetitive effect is seldom possible and [is] not required for a merger to be illegal.”<sup>220</sup> With that directive in mind, it should be clear that the Dow/DuPont, Bayer/Monsanto, and Syngenta/ChemChina mergers all raise serious antitrust concerns. Whether considered singly or cumulatively, the three proposed mergers will have wide-reaching impacts on competition, prices, and innovation in global and national agricultural markets. Past experience with mergers in this industry has shown that consolidation leads to increased prices, decreased choice, decreased innovation, and less access to information.<sup>221</sup> Yet, it seems clear that antitrust regulators are prepared to approve all three mergers.<sup>222</sup> If the Big Six indeed becomes the Big Four, it will be because regulators decided to overlook these core antitrust concerns.

Moreover, antitrust’s narrow focus on competition leaves key concerns about these agricultural mergers unexamined. In particular, there is no room in the ongoing antitrust analyses of these proposed mergers for an examination of fundamental public policy objectives like food security and environmental sustainability.

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<sup>220</sup> U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, *supra* note 26, at 1.

<sup>221</sup> Aerin Einstein-Curtis, *US Farmers Campaign Against Dow Chemical Merger with DuPont*, FEEDNAVIGATOR (June 28, 2016), <https://perma.cc/RYK2-BFZD> (quoting Barbara Patterson, government relations representative for the United States National Farmers Union).

<sup>222</sup> See Bert-Freidrich Fröndhoff, *Betting On the Bayer-Monsanto Merger*, HANDELSBLATT GLOBAL (Feb. 21, 2017), <https://perma.cc/J2EM-VZEW> (inferring from Warren Buffett’s recent purchase of eight million shares of Monsanto that the deal is likely to go through soon); Emily Unglesbee, *Merger Update: Dow-DuPont Merger Gains EU Approval, ChemChina-Syngenta Pending*, DTN PROGRESSIVE FARMER (Mar. 27, 2017), <https://perma.cc/CVJ7-2B9K>.