2021 Report on Ethanol Market Concentration

I. Introduction

This Report presents the Federal Trade Commission's ("Commission" or "FTC") concentration analysis of the ethanol production industry for 2021.[1] The report includes certain data and information from the U.S. Energy Information Administration ("EIA"), industry participants, and other sources.[2] Section 1501(a)(2) of the Energy Policy Act of 2005 requires that the FTC annually "perform a market concentration analysis of the ethanol production industry . . . to determine whether there is sufficient competition among industry participants to avoid price-setting and other anticompetitive behavior."[3] Pursuant to the statute, the FTC must measure concentration using the Herfindahl-Hirschman Index ("HHI") and consider all marketing arrangements among industry participants in preparing its analysis.[4] Also pursuant to the statute, the FTC delivers its report to Congress and the Administrator of the Environmental Protection Agency ("EPA") by December 1 of each year.

The HHI is a measure of market concentration. A given market's HHI is the sum of the squares of the individual market shares of all market participants.[5] As in previous reports, FTC staff ("staff") analyzed concentration based on U.S. ethanol production capacity and actual production of ethanol. Staff's analysis does not address whether ethanol production in any geographic area constitutes a relevant antitrust market; instead, it calculates concentration on a

[1] This Report builds upon Commission reports from previous years. Prior reports contain background information not included in this Report. *See* FTC, Oil and Gas Industry Initiatives, Competition Policy: Reports, https://www.ftc.gov/tips-advice/competition-guidance/industry-guidance/oil-and-gas.

[2] Certain data and information relied upon in this Report may be revised or updated between annual reports.

[3] Energy Policy Act of 2005, Pub. L. No. 109-58, § 1501, 119 Stat. 1067, 1074, *amended by* Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492. For purposes of this Report, we presume that Congress used the term "price-setting" to mean "illegal price fixing."

[4] *Id*.

[5] For example, a four-firm market with market shares of 30 percent, 30 percent, 20 percent, and 20 percent has an HHI of 2600 [(30*30) + (30*30) + (20*20) + (20*20) = 2600]. HHIs range from 10,000 in a one-firm (pure monopoly) market to a number close to zero in a highly unconcentrated market.

nationwide basis, based on ethanol production capacity and actual ethanol production. For both measures, HHIs are calculated for producers and marketers. For both production capacity and actual production, concentration for producer shares is lower than concentration for marketer shares. Based on production capacity, the HHIs are 561 for producer-based shares and 809 for marketer-based shares. Based on actual production, the HHIs are 526 for producer-based shares and 847 for marketer-based shares. There has been an increase in concentration since last year for each of the four categories.

The low level of concentration and large number of market participants in the U.S. ethanol production industry continue to suggest that the exercise of market power to set prices, or coordinate on price or output levels, is unlikely on a nationwide basis. As has been the case each year since the Commission began reporting, the current HHIs indicate that the industry is unconcentrated nationwide.[6] At this level of concentration, a single ethanol producer or marketer likely lacks market power. Successful anticompetitive coordination would require agreement among a very large number of competitors and thus is similarly unlikely. Moreover, imports and the possibility of entry would likely impede the exercise of market power by any group of domestic firms.

II. Industry Updates

A. Renewable Fuel Standard

Since 2005, Congress has required that the national transportation fuel supply contain a minimum annual volume of renewable fuels, including fuel ethanol.[7] This mandate, known

[6] The Commission and the U.S. Department of Justice characterize markets in which the HHI is below 1500 as unconcentrated. U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines § 5.3 (2010), https://www.ftc.gov/sites/default/ files/attachments/merger-.review/100819hmg.pdf ("Horizontal Merger Guidelines").

[7] *See* Energy Policy Act of 2005 § 1501, *supra* note 3.

as the Renewable Fuel Standard ("RFS"), increases every year. In 2007, Congress revised the RFS, significantly increasing the minimum volumes of ethanol and adding requirements for advanced biofuels.[8] The annual use of renewable fuels did not keep pace with the statutory RFS requirements, however.[9] This situation has prompted the EPA for several years to use its rulemaking authority to decrease the annual requirements below the statutory volumes.[10] For 2021, the RFS mandates 33.0 billion gallons of renewable fuel, 15.0 billion gallons of which can be conventional corn ethanol.[11] The 2021 advanced biofuels target is 18.0 billion gallons, at least 13.5 billion gallons of which must be cellulosic biofuel.[12] The final renewable fuel standards for 2021 are forthcoming.[13]

B. Supply and Demand

Most market participants that staff interviewed characterize the ethanol industry as having excess capacity. Some market participants, however, describe the industry as having sufficient capacity. Most market participants interviewed stated that demand for ethanol substantially recovered to a more normal level this year, along with demand for gasoline, after

[8] "Advanced biofuel" refers to a renewable fuel, other than ethanol derived from corn starch, that has lifecycle greenhouse gas emissions that are at least 50 percent less than the average greenhouse gas emissions of the baseline fossil fuel. 42 U.S.C. § 7545(o)(1)(B)(i). Advanced biofuels include, but are not limited to, cellulosic biofuel and biomass-based diesel. *Id*. § 7545(o)(1)(B)(ii)(I)-(VII).

[9] *See* 2013 Ethanol Report, *supra* note 1, at 4; 2014 Ethanol Report, *supra* note 1, at 3; 2015 Ethanol Report, *supra* note 1, at 3.

[10] *See* 2016 Ethanol Report, *supra* note 1, at 3 (discussing revised volume requirements), and subsequent reports. The Clean Air Act provides EPA authority to adjust cellulosic, advanced, and total volumes set by Congress as part of the annual rulemaking process. *See* EPA, Overview for Renewable Fuel Standard, https://www.epa.gov/renewable-fuel-standard-program/overview-renewable-fuel-standard (last visited Oct. 28, 2021).

[11] 42 U.S.C. § 7545(o)(2)(B)(i)(I).

[12] *Id*. § 7545(o)(2)(B)(i)(II)-(III).

[13] EPA, Renewable Fuel Annual Standards, https://www.epa.gov/renewable-fuel-standard-program/renewable-fuel-annual-standards (last visited Nov. 8, 2021). The EPA's volume requirements, like the statutory RFS mandate, set a target for total renewable fuels and include a nested requirement for advanced biofuels. Thus, each gallon of fuel that meets the advanced biofuels requirement also counts toward the total renewable fuels requirements. Once obligated parties meet the minimum requirement for advanced biofuels, they may meet any remaining obligation under the total renewable fuels requirement with conventional corn ethanol.

previously declining due to the COVID pandemic. Some market participants reported idling plants during the last year due to the pandemic, and subsequently restarting some of those plants. Market participants noted that although some ethanol producers shifted some production to ethanol for hand sanitizer during the pandemic, interest in supplying hand sanitizer is now less or uncertain.

Most market participants interviewed stated that the vacatur of the EPA's 2019 regulatory changes to allow E15 gasoline to be sold year-round, rather than limited to eight months of the year, would have little immediate impact of demand for ethanol.[14] Some market participants, however, allowed that the decision may create uncertainty for some gas stations considering future options for E15. The EPA had previously finalized regulatory changes in 2019 to allow E15 to be sold year-round, rather than limited to eight months of the year.[15] A reason for this rule change was to remove barriers that limited potential growth in biofuel consumption.[16] On appeal, the reviewing court found the EPA's logic justifying extending its waiver authority for E10 to also cover E15 gasoline to be unpersuasive, and therefore vacated the rule.[17] In addition, most market participants interviewed stated that a Supreme Court decision holding that small refiners and others can receive extensions of their exemptions to the RFS, even if their earlier exemptions had lapsed, would have little impact on demand for ethanol.[18]

[14] E15 is gasoline blended with 15 percent ethanol.

[15] Historically, EPA regulated the use and required volumes of biofuels on an E10 standard with 10 percent ethanol, as contemplated by the 2005 and 2007 laws. *See supra* note 3. The EPA's 2019 final E15 rule interpreted E10 and E15 to be substantially similar for the purpose of expanding the use of biofuels in the gasoline supply. EPA, Final Rule, Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations, 84 Fed. Reg. 26980 (June 10, 2019).

[16] *Id*. at 26981.

[17] Am. Fuel & Petrochem. Manuf. v. EPA, 3 F.4th 373, 382-84 (D.C. Cir. 2021) (vacating rule), *petition for cert. docketed,* Growth Energy v. Am. Fuel & Petrochem. Manuf. v. EPA (Oct. 7, 2021).

[18] HollyFrontier Cheyenne Refining, LLC v. Renewable Fuels Ass'n, 141 S. Ct. 2172 (2021).

C. Prices and Margins

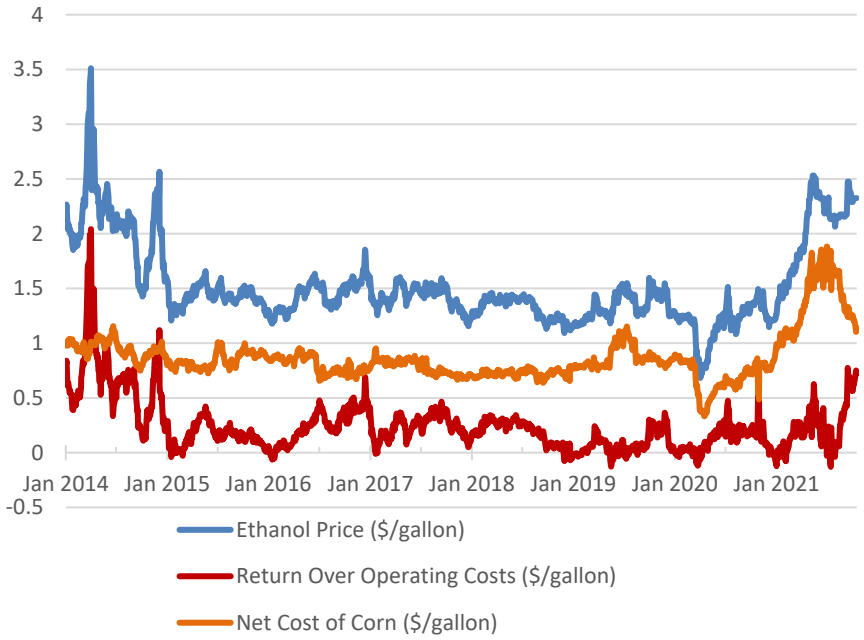
Prices were volatile this year. Margins were low or negative at the beginning of the pandemic and ended significantly higher by the end of the period. Figure 1 shows daily net cost of corn,[19] ethanol prices, and margins from the beginning of 2014 to October 15, 2021, expressed on a per-gallon basis.[20] Margins are measured by a return over operating costs estimated for a hypothetical dry mill in Iowa, as reported by the Iowa State University Center for Agricultural and Rural Development.[21]

[19] Net cost of corn is the daily nearby futures price in Chicago plus Iowa corn basis. Weekly corn basis is calculated as the price that Iowa ethanol plants pay, as reported by the U.S. Department of Agriculture's Livestock and Grain Market News, minus the Chicago Board of Trade nearby futures price.

[20] October 15, 2021 is the last date for which data from Iowa State University were reviewed for purposes of this Report.

[21] *See* Iowa State University, Center for Agricultural and Rural Development, Historical Ethanol Operating Margins, http://www.card.iastate.edu/research/biorenewables/tools/hist_eth_gm.aspx (last visited Oct. 18, 2021). "Return over operating costs" is specifically defined as the difference between the revenue from ethanol (including revenue from ethanol and dried distillers grains with solubles) and variable production costs (including corn, natural gas, and labor). As of November 2016, revenue includes sales of corn oil, a byproduct of ethanol, which could make margins not comparable before that date.

Figure 1: Ethanol Price, Corn Cost, and Margin
Jan. 2014 to Oct. 2021



Data from Iowa State University, Center for Agricultural and Rural Development, Historical Ethanol Operating Margins

The average estimated margin from the beginning of 2021 through mid-October 2021 was $0.25 per gallon, which is higher than the $0.12 per gallon margin for the same period in 2020 and higher than the margin in 2019.[22] During this period, the estimated margin was initially low or negative, continuing the COVID-19-influenced conditions in 2020. The estimated margin increased to a peak in mid-May as both the ethanol price and net cost of corn increased, then decreased to negative levels in mid-July, and reversed course and surpassed the May peak toward the end of the period.[23]

[22] *Id.* (margins calculated to October 15 for each of the years).
[23] *Id.*

Some market participants stated that prices and margins are more normal this year, following an unusual previous year. Some market participants variously cited regional corn crop scarcity in some areas due to drought conditions, increased U.S domestic corn exports to China, and higher prices for certain inputs into the ethanol production process, such as natural gas, as factors negatively affecting margins.

D. Market Trends

Domestic ethanol production capacity remained almost unchanged, while actual production decreased since last year's Report. Production capacity (including capacity under construction) was 17.8 billion gallons per year.[24] Actual production from July 2020 through June 2021 decreased slightly from the prior 12 months, from 14.6 billion to 14.5 billion gallons per year.[25]

Ethanol exports have also decreased. From July 2020 through June 2021, the United States exported approximately 1.27 billion gallons of ethanol.[26] This marked the third

[24] Production capacity decreased slightly from 17.835 billion gallons per year in 2020 to 17.770 billion gallons per year in 2021. Staff's total capacity estimate takes into account information obtained through interviews with market participants and publicly available information, including information published online by the Renewable Fuels Association ("RFA") as of September 7, 2021, regarding Ethanol Biorefinery Locations. RFA, Ethanol Biorefinery Locations, https://ethanolrfa.org/resources/ethanol-biorefinery-locations. Staff's capacity total is greater than the EIA annual published estimate of 17.5 billion gallons. EIA, U.S. Fuel Ethanol Plant Production Capacity (Sept. 3, 2021), http://www.eia.gov/petroleum/ethanolcapacity/. EIA's capacity data are a snapshot of capacity as of January 1 of each year and exclude plants that were idle, shut down, or still under construction as of that month. *See* EIA, EIA Releases U.S. Fuel Ethanol Production Capacity Data (Nov. 30, 2011), http://www.eia.gov/todayinenergy/detail.cfm?id=4110 (describing EIA's method for calculating total capacity for its first annual reports).

[25] EIA, Monthly Energy Review, Table 10.3 Fuel Ethanol Overview (release date: Sept. 27, 2021), https://www.eia.gov/totalenergy/data/browser/?tbl=T10.03#/?f=M&start=201903&end=202106&charted=7-18.

[26] Calculations based on July 2020-June 2021 monthly exports reported in EIA, U.S. Exports of Fuel Ethanol, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=M_EPOOXE_EEX_NUS-Z00_MBBL&f=M (calculating a monthly sum of barrels converted to U.S. gallons (1 barrel = 42 U.S. gallons)). Monthly exports reported by EIA for July 2019-June 2020 have been revised since last year's report to total 1.34 billion gallons of ethanol.

consecutive annual decline during a July-to-June period after five consecutive years of increased ethanol exports.[27]

Over 100 firms produced ethanol in 2021. The largest ethanol producer's share of domestic capacity is approximately 17 percent, increased from 12 percent in 2020. This is primarily due to a merger between two industry firms.[28]

Most market participants interviewed cited transportation challenges in trucking due to a shortage of drivers, and similar challenges in rail due to staffing issues. Some market participants stated that varying local crop and transportation conditions have required moving more corn by rail this year. Some market participants also noted interest in the ethanol industry in producing higher-grade ethanol for various applications and adapting existing ethanol plants to produce certain co-products.

III. Analysis

Section 1501(a)(2) of the Energy Policy Act of 2005 instructs the Commission to use HHIs to measure concentration in the U.S. ethanol production industry.[29] HHIs can provide a snapshot of market concentration based upon the number of market participants and their respective sales, production, or capacity.[30] An analysis of competition among market participants using these HHIs assumes that the U.S. ethanol production industry is an appropriate (or "relevant") antitrust market, a question that this Report does not address.[31] Such an

[27] *Id.*

[28] *See* 2020 Ethanol Report, *supra* note 1, at 6 (largest producer's share 12 percent).

[29] Energy Policy Act of 2005 § 1501(a)(2), *supra* note 3.

[30] The Commission and the U.S. Department of Justice regularly use HHIs to measure concentration in a relevant antitrust market as part of their analysis of the likely effects of a merger or acquisition on competition in that market. *See* Horizontal Merger Guidelines, *supra* note 6, § 5.3.

[31] A relevant antitrust market has both product and geographic aspects. A relevant product market is a product or group of products such that a hypothetical profit-maximizing firm that was the only seller of those products likely could profitably impose at least a small but significant and nontransitory increase in price ("SSNIP"). If such a price increase would not be profitable because of the loss of sales to other products, the product or group of products

assumption precludes consideration of a broader product market that includes other gasoline blending components that might be viable substitutes for ethanol. In the event that ethanol competes with other blending components, HHIs based on fuel ethanol production and marketing would likely misstate concentration in the industry. This assumption also precludes consideration of whether broader or narrower geographic markets than the United States could provide further insight about competition in ethanol production and marketing.

This Report presents four HHIs for the ethanol industry, based on two different measures of market share (production capacity and actual production) and two different methods of attributing those market shares to various market participants (producers and marketers). In regard to measuring market share, for purposes of this Report "production capacity" is defined to mean a plant's maximum annual output of ethanol minus any required downtime for maintenance.[32] "Actual production" is defined to mean a plant's actual annual output of ethanol.[33] In regard to attributing market shares to market participants, "producer" is defined to mean a firm that in fact manufactures the ethanol. As discussed below, "marketer" is defined to mean the firm, whether the producer itself or a third-party firm, that sells and transports a producer's ethanol output.

FTC staff calculated market shares based on domestic ethanol production capacity for producers and marketers. FTC staff relied on publicly available information and interviews with

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would not be a relevant product market. Similarly, a relevant geographic market is a region such that a hypothetical profit-maximizing firm that was the only seller of the relevant product in that region likely could impose at least a SSNIP above the competitive level. If such a price increase would not be profitable because of the loss of sales to sellers outside the region, the region would be too narrow to be a relevant geographic market. *See id*. §§ 4.1-4.2.

[32] Production capacity is also sometimes referred to as "operating capacity." For purposes of this Report, production capacity is distinct from "nameplate capacity," a common industry term that may refer to the intended full-load sustained output of a facility. Nameplate capacity may also be variously known as "rated capacity," "nominal capacity," "installed capacity," or "stated design capacity."

[33] Actual production is also sometimes referred to as "operating production."

producers and marketers to determine the production capacity of each ethanol plant and marketing activities of marketers. FTC staff then calculated capacity-based HHIs for producers and marketers.

EIA staff calculated market shares based on actual production for producers and marketers. Due to the confidential nature of the ethanol production data the EIA collects, FTC staff provided to EIA staff the information necessary to attribute market shares to market participants.[34] EIA staff then separately calculated production-based HHIs for producers and marketers.[35]

A. Concentration with Market Shares Based on Production Capacity

FTC staff calculated market shares based on fuel ethanol production capacity.[36] Production capacity provides a useful and easily confirmable indicator of a producer's competitive significance.[37] In determining each producer's aggregate capacity, staff included the capacity of existing plants, as well as the projected capacity of plants currently under construction and plants currently undergoing expansion.[38] Incorporating capacity from such

[34] For producers for which EIA maintains production data, FTC staff provided EIA with the identities of those producers' marketers. EIA staff used this information, in conjunction with its own data on ethanol production, to calculate the HHIs that attribute market share to marketers.

[35] Because the production data are confidential, EIA staff did not disclose the volumes of ethanol attributable to any individual producer or the market shares based on those volumes.

[36] The RFA website provides frequently updated data on ethanol plant capacity and capacity expansion plans. Capacity information is also available on many individual producers' websites, some of which also provide details of construction and expansion plans. Staff obtained the production capacity for some producers directly from firm officials.

[37] *See* Horizontal Merger Guidelines, *supra* note 6, § 5.2. In markets for homogeneous products (such as ethanol), a firm may derive its competitive significance primarily from its available capacity – *i.e.*, its ability and incentive to increase production in the event of a competitor's price increase or output reduction. *Id.*

[38] Staff included the capacity of these construction and expansion projects only where the producer had finalized construction plans, received the necessary financing for construction, and begun physical construction. Ethanol producers frequently announce capacity additions, new plants, plant sales, and cancellations of plans to build new capacity. These HHI calculations represent staff's best estimate of the industry's concentration as of September 2021. This approach therefore excludes any more recent publicly available information that might be relevant to industry HHI calculations. These HHI calculations also might not capture the full complexity of industry ownership structures, especially the degree of control by minority interests held by marketers or third-party management

projects into current market share calculations is consistent with the approach set forth in the Horizontal Merger Guidelines.[39]

1. *Attributing Market Shares to Producers*

Under the first approach to market concentration, FTC staff attributed market share to each producer based on the producer's percentage of total production capacity. This method of calculation yielded an HHI of 561, a level regarded as unconcentrated under the Horizontal Merger Guidelines.[40] This HHI is higher than the corresponding HHI of 447 in 2020.[41]

2. *Attributing Market Shares to Marketers*

Under the second approach, FTC staff attributed the market share of each producer to the firm that markets for that producer. Some producers sell the ethanol they produce directly to blenders and end users. Many producers, however, enter into marketing agreements with third parties to sell their output. An ethanol marketer may represent and make limited decisions for multiple individual producers, essentially aggregating those producers' capacities under a single entity. For purposes of competitive analysis, attributing production capacity to marketers rather than to the actual producers provides a measure of industry concentration that captures this aggregation. For a producer that engages in direct sales, staff attributed the market shares to the

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service firms. However, the HHI resulting from attributing production to the marketer should capture any such complexity not reflected in the producer HHI.

[39] *See* Horizontal Merger Guidelines, *supra* note 6, § 5.1. Firms that are not currently producing but likely would respond rapidly in the event of a SSNIP have competitive significance even though they do not currently supply the relevant market. *Id.*

[40] *See id*. § 5.3.

[41] *See* 2020 Ethanol Report, *supra* note 1, at 9. The industry continued to experience shifts in plant capacity through plant expansions, conversions, openings, and closures over the past 12 months. Because the HHI captures these adjustments in the aggregate, it ignores the individual activity of industry participants. For example, the HHI may include a producer's acquisition of another producer's facilities that coincided with the restart or reconstruction of an idled facility. Alternatively, the HHI may exclude a plant that was converted to other uses, formally closed, or judged unlikely to reopen in the near future.

producer itself.[42] For a producer that does not engage in direct sales, staff attributed the market shares to the third-party firm that marketed the producer's ethanol output. This approach yields an HHI of 809, unconcentrated under the Horizontal Merger Guidelines. This HHI is higher than the corresponding HHI of 685 in 2020.[43]

B. Concentration with Market Shares Based on Actual Production

EIA staff calculated market shares based on actual production. Firms that produce more than eight million gallons of oxygenates (such as ethanol) per year must report to EIA their monthly production volumes by product. Using production data is instructive because capacity data have certain limitations, particularly insofar as stated capacity does not necessarily represent actual production capabilities. Ethanol plants can sometimes produce more than their stated design capacity (*i.e.*, nameplate capacity) and sometimes operate at increasing rates as their owners and operators improve the production process and gain expertise in operating their plants.[44] Thus, actual production may reflect a market participant's competitive significance more accurately than would the sum of its plants' stated design capacities.

There are some limitations on the accuracy of HHIs based on actual production, just as there are limitations on capacity-based HHIs. HHIs based on production over a given period may overstate or understate actual concentration due to entry and exit of firms, expansion of existing capacity, and variations in capacity utilization rates during the relevant period. Specifically, the production-based HHIs provided below do not fully reflect the impact of new facilities that began production during the last 12 months, nor do they fully reflect the impact of

[42] Some marketers publicly announce new agreements with producers. Where staff could not determine whether a producer marketed for itself or used an outside marketing firm, staff attributed market share to the producer.

[43] *See* 2020 Ethanol Report, *supra* note 1, at 10.

[44] Similarly, some ethanol producers may not be in a position to utilize their full plant capacity. Actual production may be a better indicator of their competitive significance in such cases.

plant closures and idling during the period. In both cases, these facilities produced only a fraction of what they otherwise could produce in a full year, leading to an understatement (in the case of new facilities) or an overstatement (in the case of idled facilities) of their competitive significance in the market. Similarly, the HHIs below do not account for the effects on concentration of plant expansions that have been in effect for less than 12 months and capacity-enhancing improvement projects that are not yet in operation. These production-based HHIs reflect actual production volumes from July 2020 through June 2021.

1. *Attributing Market Shares to Producers*

Where EIA attributed the actual production market share directly to individual producers, the resulting HHI is 526, higher than the 2020 HHI of 420.[45]

2. *Attributing Market Shares to Marketers*

Calculating production-based concentration by attributing the market share of each producer to the firm that markets for that producer results in an HHI of 847, higher than the 2020 HHI of 695.[46]

C. Entry and Imports

The U.S. ethanol industry remains unconcentrated today. This implies that any unilateral or coordinated attempt to exercise market power is unlikely. Should the industry become more concentrated, the possibility of new firms entering the domestic market and the responsiveness of ethanol imports to relative changes in domestic ethanol prices would likely provide additional constraints on anticompetitive behavior by domestic firms. Potential entrants can purchase and

[45] *See* 2020 Ethanol Report, *supra* note 1, at 11.
[46] *Id.* at 12.

restart existing production facilities that were idled due to recent economic conditions or can design and build new plants to enter the market.

Ethanol import levels historically have responded to fluctuations in the price of U.S. ethanol relative to foreign ethanol prices, particularly prices for sugarcane-based ethanol from Brazil.[47] This responsiveness would likely constrain any potential exercise of market power by a domestic firm. Additionally, to the extent U.S. prices increase because of the exercise of market power among a subset of U.S. producers or marketers, it is likely that other producers would react by exporting less to take advantage of more favorable U.S. ethanol prices (thereby increasing U.S. supply).

IV. Conclusion

Regardless of the particular measure of market share or the market share attribution method used to calculate concentration, the ethanol industry remains unconcentrated. Furthermore, the possibility of entry and the availability of ethanol imports provide additional constraints on the exercise of market power by current industry participants. The low level of concentration and large number of market participants in the U.S. ethanol production industry continue to suggest that the exercise of market power to set prices, or coordination on price and output levels, is unlikely.

[47] Brazil has been the largest exporter of ethanol to the United States every year since 2011. *See* EIA, U.S. Imports by Country of Origin (release date: Sept. 30, 2021), https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_epooxe_im0_mbbl_a.htm, and prior FTC reports on ethanol market concentration, *supra* note 1. Although the United States is a net exporter of ethanol, demand exists for imported ethanol with low greenhouse gas emissions, such as sugarcane-based ethanol. *See* EIA, U.S. ethanol exports fell for the first time in four years in 2019 (May 1, 2020), https://www.eia.gov/todayinenergy/detail.php?id=43575.

Figure 2: Domestic Fuel Ethanol Concentration

Concentration Based on Production Capacity	**2020 HHI[48]**	**2021 HHI**
Shares attributed to each producer	447	561
Shares attributed to marketers for all marketing agreements	685	809
Concentration Based on Actual Production	**2020 HHI[49]**	**2021 HHI**
Shares attributed to each producer	420	526
Shares attributed to marketers for all marketing agreements	695	847
Note: Production capacity for 2021 includes the annual production capacity as of September 2021 and the capacity additions under construction and expected completions within 12 to 18 months thereafter. Production data for 2021 are from the annual period of July 2020 through June 2021.		

[48] *See* 2020 Ethanol Report, *supra* note 1, at 14.

[49] *Id*.

Figure 3: Historical Fuel Ethanol Capacity and HHIs