

7-2022

The Impact of Covid-19 on Ohio's Supply Chain

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Repository Citation

Lendel, Iryna; Demko, Iryna; Figueroa, Georgina; and Saneda, Matthew, "The Impact of Covid-19 on Ohio's Supply Chain" (2022). *All Maxine Goodman Levin School of Urban Affairs Publications*. 0 1 2 3 1777.
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INTRODUCTION

Since the early months of 2020, supply chain disruptions due to the Covid-19 pandemic have become commonplace throughout the United States. While the shutdown of Chinese factories in early 2020 created a strain on global trade, the following lockdowns in the United States and Europe slowed the economy and supply chains to a crawl. This was no different in Ohio, where 29% of previously employed residents filed for unemployment as the pandemic started.¹ However, even as economies reopened around the world, both nationally and locally, businesses continued to report issues with delay and lack of materials as well as rising commodities prices.² In April 2020, 35% of Ohio businesses reported supply chain disruptions.³ According to the Small Business Pulse Survey, 45% of small businesses nationally reported having supply chain disruptions in 2020.⁴

This research brief examines the changes in Ohio's supply chains from 2019 to 2020. Through this analysis, our goal is to identify changes during the pandemic and

determine future growth opportunities in Ohio's supply chain. Using IMPLAN⁵ data, we analyze commodity⁶ demand in four sectors: Manufacturing, Health Care, High Tech and Innovation, and Agriculture. Table 1 below illustrates the total amount that a sector spends purchasing commodities and the amount that is spent on purchasing from Ohio-based industries. From 2019 to 2020, we saw a decline in gross and regional purchases from Manufacturing, High Tech and Innovation, and Health Care sectors, while purchases from the Agriculture sector saw positive changes.

The Manufacturing sector is made up of 328 industries according to the IMPLAN sectoring scheme.⁷ In 2019, these industries spent over \$113 billion purchasing commodities from regional industries. However, that number dropped to \$102 billion in 2020 (-10%), the largest decline in regional purchases of the four sectors (Table 1). The corresponding decline in all purchases -9% indicates a general decline in manufacturing production and input demand.

Table 1. Commodities Purchases by Sector

Sector	Purchases in Ohio			All Purchases		
	2019	2020	% Change	2019	2020	% Change
Manufacturing (328 industries)	\$113.5 billion	\$102.5 billion	-10%	\$261.3 billion	\$238 billion	-9%
Health Care (10 industries)	\$28.2 billion	\$27.2 billion	-4%	\$40 billion	\$38.4 billion	-4%
High Tech and Innovation (6 industries)	\$9 billion	\$8.7 billion	-3%	\$13.2 billion	\$13 billion	-2%
Agriculture (19 industries)	\$3.4 billion	\$4.2 billion	22%	\$5.6 billion	\$6.8 billion	20%

Source: 2019 and 2020 IMPLAN data files for Ohio and IMPLAN sectoring schemes for industry classification

¹ [Unemployment Insurance Claims](#) (2021). *Ohio Department of Job and Family Services*.

² [Cooperatives in Ohio's Economy: Their Contribution and the Impact of Covid-19](#). (2021, September) *Maxine Goodman Levin College of Urban Affairs*.

³ [Covid-19 and Supply Chains: A Year of Evolving Disruptions](#) (2021, February 26). *Federal Reserve Bank of Cleveland*.

⁴ [Small Business Pulse Survey: Responses by Geography and Sector](#) (2022, March 3). *United States Census Bureau*.

⁵ IMPLAN is an economic impact model that represents the interdependencies between different sectors of regional economies.

⁶ A commodity is the product or service produced by the industries. We analyze the industries from which Ohio industries purchased commodities from.

⁷ [546 Industries, Conversions, Bridges, & Construction - 2020](#). Data. IMPLAN.

The Health Care sector consists of 10 industries that together spent \$28 billion on commodities from Ohio industries prior to the pandemic.⁸ Regional purchases dropped to \$27 billion in 2020, which mirrored changes in all input purchases by the Health Care sector.

The High Tech and Innovation sector is made up of 6 industries: Software publishers, data processing, hosting and related services, internet publishing and broadcasting and web search portals, custom computer programming services, computer systems design services, other computer-related services, including facilities management. In total, the sector spent \$9 billion on commodities from Ohio industries in 2019. Similar to Manufacturing, the sector's regional input purchases declined more significantly than total input purchases.

The Agriculture sector, which includes 19 industries, spent \$3.4 billion on commodities from Ohio industries

in 2019.⁹ Unlike the other three sectors, input demand grew in 2020 to \$4.2 billion (+22%). Likewise, the sector's gross input purchases saw a large increase (+20%). The larger increase in regional input demand suggests that the Agriculture sector expanded its supply chain in Ohio in 2020.

While all four sectors purchase from Ohio industries, the scale and type of commodities needed vary between sectors. In 2020, the Health Care sector purchased 71% of its commodities in Ohio, the highest share of regional input purchases out of the four sectors. The High Tech and Innovation sector fared slightly less than Health Care, purchasing 67% of its commodities in Ohio. Similarly, the Agriculture sector purchased 62% of its commodities within Ohio. The Manufacturing sector has the lowest share of the four sectors, purchasing 43% of its commodities within Ohio.

MANUFACTURING

Factory shutdowns around the world and in the U.S. caused decreases in productivity, product shortages, and shipping delays.¹⁰ In May 2020, more than two-thirds of manufacturing contacts from the Fourth Federal Reserve District indicated their capacity utilization was below normal.¹¹

The Manufacturing sector purchased commodities from 141 different industries. In 2019, the sector spent over \$113 billion on commodities from regional industries; however, that amount dropped 10% in 2020 to a little over \$102 billion. Table 2 breaks down the top ten industries from which the Manufacturing sector purchased in 2019 and 2020. These industries account for 67% of the total amount spent on commodities in 2020.

The decline in input demand for oil and gas from 2019 to 2020 is not a surprise given the challenges that this industry faced during 2020 at the peak of the Covid-19

pandemic. In April of 2020, oil and gas producers collectively decided to cut supply short to help increase the price of crude oil, along with other measures that included shutting off wells and delaying all future investments.¹²

Tables 1 and 2 show that the Manufacturing sector saw a widespread decline in the amount spent on commodities, even more so in Ohio, suggesting that the Manufacturing sector was the most affected by the supply chain disruptions in 2020.

There was a decline in purchases from several wholesale industries that include: other durable goods (-12%); machinery, equipment, and supply (-7%); other nondurable goods (-9%); and mother vehicle and vehicle part and supplies (-3%). These declines were observed for the overall sector and Ohio commodities, signaling widespread Covid-19-related issues.

⁸ Offices of physicians; Offices of dentists; Offices of other health practitioners; Outpatient care centers; Medical and diagnostic laboratories; Home health care services; Other ambulatory health care services; Hospitals; Nursing and community care facilities; Residential mental retardation, mental health, substance abuse and other facilities.

⁹ [546 Industries, Conversions, Bridges, & Construction - 2020](#). Data. IMPLAN.

¹⁰ [COVID-19 and Supply Chains: A Year of Evolving Disruption](#). (2021, February 26). *Federal Reserve Bank of Cleveland*.

¹¹ [The Beige Book, May 2020](#). (2020, May 27). *US Federal Reserve System*.

¹² [Investment in oil supply has collapsed. It may not roar back](#). (2020, June 13). *The Economist*

The decline in purchases from the truck transportation industry can also be attributed to Covid-19 and plant closures, which led to a decline in production and a reduced demand for transportation of merchandise.

Grain farming was the sole industry that experienced an increase in purchases from the manufacturing sector. This increase can relate to an increase in the production

of ethanol in Ohio. There are seven ethanol producers in the state, and they require corn, which is one of the top grains produced in Ohio. Ethanol was in high demand as it is required to produce sanitizing products, which were in high demand during the peak of the Covid-19 pandemic.¹³ With GOJO, the producer of Purell, located in Akron, Ohio, it is not surprising that demand for this commodity increased.

Table 2. Top Industries in Ohio's Manufacturing Supply Chain

Industry	Purchases in Ohio			All Purchases		
	2019	2020	% Change	2019	2020	% Change
Manufacturing*	\$35.5 billion	\$31.2 billion	-12%	\$156 billion	\$142.2 billion	-9%
Management of companies and enterprises	\$7 billion	\$7 billion	0%	\$7.2 billion	\$7.2 billion	0%
Wholesale - Other durable goods merchant wholesalers	\$7 billion	\$6.1 billion	-12%	\$8.2 billion	\$7.3 billion	-12%
Truck transportation	\$6.1 billion	\$5.8 billion	-4%	\$6.1 billion	\$5.8 billion	-4%
Wholesale - Machinery, equipment, and supplies	\$4.6 billion	\$4.3 billion	-7%	\$5.1 billion	\$4.7 billion	-8%
Wholesale - Other nondurable goods merchant wholesalers	\$4.5 billion	\$4.1 billion	-9%	\$5.2 billion	\$4.7 billion	-8%
Wholesale - Motor vehicle and motor vehicle parts and supplies	\$3.2 billion	\$3.1 billion	-3%	\$4.2 billion	\$4.2 billion	0%
Grain farming	\$1.6 billion	\$2.6 billion	63%	\$2.4 billion	\$3.2 billion	36%
Electric power transmission and distribution	\$2.4 billion	\$2.3 billion	-5%	\$3 billion	\$2.8 billion	-7%
Oil and gas extraction	\$4.7 billion	\$2.1 billion	-55%	\$9.4 billion	\$5.3 billion	-43%
All other Commodities	\$36.9 billion	\$33.7 billion	-8%	\$54.5 billion	\$50.5 billion	-7%
Total	\$113.6 billion	\$102.5 billion	-10%	\$261.3 billion	\$238 billion	-9%

Source: 2019 and 2020 IMPLAN Data Files. Sorted by 2020 regional input value

*Manufacturing refers to purchases made within the industry (328 industries that make up this sector)

HEALTH CARE

While there is little doubt that Covid-19 had an impact on every job sector in some capacity, the pandemic placed major stress on the Health Care sector. According to Ohio Hospital Association, postponed nonessential procedures in the spring of 2020 meant \$3.3 billion in lost revenue and emergency expenses to hospitals in Ohio.¹⁴

Supply chain disruptions were another source of stress on the Health Care sector. When demand for Personal Protective Equipment skyrocketed in early 2020, it

caused shortages nationwide. These shortages hit health care workers particularly hard. Between April and May of 2020, 87% percent of nurses in the U.S reported needing to reuse a single-use mask with Covid-19 patients.¹⁵

The Ohio Health Care sector purchased commodities from more than 300 industries, spending over \$28 billion regionally in 2019. However, the sector reduced its spending by \$1 billion in 2020 (\$27.2 billion). To further analyze the changes in Ohio's Health Care supply chain, Table 3 compares the 10 top industries from which the

¹³ [Ethanol's market move.](#) (2020, August 27). *Ethanol Producer Magazine*

¹⁴ [COVID-19's financial impact on hospitals in Ohio is \\$3.3 billion to date.](#) (2020, July 2). *Crain's Cleveland Business*.

¹⁵ [US Nurse and Patient Safety Survey.](#) (2020, May 20). *National Nurses United*.

Health Care sector purchased commodities. These top industries account for 63% of the Health Care sector's total spending on commodities in 2020.

The majority of the largest purchases remained relatively stable from 2019 to 2020. The largest change was in the All other food or drinking places industry which had a 26% decrease in all purchases as well as a 22% decrease regionally. This decrease was likely caused by restrictions on indoor dining and food service availability to combat the spread of Covid-19.

Insurance is the second largest industry in the Health Care sector supply chain, accounting for \$2.8 billion in

purchases in Ohio. In 2020, the share of regional purchases saw a 1% increase compared to a 2% decline in overall input demand. This is likely due to the high availability of Ohio-based insurance companies. Ohio is home to large health insurance corporations, including Medical Mutual, CareSource, and ProMedica. The Insurance carriers industry remained stable in Ohio, with a small 2% decline in 2020.¹⁶ The industry saw a decline in elected care that potentially lowered earnings during the first half of 2020 but started to see recovery towards the end of the year, which continued during 2021.¹⁷

Table 3. Top Industries in Ohio's Health Care Supply Chain

Industry	Purchases in Ohio			All Purchases		
	2019	2020	% Change	2019	2020	% Change
Other real estate	\$4.3 billion	\$4.2 billion	-2%	\$5.5 billion	\$5.3 billion	-3%
Insurance carriers, except direct life	\$2.8 billion	\$2.8 billion	1%	\$3.2 billion	\$3.1 billion	-2%
Employment services	\$2.5 billion	\$2.4 billion	-5%	\$2.6 billion	\$2.6 billion	-2%
Management of companies and enterprises	\$1.6 billion	\$1.6 billion	5%	\$1.6 billion	\$1.7 billion	5%
Health Care*	\$1.4 billion	\$1.4 billion	1%	\$1.5 billion	\$1.5 billion	2%
Wholesale - Professional and commercial equipment and supplies	\$1.2 billion	\$1.2 billion	2%	\$1.3 billion	\$1.4 billion	6%
Management consulting services	\$956 million	\$921 million	-4%	\$1.7 billion	\$1.6 billion	-5%
Wholesale - Drugs and druggists' sundries	\$812 million	\$815 million	0.5%	\$847 million	\$864 million	-2%
Legal services	\$804 million	\$802 million	0%	\$1.2 billion	\$1.2 billion	-1%
All other food and drinking places	\$941 million	\$733 million	-22%	\$1.1 billion	\$807 million	-26%
All other commodities	\$10.9 billion	\$10.1 billion	-7%	\$19.4 billion	\$18.4 billion	-5%
Total	\$28.2 billion	\$27.1 billion	-4%	\$40 billion	\$38.4 billion	-4%

Source: 2019 and 2020 IMPLAN Data Files. Sorted by 2020 regional input values

*Health Care refers to purchases made within the industry (19 industries that make up this sector)

The Other textile product mills commodity experienced a remarkable 145% increase (+\$975 million) in overall input purchases but a 3% decrease in regional input purchases. This large increase is due to the sharp spike in demand for face masks in 2020, as well as the hospital PPE shortages previously mentioned. While the decrease in regional input purchases may be surprising compared to overall input purchases before the pandemic, regional producers supplied only 4% of the demand for this industry. These producers were likely unable to meet the scale of demand that arose in 2020 and therefore

could not benefit from the higher demand for PPE.

Medicinal and botanical manufacturing experienced a 50% increase in overall input purchases (+\$21.7 million) and a 117% increase in regional input purchases in Ohio (+\$0.33 million). While the pandemic may have played a role, an Ohio bill passed in late 2019 may be the main contributor to this significant increase. The change made by Senate Bill 57 updated the definition of marijuana in Ohio, which legalized hemp products such as CBD and Delta 8 along with allowing them to be bought and sold

¹⁶ 2019 and 2020 IMPLAN data files

¹⁷ [Midyear 2021 US insurance outlook](#). (2021, July 27). Deloitte Insights.

outside of medical marijuana dispensaries.¹⁸ As a result of the bill, sales of marijuana-infused products grew dramatically in Ohio as access to them became easier, from \$56 million of medical marijuana products sold in

2019 to \$221 million in 2020.¹⁹ The data suggest that the increased demand for marijuana-infused commodities, classified in the Medicinal and botanical manufacturing industry, is due to the changes in Ohio legislation in 2019.

HIGH TECH AND INNOVATION

While some sectors, such as Manufacturing, saw a widespread decline due to the pandemic, the Technology and Innovation sector saw conflicting results. Large tech firms such as Apple, Amazon, and Google saw massive profits in 2020.²⁰ However, smaller tech companies and tourism-based tech companies struggled during the pandemic due to decreased demand and loss of financial capital.²¹

Despite the fact that the tech sector has historically been concentrated in coastal cities such as San Francisco and New York City, recent data suggest that the pandemic and the growth of remote work have shifted high-tech and innovation jobs towards other geographies.²² In recent years, Ohio has seen growth in these industries. Investment from large tech firms, particularly in large cities such as Columbus and Cincinnati, has been fueling this growth.

The High Tech and Innovation Sector purchased commodities from 247 industries. In 2019, the sector spent nearly \$9 billion on commodities from Ohio industries, but that amount dropped about 3% in 2020 to a little over \$8.7 billion. Table 4 breaks down the top ten industries from which the High Tech and Innovation sector purchased in 2019 and 2020. These industries account for about 67% of the total amount spent regionally by the sector in 2020. The majority of the changes in the amount spent on commodities between

2019 and 2020 were small (under 5%) or remained stable.

The decline in Employment services can be explained by the Covid-19 pandemic, as this commodity includes employment placement agencies, executive search services, temporary help services, and professional employment services, all of which unsurprisingly became unnecessary in 2020 as companies were forced to reduce or stop operations. Nonetheless, the employment service market is expected to grow from 2021 to 2022 as companies adapt their operations and continue the recovery path.²³

Although the overall sector saw less of a drop in spending on commodities, two industries saw an increase in the amount spent regionally but not for the overall sector: Other real estate (+2%) and Legal services (+1%). The increase in regional purchases from the other real estate market may stem from the steady demand of the industrial sector across all three major Ohio cities coming from companies moving to the area or existing ones that continue to expand their operations.²⁴ Examples include a \$45 million investment for the new Transportation Research Center Smart Mobility Advanced Research and Test Center (TRC SMART)²⁵ in East Liberty, and Intel recently announced a \$20 billion investment to build at least two new semiconductor plants that are expected to be finalized in 2025 and employ 3,000 people²⁶ in Columbus.

Table 4. Top Industries in Ohio's High Tech and Innovation Supply Chain

¹⁸ [Senate Bill 57 Legalizes Hemp Products in Ohio](#). (2019, August 7). *State Medical Board of Ohio*.

¹⁹ [Medical Marijuana Control Program Historical Sales Data](#). (2022, March 24). *Ohio Medical Marijuana Control Program*.

²⁰ [Tech giants' shares soar as companies benefit from Covid-19 pandemic](#). (2020, July 30). *The Guardian*.

²¹ [Impact of COVID-19 on Big and Small Tech Companies](#). (2021, April 32). *Journal of Human Resource Management*.

²² [Superstars, rising starts, and the rest: Pandemic trends and shifts in the geography of tech](#). (2022, March 8). *Brookings Institute*

²³ [Employment Services Global Market Report 2022](#). (2022, January) *The Business Research Company*

²⁴ [Not a bubble waiting to pop: JLL pros say industrial demand in Ohio is here to stay](#). (2020, September 15) *RE journals*

²⁵ [Transportation Research Center Inc. \(TRC\) announces all-new Smart Mobility Advanced Research and Test Center with \\$45 million new infrastructure expansion to test connected and driverless vehicles for the future mobility of people and goods](#). (2017, Jan 26) *CISION PR Newswire*

²⁶ [Intel Reveals Plans for Massive New Ohio Factory, Fighting the Chip Shortage Stateside](#). (2022, January 20) *TIME*

Source: 2019 and 2020 IMPLAN Data Files. Sorted by 2020 regional input values

Industry	Purchases in Ohio			All Purchases			*High Tech and
	2019	2020	% Change	2019	2020	% Change	
High Tech and Innovation	\$1.6 billion	\$1.6 billion	0%	\$2.4 billion	\$2.6 billion	7%	
Employment services	\$1.6 billion	\$1.5 billion	-5%	\$1.7 billion	\$1.6 billion	-2%	
Advertising, public relations, and related services	\$673 million	\$692 million	3%	\$1.2 billion	\$1.2 billion	5%	
Other real estate	\$516 million	\$525 million	2%	\$659 million	\$662 million	0%	
Management consulting services	\$379 million	\$369 million	-3%	\$659 million	\$633 million	-4%	
Management of companies and enterprises	\$283 million	\$294 million	4%	\$289 million	\$301 million	4%	
Legal services	\$249 million	\$252 million	1%	\$370 million	\$370 million	0%	
Office administrative services	\$234 million	\$236 million	1%	\$240 million	\$251 million	5%	
Wired telecommunications carriers	\$202 million	\$200 million	-1%	\$216 million	\$216 million	0%	
Monetary authorities and depository credit intermediation	\$205 million	\$198 million	-4%	\$210 million	\$200 million	-5%	
All other commodities	\$3.1 billion	\$2.9 billion	-6%	\$5.2 billion	\$4.85 billion	-8%	
Total	\$9 billion	\$8.7 billion	-3%	\$13.2 billion	\$13 billion	-2%	

Innovation refers to purchases made within the industry (19 industries that make up this sector)

AGRICULTURE

The Agriculture sector made purchases from 194 industries. In 2019, the sector spent over \$2.8 billion on commodities from regional industries, which grew 22% to a little over \$3.5 billion in 2020. Table 5 breaks down the top ten industries that the Agriculture sector purchased from in 2019 and 2020. Purchases made to these industries accounted for 85% of the total amount spent in 2020 by the sector.

Out of the top ten industries, each one saw growth in the amount purchased by the Agriculture sector overall as well as in Ohio, except for Petroleum refineries. This industry saw a 29% decline in regional purchases and a 30% decline in overall purchases. It is important to note this industry's state in during 2020. At this time, oil producers found themselves with a larger supply than there was demand as people stopped driving and flights were getting canceled. The outcome was a sharp decline in prices for petroleum-derived products such as gasoline, diesel, and jet fuel. The results we see in these cases are potentially derived from a decline in prices and not from a reduction in purchases made by the

agriculture sector, as prices plummeted by almost 50 percent by April 2020.²⁷

There was an even larger increase in spending on Ohio's pesticides, other agricultural chemical manufacturing, and nitrogenous fertilizers. One factor that could have contributed to this phenomenon was the increased time Americans spent at home during the pandemic. Many took advantage of the time at home and decided to invest in their lawns and gardens, increasing demand for lawn care products such as fertilizers. One example of this is Ohio-based company Scotts Miracle-Gro. The company reported \$4.13 billion in sales revenue for 2020, representing a 31% increase from the \$3.16 billion in revenue from 2019.²⁸

Another factor for the large increases in spending for these commodities can be attributed to the growth of the hydroponics market. Considered a more productive option for farming produce, the U.S. saw an 18% rise in

²⁷ [From barrel to pump: impact of COVID-19 on prices for petroleum products.](#) (2020, October) *BLS Monthly Labor Review*.

²⁸ [Scotts Miracle-Gro Announces Record Fourth Quarter and Full Year Results.](#) (2020, November). *Scotts Miracle-Gro*.

hydroponic crops produced from 2012 to 2017.²⁹ Although the market for hydroponics farming was already growing before Covid-19, issues caused by the pandemic such as missed opportunities for harvesting crops, labor shortages, and logistical disruptions further

incentivized hydroponic farming.³⁰ This trend can be seen in Ohio, where Hawthorne Hydroponics, a subsidiary of Scotts Miracle-Gro Company, saw a 61% increase in sales in 2020.²⁸

Table 5. Top Industries in Ohio's Agriculture Supply Chain

Industry	Purchases in Ohio			All Purchases		
	2019	2020	% Change	2019	2020	% Change
Agriculture	\$661 million	\$929 million	41%	\$1.5 billion	\$2 billion	29%
Other real estate	\$582 million	\$818 million	41%	\$744 million	\$1 billion	39%
Other animal food manufacturing	\$671 million	\$711 million	6%	\$896 million	\$996 million	11%
Wholesale - Other nondurable goods merchant wholesalers	\$575 million	\$621 million	8%	\$654 million	\$714 million	9%
Truck transportation	\$127 million	\$153 million	21%	\$127 million	\$154 million	21%
Nitrogenous fertilizer manufacturing	\$75 million	\$105 million	39%	\$119 million	\$147 million	23%
Wholesale - Machinery, equipment, and supplies	\$48 million	\$61 million	26%	\$53 million	\$67 million	25%
Pesticide and other agricultural chemical manufacturing	\$32 million	\$56 million	75%	\$328 million	\$411 million	25%
Insurance carriers, except direct life	\$39 million	\$51 million	30%	\$45 million	\$56 million	25%
Petroleum refineries	\$71 million	\$50 million	-30%	\$131 million	\$93 million	-29%
All other commodities	\$558 million	\$627 million	23%	\$1 billion	\$1.1 billion	22%
Total	\$3.4 billion	\$4.2 billion	22%	\$5.6 billion	\$6.8 billion	20%

Source: 2019 and 2020 IMPLAN Data Files

Note: sorted by 2020 regional input values

CONCLUSION

According to the results presented in this report, Ohio manufacturing suffered the most in 2020. However, the decline was somewhat expected as manufacturing plants were required to stop operations in 2020 due to the pandemic. Furthermore, the decline appears to be widespread as the purchases for most commodities analyzed declined in Ohio just as much as they did nationwide. The slow stabilization post-pandemic seems to be affecting all markets equally.

The resilience of Ohio manufacturers is evident. Some Ohio manufacturing industries quickly adapted to the pandemic's requirements and shifted their production to supply the present demands. This response was depicted, for example, by ethanol producers who increased their supply to producers of sanitizing products such as GOJO, in Akron, in order to be able to meet the demand for hand sanitizers during the pandemic.³¹

²⁹ [Comparative life cycle assessment of aquaponics and hydroponics in the Midwestern U.S.](#) (2020, December) *Journal of Cleaner Production*

³⁰ [Hydroponics Market - Global Forecast to 2026](#). (2021, January). *Markets and Markets*.

³¹ [GOJO announced addition of two new Northeast Ohio facilities to help meet demand for Purell](#). (2020, June 9) *WKYC studios*.

However, not all industries were able to adapt the same way. The Oil and gas extraction industry was on track to recover in 2022 as activities began returning to normal, and the energy sector started outperforming other sectors such as technology and finance³². However, on February 24th, 2022, President Vladimir Putin announced what he would refer to as a “special military operation to demilitarize Ukraine”, starting a war that surged the price of oil, given that Russia supplies between 10-25% of the oil in some regions of the EU and America. Due to this, the world transitioned from an oversupply during the pandemic to undersupply that is still ongoing. Countries have begun serious discussions about moving away entirely from fossil fuels, yet many believe it won't be possible until 2030.³³

The health care sector in Ohio is a strong asset that was hit hard in 2020 because of Covid-19. The sector was forced to sharply increase its spending in areas like PPE while seeing a decrease in medical procedures. Ohio experienced an increase in spending on insurance while overall spending in this industry decreased. Once announcements were made that hospitals were allowed to resume regular operations, the demand in the Health Care sector started to stabilize. As was mentioned, the health care sector in Ohio is one of the main economic drivers, and despite the pandemic, investments continued to be made. The Cleveland Clinic expanded operations in Florida with the creation of the Florida Research and Innovation Center in Port St. Lucie. This center joined the Center for Immunotherapy and Precision Immuno-Oncology and the Global Center for Emerging Pathogens Research, which has recently been created in Cleveland.³⁴

Ohio's High Tech and innovation sector has seen benefits derived from “remote work” and “work from home” policies. As more people have begun to take advantage of the possibility of performing their duties from any location, a shift has started where people are looking for more affordable living options, which started a slow but recognizable decentralization of firm location. Examples of this shift might not be visible in the 2020 data presented here; however, high-tech firms have made substantial investments in Ohio over the past years, and this trend is expected to continue.

The Agriculture sector was unique among the sectors studied in that it increased its purchases in 2020. This can be attributed to federal incentives implemented to protect farmers and processors, such as the Coronavirus Food Assistance Program (CFAP), which was introduced early during the pandemic to support producers of commodities that faced market disruptions related to Covid-19.³⁵ But incentives were not provided just at the onset of the pandemic, as they have continued with the most recent introduction of the Pandemic Response and Safety (PRS) and the Farm and Food Workers Relief (FFWR) grant programs, all of which contributed to the success of the agriculture sector in 2020.

Unfortunately, disruptions to the supply chain caused by the Covid-19 pandemic have continued to be an issue for many industries and markets worldwide, and expert reports indicate that they might continue for longer than anticipated.³⁶ Looking forward, Ohio industries need to continue adapting while the economy recovers from the pandemic and take advantage of the state's affordable real estate to attract new investment, businesses, and population.

³² [Can big oil's bounce-back last?](#) (2022, January 12). *The Economist*

³³ [Why energy insecurity is here to stay.](#) (2022, March 26) *The Economist*

³⁴ [2020 health care in review.](#) (2020, December 29) *Crain's Cleveland*

³⁵ [USDA Announces Coronavirus Food Assistance Program.](#) (2020, April 17) *U.S. Department of Agriculture*

³⁶ [A normal supply chain? It's 'unlikely' in 2022.](#) (2022, Feb 1) *New York Times*