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In recovery mode: manufacturers try to bounce back after COVID-19 disruptions

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Abstract

Manufacturers experienced significant disruptions in their operations and demand in 2020, as businesses struggled to cope with COVID-19 and its implications. To control the spread of the virus, governments initiated stay-at-home orders, and many firms were forced to close or limit operations. As a result, there were severe declines in production and employment, both in the United States and in global markets, often at record paces or rivaling the decreases seen in the Great Recession. While activity has started to rebound somewhat in this latest downturn, it will take time for output and hiring to return to pre-recessionary levels—perhaps not until at least 2022—with uncertainties in the outlook pervasive.

Keywords Manufacturing · Economic outlook · COVID-19 · Workforce · Disruptive technologies

The economic landscape changed suddenly and dramatically due to the COVID-19 pandemic. US manufacturers had entered 2020 with a sense that the sector was stabilizing following weaknesses in 2019. The signing of the United States–Mexico–Canada Agreement and the "phase one" deal with China provided much-needed trade certainty for businesses. And after serving as a drag on growth for three straight quarters, signs that nonresidential fixed investment might rebound somewhat in the first quarter helped increase optimism (National Association of Manufacturers 2020b). Most importantly, at the year's start, fears of a recession, which were pervasive in the summer of 2019, abated almost entirely, with the Federal Reserve's three rate cuts in 2019 doing their job to keep the economy growing, or so we thought.

Assessments began to change in late January and early February, with COVID-19 cases surfacing in China and then moving elsewhere. Almost immediately, manufacturing business leaders cited challenges, both in terms of demand and in obtaining raw materials and other inputs to production processes. Then, as the virus spread more widely in the United States in early March, these concerns and negative impacts became even more pervasive and exacerbated. In a special survey conducted around that time, 35.5% of respondents said that they were facing supply chain disruptions and more than 78% noted that they expected the outbreak would negative impact their finances (National Association of Manufacturers 2020a). In hindsight, we now know that these responses underestimated the economic damage that would result from COVID-19.

US manufacturing production declined 20.2% between February and April, and the sector lost 1,363,000 workers over that time frame, many temporarily furloughed due to shutdowns and reduced operations.[1] And, while the unemployment rate peaked at 14.7% in April, the reality was even starker, with the "real" unemployment rate—which adds in those "marginally attached to the labor force and those employed part time for economic reasons"—at 22.8% that month. Initial claims for unemployment insurance declined after reaching 6,867,000 for the week ending March 28, but as of this writing, they remain highly elevated, exceeding levels seen in the Great Recession, where they had peaked at 665,000 for the week ended March 28, 2009. Moreover, real GDP shrank at a 5% annual rate in the first quarter but then fell at a jaw-dropping 31.4% rate in the second quarter.

There is great uncertainty about several significant factors contributing to the overall economic outlook. These developments are quite fluid, and likely to change before publication of this piece, but as of this writing (in September 2020), there is an expectation that the US economy will start

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[1] Data as of September 8, 2020.

to rebound in the third quarter, with my forecast of at least an 20% growth at ab annual rate in real GDP. Yet, the economic damage will have already been done by that point, with the US economy shrinking by at least 3% in 2020 relative to the average for 2019. Even with some improvements in the latter half of 2020, manufacturing production is seen falling by roughly 6% this year relative to the average for the last.

The forecast for a rebound, however, has been clouded on two fronts. First, the COVID-19 outbreak has not gone away, and in some areas, the numbers of cases increased dramatically during the summer months. This forced some re-closures and a renewed emphasis on safety protocols and restrictions. Second, and definitely related, is the willingness of consumers and business to get back to "normal," and it is clear that there has been some hesitancy for people to get back into crowds and resume some of the activities that might have been commonplace before the pandemic (e.g., going to amusement parks, sporting events, restaurants, movies, flying, and so on).

These scenarios could, at a minimum, restrict spending and hiring in the economy, making the "v-shaped" recovery slower than we would prefer. But there is also the possibility that this could lead to a "w-shaped" business cycle, where the economy bounces back only to experience another recession. While that might not be the baseline assumption, the possibility of another outbreak could lead businesses and consumers to be more hesitant, restricting growth in the second half of this year and, possibly, in 2021 from what it might have been otherwise.

Absent that scenario, our current forecast is for the US economy to grow by 3% to 4% in 2021 relative to the average for 2020, with output in the manufacturing sector rising by 4%. For their part, fiscal and monetary policymakers have been aggressive in their attempts to stabilize the economy, and those efforts have been helpful. The Federal Reserve is expected to keep interest rates near zero throughout 2021, with further support provided by the expansion of the assets on its balance sheet from $4 trillion to $7 trillion since the start of the COVID-19 crisis.

Overall, the outlook for 2021 is one of cautious optimism. The US and global economy should—barring another outbreak—continue the slow process of recovery from what has been the worst economic downturn since the Great Depression. But, as the data above suggest, economic conditions later this year and next year will also be radically different than what was seen this past January and February (pre-COVID-19). That means that business conditions will likely continue to be challenging, particularly for certain sectors.

This write-up will now delve into the manufacturing data, showing the full extent of declines in production and employment in the sector, particularly for the hardest hit industrial segments, both in the US and globally. More importantly, it will also focus on how manufacturing will likely change moving forward, as firms debate what the "new normal" might look like over the coming years.

1 Sentiment dropped sharply—and then rebounded

Manufacturers entered 2020 with a sense that activity had stabilized, as noted earlier. In the aftermath of the COVID-19 pandemic, sentiment waned quickly, mirroring sharp declines in production, demand, and employment as firms struggled to keep their doors open amid widespread stay-at-home orders and the weakened global economic environment. In the second quarter of 2020, 33.9% of manufacturing respondents to the NAM's Manufacturers Outlook Survey reported a positive outlook for their company (Figs. 1, 2), the lowest reading since the first quarter of 2009, and down from 75.6% in the previous survey. Overall, the data reflect a sector that experienced its worst contraction since the Great Recession—a finding that mirrored other economic indicators.

Encouragingly, sentiment rebounded in the third-quarter NAM Manufacturers' Outlook Survey, with 66.0% of respondents reported a positive outlook for their company–nearly double May's reading. Over the past few years, large manufacturers (those with 500 or more employees) have been the least positive in their outlook, likely due to those firms having more elaborate trade and supply chain networks at a time when issues about those were more uncertain. That turned around in the third quarter; just over 70% of larger firms were positive about their company's outlook. In contrast, 62.0% of small manufacturers (those with fewer than 50 employees) and 65.5% of medium-sized businesses (those with 50 to 499 employees) reported positive outlooks. These slightly lower readings may have reflected lingering weaknesses among small- and medium-sized manufacturers, many of whom were hard-hit by the pandemic.

For the second straight survey, weak domestic demand was the top primary business challenge (66.5%) reported by manufacturers, but the percentage citing that as a concern dropped from May's 83.1%. Other top worries among manufacturers included the inability to attract and retain talent (55.1%), rising health care and insurance costs (51.1%), trade uncertainties (40.0%), and weaker global growth and slowing export sales (36.4%). Prior to COVID-19, workforce challenges had been the main concern for manufacturing

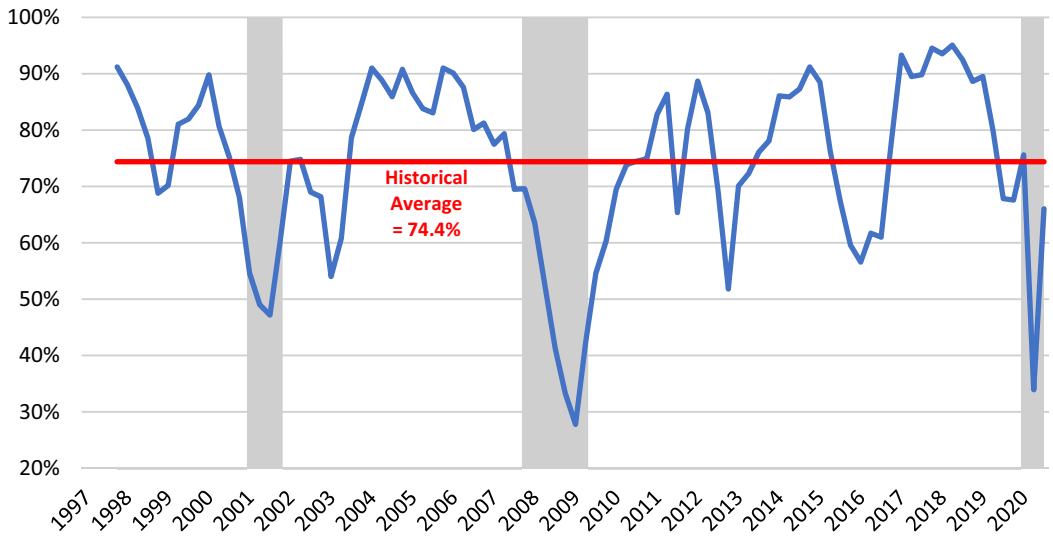

Fig. 1 Manufacturing business outlook by quarter, 1997–2020 (recessions are highlighted with gray shading). *Note* Percentage of respondents who characterized the current business outlook as somewhat or very positive. *Source* NAM Manufacturers' Outlook Survey

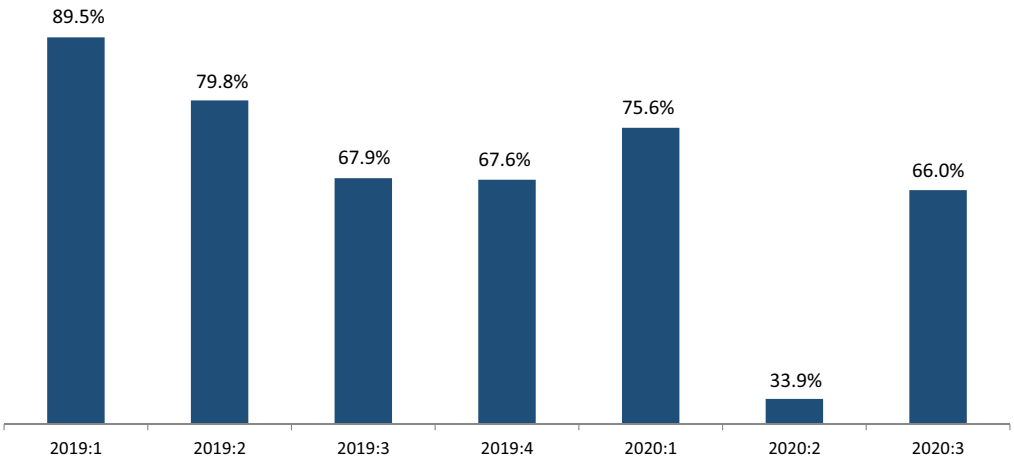

Fig. 2 Manufacturing business outlook by quarter, 2019–2020. *Note* Percentage of respondents who characterized the current business outlook as somewhat or very positive. *Source* NAM Manufacturers' Outlook Survey

respondents for 10 consecutive quarters, and these data suggest that it continues to be a struggle, despite the dramatically changed labor market. Election risks to the business environment were the most frequently cited response among the 17.5% of those completing the survey who offered another challenge.

These results were similar in other surveys. In April, the ISM® Manufacturing Purchasing Managers' Index® fell at the quickest rate in 11 years, dropping to a reading of 41.5, and there was a record decline in terms of the production index for the ISM survey (Fig. 3). Likewise, the index for employment was the lowest since June 1949. New orders and exports both fell at rates not seen since December 2008. With that said, manufacturing activity—at least in terms of sentiment—has rebounded since then, buoyed by strong gains in the responses to the questions on new orders and production.

The severe declines in manufacturing activity were not limited to the United States, with PMI readings dropping in many markets to their lowest levels since the Great Recession or to all-time lows.[2] After dropping to its lowest point in April since March 2009, by August the J.P. Morgan Global Manufacturing PMI reached a level not seen since November

[2] The service-sector PMI readings were at heartbreaking and unprecedented lows in April and May, as one might expect, with retail stores, hospitality and leisure establishments, restaurants, and bars closed due to stay-at-home orders in most countries.

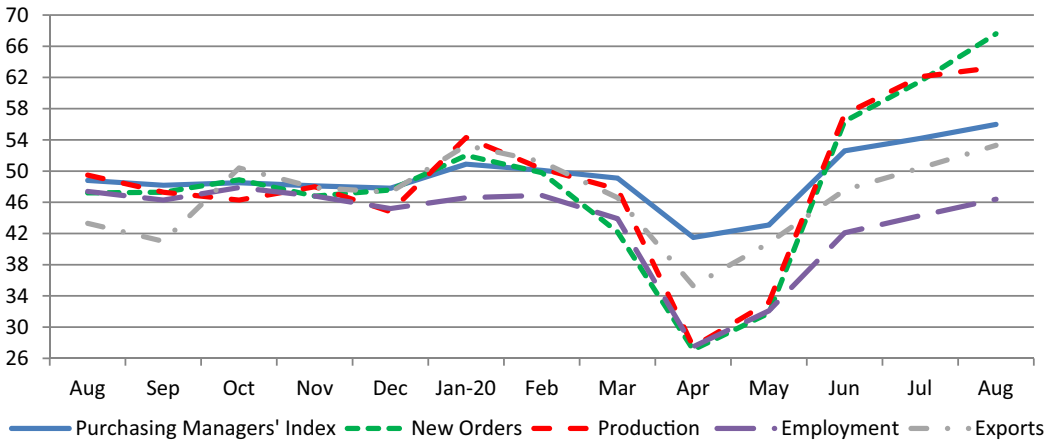

Fig. 3 ISM® Manufacturing Purchasing Managers' Index®, August 2019–August 2020. *Source* Institute for Supply Management®

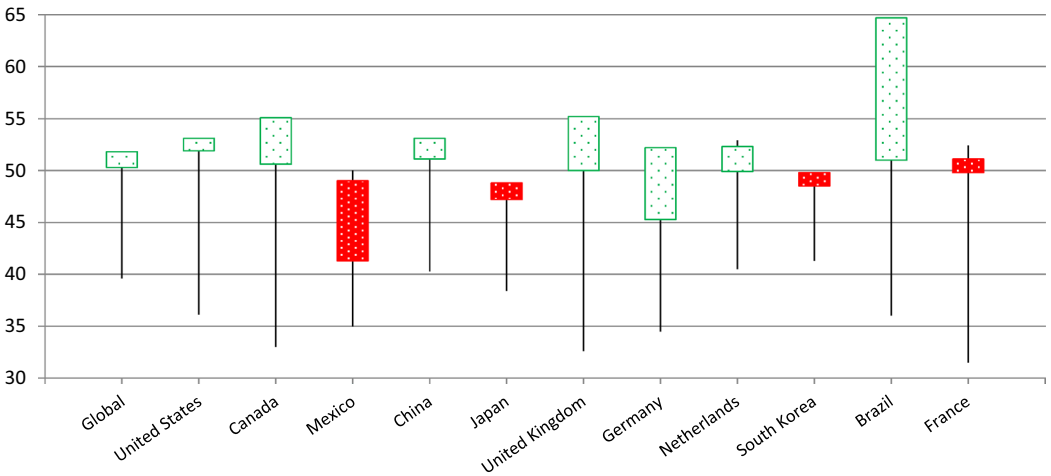

Fig. 4 Candlestick chart for global IHS Markit Purchasing Managers' Indices®, including for the Top 10 export markets for US manufactured goods, January–August 2020. *Note* Top 10 Export Markets Based on 2019 Data from the United States. Commerce Department. *Source* IHS Markit

2018. Figure 4 illustrates the wide swings in select worldwide PMI readings through the first eight months of 2020, using a tool that is more traditionally used when describing stocks: a candlestick chart. The straight line shows the high and low readings between January and August, and the box plots the data for the endpoints of the time frame, where dotted boxes suggest that the August PMI reading exceeds the January value and solid boxes refer to the opposite.

Overall, manufacturing continues to stabilize in most economies, even as production and other activity remains well below levels seen before the COVID-19 pandemic began. To illustrate that point, all but one (France) of the top 10 markets for US manufactured goods had better manufacturing PMI readings in August than in July, and six of those economies had expanding manufacturing sectors, up from just one (China) in May.[3]

2 Severe disruptions in production, hiring and exports

US manufacturing production fell abruptly and sharply between February and April, plunging 20.2% over that time frame (Table 1). This rivaled the loss of output seen peak to trough in the Great Recession, with production in the sector

[3] The list of top 10 markets for US-manufactured goods stems from 2019 data from the US Department of Commerce. In order, those markets are Canada, Mexico, China, Japan, the United Kingdom, Germany, the Netherlands, South Korea, Brazil and France. For more information, see https://tse.export.gov/tse/tsehome.aspx.

Table 1 Manufacturing production trends by major sectors, January 2015 to July 2020

	January 2015 to July 2020 (%)	Since July 2019 (year-over-year) (%)	February to April 2020 (%)	February to July 2020 (%)
Largest grouping of declines by manufacturing sector, February to April 2020 (peak to trough)				
Motor vehicles and parts	8.0	− 1.4	− 83.1	− 0.3
Apparel and leather goods	− 38.8	− 14.9	− 31.5	− 12.4
Printing and related support activities	− 19.4	− 16.3	− 31.2	− 19.1
Textiles and products	− 17.7	− 12.0	− 28.4	− 13.0
Furniture and related products	− 9.7	− 11.3	− 27.0	− 12.1
Aerospace and misc. transportation equip	− 25.4	− 20.5	− 27.0	− 12.3
Primary metals	− 29.8	− 25.4	− 25.5	− 24.6
Middle grouping of declines by manufacturing sector, February to April 2020 (peak to trough)				
Plastics and rubber products	− 6.6	− 7.4	− 24.4	− 9.9
Miscellaneous durable goods	− 8.4	− 9.0	− 23.2	− 6.5
Petroleum and coal products	− 5.2	− 14.2	− 23.1	− 14.2
Machinery	− 15.5	− 12.0	− 22.0	− 11.6
Nonmetallic mineral products	2.9	− 4.7	− 19.8	− 8.9
Wood products	11.3	− 3.3	− 15.1	− 6.8
Fabricated metal products	− 10.3	− 10.2	− 14.8	− 11.3
Smallest grouping of declines by manufacturing sector, February to April 2020 (peak to trough)				
Electrical equipment and appliances	− 10.7	− 13.8	− 11.5	− 13.4
Food, beverage, and tobacco	4.6	− 1.4	− 10.0	− 3.6
Chemicals	− 0.7	− 4.4	− 6.1	− 4.0
Computer and electronic products	19.5	2.4	− 5.9	− 2.1
Paper	− 14.5	− 7.1	− 3.7	− 9.7
Overall manufacturing production trends				
Manufacturing (NAICS)	− 4.8	− 7.5	− 20.2	− 7.8
Durable manufacturing (NAICS)	− 6.8	− 9.3	− 27.9	− 9.0
Nondurable manufacturing (NAICS)	− 2.4	− 5.4	− 12.0	− 6.5

Seasonally adjusted (2012 = 100). *Source* Federal Reserve Board of Governors

decreasing 20.8% between December 2007 and June 2009 (Table 2). With that said, the index of manufacturing production in April reached its lowest level since November 1997. This was true even as manufacturers were deemed "essential" in most states. Case in point, motor vehicles and parts production plummeted a whopping 83.1% over that two-month period, with almost all auto production stopped for several weeks.

All 19 major industry sectors experienced declines in output between February and April, but at varying degrees. Table 1 and Figs. 5, 6 and 7 show the trends seen for each from January 2015 to July 2020, with the major sectors divided into three distinct groupings based on the declines seen over the two-month period from peak to trough. The first group—led by the motor vehicles and parts—includes the seven sectors that experienced losses of production of at least 25% between February and April. The middle group of seven industries had output declines between 14 and 25%, and the final group had decreased production ranging from 3.7 to 11.5%.

There are some interesting trends to observe in these data. Durable goods industries experienced more significant drops in activity, with production falling 27.9% between February and April. In contrast, output declined 12% for nondurable goods manufacturers. Yet, the grouping with the largest declines in production over that two-month period had a mix of both durable and nondurable goods sectors: motor vehicles and parts (down 83.1%), apparel and leather goods (down 31.5%), printing and related support activities (down 31.2%), textiles and products (down 28.4%), aerospace and miscellaneous transportation equipment (down 27%), furniture and related products (down 27%), and primary metals (down 24.6%). Note that for some sectors, COVID-19 simply accelerated pre-existing trends, both positive and negative.

At the other end of the spectrum, there were five sectors that faired better than others in terms of lost production:

Table 2 Comparing the COVID-19 recession with recent downturns

	January to June 1980, and July 1981 to November 1982	July 1990 to March 1991	March to November 2001	December 2007 to June 2009	February 2020 to TBD
Gross domestic product (largest quarterly decline during the recession period)	−8% in the first quarter of 1980	−3.6% in the fourth quarter of 1990	−1.7% in the third quarter of 2001	−8.4% in the fourth quarter of 2008	Down 31.4% in the second quarter of 2020; for 2020 as a whole, down 3.3%
Unemployment rate (peak unemployment rate during or right after the recession period)	10.8% on November and December 1983	7.8% on June 1992	6.3% on June 2003	10% on October 2009	14.7% in April before starting to pull back to as low as 7.5% by year's end; 8.4% in August
Manufacturing employment (total lost employment during or right after the recession period, peak to trough)	2.1 million workers between June 1981 and Dec. 1982	1.3 million between Mar. 1989 to July 1993	2.95 million between Sept. 2000 to Jan. 2004	2.3 million workers between Dec. 2007 and Feb. 2010	1.3 million workers lost between Feb. and April before rebounding; currently down 720,000 since Feb.; will likely be down 500,000 by year's end
Manufacturing production (total percentage of lost output in the sector, peak to trough)	−9.1% between May 1981 to Nov. 1982	−2% between Aug. 1990 to Jan. 1992	−6.1% between July 2000 to Oct. 2001	−20.8% between Dec. 2007 to June 2009	Down 20.2% between Feb. and April before rebounding; output down 6.4% in 2020 overall relative to last year
Manufacturing value-added output (total percentage change, peak to trough)				−11% between Q4:2006 to Q4:2009	

Recession dates are from the National Bureau of Economic Research. *Sources* Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve, Moody's Analytics

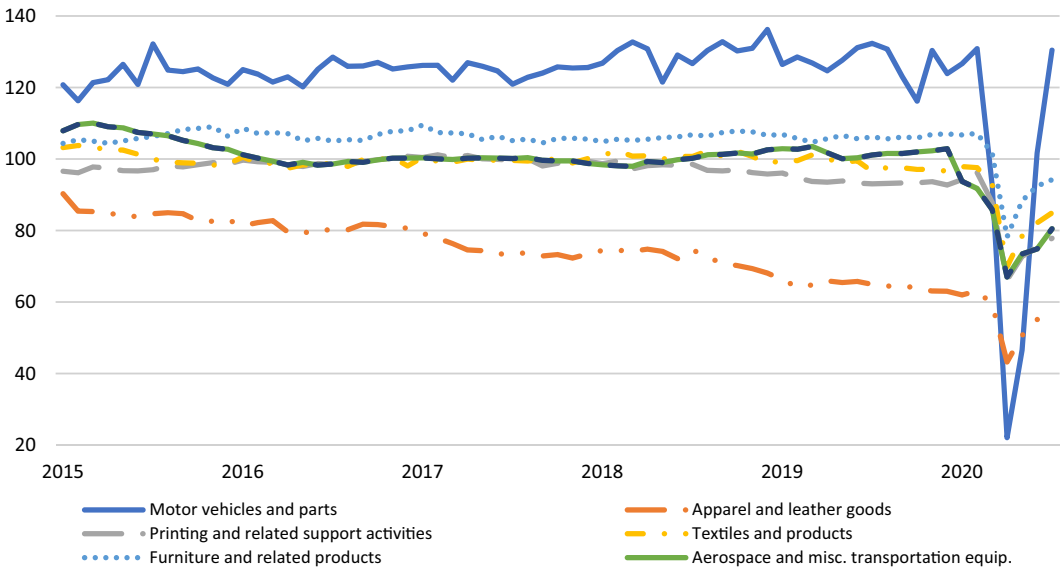

Fig. 5 Largest declining manufacturing sectors, February to April 2020. Output levels, 2012 = 100, seasonally adjusted. *Source* Federal Reserve Board of Governors

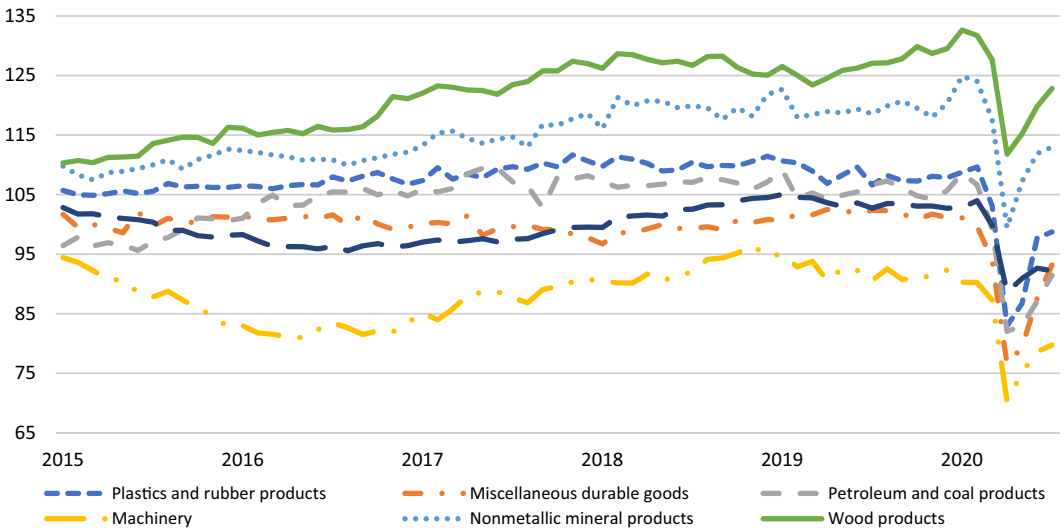

Fig. 6 Middle grouping of manufacturing sectoral declines, February to April 2020 output levels, 2012 = 100, seasonally adjusted *Source* Federal Reserve Board of Governors

paper (down 3.7%), computer and electronic products (down 5.9%), chemicals (down 6.1%), food, beverage, and tobacco products (down 10%), and electrical equipment and appliances (down 11.5%).

The other notable findings in these data come in the rebound in production seen since April, and, once again, motor vehicles and parts had a starring role. Auto-sector output had almost fully recovered by July, down just 0.3% from February's pace and providing a very pronounced and nearly perfect V-shape in Fig. 5. Overall, manufacturing production was down 8% between February and July, with durable and nondurable goods output down 9% and 6.5%, respectively. That represents a nice turnaround in activity, albeit with a lot of room for greater improvement to get back to prepandemic levels. Outside of automobiles, most of the other sectors in manufacturing saw sizable progress in the late spring and summer. But, there were two sectors that weakened further: electrical equipment and appliances and paper.

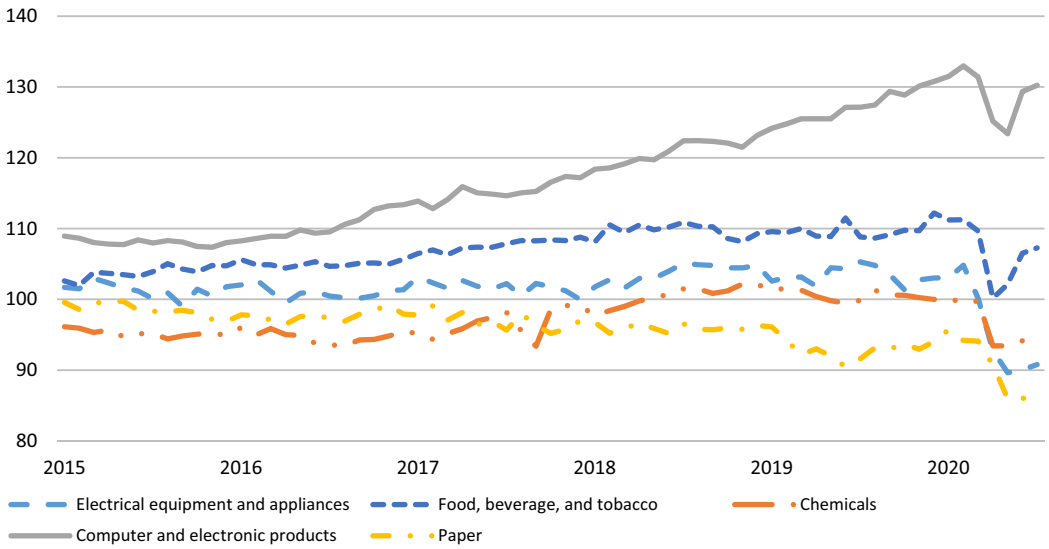

Fig. 7 Smallest declining manufacturing sectors, February to April 2020 output levels, 2012 = 100, seasonally adjusted. *Source* Federal Reserve Board of Governors

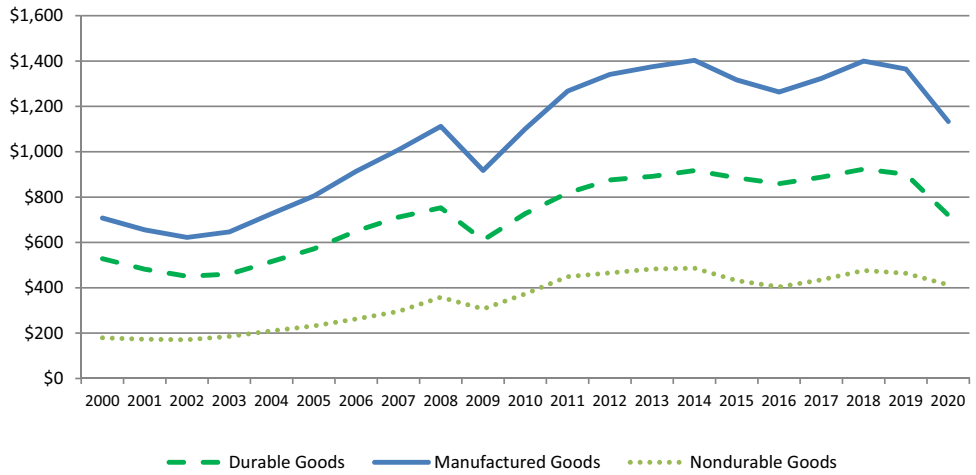

Fig. 8 US manufactured goods exports, 2000–2020 (billions of dollars, seasonally adjusted). *Note* Goods exports for 2020 are estimated, annualizing data available for the first two quarters. *Source* US Department of Commerce

Looking beyond the February to April or July trends, just one of the 19 major sectors had positive year-over-year growth in July. Production in the computers and electronic products sector rose 2.4% between July 2019 and July 2020, and it led the pack in terms of increased output since January 2015, with production jumping 19.5% over that time frame (Table 1).

It is important to note that the declines in activity have not been limited to the United States. While sentiment has improved notably since the spring, output remains well below pre-recessionary levels in most markets. Eurozone industrial production, for instance, jumped strongly in May and June but remained down 12.3% year-over-year. In addition, while Chinese industrial production grew 4.8% year-over-year in June, which was a stark turnaround after dropping by 13.5% year-over-year in January/February, Chinese output growth continued to be lower than before the pandemic. Chinese industrial production rose 6.9% year-over-year in December, for example. Beyond those statistics, global trade volumes have fallen dramatically, both for imports and exports. Along those lines, US manufactured goods exports plummeted more than 17% through the first six months of 2020 relative to the same time frame in 2019 (Fig. 8), led by declines in durable goods.

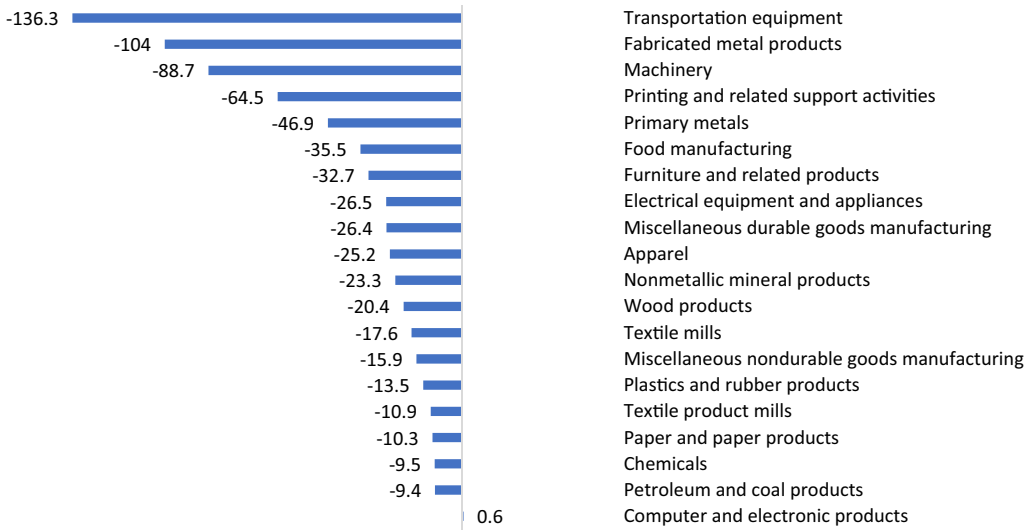

Fig. 9 Net changes in manufacturing employment by sector since February (thousands of workers, February to August 2020). *Source* Bureau of Labor Statistics

Turning to employment, US manufacturers in the middle of 2020 replaced about half the jobs initially shed. There were 12.13 million employees in the sector in August, down 720,000 from 12.85 million in February. The movements in employment closely mirrored those in production. Every manufacturing sector outside of computer and electronic products had lower employment in August than in February (Fig. 9).

3 What is the 'new normal'?

Beyond the data, there is also a sense—based on conversations with manufacturers and in other reports—that COVID-19 has been a game-changer in terms of how manufacturers operate, even as companies are still grappling with what that "new normal" means for them. For instance, 82% of respondents to a recent Manufacturing Leadership Council (MLC) poll said that the pandemic had "created a new sense of urgency" among leaders, steering their firms toward investments in new technologies and digitalization, either partially or to a significant extent (Brown 2020b). At the same time, manufacturers are re-evaluating their supply chains after experiencing severe disruptions to the crisis, with a goal of being better prepared for future events. More than 60% of respondents to a separate MLC survey noted that the crisis will increase their focus on supply chain resiliency in the future, with 43% suggesting that they will explore more local production or reshoring (Brousell 2020).

While it is still too early to see the full impacts of the changed environment, manufacturers acknowledge that the landscape has changed, perhaps permanently. The other consensus that has emerged is that COVID-19 accelerated trends that were already in motion, ranging from increased automation to supply chain assessments to workplace and workforce changes.

First and foremost, there is a need for manufacturers to keep the shop floor and other workplaces healthy and safe, protecting their employees from COVID-19 or from the spread of any future infection. Business leaders have had to manage in a trying economic environment, juggling the need to keep factories open and operating (including an all-important "essential business" designation from state or local policymakers) with drafting safety protocols and communicating flexibility and patience with an anxious workforce. A survey of NAM members (National Association of Manufacturers 2020c) found that 76.9% of manufacturers were re-evaluating what work could be done remotely, with two-thirds of respondents suggesting that their firm would reengineer the production process with "social distancing" in mind.

McKinsey & Company (Furtado et al. 2020) has suggested that companies might need to "alter team structures and working methods in order to limit contacts across the workforce." This might include the creation of "pods," or "self-contained teams with clearly defined tasks and workspaces that can be physically and socially separated from each other as much as possible." While such strategies might eventually yield greater productivity, the short-term effect has more often meant that companies also risk reducing output and overall agility (Brown 2020a). In addition, workforce management has needed to evolve to cope with the changing workplace models, and it will alter how companies think about recruitment

and project coordination, perhaps permanently (Ernst and Young 2020).

Companies will need to be increasingly flexible in workforce management, not just for health reasons but also as a recognition of work-life balance. Along those lines, manufacturers (and likely other businesses) are trying to figure out how to prevent absences and to retain employees due to the lack of traditional schooling and increased virtual learning for their children. That will almost certainly require flexible work arrangements for many working parents. Studies have shown that a healthy work-life balance can have a positive influence on recruitment and overall outcomes (Barber et al. 2015). At the same time, the COVID-19 pandemic has both reprioritized "what is really important" in our lives and also provided a fertile laboratory for researchers to examine how workplace changes implemented during this crisis will permanently alter how we think about how we get things done while balancing family and work—all from home.

The labor market itself presents ongoing challenges for manufacturers. Despite the dramatically different landscape—weaker economic growth and sales topping the list of primary challenges—half of US manufacturers expect to continue having trouble finding talent over the next 12 to 18 months, once the COVID-19 outbreak abates (National Association of Manufacturers 2020c). Prior to the second quarter, the inability to attract and retain a quality workforce had been the top concern for ten straight surveys. As more Baby Boomers retire and firms continue to struggle with recruiting younger generations of workers, the "skills gap" challenge represents a structural problem in the labor market—one that manufacturers have tried to proactively cope with for years. The COVID-19 crisis reveals a new opportunity for possible recruitment. With some training or upskilling, unemployed or discouraged workers from other sectors, especially in the hard-hit service industries, could be ideal candidates to fill these gaps.

On that topic, the Manufacturing Institute (2020) has estimated that companies in the sector spent at least $26.2 billion on training in 2019, mostly on programs to help employees do their daily jobs, especially with new technologies. As noted earlier, COVID-19 has accelerated trends that were already ongoing, particularly assessments of automation and the supply chain. As a result, the need for educational programs to enhance and retool workforce skills will increase substantially moving forward, particularly as companies embrace and accelerate their spending on disruptive technologies. Even with increased automation and robotics, it is still true that more advanced manufacturing processes require a more highly skilled workforce (Lee 2020).

As manufacturing has become increasingly more advanced, technology is dramatically altering the way that companies think about innovation, production, and after-sale services. With the COVID-19 pandemic and a severe global recession, the technological advancement of the industry has accelerated and will continue to do so. This digital transformation will be key to "moving up the value-added curve" and helping the industry remain profitable in a post-COVID world. In a recent survey from the Manufacturing Leadership Council (Brown 2020a, b), more than 70% of the respondents said that effective leaders need to have data acumen and a complete understanding of how digital information can be utilized to improve the operations and customer service of their companies.

Of course, manufacturers—much like other firms—are awash in data. In another MLC survey (Tate 2020), manufacturers predict that the volume of data flowing through their businesses will multiply by 2 to 5 times over the next two years. With such an onslaught of data, the key to success continues to be how companies utilize the digital information at their fingertips. More than half of companies in the MLC survey said that they use data to help improve their operational performance. Along those lines, most manufacturers have used their data inflow to increase productivity, efficiency and quality and to achieve cost reduction.

With that said, some of the data tools that companies rely on—including artificial intelligence, machine learning, and regression analysis—might need to be tweaked as those models utilize historical information and might be less dependable in these unprecedented times post-pandemic, according to a recent report from Deloitte (Muthukumarana and Perricos 2020). Instead, companies might need to make some decisions based on a series of "what if" simulations, which still use data but also rely heavily on instincts and the outcomes of various scenarios.

To illustrate the challenges that manufacturers have had to face during the COVID-19 crisis, three quarters of respondents to a McKinsey & Company survey (Alicke et al. 2020) said that they experienced production and distribution problems that will need to be addressed moving forward, with 73% noting supply chain complications worth tackling. As such, 93% of manufacturers in that report cited a need to make their supply chain more resilient as a way of proactively trying to prevent these types of problems in future scenarios. This will require reconsidering or adding some suppliers—perhaps in new locations or with duplication where possible—and increased internal controls. It will likely also require new hires or workforce training.

Manufacturers are likely to rethink their models about global trade—a trend that was already emerging even before COVID-19, due to trade wars, rising costs,, and other developments. While global markets will remain a key driver for growth for most manufacturers, firms will need to utilize crisis scenario development and data-driven supply chain reorganization in their thinking (Condon et al. 2020). Companies

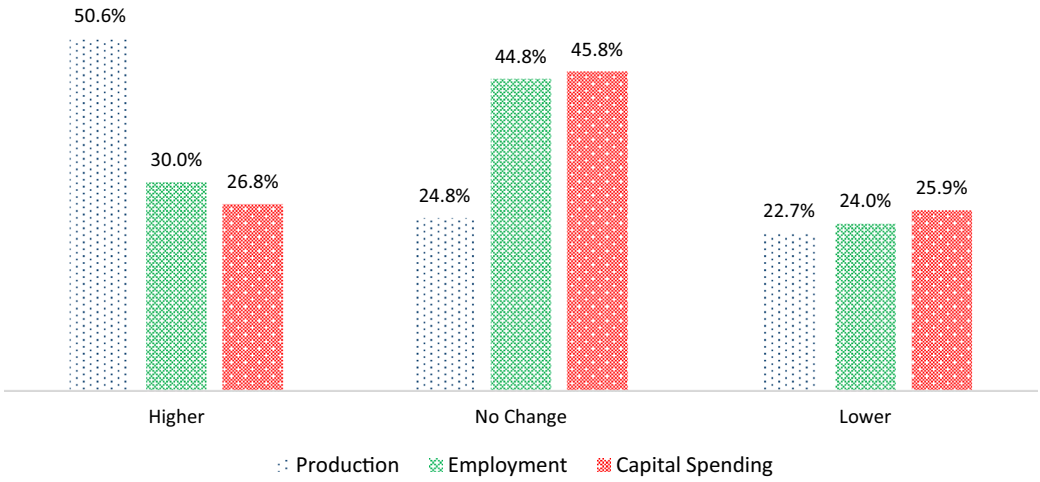

Fig. 10 Change in manufacturing activity in third quarter relative to second quarter of 2020. *Source* NAM Manufacturers' Outlook Survey

can be better informed about global demand, logistics, and infrastructure.

In the immediate aftermath of the pandemic, trade volumes fell abruptly and without precedent. Indeed, US manufactured goods exports plummeted more than 17% in the first half of 2020 relative to the same six months in 2019, with US manufactured goods imports off 11.2%, according to Commerce Department data. While trading activity will, no-doubt, bounce back, there will be increasing incentives to produce more goods or inputs domestically, especially given the disruptions seen during the COVID-19 crisis, accelerating trends that were already developing before the pandemic (Ernst and Young 2020). From the US perspective, this will also likely put a greater onus on policymakers to enact initiatives that might promote greater onshoring (National Association of Manufacturers 2020e).

4 Conclusion

It is amazing how different the economy is today than it was at the beginning of 2020. The COVID-19 pandemic has been a game-changer in many ways, accelerating trends that were already emerging, and dramatically altering others. More than anything, the economic pain has been both severe and unprecedented, sharply reducing activity to rates not seen since the Great Recession or to the lowest on record. Encouragingly, manufacturers have more recently reported rebounding growth. Yet, much like in the United States, it is also clear that production and employment remain well below prepandemic levels. It will take time for businesses to dig out of abrupt drops in activity brought about by COVID-19, with more caution in the economic recovery than we might prefer. Consumers and businesses remain anxious about future outbreaks, with lingering hesitance on the part of many to get back into crowds and for life to get back to "normal."

In the NAM's third-quarter survey (National Association of Manufacturers 2020d), 50.6% of manufacturers expected that production will be higher in the third quarter than in second, with 22.7% predicting that output will be lower and 24.8% feeling that there will be no change (Fig. 10). In a similar way, 30.0% and 26.8% of those completing the survey anticipated that hiring and capital spending will increase in the third quarter, respectively.

Respondents were asked when they expect revenues to return to normal levels. A full sixty-two percent expect that their firm's revenues will not get back to pre-COVID-19 levels until 2021 or later (Fig. 11). Just 17.6% note that their revenues had already recovered.

Finally, the challenging disruptions from COVID-19 have dramatically altered the way that manufacturers think about operations, supply chain management,, and their workforce. To adjust, firms will need to think strategically about where they source their products, something that was already beginning due to other events in recent years, including the ongoing trade war and rising costs of production elsewhere. This could lead to increased production domestically—at least that is a hope. At the same time, companies will accelerate the use of new technologies and innovation as they seek to adapt to changing demands, including a desire to keep employees healthy and safe and to enhance operational performance and customer satisfaction. This puts a premium on managers who have a strong understanding of data and how to use it, as digital acumen will be key to surviving ongoing shifts in the global trade environment, especially given trade uncertainties and the supply chain disruptions seen during this crisis.

Lastly, an increasingly more advanced manufacturing sector requires a highly skilled workforce that can effectively

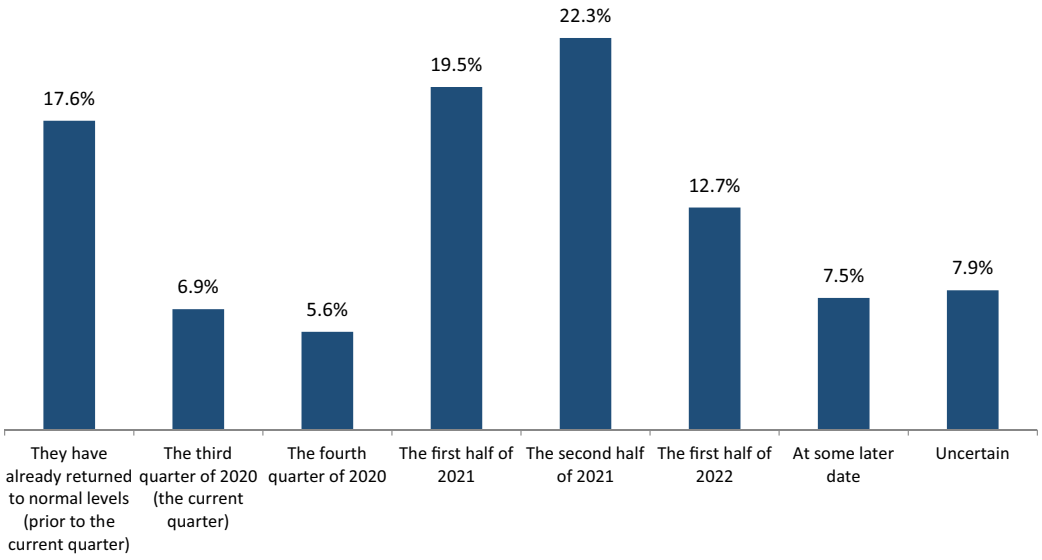

Fig. 11 When firms expect revenues to return to Pre-COVID-19 levels. *Source* NAM Manufacturers' Outlook Survey

adapt to new technologies. The pandemic has highlighted the need to focus on work-life balance and increased employee flexibility, but it has also reinforced challenges with talent attraction and retention.

While it will likely take longer than we might prefer for the sector's output to get back to levels seen before the COVID-19 pandemic, it should do so by 2022, if not sooner. Importantly, the future of manufacturing continues to be bright. Manufactures will learn important lessons from this crisis, strengthening their operations to weather the next big disruptor, whenever that might occur. The "new normal" might take a while for us to get used to, but it will only serve to make the sector healthier and more competitive globally, much like previous downturns. For their part, politicians can help by enacting policies that will further enhance manufacturing competitiveness, especially with firms already re-evaluating their supply chains and considering onshoring. This could be a chance for firms to produce more in the United States, if we take advantage of this unique opportunity.

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