



THE GLOBAL AUTO INDUSTRY RESPONDS TO THE CORONAVIRUS

By Brian Collie, Nikolaus Lang, Gang Xu, Justin Rose, Michael McAdoo, Nicholas Ge, and Diego Medicina

AMID THE FAST-MOVING CORONAVIRUS outbreak that began in Wuhan, China, companies doing business in China have rightly focused first and foremost on the health and safety of their employees there. Over the last few weeks, we have seen companies mobilize in quick fashion to ensure that affected employees receive prompt, proper care and take steps such as evacuating employees from high-risk areas or shutting down production to protect employees from exposure to the virus.

This focus on people is, of course, the most important consideration, especially given the magnitude of the situation. As we write this in early February, more than 40,000 people have formally been diagnosed with the virus and more than 1,100 people have died—already surpassing the death toll from the SARS epidemic of 2002–2003. The World Health Organization has declared a public health emergency, and the Chinese government is taking vigorous action: implementing a complete quarantine of Wuhan, extending the Chinese New Year break, and dramatically increasing medical

support, to include constructing in just ten days a complete hospital with 1,000 beds dedicated to coronavirus response. And while some recent reports suggest that the rate of new infections is slowing, little is known about the virus and how it spreads. It is therefore imperative that companies continue to exercise extreme prudence in the days and weeks ahead.

Against this backdrop, it is incumbent on CEOs and leadership teams to, as a secondary concern, monitor and maintain their business as well; in fact, doing so is a means of ensuring that their organizations can meet their obligations to employees elsewhere in the world.

Many industries have already been affected by the coronavirus emergency, but the auto industry stands out as one that is feeling the effects quickly and deeply, given the critical role that China plays—both as the single largest market for new vehicle sales and as a supplier of components to other parts of the world. Exacerbating the potential impact on the industry, Hubei

province, where Wuhan is located, is a particular hub of manufacturing activity. As the complex global supply chains that involve these facilities are disrupted, the auto industry will be impacted both locally and around the world. We offer here some data to help the industry understand what is happening to automotive supply chains in China right now and how company leaders can respond in the near and long term.

Reviewing the Supply Chain Risk

The risk to supply chains has been compounded in recent decades as companies, in a relentless push for greater efficiency, have created more global supply chains to leverage low-cost labor in emerging economies (in some cases, consolidating production with a select supplier) while striving to

make inventories lean in order to minimize working capital (meaning that excess supply is not on hand to compensate for disruptions). We've seen a variety of events turn that risk into painful reality. Consider the March 2011 earthquake and tsunami in Japan; in the wake of that event, companies were reminded of the need to build in resiliency and redundancy to protect against natural disasters. But a BCG survey conducted several years later indicated that only 25% of companies felt adequately prepared; most still deal with disruptions reactively. (See the sidebar, "The Lessons of the 2011 Japan Earthquake and Tsunami.")

Just how far the impact of the current crisis will be felt will depend on the depth and length of production stoppages in China. Hubei province is the number-two produc-

THE LESSONS OF THE 2011 JAPAN EARTHQUAKE AND TSUNAMI

We have seen the effect of unexpected natural disasters on global supply chains. In March 2011, the fourth biggest earthquake ever recorded and a consequent tsunami hit the northeast coast of Japan, resulting in the most devastating natural disaster in Japan's modern history.

In addition to the immediate humanitarian effects, the event caused a slowdown for the Japanese economy and disrupted supply chains in Japan and around the world. The impact was particularly acute for Japanese automakers, which had several assembly and supplier plants located in the affected areas, but the entire automotive supply chain was hit by the crisis as well and experienced a shortage of components, especially in electronics and paint pigments.

The fallout for Japanese OEMs was strong, and swift. Toyota's net income for the quarter including the earthquake fell 77% versus the same period in 2010. It closed most of its Japanese plants for

about a month after the disaster and ran its US operations at 30% capacity for several weeks as a consequence of the shortage of parts. Honda's quarterly net profit fell 38% relative to 2010. It closed several Japanese plants during the month of March and ran them at partial capacity for several months after the disaster. Nissan had to deal with 40 supplier companies' critical production issues and plant closures for several weeks.

OEMs with headquarters based oceans away felt the economic aftershocks as well. For example, Detroit's Big Three OEMs were forced into temporary shutdowns and review of supply chain priorities to cope with the shortage of critical components. The impact was also felt in Europe, where OEMs had to cut production because of parts shortages. Peugeot, for instance, lacked its Hitachi-supplied diesel engine parts, and Opel, short of electronic components, had to reduce production at factories in Germany and Spain.

er of light vehicles in China, second only to Guangdong; in Hubei, nearly 2 million vehicles are produced annually at more than a dozen production sites. (See Exhibit 1.) But the effects of the stoppage will be felt all across the country, given that more than 20 provinces and cities have been under production shutdowns for at least 8 working days (as of February 10). Production in Hubei faced a 12-day shutdown, and eight of the other top ten auto-producing provinces have been under an 8-day production shutdown. In total, more than 60% of Chinese auto assembly production is directly affected. Of course, the impact will be felt more widely as hundreds of suppliers to these facilities also manage the disruption to their production.

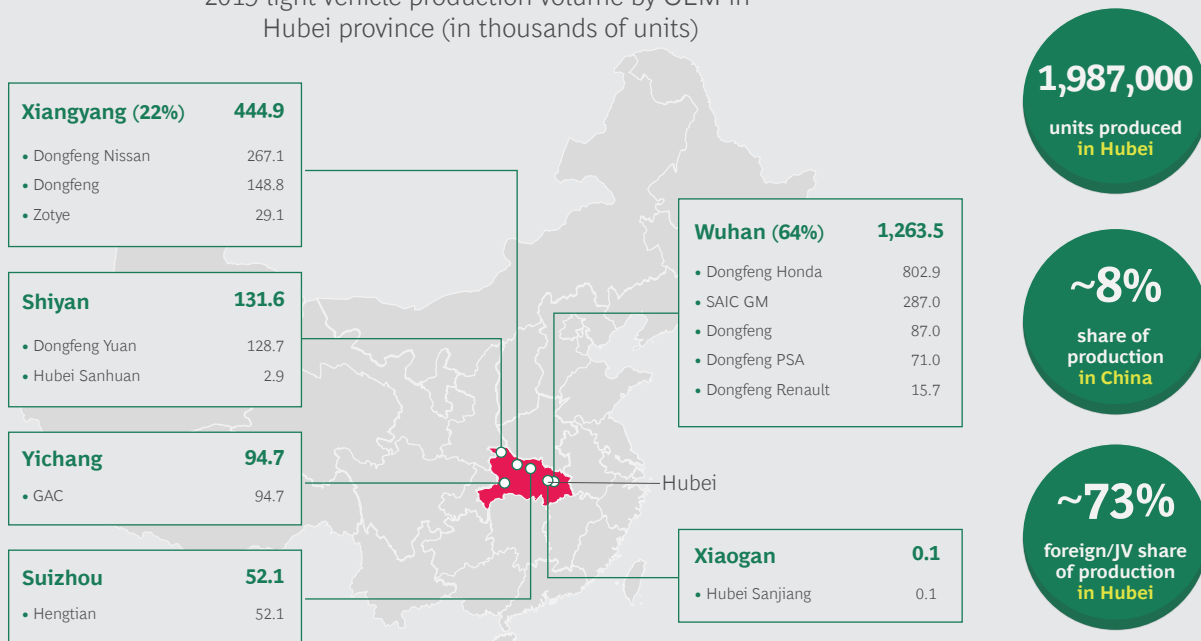
OEMs will be affected differently. Hubei is the headquarters of the largest indigenous Chinese OEM by unit volume, Dongfeng Motors, which is responsible for more than 50% of all light-vehicle production in China coming out of the Hubei province. But other OEMs have significant volumes in Hubei as well. For example, Dongfeng Honda pro-

duced 800,000 vehicles in Hubei in 2019, representing 100% of its China production. Dongfeng’s joint venture with Nissan also produced some 270,000 vehicles in the province. Meanwhile, SAIC-GM contributed another 290,000 units. Continued production shutdowns will not only severely impact the immediate plant employees but also starve retail dealers of needed vehicles (assuming that secondary capacity for a given model does not exist elsewhere). Suppliers will be affected as well; many are operating with very aggressive business cases, and so they feel every decline in volume—acutely.

Hubei is also home to a vast network of parts suppliers (more than 700 in total) that serve OEMs in provinces across China, including both indigenous Chinese companies and foreign firms; they also, in a select few cases, produce parts for export abroad. While most component production in Hubei serves Hubei-based OEMs, the portion of production for OEMs based outside Hubei is significant. An exact breakdown, by supplier, of customers and ship-to points is

EXHIBIT 1 | In Hubei, the Indigenous and Foreign OEM Presence Is Significant

2019 light-vehicle production volume by OEM in Hubei province (in thousands of units)



Sources: IHS Markit (February 2020); press search; BCG analysis.

Note: Map indicates territories that are officially administered by China. Light vehicles include both passenger vehicles and light commercial vehicles of less than 6 tons. Numbers reflect rounding.

not yet available, but our preliminary research suggests that the most exposed categories are braking, steering, and lighting and electricals; here, the total share of revenue outside Hubei for a given supplier could be as much as 70% to 80%.

While the exact severity of these supply chain shocks on China's vehicle production will largely depend on the extent to which OEMs have concentrated component production in Hubei and the amount of secondary capacity that exists elsewhere, most analysts are already suggesting that these supply chain disruptions will serve to prolong the decline in China passenger vehicle sales that began in 2017.

And given the importance of China to the worldwide auto sector, the effects will be felt at headquarters across the world. Many foreign OEMs have significant sales in China, largely served by local Chinese assembly facilities. General Motors sells more units in China than in the US, for example, and Volkswagen has said in an investor presentation that the profit from its China joint ventures represented 26% of its global EBIT in 2018.

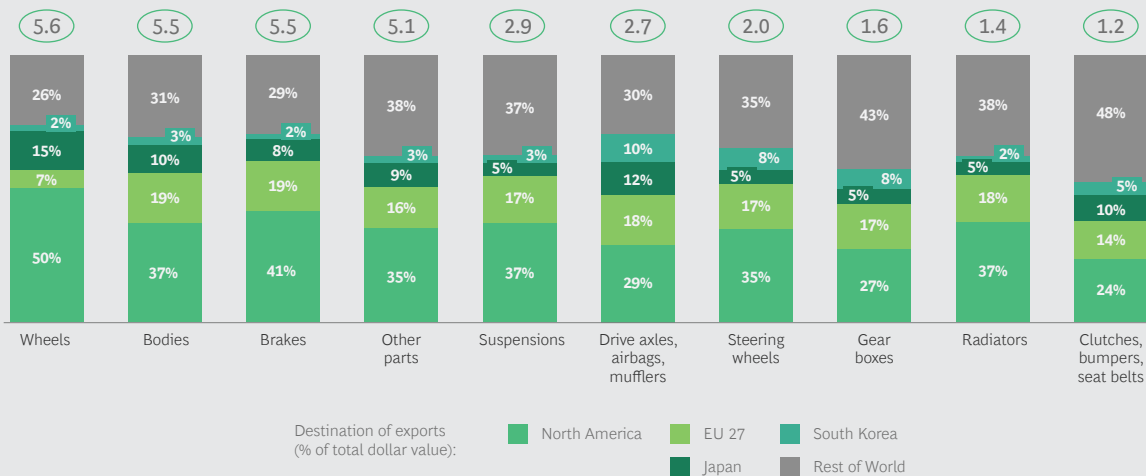
Beyond the impact on its domestic auto production, China is also a significant exporter of components to multiple OEM fa-

cilities in North America, the European Union, Japan, and elsewhere. Exhibit 2 shows the major destinations of Chinese auto components by type and key geography. Clearly, an extended Chinese shutdown has the potential to dramatically affect final assembly operations in North America, the EU, and Japan. (It's important to note that many components produced in Hubei are tier-two components shipped to tier-one suppliers based elsewhere in China for assembly and ultimately export overseas.)

Of particular note are wheels, bodies, and brakes. Each of these categories represents \$5 billion to \$6 billion of exports from China, and well over half of these exports goes to facilities in North America and the EU. Looking at this broader picture is important, but a view at the company or facility level is vital in order to de-average the risk to product flows by location, product category, and trading partner. For example, for steering wheels, steering columns, and steering boxes, Wuhan is China's third largest exporter; more than 20% of the steering systems that China exports to the US originate in Wuhan. Any disruption in supply from these facilities could have dramatic ramifications for assembly facilities in the North American trade bloc. Shifting production to other facilities may not be easy.

EXHIBIT 2 | NA and EU Countries Are the Areas Most Exposed to China's Export Disruptions

2019 China exports (\$billions)



Sources: IHS Markit Global Trade Atlas; BCG analysis.

Note: Product categories are 6-digit HS tariff codes under the heading HS 8708. Percentages may not total 100% because of rounding.

In some cases, duplicate production capacity (tooling and inputs) may exist in other geographies. In others, new tooling may need to be fabricated, workers retrained or hired, and inputs redirected. Depending on product complexity, this process can take three to nine months.

Working with many clients in the industry, we have seen some automotive companies set up robust risk management systems and comprehensive contingency plans. These systems ensure event readiness and fast reaction times that can make the difference between a good quarter and a bad quarter. Measures include gaining clarity on supply chain risk throughout the value chain—including tier-two and tier-three suppliers—and securing alternative sources of supply *before* a stoppage has occurred that threatens to block critical capacity for a component in a particular geography during, for example, a health epidemic or a natural disaster.

However, the majority of the companies do not have such systems. They are now significantly exposed to the impacts of the crisis. The potential downside for such companies is worse still if their competitors are ahead of them in executing contingency plans and thereby securing the scarcest resources for themselves.

Failure to access the necessary supply can cause huge damage for companies because even a single missing part can shut entire facilities. This lesson was learned amply during the 2011 earthquake and consequent tsunami in Japan. And while many OEMs have 45 or more days' worth of inventory in the market already, any extended shutdown will drive real revenue loss. With a heavily fixed cost base, revenue loss translates quickly into losses in the hundreds of millions of dollars—and this in an industry already financially stretched by regulations and technology changes that require them to fund new business models and technologies.

Responding for the Near and Long Term

While it is far too early to gauge the impact on the Chinese and global economies, it is not too late for companies to launch an immediate risk assessment and to develop contingency and recovery plans. Here, and in Exhibit 3, we describe how companies should think about their response to this challenge: in three broad modes, each with a specific series of steps.

Care for local employees and their families. Working with the relevant authorities in China or anywhere else that may have been

EXHIBIT 3 | Companies Should Respond in Three Broad Ways

 <p>Care for local employees and their families</p>	<ul style="list-style-type: none"> • Coordinate with the authorities • Ensure the safety of your people in the area • Make company resources available as appropriate • Proactively support vulnerable suppliers • Support the relaunch of the local economy
 <p>Stabilize and manage the value chain</p>	<ul style="list-style-type: none"> • Designate a clear leader • Gain transparency and de-average exposure (tier one and tier two) • Develop a continuity or resourcing plan at the component level • Actively manage the demand • Stay nimble
 <p>Build resilience for the long term</p>	<ul style="list-style-type: none"> • Proactively assess potential threats • Gain visibility into supply origin and embed traceability in contracts • Define cost-efficient risk mitigation strategies • Outline contingency plans by crisis type • Preapprove a response protocol and chain of command

Source: BCG.

affected, companies should first and foremost act to ensure the safety and well-being of employees and their families. At the most basic level, this includes making sure that any affected employees are receiving the best medical attention possible and, where appropriate, working closely with respective foreign government representatives to help with expatriate employees and their families. Beyond this, auto companies should consider whether they can leverage their well-defined supply chains to accelerate the movement of needed aid and medical supplies into impacted areas.

Stabilize and manage the value chain. The following steps are similar to those that leading companies have been taking to manage the risk associated with politically driven disruptions to global trade:

- **Designate a clear leader.** Assign a single leader in the organization to own your company's response to this crisis and to be accountable for the process. This individual will chair a cross-functional group that should generally include operations, supply chain, sourcing, impacted customer business units, and finance personnel, for example. It is critical to have a focal point of responsibility for developing the response plan. When responsibility is instead spread across the organization, there is too acute a risk of a suboptimal response as people seek to optimize for their own areas without sufficient consideration to the whole of the problem. Worse is inaction, when people feel that they lack the decision rights to adequately address issues.
- **Gain transparency and determine your exposure.** Identify the potential exposure of each component to suppliers, including those in tier one and tier two and, in some cases, all the way down to the raw-material level. This may be difficult. Many firms lack visibility into second- and third-tier suppliers. But it's critical, as we learned when the Xirallic paint pigment shortage following the Japan earthquake and tsunami impacted vehicle

assembly around the world. Identify the components and subcomponents that have the greatest potential exposure and prioritize your response accordingly.

- **Develop a near-term supply continuity plan at the component level.** For components and suppliers with the greatest exposure to supply disruption, develop a detailed mitigation plan. An effective plan would likely use a combination of levers including first claim on supply, buffering of inventory, shifting sourcing to similar facilities in other geographies, scouting of alternative sources, and entering into ad hoc negotiations. This will require close communication and coordination with upstream and downstream participants in the value chain. We have seen many clients set up a "war room" where key functions meet and work daily, using visual management techniques for critical cross-functional information exchange.
- **Actively manage the demand.** Suppliers must move quickly to define an optimized order fulfillment plan for finished goods that are at risk of shortage. They must understand the main tradeoffs across potential penalties and reputational damage, strategic priorities, the risk of losing market share, and margin realization (price increase) opportunities. Engaging with customers is a way to understand where demand fulfillment can be delayed, to maximize optionality, and to continuously refine the priorities.
- **Stay nimble.** We expect a fluid environment in which predictions about the extent of the coronavirus and its impact will seem to change daily. Ensure that the mitigation team is accountable, on top of the shifting environment, and updating plans as the situation evolves.

Build resilience for the long term. While supply chain design and management have been refined into a science aimed at

minimizing cost to a fraction of a percent and working capital to a bare minimum, risk management has often been left by the wayside. The best firms are able to play the long game, gaining deep and sustainable visibility into their supply chains, often to the raw-material level. This allows them to proactively assess and monitor disruption risk and to make the tradeoffs between absolute minimum cost and a manageable level of risk.

This is not a response that should be tapped only as supply shocks require but rather one that is embraced as a core capability and institutionalized into supplier selection and broader supply chain design, with contingency and crisis management plans firmly in place. These skills and management systems will be critical in creating the resilience necessary to confront the global challenges of the 2020s.

virus that would dramatically impact the global automotive market. The imperative now is for companies to first and foremost take care of their people, and our hope is that authorities and health care officials will be able to get this crisis under control, especially given the substantial influx of resources we are now seeing. Events on the ground continue to unfold at a rapid pace, and there is no telling whether this crisis will be short-lived or get far worse before it gets better. Regardless, the sooner companies can take strong, proactive steps to manage the corresponding impact and to build resilience for the future, the better. If we can learn one thing from mass infectious diseases, natural disasters, and the new dynamic around global trade, it is that resilience pays dividends.

JUST A FEW months ago, companies were working to finalize their 2020 business strategies and plans. No one could then predict the emergence of a dangerous new

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