ECG Business Intelligence

April 2020

Preparing for the next phase of the Covid-19 crisis

European vehicle forecast and logistics changes

ECG

AUTOMOTIVE FROM ULTIMA MEDIA

Global. Business. Intelligence.

Table of Contents

ECG Business Intelligence
powered by
Automotive from Ultima Media

Report by
Christopher Ludwig
Daniel Harrison

April 15th 2020

1. Executive summary

- After nearly a month of shutdowns, vehicle manufacturers are resuming output at a number of assembly plants in Europe, beginning a complex and lengthy restart. However, OEMs, suppliers and service providers will face volatile conditions, including risks in the supply and logistics chain, constraints from new health and safety requirements, as well as uncertainty over the ongoing length of lockdown restrictions.

- Those restrictions, which have led to the closure of most vehicle retail channels, are set to have a devastating impact on European vehicle demand, and thus ultimately production levels. In our forecast scenarios, which are based on different average lockdown periods, total vehicle registrations and output could fall by around 30% this year compared to 2019. They may not recover to pre-crisis levels until the end of the 2020s. Nonetheless, some recovery, including temporary spikes in demand, are expected.

- European supply chain and production managers are set to navigate higher levels of sustained risk in the supply chain than before, including potential liquidity issues, failures among smaller suppliers, and many logistics gaps and constraints. Some finished vehicle logistics providers could be among those companies whose financial weakness cause disruption to restarts and later recovery.

- Among this uncertainty, OEMs and their suppliers should put more emphasis on supply chain and logistics resilience across their supply chain and manufacturing operations, which could help them to maintain production and distribution as the industry emerges from the crisis. That will include considerations for inventory holding, local production and shortening time to markets – all areas in which OEMs need to work closely with their suppliers and logistics providers.

2. Waking the European supply chain from its coma

2.1 Preparing for risky restarts

The fates of thousands of companies across the European automotive supply chain depend upon vehicle production and distribution restarting across the continent. The longer assembly lines and vehicle sales operations remain in what can be described as a coma – medically induced to battle the spread of the novel coronavirus – the longer it is likely to take OEMs, suppliers and service providers to wake operations back up.

Without coordinated planning, monitoring and direct support and collaboration across OEMs and their suppliers, there is a risk that some might not be able to come back at all as they run into liquidity shortages. A range of companies face this risk of insolvency, including specialist tooling manufacturers, car retailers and freight carriers – including finished vehicle logistics providers.

According to ACEA, the European Automobile Manufacturers Association, the shutdowns have already impacted on the jobs of nearly 1.14m workers employed directly by vehicle manufacturers across the EU and UK through the first week of April – with the true impact across the wider supply chain much higher.

The good news is that vehicle manufacturers are set to resume some operations in Europe, including the partial reopening of assembly plants already, and preliminary start dates at others later in April and May. But production and supply look likely to be anything but a 'return to normality' either in volume or in processes. For example, manufacturers and suppliers need to adjust operations to prevent the further spread of the coronavirus by limiting human contact and introducing significant amounts of personal protective equipment (PPE).

Output is also likely to be volatile, with significant risks across the supply chain that could prolong closures or cause new ones. A particularly worry would be financial distress at small-and-medium-sized suppliers, including specialist toolmakers and outbound vehicle logistics carriers.

Meanwhile, without a wider coordination of the restart – at a European level, for example – to manage supplier orders, vehicle priorities and even PPE standards and supply, many suppliers and logistics providers could struggle to meet demand just when it will be most needed.

Any restart of production at a high scale will ultimately depend on the extent to which governments can ease lockdowns and allow vehicle sales to resume. In most European countries, dealer sales offices and official registration offices have been ordered closed, and

wider personal mobility curtailed. This remains the case in most large markets, with Germany set to be the first to allow dealers to reopen. And with most major export markets still facing restrictions, export orders will remain low until a wider recovery can take hold.

In other words, even if plants find ways to safely and stably operate, few would remain open long so long as orderbooks cannot be filled, and the outbound distribution chain has no real destination.

2.2 A new era of supply chain resilience

Even this complex and uncertain outlook does not mean that the automotive supply chain and logistics sectors should remain in a comatose state until the pandemic is over. Firstly, such a clear 'end point' is unlikely to appear suddenly. We expect some form of lockdown to continue in most major European markets – especially those hit hardest by the crisis – for several months, even as countries make small steps to ease the harshest restrictions.

Even by the time lockdowns are eased later this year, the virus is unlikely to be eradicated completely. Instead, the automotive supply chain – like the rest of the economy – will have to adapt new requirements to contain its spread and manage the volatility likely to persist in both supply and demand. Along with new safety measures and PPE, we anticipate a much greater requirement for supply chain visibility and resilience. For example, uncertainty in global supply regions will require robust tracking and mitigation strategies, such as finding supply alternatives and building up higher inventory levels where needed.

The same is likely to be true for outbound logistics in terms of allocating vehicles to meet demand. While a deep recession is by now unavoidable, the reopening of markets from near zero levels of vehicle sales is still likely to release some measure of pent-up demand. Our current vehicle demand and production forecasts, for example, expect rebounds in volumes once restrictions are eased more significantly. This will likely vary by market and be pushed back even further depending on the development of the pandemic. However, when demand is awoken, supply chains are likely to face bullwhip effects up and down – especially should governments apply further stimulus measures.

Those companies able to keep plants running and move vehicles quickly at the right time will have a significant advantage. OEMs will need to work more closely than ever with suppliers and freight providers on planning, organising storage and buffers, and moving quickly to consumption points where needed.

Indeed, if there is 'good news' to come from the crisis – measured in very relative terms – it would be the likeliness that supply chain and logistics management becomes a much more obvious strategic advantage for the automotive sector than before. It has already proven to be in other sectors, especially food, medicine and other areas of ecommerce.

It is still too early to live on this hope. And in the long run, the financial pain suffered by many companies, along with the potential for a protracted recovery, suggest that cost pressure and efficiencies will be significant across supply chain and production operations. However, getting started in the current crisis will take significant energy and resolve across OEM departments and suppliers. Now is the time to prepare, communicate and collaborate to put plans for more resilient supply chains into action.

2.3 Measuring the impact of lockdowns on demand and production

The coronavirus pandemic has already decimated European vehicle sales and production, and its effects will be felt even more significantly in the coming months. Even as some countries show tentative signs of containing the disease, and the potential to ease some social and economic restrictions, it will take longer for vehicle markets to recover.

March registration figures provided the first indication of just how severe the lockdowns will impact European vehicle sales. Western European vehicle sales were down 52.9% compared to March 2019. In markets with lockdowns in place, car sales have come to virtual standstills. New vehicle sales dropped around 70% in Spain and France, and 85% in Italy. In Germany and the UK, where some restrictions began earlier but stricter lockdowns came in nationwide later in the month, declines were closer to 40%.

Most major European countries implemented lockdown strategies around mid-March 2020, with some countries such as Italy and France starting slightly earlier and others, such as Germany and the UK, somewhat later. Non-essential businesses, including car dealership sales in most cases, have been closed.

Some parts of eastern Europe also implemented lockdowns later, or with fewer restrictions. For example, Croatia and Slovakia have mostly had partial lockdowns. The Netherlands, meanwhile, has deployed an ‘intelligent lockdown’, targeting vulnerable parts of the population but less severe than other countries. In Sweden, restrictions have been much more limited, with no official lockdown so far. In such markets, March sales declines were milder.

We estimate that the wider European market will have fallen by 50% overall in vehicle registrations in March (**see Figure 1 in section 3)**. The different levels of penetration and containment of the coronavirus will ultimately be a deciding factor in how long restrictions stay in place (**see Table 5 in section 7**).

A similar trajectory will also be evident for vehicle production, which began to wind down once the lockdowns came into place, impacting virtually every vehicle assembly plant in the

EU and UK. According to ACEA, nearly 1.47m passenger and commercial vehicle units had been lost from the shutdowns through the first week of April.

Even with variations in sales and production early on, as well as variations in the severity and length of lockdowns, we expect that all major countries in Europe are heading for significant declines. The shock to the global economy and massive collapse in trade – which the IMF predicts will be the worst since the Great Depression – will cast a shadow on the vehicle sales and production outlook. Supply and product shortages will also restrain even those markets without a lockdown.

In our worst-case scenarios, we forecast drops in European total vehicle output of close to 30% compared to 2019. Those would be steeper annual declines than seen during the financial crisis – and they could still be revised down further depending on the development of the pandemic and the extension of quarantine measures.

2.4 Managing an 'easing' of restrictions

There are, however, some green shoots that the health crisis in Europe might be approaching or have surpassed the peak in many markets. Daily deaths and hospitalised cases have begun to fall in Italy, Spain and France. Italy and Spain have lifted restrictions on some types of businesses.

Germany, Austria and Denmark have sustained relatively low death rates and look set to begin loosening some restrictions in the second and third week of April. In the UK, where cases and deaths have risen sharply – and where the prime minister has been struck by the disease – many experts nevertheless believe the nation to be approaching the peak.

Several central and eastern European countries, including Poland, Hungary, Slovakia, the Czech Republic and Romania, appear to have contained the spread of the virus and have already lifted some restrictions.

However, even the so-called 'flattening of the curve', in which cases and deaths fall, does not indicate the end of the pandemic, and certainly not the quick reversal of economic fallout. Lockdowns look unlikely to be lifted so much as 'eased' – phased reopening of businesses and economic activity, but still with requirements on social distancing. In our estimates, we forecast that some variation of a lockdown will persist for 4-6 months in the worst-hit countries, including Italy, Spain, France, the UK and Belgium (**see Table 5 in section 7**).

Despite the persistence of lockdowns, we expect countries to start allowing vehicle sales again, and take further measures to support manufacturing. But so long as strict measures

are in place on economic activity and mobility, vehicle sales and production activity will remain limited.

This volatile situation makes the European vehicle market particularly difficult to forecast. But we still see room for recovery. As can already be seen in China, economic activity can be restarted even under ongoing restrictions. After falling 80% in February in the grip of the crisis, Chinese vehicle sales dropped around 50% in March as restrictions began to ease. Many OEMs and dealers report strengthening showroom traffic that could point to reasonable recovery. Even Wuhan, the original epicentre of the disease, has lifted the strictest measures of its lockdown, with manufacturers reporting that vehicle production and sales are returning to normal levels.

By all available accounts, many European countries have been worse hit by the coronavirus crisis than China, with far more deaths as a proportion of population. However, demand should still start to recover in the months following the easing of restrictions. While 'V'-shaped recoveries for vehicle sales are unlikely in our view, we expect that monthly volumes will start to approach and then exceed normal monthly levels later in the year as some pent-up demand is released and likely government incentives are implemented.

We do, however, expect sales and production to remain at restrained levels for some time. In all scenarios, our longer-term forecast is for vehicle sales not to recover to pre-crisis levels until well into the decade – but we do expect them to recover.

3. European vehicle sales and production forecast update

3.1 Vehicle registration 2020 outlook: Best, base and worst-case scenarios

We have forecasted monthly 2020 European vehicle demand based on three scenarios and compared them to our 'business as usual' forecast (BAU) – our expectations for sales had the current crisis not occurred. The forecast is based on an aggregate of 26 markets, including the UK and EU minus Cyprus and Malta, and includes passenger and commercial vehicles. (**For more on our forecasting methodology, see section 7.)**

- **Business as usual** – A fall in volume of **360,000 units** (**-2%** from 2019)
- **Best case** - A fall in volume in 2020 of **1.2m units** (**-6**% from BAU, **-8%** from 2019)
- **Base case** - A fall in volume in 2020 of **2.6m units** (**-13.2**% from BAU, **-15%** from 2019)
- **Worst case** - A fall in volume in 2020 of **5.6m units** (**-28.5**% from BAU, **-30%** from 2019)

Business as usual

This is our outlook for Europe had the coronavirus had not occurred. We had already expected 2020 to see sales decline by 2% compared to 2019, as OEMs faced headwinds from slower economic growth, trade uncertainty and rising regulatory costs. The forecast accounts for the normal seasonality that we would expect due to various registration plate periods throughout the year.

Best case

In this (less likely) scenario, we would expect an average eight-week lockdown across Europe from the middle of March to the middle of May. The impact on automotive markets would be felt most significantly over the next two months, but demand and consumer confidence would rebound relatively quickly and start rebounding as early as June as pent-up demand is released.

Under this scenario, monthly sales across Europe would fall by as much as 90% year-on-year in April – with most major markets almost entirely 'paused' during the strictest period of lockdown – followed by declines less severe thereafter. By the end of the summer, however, monthly sales could be as high as 47% above normal levels, before levelling off.

While this does not necessarily imply a 'V'-shaped recovery, some lost volume would be recovered. In the best case, 2020 volume would finish 7.8% lower than 2019, or 6% below our business-as-usual forecast: that would equate to more than 1m lost units of European sales as a result of the coronavirus pandemic.

Base case

In this (more likely) scenario, we expect an average lockdown across Europe of three months from the middle of March until mid-June. The impact on automotive demand and supply chains would only start to recover to normal volumes over the summer.

Under this scenario, monthly sales across Europe would fall by as much as 95% year-on-year in both April and May, with declines only levelling off in summer after the lockdown eases further. But sales would then rise by as much as 47% above normal levels at the end of summer before levelling off at above-average growth.

In the base case, Europe sales would fall by 15% compared to 2019, or 13.3% below our business-as-usual forecast: that would equate to more than 2.3m lost units of European sales as a result of the coronavirus pandemic.

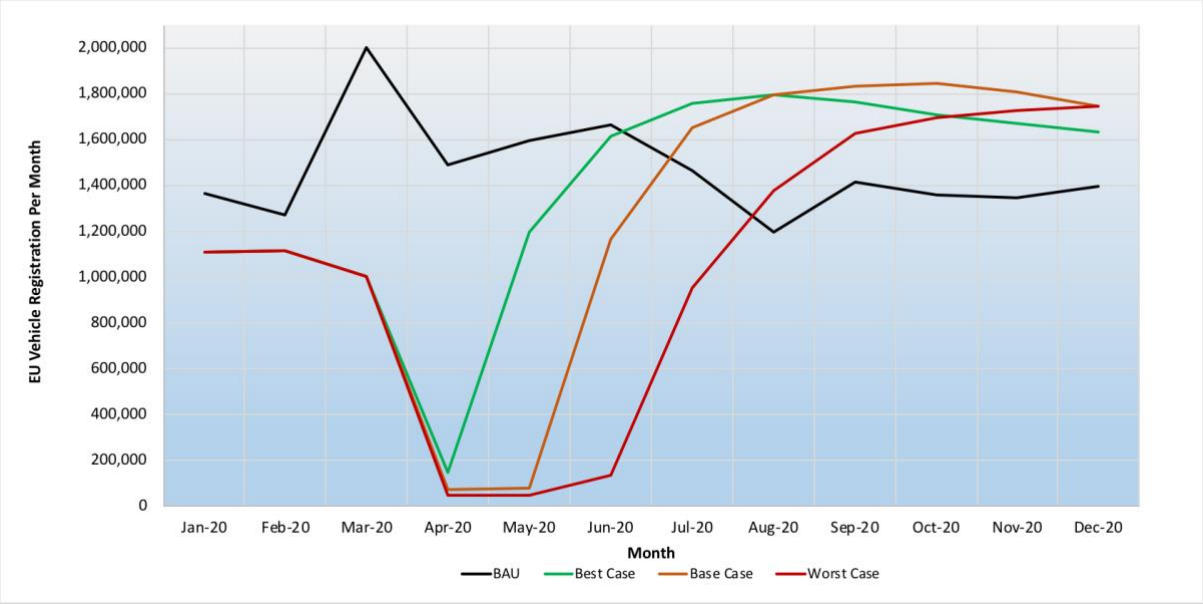
Worst case

In this (less likely but still plausible) scenario we expect an average lockdown across Europe of four months from the middle of March to the middle of July with demand only starting to recover to normal by the end of the summer.

Under this scenario, monthly sales would fall as much as 97% year-on-year in both April and May and 92% in June, with declines levelling off in summer after the lockdown is eased. There would be less pent-up demand following this level of economic damage, however monthly sales could still rise by as much as 25% above normal levels by the end of the year.

In this scenario, Europe sales would fall by 30% compared to 2019, or 28.5% below our business-as-usual forecast: that would equate to more than 5m lost units of European sales as a result of the coronavirus pandemic.

Figure 1 Europe Vehicle Registration Monthly Forecast Under 3 Scenarios 2020 (Monthly Units)



Source: Automotive from Ultima Media

*Passenger and commercial vehicles in 26 markets covering the UK and EU minus Malta and Cyprus

Table 1 Europe Vehicle Registration Forecast Under 3 Scenarios 2020 (Monthly Units)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Business As Usual 2020	1,366,824	1,270,401	2,003,800	1,488,898	1,598,258	1,667,080	1,463,779	1,197,928	1,412,171	1,355,645	1,347,167	1,396,811
Volume change from 2019	-27,894	-25,927	-40,894	-30,386	-32,618	-34,022	-29,873	-24,448	-28,820	-27,666	-27,493	-28,506
% change from 2019	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Best Case Scenario 2020	1,109,893	1,112,872	1,001,900	148,890	1,198,693	1,617,068	1,756,535	1,796,891	1,765,214	1,708,112	1,670,487	1,634,268
Volume change from 2019	-284,825	-183,456	-1,042,794	-1,370,394	-432,182	-84,034	262,883	574,516	324,223	324,801	295,827	208,951
% change from 2019	-20.4%	-14.2%	-51%	-90.2%	-26.5%	-4.9%	17.6%	47%	22.5%	23.5%	21.5%	14.7%
Base Case Scenario 2020	1,109,893	1,112,872	1,001,900	74,445	79,913	1,166,956	1,654,070	1,796,891	1,835,823	1,843,677	1,805,204	1,746,013
Volume change from 2019	-284,825	-183,456	-1,042,794	-1,444,839	-1,550,962	-534,146	160,418	574,516	394,832	460,366	430,544	320,696
% change from 2019	-20.4%	-14.2%	-51%	-95.1%	-95.1%	-31.4%	10.7%	47%	27.4%	33.3%	31.3%	22.5%
Worst Case Scenario 2020	1,109,893	1,112,872	1,001,900	44,667	47,948	133,366	951,456	1,377,617	1,623,997	1,694,556	1,724,374	1,746,013
Volume change from 2019	-284,825	-183,456	-1,042,794	-1,474,617	-1,582,927	-1,567,736	-542,196	155,242	183,006	311,245	349,714	320,696
% change from 2019	-20.4%	-14.2%	-51%	-97.1%	-97.1%	-92.2%	-36.3%	12.7%	12.7%	22.5%	25.4%	22.5%

Source: Automotive from Ultima Media

Table 2 European Vehicle Registration Forecast Under 3 Scenarios 2020 (Annual Units)

Scenario	2019 Volumes	2020 Volumes	2020 Volume Drop from BAU	2020 % Drop from BAU	2020 Volume Drop from 2019	2020 % Drop from 2019
Business As Usual	17,927,307	17,568,761	-	-	-358,546	-2%
Best Case Scenario	-	16,520,823	1,047,938	-6%	-1,406,484	-7.8%
Base Case Scenario	-	15,227,656	2,341,105	-13.3%	-2,699,651	-15.1%
Worst Case Scenario	-	12,568,658	5,000,102	-28.5%	-5,358,649	-29.9%

Source: Automotive from Ultima Media

3.2 European vehicle sales market under lockdown

During the strictest periods of the lockdown, we expect an unparalleled drop off in vehicle demand to less than 5% of normal volumes. In most countries, the vehicle sales departments of car dealerships have been deemed non-essential business and ordered closed (parts and service centres are usually still open). These could be allowed back open in phases, but sales will likely remain low until stricter restrictions are lifted.

We do, however, expect some level of sales activity during the main lockdown periods:

- A low level of online sales activity and lease renewals (although renewals will be severely limited, not least as defaults may increase as a result of the crisis).
- Some commercial fleet renewal, driven especially by ecommerce demand and for essential food, medicine and pharmaceuticals.
- Regions with fewer restrictions, most notably Sweden, which is not in lockdown, and parts of eastern Europe with lighter lockdowns and possibly quicker recoveries, such as Poland.

Once the lockdown is eased across Europe, a recession is likely to continue and there will be ongoing damage to consumer confidence. However, under all three scenarios, we foresee short-term sales rebounds due to pent-up demand in the immediate months following the easing of restrictions.

Furthermore, there are likely to be many government and industry initiatives to drive a demand recovery to help the automotive industry recover. These could include:

- Government scrappage schemes.
- Tax incentives.
- Purchase subsidies for hybrids and electric vehicles.
- 0% finance and leasing deals from OEMs.

There will be challenges and questions around any such incentives, however. Any scrappage scheme that encourages purchases of internal combustion engines – which still make up the majority of vehicle sales and production – could be politically difficult in the face of strict EU CO_2 emission fleet targets. On the other hand, incentives specifically for electric vehicle and ultra-low emission vehicles might trigger supply issues or incentivise imports. Nonetheless, we expect policymakers and industry to strike a balance in most cases.

3.3 Europe vehicle registrations forecast 2020-2030

The effects of the pandemic on automotive demand in Europe will reach well beyond 2020. Once the short-term unwinding of pent-up demand occurs by the end of the year or even early in 2021, we expect sales volumes to level out. We would expect 2021 to improve only marginally upon 2020 volumes as the wider economy struggles; overall European sales volumes could take five years or longer to recover to pre-coronavirus crisis levels.

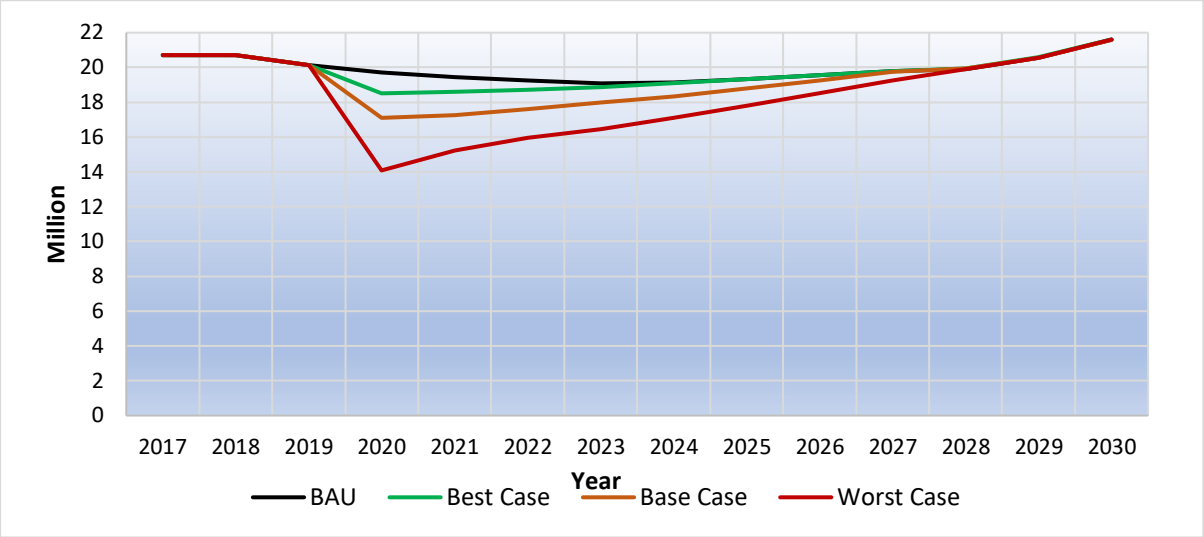
In our business-as-usual forecast, European volumes were expected to soften and decline further over the coming years, bottoming out in 2023. Now, even under our best-case scenario, volumes will not recover to pre-crisis levels until around 2026.

In all other scenarios, we are likely to enter a major global recession in 2020 with a sharp contraction of GDP and global trade, supressing business investment and job creation, leading to rising unemployment and a long-term fiscal drag.

In our worst-case scenario, the deep damage to consumer confidence will mean suppress volumes below pre-crisis levels until 2028. In this scenario, the cumulative lost vehicle sales units in Europe as a result of the coronavirus from 2020 to 2028 will number around 20.5m units – around a full year of sales.

The good news is that all scenarios see volumes eventually recovering above pre-crisis levels. Many factors make such forecasts volatile, including current oil prices and the pace of global economic recovery. But we see a long-term demand for vehicles and mobility in the European economy.

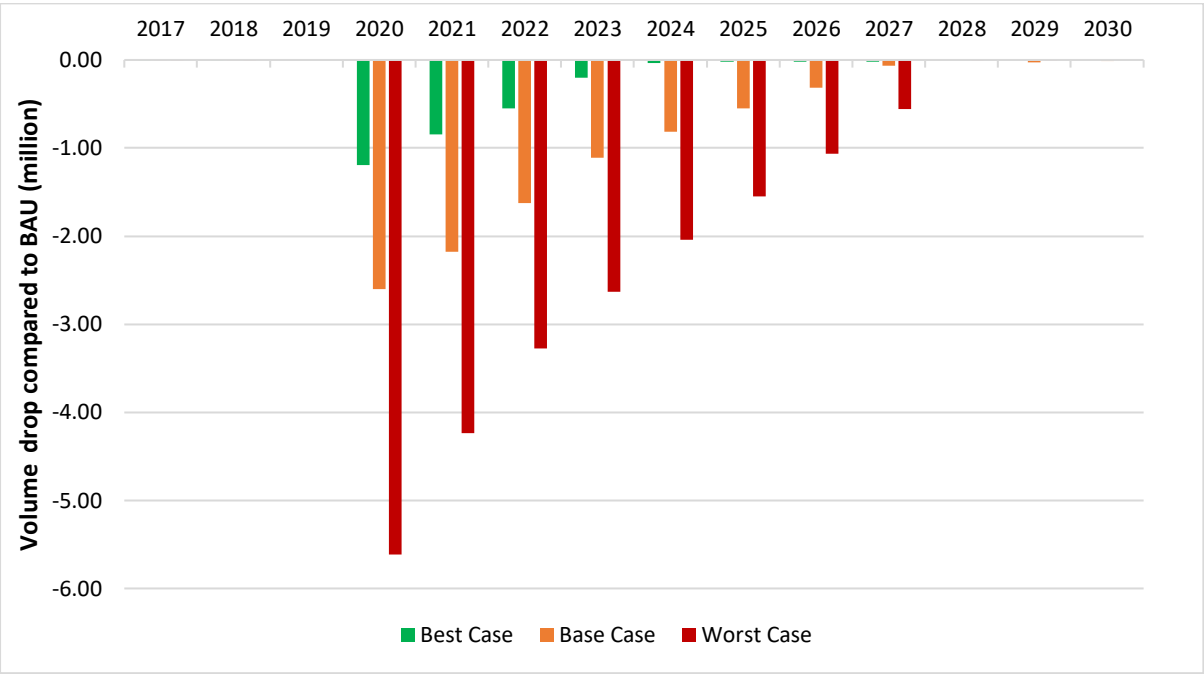
Figure 2 Europe Vehicle Registrations Forecast Under 3 Scenarios 2017-2030 (Annual Units)*



Source: Automotive from Ultima Media

*The forecast in **Figure 2** is based upon **OICA** sales data which has a larger and broader definition of Europe than ACEA. **OICA** data includes the 26 countries used in our 2020 monthly forecast but also includes EFTA countries, Iceland, Norway and Switzerland, and also other European markets including Russia, Turkey, Cyprus, Malta, Albania, Armenia, Belarus, Bosnia, Georgia, Macedonia, Moldavia, Serbia and Ukraine.

Figure 3 Europe Vehicle Registration Volume Drop Compared to BAU Under 3 Scenarios 2017-2030 (Annual units)



Source: Automotive from Ultima Media

3.4 Vehicle production 2020 outlook: Best, base and worst-case scenarios

As for vehicle demand, we have forecasted European vehicle production across the EU and UK for passenger and commercial vehicles for 2020 in a 'business as usual' forecast (BAU) – our estimates had the current crisis not occurred – and compared it to three scenarios. The forecast covers passenger and commercial vehicles. (**For more on our forecasting methodology, see section 7.)**

- **Business As Usual** – A fall in volume of **375,000 units** (**-2%** from 2019)
- **Best Case** - A fall in volume in 2020 of **1.16m units** (**-4.8**% from BAU, **-6.2%** from 2019)
- **Base Case** - A fall in volume in 2020 of **2.53m units** (**-13.3**% from BAU, **-11.8%** from 2019)
- **Worst Case** - A fall in volume in 2020 of **5.3m units** (**-28.4**% from BAU, **-27%** from 2019)

Business As Usual

This is the outlook for Europe if the coronavirus had not occurred. We had already expected 2020 to see production decline by 2% compared to 2019, as OEMs faced headwinds in Europe and as global trade and exports slowed in other markets as well.

Best case

In this (less likely) scenario, we would expect an average eight-week lockdown across Europe from the middle of March to the middle of May. The impact on automotive production would be felt most significantly over the next two months, with plants almost entirely shutdown. As sales resume, production ramp up could also be subject to disruption from supply and labour issues.

Under this scenario, monthly vehicle output across Europe would fall by as much as 98% year-on-year in April, with some output resuming in May and staying well under normal levels into the summer. However, production could see a short-term spike above normal levels by the end of the summer to support sales recovery and exports (and in response to seasonal adjustments), before levelling off.

In the best case, 2020 production volume would finish 6.2% lower than 2019, or nearly 5% below our business-as-usual forecast: that would equate to nearly 800,000 lost units of European production as a result of the coronavirus pandemic.

Base case

In this (more likely) scenario, we expect an average lockdown across Europe of three months from the middle of March until mid-June. The impact on automotive production and supply chains would be significant, including longer shutdowns and longer periods to recover from supply disruption and to make adjustments adjust production to protect labour.

Under this scenario, monthly vehicle output across Europe would remain mostly shutdown through May, with some production resuming in June. However, vehicle output could see a short-term spike above normal levels by autumn to support sales recovery and exports (and in response to seasonal adjustments), before levelling off.

In the base case, 2020 production volume would finish 13.3% lower than 2019, or nearly 12% below our business-as-usual forecast: that would equate to nearly 2.16m lost units of European production as a result of the coronavirus pandemic.

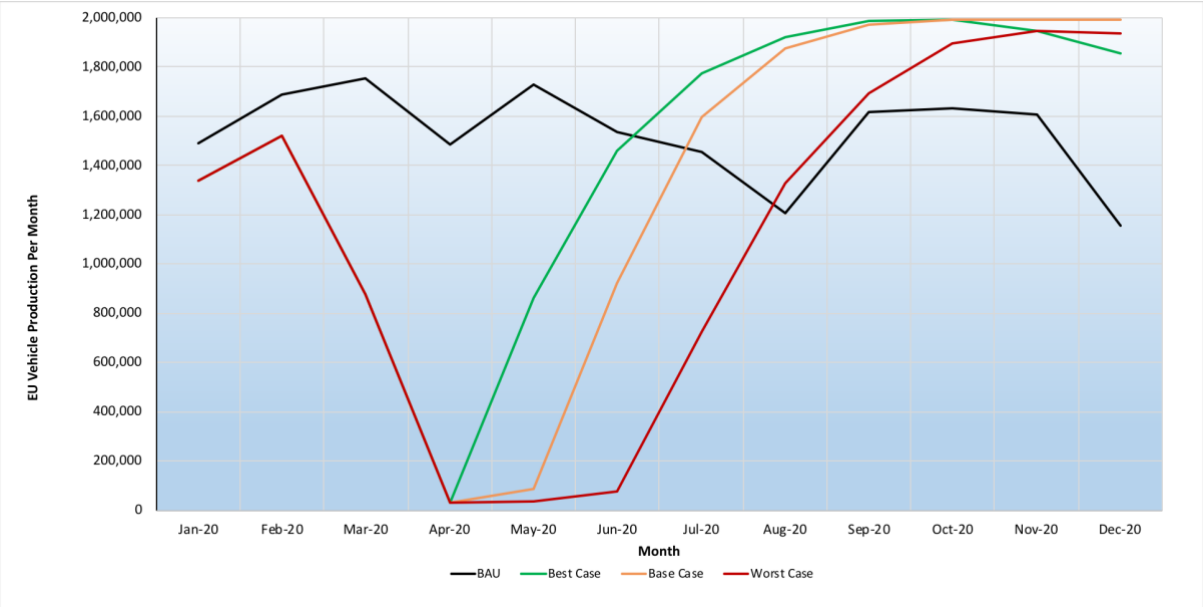
Worst case

In this (less likely but still plausible) scenario we expect an average lockdown across Europe of four months from the middle of March to the middle of July with production only starting to recover thereafter. The impact on automotive production and supply chains would mean even longer shutdowns and potentially longer periods needed to recover from supply and labour disruption.

Under this scenario, monthly vehicle output across Europe would remain almost entirely shutdown through June, with more production resuming only over the summer. However, by the end of the year output could see a short-term spike above normal levels to support sales recovery and exports (and in response to seasonal adjustments), before levelling off.

In the worst case, 2020 production volume would finish 28.4% lower than 2019, or around 27% below our business-as-usual forecast: that would equate to nearly 5m lost units of European production as a result of the coronavirus pandemic.

Figure 4 European Vehicle Production Forecast Under 3 Scenarios 2020 (Monthly Units)



Source: Automotive from Ultima Media

*Passenger and commercial vehicles in 26 markets covering the UK and EU minus Malta and Cyprus

Table 3 European Vehicle Production Forecast Under 3 Scenarios 2020 (Monthly Units)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Business As Usual 2020	1,488,817	1,688,853	1,756,452	1,483,712	1,729,141	1,536,892	1,453,737	1,209,445	1,615,032	1,633,371	1,607,194	1,158,666
Volume change from 2019	-30,384	-34,466	-35,846	-30,280	-35,289	-31,365	-29,668	-24,683	-32,960	-33,334	-32,800	-23,646
% change from 2019	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%	-2%
Best Case Scenario 2020	1,339,935	1,519,967	878,226	29,674	864,571	1,460,047	1,773,559	1,923,018	1,986,490	1,992,712	1,944,705	1,853,865
Volume change from 2019	-179,266	-203,352	-914,072	-1,484,318	-899,859	-108,210	290,154	688,890	338,498	326,007	304,711	671,553
% change from 2019	-11.8%	-11.8%	-51%	-98%	-51%	-6.9%	19.6%	55.8%	20.5%	19.6%	18.6%	56.8%
Best Case Scenario 2020	1,339,935	1,519,967	878,226	29,674	86,457	922,135	1,599,111	1,874,640	1,970,339	1,992,712	1,992,921	1,992,905
Volume change from 2019	-179,266	-203,352	-914,072	-1,484,318	-1,677,973	-646,122	115,706	640,512	322,347	326,007	352,927	810,593
% change from 2019	-11.8%	-11.8%	-51%	-98%	-95.1%	-41.2%	7.8%	51.9%	19.6%	19.6%	21.5%	68.6%
Worst Case Scenario 2020	1,339,935	1,519,967	878,226	29,674	34,583	76,845	726,868	1,330,390	1,695,784	1,894,710	1,944,705	1,934,972
Volume change from 2019	-179,266	-203,352	-914,072	-1,484,318	-1,729,847	-1,491,412	-756,537	96,262	47,792	228,005	304,711	752,660
% change from 2019	-11.8%	-11.8%	-51%	-98%	-98%	-95.1%	-51%	7.8%	2.9%	13.7%	18.6%	63.7%

Source: Automotive from Ultima Media

Table 4 European Vehicle Production Forecast Under 3 Scenarios 2020 (Annual Units)

Scenario	2019 Volumes	2020 Volumes	2020 Volume Drop from BAU	2020 % Drop from BAU	2020 Volume Drop from 2019	2020 % Drop from 2019
Business As Usual	18,736,033	18,361,312	-	-	-374,721	-2%
Best Case Scenario	-	17,566,770	794,542	-4.8%	1,169,263	-6.2%
Base Case Scenario	-	15,874,355	2,162,289	-11.8%	2,537,009	-13.3%
Worst Case Scenario	-	13,118,735	4,,954653	-27.0%	5,329,374	-28.4%

Source: Automotive from Ultima Media

3.5 European vehicle production under lockdown

Once lockdowns are eased and the recovery starts, there will be challenges in re-starting production plants and the accompanying extended supply chains *en masse* across Europe and elsewhere. While the demand shock is still likely to be most crippling, production will be highly sensitive to failures of suppliers, inventory issues out of other regions and even potential financial troubles among logistics providers (**see section 4.4**).

A significant share of European production is also exported beyond the continent, and these volumes are likely to remain subdued, and dependent on how other major regions – notably the US, China and other parts of Asia – can contain and recover from the crisis. A stronger recovery in China could help drive demand for some vehicle production, especially for premium OEMs.

Once the recovery gains pace, we still see scope under each of the three scenarios for rises in production later in the year in line with demand. The upper constraint here, besides potential supply disruption, would be that overall production capacity is limited. But overcapacity in European plants, which has been most notable in countries such as Italy and France, may actually be a short-term advantage. We estimate that full capacity utilisation in Europe of around 2m vehicles per month could be achieved in the autumn of 2020.

However, in 2021, we expect production to subside to more normal levels in line with demand, with only slightly higher overall volumes compared to 2020, but still below pre-crisis levels. Although we have not yet updated our longer-term production forecast for Europe, we expect it to recover slowly, with output unlikely to surpass pre-crisis peaks until later in the decade.

**Note: we will have a longer-term European production forecast in an upcoming update, which requires further consideration of global export and powertrain demand*

3.6 Market snapshots

Europe's highly interconnected automotive industry and supply chains mean that the fortune of the overall region will depend on all countries being able to resume economic and industrial activity. However, there are variations in the outbreak and containment of the disease, which will play a major role in when lockdown restrictions are eased, and thus when sales activity can resume (**see section 7**).

3.6.1 Germany

Germany, Europe's largest vehicle sales and production market, implemented its lockdown on March 22nd, almost two weeks after Italy. This resulted in German vehicle registrations falling 37.7% in the month compared to March 2019 – a less precipitous fall than elsewhere. However, this will change in the coming months with restrictions in place.

However, Germany's strategy of intensive coronavirus testing compared to other European countries may have contributed to better containment of the virus. It has one of the highest numbers of confirmed cases globally, however its death rate is well below the European average, although still far higher than in China or South Korea (**see section 7**).

With cases falling, Germany is set to loosen some restrictions sooner than elsewhere, including reopening some small shops, and reopening schools starting May 4th. Crucially, Germany has also allowed states to decide when vehicle dealerships should reopen, which should support at least some level of sales. Social distancing requirements, however, will stay in place, and thus be required for production, logistics and sales activities. A number of OEMs are set to open assembly plants the week of April 20th. Overall sales are still likely to be low with the crisis ongoing and further restrictions still in place.

The German government has been working with the country's car industry to manage the pandemic, including building ventilators and sourcing protective equipment. It has also started to work with industry on establishing procedures that would allow vehicle assembly plants to resume production safely. Some component plants have already been operating at low levels, for example supplying components for China.

However, the German federal government remains cautious, wary of adopting measures that would allow a new surge in cases. However, overall economic and industrial activity could resume earlier in Germany, with around two months of tighter restrictions our base assumption (**see Table 5 in section 7**).

Germany's export-driven and integrated supply chains mean that even as vehicle sales and production resume, German output would remain at low levels until markets in Europe, the US and Asia started to recover. The potential resurgence of the Chinese vehicle market as the year goes on could provide some succour for German exports, but the opening of European markets will be most important.

3.6.2 UK

The UK, Europe's second largest vehicle sales market, began with a seemingly lower level of coronavirus cases than elsewhere, but has since seen a large spike. The UK lockdown was introduced somewhat softly on March 16th but much more strictly on March 24th. This has resulted in UK vehicle registrations falling 44.4% in March compared to March 2019.

In April, however, Covid-19-related deaths surged to daily totals that surpassed those seen earlier in Spain and Italy. At the time of writing, it is still unclear to what degree the infection curve had been flattened. The country had been due to officially review its lockdown measures after Easter – complicated in part by the fact that Boris Johnson, the prime minister, had been hospitalised with severe Covid-19 symptoms – but they are certain to be extended into May.

Any loosening of measures may bring only partial relief, but there are reports of a sector-by-sector relaxation of the lockdown, which would see car sales and manufacturing brought back online. However, our estimate is that the lockdown measures will persist in varying forms for several months yet (**see Table 5 in section 7**).

The UK vehicle market is likely to remain at low levels until more restrictions are lifted, possibly hampered further by defaults on leases and personal payment contracts. We do expect at least a short-term kick in demand later in the year supported in part by government incentives. UK production for European exports would likely take a hard hit, as would North American exports until the US recovered.

The UK automotive industry was already facing uncertainty before the crisis, especially over the outcome of a free trade agreement with the EU by the end of its post-Brexit transition period this year. The outcome of such talks is still highly uncertain, and a failure to secure terms or an extension in time for 2021 could weigh even more heavily on output.

3.6.3 France

France has been in the upper range of coronavirus cases, and in April saw several days of the most deaths of any European country (although French counting of care home deaths may be more accurate than elsewhere). France had some restrictions in place in early March but enforced a much stricter lockdown on March 16th. As a consequence, France's vehicle registrations fell by 72.2% in March compared to March 2019.

Despite the high deaths, France has shown signs that it may have passed the peak, with declining daily totals of deaths and new cases. The country has nevertheless extended its lockdown until at least May 11th. As elsewhere, the government is more likely thereafter to ease restrictions rather than lift them altogether.

French car sales will depend upon further lifting of restrictions and could see a short-term bump in demand in the months after dealership sales are allowed to resume. French car production exports fewer vehicles to regions outside of Europe than Germany or the UK, and will remain depressed by weak sales in the domestic and in southern European markets.

The French government's stakes in Renault and PSA, which the government has indicated could be increased, could support operations, however this would be dependent on EU state-aid rules. PSA is also in the midst of merging with Fiat Chrysler, a mega deal that could at some point see plant rationalisation. That would be complicated by the role of the French government. It is not yet clear if the crisis will threaten this deal; however, both companies have said they are on track for its completion.

3.6.4 Italy

Italy has experienced some of the worst infection rates of coronavirus and has had the most deaths in Europe at the time of writing. As the first country in Europe to suffer a serious outbreak – concentrated mainly in the highly industrialised Lombardy region – Italy began quarantining northern areas in late February. A regional lockdown in the north was implemented on March 8th, and then quickly extended nationwide.

Unsurprisingly, this has had a drastic impact upon vehicle registrations, which fell 85.4% in March compared to March 2019. This was in line with China's 80% decline in February, and is a clear indication of the impact lockdowns will have on European sales markets.

Although the Italian crisis appears to be easing – new infections and deaths have slowed considerably – the country's lockdown has already been extended to early May, although a limited number of shops can now reopen.

Given the scale of the crisis in Italy, Italian authorities will loosen restrictions very carefully. Our estimate is that restrictions remain in place in some form for several months more (**see Table 5 in section 7**), and that Italian vehicle sales will remain low. Italy should nonetheless eventually benefit from a release of pent-up demand and support measures. However, the overall weakness of the Italian economy before the crisis suggests a long road to recovery.

The Italian lockdown had also featured stricter measures on non-essential manufacturing; however, the government is expected to take steps to ease these and allow the resumption of vehicle assembly before wider lockdowns are lifted. We expect Italian vehicle production to remain hard hit, with both the domestic market and exports to southern European countries depressed.

FCA's merger with PSA could eventually see closures of some plants – especially in Italy where there has been chronic overcapacity. However, it is too soon to say what impact the crisis will have on the deal and the shape of the production network afterwards.

3.6.5 Spain

Spain has become in many ways the European country worst affected by the coronavirus, overtaking Italy in terms of deaths per 100,000 population (**see Table 5 in section 7**). Spain announced its lockdown on March 15th. As a result, vehicle registrations fell 69.3% in March compared to March 2019. Things will get significantly worse in the coming months.

However, as in Italy, Spain has had some more positive signs of late as new infections and deaths from Covid-19 show signs of declining. The country has extended its current lockdown until May 10th but will allow some shops and non-essential businesses to reopen. Similar to Italy, the government is also expected to ease rules that will support the resumption of vehicle output.

Nonetheless, given the scale of the crisis here, we expect many of Spain's restrictions to persist for months to come. As elsewhere, any easing of restrictions after that would likely take some time, and so any recovery in Spanish sales is unlikely until later in the year.

Spanish vehicle production – which ranks second in Europe after Germany – would also be depressed, largely from the slump in UK and EU demand. Most of the brands with large plants in Spain look set to be hurt deeply by the crisis. Most also produce mainly for Europe, including Seat, Ford, Renault-Nissan and PSA Group, and may have limited room for growth in the short term.

3.6.6 Sweden

Although it is not one of Europe's largest sales markets, Sweden is interesting as a counterpoint to other European markets because of its different level of restrictions. Sweden is the only European country not to have a formal lockdown strategy, with a controversial approach of relying on social distancing and more targeted protection of high-risk people.

It may still be too early to understand if this approach has kept the number of coronavirus cases below average at least in western Europe.

Because Sweden has kept more businesses open, the vehicle market has still been able to function more normally, as evidenced by vehicle registrations dropping 'only' 8.6% in March compared to March 2019.

However, the Swedish economy is still under pressure as European growth and global trade drop dramatically, and it is likely that sales in the country will continue to decline amidst a wider recession, albeit at a slower rate than elsewhere. And even with Swedish sales channels mainly open, the market is expected to start running low on vehicle inventory later this spring, which would restrain sales even if there were continuing demand.

It is also not impossible that the Swedish government changes course should infections and deaths rise significantly (Norway, which took a much stricter approach, has had fewer cases and deaths as a proportion of its population, as has Denmark).

Despite the looser restrictions, Swedish vehicle production, namely from Volvo Cars and commercial vehicles from the Volvo Group, have shutdown, both to protect workers and because of a dramatic drop in export demand. Some Swedish vehicle production is so far planned to restart as early as April 20th, however wider increases, including at Volvo's plant in Ghent, Belgium (where death as a proportion of the population is now amongst the worst in Europe) are more likely to restart in early May.

Volvo Cars' links to China through its owner, Geely may help support some level of Swedish exports of parts and vehicles later this year, as well as to learn and adapt to working practices implemented in China. However, as with other brands, the declines in the European market and the US market will weigh heavily on production until any recovery sets in.

4. Managing European supply chain risk

4.1 Starting the European engine back up: Plants set to reopen

With almost all European vehicle assembly plants shut since the third week of March, some OEMs are beginning the complex process of restarting production. We expect this output to remain slow and halting, and likely to be delayed further for a number of carmakers and markets.

European lockdowns have not necessarily mandated the closures of automotive plants. In most cases, governments have deemed manufacturing and logistics as essential sectors, although the severity of lockdowns in Italy, Spain and France effectively included non-essential manufacturing.

In most cases, even as EU borders were shut internally and externally, goods have continued to circulate, albeit with significant delays at road borders and ports. Assembly lines were shut mainly because dealership and other sales channels closed, OEMs took action to protect workers, and because of inevitable supply constraints.

Up to now, most ongoing automotive supply chain operations have been those related to the delivery and storage of products in the pipeline, whether at ports, compounds or centres processing components or vehicles to or from shuttered plants or dealerships. Parts distribution centres have also stayed open to serve the aftermarket. Some component plants and warehouses have continued to ship material overseas, for example BMW's plant and export centre in Landshut in Bavaria, which exports material to China. Volkswagen has also kept a number of component plants operating.

OEMs have also used component and logistics facilities to help support the relief effort, including production of ventilators and procurement of masks and PPE. Some governments, such as Germany, have even worked directly with the procurement and logistics departments of OEMs, including Volkswagen, to help procure supplies and deliver equipment from overseas, especially from China.

A number of Volkswagen Group component plants were set to open on April 14th, including Audi's powertrain plant in Győr, Hungary, as well as other Volkswagen component plants in Germany, including Braunschweig, Kassel, Salzgitter, Chemnitz and Hannover. Daimler, meanwhile, is set to restart production after Easter at its German engine and battery plants.

Some vehicle assembly plants are also starting to reopen. Kia was the first major OEM in the EU to resume production, reopening its plant in Slovakia on April 6th. Hyundai, meanwhile, restarted assembly at its plant on April 14th in the Czech Republic, which also swaps powertrain parts with Kia. Contract manufacturer Magna Steyr restarted assembly of the Mercedes-Benz G-Class at its plant in Graz, Austria on April 14th.

Renault has also restarted some output at its plant in Portugal.

Other OEMs are cautiously planning to resume vehicle assembly. Daimler will start bus and heavy truck production on April 20th and plans to resume output at its major German assembly plants in Sindelfingen and Bremen the week of April 27th. The Volkswagen Group is also planning a coordinated restart assembly in Zwickau, Germany and in Slovakia the week of April 20th, and other factores in Germany, Portugal and Spain the following week.

Jaguar Land Rover has initially said it would restart plants on April 20th, although this is potentially more optimistic for its output in Slovakia and Austria than in the UK. Renault's Dacia brand was set to restart in Romania the week of April 20th. Volvo Cars had also set April 20th as the earliest date it would restart assembly. Toyota was targeting April 24th for restarting some output in France and Poland, though its other European plants are set to reopen later.

Other OEMs have pushed back restart until at least early May, including BMW, Ford, PSA Group, Renault and Nissan, as well as Volkswagen's Seat brand. FCA pushed back restarting production in Italy to May as the country extended most lockdown restrictions, while its plant in Poland was scheduled to open at the end of April.

4.2 Supply disruptions loom

While some OEMs are able to restart some operations, their stability will depend in many cases on securing the supply chain, and the extent to which demand remains shutoff. That Kia and Hyundai could resume output early in Slovakia and the Czech Republic, respectively, and Daimler in Austria, could suggest other restarts are possible in central and eastern Europe.

But so long as sales in most markets in Europe remain on pause, output is likely to remain low. In South Korea, Kia is reported to be considering prolonged shutdowns at its plants as export demand collapses in Europe and North America. That would already follow the example of most major OEMs in Japan, even before considering the possible re-emergence of the virus there.

Furthermore, any carmaker producing on its own would quickly run into supply issues if many suppliers are unable to open.

That is why sources at most OEMs express caution about the planned restart dates. Carmakers have already pushed back initial restart dates in line with the extensions of lockdowns, such as FCA in Italy. Some are likely push back those dates again.

Ford's May 4th restart date, for example, could be extended at any of its plants in Germany, Spain, the UK or Romania. Sue Slaughter, director of purchasing, global material cost, supply

chain sustainability and diversity at Ford Europe, told *Automotive Logistics* that Ford would not resume production where local restrictions remained in place. She cited particular caution around restarting at its plant in Valencia, Spain, a region that has been badly hit. Worker safety precautions, as well as supply availability, will play key roles.

With most major producing and sales countries in Europe likely to keep tight restrictions in place into May – if not significantly longer, in some cases – vehicle production will face a mix of delays and disruptions in the coming months. The automotive industry has plenty of examples where multiple production plants were disrupted as a result of single supply chain failures. The Japanese earthquake in 2011 cut off supply from a number of key suppliers, be it of key parts, materials, paints and other technology. Shortages from chip-maker Renesas led to years of supply issues.

In 2016, a dispute with one supplier group, Prevent, led to the shutdown of six of Volkswagen Group plants. In 2018, a fire at a Meridian Magnesium plant in Michigan disrupted output at several OEMs, notably halting production at three Ford plants building the F-150 pickup truck, the best-selling vehicle in the US.

Such risks will be magnified exponentially across the supply chain in the current crisis as OEMs resume output, especially where a tier 2 or tier 3 supplier might be the single source for key components of larger modules.

Purchasing and supply chain managers acknowledge that liquidity is likely to be the major challenge among many suppliers. Even large manufacturers are severely constrained – Volkswagen is burning through €2 billion per week with plants shut – and there could be risks of insolvencies even at larger tier 1s, many of whom were already seeing pressure on profit margins before the crisis.

But many smaller suppliers are companies with 100 employees or less, including tooling and manufacturing equipment makers across the German *Mittelstand*, or fabric and material specialists in northern Italy. Such firms may not be able to survive more than a few weeks; they might also struggle to access credit lines and government support measures as readily as larger companies.

4.3 Mind the logistics gaps

Supplier failures are not the only risk, as OEMs will need to secure material from regions where production may remain limited and restrictions still in place, with potential freight constraints. For example, although most logistics lanes remain open, some modes are severely disrupted, such as air freight – which is often used to mitigate supplier disruptions.

Container shipping was already struggling during the earlier phase of the crisis in China, with much equipment still out of place. Shipping lines have since employed extremely slow steaming to reduce costs and avoid overcrowding at ports where consumer and industrial markets have effectively been shut.

In Europe, meanwhile, ports face space shortages as unused inventory has piled up. Border crossings remain slow with more checks carried out to prevent non-essential travel, much of which would cause delays to the movement of any higher volume of automotive freight and vehicles. And at this stage, there would also rightfully be priority for medical and food supplies.

While Volkswagen Group is preparing to restart a number of component and assembly plants later in April, the company's executives have acknowledged the risk that lockdown and travel restrictions bring to production and distribution, whether in Europe or elsewhere in the world.

Thomas Zernechel, head of Group Logistics, told the *Wolfsburger Nachrichten* that the company has to monitor such restrictions carefully, including the effect they might have on critical suppliers in certain regions, such as their ability to produce and ship, as well as the time it takes to cross borders, travel by ocean or move through ports. "Goods traffic must be able to flow freely," he cautioned.

With much of Europe and the world still under some kind of lockdown, such smooth flows are far from guaranteed. Continuing problems in Italy, Spain or Belgium, for example, could shutter plants again in Germany. Already, European OEM and partner plants in Russia and Turkey – such as Ford Otosan, Oyak Renault and FCA Tofas – have had to halt production in large part because they could not receive parts from Europe.

European logistics constraints could even slow recovery in China. Sources at European premium brands in China admit that they face potential shortages of parts and vehicles from Europe in the coming weeks and months.

European OEMs could also struggle to retrieve products from other hard-hit regions as and when markets reopen, including North America, including parts or key vehicle models, such as popular SUVs. Further outbreaks in Asian countries that had initially seemed to have contained the disease, notably Japan, as well as major outbreaks in the developing world – for example in India, Africa and Latin America – also risk significant disruption.

4.4 Financial risks at logistics service providers

Along with freight and logistics constraints, another risk to European manufacturing restarts could be among logistics providers themselves, particularly should asset-owning carriers and smaller subcontractors go bankrupt. Some OEM supply chain executives feel that vehicle logistics in particular could be vulnerable to such insolvencies.

The wider logistics industry is already facing a significant crisis. The airline sector is at risk of collapse in some areas, with some passenger airlines likely to require government bailouts and assistance to survive the crisis. A number of smaller freight carriers could also face bankruptcy, although the loss of freight capacity from passenger planes has helped keep

rates high for freighters. Still, the overall decline in industrial and economic volumes will hurt many.

The global container shipping industry was already struggling with declining trade volumes – driven down in part by global trade wars – overcapacity, shrinking profits and high debt levels. The industry could face the collapse of smaller carriers or further consolidation.

Third party and contract logistics providers also face huge challenges. The loss of manufacturing and distribution of key sectors will hurt many, and likely lead to price wars across many trade lanes and modes. Several major 3PLs are themselves even looking to drop contracts they no longer see as tenable – for example, ending agreements or changing rates with automotive manufacturers by declaring *force majeure*.

For European automotive logistics specifically, many providers will be under intense pressure. Since March, with vehicle sales at minimal levels, shipments of parts and vehicles across all modes are at historic lows.

4.5 European vehicle logistics: A weak link?

While general cargo carriers and 3PLs have at least the opportunity to pivot to other sectors – notably food, ecommerce and medical supplies – most vehicle logistics providers are less diversified across sectors.

As with smaller tier 2 and tier 3 suppliers, vehicle logistics providers are often small-to-medium-sized companies; many are likely to face liquidity challenges soon. While most are already taking measures to reduce costs including mothballing fleets, moving to short-working weeks and furloughing workers, it is unclear how many can survive shutdowns of several months.

Those carriers likely to disappear first would be smaller local trucking carriers, many of which may have 50 trucks or fewer. Following the financial crash and subsequent eurozone crisis, the vehicle logistics sector already saw many small, family-owned car carriers leave the market, notably in Italy, Spain and eastern Europe. As many of the larger European vehicle logistics providers tend to depend on these carriers for subcontracting capacity, the loss of such companies would be felt widely during even a mild recovery in volumes.

European short-sea and ro-ro shipping lines, meanwhile, are already taking measures to layup and recycle vessels, as well as to reduce sailing frequencies and to deploy ‘super slow steaming’ where possible to save costs. Some were already facing pressure on margins and finances, including investments aimed at meeting new low-sulphur fuel requirements that have come into force globally (having previously been in place in Europe in low-emission control areas in northern Europe). That has included switching to LNG vessels or installing

'scrubbers' to remove sulphur emissions – the economics for which have been erased, at least temporarily, by the collapse in the oil price and a much smaller difference between high-sulphur heavy fuel and low-sulphur variants.

A number of smaller ferry and cruise lines in Italy have already sought government bailouts, although these are so far those more dependent on passenger traffic.

Not every company, however, is facing imminent collapse. Many rail and ro-ro lines can serve other sectors, including trailers and wagons carrying essential food and medical supplies. Ro-ro lines are also offering vessels as floating garages to store finished vehicles or excess ro-ro trailers with no current retail destination.

This extra inventory has also led to a scramble for space at ports, warehouses and vehicle processing centres. Ro-ro hubs such as Antwerp and Zeebrugge, for example, have had space issues storing finished vehicles or trailers destined for other locations in Europe, and many companies are searching for temporary storage space. Some OEMs will also be looking directly for such space, partly in consideration of when retail sales can resume.

As the last financial crisis showed, vehicle logistics providers are highly nimble. As family-run companies, most respond quickly to customer needs. Trucking assets may be put in temporary storage, but providers should be able to return them fairly quickly to service. The length of the shutdown and the recovery will put such flexibility to the test – and to a much greater extent than ever before.

5. Learning to live with the virus: Protecting workers

5.1 Health and safety requirements and constraints

As automotive production and supply chain operations resume, manufacturers and their suppliers have to adjust operations to new health and safety measures to protect workers and customers from any further spreading of the virus. This could involve processes and equipment that might lead to further constraints in vehicle output.

The measures include coordinating working shifts and patterns to allow for more social distancing, as well as redesigning shopfloor and warehouse operations to allow at least two metres distance between workers. More time overall would also be needed for cleaning and disinfection not only between shifts but also for many processes, such as material and goods receiving areas, as well as vehicle exteriors and interiors throughout assembly, testing and yard operations.

Importantly, automotive manufacturing and logistics operations would require the deployment of PPE on a potentially massive scale, including a range of masks, gloves, gowns, shields and hand sanitizers. Temperature testing and monitoring equipment could also be installed to detect workers with potential symptoms.

These changes raise a number of challenges for the return of automotive production at scale. Social distancing and disinfection measures will require more space and longer takt times, which would reduce productivity and capacity utilisation. Uncertainty over workers' availability on given days because of possible exposure could also cause further labour constraints.

As OEMs typically require plant utilisation in excess of 80% to be profitable, such measures could upend the current economics of much automotive manufacturing and logistics.

PPE requirements could also represent a significant supply constraint. Based on estimates from the VDA, OEMs alone across Europe could require around 80m masks per month – a figure that would significantly multiply across the supply chain, including logistics centres, drivers and ports. The industry could struggle to procure such equipment in any reasonable time, especially with the pandemic ongoing and many other sectors likely to require similar PPE.

Some of these wider concerns, however, may be premature. Initial output at vehicle plants is likely to start at low levels and remain so until vehicle demand starts to recover. That gives manufacturers and logistics providers room to manoeuvre in making adjustments to operations and procuring equipment over the next few months. Hyundai and Kia plants in Europe have started operating on two shifts, for example, to allow enough room and time for protections.

The PPE required in manufacturing and logistics operations, meanwhile, is not necessarily the same standards as for healthcare workers. A number of OEMs, including Volkswagen and BMW, have been working with governments to procure equipment for frontline workers, as well as for their own staff. Tier 1 supplier Robert Bosch is also involved in producing PPE.

Those manufacturers who have restarted production, as well as used their facilities to produce ventilators and medical supplies, are already adjusting to these procedures. They are also emulating the processes put in place at factories and logistics centres in China. There will be much to learn and refine in the supply chain, but most companies are likely to adapt quickly so that they can get back up and running.

5.2 Accelerating digital tools and documentation

Digital tools are also set to play greater roles. Existing technology in plants and logistics that can reduce worker contact will see greater use, whether electronic bills of material, automated guided vehicles or remote maintenance apps and monitoring. Digital twinning and other data visualisation tools will also help to configure human, material and vehicle flows in ways that minimise contact.

In other sectors, freight carriers are turning more towards electronic bills of lading and documentation for shipping and trucking. This shift could accelerate in the automotive supply chain as it restarts, including electronic transport declarations and proof of delivery. It would be welcome, for example, if the crisis could spur wider adoption of the e-CMR, an electronic consignment note that has been available since 2011, but which a number of major European markets – including Germany and Italy – have yet to implement.

Other technology may also play key roles that could reduce the need for more severe distancing measures and PPE, including the contact tracing apps widely used in China that indicate whether someone may have been exposed to the virus. Plants could even benefit from mass testing of workers directly, as well as ‘immunity passports’, which would indicate if someone has recovered from the virus and thus has a certain period of immunity.

However, each of these solutions faces challenges, from privacy laws, untested science, or a lack of availability.

It is likely that OEMs and suppliers will have to quickly implement and change an evolving set of processes to mitigate the threat of the virus.

6. Supply chain actions for recovery

The European automotive supply chain is not about to emerge out of the coronavirus crisis altogether. Rather, it is about to enter the next phase, from a medically induced coma, to flicking open its eyes to resume some output. As production ramps up, it will require adjusting operations to help manage containment of the virus, as well as to respond to what is likely to be significant supply chain and demand volatility.

Managing these changes and uncertainty will require greater levels of collaboration and coordination than is common in the automotive sector, not only different functions at OEMs, but also with suppliers, policymakers and indeed competitors. It will also require more supply chain resilience to maintain operations and capture demand. For supply chain and logistics management, that will mean some important tactical planning adjustments – and potentially some strategic shifts over the long term.

We have identified four key action areas.

6.1 Liquidity and distress support to suppliers

The scale of supplier distress during the coronavirus lockdowns and economic pause will be much higher than anything seen before. As OEMs and larger suppliers are able to extend credit lines and access government loans and stimulus, they will need to consider how they can support smaller suppliers and service providers.

In some cases, this means at least maintaining or even accelerating payment terms, especially to those most in need. It could also mean supporting these companies with their own creditors, including maintaining contracts that would allow them to secure credit.

Involving these companies where possible in other business areas – including the provision and production of medical equipment, for example – could also provide key help.

In other cases, it could mean taking more extreme action, whether in helping to fund suppliers or providers directly, acquiring them or helping to facilitate consolidation.

6.2 Focus on resilience over lean

Critical supply and product management is likely to benefit, at least in the short term, from less focus on lean inventory management. Restrictions could be lifted and reapplied in some regions, making it more important to hold enough stock to smooth supply peaks and troughs. And with longer takt times in plants because of safety precautions, just-in-time delivery and processes could make less sense for some commodities than they did before.

Similarly, OEMs will need to respond quickly to vehicle demand, which may also face periods of surge and decline as restrictions are loosened.

That is why it is even more important that OEMs work in advance with their suppliers and logistics providers to secure storage space and buffers to manage restarts – including creative options like floating warehouses on the water or tactically positioned compounds close to destination markets.

Unlike in 2008-2009, when higher inventory and over-production contributed to the sector's financial woes, in this crisis it may help companies keep plants and dealer networks moving at key points. But the benefit is more likely to come when OEMs work hand-in-glove with suppliers and providers to ensure the right products are stored and maintained to avoid damage or mass obsolescence.

Over time, we do not expect lean processes or just-in-time operations to disappear. In fact, the need for significant cost savings is likely to bring even more pressure on efficiencies in manufacturing and logistics over the long term. However, the value of resilience looks set to be higher both during the crisis and in its aftermath.

6.3 Shore up the supply chain in Europe

After the crisis, there will be further questions over the viability of some global sourcing and international trade in the supply chain, with some supply chain experts already expecting higher levels of regional and local production.

As the development of the pandemic has already shown, localisation on its own would not have prevented many issues, not least as shutdowns spread from China to Italy to Spain and then across Europe and elsewhere. Likewise, many lower tier suppliers and components are concentrated in clusters in key regions, such as China for many electronic parts. Switching such supply cannot be done easily.

Nonetheless, most supply chain disruptions have helped OEMs and suppliers to better map their value chains, and to factor in potential risk more comprehensively, as well as other factors such as time to market. This has contributed to a wider trend towards regional supply of components and vehicles over the past decade seen in Europe, such as a higher regional production of Japanese and South Korean vehicles, just as European OEMs have expanded output in North America and China. As electrification increases, meanwhile, vehicle and battery production to serve local regions, including Europe, is set to increase.

With supplier distress and risk set to rise, regional supply chains will likely support greater resilience. Manufacturers should give more consideration to weaker links or single sources at lower tier supply levels, as well as gaps in freight and delivery services. Regional production could also buffer against additional trade and protectionist measures, which could be a further ugly consequence of the crisis.

6.4 Collaborate, communicate, coordinate

Since the coronavirus first struck in China in January, most OEMs and suppliers set up taskforces across engineering, purchasing, logistics, production and sales departments to monitor and manage critical supply situations. Such measures helped to avoid significant disruptions to European production until the crisis quickly spread. Many of those taskforces then quickly switched to monitoring supply in the other direction, such as how to get supplies and material out of Europe for China.

Now they are constantly tracking supply, demand and logistics constraints ahead of restarting plants.

Managing this wide array of supply and demand constraints will challenge OEM supply chains. The industry has little chance of avoiding disruption without some semblance of wider coordination between OEMs, suppliers, service providers and European governments.

Such an approach would allow manufacturers to phase their production and distribution activation plans, including synchronising supply chains to make sure that key suppliers are able to prioritise production and shipments. Both suppliers and logistics providers could plan where to reallocate operations, fleets and staff. Together, all stakeholders could better plan for demand as sales and retail activity resume.

Major OEMs, notably Volkswagen Group, have led the calls for such coordination. But it is not yet clear if governments or the wider industry have the capacity or the will to work together in this way. Supply chain managers and logistics providers shouldn't wait to start planning, and all companies should ensure that they communicate and update each other as often as possible.

Each of these actions apply equally across the European outbound vehicle logistics chain as for other specialist suppliers. After all, vehicle logistics providers will be essential in safely preserving vehicle inventory and cash flow until restrictions lift, as well as in moving product as quickly as possible to customers. Any breakdown in distribution will further threaten a sustainable recovery.

That is why even as the time for wider restarts is likely to stretch further, OEMs and their partners have no time to lose in getting ready.

7. Appendix

7.1 Forecasting methodology

To forecast European vehicle sales and production in this difficult time, we have considered a number of factors related to the coronavirus crisis, as well as assumptions related to lockdown and stay-at-home orders.

These parameters include:

The influence of lockdowns on sales

To forecast demand, we have assumed that in most cases car dealerships have been forced to close as they are deemed to be non-essential businesses. Consumers have also been forced to remain at home unless absolutely necessary and cannot go out for non-essential trips. Therefore, the length of lockdown will largely determine the impact upon vehicle demand. However, even after restrictions are lifted or phased out, it will take time before consumer confidence returns.

The influence of lockdowns on production

For production, we have assumed that whilst strict lockdown measures are imposed across Europe, most vehicle assembly plants will be unable to operate. This is in part due to employee and union concerns about the risks to health for assembly line workers, in part due to supply chain shortages, and of course because of the drastic fall in vehicle demand. All will play a role in how long it takes for production to resume, but lower demand will have the biggest impact.

Market definition

Volumes include both passenger cars and all types of commercial vehicles. Except for **Figure 2** and **Figure 3**, which are based on OICA data, the data in this report is based upon ACEA data, which includes 26 markets across the UK and EU (Cyprus, Malta and EFTA countries are not included).

Length of lockdown restrictions

We have constantly monitored the outbreak of the coronavirus pandemic across Europe and for each individual country, lockdown start dates and their impacts upon vehicle demand. We have also monitored important public health metrics: official Covid-19 cases confirmed, deaths and deaths per 100,000 population (see **Table 5**).

Although the number of coronavirus cases reported by a country is a useful statistic in assessing how far the virus has infected a country, it is confounded by the variable levels of testing implemented in each country. For example, Germany has a much higher intensity of testing than most other countries and thus appears to have one of the highest infection

rates. However, Germany has a relatively low death rate indicating either a lower penetration rate than other countries, or better containment, or both.

The UK, by contrast, has had a lower capacity for testing, and a much higher death rate than Germany. It is likely that the rate of infection in the UK is at least as high or significantly higher than in Germany and could take longer to contain overall.

Similarly, the number of coronavirus related deaths is a good indicator of the level of penetration of the virus. However, clearly the absolute level of deaths is also confounded by the size of the population which clearly varies across each of the European countries.

Therefore, the most revealing metric is coronavirus deaths per 100,000 of population, as reported by John Hopkins University. This measure better represents the penetration of the virus in each country – and from our perspective gives a clear indication of which countries are going to require the longest lockdowns.

We have coded these as shown in **Table 5** to indicate the regions where we believe the lockdowns will have to be the longest. At present, Italy and Spain are clearly the two countries most badly affected, however the death rate is also high in the UK, France and Belgium.

Table 5 Top 26 European Market & Covid-19 Impact Overview (as of April 15th)

Rank	Country	2019 Vehicle sales	Lockdown started	Official Lockdown end/review[1]	Predicted Lockdown Period[2]	CV-19 Deaths Per 100,000 Population[3]
1	Germany	4,017,059	22nd March	May 3rd	2 months	3.85
2	UK	2,676,918	24th March	Early May	4 months	17.07
3	France	2,693,977	16th March	May 11th	5 months	22.37
4	Italy	2,131,916	9th March	May 3rd	6 months	33.86
5	Spain	1,501,260	15th March	May 10th	6 months	38.00
6	Poland	656,265	15th March	April 19th	2 months	0.65
7	Belgium	644,041	17th March	Early May	6 months	34.17
8	Netherlands	538,742	16th March	April 28th	4 months	16.44
9	Sweden	418,478	No lockdown	-	-	9.02
10	Austria	382,333	16th March	May 1st	3 months	4.16
11	Czechia	281,423	16th March	11th April (now part lockdown)	2 months	1.35
12	Portugal	271,817	16th March	May 1st	3 months	5.20
13	Denmark	264,256	11th March	April 13th (now part lockdown)	3 months	4.92
14	Romania	189,025	25th March	April 15th (now part lockdown)	3 months	1.70
15	Hungary	162,659	17th March	Indefinite	2 months	1.12
16	Finland	155,147	16th March	April 13th (now part lockdown)	2 months	1.07
17	Ireland	142,494	24th March	May 5th	3 months	7.52
18	Greece	122,366	23rd March	April 30th	2 months	0.92
19	Slovakia	113,863	16th March	Part lockdown	1 month	0.02
20	Slovenia	84,503	20th March	April 30th	3 months	2.66
21	Croatia	72,072	19th March	Part lockdown	2 months	0.61
22	Luxembourg	60,239	15th March	April 20th	3 months	11.35
23	Lithuania	47,382	16th March	April 27th	2 months	0.86
24	Bulgaria	43,767	13th March	April 13th (now part lockdown)	2 months	0.46
25	Estonia	37,211	13th March	May 1st	3 months	2.12
26	Latvia	19,488	13th March	May 12th	2 months	0.26
						Average=8.5

CV-19 Deaths per 100,000 population	0 to 2	2 to 10	10 +

Source: Automotive from Ultima Media

1. Official lockdown end dates are more likely to be reviews of existing measures, and in some cases include lifting some restrictions (already seen in eastern Europe, as well as Austria, Denmark, Spain and Italy). However, a broader relaxing of rules is much likely to come later.
2. Our base case prediction for lockdown periods correlates to the mortality rate for each country.
3. Data as of April 15th 2020 from the most widely respected source: **John Hopkins University (JHU) Coronavirus Resource Center** (https://coronavirus.jhu.edu/data/mortality)

ECG – The Association of European Vehicle Logistics
Bd. Auguste Reyers 80
B-1030 Brussels
www.ecgassociation.eu
+32 2 707 82 80

Ultima Media Ltd *part of* Süddeutscher Verlag
401 King Street
Hammersmith
London, W6 9NJ
www.ultimamedia.com
+44 (0)20 8987 0900

Disclaimer

All facts and figures are believed to be accurate at the time of publication; Ultima Media accepts no responsibility for inaccuracies due to future developments in the market or incorrect information provided by Ultima Media's sources. Ultima Media is unable to accept any legal liability for any consequential loss or damage, however caused, arising as a result of any actions taken on the basis of the information provided in this report.

Contact Details

Mike Sturgeon
Executive Direction, ECG
mike.sturgeon@ecgassociation.eu
+32 2 707 82 82

Christopher Ludwig
Editor-in-Chief, Ultima Media
christopher.ludwig@ultimamedia.com
+44 (0)208 987 0968

Daniel Harrison
Automotive Analyst, Ultima Media
daniel.harrison@ultimamedia.com
+44 (0)208 987 0946