

Automotive: COVID-19 Analysis

Risk analysis
VERSION 3.1, 08. April 2020



Agenda

1. Implications of COVID-19 for the automotive industry
2. Overview of scenarios and assumptions
3. Global sales
4. Europe: Sales
5. Germany: Sales
6. Europe: Production
7. USA: Sales
8. China: Sales
9. Version Control

Structural analysis: The corona crisis affects the development of the entire automotive industry in 2020 and beyond

Short term

Shutting down and closing

Market

Lack of demand

Sudden and complete drop in new car sales due to social restrictions and a lack of sales and financing staff

OEMs

Plant closures

Synchronous, complete shutdown to minimize variable costs - Avoiding permanent layoffs and closures as much as possible

Suppliers

Interrupted production

Extensive lack of demand impairs the production of suppliers in all regions and requires dedicated coordination

Finances

Cash flow effects

Lack of sales impair the inflow of liquidity from April onwards, while structural costs remain largely unchanged

Medium term

Restart and recovery

Online marketing

Easily accessible online on-demand marketing and interactive sales process, with a focus on B2B and digitally-savvy customers

Production ramp-up

Even where individual components are missing, strategies should be developed for building "incomplete" vehicles for later completion

Restoring supply chains

The demolition of the logistics chains will cause supply bottlenecks for another 2-6 weeks; failed suppliers will have to be replaced

Effects on profitability

Due to a lack of revenue and cash inflows, profitability is lost at all levels of the automotive value chain

Long term

Restructuring and implications

Decentralised marketing/ sales

Integration of digital and local marketing and sales processes in addition to stationary retail

Advanced mobility services

Development of models that go beyond mass transport to network multimodal individual mobility scenarios

De-globalized supply chains

Extensive transparency and active management of cluster risks across all supplier levels and regions

Dissolving of rigid structures

Create multiple scalable, independent business units with resilient business models

Volume loss Q1 2020: Already in the first quarter, almost 5 million passenger cars were sold less globally

Country	Sales*	Decrease vs. Q1 19	Production**	Decrease vs. Q1 19	Comment
China	- 2,362,223	- 45.8%	- 2,024,988	- 40.5%	<ul style="list-style-type: none"> 23.01. Wuhan is quarantined, including plant closures and curfews 19.03. No new infections are reported; companies re-opened
Japan	- 130,752	- 10.3%	- 243,311	- 11.3%	07.04. State of emergency and contact restrictions imposed for 6 prefectures including Tokyo
South Korea	- 26,871	- 7.9%	- 56,872	- 6.5%	22.02. Nationwide closure of schools, universities and businesses by mid-March
USA	- 445,711	- 13.8%	- 277,044	- 14.1%	<ul style="list-style-type: none"> From 19.03. Automotive plants will be closed, initially announced only until the end of March 31.03. 35 states impose curfews, contact ban until 30.04.
Rest of NA	- 75,592	- 13.0%	- 163,990	- 13.2%	Plant closures in Canada and Mexico implemented from mid-March
Germany	- 178,887	- 20.3%	- 203,484	- 16.7%	22.03. Introduction of contact bans until 20.04.; schools and car factories already closed
UK	- 142,066	- 20.3%	- 36,323	- 9.8%	23.03. Imposition of curfews
France	- 188,873	- 34.1%	- 207,868	- 44.2%	15.03. Closure of non-essential businesses, including school and factory closures
Italy	- 193,159	- 35.8%	- 36,147	- 25.2%	08.03. Lombardy region is quarantined, including school and factory closures
Spain	- 124,388	- 36.3%	- 45,562	- 7.9%	14.03. Imposition of a nationwide curfew, including school and factory closures
Remaining EU	- 271,902	- 23.2%	- 210,281	- 14.9%	Since March: Plant closures fully implemented
ROW	- 712,376	- 18.0%	- 758,900	- 21.5%	From March onwards: All over the world there will be factory closures & curfews
Total	- 4,852,799	- 25.9%	- 4,264,768	- 22.5%	31.03. More than 1/3 of the world population is restricted in their freedom of movement

* - partly estimated

** - estimated

In the **four scenarios** examined, demand and production are modelled separately and consolidated into sales

Scenario	Impact/ V-Shape	Recovery/ Short V	Deep Impact/ U-Shape	Double Dip/ L-Shape
Assumptions on demand	Collapse of consumer confidence over 4 weeks, in February in China (-86% sales), from mid-March in Europe (-50%), from the end of March in the USA (-30%); rapid recovery to original level in Q3 and Q4	As "Impact"; rapid recovery and catch-up effects with up to 25% over-expectations in the second half of the year	Collapse of consumer confidence as well as curfews and closures lead to losses of 80% over 6 weeks from March into May. Permanent reduction in demand also in the second half of the year in line with the financial crisis 2008/2009	Like "Impact"; weakened recovery until September; due to second wave of infection renewed containment measures with demand in China weakening by 30% in September, 40% in October 2020, in EU/ USA one month later
Assumptions on production	Synchronous plant closures in February in China (-80%), over 4 weeks in EU lead to 50% losses in March, 60% in April. Rapid recovery in the supply chain leads to -10% in May, -5% in June; recovery to originally expected level from July 2020	As "Impact"; stable supply chains and full availability allow an increase in production of up to 25% compared to expected values in the second half of the year to fully compensate for the losses of the crisis	Voluntary and officially ordered plant closures over 6 weeks reduce global production by 30% in March, 85% in April. Reorganisation of supply chains and possible reassignment to alternative suppliers reduce production by 55% in May and 35% in June compared to plan	As "Impact"; 5% less recovery in June and August, in autumn new closures limit production in China in September by 45%, in October by 20% compared to plan, in other regions 1-2 months later
Consolidation to sales	Restrictions in demand lead to a global oversupply of approx. 2.7 million units	Restrictions in demand lead to a global oversupply of approx. 2.2 million units	Restrictions in demand lead to a global oversupply of approx. 1.2 million units	Restrictions in demand lead to a global shortage of approx. 2.5 million units

COVID-19 measures are increasingly moving towards the „Deep Impact“ scenario with severe effects

Key assumptions:

- **Demand** is returning to the end of local restrictions at different rates, with labour market effects amplifying the impact
- **Production** bottlenecks caused by delivery restrictions of global suppliers determine the market recovery in Q2 2020

Current situation: Demand slumps sharply in February and March 2020, particularly due to measures to contain COVID-19. China, the world's most important market, is already visibly recovering in March and is aiming for 90% capacity utilization by May. Global governments, including the USA, are responding with strong containment measures from March onwards, which are increasingly extended until the end of April. In the „Double Dip“ scenario, a second wave of infection occurs in autumn.

Effects:

China: After a strong recovery to -40% in March, the peak of the crisis has been overcome and the containment of the pandemic as well as the financial aid by the government (e.g. reduction of purchase tax, NEV subsidies) have a positive effect.

EU Top 5: The Italian market experiences a strong slump in March (~-80%), Germany and France follow with a slight delay (approx. 2 weeks). Recovery is not expected until May, while April is the most critical month.

USA: The US market falls later in the global comparison (~-50% March), social restrictions are announced until the end of April.

New York Times, 7 February Chinese Car Factories Idled

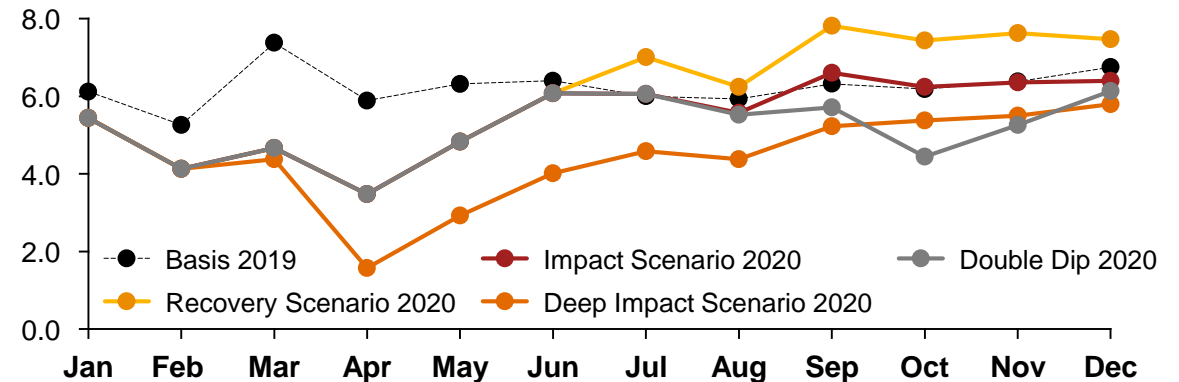
As the coronavirus spreads, assembly lines may take longer than expected to restart, causing a chain reaction around the world.

AbcNews, 19 March 2020 Automakers shut N. A. plants

Concerns about the spreading coronavirus has forced most of North America's auto plants to close temporarily

PC* Sales: Risk assessment for 2020 sales

(in millions, global)



Scenario	Sales (in millions)	Effect	Result
2019	75		• Basis of comparison
Recovery	72	-4%	• -41% in April vs. 2019 • +25% in H2 vs. 2019
Impact	66	-12%	• -41% in April vs. 2019 • Recovery in the 2nd HY
Deep Impact	53	-29%	• -73% in April vs. 2019 • 2nd half year -15% like 2008/2009
Double Dip	62	-18%	• -41% in April vs. 2019 • -28% in October vs. 2019

*PC: Passenger Cars = Car

Focus on Europe: Corona effects are showing a massive impact on demand, with countries following individual paths

Key assumptions:

- **Demand** returns differently after local restrictions expire
- Bottlenecks in **production** due to delivery restraints of local suppliers slow down market recovery in Q2 2020

Current situation: European demand increasingly collapsed in March 2020, in particular due to the measures to contain COVID-19. On the basis of available information, it can be assumed that new registrations in Europe in March fell by about 50% compared to the previous year.

Effects:

France: For March, France reports a 72% drop in new registrations, which means that only one week of sales was actually registered in that month. The future effects of the crisis will depend strongly on the duration of the measures.

Italy and Spain: As severely affected pandemic countries, new registrations in March fell by 85% and 69% respectively, as expected. So far, relatively early withdrawals of protective measures have been communicated.

UK: Delayed government measures (e.g. school closures) lead to an overall later decline in demand (April:-- 40%, May:--20%) followed by a slow recovery in Q2.

Mercury, 17 March 2020 Ban on entry into EU countries

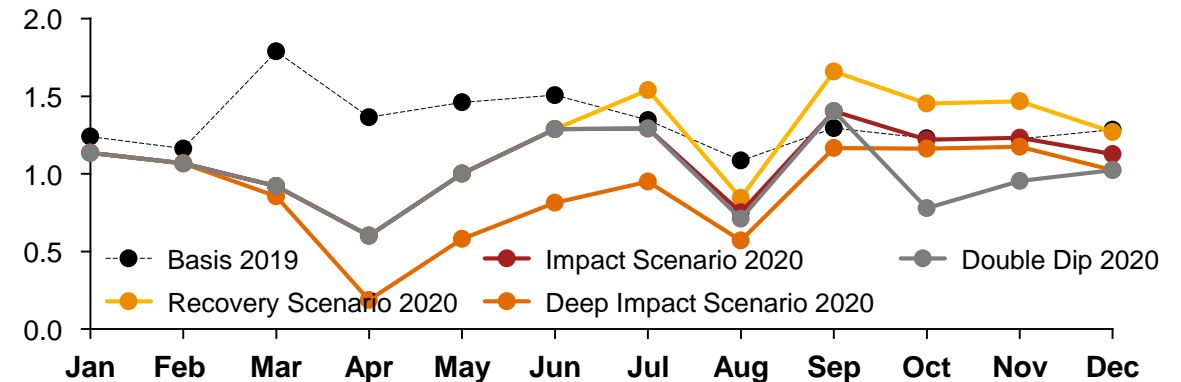
The EU imposes "basically a 30-day entry ban" on non-EU citizens, Chancellor Merkel said.

News, 22 March 2020 Increased curfew

Italy has to mourn 800 corona deaths in one day - and immediately tightens the rules. All non-essential businesses must close down ...

PC* Sales: Risk assessment for 2020 sales

(in millions, Europe incl. UK)



Scenario	Sales (in millions)	Effect	Result
2019	15.9		• Basis of comparison
Recovery	14.2	-11%	• -56% in April vs. 2019 • +25% in H2 vs. 2019
Impact	13.0	-18%	• -56% in April vs. 2019 • Recovery in second HY
Deep Impact	10.6	-33%	• -86% in April vs. 2019 • 2nd half year -14% like 2008/09
Double Dip	12.1	-24%	• -56% in April vs. 2019 • -37% in October vs. 2019

Focus on Germany: As the lead sector, the automotive industry will be hit particularly hard by all measures

Key assumptions:

- **Demand returns** at different rates after local restrictions expire
- Bottlenecks in **production** due to delivery restraints of local suppliers slow down market recovery in Q2 2020

Current situation: New registrations in Germany already slumped by 38% in March, and production by 37%. The declines correspond almost exactly to the duration of the isolation measures and show that these have brought the car market to a virtual standstill.

Effects:

Demand: The future development of demand is largely determined by the duration of social measures. No demand is to be expected during the period when public life is suspended; online sales will also have only a minimal effect. Depending on the developments on the labour market, long-term effects will occur.

Production: The synchronous closure of all vehicle plants in Germany from 13-18 March has so far been planned to take place in April, with varying lengths of time. The Deep Impact/ U scenario assumes a complete closure over April, with significant effects on liquidity and supplier availability in Q2.

FNP, 23 March 2020
No contact in Germany

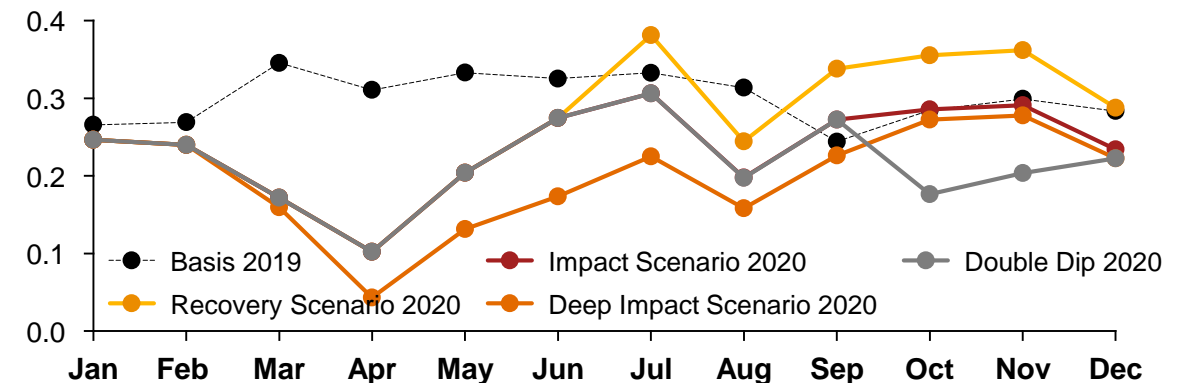
A general curfew will not be introduced in Germany for the time being. But the federal and state governments have decided to ban all contact...

N-tv, 03 April 2020
No deadline for the end of measures in sight yet

The Chancellor said in her video podcast published on Friday that she could not name an end to the measures...

PC* Sales: Risk assessment for 2020 sales

(in millions, Germany)



Scenario	Sales (in millions)	Effect	Result
2019	3,6		• Basis of comparison
Recovery	3,2	-11%	• -67% in April vs. 2019 • +25% in H2 vs. 2019
Impact	2,8	-22%	• -67% in April vs. 2019 • Recovery in the second HY
Deep Impact	2,3	-34%	• -86% in April vs. 2019 • 2nd half year -14% like 2008/09
Double Dip	2,6	-27%	• -67% in April vs. 2019 • -38% in October vs. 2019

Production Europe: Vehicle production will be affected in the longer term by disruption of value chains

Key assumptions:

- European **production** largely shut down from mid-March, resumption of production varies according to scenario
- Restrictions in production due to **delivery difficulties of suppliers**, especially from Asia, into the 2nd quarter

Current situation: European production showed the first effects of the corona crisis at the beginning of March in Northern Italy, quickly followed by disruptions in Bavaria (Webasto, Brose). From 16 March onwards, a synchronized shutdown of vehicle production in Western Europe set in, correspondingly also at Tier 1 suppliers. Suppliers at other levels do not have sufficient market power to enforce closures and are faced with unchanged high costs.

Effects:

Short-term: Based on available information, we expect production to fall by about 35% in March compared to 2019, and to literally be at a complete standstill at the beginning of April.

Medium-term: Due to dramatic pandemic effects, Italy decreed the closure of all factories on 22 March after FCA had already stopped vehicle production, as well as in **Spain**.

UK: Delayed policy measures (such as school closures) lead to a delayed but all the stronger impact on production and logistics.

News, 17 March 2020

Volkswagen stops production

Due to the coronavirus, Volkswagen is closing plants in Spain, Portugal, Italy and Slovakia for 2 weeks, starting on 20.03.20....

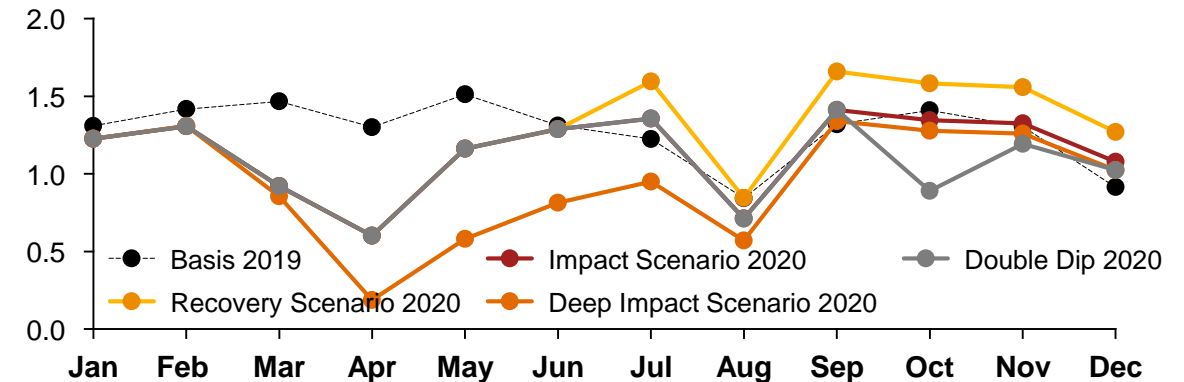
ManagerMagazine, 16 March 2020

FCA closes 8 plants in Europe

FCA is closing most of its production in Europe due to the impact of the pandemic. This affects 6 plants in Italy alone ...

PC* Production: Risk assessment for production 2020

(in millions, Western and Central Europe including UK)



Scenario	Production (in millions)	Effect	Result
2019	15,3		• Basis of comparison
Recovery	15,0	-2%	• -54% in April vs. 2019 • +25% in H2 vs. 2019
Impact	13,7	-10%	• -54% in April vs. 2019 • Recovery in the second HY
Deep Impact	11,3	-26%	• -86% in April vs. 2019 • -5% in the 2nd HY vs. 2019
Double Dip	13,0	-15%	• -54% in April vs. 2019 • -37% in October vs. 2019

*PC: Passenger Cars = Car

Focus on USA: OEMs have anticipated the political containment measures by closing factories earlier

Key assumptions:

- **Demand** is affected to varying degrees by state-level measures and escalating unemployment
- Bottlenecks in **production** due to failures and closures of suppliers and logistics chains from Mexico and South Asia/ China

Current situation: After initial hesitation, the US government put massive restrictions on public life into effect at the end of March and initially set a deadline of 30 April. The implementation of the measures at state level is varied and inconsistent, and is additionally overlaid by election campaign maneuvers.

Effects:

Demand: After initial slumps in California and New England (New York, Boston), vehicle retail has now largely come to a standstill. The sharp rise in unemployment - together with a collapse of stock markets - is further dampening purchasing power.

Production: While global car manufacturers shut down their US plants partially in line with global strategies (Hyundai, Volkswagen, Daimler, BMW), the US manufacturers initially tried to implement short closures only until the end of March. In the meantime, we don't expect a restart before May (Deep Impact Scenario), so that a catch-up process lasting several years is to be expected, as seen 2008/09

ARD, 01 April 2020

Setback in the US auto market

Devastating consequences of the corona pandemic for the business of manufacturers. Mazda and Mitsubishi suffered losses of 42% and 52% respectively in March (US market) ...

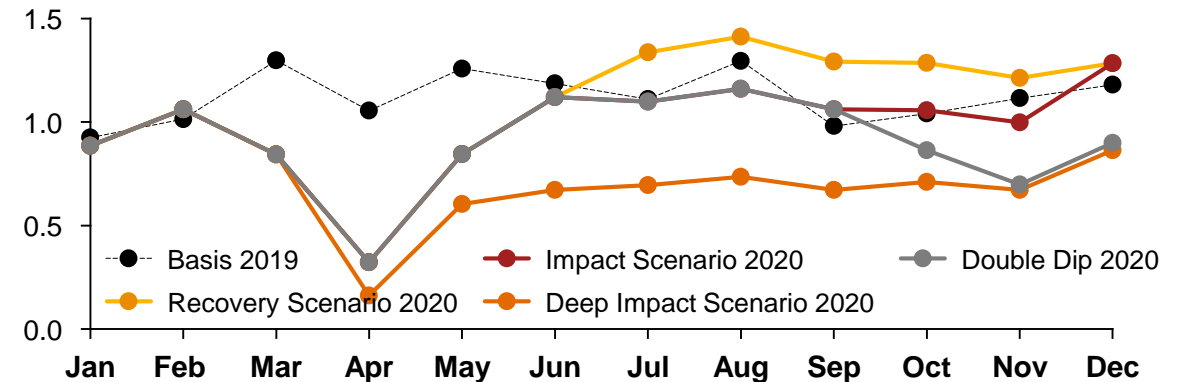
NTV, 01 April 2020

US market: VW suffers

March: Sales in the USA slumped by 42% for Volkswagen. The focus is now on the greatest possible stability for customers, employees ...

PC* Sales: Risk assessment for 2020 sales

(in millions, USA)



Scenario	Sales (in millions)	Effect	Result
2019	13,4		• Basis of comparison
Recovery	12,9	-4%	• -69% in April vs. 2019 • Up to +25% in H2 vs. 2019
Impact	11,7	-13%	• 1st half-year like Recovery • Recovery in the second HY
Deep Impact	8,5	-36%	• -85% in April vs. 2019 • 2nd half year -20% like 2008/09
Double Dip	10,8	-19%	• -69% in April vs. 2019 • -17% in October vs. 2019

*PC: Passenger Cars = Car

Focus on China: Demand shows surprising resilience while production resumes in all OEM and supplier plants

Key assumptions:

- **Demand** is returning rapidly even before the expiry of local restrictions and continues to be politically supported
- Continued measures in **production** reduce capacity utilisation, but are to be phased out quickly

Current situation: After the almost complete loss of demand in February, car retailers quickly switched to online processes and were able to continue to meet part of the demand. Outside of Hubei/ Wuhan, production has restarted in all plants, both at OEMs and suppliers.

Effects:

Demand: The pent-up demand for new and replacement vehicles is already high as a result of the 2008/ 2019 downturn, and will be further supported by the reduction of registration restrictions and the extension of NEV subsidies. However, the reduction of VAT on used cars may have a reverse effect on new vehicle sales.

Production: The release of the supplier and manufacturer plants allows a rapid start of production; however, JV plants of foreign brands still suffer in part from a lack of supply from international suppliers. A return to planned volumes is foreseeable (scenario Impact/ Recovery), if no second wave of infection occurs (scenario Double Dip).

Bloomberg, 04 March 2020
China Car Sales Drop 80%

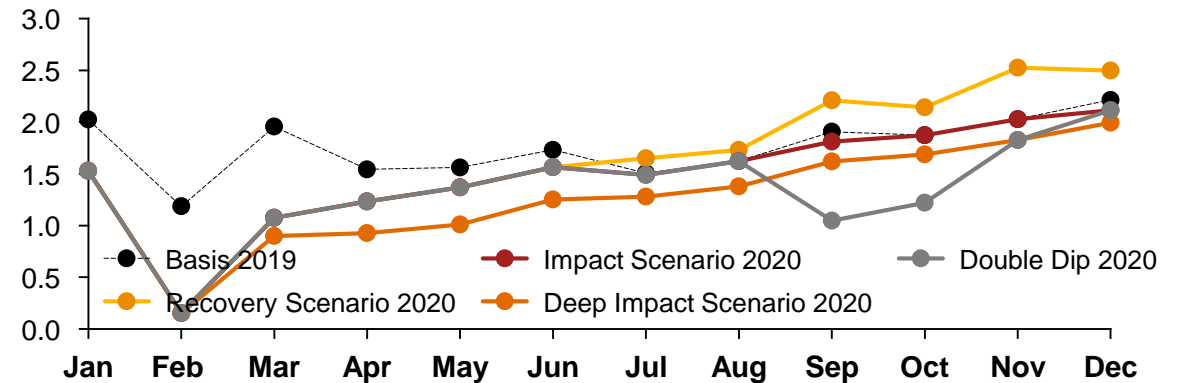
China's car sales had the biggest monthly plunge on record as the coronavirus kept shoppers away...

China Daily, 05 April, 2020
China to invigorate car market

A State Council...decided to extend subsidies and tax exemptions for new energy vehicle purchases by another two years ...

PC* Sales: Risk assessment for 2020 sales

(in millions, China)



Scenario	Sales (in millions)	Effect	Result
2019	21,1		• Basis of comparison
Recovery	19,6	-7%	• -10% in May vs. 2019 • +25% in H2 vs. 2019
Impact	17,8	-16%	• -20% in April vs. 2019 • Recovery in the second HY
Deep Impact	15,5	-27%	• -40% in April vs. 2019 • 2nd half year -14% like 2008/09
Double Dip	16,2	-23%	• -20% in April vs. 2019 • -35% in October vs. 2019

*PC: Passenger Cars = Car

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Version control

Version	Date	Editor	Changes
0.0	20.03.2020	C. Stürmer	Annex
1.0	23.03.2020	C. Stürmer	Presentation
2.0	25.03.2020	C. Stürmer	Adaptation of documentation, premises and results
			Impact scenario: -111 k production in EU countries, correction ROW; global sales -14.5% instead of -11.5%
			Scenario Recovery: -111 k Production in EU countries, reduction 2nd HY; Global A. -4.4% instead of -3.4%
			Scenario Deep Impact: - 283k in Mar 20, - 2.2 Mio in H2; Global A. -27.4% instead of - 22.4%
			Scenario Double Dip: New scenario like Impact + 2nd wave infection with measures in Oct/ Nov 2020
2.1	27.03.2020	C. Stürmer	Formatting
3.0	06.04.2020	C. Stürmer	Corrections, contacts and annex; 2019 Global Sales 75 mln instead of 74 mln due to update Rest-of-NA
			Inclusion of actual values for March (no significant changes)
			Scenario Impact: global -12.4% instead of -14.5% due to rapid recovery in China
			Scenario Deep Impact: global -28.9% instead of -27.6% due to H2 analogous to financial crisis 2008/ 2009
3.1	08.04.	C. Stürmer	Added Q1 overview slide
			Slide 4: Consolidation leads to global over- instead of undersupply

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