

The background of the slide is an aerial photograph of a shipping yard, showing rows of stacked shipping containers in various colors. A decorative graphic of teal and green squares and circles is overlaid on the left side, extending diagonally across the image.

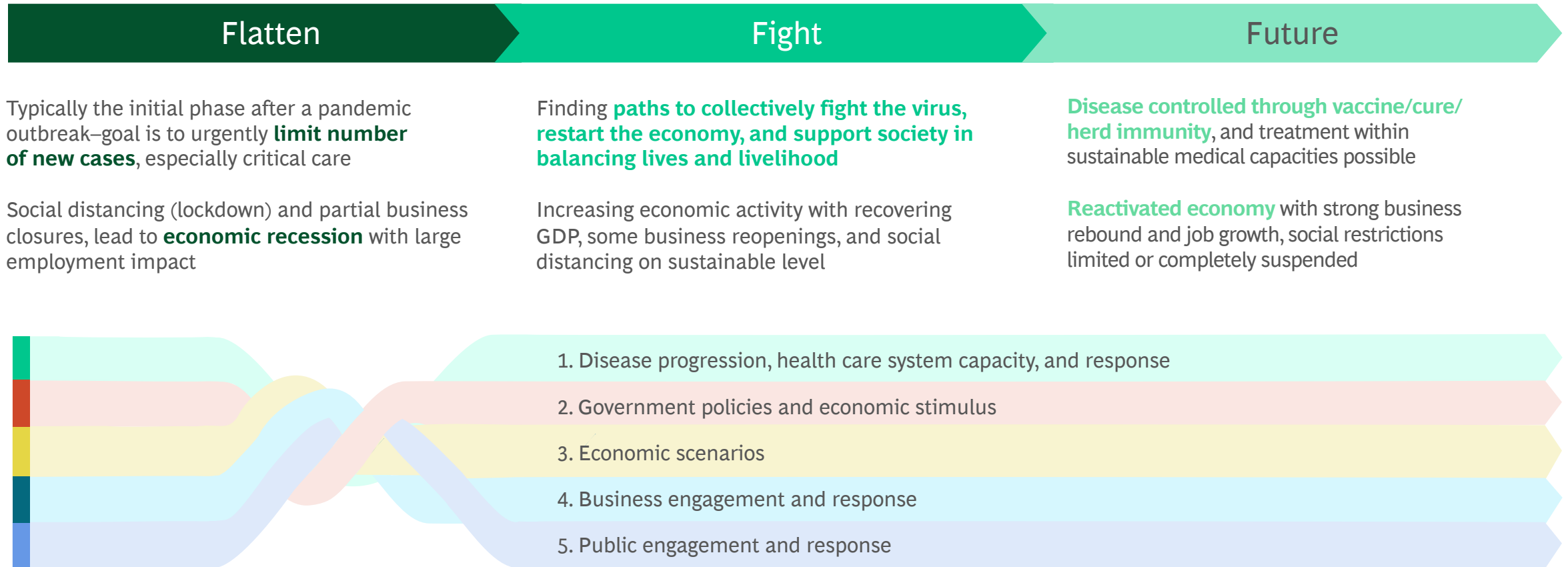
COVID-19 BCG Perspectives

Facts, scenarios, and actions for leaders

Future of Global Trade and Supply Chains

9 June 2020

COVID-19 will be a journey with three distinct phases, requiring an integrated perspective



All of the above five factors result in specific economic and social outcomes in each phase

COVID-19 BCG Perspectives

Objectives of this document

COVID-19 is a global societal crisis

We at BCG believe that the COVID-19 outbreak is first and foremost a societal crisis, threatening lives and the wellbeing of our global community. Society now, more than ever, needs to collaborate to protect people's lives and health, manage mid-term implications, and search for lasting solutions.

Leaders need to drive an integrated response to navigate the crisis

It is the duty of health, political, societal, and business leaders to navigate through this crisis. A complex interplay of epidemic progression, medical response, government action, sector impact, and company action is playing out. This document intends to help leaders find answers and shape opinions to navigate the crisis in their own environments. It encourages thinking across the multiple time horizons over which we see the crisis manifesting itself.

Executive Summary | COVID-19 BCG Perspectives

COVID-19 accelerates ongoing global trade shifts; strengthening supply chain resilience is critical in the new reality

- While global trade grew to a record value of \$18 trillion in 2019, COVID-19 is likely to negatively impact future trade
- Total trade volume may potentially recover to pre-COVID level only by 2023; however, with substantial shift in volumes across corridors
- Companies should act to improve supply chain resilience; drive end-to-end visibility, streamline complexity, and implement shock absorbers
- It is also critical to evaluate supply chain tradeoffs to rebalance priorities; secure access to resources, respond to demand shifts, and improve sustainability
- Many companies are already starting to adapt supply chains; global, migrated, and regionalized designs have emerged as distinct models

Across countries, efforts to flatten curve and ramp-up testing continue; equity markets and industry sectors show signs of recovery

- Globally, 2.8 million patients have recovered from COVID-19, but growth rate of daily new cases has increased to ~2%¹
- Global increase in daily new cases is propelled by South America, Asia, and Africa, while Europe and North America continue to improve
- Vaccine and therapeutics development continues to move at unprecedented pace; nine vaccine candidates in phases I, II & III
- Rebound of global GDP is not expected before 2021; but global equity markets recover rapidly and all sectors show positive TSR² trend
- 20-45%+ of employees in major economies continue to be affected; but US report strong decrease in unemployment insurance claims

We believe during this crisis leaders need to think along two dimensions:

Taking an integrated perspective on health/medical progression, governmental responses, societal reactions, and economic implications to understand business/sector impacts

Thinking multi-timescale in a Flatten-Fight-Future logic

1. Daily new case growth rate is calculated basis 7 day rolling average; daily case growth rate is 2.2% as of 05 June and was 0.9% as of 29 May; 2. Total Shareholder Return Source: BCG

An aerial photograph of a port area, showing numerous shipping containers and industrial structures. A diagonal band of green and blue squares and circles runs across the image from the top-left to the bottom-right. In the bottom-left corner, there are several green circles of varying sizes and some thin white lines, resembling a network or data visualization.

Guide for leaders

Macro view on future of trade

Building resilience in supply chains

Updated analyses and impact

Epidemic progression and virus monitoring

Economic and business impact

COVID-19 Impact dashboard

As of 05 June 2020

Epidemic Progression

6.8M

of cases

2.8M

of recoveries

396K

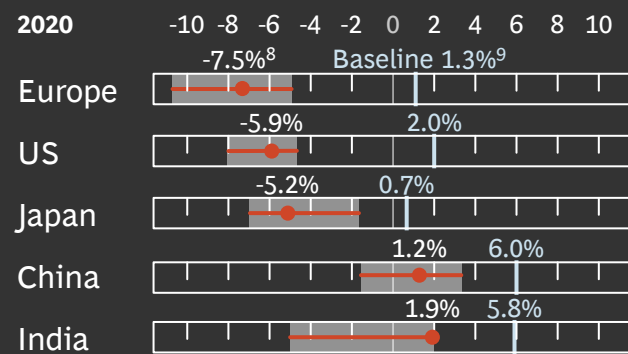
of fatalities

	22 May	29 May	5 June
Growth rate ¹ of daily new cases	1.5%	0.9%	2.2%
# of days of case doubling ²	35	37	36
# of reported recoveries as % of total cases	39%	42%	41%
# of tests / case ³	15	17	18
# of tests / million ³	34K	44K	48K

	Vaccine	Treatment
Trials in pre-clinical stage and beyond ⁴	159	126
Trials in Phase 1 and beyond ⁵	9	53
Current estimated timeline for approval and scale-up	6-33 months ⁶	6-21 months ⁷

Economic Impact

GDP forecasts [%]



Estimated employment impact⁹

	Total employment 2019 (M)	Employees impacted ¹⁰ (M)	% of employees impacted
US	159	43	27%
UK	33	10	29%
Germany	45	12	26%
France	28	13	47%
Italy	23	8	35%
Spain	20	4	22%

Business Impact

Stock market performance¹¹

Index	20 Mar vs 21 Feb	05 June vs 21 Feb
S&P500	-31%	-4%
NASDAQ	-28%	2%
FTSE100	-30%	-12%
DAX	-34%	-5%
CHN SSE	-10%	-4%

Total Shareholder Returns¹¹

First column: 21 Feb to 20 Mar; Second column: 21 Feb to 05 June

	Americas		Europe		Asia	
Pharma	-19%	2%	-20%	-4%	-22%	9%
F&B ¹²	-26%	-9%	-24%	-11%	-12%	0%
Telecom	-17%	-6%	-20%	-14%	-14%	-7%
Software	-30%	-3%	-32%	-9%	-28%	-7%
Retailing	-42%	-7%	-36%	-10%	-24%	10%
Capital goods	-38%	-7%	-35%	-11%	-29%	-2%
Auto	-47%	-7%	-45%	-9%	-32%	-7%
Real Estate	-42%	-22%	-26%	-20%	-22%	-10%
Energy	-56%	-23%	-45%	-20%	-41%	-22%
Banks	-41%	-19%	-44%	-28%	-26%	-9%

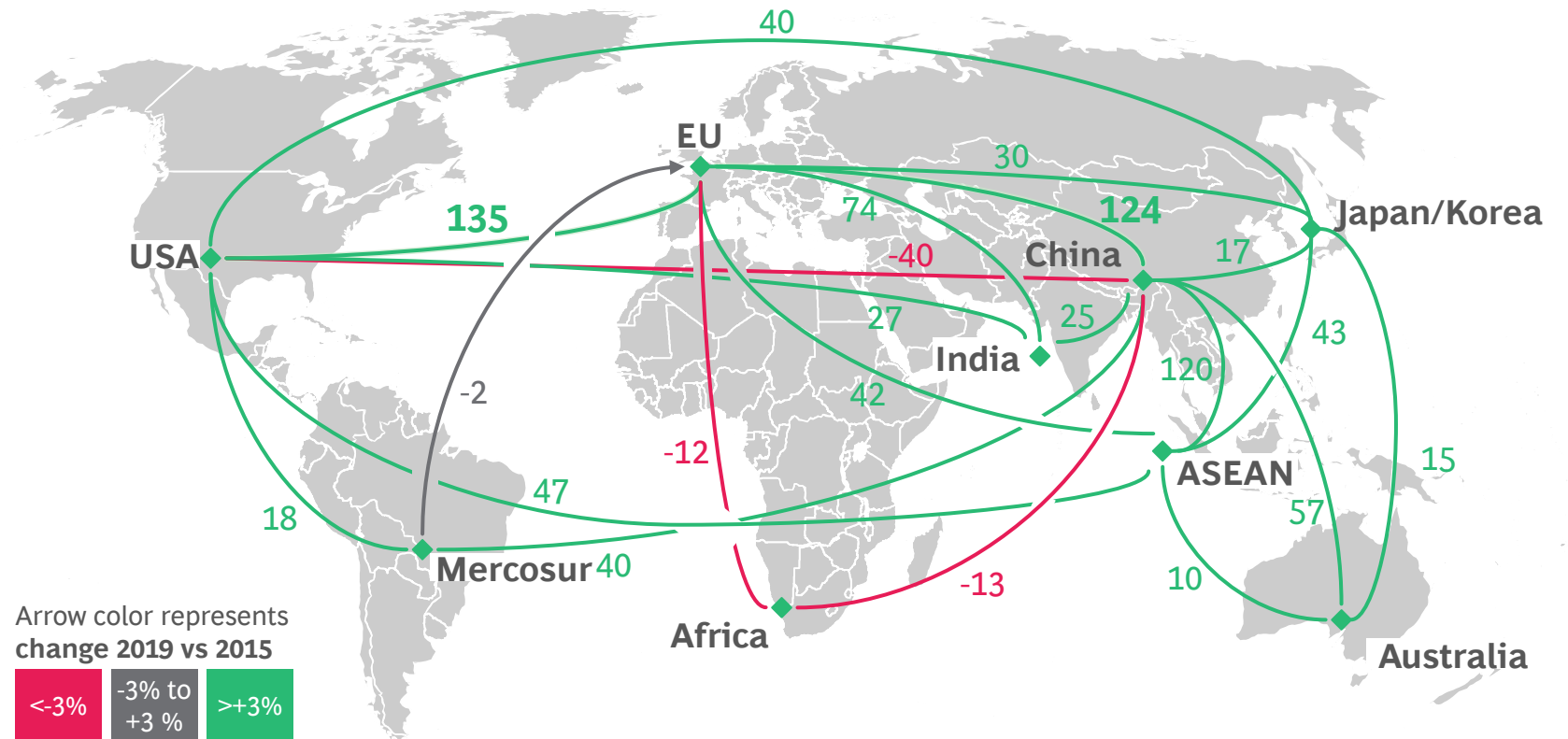
1. Growth rate calculated basis rolling 7 day rolling average of new cases; 2. No. of doubling days based on 7 day average growth rate of total cases; 3. Median of values for top 15 countries by nominal GDP (except China); 4. Ongoing trials including pre-clinical, Phase 1 (first trial in humans), Phase 2, Phase 3, Phase 4; 5. Ongoing trials including Phase 1 (first trial in humans), Phase 2, Phase 3, Phase 4; 6. 6 month development current "best case" (9 months since Apr 2020), then likely to require time to scale across population; 7. Remdesivir is approved now, could be more widely available by Jul-Sep 2020. For the next wave, estimated timeline is Oct '20 – April '22 (6-21 months). If first round of drugs being tested succeeds – then 6-9 months; if not – substantially longer; 8. For India, forecast is for financial year; for others, it is for calendar year; IMF April 2020 forecast; YoY forecasts; Range from forecasts (where available) of International Monetary Fund, JP Morgan Chase, Goldman Sachs, Morgan Stanley, Bank of America; Fitch Solutions; Credit Suisse; Danske Bank; ING Group; HSBC; As of reports dated 12 April 2020 to 5 June 2020; 9. IMF January 2020 forecast; 10. Available data as of 05 June 2020; Includes increase in unemployment and employees covered by government's wage support programs; numbers are cumulative from mid of March 2020; US: unemployment insurance claims; UK: unemployment and inactive people, Data only available from end of March; Germany: short-time work requests, not actual used short-term work; Italy: unemployment and inactive people; figures are changing rapidly and often being reported with a lag from the current date; 11. Performance is tracked for two periods, first from 21 February 2020 (before international acceleration of outbreak) to 20 March 2020 (trough of the market) and from 21 February 2020 through 05 June 2020; 12. Food & Beverage. Source: WHO, World Bank, JHU CSSE, Our World in Data, IMF, Bloomberg, BCG, Eurostat (Europe), Gov't Wage Support & Unemployment figures & comments: UK Govt 5/12 (UK), ISTAT 4/30 & FitchRatings 5/18 (Italy), U.S. Department of Labor 5/21 (US), Ministerio de Trabajo 6/2 (Spain), Ministère du Travail 6/5 (France), Arbeitsagentur 6/3 (Germany)

Pre-COVID-19, global trade grew, sustaining a record \$18 trillion in value



Change in value of global trade of goods from 2015 to 2019 (Major corridors, \$B)

Data on map represent ~30% of global trade; Not shown: Intra EU=~20%, NAFTA=~8%, China/Hong Kong=4%, ASEAN=3%, RoW=~35%



1. Compound Annual Growth Rate; Note: 2019 figure of \$18.2T followed a 2018 record figure of \$18.3T
Source: UN Comtrade, OECD, WEF, IHS, TradeAlert, BCG

US-China dynamic had already shifted import sources in 2019

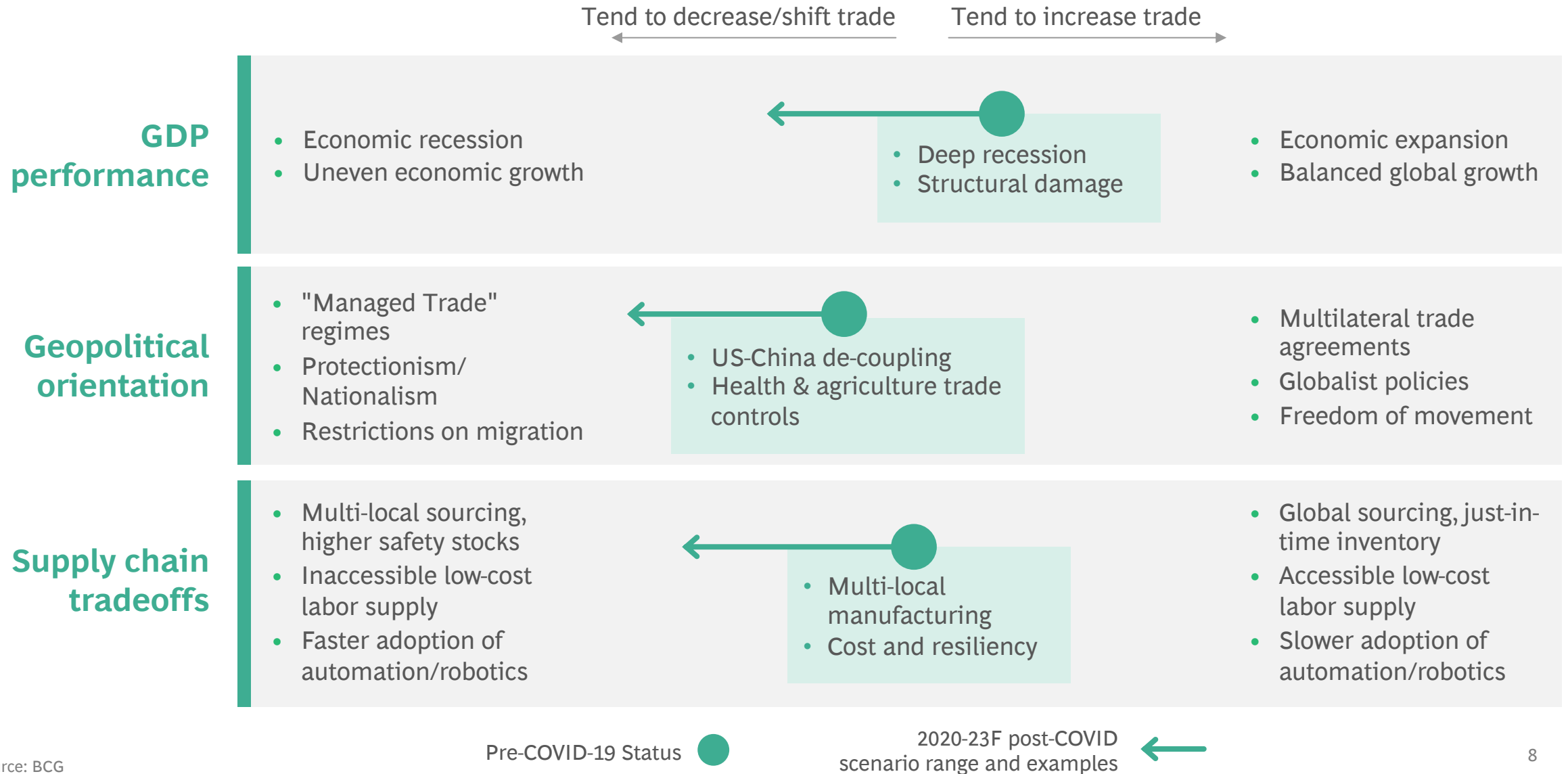
US Example

% change in goods imports ('18-'19)		ASEAN	India	China	JP/KR ¹	EU	Mexico	Brazil	Turkey	RoW ³	World
Health Care	Biopharma	-19%	19%	-14%	10%	17%	-6%	-7%	1%	2%	10%
	MedTech	23%	9%	-2%	-2%	5%	11%	31%	-13%	5%	6%
Consumer Goods	Consumer Durables	33%	10%	-19%	6%	3%	1%	26%	1%	5%	-4%
	Fashion & Luxury	12%	5%	-11%	2%	3%	-6%	-3%	8%	5%	0%
	Packaged Food	6%	15%	-36%	11%	6%	10%	-8%	13%	4%	4%
Tech, Media & Telco	Consumer Electronics	24%	100% ²	-13%	-25%	9%	14%	108% ²	138% ²	15%	-8%
	Equip. & Data Center Solutions	-2%	-12%	-31%	-19%	-2%	-4%	23%	-45%	69%	-13%
	Semiconductor & Materials	14%	36%	-53%	-3%	-7%	-14%	-41%	33%	-3%	0%
Energy	Energy	-40%	18%	-68%	34%	3%	-19%	-2%	10%	-14%	-13%
Industrial Goods	Aerospace	-14%	39%	-9%	3%	18%	21%	31%	21%	12%	13%
	Agribusiness	-8%	0%	-23%	9%	3%	10%	6%	-13%	1%	1%
	Automotive - Components	24%	1%	-17%	1%	-1%	2%	-4%	10%	0%	-2%
	Automotive - Vehicles	12%	4%	-19%	1%	-2%	11%	-36%	-12%	1%	3%
	Chemicals	11%	10%	-16%	4%	-1%	5%	0%	7%	-7%	-4%
	Electrical machinery	10%	21%	-18%	1%	3%	7%	14%	11%	7%	-3%
	Mechanical machinery	13%	6%	-37%	3%	2%	5%	9%	22%	10%	-7%
	Metals	2%	-1%	-15%	-1%	-4%	-2%	-12%	-31%	-8%	-7%
	Mining	-38%	5%	-22%	10%	-27%	30%	16%	-2%	2%	2%
	Non-metal building materials	45%	38%	-29%	6%	0%	6%	3%	21%	0%	-4%

% change < -20% -2% to -20% -2% to +2% +2% to +20% > +20%

1. Japan, South Korea 2. Growing from a very low base in 2018; 3. Rest of World
Source: IHS Markit Global Trade Atlas Global Trade Atlas; BCG & GTI Team analysis

COVID-19 is accelerating previous trends toward more restrictive trade



Responding to COVID-19, governments are rolling out measures to protect domestic industries, localize supply chains, and attract private investment flows

As of 05 June 2020



Trump says US will start buying dairy, meat and produce from farmers amid supply chain disruptions



Under an 'America First' president, will the U.S. corner the market on Covid-19 vaccine?



"Cabinet approves Rs 40,995 crore production linked incentive manufacturing scheme to make India electronic manufacturing hub"



China Asks Banks to Boost Manufacturing Loans: Securities News



Germany would like to localize supply chains, nationalization possible, minister says



Coronavirus forces EU leaders to weigh nationalization options



US should have a 'couple hundred million' doses of a Covid-19 vaccine by the start of 2021, Fauci says



S. Korea seeks to ease factory regulations for more reshoring

Total trade can potentially recover to previous level by 2023; however, with substantial shift in trade volumes across corridors

Projected global trade

Value in 2023

\$21T

Optimistic case

\$18T

Base case
≈2019 global trade

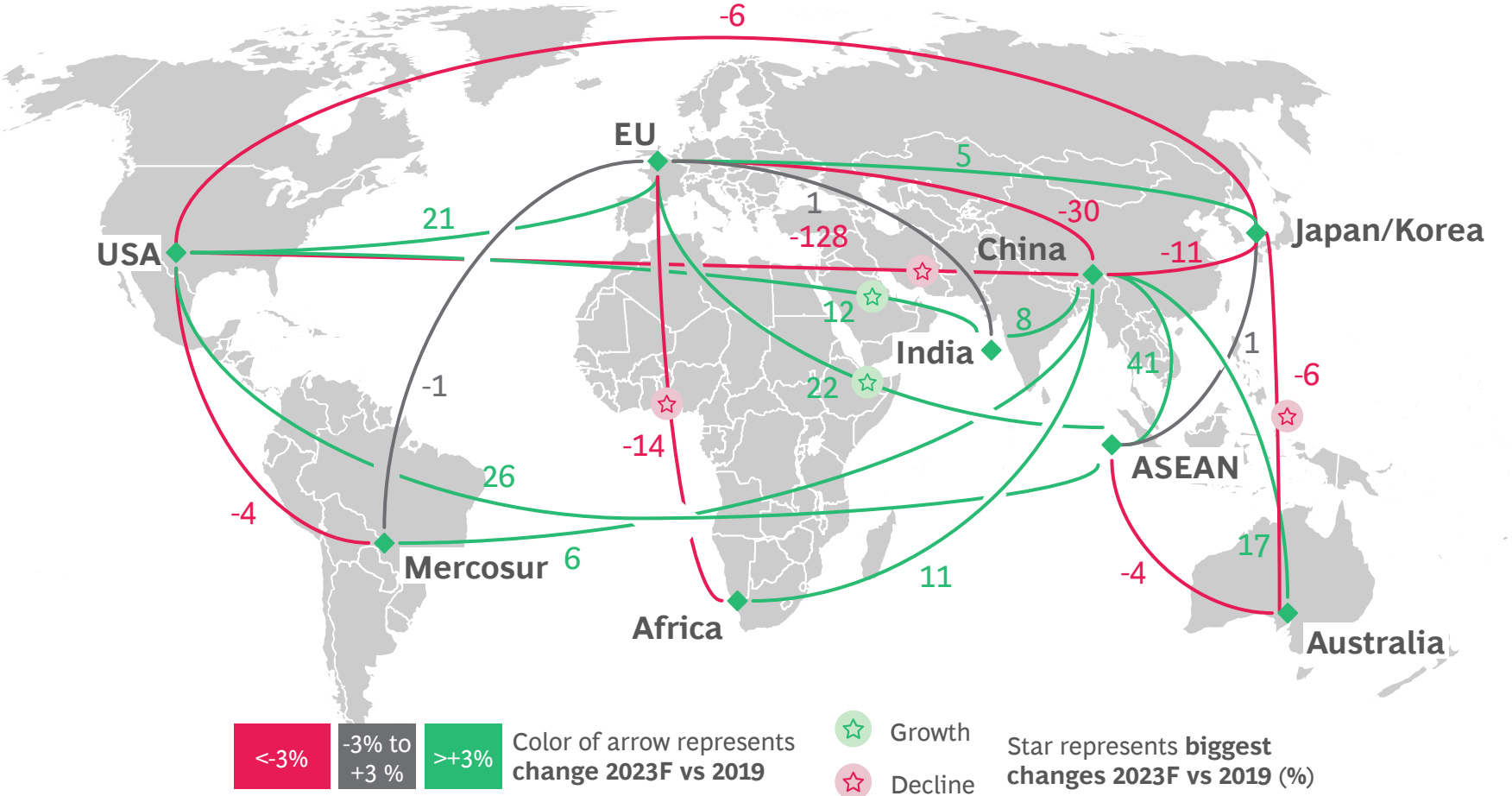
\$13T

Pessimistic case



Base case scenario: Change in value of trade of goods, 2023 vs 2019 (Major corridors, \$B)

Data in map represent ~32% of global trade. Not shown: Intra EU≈20%; NAFTA≈8%; China/Hong Kong=4%; ASEAN=3%, RoW≈32%



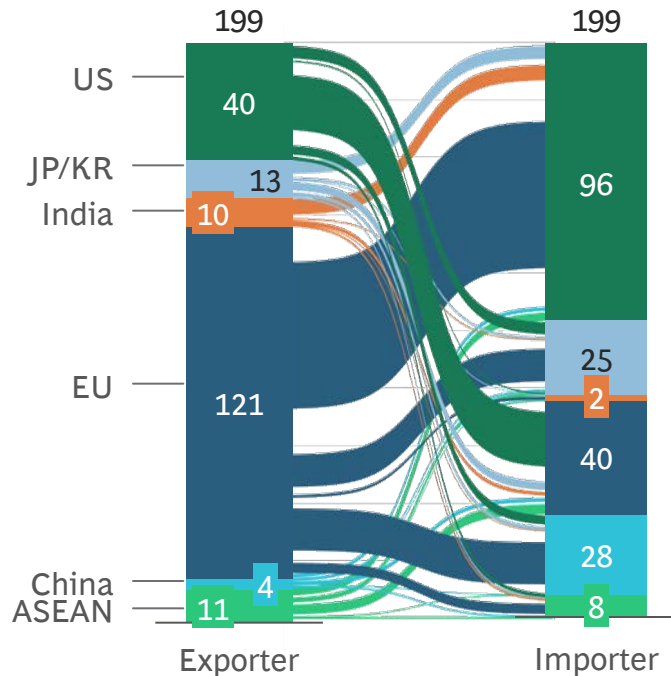
Sector impact example | Future biopharma supply chain may change given government mandates and impetus for diversification

Illustrative

Today – highly globalized

Future – depends on product type and local government actions

Example Pharmaceuticals | Trade
Import/Export Selected trade routes¹, \$B 2019



Potential impact

Essential biopharma²

- Local/regional sourcing of excipients, API
- Increase in drug products inventory “close to customer”
- Addition of local/regional sites for key drug products
- Capacity expansion/ optimization of existing facilities
- Improvement of forecasting and visibility

Influencing factors

Government mandates³ or incentives to ensure access to essential medications

Non-essential biopharma⁴

- Multi-sourcing of inputs; geographical diversification
- Increase inventory of both WIP and finished goods
- Backup or parallel mfg. sites in case of disruptions
- Expansion of regional warehouse and distributor networks
- Improvement of forecasting and visibility

High impetus to change in order to protect high-margin products, but changes long and difficult

1. Figures represent trade volumes between selected geographies only, and exclude API 2. Vaccines, antibiotics, anti-virals, etc. 3. Essential-biopharma supply chain highly dependent on occurrence and nature of government policies; reality of supply chain design highly dependent on details of country-specific regulation and may not resemble the example shown 4. Wide range of products w/o national security implications

Companies should take immediate actions to increase current supply chain resilience, and evaluate design tradeoffs to rebalance priorities in the new reality

Flatten

Actively drive workforce safety

Develop stop-gap measures for continuity

Perform scenario stress tests around demand, supply issues

Fight & Future

A

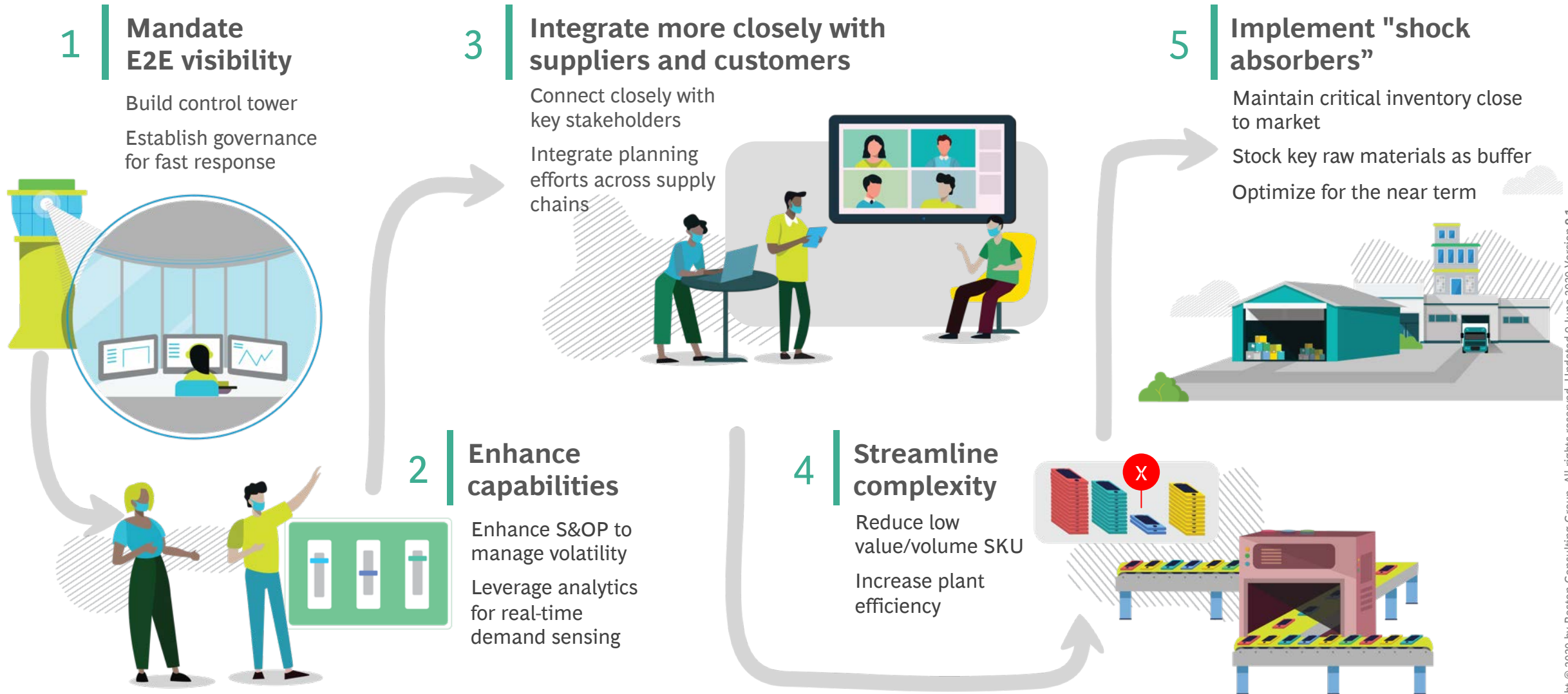
Take immediate actions to increase current supply chain resilience

- Mandate **end-to-end visibility** through control tower
- Enhance **capabilities** of Sales & Operations Planning through analytics
- Integrate more closely with **suppliers and customers**
- Streamline **complexity**
- Implement "**shock**" absorbers (e.g., inventory)

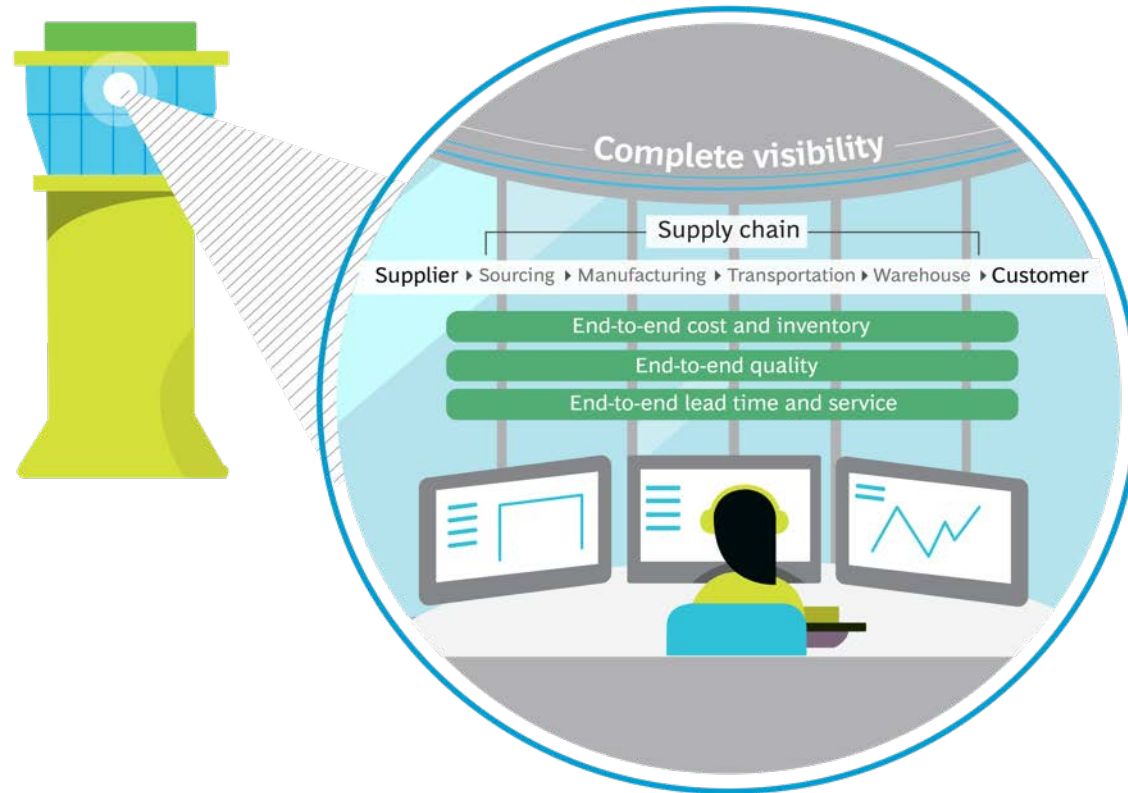
B

Evaluate supply chain design tradeoffs to rebalance priorities

- Ensure **resilience** to future disruptions
- Secure **access** to resources and markets
- Drive **cost efficiency**
- Respond to demand shifts and revised **service requirements**
- Double-down on **sustainability efforts**



A central control tower can aid complete end-to-end visibility of the supply chain, and supplement informed decisions



Build a central "control tower" to gain visibility into end-to-end data from customer to supplier

Establish a governance structure to address immediate and midterm issues

Use newfound visibility to make more effective decisions and resolve outstanding issues

Potential value impact

8-15%

Service improvement

10-15%

Savings across end-to-end supply chain and cost of quality

5-20%

Working capital improvement

Digital twin can help simulate scenarios, and model supply chain performance to manage demand and supply volatilities

Illustrative

What it is

Virtual replica to simulate SC performance

- Model multiple configurations to manage volatility of demand and supply

Probability-based view of future flows

- Scenario creation for different demand patterns and order-book

Value add

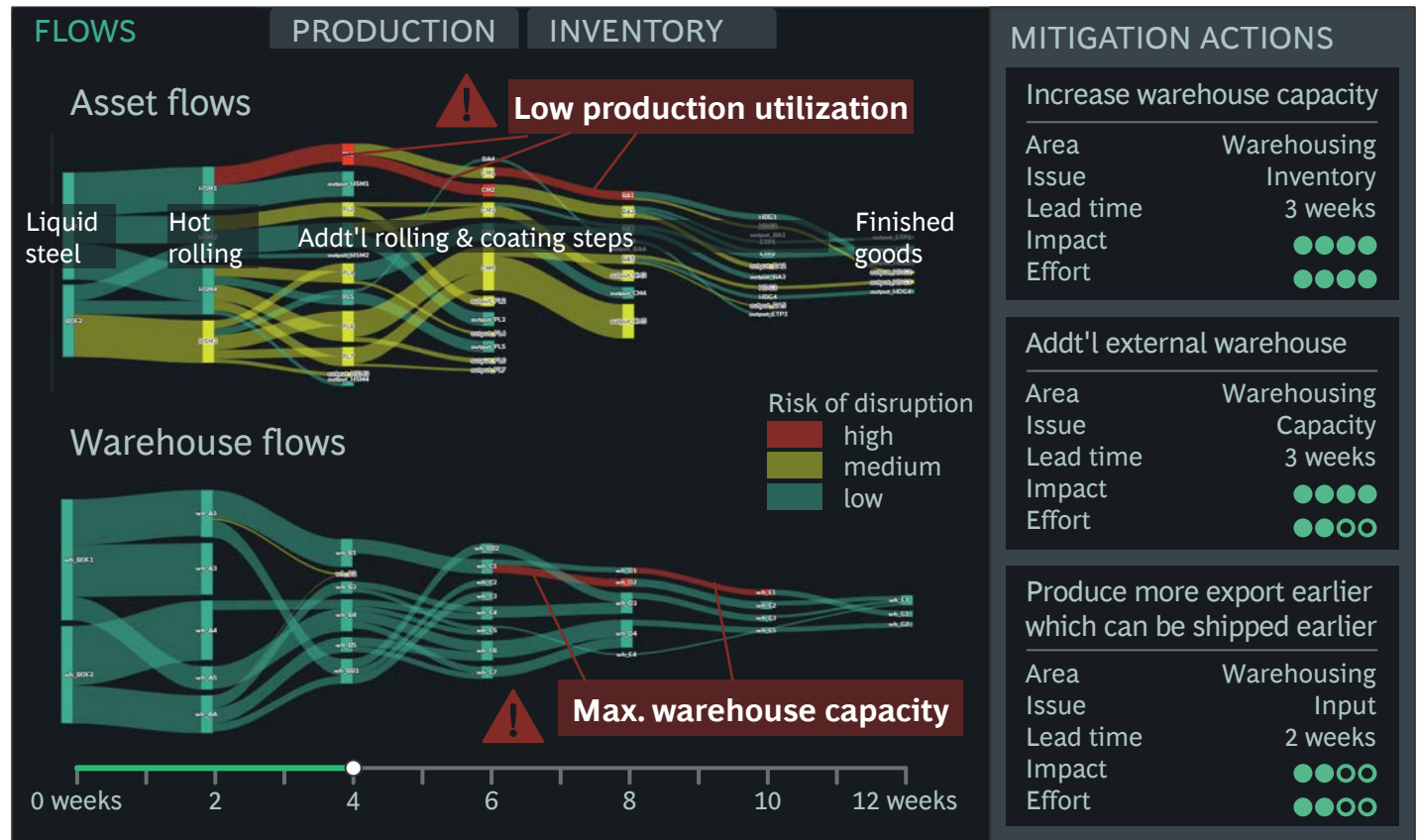
Dynamic reconfiguration of flows

- Optimize manning/warehousing/logistic cost
- Improve service levels and inventory
- Reconfigure demand mix and allocation



Example - European steel production company

Risk of warehouse capacity limiting production utilization identified four weeks in advance



Companies are leveraging category and supplier intelligence to understand exposure and manage supply chain risks

As of 15 May 2020

Global metals & mining company example

Illustrative

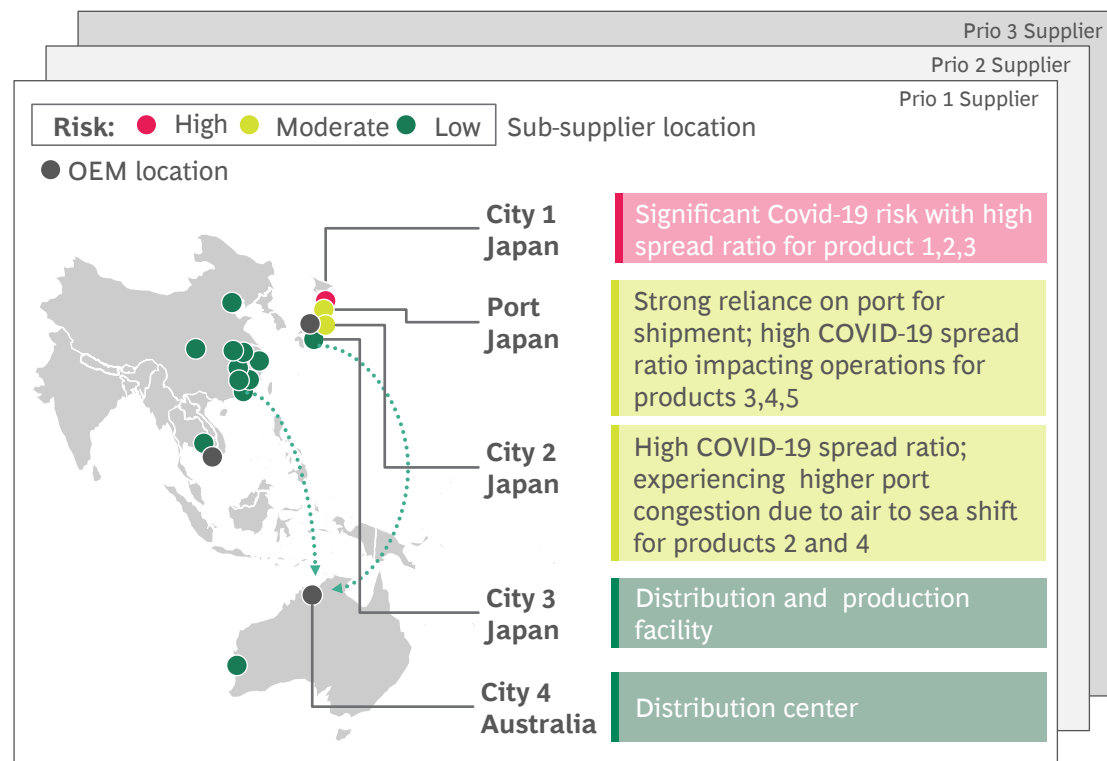
Category intelligence

Assess exposure

- Determine **focus categories** (failure criticality)
- Analyze **supply risk** of categories (origin and failure probability)
- Quantify **value at risk** (inventory, substitution, etc.)
- Prioritize **focus categories with their suppliers**

Supplier intelligence

Evaluate supply chain risk of identified supplier



Mitigation plan

- Pull forward orders of critical materials
- Change payment terms to incent priority delivery
- Increase lead times on orders and shipping
- Establish alternative vendors

Companies should holistically evaluate supply chain tradeoffs to rebalance priorities for the new reality

B

Ensure resilience to disruptions

Reduce exposure to concentration risk

Restructure supply chain for new reality

Secure access to resources & markets

Develop access to new markets, secure current access

Diversify geographic and supplier access of key resources, drive future optionality

Drive cost efficiency

Accelerate automation to achieve cost efficiency¹

Leverage changes in logistics costs and duties

Respond to demand shifts & revised service requirements

Track demand shifts; build platform for real-time customer communications

Differentiate through delivery performance

Improve sustainability

Reduce CO₂ emissions: less waste, more green tech, EH&S² integrity

Redefine offerings to optimize upstream, downstream footprint



Increased focus expected in light of COVID-19



Opportunity to redesign in sustainable manner

1. Capture factor cost differentials from scale effects, inventory levels; 2. Environment, Health & Safety
Source: BCG

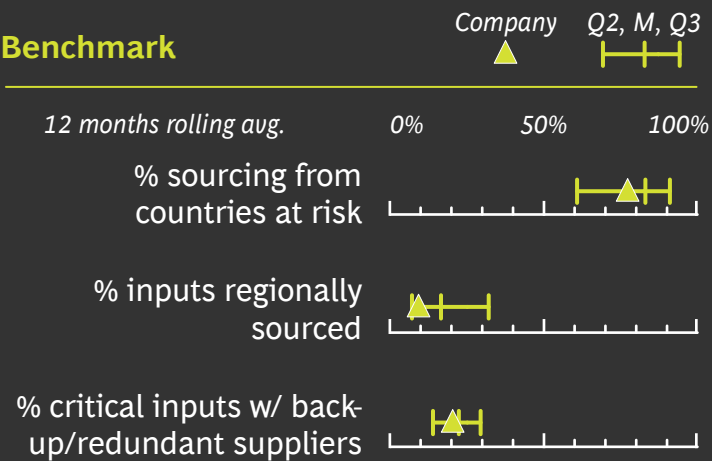
Build a resilience dashboard to guide actions across the supply chain

Specific KPIs depend on industry & value chain position

Illustrative

Source

Benchmark



Per calendar week (CW)

Avg. lead time from supplier to mfg. site

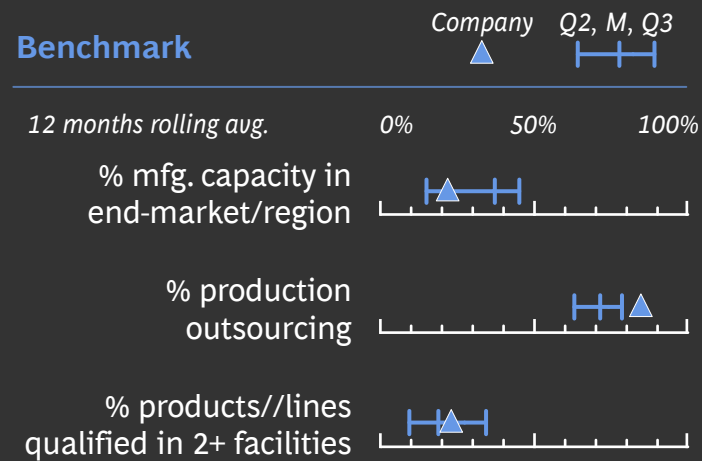


Days of inventory of key inputs (average)



Make

Benchmark



Per month

% utilization of plant network

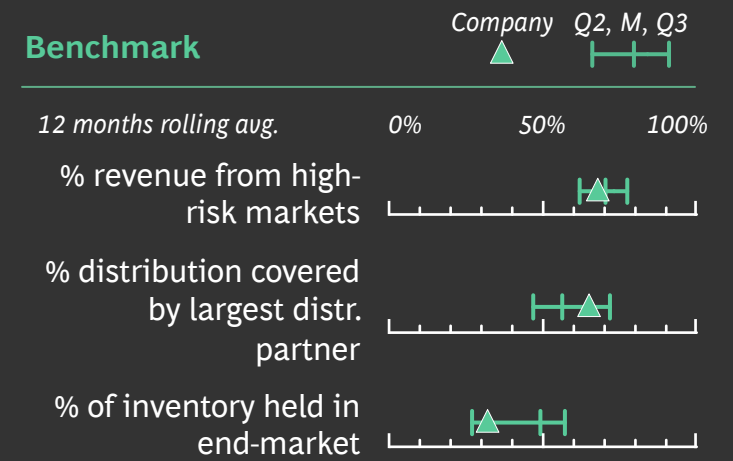


Productivity of plant employees (lvl. of autom.)



Deliver

Benchmark



Per calendar week (CW)

Avg. lead time from plant to customer



Days of inventory of final goods (average)



Increase resilience by pulling a comprehensive set of levers

Supplier ecosystem Source

- Optimize inventory of raw materials and components to increase resilience
- Reallocate supply mix between existing suppliers in alternate geographies
- Influence suppliers to shift mfg. base in alternate geographies
- Qualify new suppliers to increase diversification
- Source from new suppliers in alternate geographies



Manufacturing network Make

- Qualify backup contract manufacturers to handle disruptions
- Expand manufacturing capabilities to increase flexibility
- Resize existing plant network to increase backup capacity
- Re-shore or regionalize own manufacturing facilities footprint
- Rethink make vs. buy strategy



Channels & customers Deliver

- Optimize inventory of finished goods to increase resilience
- Add new distribution partners
- Rethink transportation modalities mix (e.g., air vs. ocean)
- Rethink distribution strategy (e.g., outsource vs. insource)
- Shift warehousing/DCs closer to end market

Speed of change depends on specific company and industry and may vary between few months and several years

Advanced Network Optimization

Illustrative

Design dimensions

Resilience

Concentration of suppliers	<40% of key components sourced from selected geographies
Supplier distance	>75% of key components with lead delivery time of 2 days to mfg. sites
Size of plant	<85% of plant network utilization given demand scenarios
Mfg. redundancy for key products	>30% of key products qualified in 2+ mfg. sites, in different geographies
Make vs. buy strategy	<15% outsourced production for selected key products
Inventory levels in end-market	>21 days of inventory of finished goods in selected sales markets

Sustainability

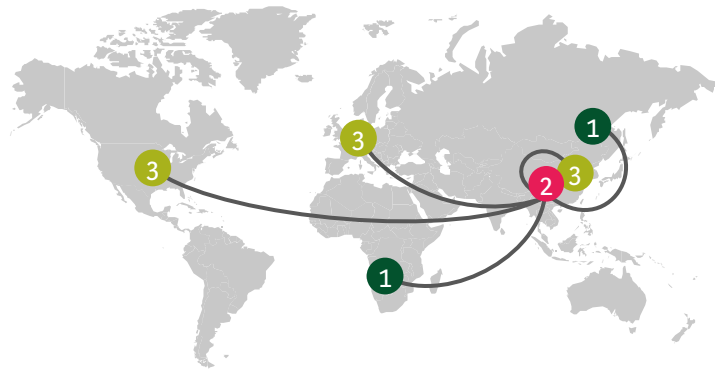
Carbon footprint	10% reduction in overall carbon footprint
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Companies already starting to adapt supply chains; three models emerge

Illustrative example for a firm traditionally manufacturing in Asia and selling globally¹

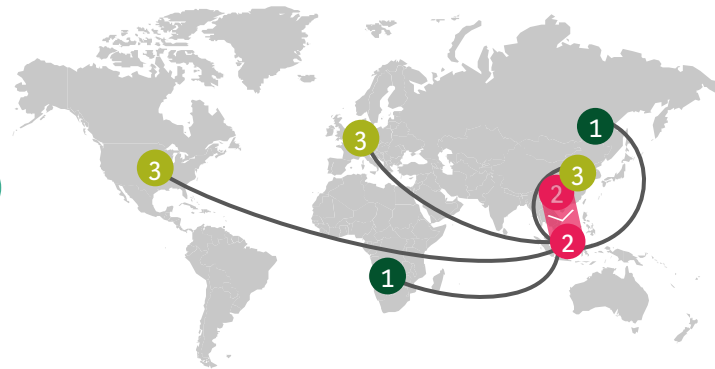
Global supply chains

Limited footprint changes due to cost and access constraints; digital enablement for agility



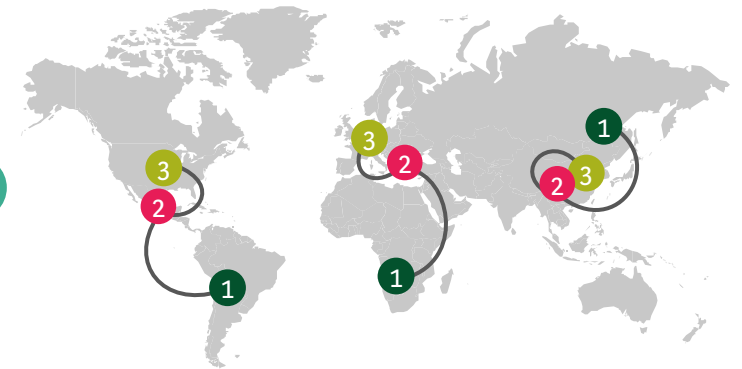
Migrated supply chains

Shift manufacturing to new location to reduce geopolitical risk exposure



Regionalized supply chains

Move closer to end-markets, due to government restrictions/ incentives



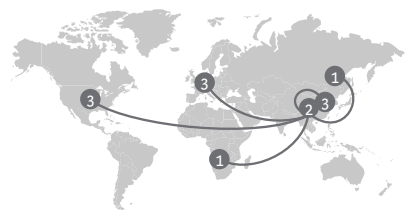
1 Sourcing 2 Manufacturing 3 Distribution

Degree of change

1. Starting point and speed of change will vary significantly between industries, i.e. some industries will start and/or finish within few months, others within the next years
Source: BCG

Outcomes will look very different across these models

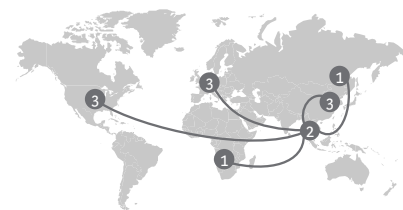
Illustrative



Global supply chains

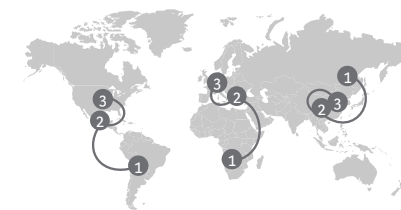
What resilience may look like

- Diversified networks
 - Back-up suppliers across geographies
 - Alternate qualified facilities
- Large automated sites (I4.0)
- E2E visibility to react quickly
- Strong risk management



Migrated supply chains

- Large-scale footprint shift
 - Rebalance supplier mix, to less exposed geographies
 - Moving manufacturing sites
- Large automated sites (I4.0)
- E2E visibility to react fast
- Trained and upskilled workforce



Regionalized supply chains

- Regional footprint including
 - Supplier mix across multiple regions
 - Manufacturing sites, incl. back-up capacity
- Cost-efficient sites (I4.0)
- E2E visibility across network
- Trained and upskilled workforce

Illustrative examples

Low-value electric motors mfg. with global SC and automated sites

Apparel manufacturer moving footprint from one Asian country to another

Biopharma firm reshoring part of drug production to the US

An aerial photograph of a port area, showing numerous shipping containers and industrial structures. A diagonal path of teal-colored squares and circles is overlaid on the image, starting from the top left and extending towards the bottom right. The path consists of a series of squares of varying sizes and shades of teal, interspersed with circles of varying sizes and shades of teal. The overall image has a dark, muted color palette.

Guide for leaders

Macro view on future of trade

Building resilience in supply chains

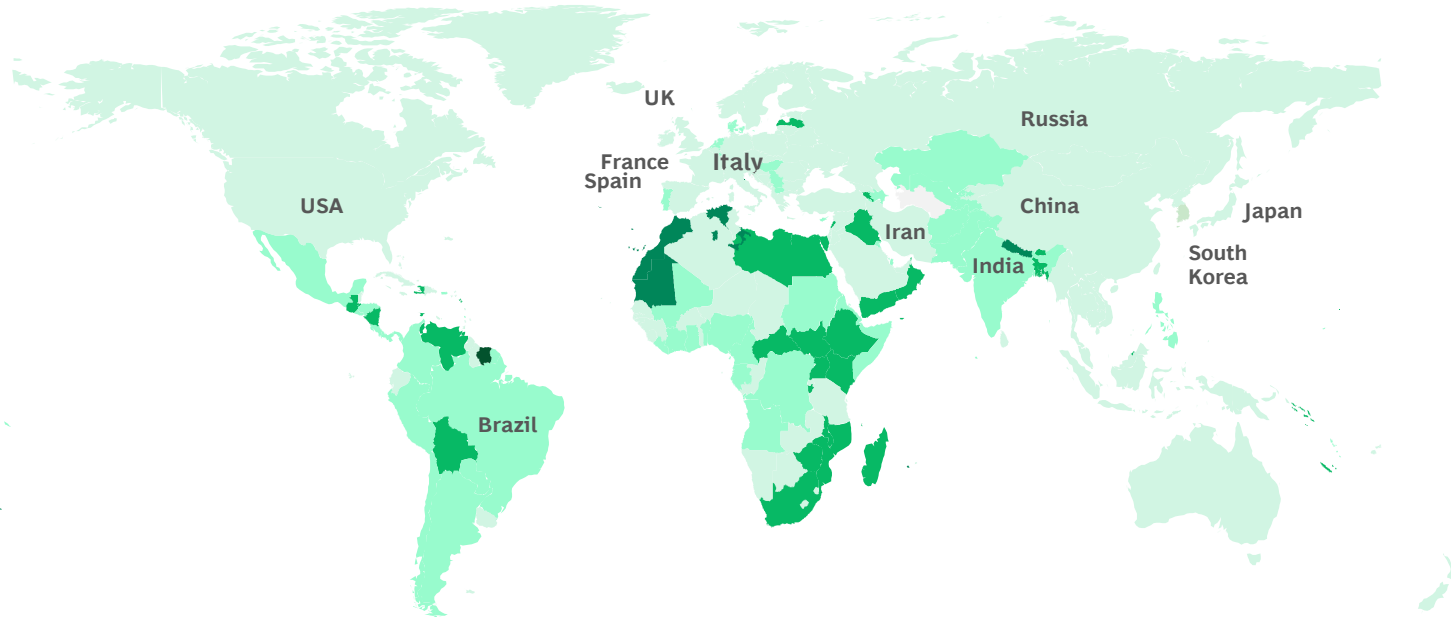
Updated analyses and impact

Epidemic progression and virus monitoring

Economic and business impact

~2.8M reported recoveries globally so far;
 growth rate of daily new cases has worsened to ~2%

As of 05 June 2020



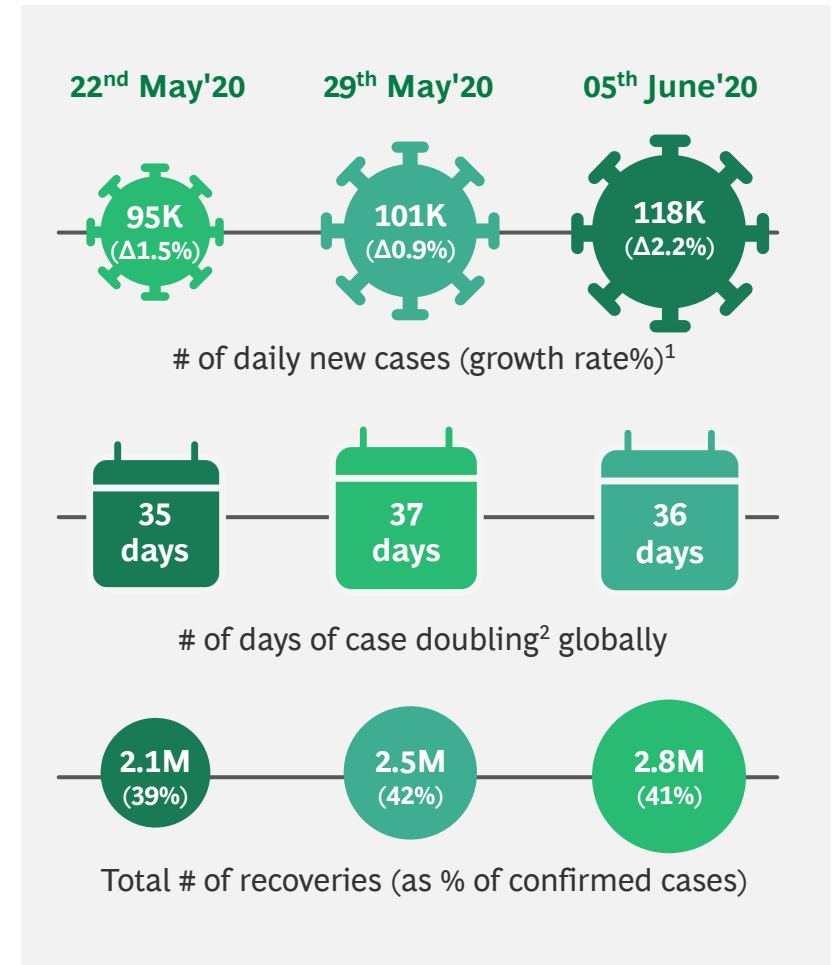
Days of doubling cases:



185
 Countries with cases³

6.8M [$\Delta 1.9\%$]⁴
 Confirmed cases globally

396k [$\Delta 1.2\%$]⁴
 Fatalities globally



Note: Continued cases and fatalities are subject to different testing, propensity, reporting standards and hence are imperfect measures

1. # of daily new cases calculated as 7-day rolling average; growth rate calculated basis 7-day average; 2. No. of doubling days calculated basis 7-day average growth rate of total cases; 3 Basis Johns Hopkins CSSE; 4. Daily growth rate basis 7-day average

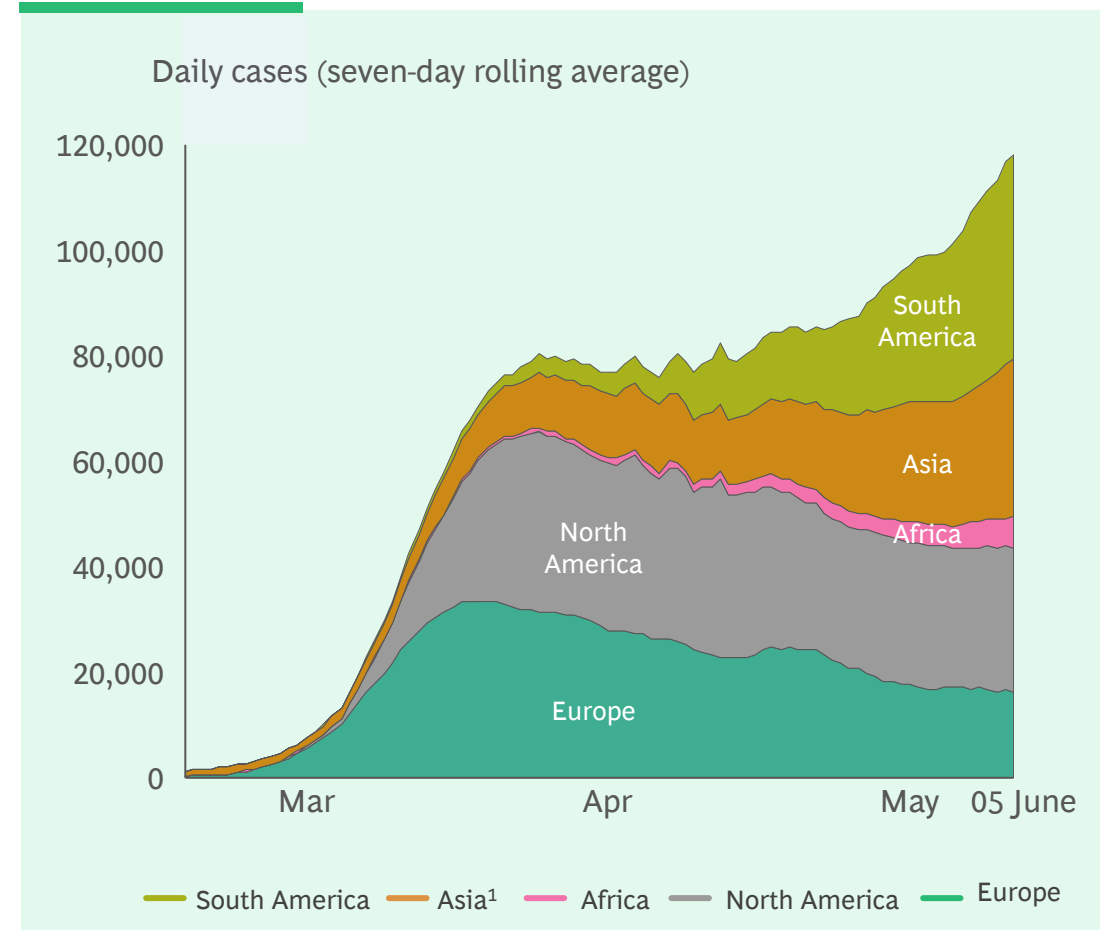
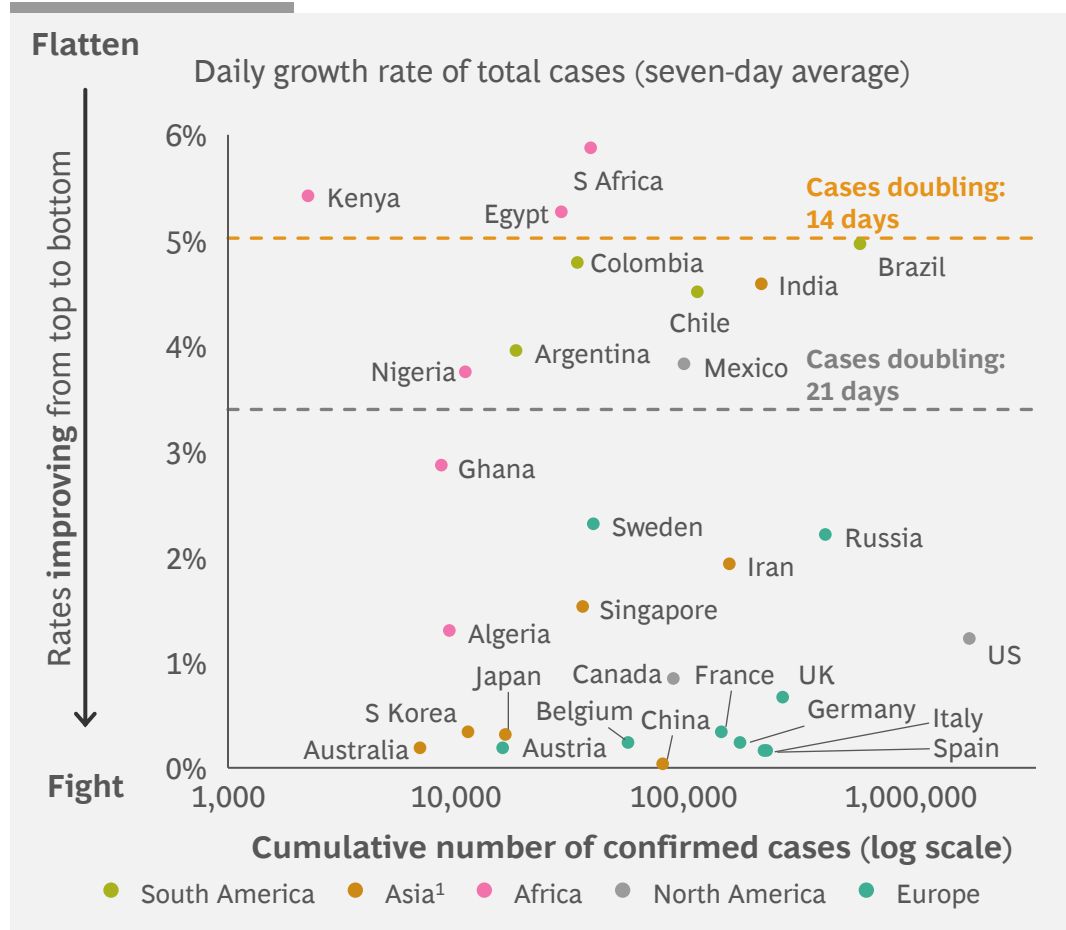
Sources: Johns Hopkins CSSE; Our world in data; WHO situation reports; BCG

Daily new cases are increasing globally; propelled by South America, Asia, and Africa

As of 05 June 2020

Several European and North American countries continue to improve doubling rate...

... but countries in South America, Asia, and Africa witness an increase in daily new cases

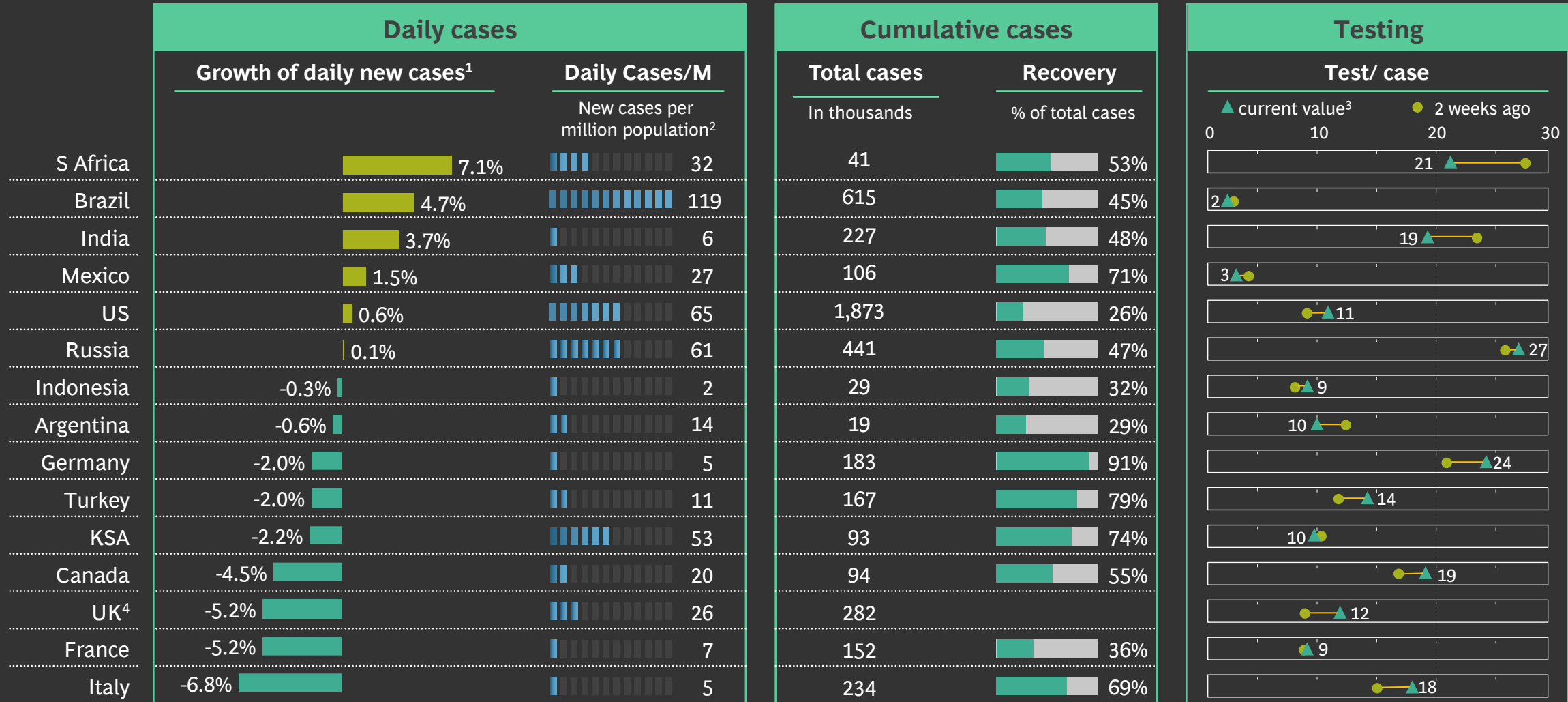


1. Includes Middle East & Oceania
Source: Johns Hopkins CSSE; Our World in data; BCG

Epidemic progression snapshot

As of 05 June 2020

Data shown only for G20 countries with 100+ daily new cases



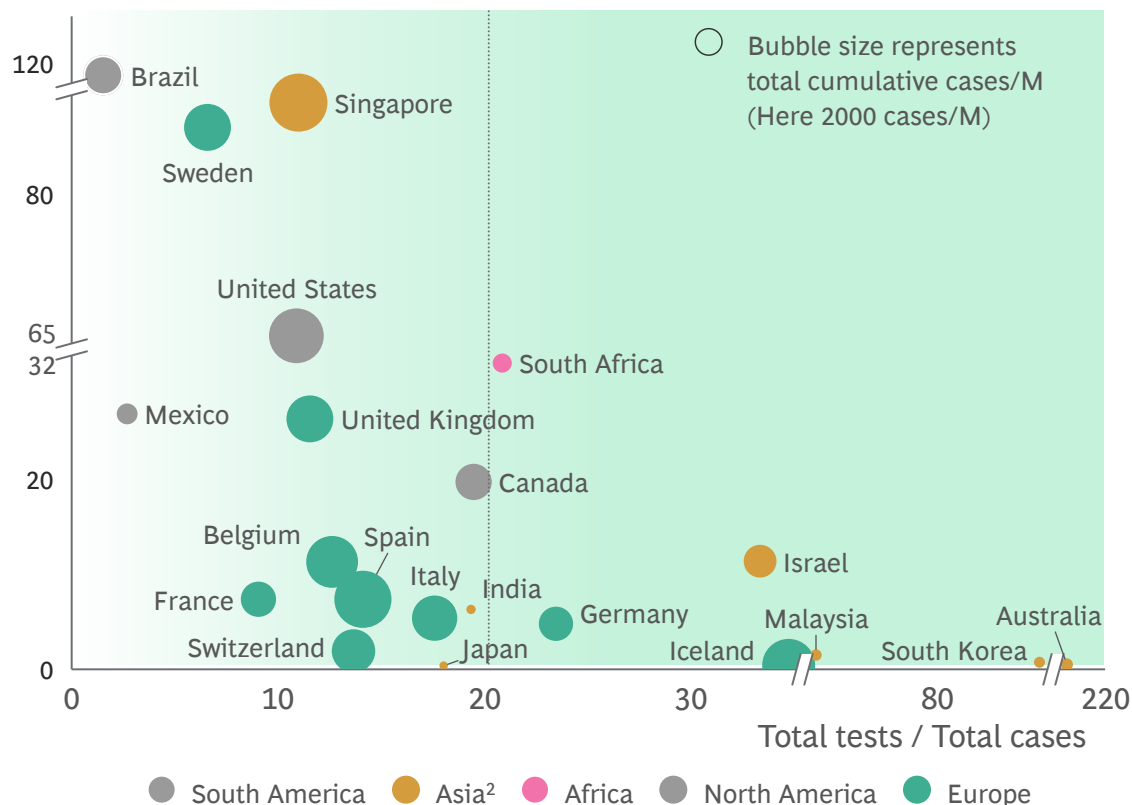
1. Growth rate calculated basis 7-day rolling average of new cases; 2. 7-day rolling average; represented scale rounds up daily case/m to next 10th place; 3. Test/case data is not updated daily for few countries, data represented is within last 1 week; 4 UK recovery data not available; Source: Our World in Data, John Hopkins, Worldometers, BCG

As countries further relax lockdown measures, continued testing capacity ramp-up is critical

As of 05 June 2020

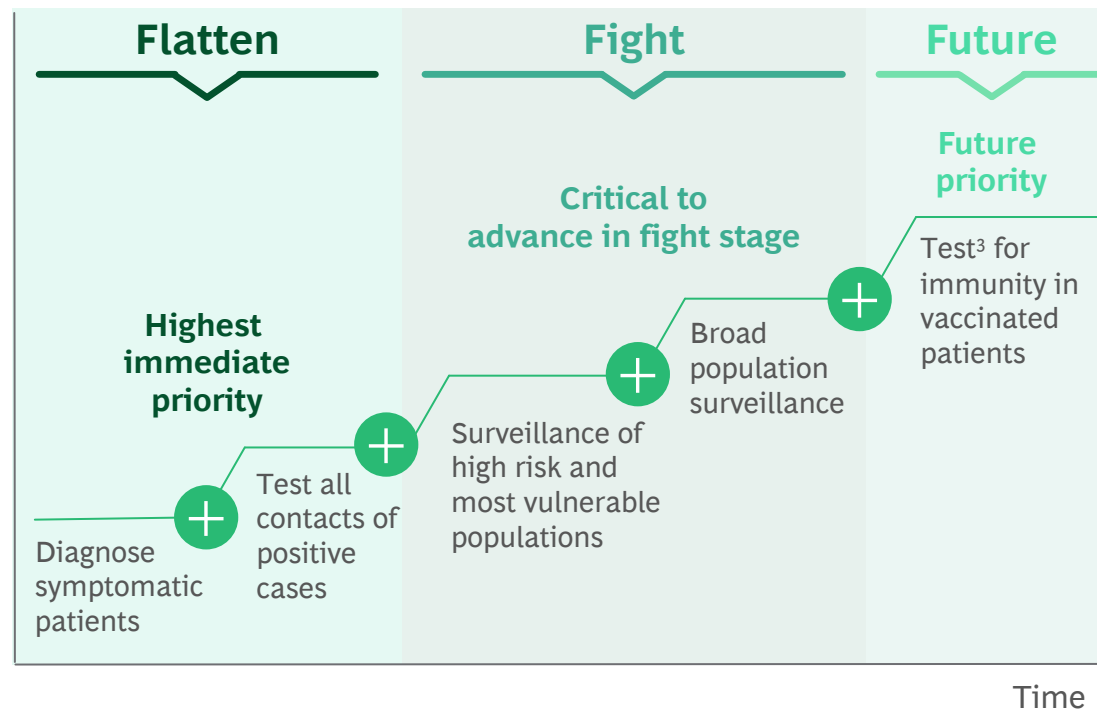
As countries ramp-up testing capacity..

Daily new cases per million population¹



..they need to plan to move beyond testing symptomatic patients to greater degrees of population monitoring

Overall testing level required



1. Taken as 7-day rolling average; 2. Includes Middle East & Australia; 3. Tests for testing immune response to vaccines may be different from current ones to test infection
Source: Our World in Data, Worldometer, BCG

Vaccine fast movers | 9 vaccine candidates already into clinical trials

As of 05 June 2020

1 Phase II/III

Oxford Univ. & AstraZeneca

Phase III recruitment underway; concerns¹ over effectiveness on rhesus macaque monkeys in May 2020

2 Phase II

CanSino Biologics

Phase II advancement since Apr 2020; follow-up expected by Oct 2020

Moderna

Positive signs² from Phase I trials in May; further wide-scale trials being planned

4 Phase I/II

BioNTech & Pfizer

Trial ongoing in Germany; if approved, distribution possible by Oct-Dec 2020

Novavax

Trial started in Apr 2020; expected completion of final trials by Nov 2021

China National Biotec³

Trial started in Apr 2020; expected completion of final trials by Nov 2021

Sinovac

Trial started in Apr 2020; expected completion by Aug 2020

2 Phase I

Chinese AMS⁴

Trial started in Mar 2020; follow-up expected by Dec 2020 and completion by Apr 2021

Inovio

Trial started in Apr 2020; larger studies possible in Jun-Aug 2020

150 Pre-clinical

159 Total

"By the beginning of 2021, we hope to have a couple of hundred million doses. I'm cautiously optimistic with the multiple candidates we have with different platforms."

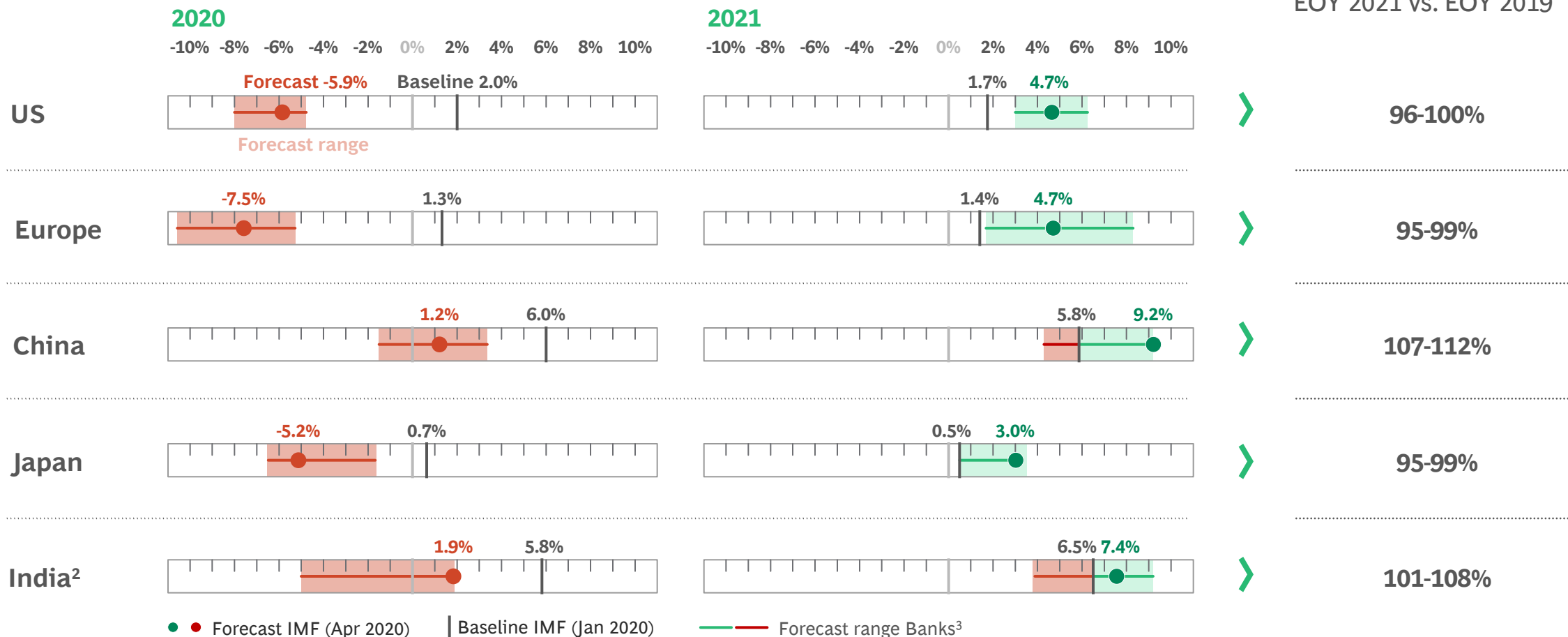
Dr. Anthony Fauci, Member, White House Coronavirus Task Force

1. Trial of the vaccine on rhesus macaque monkeys did not stop the animals from catching the virus and has raised questions about the vaccine's likely human efficacy and ongoing development; 2. Vaccine showed signs of creating immune-system response to fend off the virus – on a small sample designed to look at safety of the shot on human volunteers; 3. Listed as two candidates by WHO: Beijing institute of Biological Products / Sinopharm & Wuhan Institute of Biological Products / Sinopharm; 4. Academy of Medical Sciences and Institute of Medical Biology
Source: WHO (June 2nd), Citeline Pharma Project (June 5th), Milken Institute (June 2nd), ClinicalTrials.gov (May 19th), Telegraph, Bloomberg, BCG

Economic forecasts point toward severe downturn in 2020; rebound of global GDP not expected before 2021

As of 05 June 2020

GDP growth forecast vs. baseline



GDP level forecast¹ EOY 2021 vs. EOY 2019

96-100%

95-99%

107-112%

95-99%

101-108%

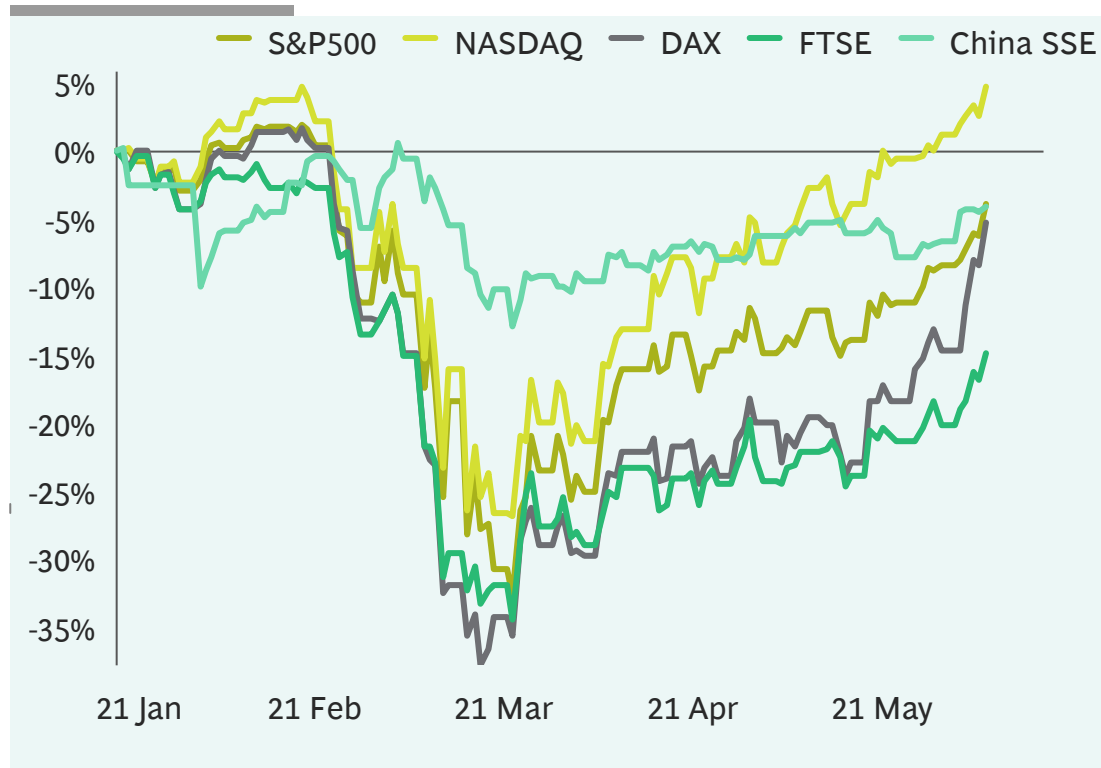
Note: As of reports dated 31 March 2020 to 05 June 2020, YoY forecasts 1. Range calculated with 25th & 75th percentile values of forecast range 2. For India, forecast is for financial year; for other countries, the forecast is for calendar year; 3. Range from forecasts (where available) of International Monetary Fund, Goldman Sachs, JP Morgan Chase; Morgan Stanley; Bank of America; Fitch Solutions; Credit Suisse; Danske Bank; ING Group; HSBC; Source: Bloomberg; IMF; BCG

Global equity markets recover rapidly; US unemployment insurance claims have declined

As of 05 June 2020

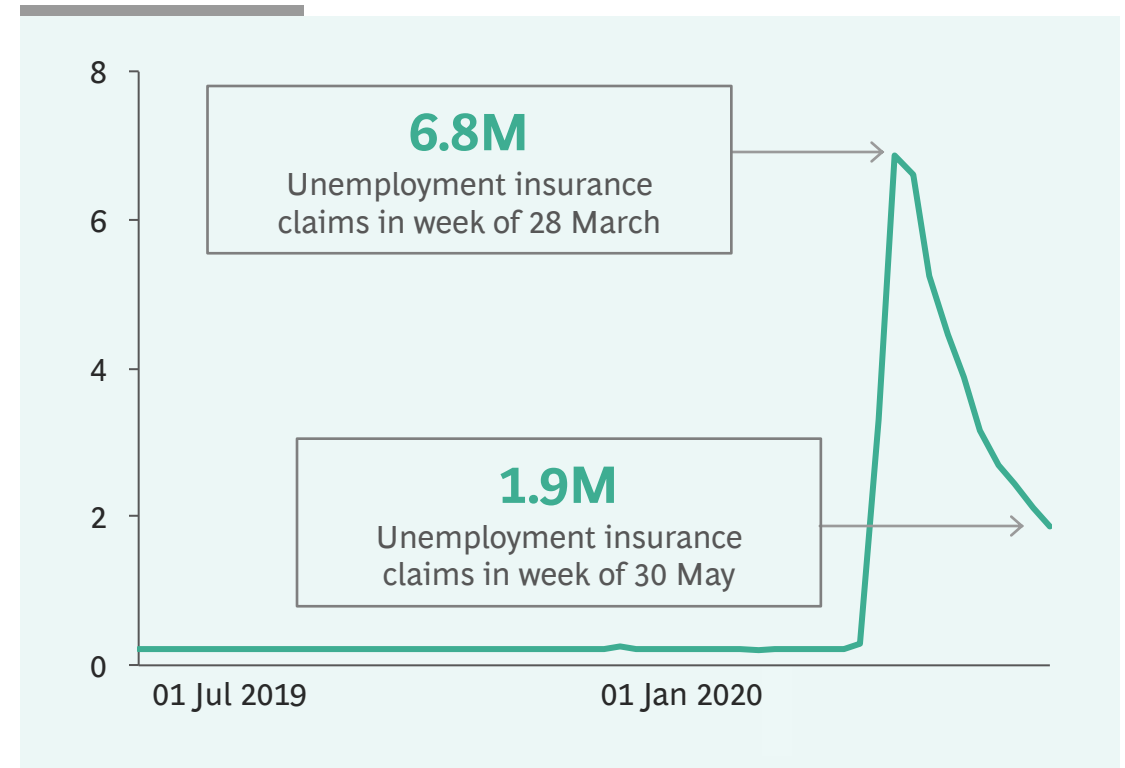
Global equity markets recover rapidly; NASDAQ already at all-time high

Cumulative returns until 05 June (%)



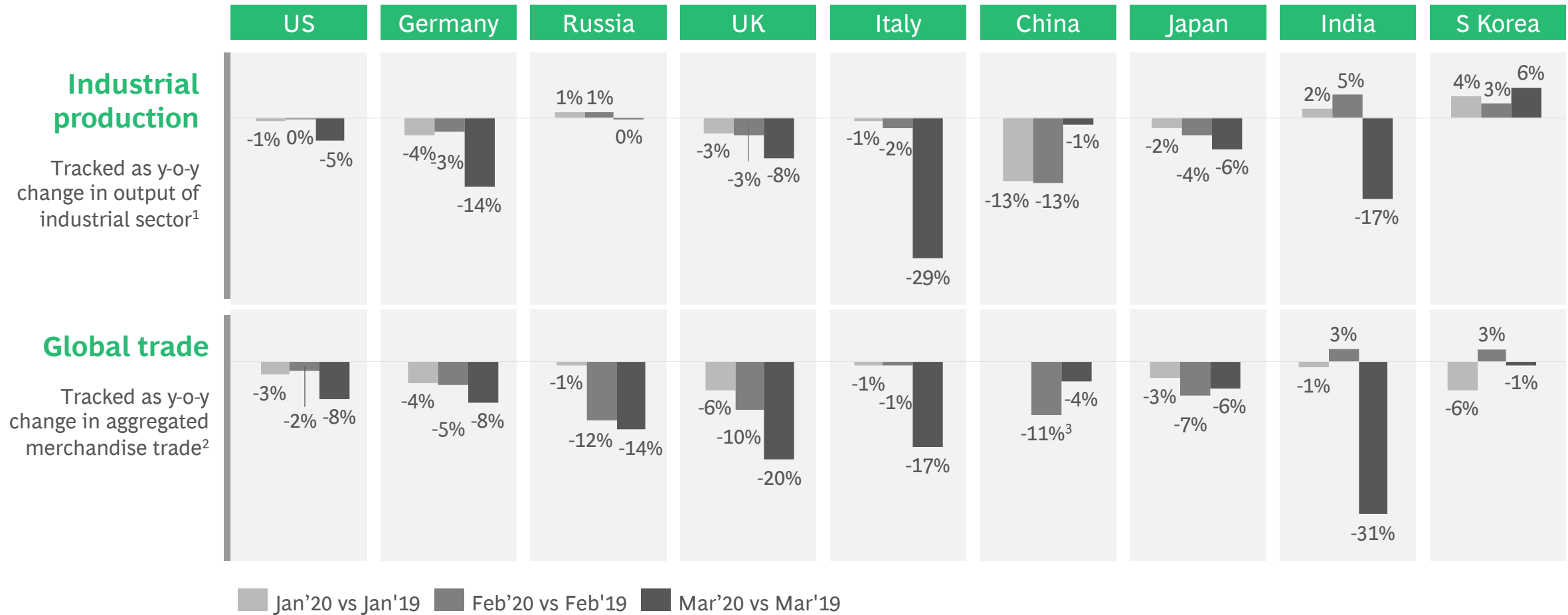
Weekly number of seasonally adjusted US unemployment insurance claims have declined

Initial US unemployment insurance claims (millions per week)



Industrial production and global trade disrupted due to COVID-19 crisis

As of 31 March 2020



1. Industrial production is a measure of output of industrial sector which includes manufacturing, mining & utilities; 2. Merchandise trade is trade of SITC revision 3 commodities and is taken as the sum of exports & imports
 Source: World bank, WTO, BCG

All sectors with positive momentum; semiconductors and pharma back on pre-crisis TSR-level globally

As of 05 June 2020

Order based on TSR & net debt/enterprise value¹

		TSR performance ²			Companies with probability of default >15% ³		
		21 Feb 2020 - 20 Mar 2020	21 Feb 2020 - 05 June 2020	22 May 2020 - 05 June 2020	21 Feb 2020	05 June 2020	22 May 2020 - 05 June 2020
Healthier sectors	Semiconductors	-30%	3%	↗	0%	0%	→
	Pharma	-20%	0%	↗	0%	0%	↗
	Tech Hardware	-26%	-1%	↗	0%	0%	→
	Household Products	-16%	-3%	↗	0%	0%	→
	Food/staples Retail	-10%	-3%	↗	0%	0%	→
Pressured sectors	Health Equipment	-31%	-4%	↗	0%	0%	→
	Materials	-32%	-5%	↗	4%	9%	↗
	Software	-30%	-5%	↗	9%	8%	→
	Retailing	-40%	-5%	↗	0%	29%	↗
	Prof. Services	-30%	-6%	↗	0%	0%	→
	Auto	-41%	-7%	↗	0%	10%	↗
	Financials	-35%	-8%	↗	0%	0%	→
	Food & Beverage	-23%	-8%	↗	0%	0%	→
	Capital Goods	-35%	-8%	↗	2%	4%	↗
	Transport	-34%	-9%	↗	0%	36%	→
Vulnerable sectors	Telecom	-17%	-9%	↗	0%	8%	↗
	Media	-36%	-9%	↗	0%	0%	↗
	Durable Goods	-39%	-12%	↗	0%	5%	→
	Utilities	-30%	-12%	↗	0%	0%	↗
	Insurance	-39%	-17%	↗	0%	0%	→
	Real Estate	-39%	-19%	↗	0%	17%	→
	Banks	-39%	-19%	↗	0%	4%	→
	Hospitality	-44%	-20%	↗	7%	29%	↗
Energy	-52%	-21%	↗	0%	21%	→	

Note: As of 05 June 2020; Based on top S&P Global 1200 companies; Sectors are based on GICS definitions; 1. From latest available balance sheet 2. Performance is tracked for two periods, first from 21 February 2020 (before international acceleration of outbreak) to 20 March 2020 (trough of the market) and from 21 February 2020 through 05 June 2020 based on median; 3. Implied by 5-year Credit Default Swap based on median Source: S&P Capital IQ; BCG ValueScience® Center; BCG

↗ Pos. trend >= 2%
→ No sig. change
↘ Neg. trend >= 2%

Additional perspectives on COVID-19

COVID-19 BCG Perspectives



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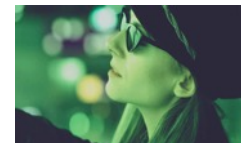
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