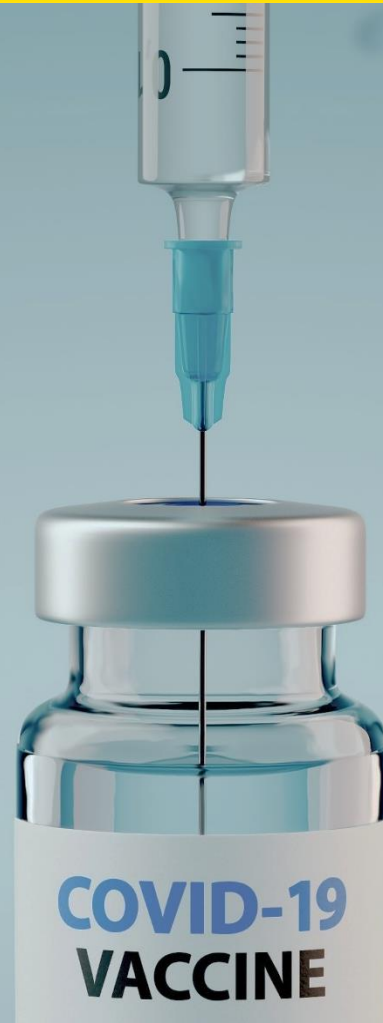


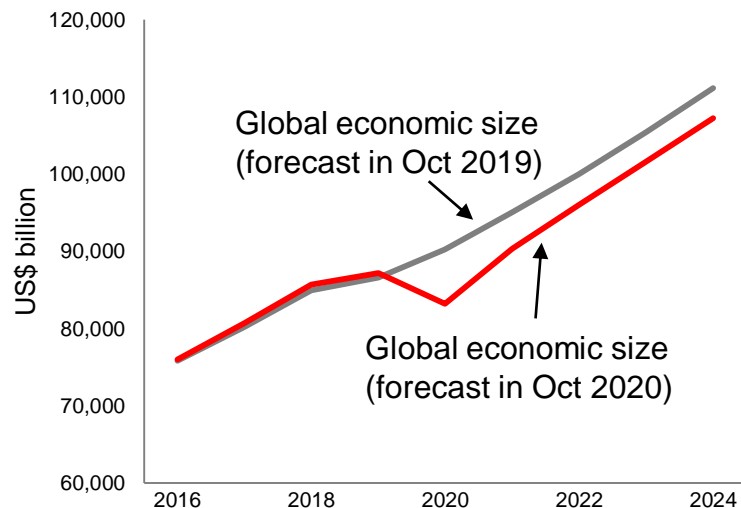
Vaccine Tracker

14 April 2021



Covid-19 had a US\$7 trillion impact in 2020 but the efficacy and rate of vaccination could be the game changer

Global Economic Impact of COVID-19



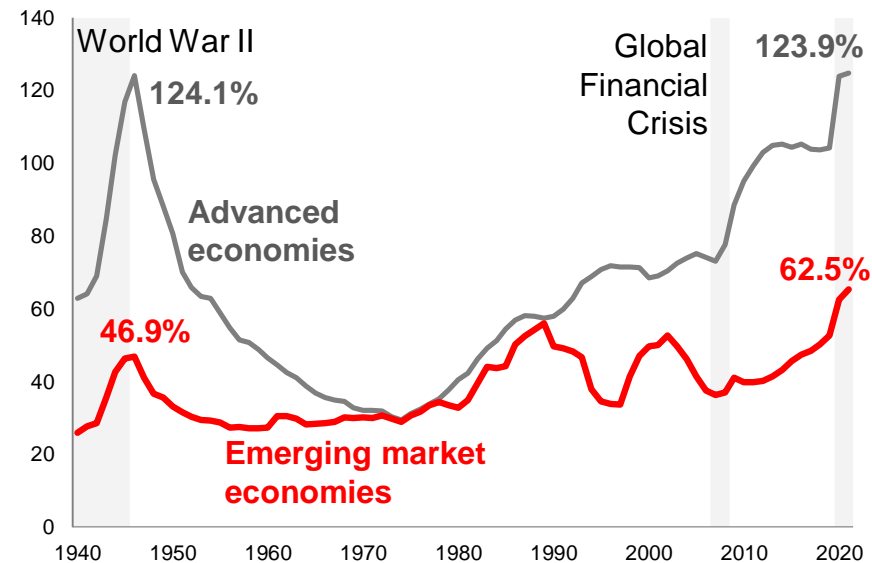
Source: IMF

Economic cost:

US\$7 trillion (7.8%) of global 2020 GDP

US\$23.5 trillion over 2020-24

General Government Debt (Percent of GDP)

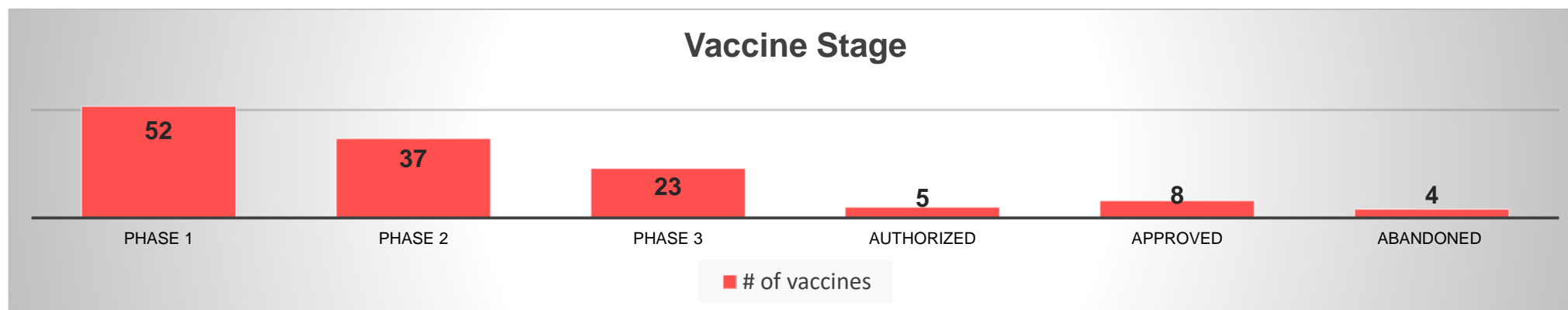


Source: IMF

Unprecedented stimulus leaves countries more indebted than at any point in modern history.

Six vaccine front runners but more in pipeline

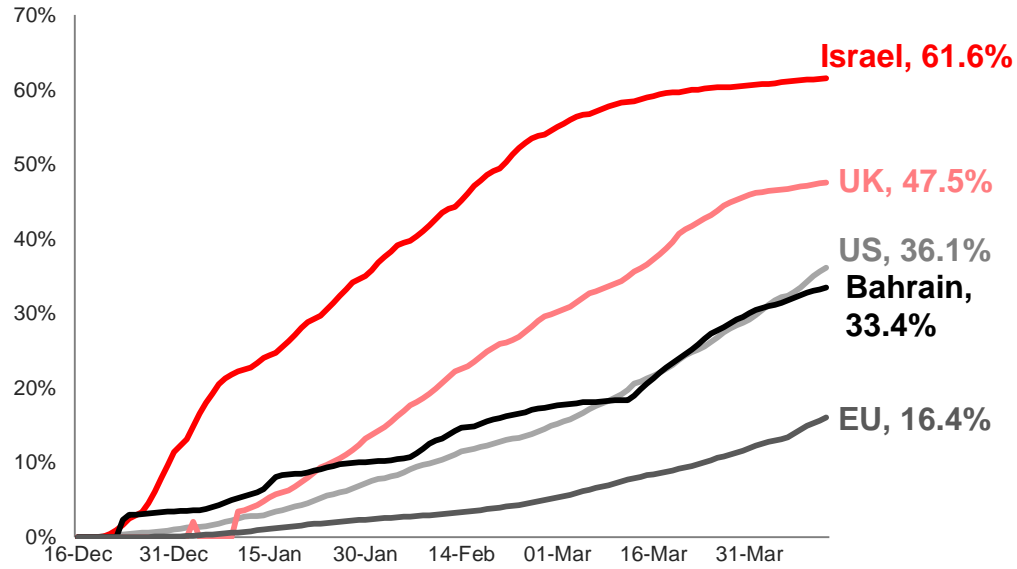
Developer	Reported efficacy rate	Doses required	Production in 2021	Price per dose, US\$	Storage requirement	Status
Pfizer-BioNTech	95%	2	Up to 2 bn	19.5	-75°C (2-8°C: 5 days)	Approved: Bahrain, Saudi Arabia, Switzerland. Emergency use: US, EU & others
Moderna	94.1%	2	600m – 1 bn	32-37	-20°C (2-8°C: 30 days)	Approved: Switzerland Emergency use: US, UK, EU, others.
AstraZeneca / Oxford	70%	2	3bn	1.5-4	2-8°C	Approved in Brazil Emergency use: UK, EU, others Stop using in Denmark
Sinopharm	79%	2	1 bn	<77	2-8°C	Approved: China, U.A.E., Bahrain. Emergency use: Egypt & others
Sinovac	50-91%	2	1 bn	14	2-8°C	Approved: China Emergency use: Brazil, others.
Johnson & Johnson	66%	1	1 bn	10	2-8°C	Emergency use in U.S., E.U., other countries.



Sources: Financial Times, Economist Intelligence Unit, New York Times

Messy early start to vaccination

Share of population receiving at least one dose of Covid-19 Vaccines



Source: Our World in Data (data as at 14 Apr 2021)

More than 832.9 million doses have been administered around the world (≈ 18 million doses / day)

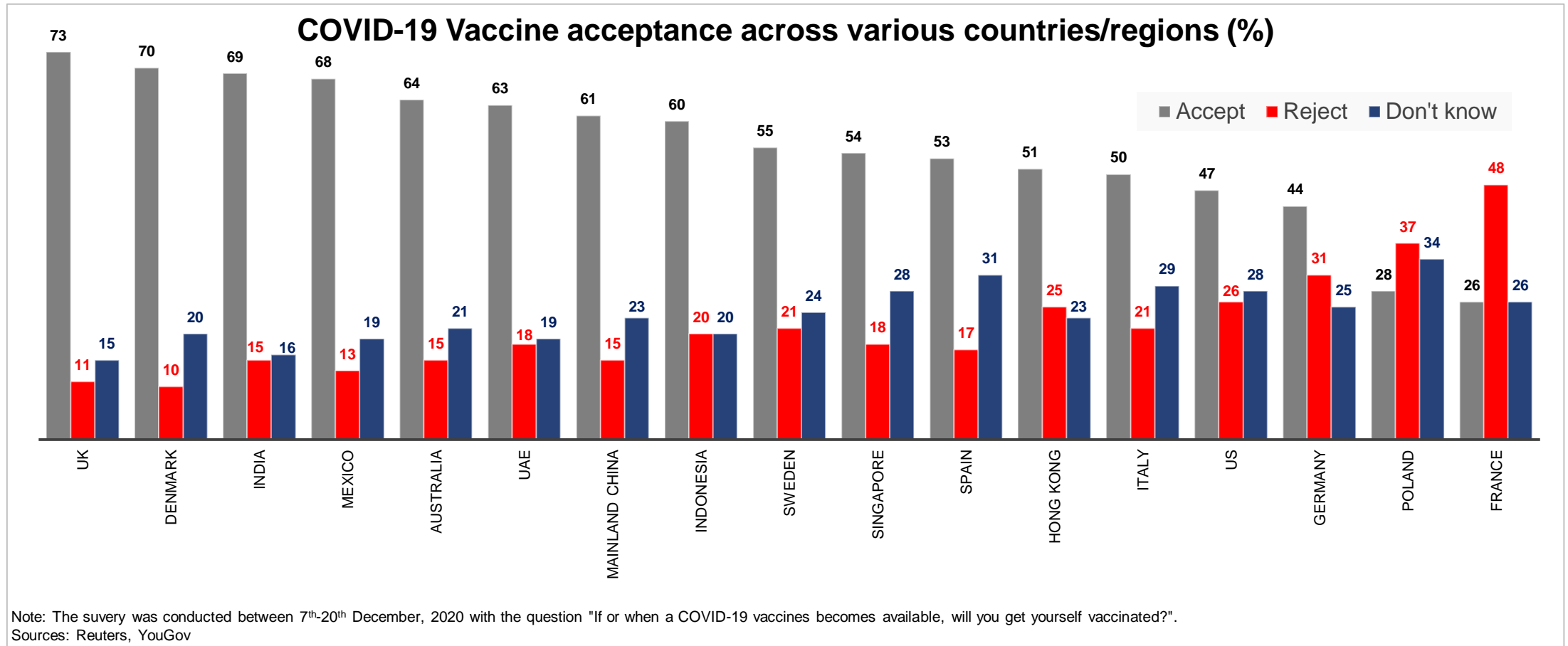
Speed of vaccination: developed vs developing

Country	Doses administered (million)	Doses per 100 people	1+ dose per 100 people	Fully vaccinated
US	192.3	57.4	36.1	22.9
China	175.6	12.2	--	--
EU	101.1	22.6	16.4	6.2
UK	40.1	59.1	47.5	11.6
Israel	10.3	118.9	61.6	57.2
UAE	9.3	93.9	--	--
World	825.1	10.6	5.9	2.3

Source: Bloomberg (data as at 14 April 2021)

Speed depends on a number of factors, including logistics, # of healthcare practitioners, vaccination centres

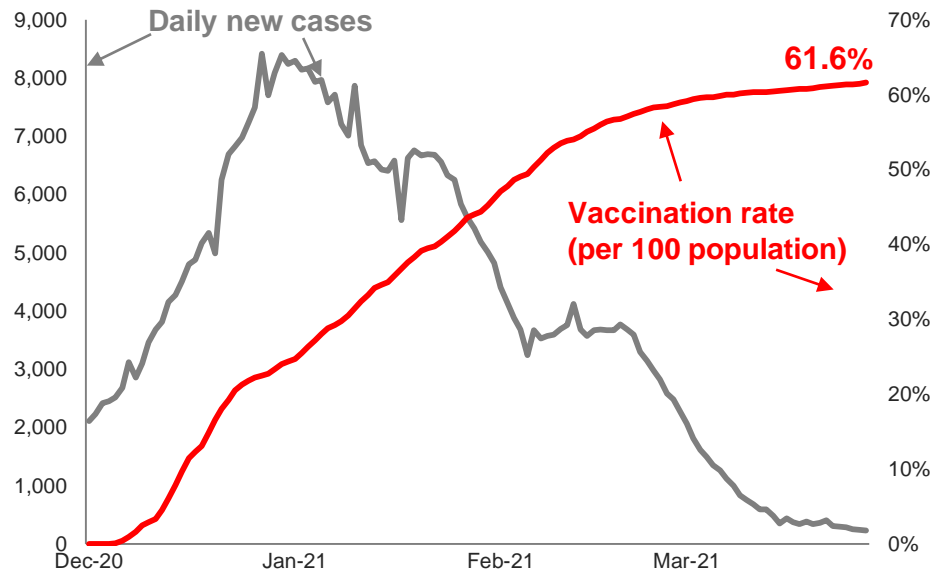
Vaccine skepticism a key concern



- In Britain & Denmark, a respective 73% & 70% of people said they would get vaccinated.
- But the ratio was less than 50% in the US, Germany; and less than 30% in France and Poland.

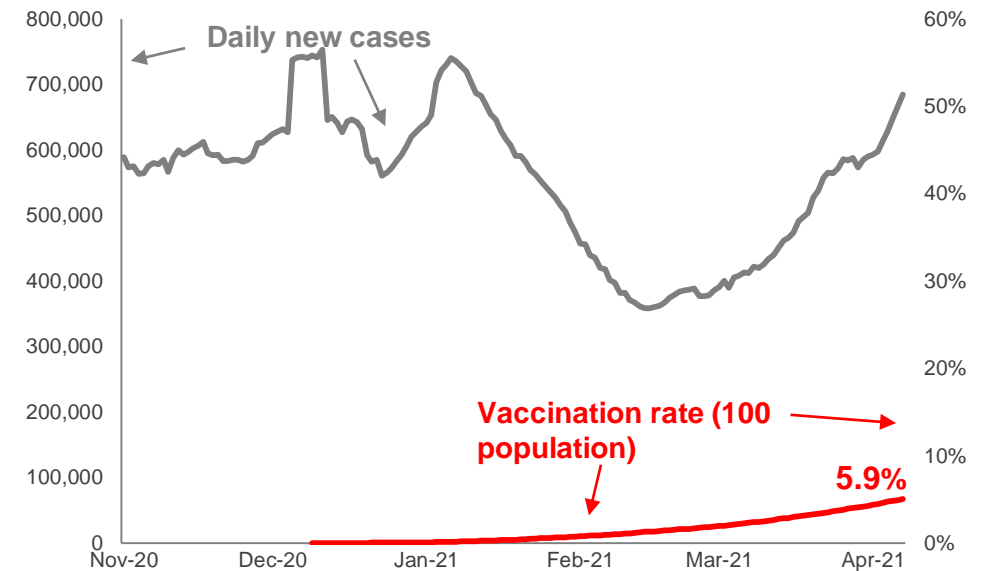
Vaccination alone may not reduce infection rate

Israel: COVID-19 Cases and Vaccination Rate



Sources: Bloomberg; Our World in Data (data as at 14 Apr 2020)
Remark: The new Covid-19 cases are in 7-day rolling average

World: COVID-19 Cases and Vaccination Rate



Source: Bloomberg (Data as at 14 Apr 2020)
Remark: The new Covid-19 cases are in 7-day rolling average

- Even vaccination goes as fast as Israel, its infection rate was still elevated until the vaccination rate goes high enough.
- A single dose is providing less protection; while Israel is facing a bottleneck in vaccination rate.
- Danger: a high vaccination rate may draw false sense of security and people may become lax in social distancing.

Years before the world returns to normal

Scenario		Bear Case	Base Case	Optimistic Case
Speed of vaccination in a month (% of population inoculated with 2 doses)		1%	1.2%	5%
Vaccine efficacy rate	Vaccine coverage of total population required	Time required for herd immunity (months)		
95%	63%	63	53	13
90%	67%	67	56	13
80%	75%	75	63	15
70%	86%	86	71	17
60%	100%	100	83	20

Assumptions:

- Covid-19 reproduction rate = 2.5 → Herd immunity threshold = 60% of population
- (Before lockdowns in most countries, the reproduction rate is between 2.5 to 3.5)
- Duration of vaccine immunity = life-long protection
- US & UK may reach herd immunity within a year, but it can take about 5 years for the world, and it is very probable that it will take longer...

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For further information please contact Economic Research Department.

Celia Lam

LAMCYH1@hkbea.com

3609 1542

Annie Wong

WONGAYK@hkbea.com

3609 1534

Mary Kwan

KWANMHT@hkbea.com

3609 1543