China's Emergence as a Superpower

A Graphic Comparison of the United States, Russia, China, and Other Major Powers

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Photo: somartin/Adobe Stock

Introduction

The Emeritus Chair in Strategy at CSIS is issuing a report written by Anthony H. Cordesman that compares the key trends in civil and military power in the United States, developed democracies, China, and Russia. The graphs, maps, and tables in this report only highlight a limited range of the complex changes involved, and reliable data are often lacking for the years after 2020. They still show, however, that the civil and military role of the world's major powers is in a process of dramatic and unpredictable change.

The Key Impact of China's Emergence as a Major Global Economic Power

China has emerged as an economic superpower that rivals the United States in many ways, although the total economic power of modern democracies—most of which are strategic partners of the United States—vastly exceeds the size of the Chinese economy, trade efforts, and efforts in technology and research and development. China also faces major internal challenges created by outside restrictions and economic sanctions, its handling of Covid-19, and state interference in its economic development.

Nevertheless, China is already competing with the economies of developed democratic states on a global level. Its "belt and road" efforts to establish economic ties to developing states and control critical minerals and resources. It may succeed in creating a rival economic bloc that can function and grow outside the "rules-based order" democracies created after World War II, and it is already competing in its relations with a number of developing states and other countries.

The trends presented in this report show that this competition may well become an ongoing confrontation between China and its allies, and developed democracies and their strategic partners, unless radical changes take place in Chinese policies and leadership. And—as is discussed shortly—is a growing level of civil confrontation that is being matched by military confrontation as well.

Russia's Diminished Global Economic Role

The following graphics show that Russia is not an economic superpower now that it has lost control of most East European states and many of the Central European and Asian elements of the former Soviet Union. Russia has long lagged badly in total economic growth, trade, research and development, and all the other major areas of economic power. Russia's size, geographic position, and large oil and gas reserves do, however, still make it a key global power.

Key Uncertainties in the Civil Impacts of Economic Power

It should be stressed, however, that current trends can only tell part of the story. Any analysis of economic and civil power will be shaped by many key trends that cannot be quantified. They include the longer-term impacts of the economic stresses between and within developed states, the impact of internal politics, the impact of demographic change and population pressure, and the impact of global warming. They also include the degree to which the developed democracies can succeed in cooperating and creating truly functional economic strategic partnerships. As yet, governments often rely far more on rhetoric about such cooperation than on taking tangible action, although there are positive indicators as well.

The graphics in this analysis also do not include the developing world. Here, the allocation of international economic power has generally favored developed states. As the UN, World Bank, IMF, and a host of NGO reports make clear, many states have failed to move towards effective development and face major challenges from failed or corrupt governance, repression and internal division, population pressure, limited water supplies, and climate change. For all the former rhetoric about globalism, this includes at least one-third of the world's nations.

At the same time, there are cases like India, where the trends in global power could move in other directions. While they are not yet positive enough to include in this analysis, India has overtaken China as the world's most populous state, has a GDP of some $9.3 trillion, and ranks high in terms of total military spending. Several major petroleum states in the Gulf are taking positive steps to develop beyond a reliance on energy exports, as are some states in Asia, Africa, and Latin America. For all the failings in the developing world, they are also important potential successes.

The Impact of Trends in Military Power

The graphs and tables that follow show that the United States remains the world's largest military power, the one with the most combat experience and highest levels of total spending and investment in modernization, and the one with the strongest strategic partners.

It is also clear, however, that the United States already faces growing competition from China, particularly in the Pacific and in the Indian Ocean as well. In the case of Taiwan, competition has already turned to serious confrontation and the risk of war. Once again, China has vastly increased its capabilities since 1990, as well as its military links to other Asia power. Much depends on the United States' ability to strengthen its strategic partnerships with Japan, South Korea, Australia, the Philippines, and other Asian states—as well as European states with major power projection capabilities like Great Britain and France.

The Uncertainties Driven by the War in Ukraine

At the same time, the United States and its strategic partners face a major challenge from Russia and one that current U.S. national strategy tends to seriously understate. As the graphics show, Russia may not have an economy that can fully support its present conventional forces, but it remains a major threat to the United States' European strategic partners and NATO, and the Russian military threat must be given equal priority with that from China.

The trends shown in this analysis do not generally go beyond 2021 and cannot reflect the many longer-term changes in the military balance that are growing out of the war in Ukraine. It is clear, however, that the United States and its NATO allies are engaged in major proxy war, supporting Ukraine in its defense against Russia. They also are already rebuilding NATO's overall level of extended deterrence against Russia, and doing so at a time when Vladimir Putin, Russia's leader, has made it clear that he sees NATO as a major and continuing threat.

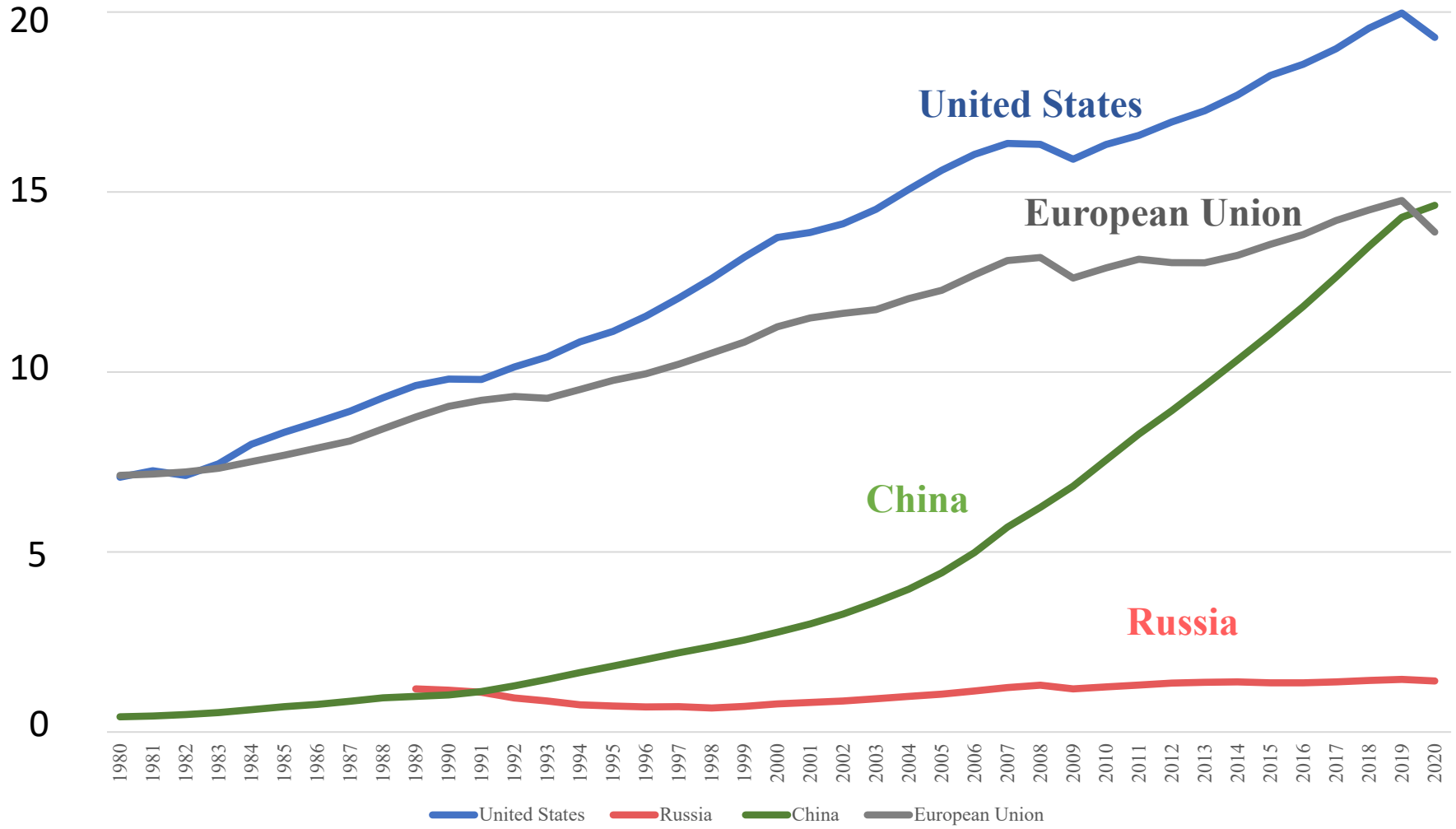
There is no current way to predict how the war in Ukraine will change the overall balance of military power and how and when it will end. It seems almost certain, however, that as long as Putin rules Russia, the United States and the rest of NATO will be engaged in a new Cold War, and one which will effectively match a similar Cold War between the United States and its strategic partners in Asia and China.

A Return to Nuclear Forces

As the final sections of this analysis also show, these two Cold Wars have a major nuclear dimension. The race to build up conventional military power is, in some ways, being outpaced by a new nuclear arms race. This race not only reflects the near collapse of nuclear arms control but a potential return to major tactical, theater, and dual-capable nuclear forces. It also is clear that Russia is now only a superpower to the extent it has inherited a massive legacy of nuclear weapons and technology from the former Soviet Union.

China's Rising Economic Power Has Vastly Outstripped Russia and Competes with the U.S. and EU

China as the Emerging Economic Superpower: 1980-2021 - I
(in Constant 2015 $US Trillions)



Note: Data for Russia are unavailable between 1980-1988.
Source: World Bank, "GDP (constant 2015 US$)," https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.

2021 in $ current US

US = 23.32 trillion

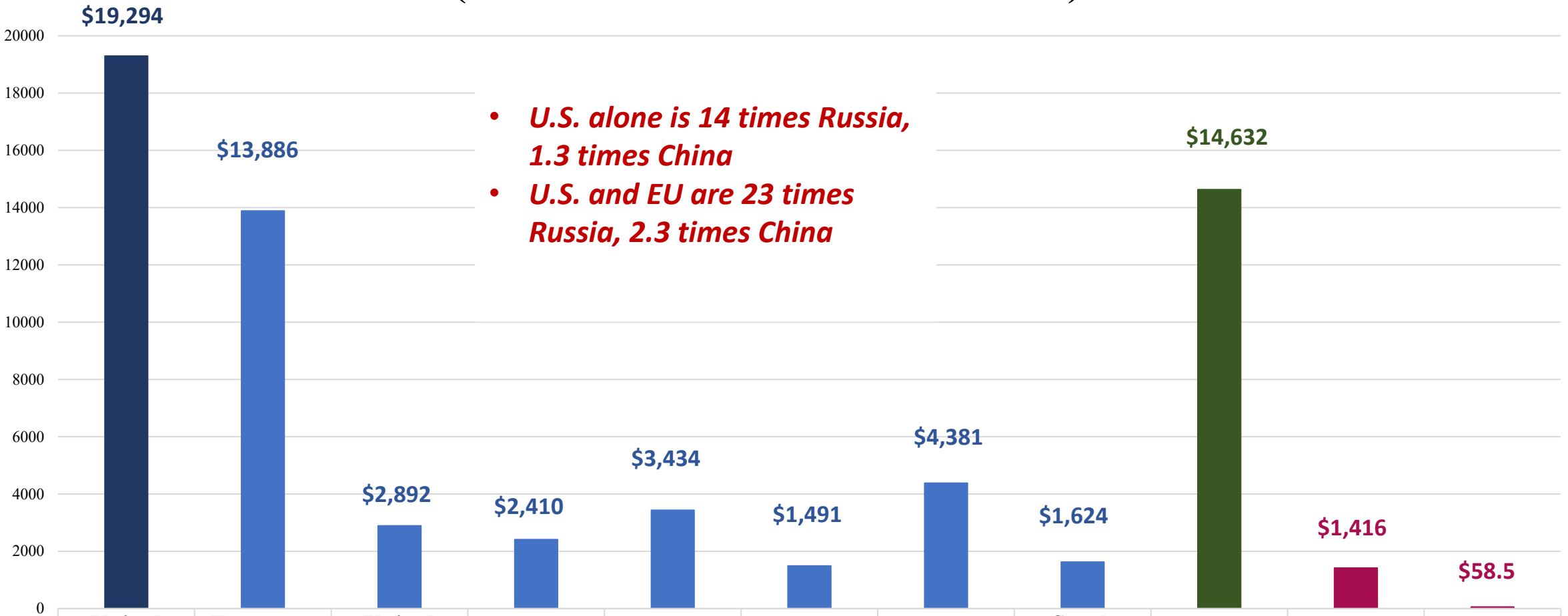
China = 17.73 trillion

EU = 17.17 trillion

Russia = $1.78 Trillion

U.S. and Partner vs. Chinese and Russian Economic Power in 2020

(GDP in Constant 2015 $US Trillions)



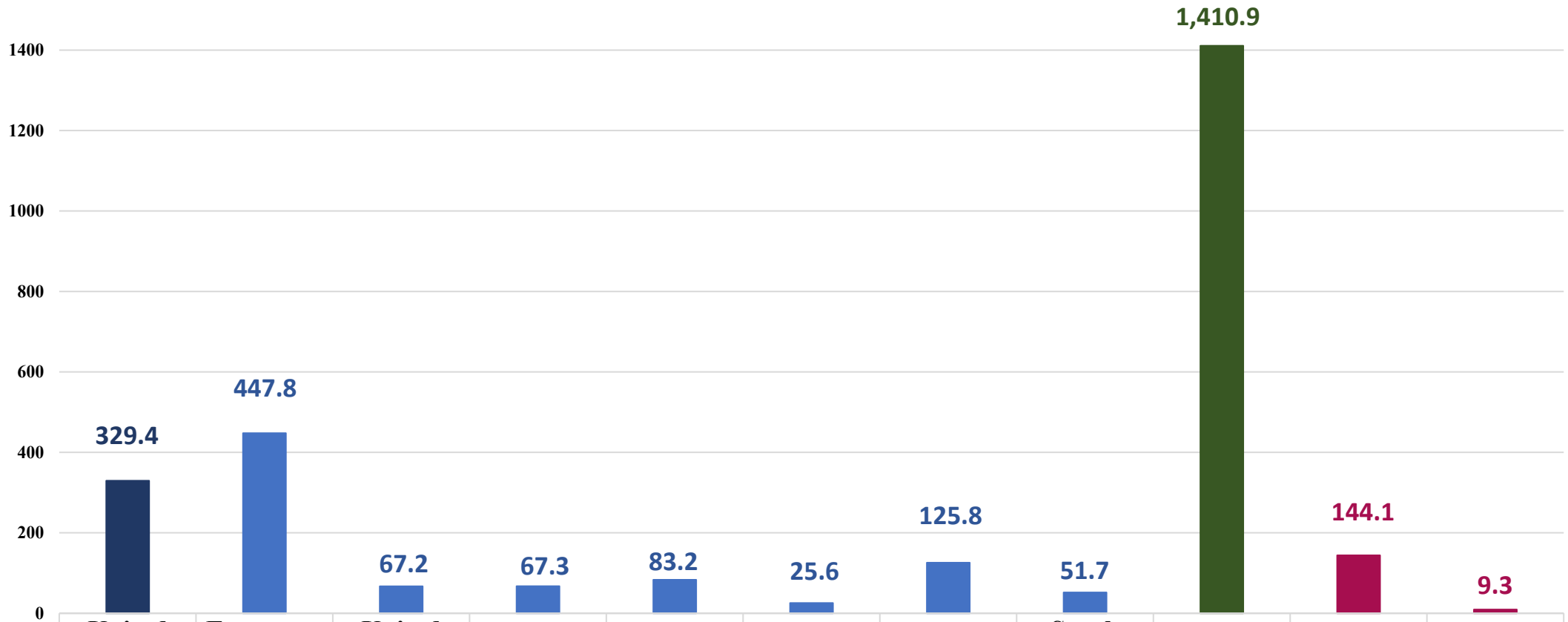
- *U.S. alone is 14 times Russia, 1.3 times China*
- *U.S. and EU are 23 times Russia, 2.3 times China*

	United States	European Union	United Kingdom	France	Germany	Australia	Japan	South Korea	China	Russia	Belarus
$US	19294	13886	2892	2410	3434	1491	4381	1624	14632	1416	58.5

Source: World Bank, "GDP (constant 2015 US$)," https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.

But, China Does Not Compete in Per Capita Income and Russia has a Very Low Per Capita Income

Population in 2020
(in Millions)

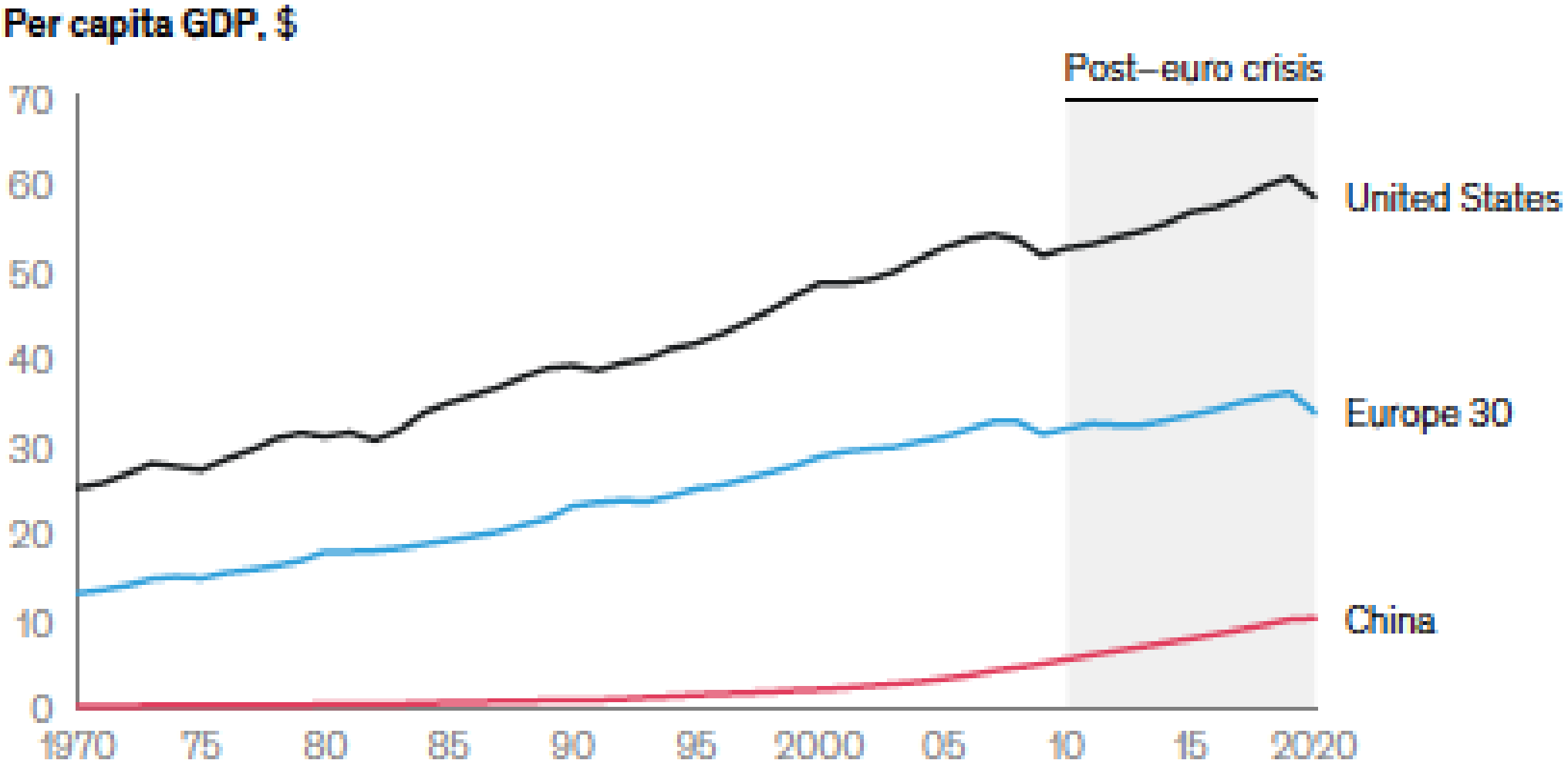


	United States	European Union	United Kingdom	France	Germany	Australia	Japan	South Korea	China	Russia	Belarus
Pop	329.4	447.8	67.2	67.3	83.2	25.6	125.8	51.7	1410.9	144.1	9.3

Source: World Bank, "Population, total," https://data.worldbank.org/indicator/SP.POP.TOTL.

A Massive Gap Remains in China's Per Capita Income

(in Constant 2015 $US Trillions)



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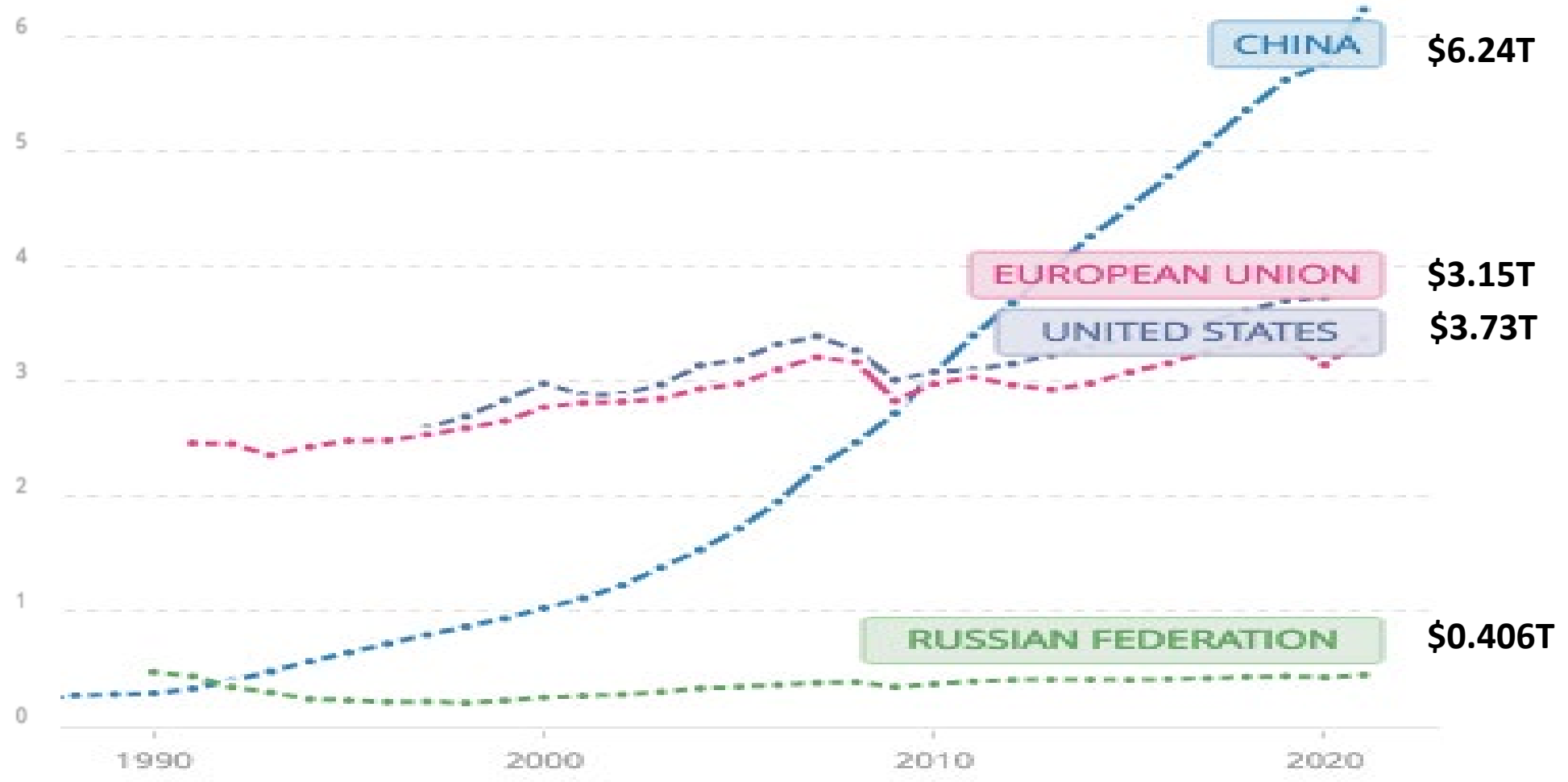
Source: McKinsey Global Institute**,** *Securing Europe's competitiveness: Addressing its technology gap*, September 2022, p. 9
World Bank, "GDP (constant 2015 US$)," https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.

China Has Become the World's Dominant Manufacturer While Russia's Rank Is Critically Low

Annual Value Added of Industry (including construction) in Constant US$ Trillions: 1990-2021



Source: World Bank, database, https://data.worldbank.org/indicator/NV.IND.TOTL.KD?locations=CN-RU-US.

Top Ten Countries by Manufacturing Output in 2019

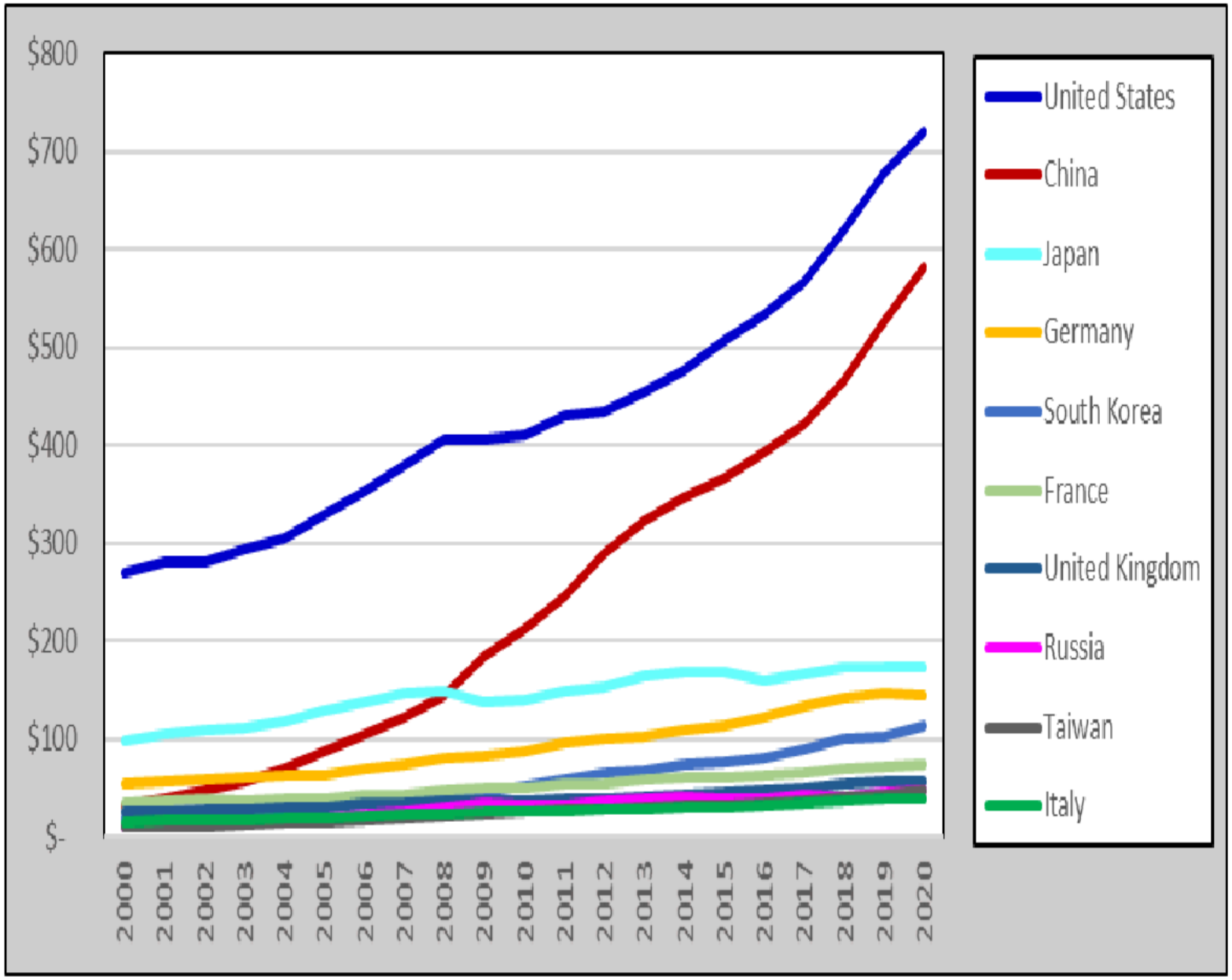
Output measured on value added basis in current US Dollars using data from UN statistic division

Source: Adapted from Felix Richter, “China Is the World's Manufacturing Superpower,” May 4, 2021, Statista, https://cdn.statcdn.com/Infographic/images/normal/20858.jpeg.

China's Technology Base Has Outstripped Russia and European States and Increasingly Competes with the U.S.

CRS: Comparative National Expenditure on Global Research and Development: 2000-2020

In $US Billions of PPP Dollars

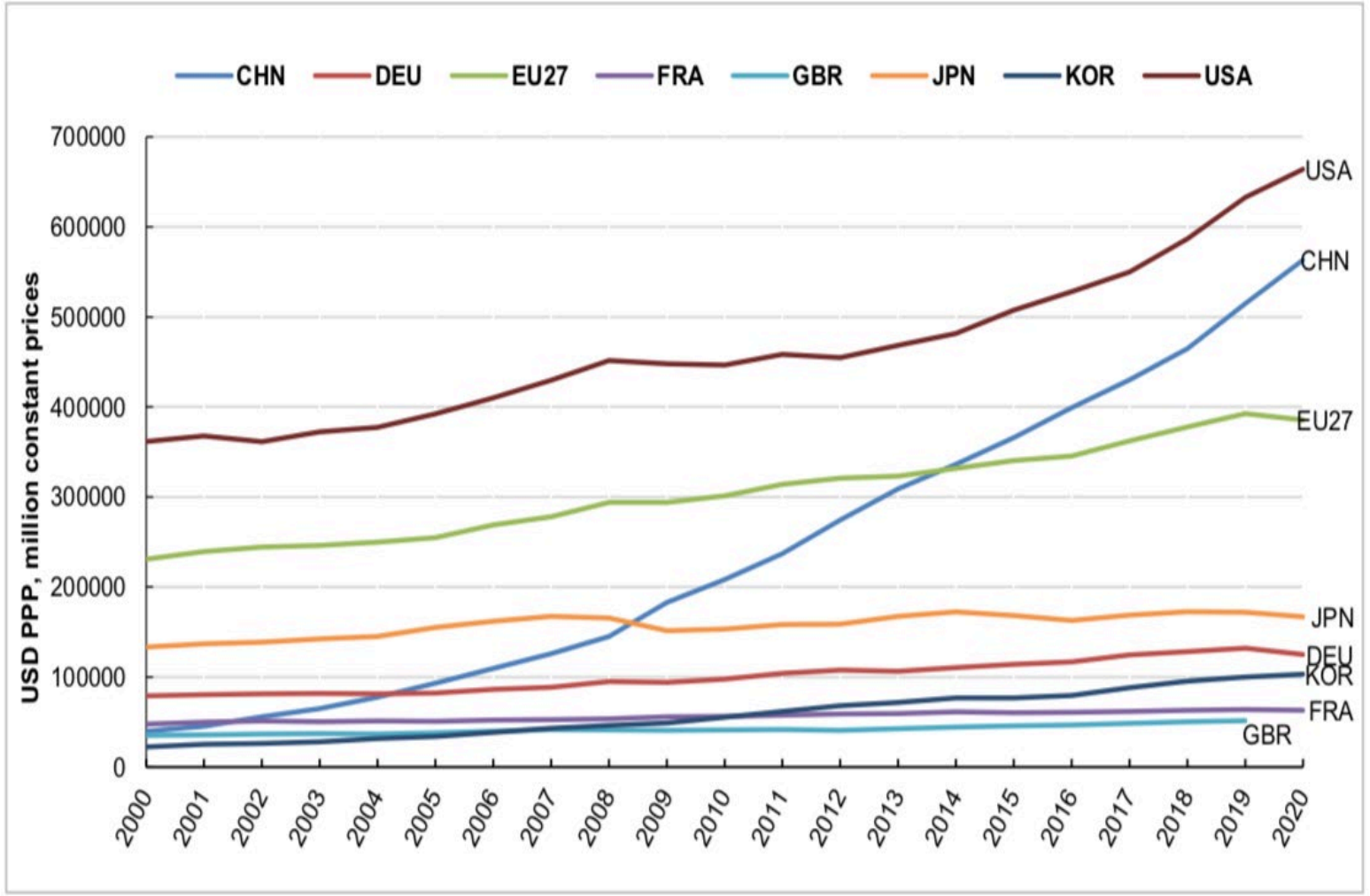


Source: CRS analysis of Organization for Economic Cooperation and Development, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB. Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.

Source: Adapted from John F. Sargent, *Global Research and Development Expenditures: Fact Sheet* Congressional Research Service, R44283, Updated September 14, 2022, https://sgp.fas.org/crs/misc/R44283.pdf

China, U.S. and OECD Gross Domestic Expenditure on R&D, Selected Economics, 2000-2020

(USD million in constant PPP prices)



The US and China consolidated their positions as R&D powers while the EU lost some ground

Real growth in R&D in the OECD area in 2020 was primarily driven by growth in the United States at 5%, in contrast with R&D expenditures in Germany and Japan, which declined at -5.3% and -2.7% respectively. In the EU27 area, business R&D performance was the principal source of the aggregate fall in R&D.

In other words, if European business R&D performance had been on a par with the United States, its overall R&D performance would have been more similar. The structure of business R&D in the EU is more concentrated in industries that have been more negatively impacted by the COVID-19 crisis, as noted further below.

China's reported R&D expenditure grew by 9% in 2020, a figure comparable with previous years. The implications for comparisons with respect to the United States depend on how figures in different countries are adjusted for differences in purchasing power (PPP) for R&D investments.

If forthcoming revisions to PPP conversion rates turn out as on previous occasions, China's R&D expenditure gap with respect to the United States would have remained stable, with China's R&D expenditure at close to 74% of that of the United States.

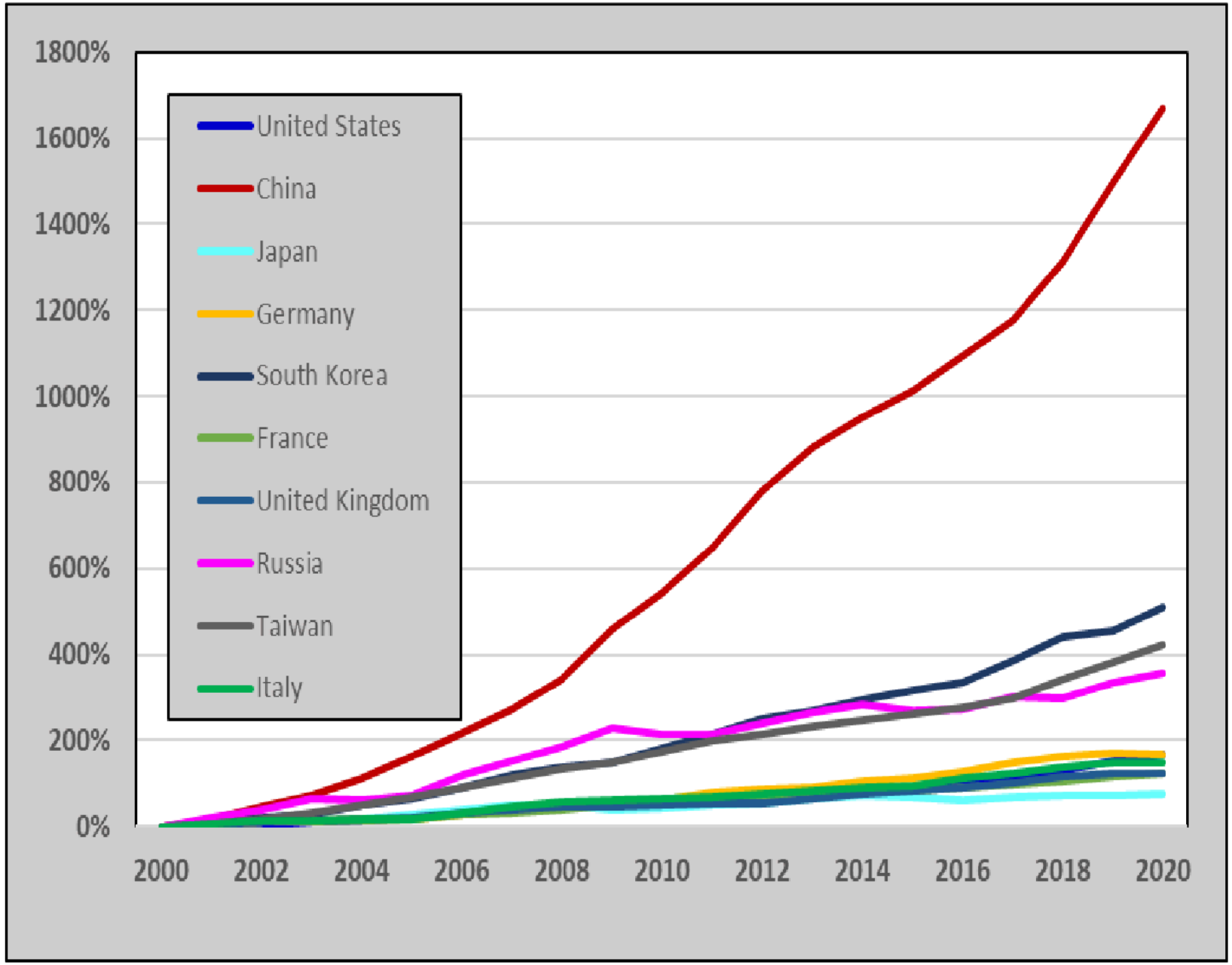
Source: OECD, *Main Science and Technology Indicators (MSTI) Database*, March 2022, https://www.oecd.org/sti/msti.htm and http://oe.cd/msti

Percentage Growth in Growth in R&D Expenditures Since 2000 for Selected Countries, 2000-2020

Growth of R&D expenditures for each of the 10 countries with the highest 2020 R&D expenditures for 2000 to 2020 as a percentage of its 2000 R&D expenditures.

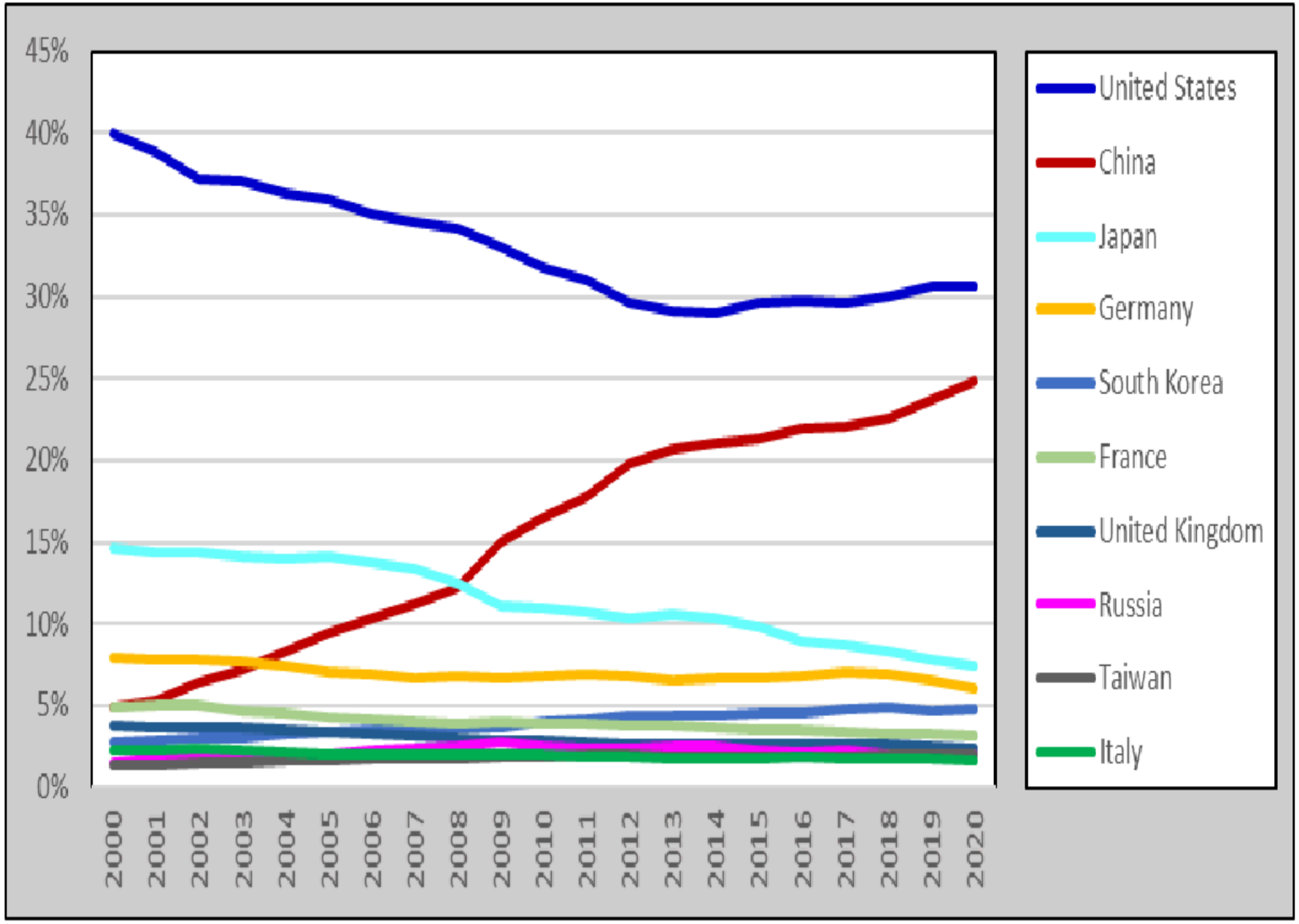
During this period, China had the highest growth in R&D expenditures (1,669%), followed by South Korea (509%), Taiwan (423%), and Russia (357%).

Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.



Source: Adapted from John F. Sargent, *Global Research and Development Expenditures: Fact Sheet* Congressional Research Service, R44283, Updated September 14, 2022, https://sgp.fas.org/crs/misc/R44283.pdf

CRS: Comparative National Share of Global Research and Development Expenditure: 2000-2020



Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB.
Notes: Global R&D includes the expenditures of the OECD countries, Argentina, China, Romania, Russia,
Singapore, South Africa, and Taiwan. Share computed in PPP terms. PPP = Purchasing Power Parity. PPP is used
to determine the relative value of different currencies and to adjust data from different countries to a common
currency allowing direct comparisons among them.

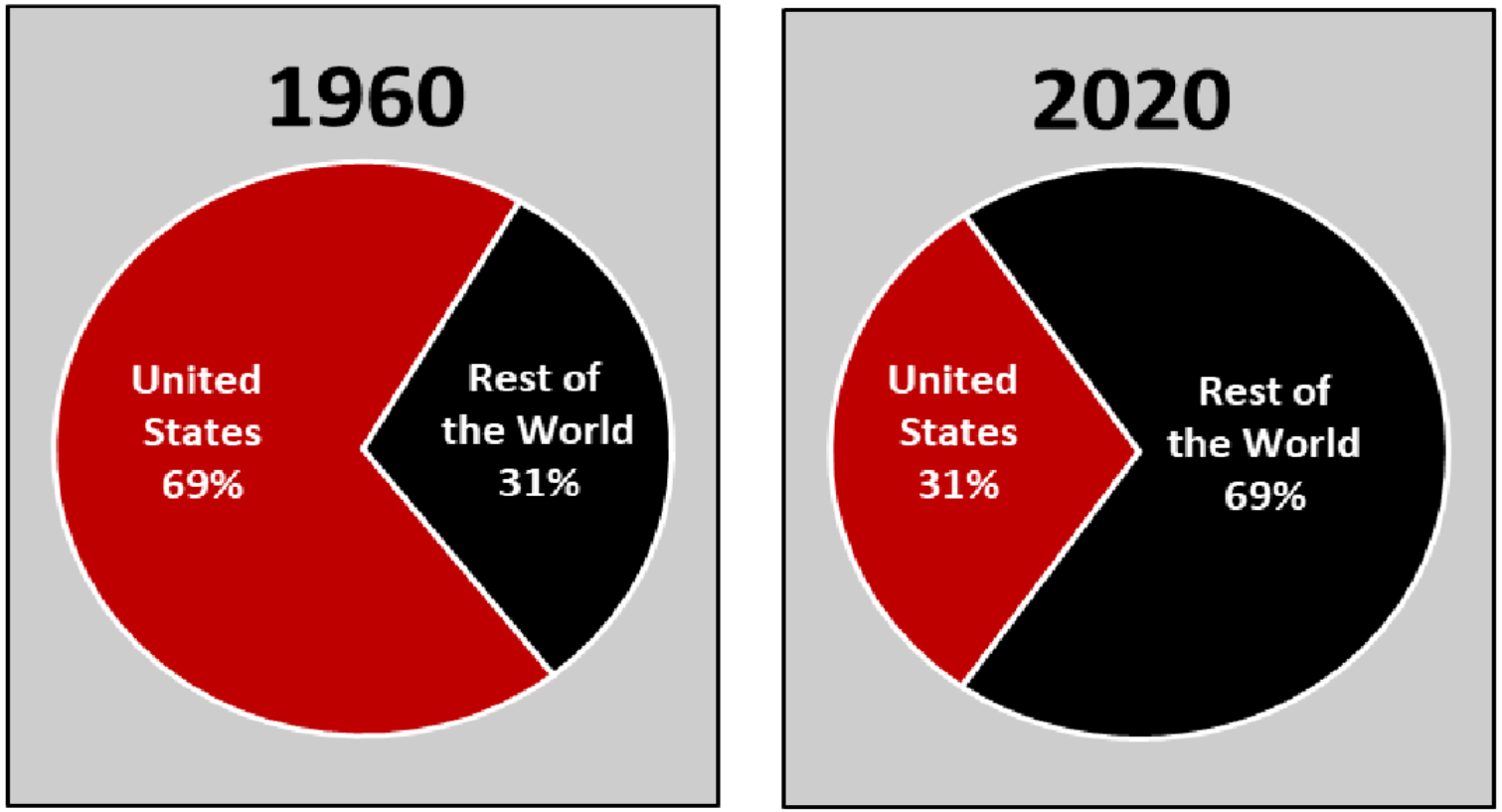
Source: Adapted from John F. Sargent, *Global Research and Development Expenditures: Fact Sheet* Congressional Research Service, R44283, Updated September 14, 2022, https://sgp.fas.org/crs/misc/R44283.pdf

CRS: Countries with the Highest R&D Expenditure in 2020

In $US Billions of PPP Dollars

Rank	Country	Amount	Rank	Country	Amount
1	United States	720.9	11	Canada	30.1
2	China	582.8	12	Spain	25.1
3	Japan	174.1	13	Turkey	25.0
4	Germany	143.4	14	Australia	24.0
5	South Korea	112.9	15	Netherlands	23.7
6	France	74.6	16	Belgium	21.3
7	United Kingdom	56.0	17	Sweden	20.1
8	Russia	48.0	18	Israel	19.8
9	Taiwan	47.9	19	Switzerland	19.4
10	Italy	38.2	20	Poland	18.1

Source: CRS analysis of Organisation for Economic Development and Cooperation, OECD.Stat database, https://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB. Notes: PPP = Purchasing Power Parity. PPP is used to determine the relative value of different currencies and to adjust data from different countries to a common currency allowing direct comparisons among them.



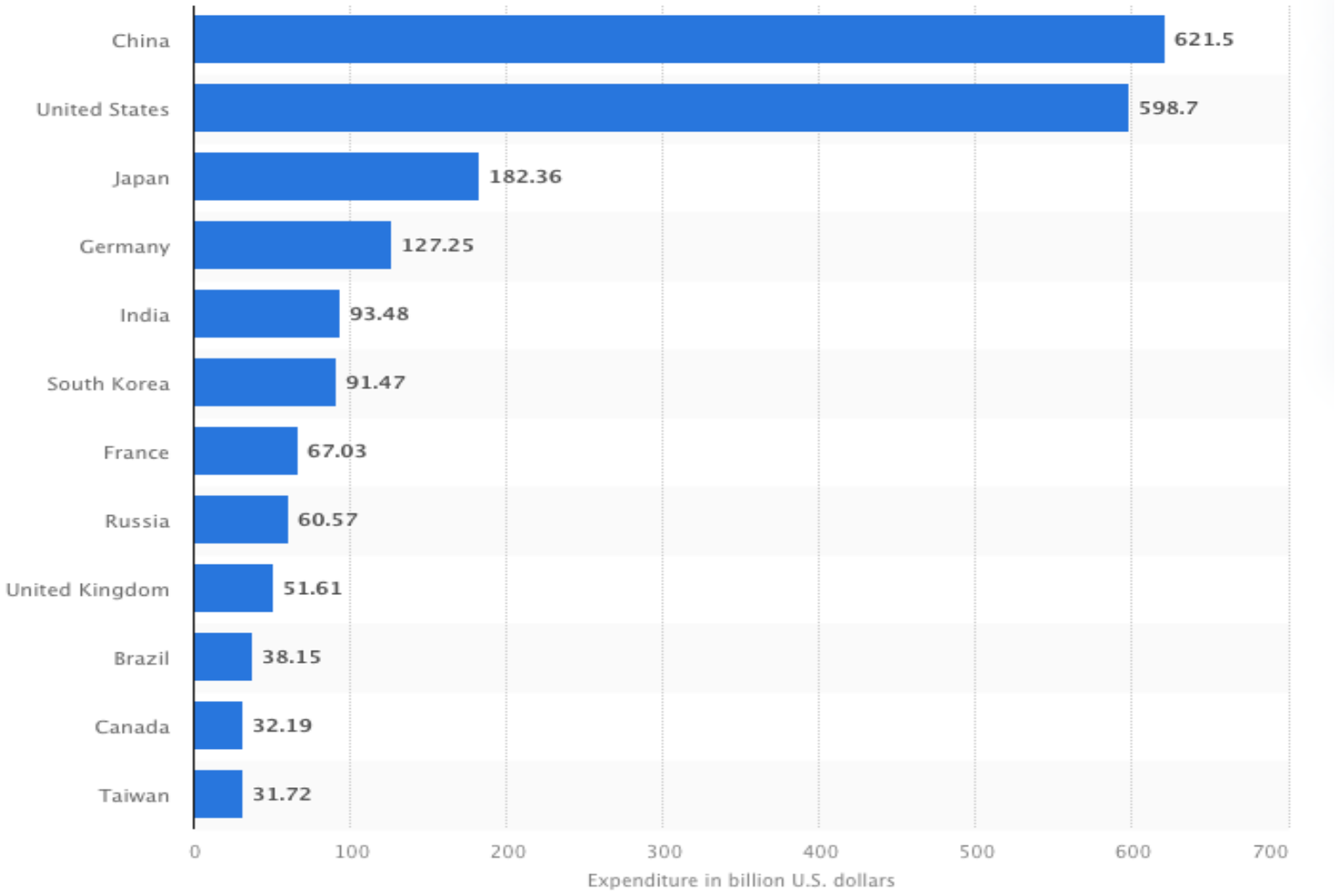
Sources: 1960: CRS analysis of U.S. Department of Commerce, Office of Technology Policy, *The Global Context for U.S. Technology Policy*, Summer 1997. 2020: CRS analysis of Organisation for Economic Cooperation and Development (OECD) data, Main Science and Technology Indicators, OECD.Stat.

Notes: Rest of the World includes the members of the OECD (less the United States), as well as Argentina, China, Romania, Russia, Singapore, South Africa, and Taiwan. R&D expenditures by some others countries are not included but are likely to be small in relative terms. In estimating total global R&D, CRS used the most recent year's reported R&D expenditures for three countries (Argentina, Singapore, and South Africa) that had not reported data for 2020.

Source: Adapted from John F. Sargent, *Global Research and Development Expenditures: Fact Sheet* Congressional Research Service, R44283, Updated September 14, 2022, https://sgp.fas.org/crs/misc/R44283.pdf

Statista: Leading Countries in Gross Global Research and Development (R&D) Expenditure in 2021

(in $US



According to the forecast for 2021, China will be the leading country worldwide in terms of spending on research and development, with R&D expenditure exceeding 621 billion U.S. dollars. The United States is expected to invest about 598.7 billion U.S. dollars into research and development.

Source: Statista, https://www.statista.com/statistics/732247/worldwide-research-and-development-gross-expenditure-top-countries/.

Ranking of National Efforts in High-Impact Research in Defense, Space, Robotics and Transportation Technology

Technology	Top 5 countries					Technology monopoly risk
Advanced aircraft engines (incl. hypersonics)	 48.49%	 11.69%	 6.96%	 3.93%	 3.60%	7/10 4.15 **medium**
Drones, swarming and collaborative robots	 36.07%	 10.30%	 6.13%	 5.15%	 4.53%	5/10 3.50 **medium**
Small satellites	 24.49%	 17.32%	 7.82%	 4.36%	 4.11%	5/10 1.41 **low**
Autonomous systems operation technology	 26.20%	 21.01%	 5.28%	 5.11%	 3.55%	3/10 1.25 **low**
Advanced robotics	 27.89%	 24.64%	 5.49%	 4.81%	 3.79%	4/10 1.13 **low**
Space launch systems	 19.67%	 18.24%	 9.81%	 8.18%	 6.53%	1/10 1.08 **low**

Source: Gaida Wong-Leung, Robin, Cave; *Australian Strategic Policy Institute*, Critical Technology Tracker, 2023, pp.

China and the U.S. are Major Global Traders

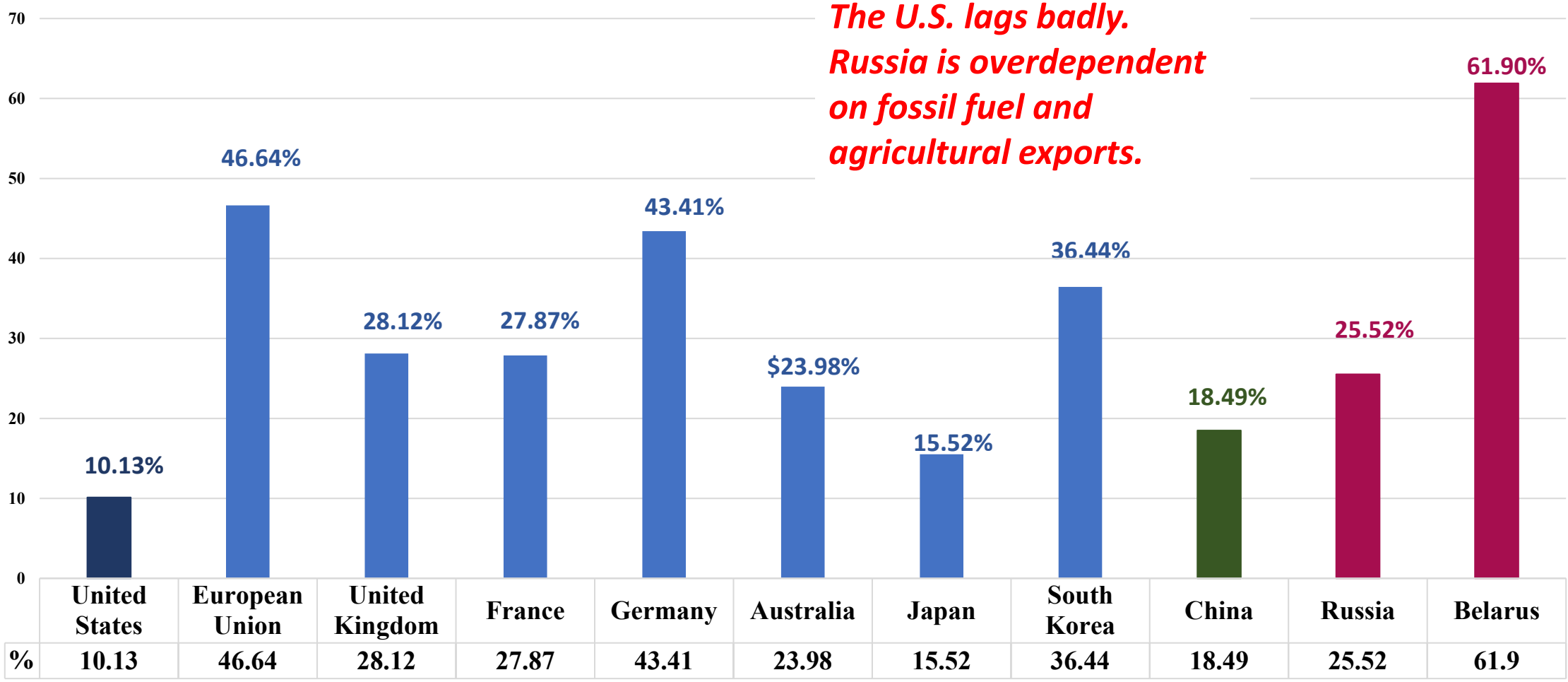
Russia Is a Third-Rate Trading Power – Falling Well below Major Western European Powers, Japan, and South Korea

Volume of Trade in 2020

Country	Trade as % of GDP	Imports		Exports	
		Value of Goods ($US Billions)	Value of Services ($US Billions)	Value of Goods ($US Billions)	Value of Services ($US Billions)
China	34.51	1,982.2	380.5	2,497.2	235.2
United States	NA	2,450.7	458.3	1,435.1	692.1
Russia	46.1	240.4	63.3	332.2	46.9
Germany	81.8	1,143.7	308.8	1,361.0	310.6
United Kingdom	55.1	547.9	204.8	339.2	342.7
France	58.3	572.3	231.3	501.0	245.9
Italy	55.3	393.3	93.0	470.6	87.6
Canada	60.0	419.1	91.2	391.7	85.6
Japan	NA	602.7	196.9	631.5	161.8
South Korea	70.1	434.7	106.3	516.6	90.1
Australia	44.0	210.7	38.3	250.7	48.4
India	38.5	376.9	116.2	281.7	203.3
Saudi Arabia	50.6	125.9	53.9	173.9	10.2

Source: World Bank, WITS, World Integrated Trade Solution, https://wits.worldbank.org/CountryProfile/en/Country/RUS/Year/2020.

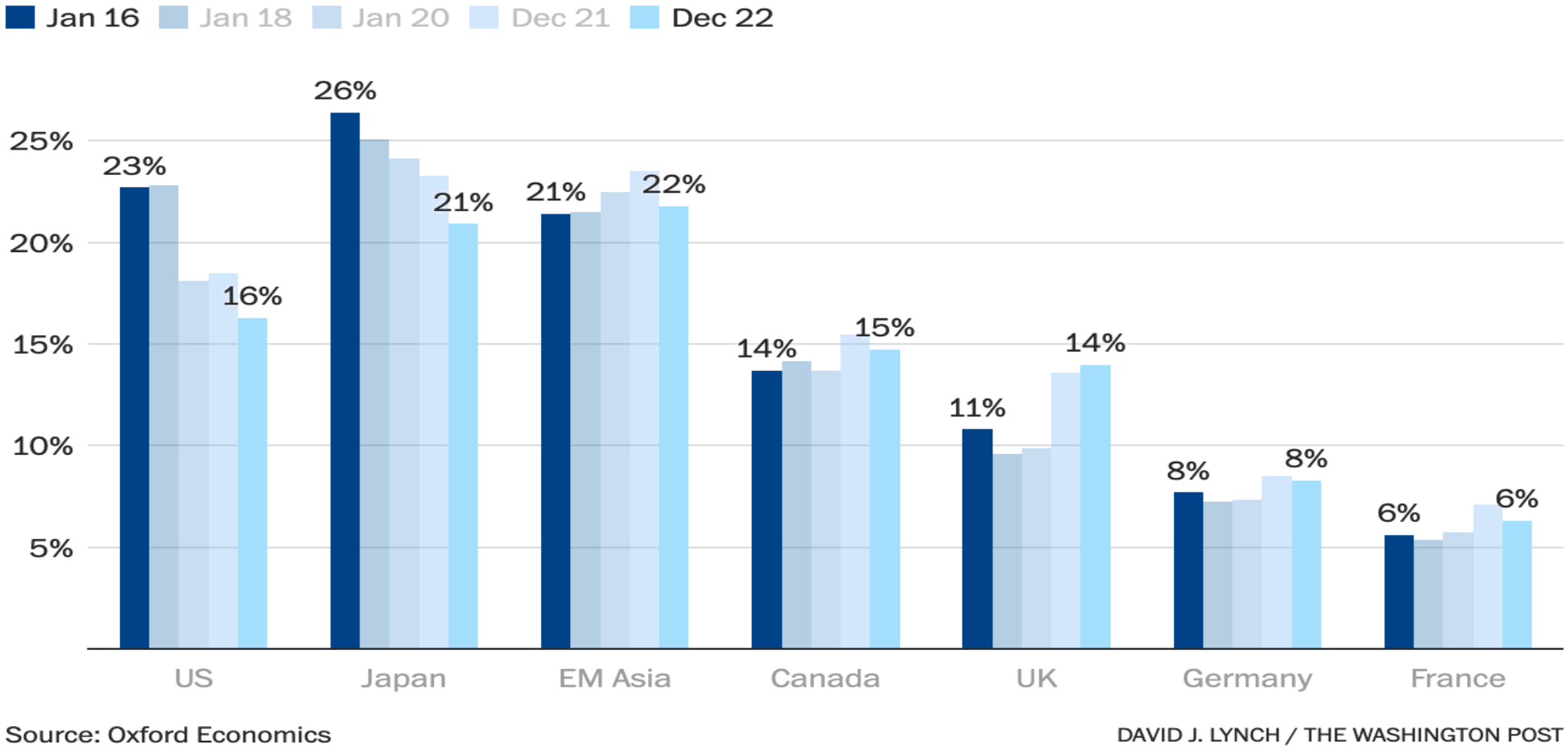
Exports as % of GDP in 2020



	United States	European Union	United Kingdom	France	Germany	Australia	Japan	South Korea	China	Russia	Belarus
%	10.13	46.64	28.12	27.87	43.41	23.98	15.52	36.44	18.49	25.52	61.9

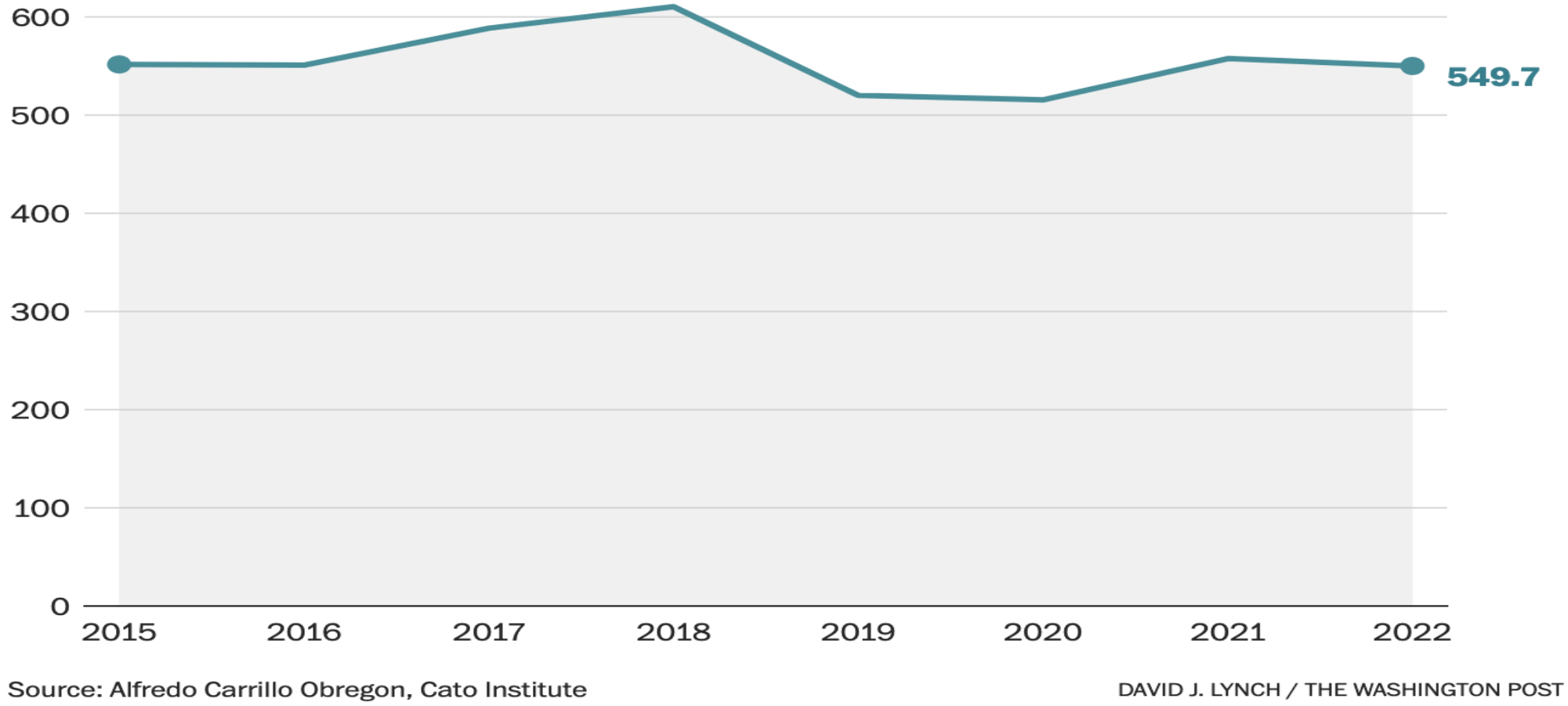
Source: World Bank, "Exports of goods and services (% of GDP)," https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS.

Percent of Total Imports from China: 1/2016 to 12/2022



Sources" David J. Lynch, "U.S. companies are buying less from China as relations remain tense," *Washington Post*, August 6, 2023,

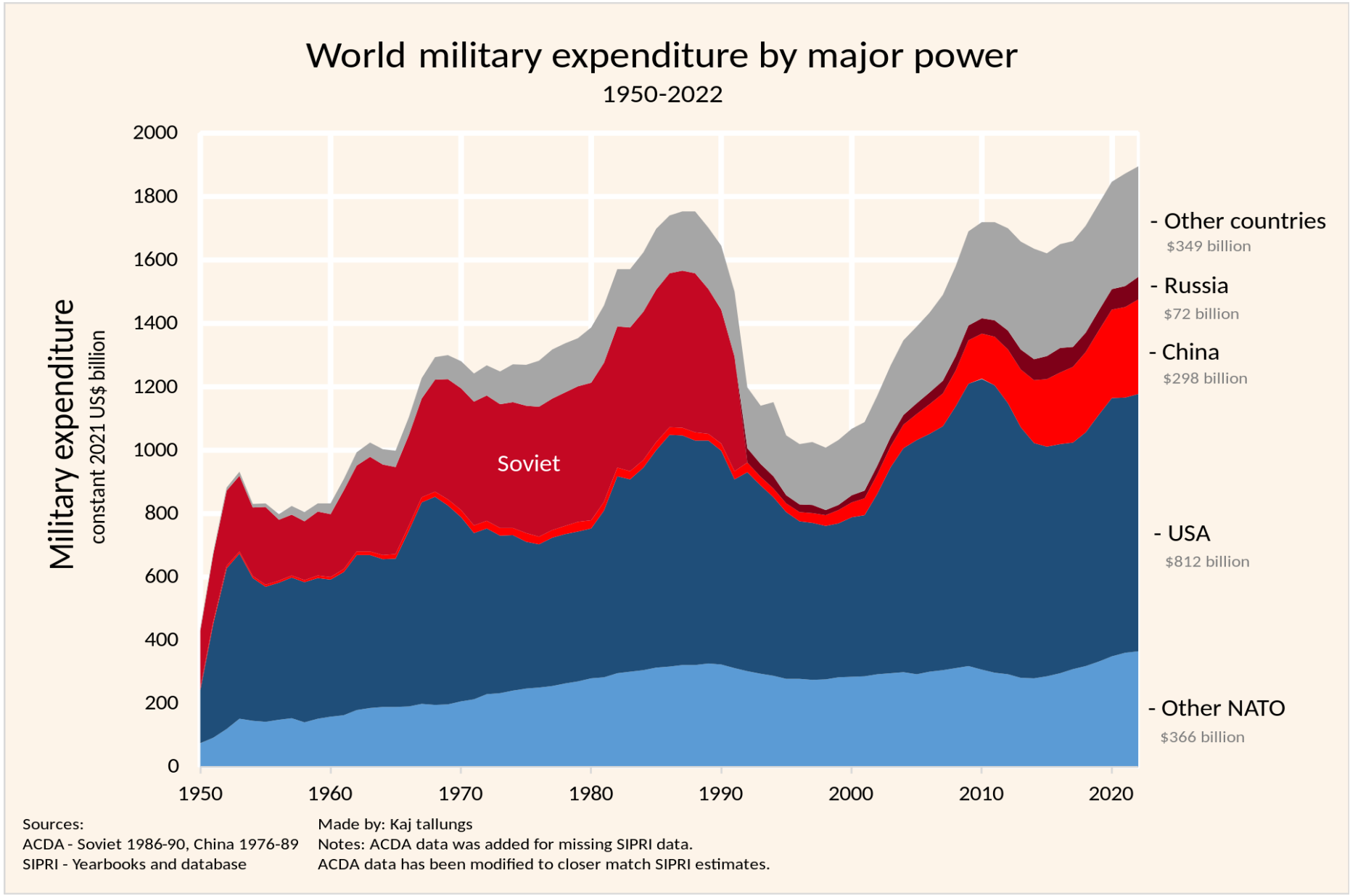
Annual Value of U.S. Imports from China, Adjusted for Inflation, in billions of dollars



Sources" David J. Lynch, "U.S. companies are buying less from China as relations remain tense," *Washington Post*, August 6, 2023,

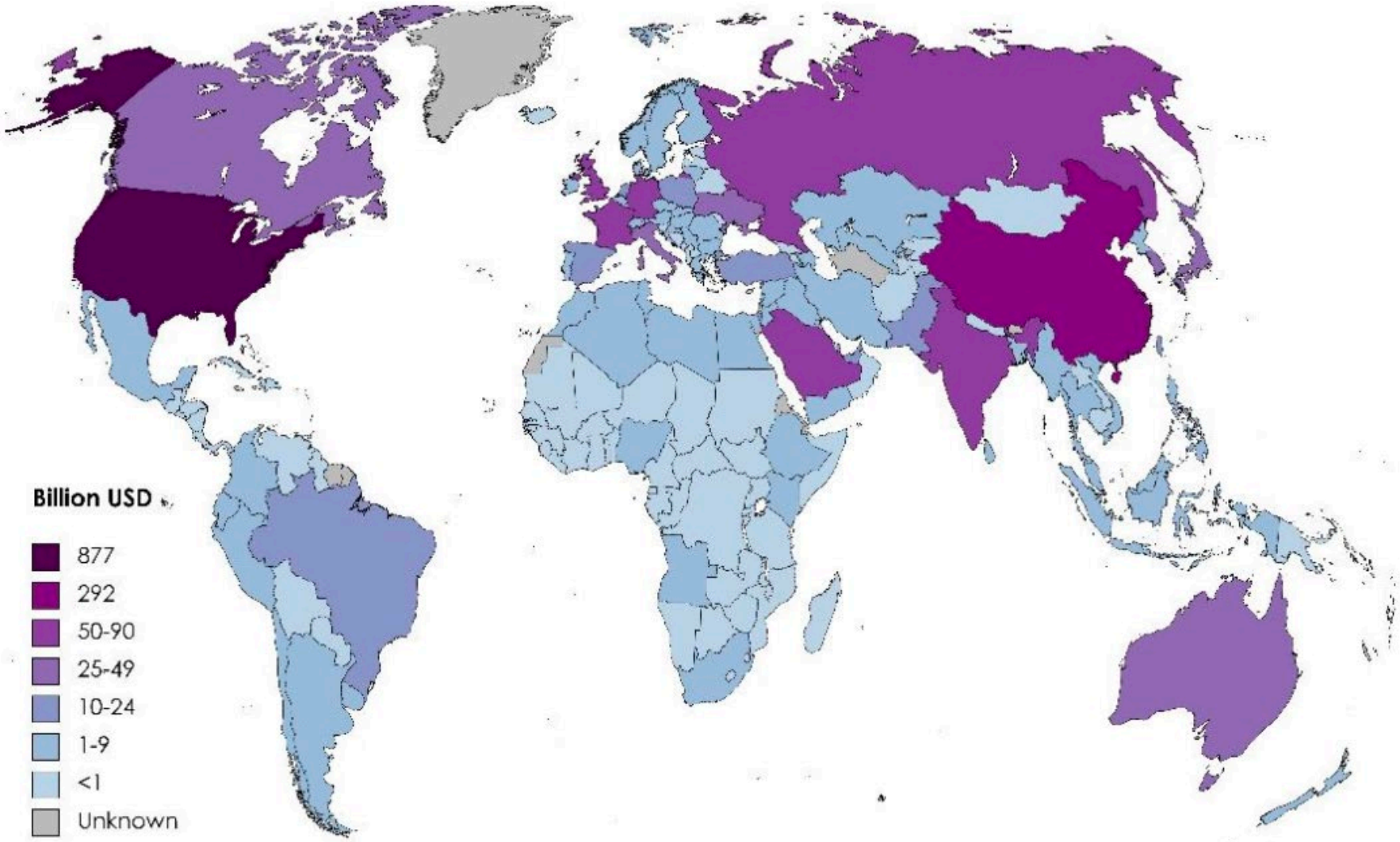
- **Comparative Military Spending is Highly Uncertain, but the U.S. still has a Clear Lead.**
- **China has made sustained major rises since 2000.**
- **Russia has lagged badly since the early 1990s, but has made significant increases as a result of the Ukraine War**

Wikipedia Estimate: Similar Post FSU Trends Through 2021



Source: Wikipedia, https://en.wikipedia.org/wiki/Military_budget_of_Russia. Its graph draws upon on work by Kaj Tallungs. The full Wikipedia article has an excellent analysis of the differences between unclassified sources..

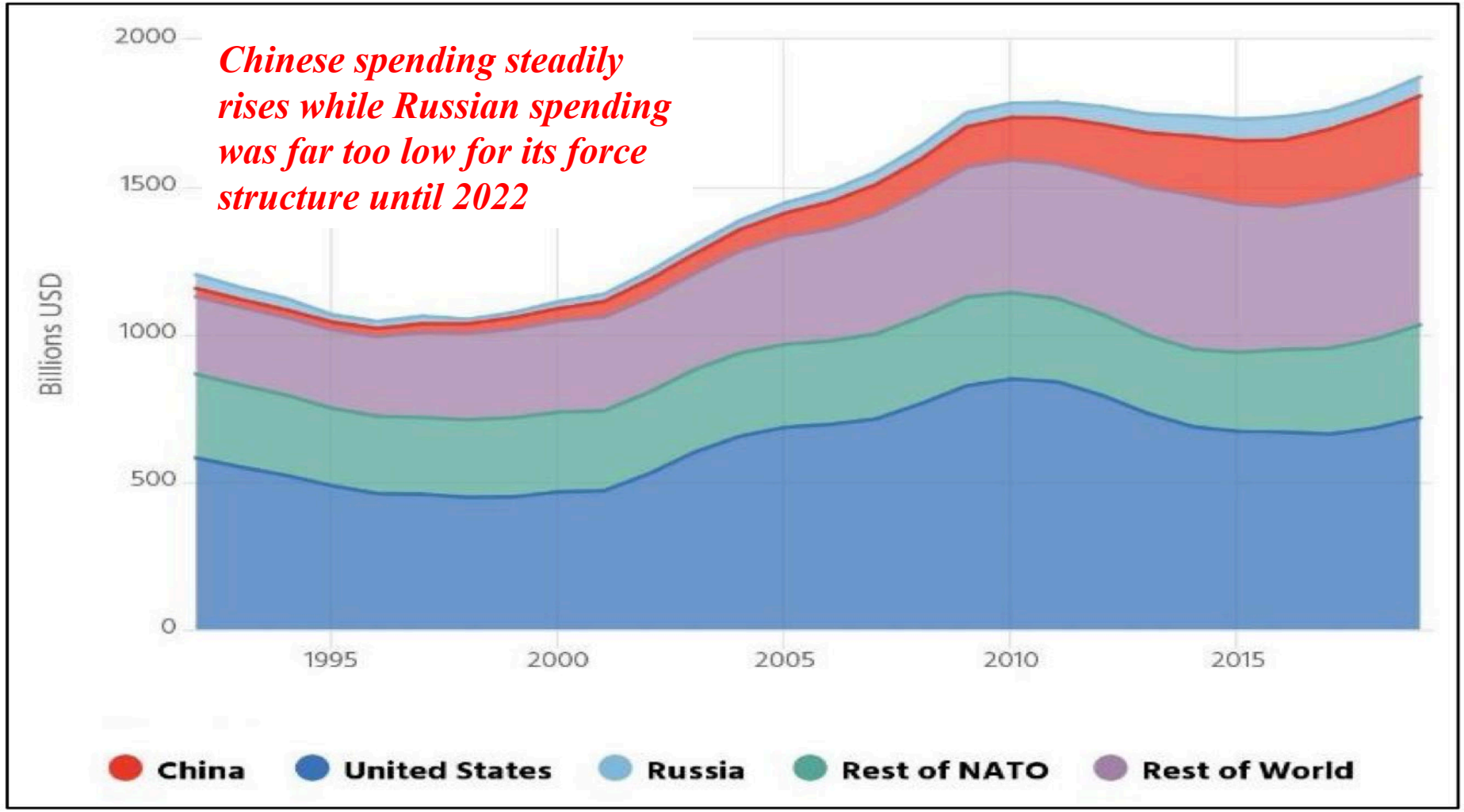
FOI Estimate of. Military Spending in a Global Context in 2022



Source: Per Olsen, *Defence Economic Outlook 2023 An Assessment of Military Strength among Major Global Powers 2000-2030*, FOI, June 2023, *Adapted fro**m*** Global military expenditure, 2022 (current USD). Source: SIPRI (2023a).

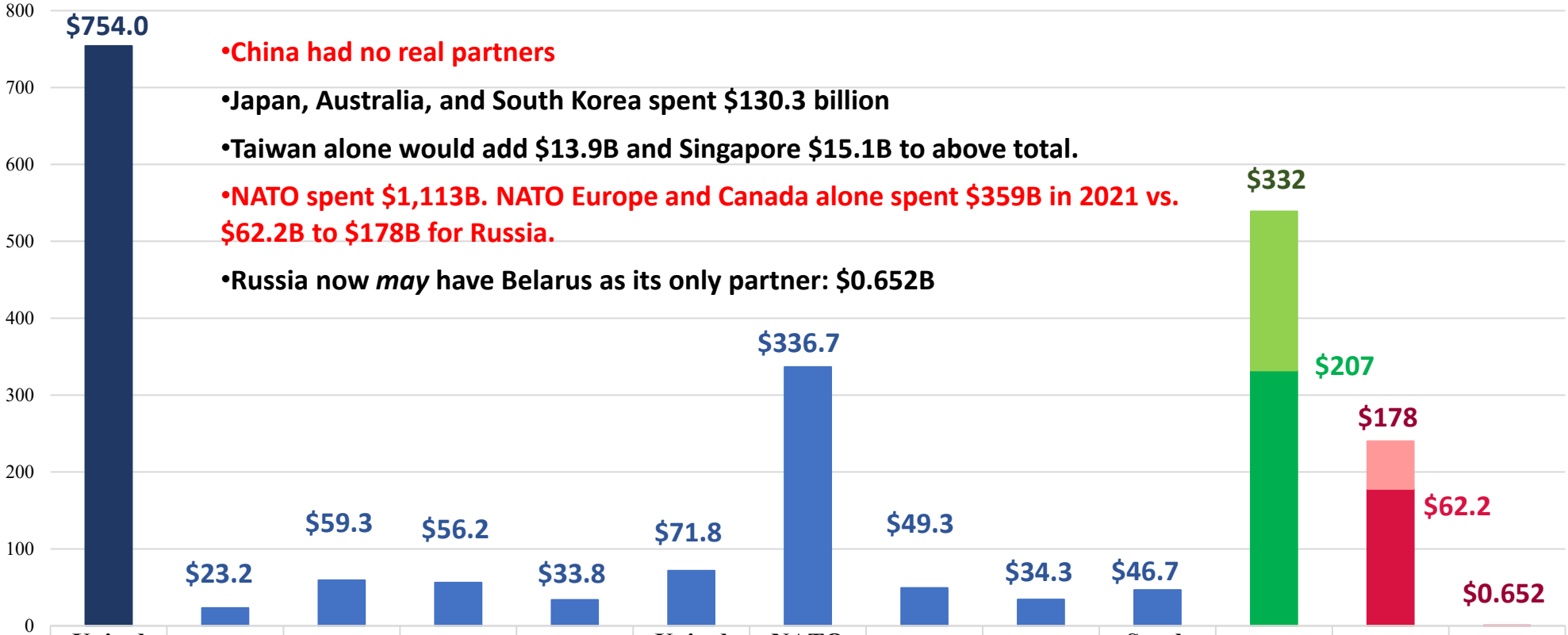
Russia Is Still a Major Military Power but Its Reported Military Spending following the break up of the FSU was Far Below the Level Needed to Fully Sustain and Modernize Its Force Structure Through 2020-2021

U.S. Estimates: The U.S. and Its Partners Have a Massive Lead in Military Spending *If* They Use Their Funds Effectively



Source: Cailtlin Campbell, *China Primer: The People's Liberation Army (PLA),* Congressional Research Service, January 5, 2021, https://crsreports.congress.gov/product/pdf/IF/IF11719/4.

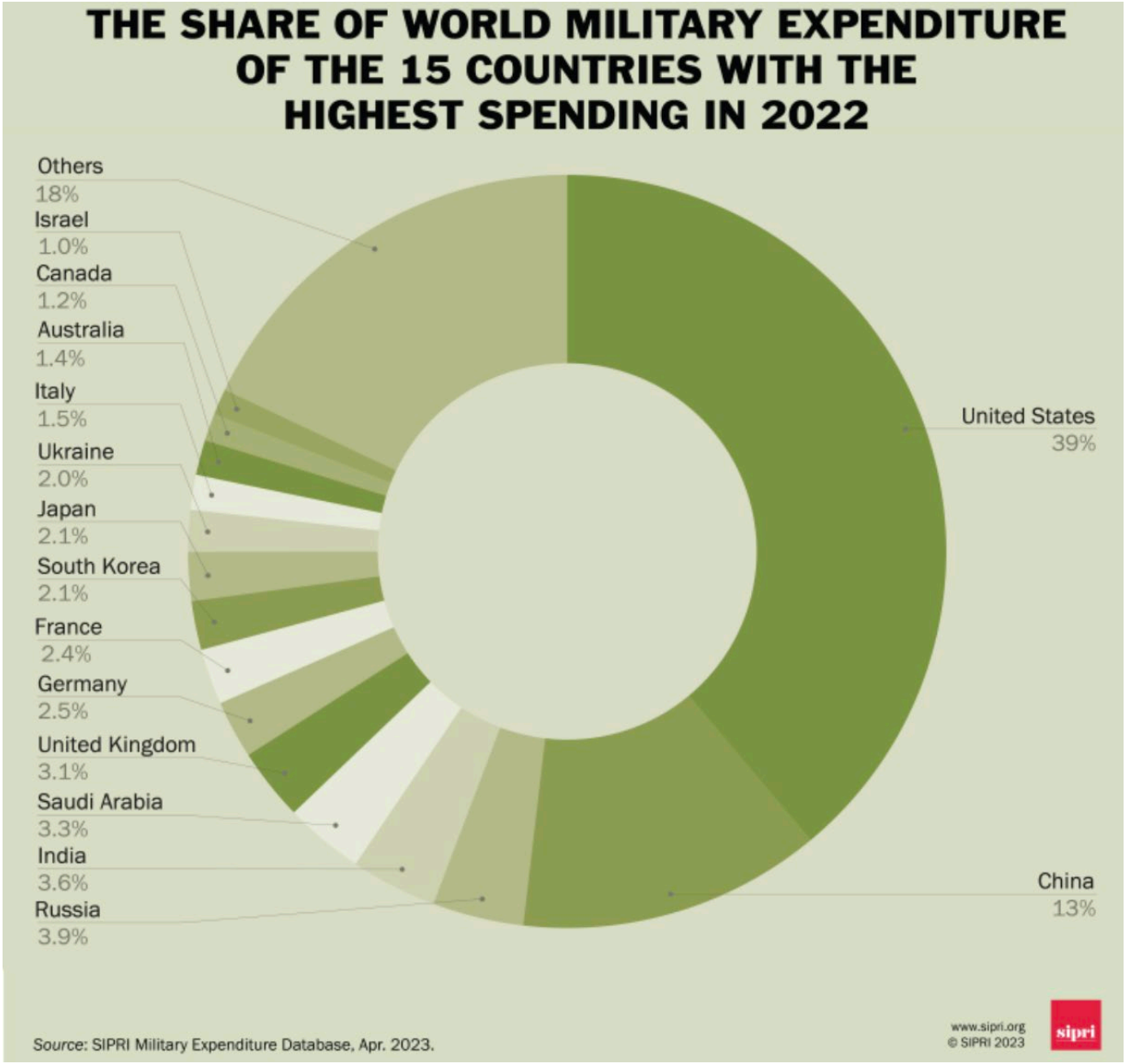
Competitive Military Spending in 2021
(in Current 2021 $US Billions)



	United States	Canada	France	Germany	Italy	United Kingdom	NATO Europe	Japan	Australia	South Korea	China	Russia	Belarus
Official Estimate	754	23.2	59.3	56.2	33.8	71.8	336.7	49.3	34.3	46.7	207	62.2	0.652
PPP Estimate											332	178	

Source: NATO; and IISS, *Military Balance 2021*.

SIPRI Estimates for 2022 Show Only a Limited Rise in Russian Spending Relative to the U.S., Europe, and China



Top 15 countries spent $1,842 billion in 2022, 82% of world total

US =	$887.0 billion
China =	$292.0 billion
Russia =	$86.4 billion
India =	$81.4 billion
Saudi Arabia =	$75.0 billion
United Kingdom =	$68.5 billion
Germany =	$55.8 billion
France =	$53.6 billion
South Korea =	$46.4 billion
Japan =	$46.0 billion
Ukraine =	$44.0 billon
Italy =	$33.5 billion
Australia =	$32.3 billion
Canada =	$26.9 billion
Israel =	$23.4 billion
Rest of World =	$398.0 billion

Source: SIPRI, *Military Expenditures, 2023*, https://www.sipri.org/research/armament-and-disarmament/arms-and-military-expenditure/military-expenditure.

Some Estimates Do, However, Reflect a Major Rise in Russian Spending Since 2021

- **The previous SIPRI data reflect a major increase from $65.9 billion 2021 to $86.4 billion in 2022, but this is not a serious rise not relative to the increases made by the U.S., China, and major NATO states.**
- **The IISS report that the draft Russian 2023 budget, submitted to to the State Duma on 30 September 2022, showed that final core spending for 2022 rose from an original proposal of RUB3.50tr (USD50.0bn) to RUB4.68tr (USD66.9bn), with a corresponding rise in total military spending from RUB4.98tr (USD71.1bn) to RUB6.15tr (USD87.9bn).**
- **Reuters reports that Russia spent 2 trillion rubles ($26 billion) on defence in January and February 2023, a 282% rise over the 525.4 billion rubles in the first two months of 2022, and driven by the conflict in the Ukraine.**
- **Other estimates emerging from a Google search indicate Russia's official 2022 military budget could be 4.7 trillion rubles ($75bn), or higher, and reach $84 billion for 2023. This is 40% more than initial military budget announced in 2021. They also estimate that Russia plans to spend a total of $600 billion on military and the police between 2022–2025, or $150 billion a year**

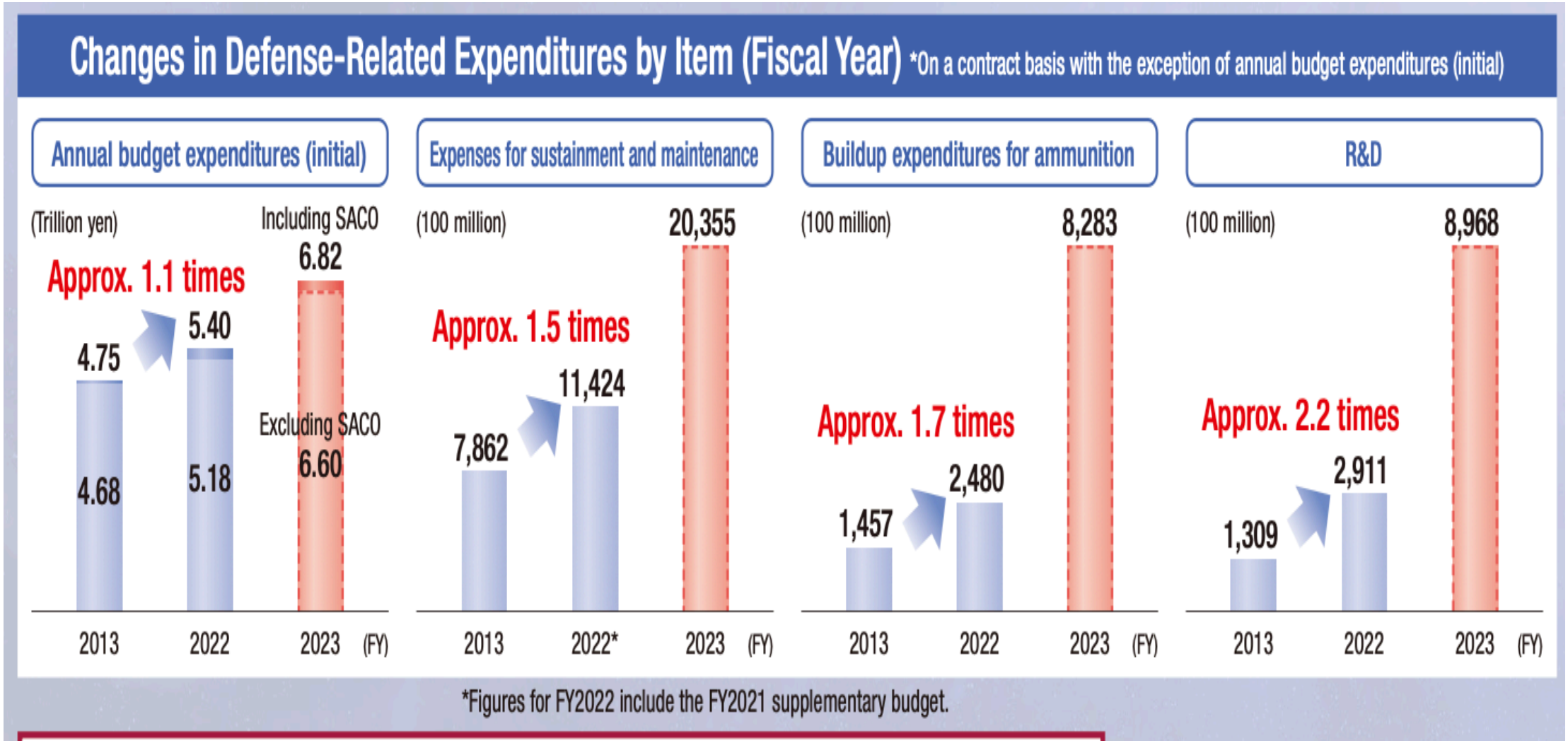
Sources: IISS, *Military Balance, 2023; "Russia;"* SIPRI, : https://www.reuters.com/world/europe/russias-defence-spending-jumped-282-yy-26-bln-jan-feb-budget-data-2023-05-15/, and https://www.google.com/search?client=firefox-b-1-d&q=russia+defense+spending+2023.

Chinese Military Spending Has Led To a Massive Force Modernization Effort that Continues in 2023

- **Rises in spite of COVID crisis, investment crisis, and other issues.**
- **Government fiscal revenues down 30-40% in some months of 2022.**
- **Military spending up more than 7% in 2022.**
- **Planned to increase by 7.2% in 2023**

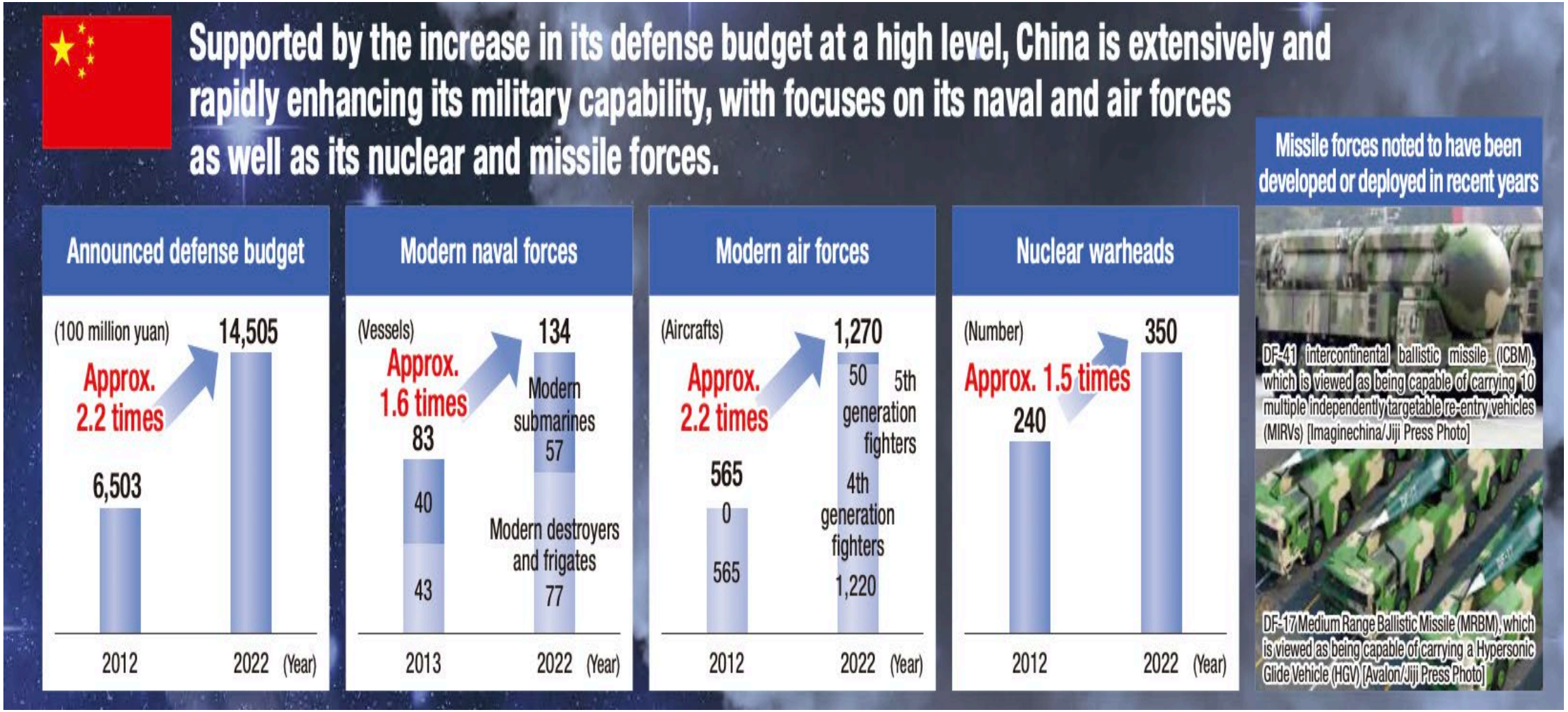
Source: ***New York Times*****, March 4, 2023**

Japanese Estimate of Rise in Chinese Military Spending by Category: 2013 vs. 2023



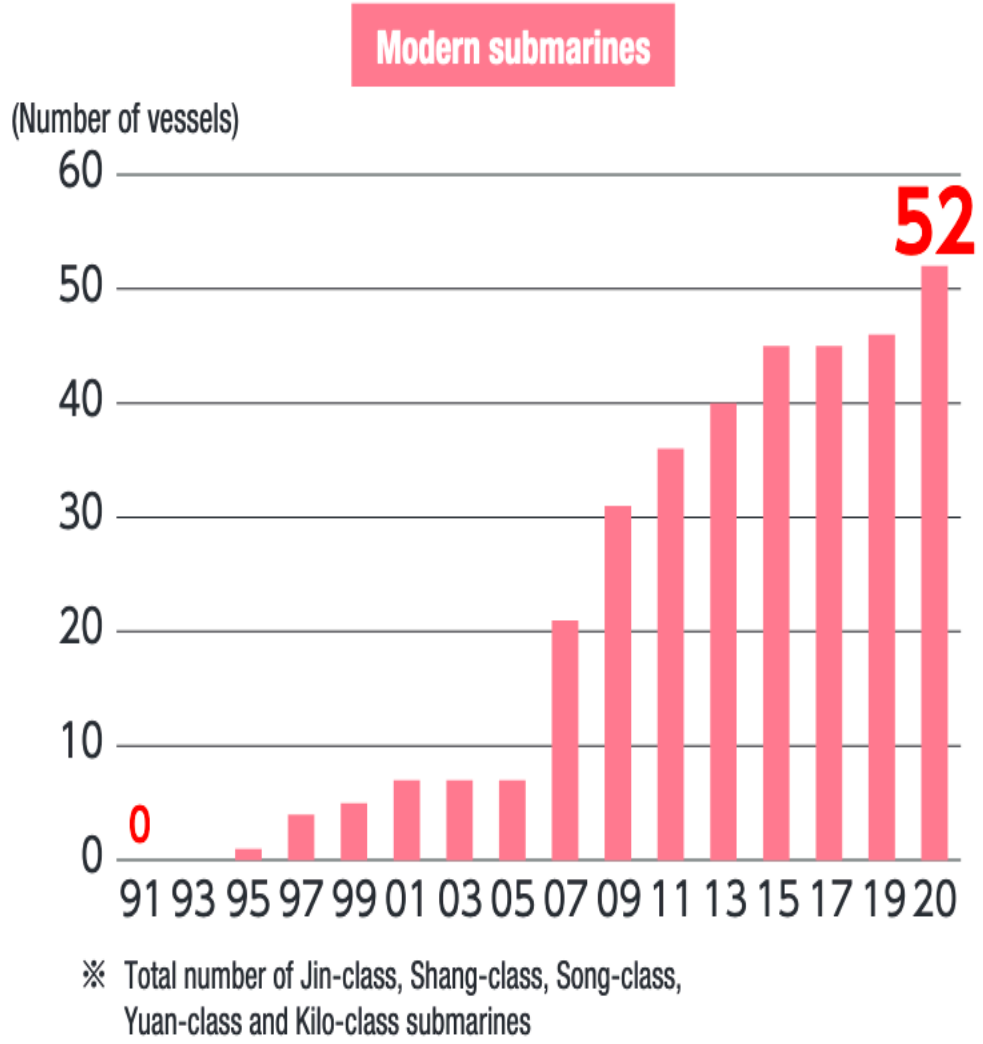
Source: ***On the Publication of Defense of Japan 2023,*** HAMADA Yasukazu Minister of Defense, 8.2023

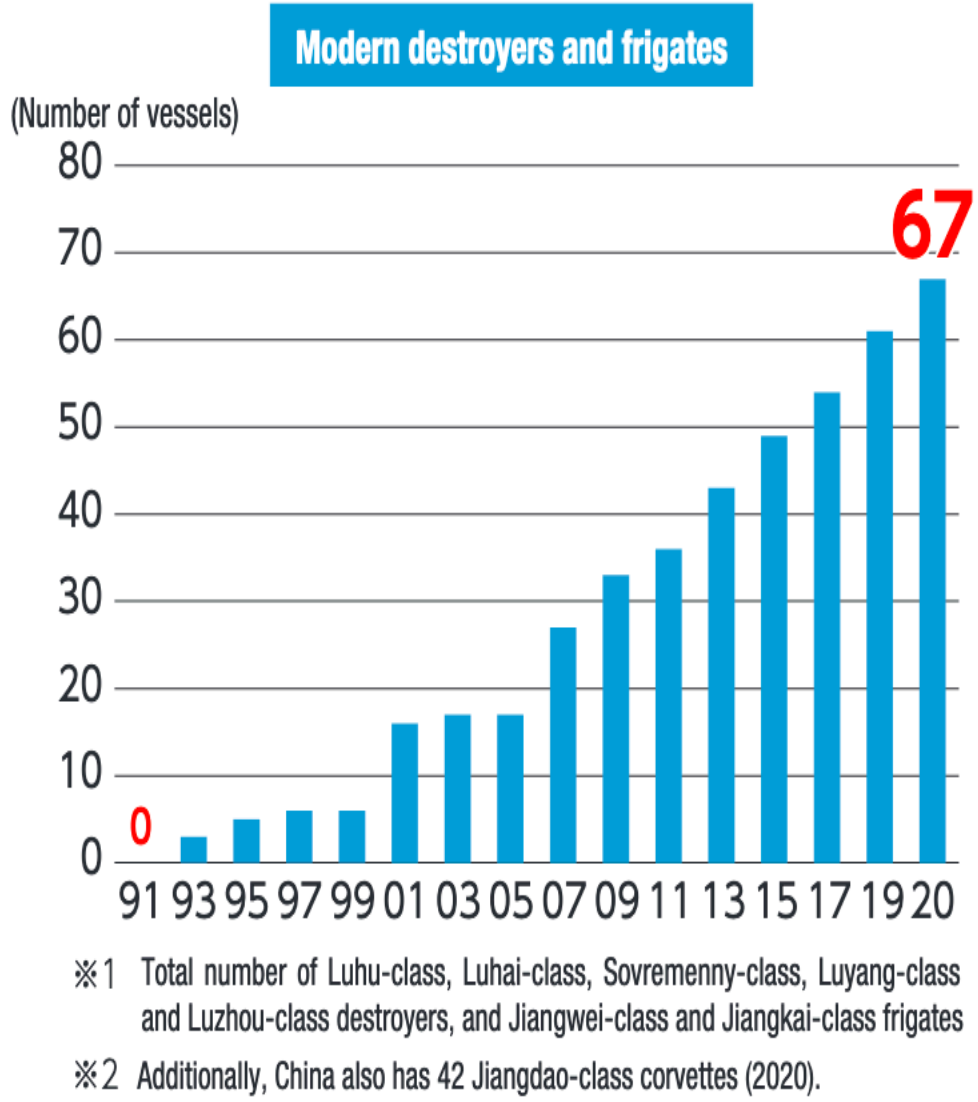
Japanese Estimate of Rise in Chinese Military Spending and Forces: 2012 vs. 2022



Source: ***On the Publication of Defense of Japan 2023,*** HAMADA Yasukazu Minister of Defense, 8.2023

Japanese Estimate of Chinese Submarine & Destroyer/Frigate Build-Up: 1991-2020





Source: Japanese Ministry of Defense, *Defense of Japan*, 2020, p. 67.

US Navy Estimate of Comparative US and Chinese Combat Ship Strength: 2000-2030

Figures for Chinese ships taken from ONI information paper of February 2020

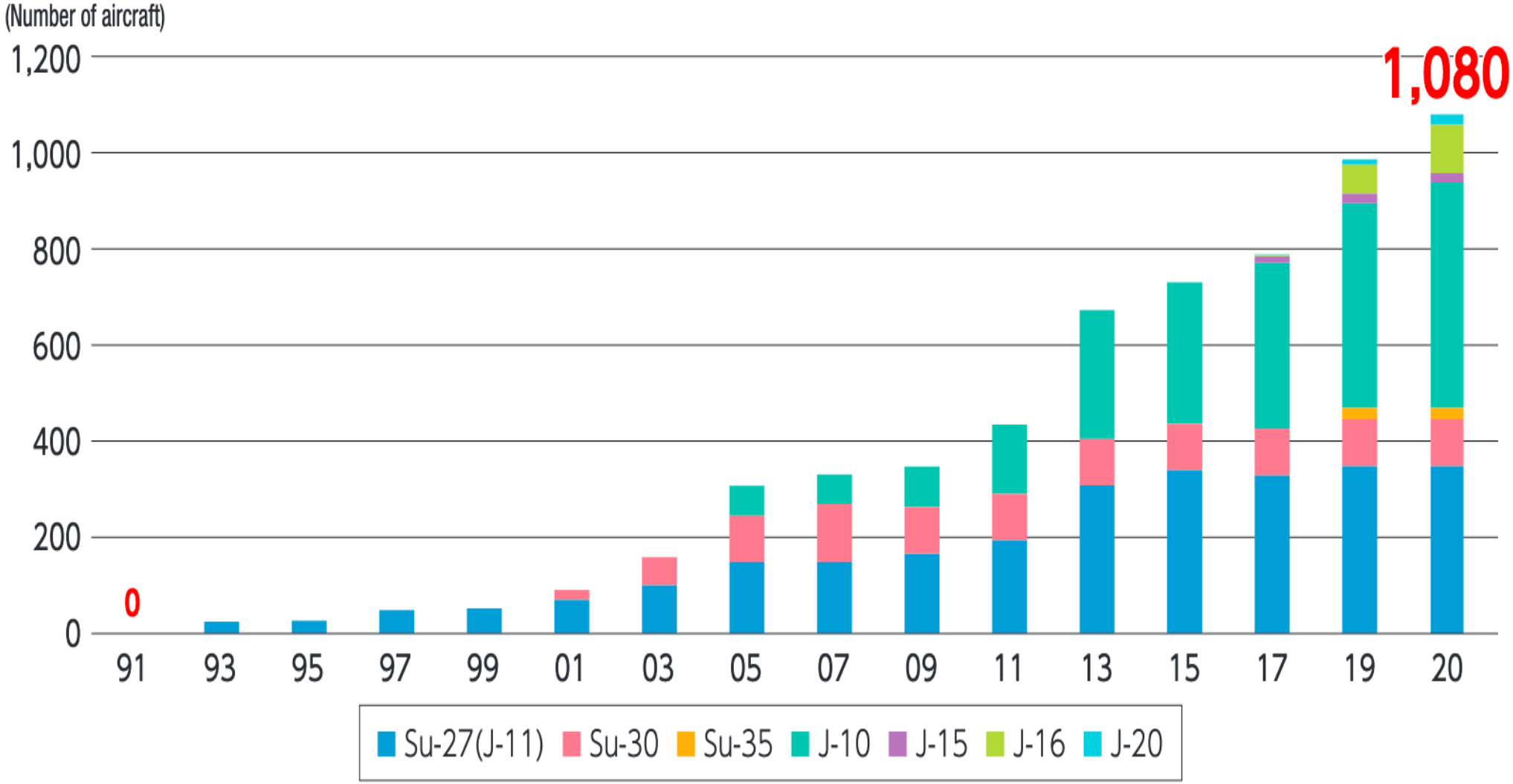
	2000	2005	2010	2015	2020	2025	2030
Selected ship types							
Ballistic missile submarines	1	1	3	4	4	6	8
Nuclear-powered attack submarines	5	4	5	6	7	10	13
Diesel attack submarines	56	56	48	53	55	55	55
Aircraft carriers, cruisers, destroyers	19	25	25	26	43	55	65
Frigates, corvettes	38	43	50	74	102	120	135
Total number of China navy battle force ships, including types not shown above	**210**	**220**	**220**	**255**	**360**	**400**	**425**
Total U.S. Navy battle force ships	***318***	***282***	***288***	***271***	***296***	***286***	***290***
U.S. total above compared to China total above	***+108***	***+62***	***+68***	***+16***	***-64***	***-114***	***-135***

Sources: Table prepared by CRS. Source for China's navy: Unclassified ONI information paper prepared for Senate Armed Services Committee, subject "UPDATED China: Naval Construction Trends vis-à-vis U.S. Navy Shipbuilding Plans, 2020-2030," February 2020, 4 pp. Provided by Senate Armed Services Committee to CRS and CBO on March 4, 2020, and used in this CRS report with the committee's permission. Figures are for end of calendar year. Source for figures for U.S. Navy: U.S. Navy data; figures are for end of fiscal year.

Note: In the column for the year 2000, the ONI information paper showed a figure for the total number of China navy battle force ships of 110, but the Navy later stated that this was a typo, and that the correct figure is 210.

Source: Ronald O'Rourke. *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress* , Congressional Research Service, Updated May 15, 2023, https://crsreports.congress.gov RL33153

Japanese Estimate of Chinese Fourth and Fifth Generation Fighter Build-Up: 1991-2020



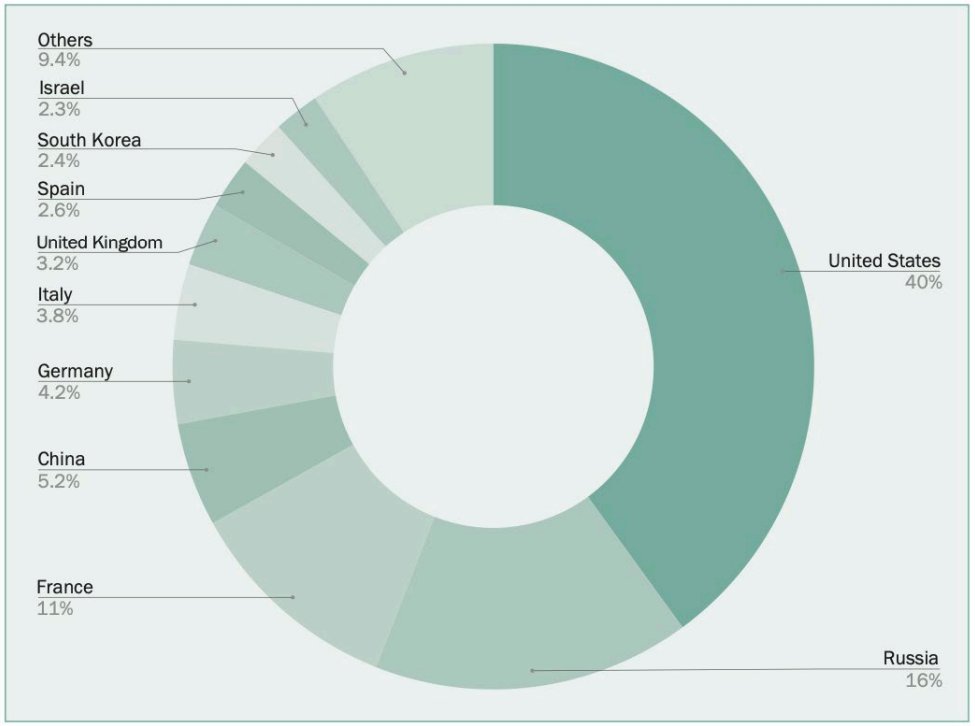
Source: Japanese Ministry of Defense, *Defense of Japan*, 2020, p. 68.

Arms Transfers Provide an Important Indicator of Comparative Strategic Influence and Security Assistance

- **The U.S. has cancelled its report on World Military expenditures and arms transfers, and there now is no reliable declassified estimate of the actual market value of arms sales.**
- **SIPRI does, however, provide an well structure estimate of the total value of major weapons transfers based on estimates of comparable prices.**
- **These SIPIR estimates indicate the the U.S. retains a massive lead over other providers of arms transfers and had 40% of the world total in 2018-2022.**
- **Russia had a 16% share.**
- **The other major arms sellers were largely strategic partners of the U.S.**
- **China only had a 5.2% share, although it was increasing.**

SIPRI Estimates That China Still Lags as a Major Arms Exporter

Share of World Arms Exports: 2018-2022



Excerpted from SIPRI, TRENDS IN INTERNATIONAL ARMS TRANSFERS, 2022, https://www.sipri.org/sites/default/files/2023-03/2303_at_fact_sheet_2022_v2.pdf

Selected major arms on order or preselected for future orders for delivery after 2022

It is very difficult to make predictions about future trends in arms transfers. Nevertheless, data on orders and final negotiations of orders can give a rough indication of which states will be among the largest exporters in coming years. The data on combat aircraft and major warships, which have a notably high military value, is particularly telling. As the table below shows, the United States will almost certainly continue to be by far the largest exporter of major arms beyond 2022, especially as around 60 per cent of all combat aircraft currently on order will be supplied by the USA. Russia, which was the second largest arms exporter in the world in 2018–22, has a relatively low number of pending deliveries.

	United States	Russia	France	China	Germany	Italy	United Kingdom	Spain	South Korea	Israel
Combat aircraft[a]	1 371	84	210	94	–	115	20	–	136	18
Major warships[b]	5	5	21	22	29	9	26	2	6	–
SAM systems[c]	40	13	6	1	25	1	–	–	..	26
Tanks	634	444	–	717	85	–	14	..	990	19
Other armoured vehicles	2 658	55	552	–	1 389	1 703	2	608	23	69
Artillery	401	–	176	128	137	–	30	10	1 232	87

.. = data not available or not applicable; – nil or a negligible figure; SAM = surface-to-air missile.

[a] Combat aircraft here include combat helicopters, combat/trainer aircraft and anti-submarine warfare aircraft.

[b] Major warships here include aircraft carriers, corvettes, destroyers, frigates and submarines.

[c] SAM systems here include only land-based systems and exclude systems for portable/very short-range SAMs.

Source: SIPRI Arms Transfers Database, Mar. 2023.

Russia Only Remains a True Military Superpower in Nuclear Forces

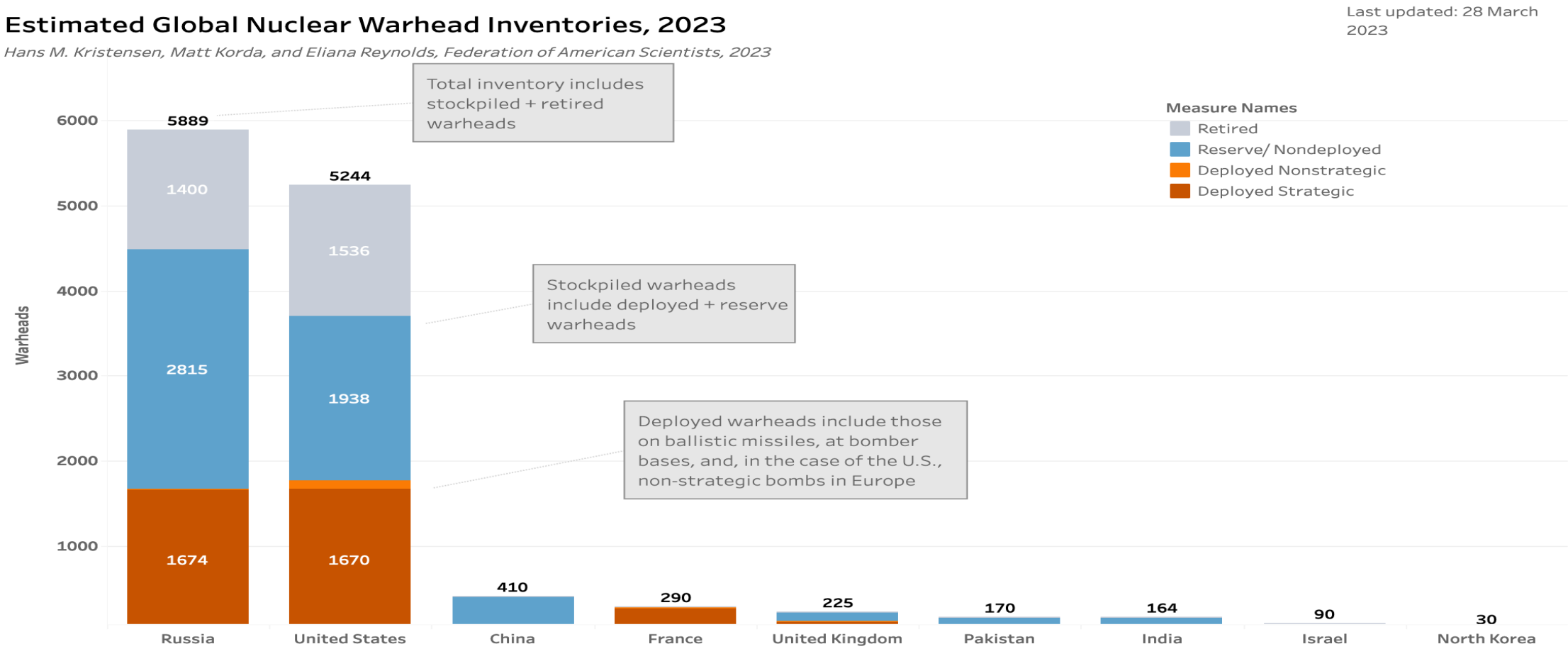
Chinese Conventional Military Forces in 2021-2022 Have Risen to Compete with the U.S. While Russian Forces Seem to Be Legacy Forces Far Too Large for Their Reported Funding

Category	U.S.	China	Russia
Military Budget ($U.S. billions)	768	207?	62.2?
Military Expenditures (U.S. Billions)	811?	270?	45.8?
Total Active Military Personnel	1,395,350	2,035,000	900,000
Reserve Military Personnel	843,450	510,000	2,000,000
SSBN	14	6	11
ICBM	400	116	339
IRBM	NA	110+	?
Nuclear Bombers	66	NA	76
Satellites	142	161	113
Army Active/Reserves Personnel	489,050	965,000	280,000
Main Battle Tanks	2,645	5,400	2,927
Other Armored Fighting Vehicles	2,931	8,950	6,880
Armored Personnel Carriers	10,607	4,350	6,050+
Major Artillery (Towed, SP, MRL)	2,616	7,034+	3,354
Surface-to-Surface Missiles	?	?	180+
Attack Helicopters	740	300+	?
Navy Active Personnel	349,600	260,000	150,000
Tactical Nuclear Submarines	53	53	18
Conventional Submarines	0	46	20
Principal Surface Combatants	124	86	32
Aircraft Carriers	11	2	1
Cruisers	24	3	4
Destroyers and Frigates	87	81	27
Patrol and Coastal Combatants	86	196	129
Principal Amphibious and Landing Ships	31	9	21
Mine Warfare	8	57	42
Combat Capable Aircraft	954	446	219
ASW and Mine Warfare Helicopters	557	50	60

	U.S.	China	Russia
Marine Active Personnel	179,250	35,000	35,000
Tanks	0	0	330
AFVs and APCs	1,949	280+	1,660
Major Artillery	859	40+	405
Combat Capable Aircraft	366	NA	NA
Attack Helicopters	131	NA	NA
Air Force Active Personnel	329,400	395,000	165,000
Combat Capable Aircraft	1,574	2,475	1,172
Bomber	123	176	137
Fighter Ground Attack	1,055	972+	427+
Fighter	261	517	185
Attack	135	140	264
Electronic Warfare, IS&R, ELINT	24?	73	92
AE&W and C2	35	24	17
Tanker/Tanker Transport	238	16	15
Transport Airlift	333	247+	448
Long Range Surface-to-Air Missile/Missile Defense Launchers	522	608+	454+

Source: Adapted from IISS, *Military Balance 2022;* and U.S. military data. Does not include reserve capabilities by service, Coast Guards, coastal defense, paramilitary forces, and 175,000 active personnel in Chinese strategic support forces.

U.S. and Russia are *the* Major Nuclear Powers. China Lags But Its Nuclear Inventory Has Grown Sharply Over the Last Few Years



are those deployed on bases with operational short-range delivery systems. "Reserve/Nondeployed" warheads are those not deployed on launchers and in storage (weapons at bomber bases are considered deployed). The "military stockpile" includes active and inactive warheads that are in the custody of the military and earmarked for use by commissioned deliver vehicles. The "total inventory" includes warheads in the military stockpile as well as retired, but still intact, warheads in the queue for dismantlement.

Source: Hans M. Kristensen. Matt Korda, and Robert Norris, "Status of World Nuclear Forces," 2023, Federation of American Scientists (FAS), March 29, 2023, https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/,

Chinese Nuclear Capability Is Growing Sharply

- **Seems to be more than doubling its stockpile of nuclear weapons. May have risen from around 200 to 350 by 2020. 272 operational for exiting missiles and bombs and 78 for new systems. Possibly grew by 118 warheads during 2020-2021. Estimates for 2023 are 410 weapons.**
- **Have detected 270+ new missile silos. 119 in Northwestern China seem to be for ICBMs.**
- **The Chinese Military Power estimates China may have some 1,000 operational nuclear warheads by 2030, most deployed on systems capable of ranging the continental United States"**
- **China has rejected arms control initiatives and provides steadily less transparency.**
- **It is improving nuclear command and control and battle management systems.**
- **Deploying advanced solid-fuel mobile ICBMs (DF-21 & DF-31/DF-31A/DF-32AG), MIRV'd liquid fuel ICBM (DF-5B), new MIRV'd DF-41 ICBM, Type 094 SSBN with JL-2 SLBMs.**
- **Developing low noise 096 SSBNs and a 9,000 kilometer range 096 SLBM.**
- **Progressively harder to determine what theater and short-range delivery systems may become dual-capable. DF-21 MRBM (2,150 KM) and DF-26 IRBM (4,000 KM) known to be nuclear. DF-21 is precision strike, dual-capable and could deliver low-yield nuclear weapons.**
- **Modifying H-6 nuclear bombers to H-6N with refueling, missile carrying capability. H-20 stealth bomber in development.**
- **May be evolving far beyond countervalue second strike capability. Examining use as theater warfare threat?**

Source: Hans M. Kristensen. Matt Korda, and Eliana Reynolds, *"Chinese nuclear weapons, 2023,*
, https://www.tandfonline.com/doi/full/10.1080/00963402.2023.2178713; SIPRI Yearbook, *Section 2: China's Nuclear Forces: Moving Beyond a Minimal Deterrent*, 2021, https://www.uscc.gov/sites/default/files/2021-11/Chapter_3_Section_2--Chinas_Nuclear_Forces_Moving_beyond_a_Minimal_Deterrent.pdf; and DoD, *China, Military Power*, 2022.

U.S. Estimate of Chinese Missile Forces in 2022

System	*Launchers*	*Missiles*	*Estimated Range*
ICBM	300	300	>5,500km
IRBM	250	250+	3,000-5,500km
MRBM	250	500+	1,000-3,000km
SRBM	200	600+	300-1,000km
GLCM	100	300+	>1,500km

Note: For the purposes of this document, the "Taiwan Strait Area" includes the PLA's Eastern and Southern Theaters.
Department of Defense, *Military and Security Developments Involving the People's Republic of China, Annual Report to Congress, 2022*, p. 167..

Russia Has Massive Nuclear and Missile Modernization Efforts Underway In Spite of Its Constraints on Military Spending

System	Warheads	Notes
Avangard HGV	One per vehicle, nuclear	Can be delivered by SS-19 and potentially the Sarmat ICBMs; intended to overcome missile defense
RS-28 (Sarmat) silo ICBM	10+, nuclear	Deployment expected around 2022; intended to overcome missile defense
Poseidon Autonomous Underwater Vehicle	Conventional or nuclear	Carried by special-purpose submarines; intended as a second-strike, retaliatory weapon
Burevestnik Nuclear Powered Cruise Missile	Nuclear	"Unlimited" range, owing to its nuclear reactor; intended to overcome missile defense
Kinzhal Air-Launched Ballistic Missile	Conventional or nuclear	Intended to target naval vessels
Tsirkon Hypersonic Cruise Missile	Conventional or nuclear	Intended to attack ships and ground targets
Barguzin Rail-Mobile ICBM	up to 4? Nuclear	Program reportedly postponed in 2017
RS-26 Rubezh ICBM	up to 4? Nuclear	Program reportedly postponed in 2018

Source: Compiled by CRS.

Note: While the text used both Russian designations (RS-X) and U.S./NATO designations (SS-X) to identify deployed Russian weapons systems, this table displays the Russian only the Russian designation (RS-X) because a NATO designation has not yet been assigned.

Source: Excerpted from Amy F. Wolf, *Russia's Nuclear Weapons: Doctrine, Forces and Modernization*, Congressional Research Service, R45861, March 21, 2022, pp. 28-30; https://crsreports.congress.cgov.

The U.S. had Major Nuclear Modernization Plans as of October 2022

Land-Based Forces

- **Fully fund Sentinel ICBM replacement program as called for in 2023-2027 Future Year Defense Program**
- **Sentinel will replace Minuteman III on one-for-one basis. $00 ICBMs on alert.**
- **Sentinel will field W88-0/Mk21 and W87 1/Mk21A warheads & aeroshells.**
- **Any alternative to the Sentinel program extending life of MMIII increases risk and cost**

Sea-Based Forces

- **Fully Columbia-Class SSBN program to deliver a minimum of 12 boats to relace the Ohio-class fleet beginning in 2030.**
- **Prioritize near-term investment in submarine industrial base and Ohio-class sustainment to completion of the Columbia-calls transition.**
- **Prioritize near-term investment in the Trident II D5 strategic nuclear weapon system.**
- **Continue W93 warhead program. Continue to support UK with its warhead replacement program, common missile compartment, and Mk7 aeroshell.**

Air-Based Forces

- **Modernize theB-52H bomber fleet through 2050 as a nuclear standoff force with global reach.**
- **Fully fund the B-21 bomber to replace the B-2A, and acquire a minimum of 100 B-21 bombers.**
- **Fully fund the long-range standoff weapon and associate W80-4 warhead to replace the Air-Launched Cruise Missile.**
- **Retire the B83-1 gravity bomb. Leverage existing capabilities in the near- term and develop an enduring capability for improved defeat of Hard and Deeply Buried Targets.**

Supplemental Capabilities

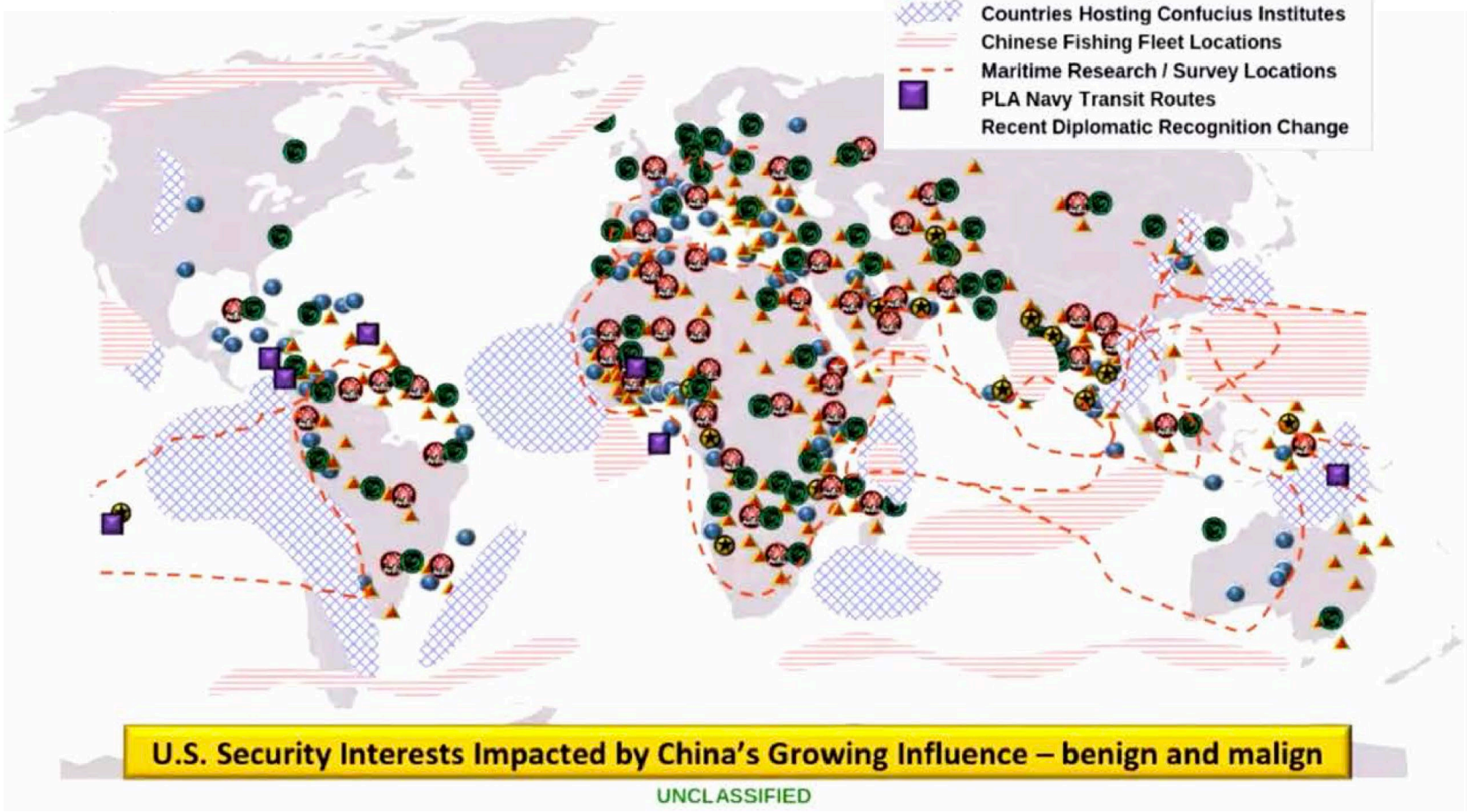
- **Retain the W76-2 low yield Submarine Launched Ballistic Missile option and periodically reassess its deterrent value.**
- **Cancel the nuclear-armed Sea-Launched Cruise Missile Program. m**
- **Continue nuclear certification of the F-35A fighter and transition from the F-15E to the F-35A to support the NAQTO nuclear mission.**
- **Replace B61-3/4/7 nuclear gravity bombs with life-extended B61-12.**

Source: Adapted from 2022 Nuclear Posture Review, DoD web site, October 27, 2022, https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF

China Is Radically Changing Its Global Civil and Military Presence in Areas Once Dominated by the U.S. and Its Partners

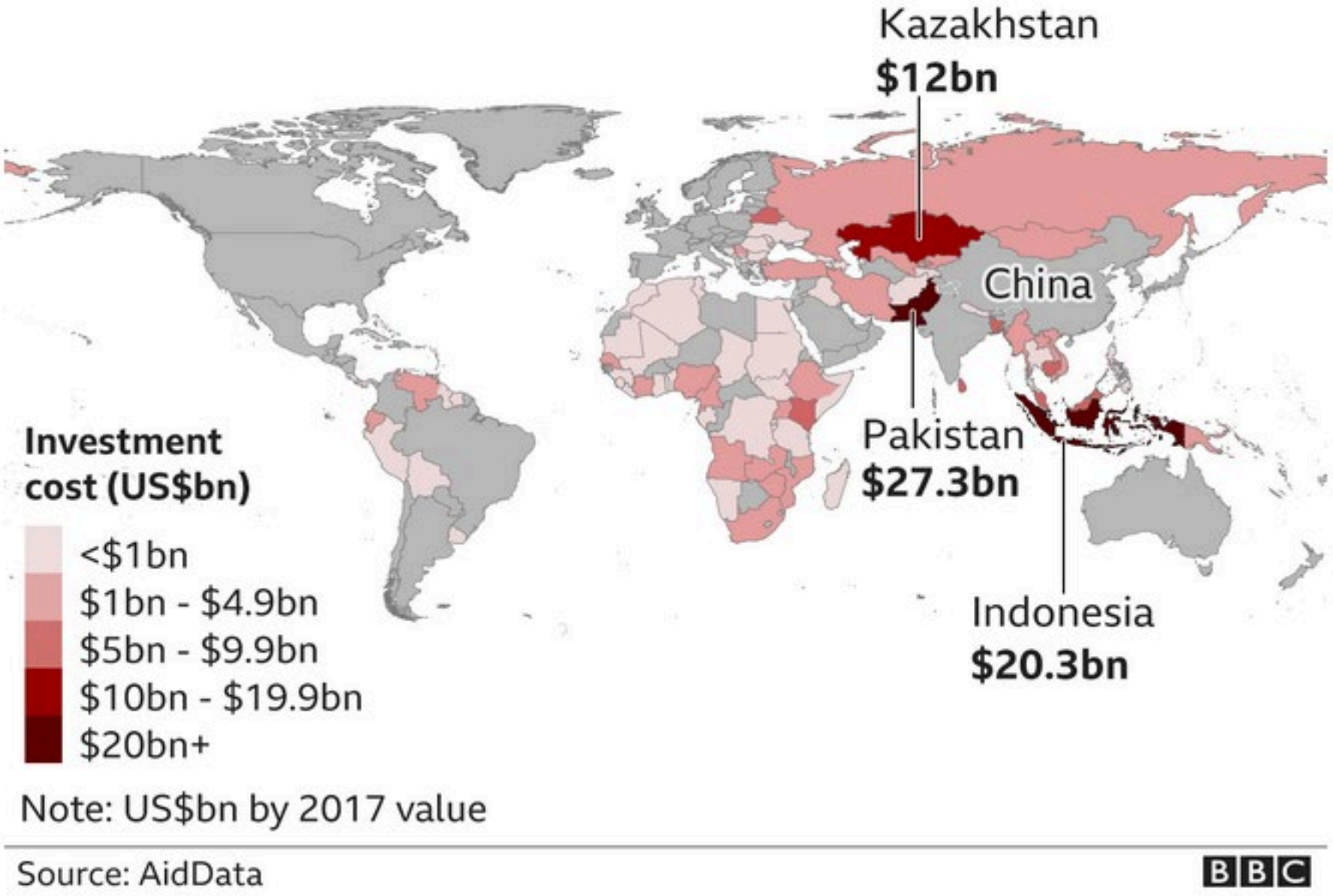
“The ultimate in disposing one’s troops is to be without ascertainable shape. Then the most penetrating spies cannot pry in nor can the wise lay plans against you. It is according to the shapes that I lay plans for victory, but the multitude does not comprehend this. Although everyone can see the outward aspects, none understands the way in which I have created victory.” (Sun Tzu)

China's Growing Global "White Area" Influence



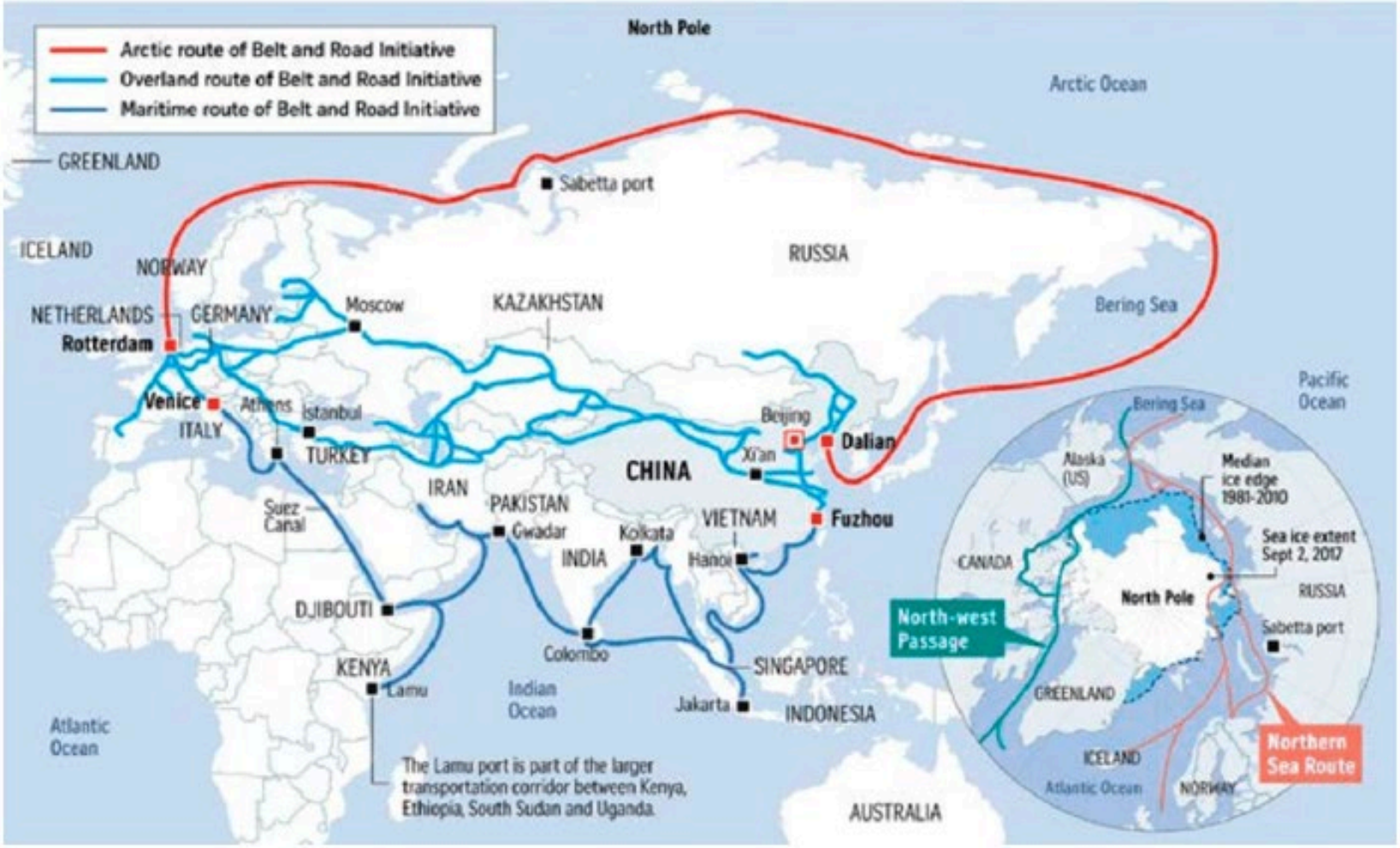
Source: Reformatted from Lt. General Mike Minihan, "2020 Virtual Annual Symposium," *Center for the Study of Weapons of Mass Destruction*, National Defense University, July 7, 2020, https://us-lti.bbcollab.com/collab/ui/session/playback/load/7cf6bb5c7aaa4aa9930d7bd7b8df0b00 and https://fas.org/wp-content/uploads/2020/09/PACOM2020_NDU-WMD-Brief2020_Minihan070720.pdf.

China's Global BRI Infrastructure Projects



Source: Jessica Parker, "Multi-billion EU bid to challenge Chinese influence," BBC, December 1, 2021, https://www.bbc.com/news/world-europe-59473071 .

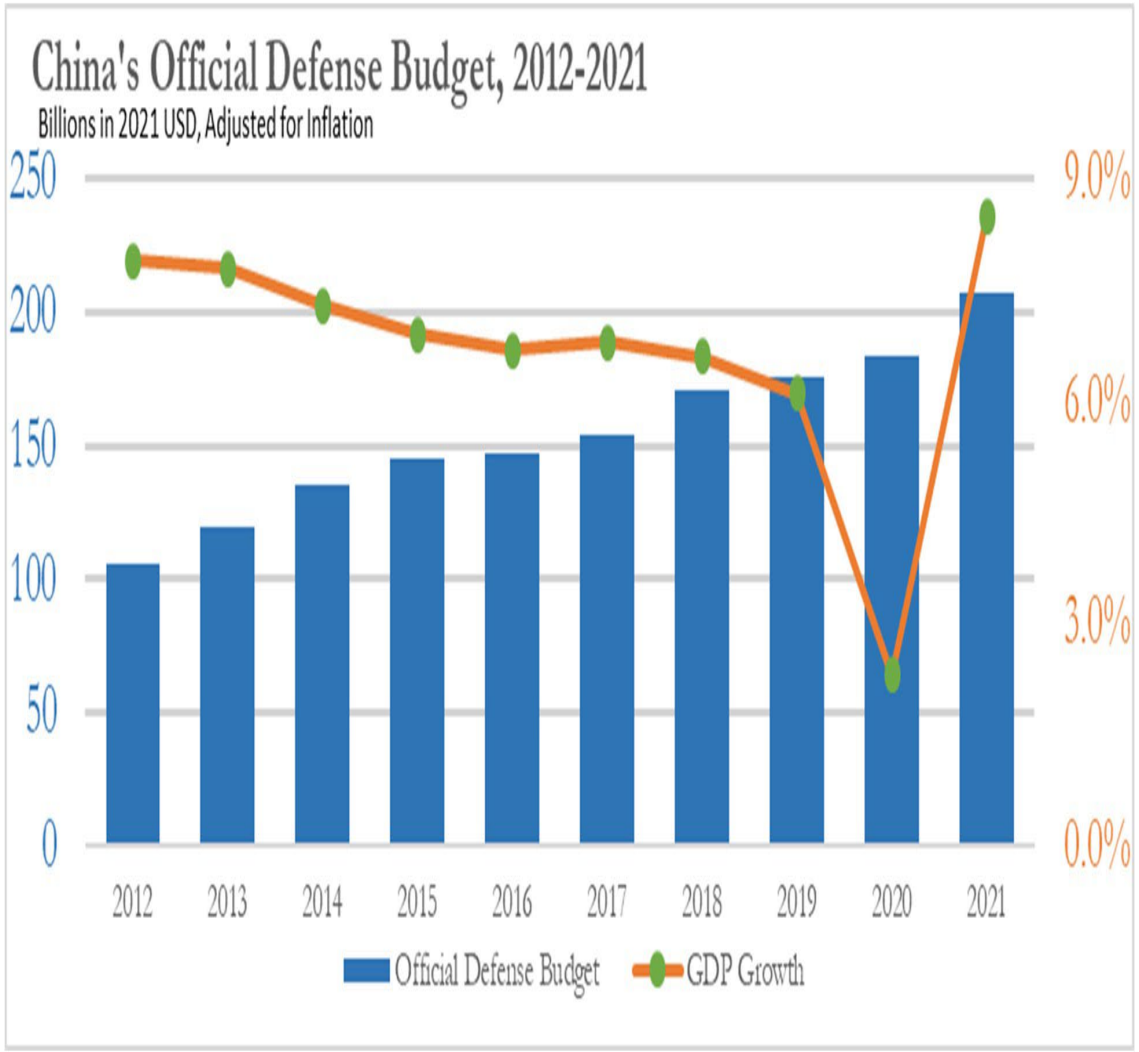
Potential Future Impact of Chinese Naval and Land Belt and Road Initiatives



Source: Ewa Oziewicz and Joanna Bednarz, "Challenges and opportunities of the Maritime Silk Road initiative for EU countries (Scientific Journals of the Maritime University of Szczecin)," October 17, 2019, ResearchGate, https://www.researchgate.net/publication/336616579_Challenges_and_opportunities_of_the_Maritime_Silk_Road_initiative_for_EU_countries_Scientific_Journals_of_the_Maritime_University_of_Szczecin.

U.S. Estimate of Asian Official Military Spending Data in 2021

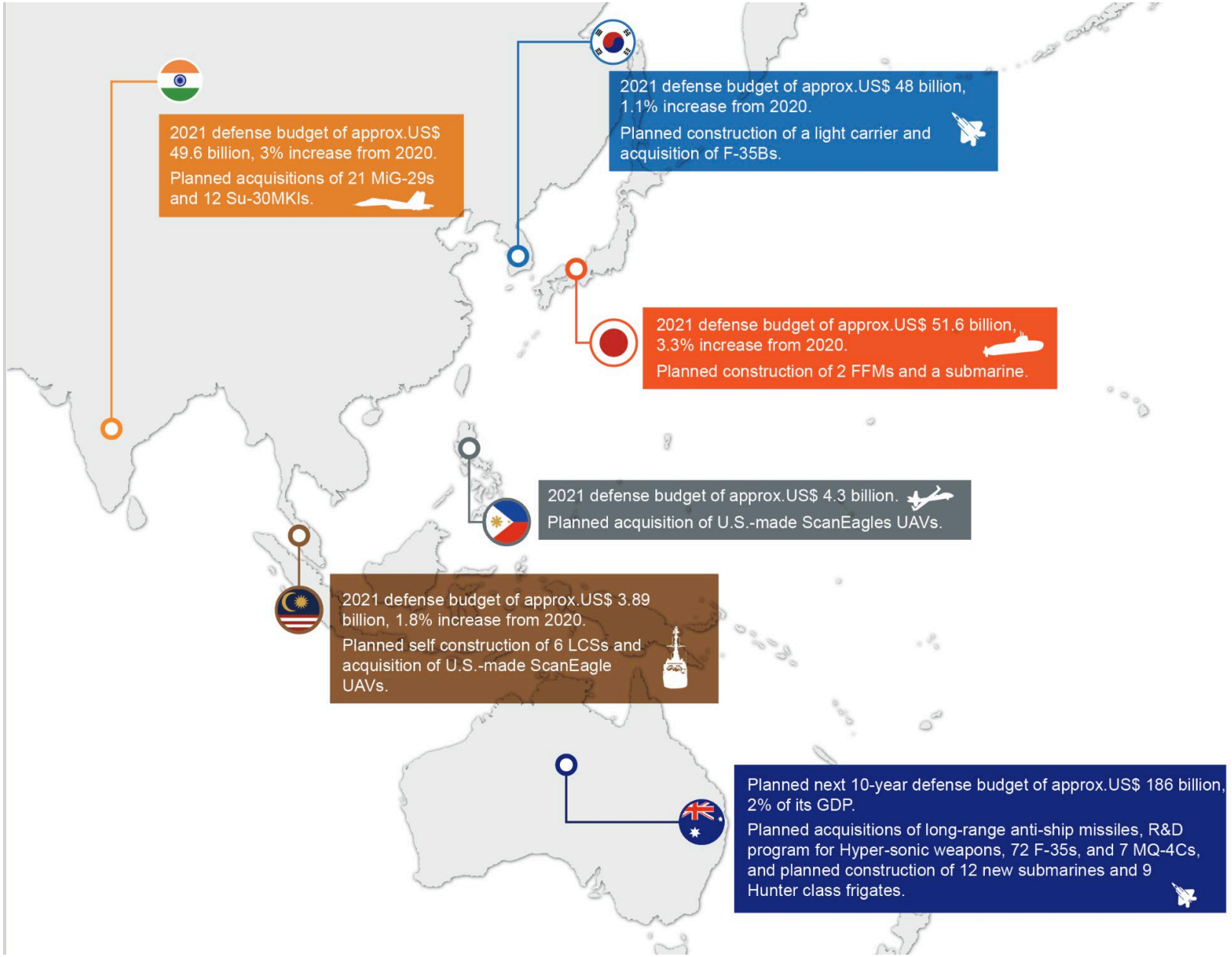
(in Current 2021 $US Billions)



	2021 $ Billion
PRC *(official defense budget)*	$209
India	$64.8
Japan	$55
Russia *(national defense budget)*	$56.7
South Korea	$48
Taiwan	$15.4

Department of Defense, Military and Security Developments Involving the People's Republic of China, Annual Report to Congress,,2022, pp. 147- 148.

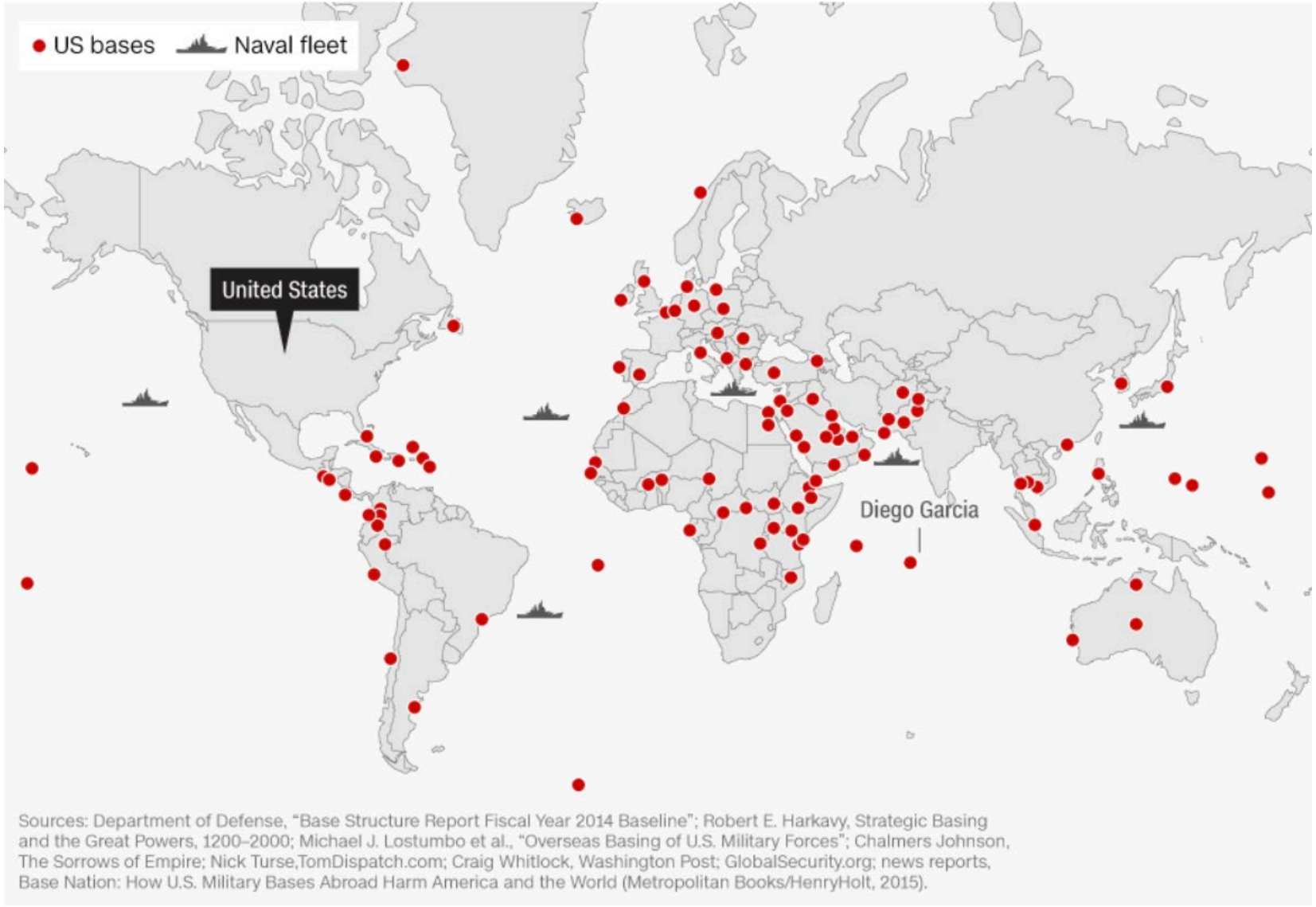
Taiwan Estimate of Asian Military Efforts in 2021 (in Current 2021 $US Billions)



Taiwan, *ROC National Defense Report, 2021*, https://www.ustaiwandefense.com/tdnswp/wp-content/uploads/2021/11/Taiwan-National-Defense-Report-2021.pdf.

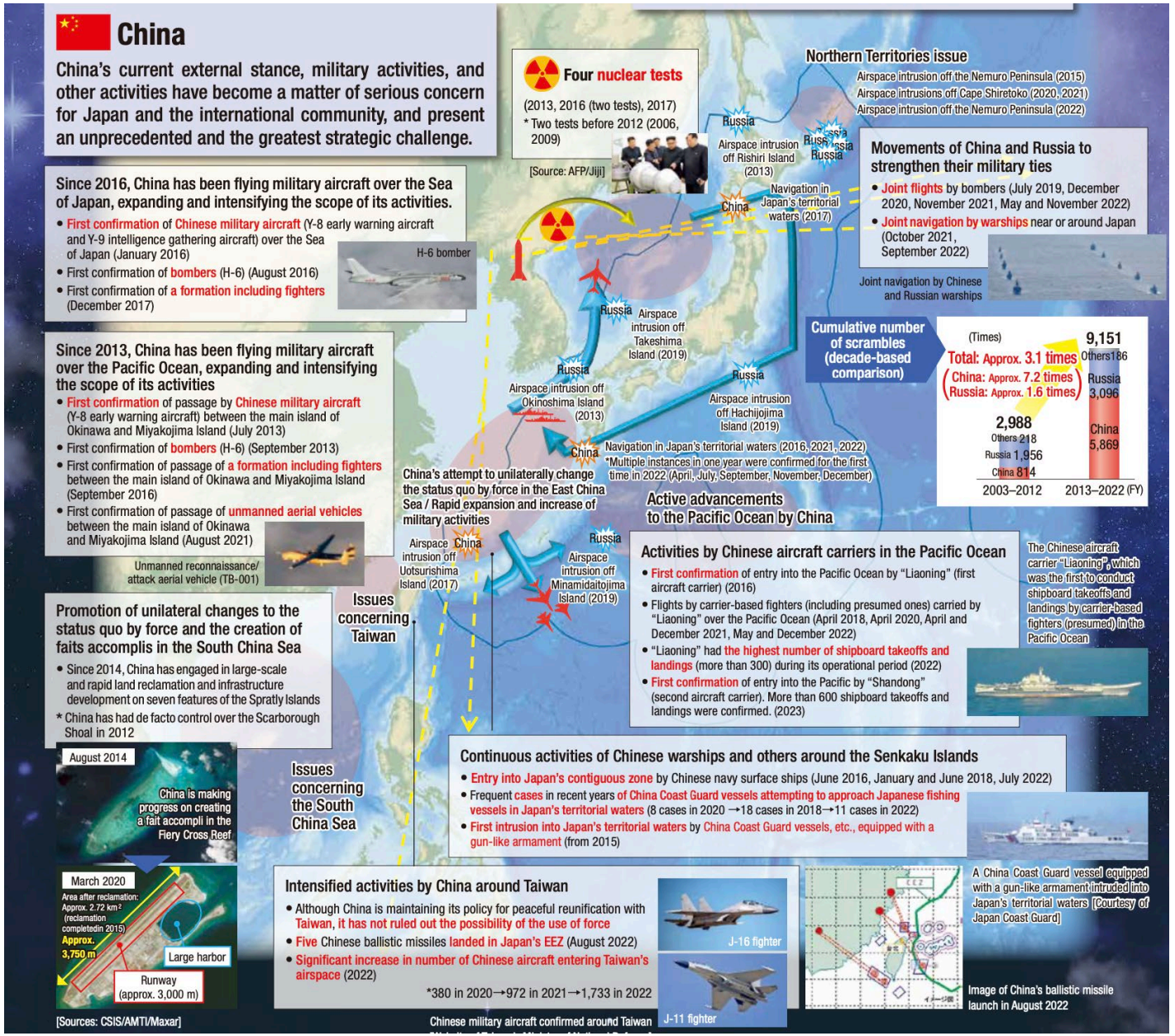
Competing for Global Naval Presence

Peak Recent Naval, Land, Air, and Other U.S. Bases; Staging Points; and Carrier Deployments: 2015



Source: https://www.transcend.org/tms/2019/03/is-the-united-states-about-to-lose-control-of-its-secretive-diego-garcia-military-base/.

Japanese Estimate of in Chinese Activity in the Pacific



Source: ***On the Publication of Defense of Japan 2023,***
HAMADA Yasukazu
Minister of Defense, 8.2023

U.S. Estimate of China vs. Taiwan Military Balance in 2022

Taiwan Strait Military Balance, Ground Forces

	China		Taiwan
	Total	*Taiwan Strait Area*	*Total*
Total Ground Force Personnel	1,040,000	416,000	89,000
Group Armies/Army Corps	13	5	3
Combined Arms Brigades	81	30 (6 Amphibious)	NA
Mechanized Infantry Brigades	N/A		3
Motorized Infantry Brigades			6
Armor Brigades			4
Army Aviation/Air Assault Brigades	17	5	4
Artillery Brigades	15	5	3
Airborne Brigades	7	7	0
Marine Brigades	8	5	2
Tanks	4,400	.	850
Artillery Pieces	9,800	.	1,200

Taiwan Strait Military Balance, Naval Forces

	China		Taiwan
	Total	*Eastern and Southern Theater Navies*	*Total*
Aircraft Carriers	2	1	0
Cruisers	6	2	0
Destroyers	36	24	4
Frigates	45	32	22
Corvettes	50	N/A	0
Tank /Medium Landing ships Amphibious Transport Dock	57	52	31
Attack Submarines	56	31	2
Nuclear Attack Submarines	9	2	0
Nuclear Powered Ballistic Missile Submarines	6	6	0
Coastal Patrol (Missile)	84	68	44
Coast Guard Ships	224	N / A	23

Taiwan Strait Military Balance, Air Forces

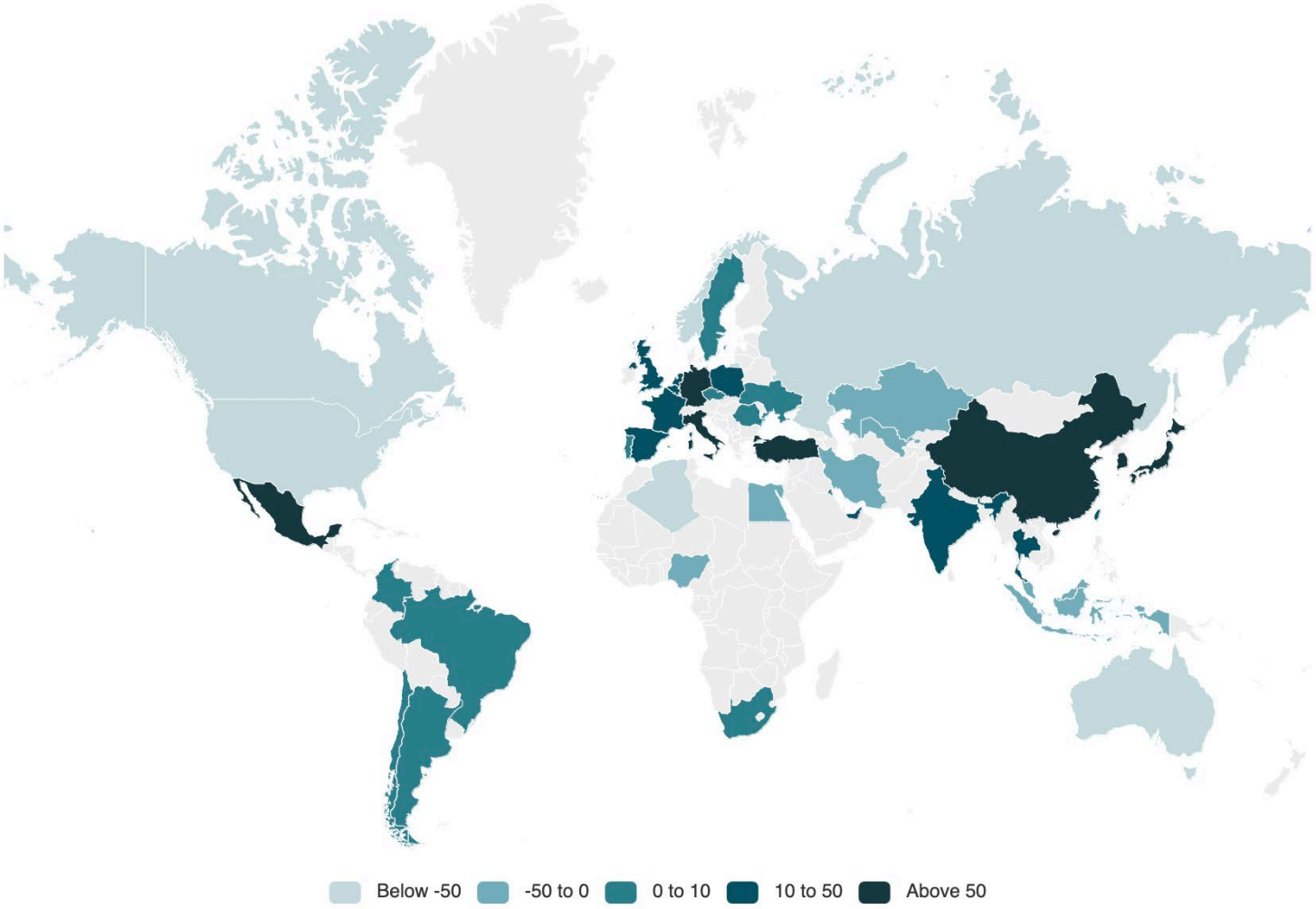
	China		Taiwan
	Total	*Eastern and Southern Theater*	*Total*
Fighters	1,900 (2,900*)	700 (800*)	300 (450*)
Bombers/Attack	450	250	0
Transport	450	20	30
Special Mission Aircraft	200	150	240

Note: For the purposes of this document, the "Taiwan Strait Area" includes the PLA's Eastern and Southern Theaters.
Department of Defense, *Military and Security Developments Involving the People's Republic of China, Annual Report to Congress, 2022*, pp. 165-167.

European, Chinese, Japanese, and Korean Vulnerability to Energy Chokepoints – *Chinese and Asian Dependence Is Most Critical*

Gas Import Dependence of Major Countries in 2022

In Billions of Cubic Meters

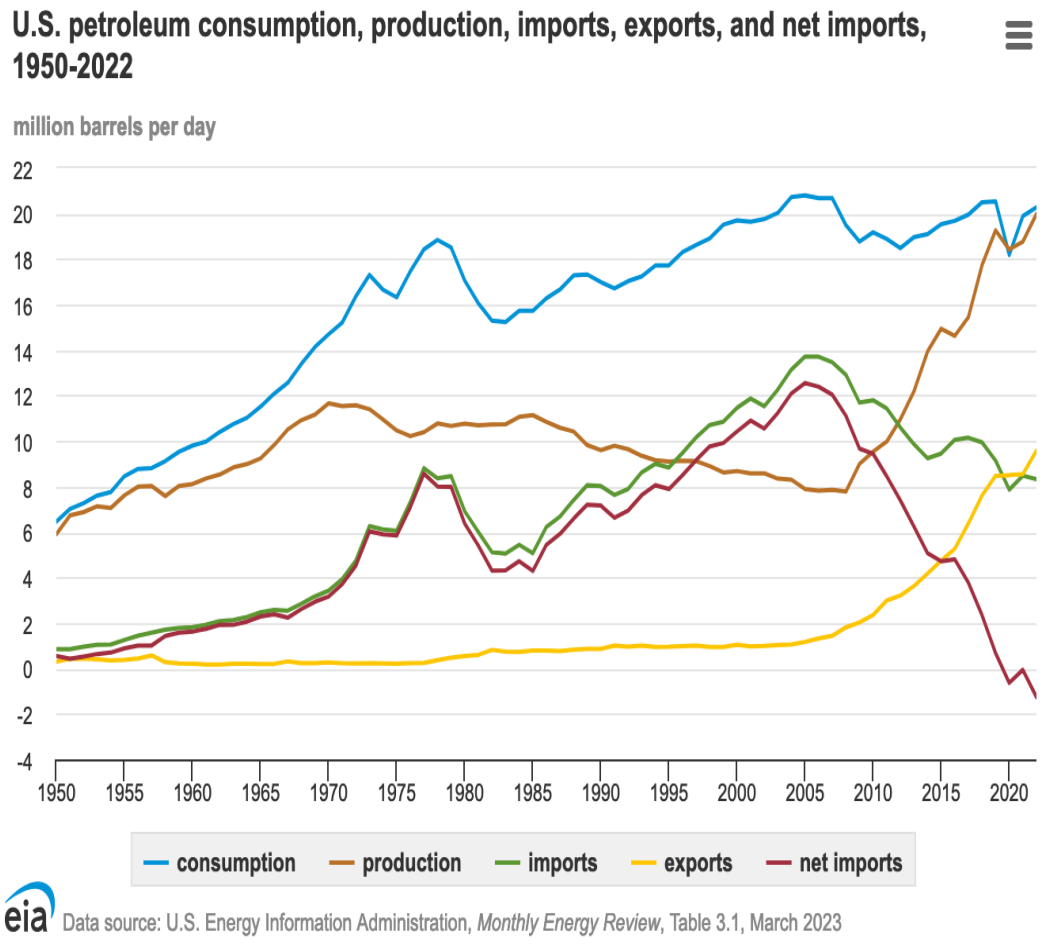


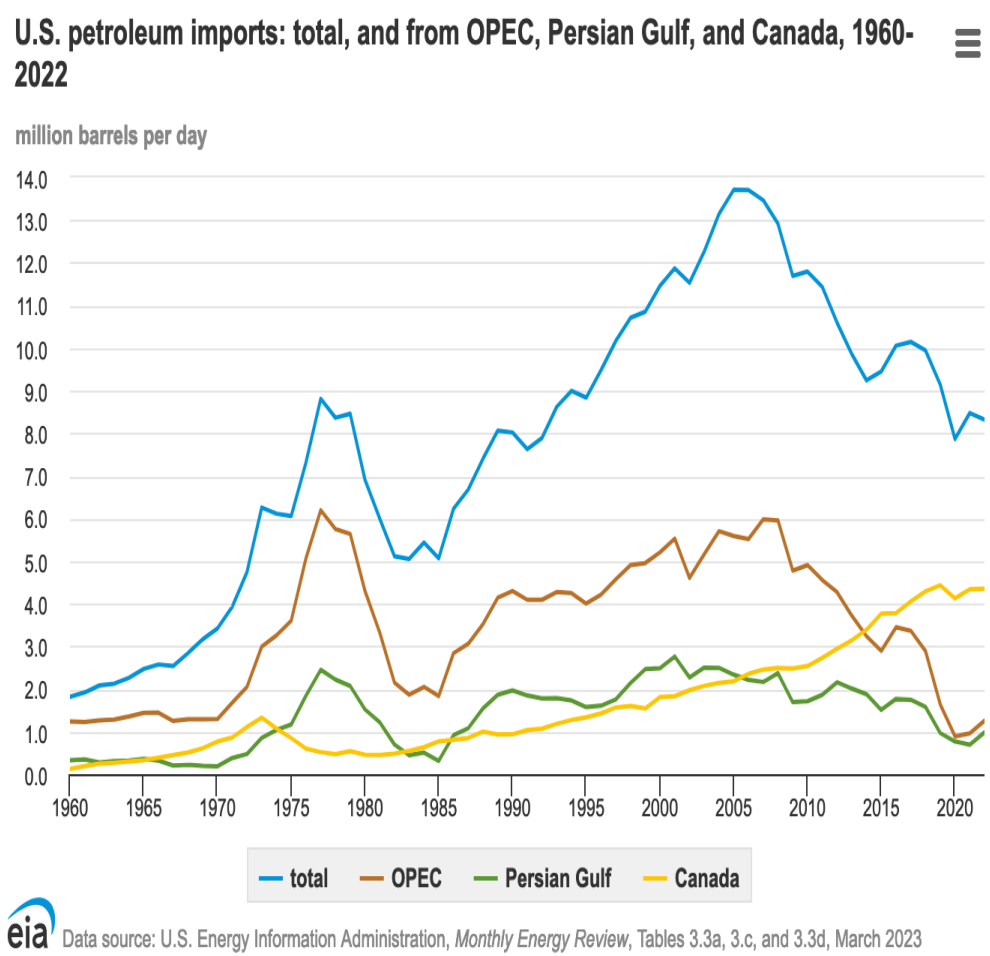
China	133.4
Japan	94.8
Germany	83.8
Italy	68.1
South Korea	61.5
Mexico	60.9
Turkiye	54.1
France	41.2
Spain	33.9
United Kingdom	33
Taiwan	26.7
India	26.3

Source: Adapted from Enerdata, World Energy & Climate Statistics, 2023, https://yearbook.enerdata.net/natural-gas/balance-trade-world-data.html.

The original source is a dynamic model showing trends since 1990.

The U.S. No Longer Imports Significant Oil from Outside North America





Source: Adapted from U.S. Energy Information Administration, https://www.eia.gov/energyexplained/oil-and-petroleum-products/imports-and-exports.php.
Last updated: July 5, 2023, with data from the Petroleum Supply Monthly, March 2023; data for 2022 are preliminary.

U.S. Became Net Oil Exporter in 2022

The United States became a total petroleum net exporter in 2020

In 2020, the United States became a net exporter of petroleum for the first time since at least 1949.[1] In 2022, total petroleum exports were about 9.58 million barrels per day (b/d) and total petroleum imports were about 8.32 million b/d, making the United States an annual *net total petroleum exporter* for the third year in a row. Total petroleum net exports were about 1.26 million b/d in 2022. Also in 2022, the United States produced[2] about 19.99 million b/d of petroleum and consumed[3] about 20.28 million b/d. Although U.S. annual total petroleum exports were greater than total petroleum imports in 2020, 2021, and 2022, the United States still imported some crude oil and petroleum products from other countries to help to supply domestic demand for petroleum and to supply international markets.

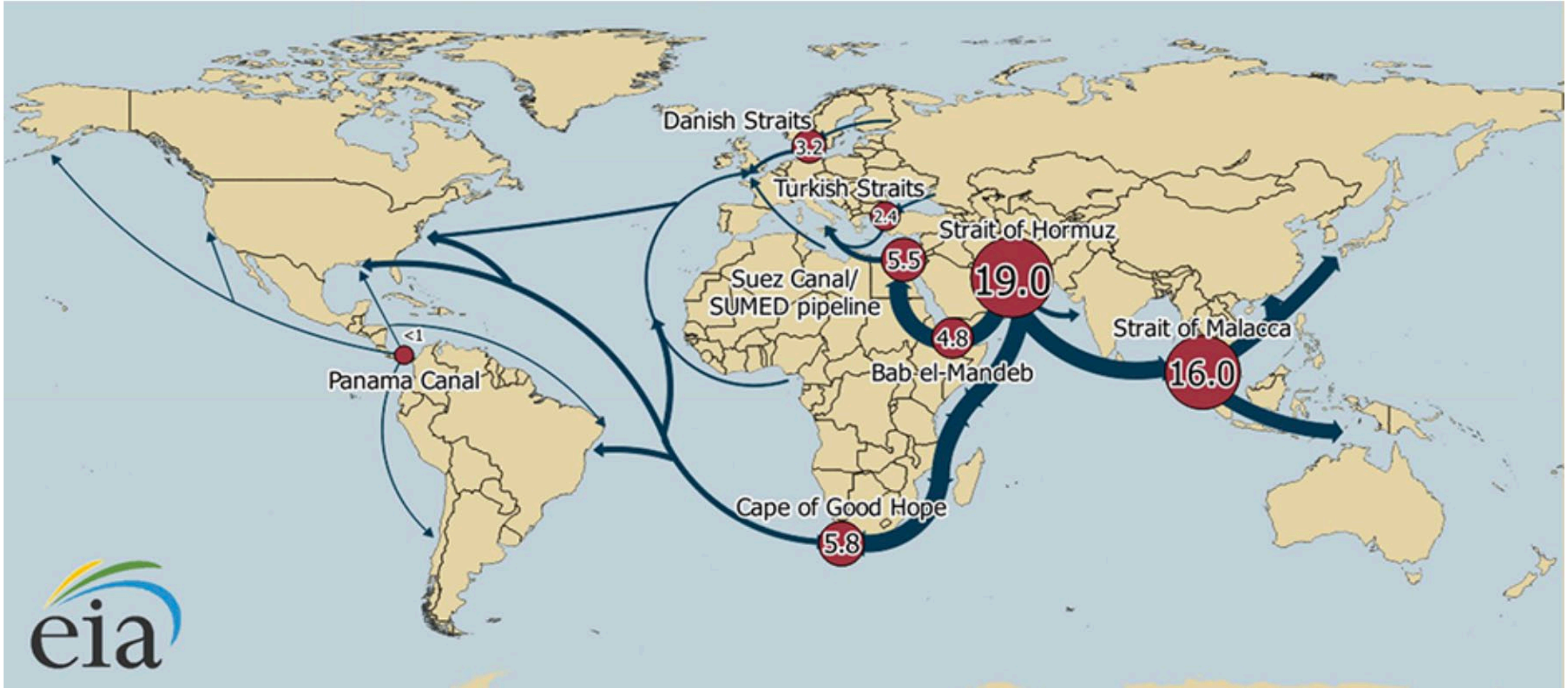
The United States remained a net crude oil importer in 2022, importing about 6.28 million b/d of crude oil and exporting about 3.60 million b/d. Some of the crude oil that the U.S. imports is refined by U.S. refineries into petroleum products—such as gasoline, heating oil, diesel fuel, and jet fuel—that the U.S. later exports. Also, some of imported petroleum may be stored and later exported.

U.S. petroleum imports peaked in 2005

After generally increasing every year from 1954 through 2005, U.S. gross and net total petroleum imports peaked in 2005. Since 2005, increased domestic petroleum production and increased petroleum exports have helped to reduce annual total petroleum net imports.

Source: Adapted from U.S. Energy Information Administration, OIL AND PETROLEUM PRODUCTS EXPLAINED. *OIL IMPORTS AND EXPORTS,* https://www.eia.gov/energyexplained/oil-and-petroleum-products/imports-and-exports.php. *Last updated: July 5, 2023, with data from the Petroleum Supply Monthly, March 2023; data for 2022 are preliminary.*

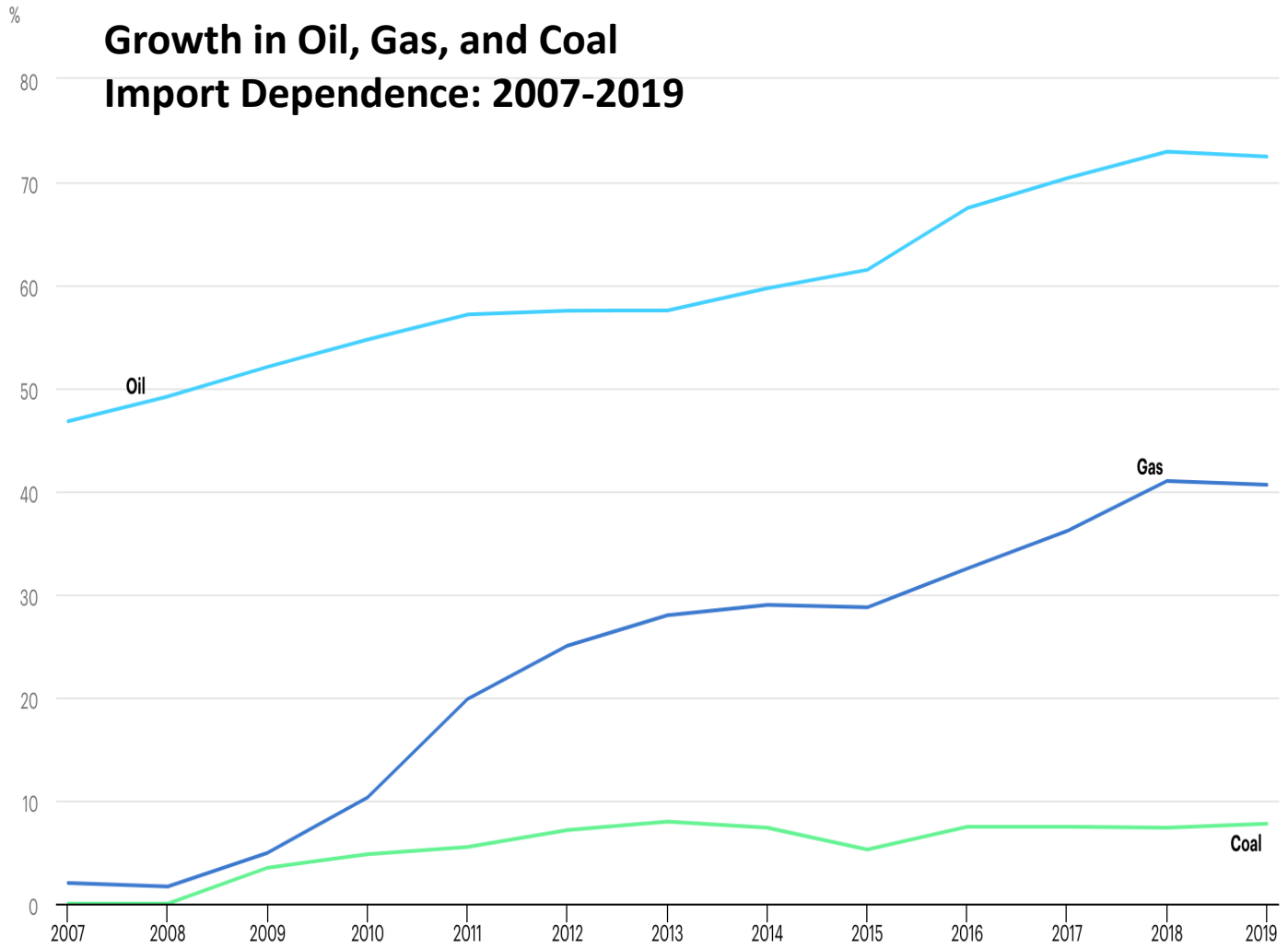
World Oil & Gas Import Chokepoints Are Most Critical for China and Asia



Source: Energy Information Administration, https://www.eia.gov/international/analysis/special-topics/World_Oil_Transit_Chokepoints.

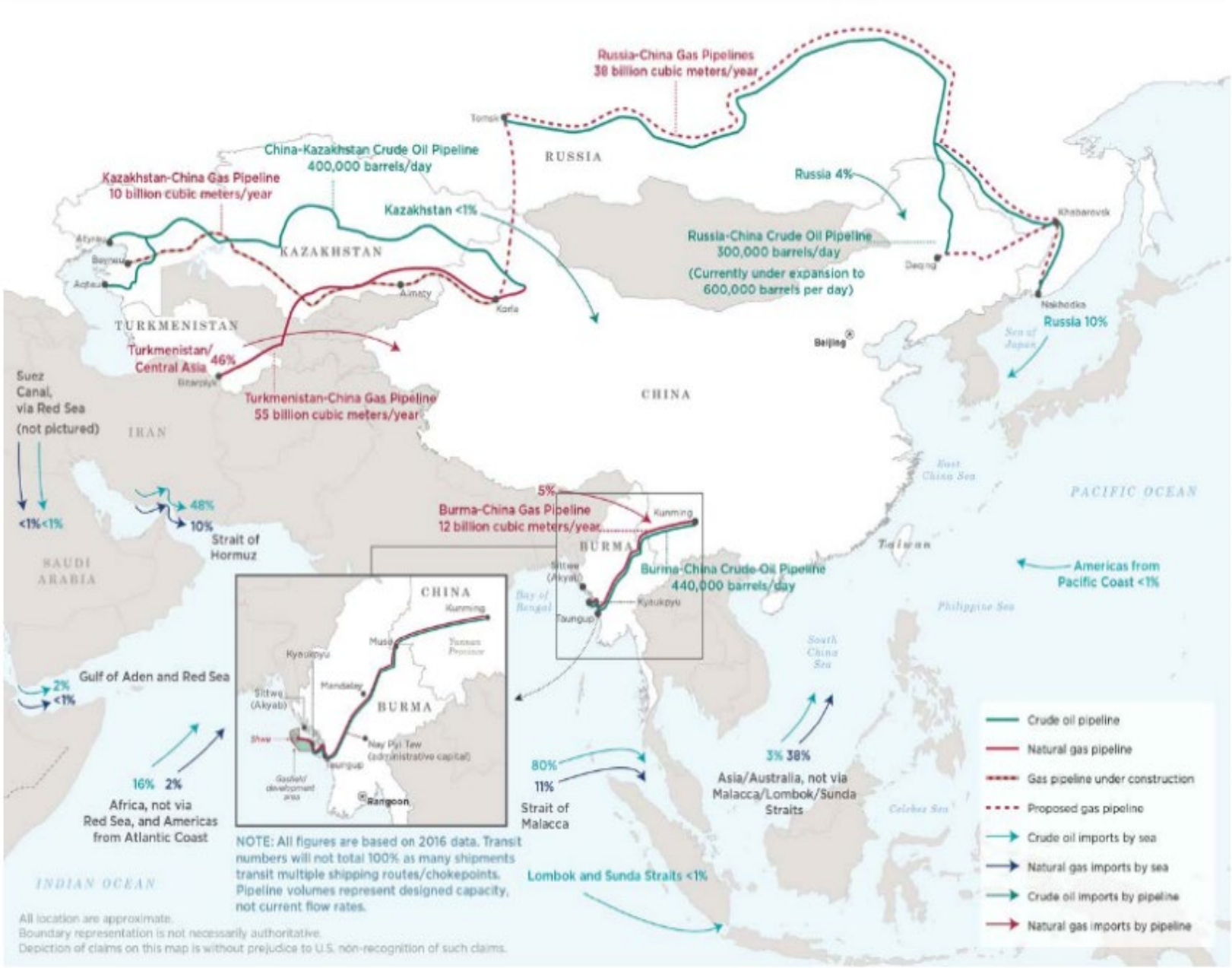
China’s Growing Dependence on Oil and Gas Imports

- The impact of global warming is highly uncertain .
- Some sources estimate that that 80% of China's crude oil supply will be imported by 2030. Based on this trend and the United States' growing crude oil production, there will continue to be opportunities for crude export to China.
- Natural gas is China's fastest growing major fuel which saw demand quadruple in the past decade.
- China's crude oil imports in June 2023 jumped 45.3% over 2022 to the second-highest monthly figure on recordwith refiners building up inventories despite tepid domestic demand.
- Crude imports in June totaled 52.06 million metric tons, or 12.67 million barrels per day (bpd), the data from the General Administration of Customs showed. It was a substantial increase on the 8.72 million bpd imported in June last year, when the economy was battered by widespread COVID-19 lockdowns.



Sources: Review of estimates through Google search, data from Reuters, and International Energy Agency, https://www.iea.org/data-and-statistics/charts/oil-gas-and-coal-import-dependency-in-china-2007-2019. .

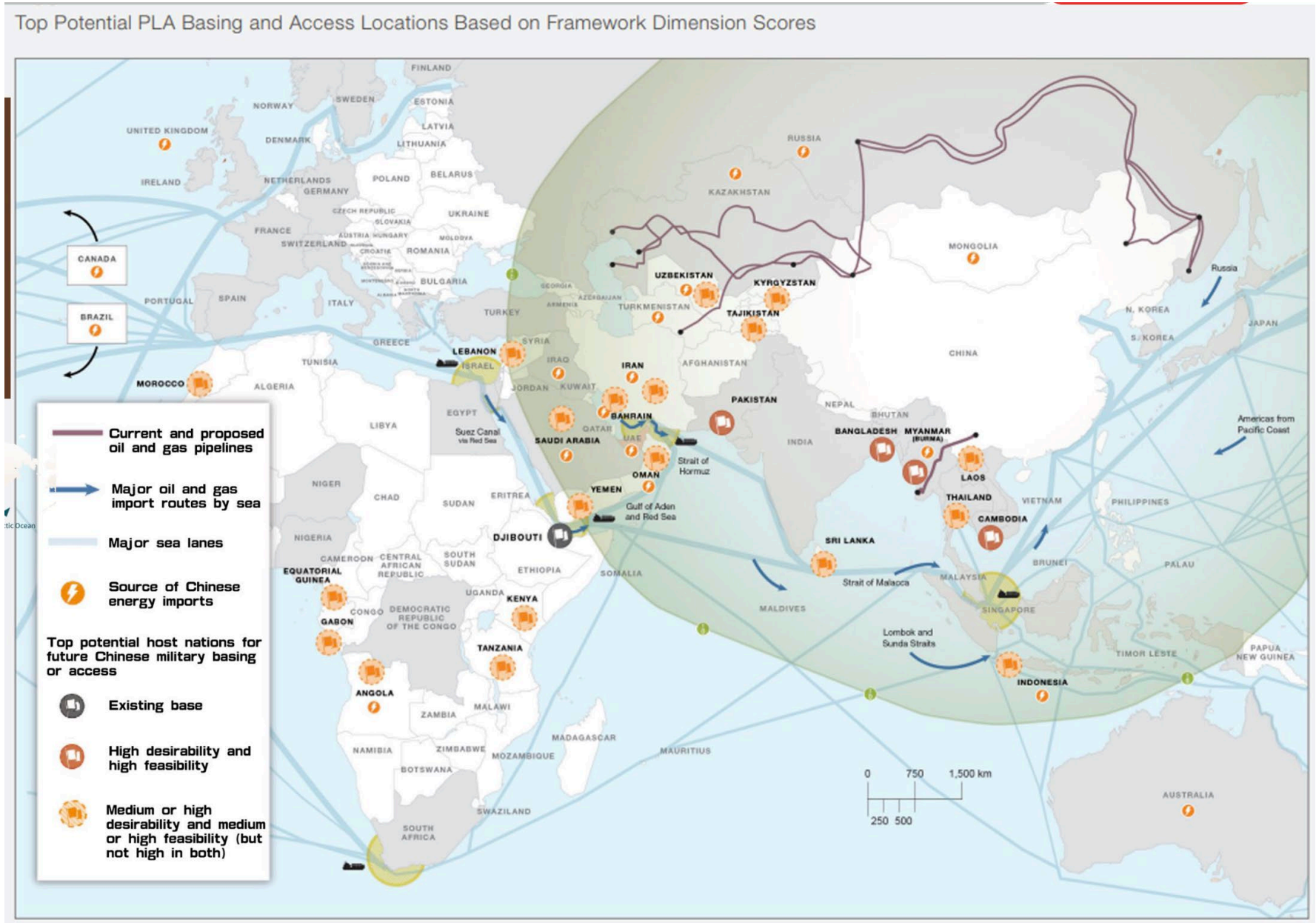
China's Focus on Changing Energy Maritime Security



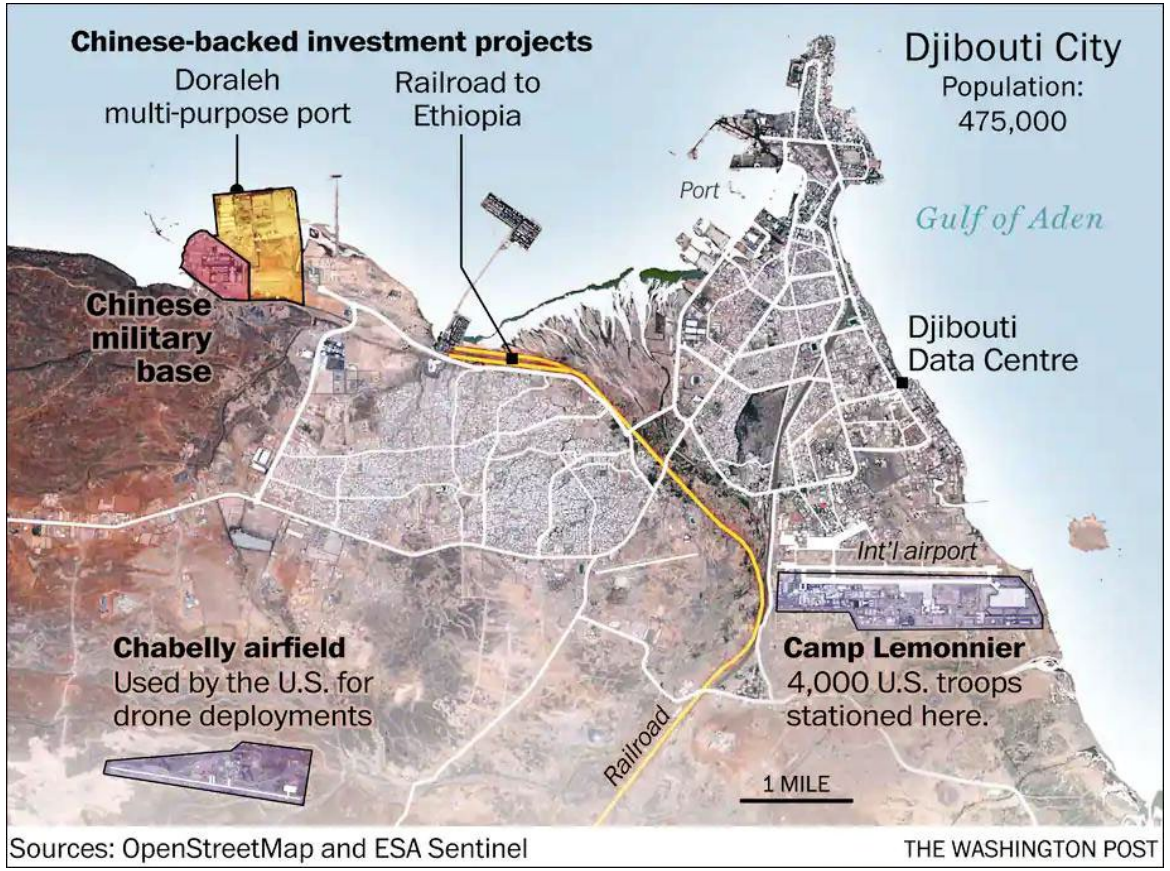
Source: Brian Wang, "Philippines will Attend China's One Belt One Road Conference in May, Next Big Future, January 20, 2017, https://www.nextbigfuture.com/2017/01/philippines-will-attend-chinas-one-belt.html; and Office of the Secretary of Defense, *Annual Report to Congress Military and Security Developments Involving the People's Republic of China 2017*, p. 44, May 15, 2018, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF.

Taiwan Estimate of China's Military Goals for Energy Import Security

Source: Taiwan MoD, Force Structure Adjustment for Enhancing All-Out Defense
Organization: MND
Presenter: Po Horng-Huei (Alex), Vice MINDEF, p.3,
https://www.ustaiwandefense.com/tdnswp/wp-content/uploads/2023/01/2023.01.10-Vice-MINDEF-Presentation.pdf



Chinese Port Access and Bases in Indian Ocean/Red Sea



Source: Max Bearak, "In strategic Djibouti, a microcosm of China's growing foothold in Africa," *Washington* Post, December 30, 2019, https://www.washingtonpost.com/world/africa/in-strategic-djibouti-a-microcosm-of-chinas-growing-foothold-in-africa/2019/12/29/a6e664ea-beab-11e9-a8b0-7ed8a0d5dc5d_story.html; and Juan Cole, "The Dragon Arrives: 1st Chinese overseas Military Base in Djibouti," *Informed Comment*, August 2, 2017, https://www.juancole.com/2017/08/overseas-military-djibouti.html.