CSET CENTER for SECURITY and EMERGING TECHNOLOGY

Introduction

Introduction

The goal of this research is to collect historical and forecast data on trends or events relevant to the future of the DoD-Silicon Valley relationship to inform stakeholders' understanding of the topic, including how future developments in the world bear on it. We began by interviewing 17 stakeholders—people associated with the Department of Defense and industry with a professional interest in this topic—to understand their views on what they expect to happen and what factors drive different outcomes. From that process, we selected forecast questions.

Before we publish these questions on Foretell to elicit ongoing forecasts from the Foretell forecasting community (the "Foretell crowd"), we are requesting stakeholders' forecasts on these questions. Note that the Foretell crowd will make more-granular, numeric forecasts over multiple time periods, but to make your job simpler, we are providing a multiple-choice alternative. Your responses will help us identify noteworthy correlations between views, as well as areas of particular disagreement or uncertainty, and determine the practical significance of the crowd's forecasts.

This survey contains four sections:

1. **Overall relationship trend (2 questions)**. Section I asks about your view on how the DoD-Silicon Valley relationship has changed over the past five years, and how you expect it to change over the next five years.
2. **Outcome measures (5 questions)**. Section II asks about facets of the future state of the DoD-Silicon Valley relationship, focusing on transactions and personnel.
3. **Factors (15 questions)**. Section III asks about events or trends related to seven factors stakeholders have identified as relevant to the future of the DoD-Silicon Valley relationship.
4. **Factor-significance (2 questions)**. Section IV asks how you expect variations of the factors would impact the DoD-Silicon Valley relationship.

This survey is designed to capture your quick, intuitive views. No outside research is necessary. Our aim is not to assess forecast accuracy but rather to identify patterns in thoughts about the factors relevant to the DoD-Silicon Valley relationship.

Confidentiality. Your individual forecasts will not be shared outside the Foretell team. We will publish data only on forecasts aggregated across stakeholders.

Section 1: Overall Relationship Trend

Section I: Overall Relationship Trend

1. Relative to today, where was the DoD-Silicon Valley relationship five years ago and where will it be five years from now?

	Much more negative	Somewhat more negative	Same as today	Somewhat more positive	Much more positive
Where was the relationship five years ago?	○	○	○	○	○
Where do you think the relationship will be in five years?	○	○	○	○	○

Definitions and clarifications

Silicon Valley refers to U.S.-based technology companies whose business models are not based on Department of Defense contracts. It's not limited to companies in the San Francisco Bay Area, although in some cases, we use location as a proxy for companies in this category.

The DoD-Silicon Valley relationship refers to the flow of resources, such as information, technology, and talent, between DoD and Silicon Valley companies. A positive change means more access to these resources, and a negative change means less access to these resources.

These definitions are deliberately loose, and we invite stakeholders to use their own common-sense interpretation of them, consistent with the spirit of the project.

Section II: Outcome Measures-Transactions

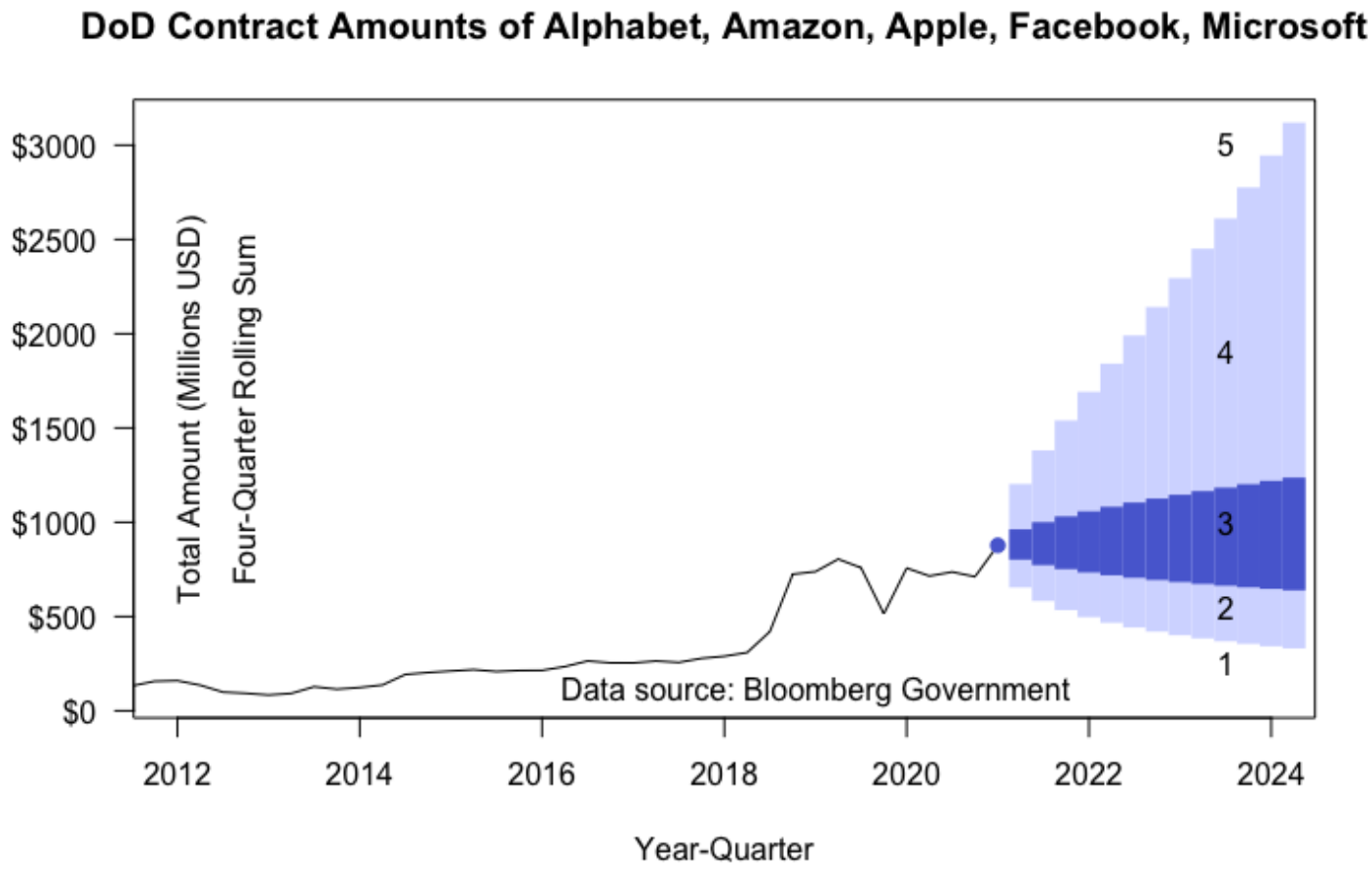
Section II: Outcome Measures

For the following questions, please refer to the 1-5 scale shown in the corresponding figures when giving your response. Each point on the scale represents a band of values defined relative to a projection based on the historical data (the “trend”): 5 is well above trend; 4 is above trend; 3 is on trend, 2 is below trend; and 1 is well below trend.

A. Transactions

1. How will the combined annual dollar amount of DoD contracts with the "Big 5" tech companies (Alphabet, Amazon, Apple, Facebook, and Microsoft) change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○

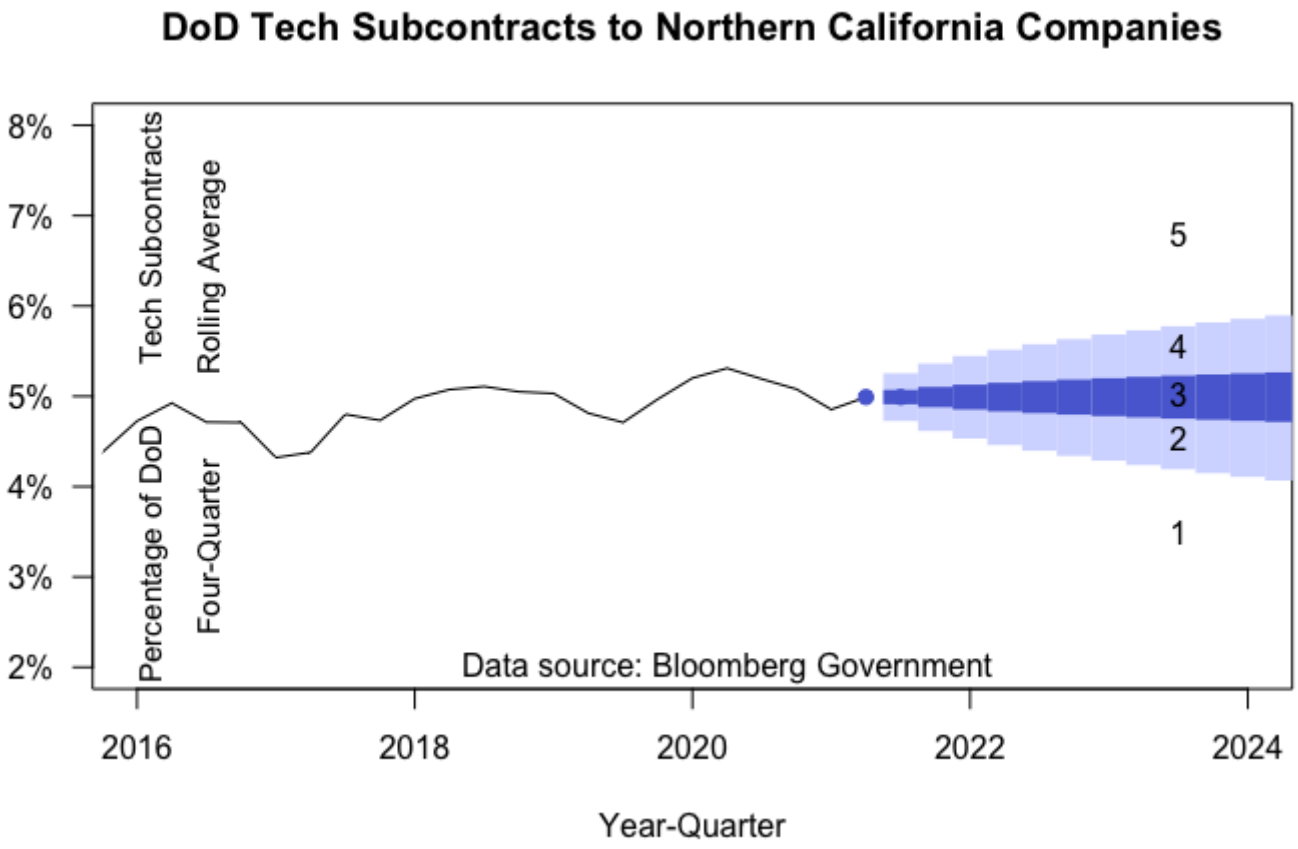


Definitions and clarifications

This question includes prime and sub contracts with Alphabet Inc., Amazon.com Inc., Apple Inc., Facebook Inc., Microsoft Inc., and any of their subsidiaries.

2. How will the percentage of DoD subcontracts for scientific research and development services going to Northern California-based companies change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



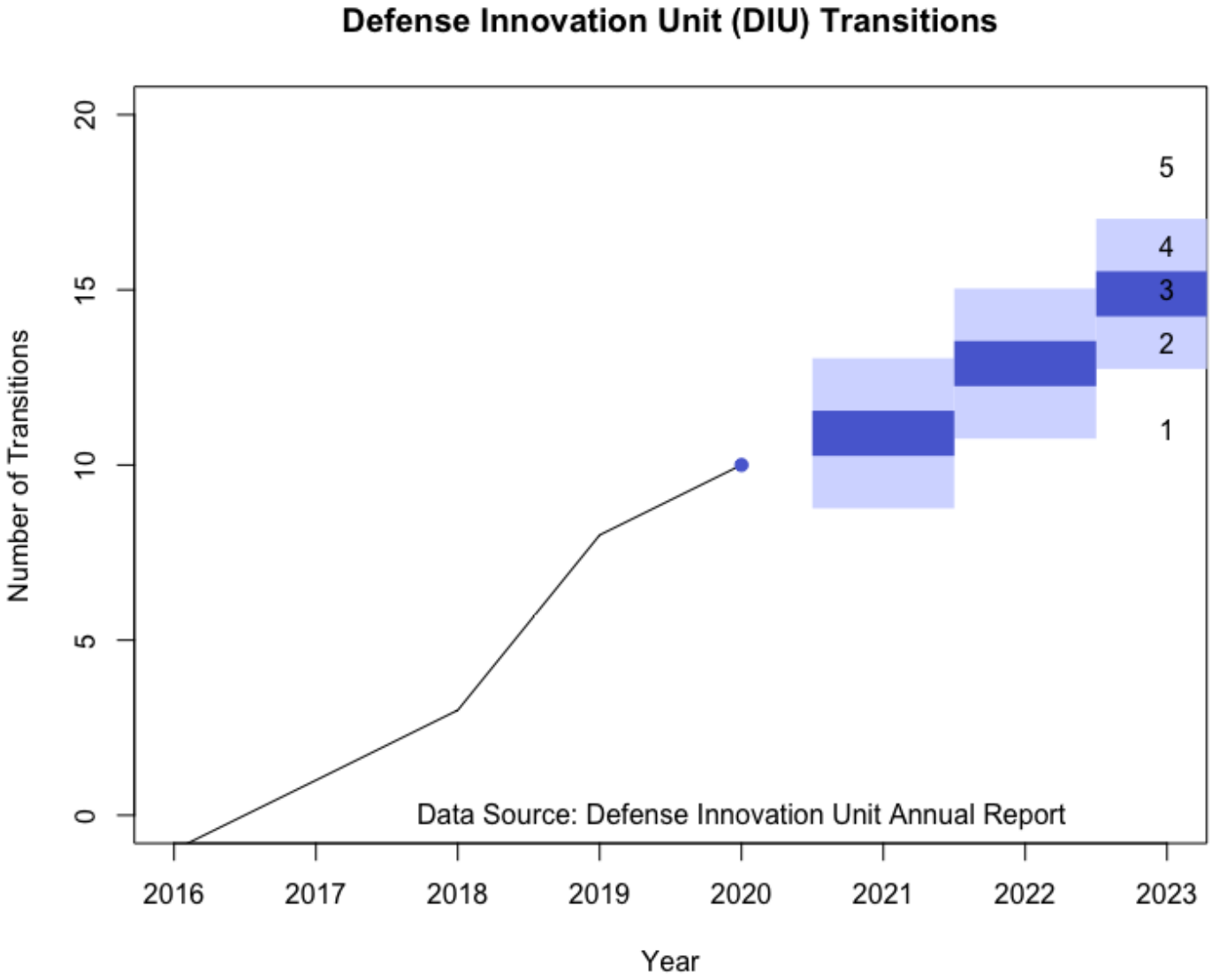
Definitions and clarifications

Scientific research and development services contracts are those categorized under NAICS 5417.

Northern California-based companies are those with zip codes that begin between 940 and 961.

3. How will the number of Defense Innovation Unit (DIU) transitions change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

The Defense Innovation Unit's mission is to "strengthen U.S. national security by increasing the military's adoption of commercial technology." In response to DoD needs for commercial solutions, it solicits proposals, primarily from small businesses or non-traditional defense contractors. Successful applicants are contracted to develop prototypes.

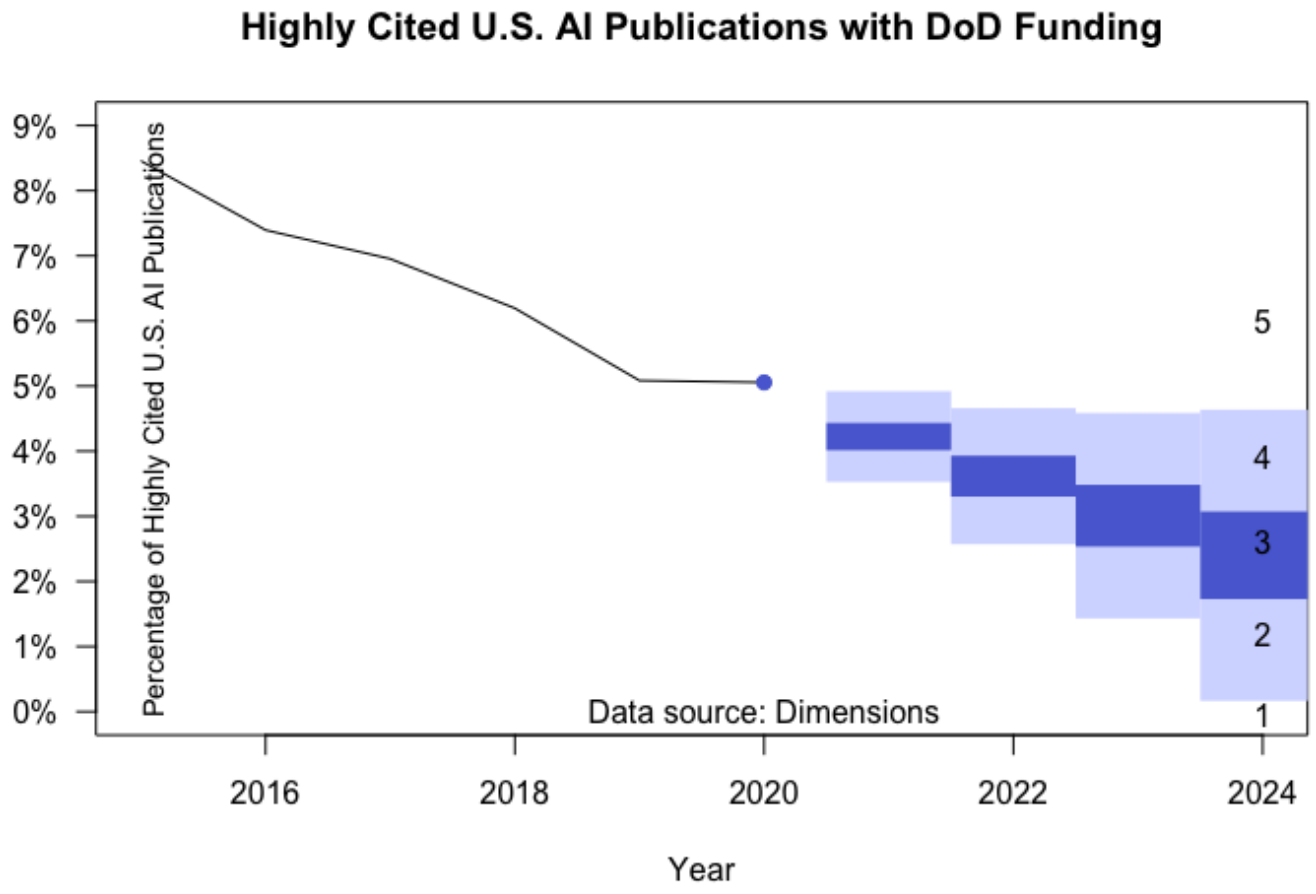
Transitions are successful prototypes that lead to large-volume procurement.

Section II: Outcome Measures-Personnel

B. Personnel

4. How will the percentage of highly cited U.S. AI publications supported by a DoD grant change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

Highly cited papers are in the top 10 percent by citation count.

A paper is a *U.S. paper* if any of its authors are affiliated with an institution based in the United States.

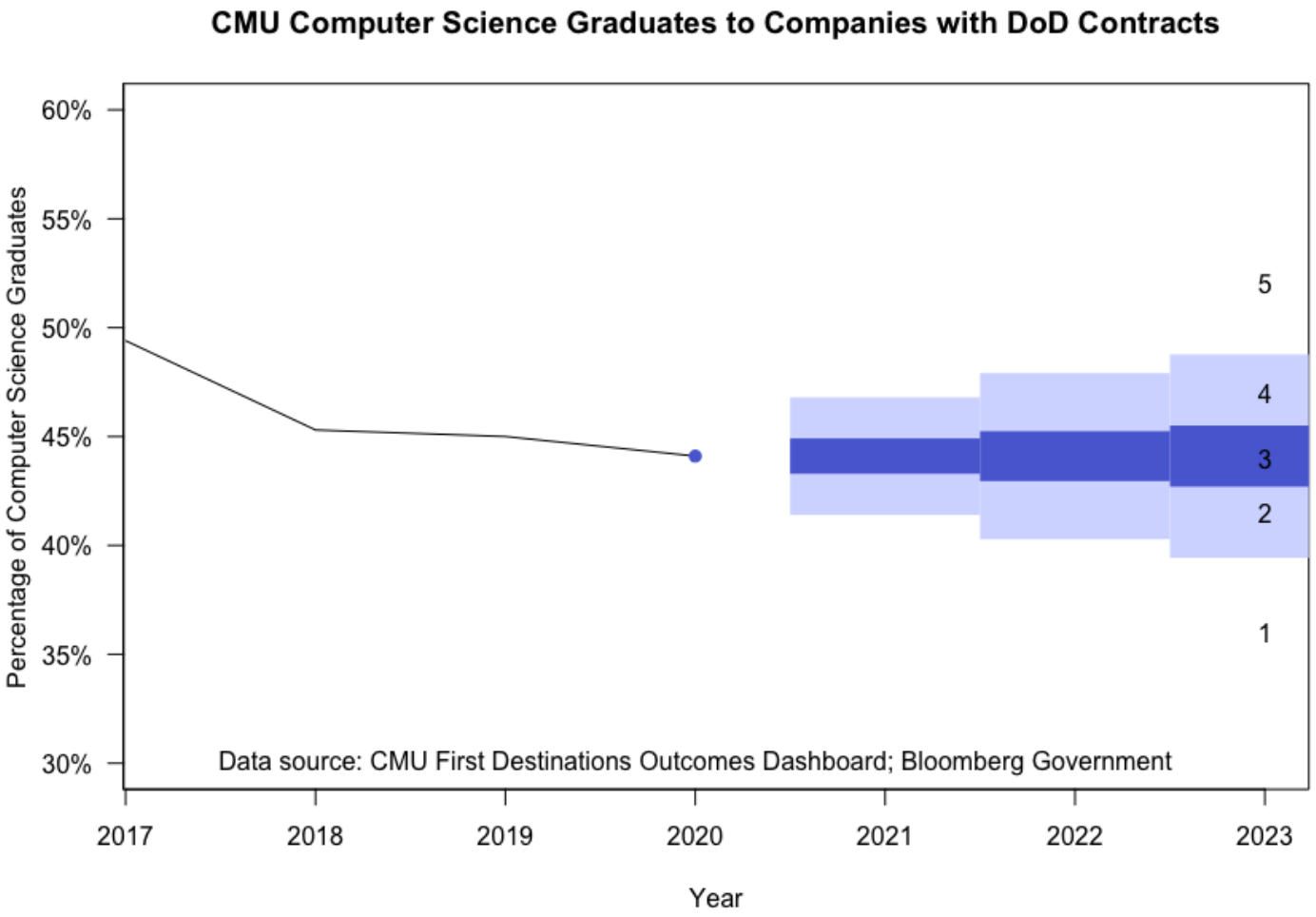
This question is based on papers in Dimensions, Digital Science. A paper is an AI paper if it would be categorized under the artificial intelligence, machine learning, computer

vision, computation and language, multi-agent systems, or robotics categories on arXiv, as determined by a CSET-developed classifier.

The percentage is the number of highly cited U.S. AI publications supported by a DoD grant divided by the total number of highly cited U.S. AI publications.

5. How will the percentage of Carnegie Mellon University (CMU) computer science graduates whose first job is at a company that has a contract with DoD change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

Computer science graduates include undergraduates and graduates from the computer science department.

A company *has a DoD contract* if its parent company or any subsidiary of its parent company has had a DoD contract in the two previous calendar years.

The percentage excludes graduates who are first employed by a university.

Section III: Factors-China Military Aggression

Section III: Factors

A. China Military Aggression

1. What is the probability that the Chinese military or other maritime security forces will fire upon another country's civil or military vessel in the South China Sea in the next six months?

0 10 20 30 40 50 60 70 80 90 100

Probability (%) it happens

Definitions and clarifications

Fires upon assumes the discharge of a weapon with lethal intent and does not include methods such as water cannons, rubber bullets, or ramming.

Chinese maritime security forces include the Coast Guard and Maritime Militia.

The boundaries of the *South China Sea* are those established by the International Hydrographic Organization (IHO), an international standards body. The Taiwan Strait is not a part of the South China Sea.

2. What is the probability that China seizes control of any Taiwanese-occupied feature in the South China Sea, in the next six months?

0 10 20 30 40 50 60 70 80 90 100

Probability (%) it happens

Definitions and clarifications

Seizing involves the invasion, conquest, and control of a part of Taiwan or a Taiwan-occupied feature in the South China Sea by Chinese military forces lasting more than 24 hours

The boundaries of the *South China Sea* are those established by the International Hydrographic Organization (IHO), an international standards body.

3. What is the probability that China executes an acknowledged national military attack against Vietnam, India, or Taiwan in the next six months?

	0	10	20	30	40	50	60	70	80	90	100
Probability (%) it happens											

Definitions and clarifications

A *national military attack* includes the employment of conventional or unconventional weapons by one country's national military forces on another country's military, military assets, or territory, including citizens located within that territory, but excluding territorial waters, foreign missions, and/or exclusive economic zones.

A cyber attack will not qualify as a national military attack.

Attacks by specific military or paramilitary units or non-state actors will not qualify as "national military attacks" unless the government claims responsibility for them.

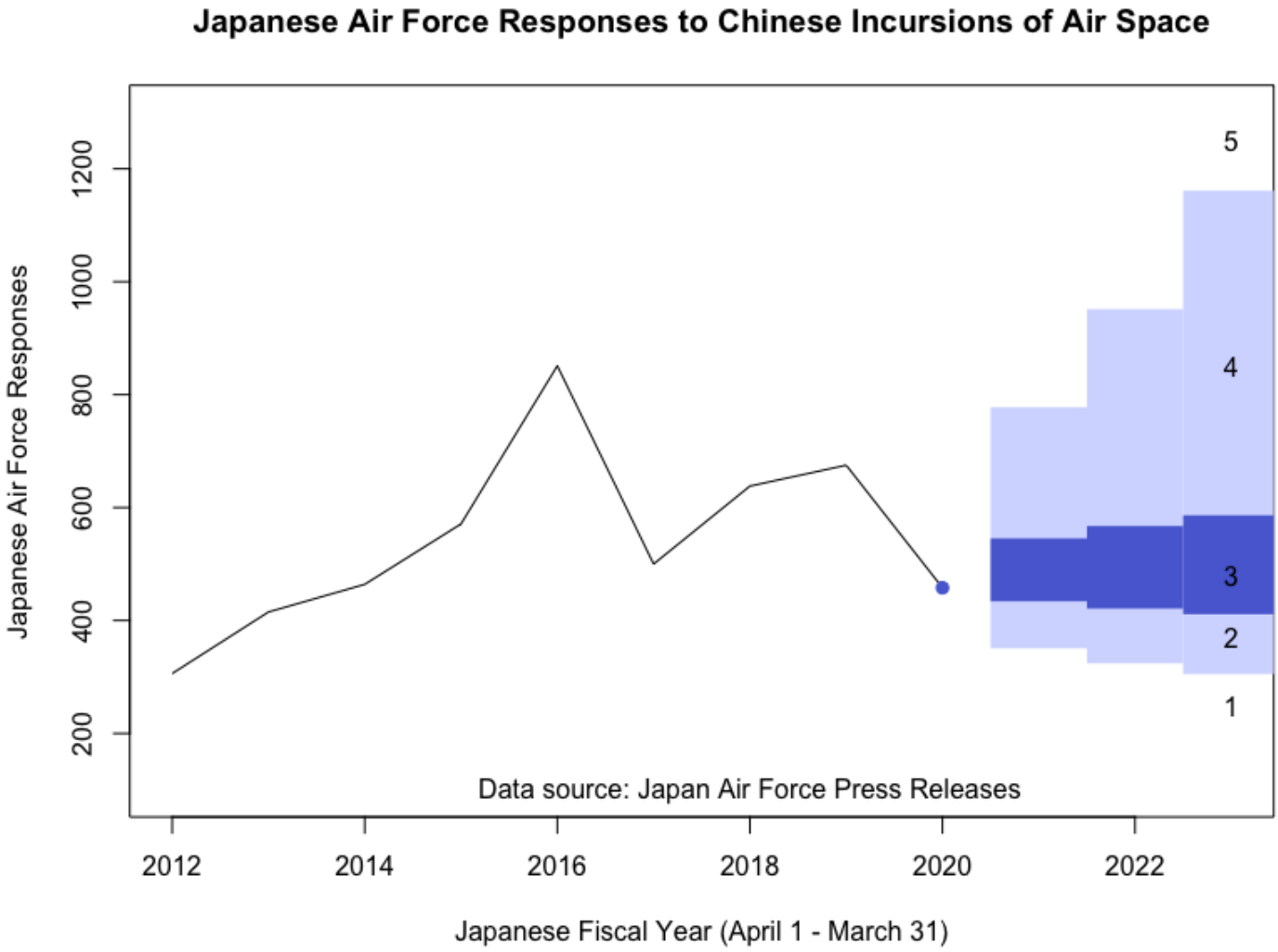
Acknowledged means the Chinese government claims responsibility for the attack.

Please continue to refer to the the 1-5 scale shown in the corresponding figures when giving your response. A reminder that each represents a band of values defined relative to

a projection based on the historical data (the “trend”): 5 is well above trend; 4 is above trend; 3 is on trend, 2 is below trend; and 1 is well below trend.

4. How will the number of Japanese Air Force responses to threats to Japan’s territorial airspace by Chinese military aircraft change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

This question is based on Japan's Ministry of Defense reporting on scrambles in response to "aircraft intruding into Japan's territorial airspace."

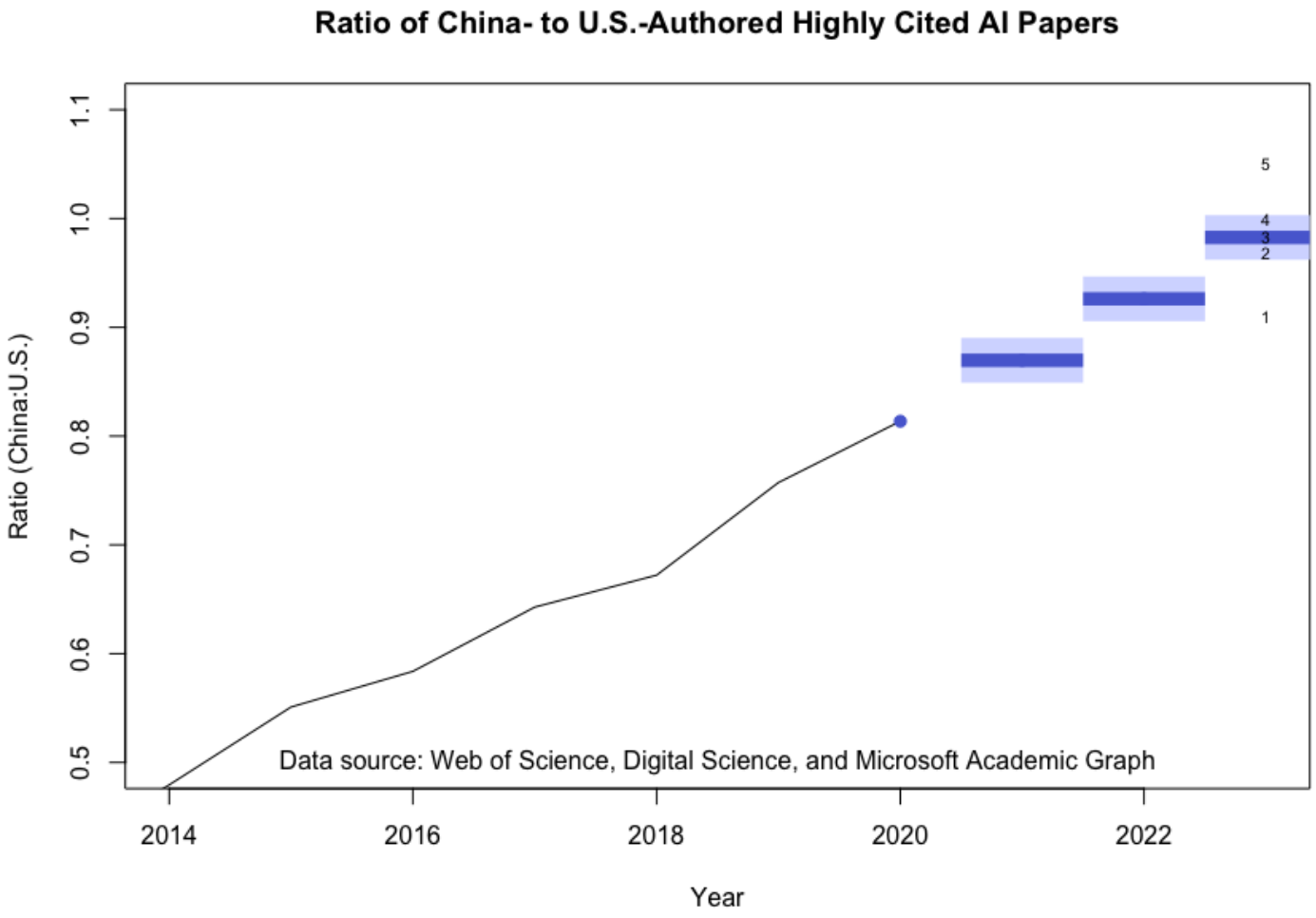
The Japanese FY ends March 31 of the following year. Data for FY 2021 will be available in April 2022.

Section III: Factors-China Tech Capabilities

B. China Tech Capabilities

5. How will the ratio of China-authored to U.S.-authored highly cited (top 1%) AI papers change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

Highly cited papers are those in the top 1 percent of papers published that year by

citation count.

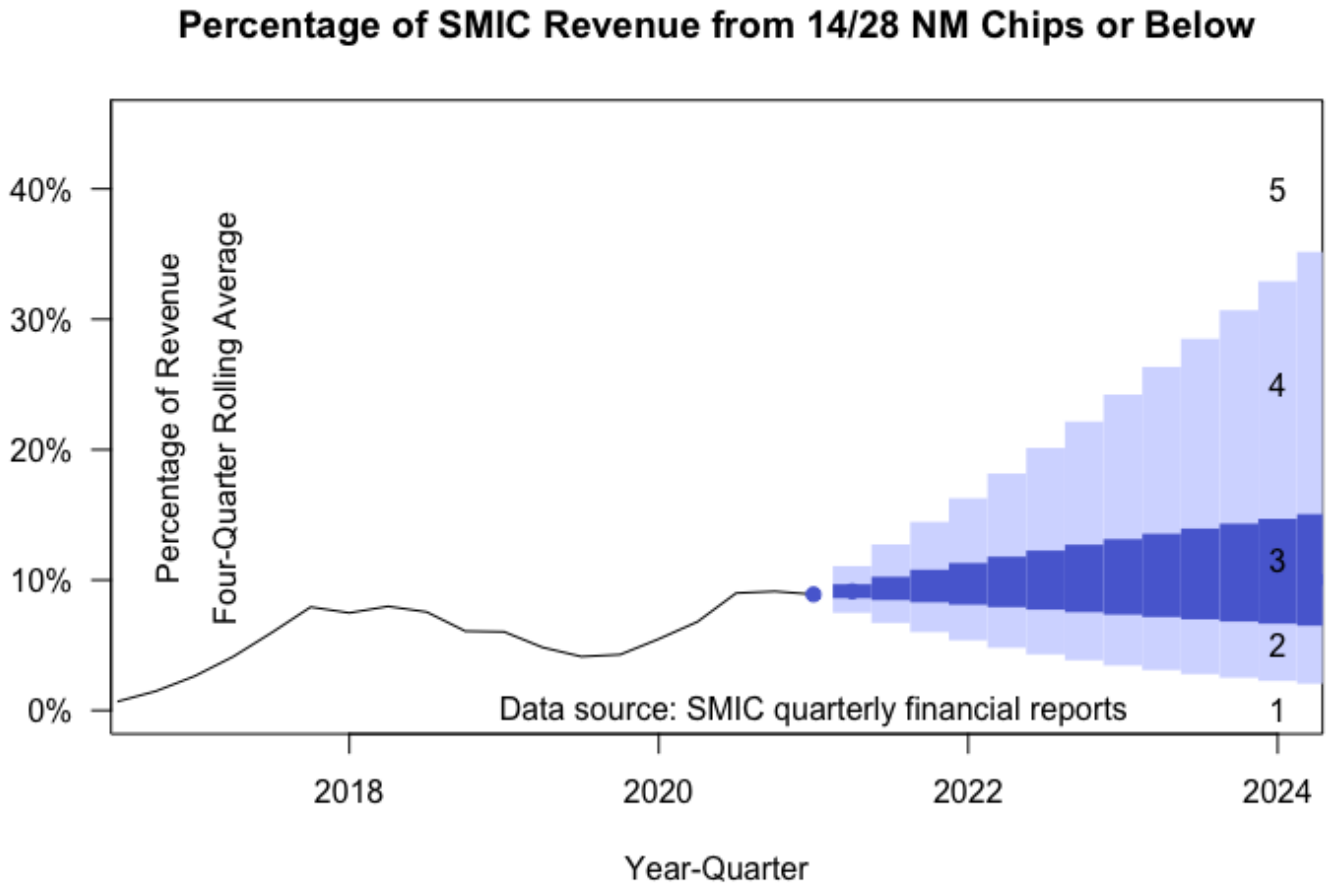
A paper is *U.S.- or China-authored* if any of its authors are affiliated with an institution based in the United States or China.

If the number of China-authored highly cited papers increases relative to the number of U.S.-authored highly cited papers, the ratio will increase. If the number of U.S.-authored highly cited papers increases relative to the number of China-authored highly cited papers, the ratio will decrease.

This question is based on papers in Web of Science, Digital Science, and Microsoft Academic Graph. A paper is an AI paper if it would be categorized under the artificial intelligence, machine learning, computer vision, computation and language, multi-agent systems, or robotics categories on arXiv, as determined by a CSET-developed classifier.

6. How will the percentage of SMIC revenue from 14/28 nm chips or smaller change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

Semiconductor Manufacturing International Corporation (SMIC) is China's leading chip manufacturer.

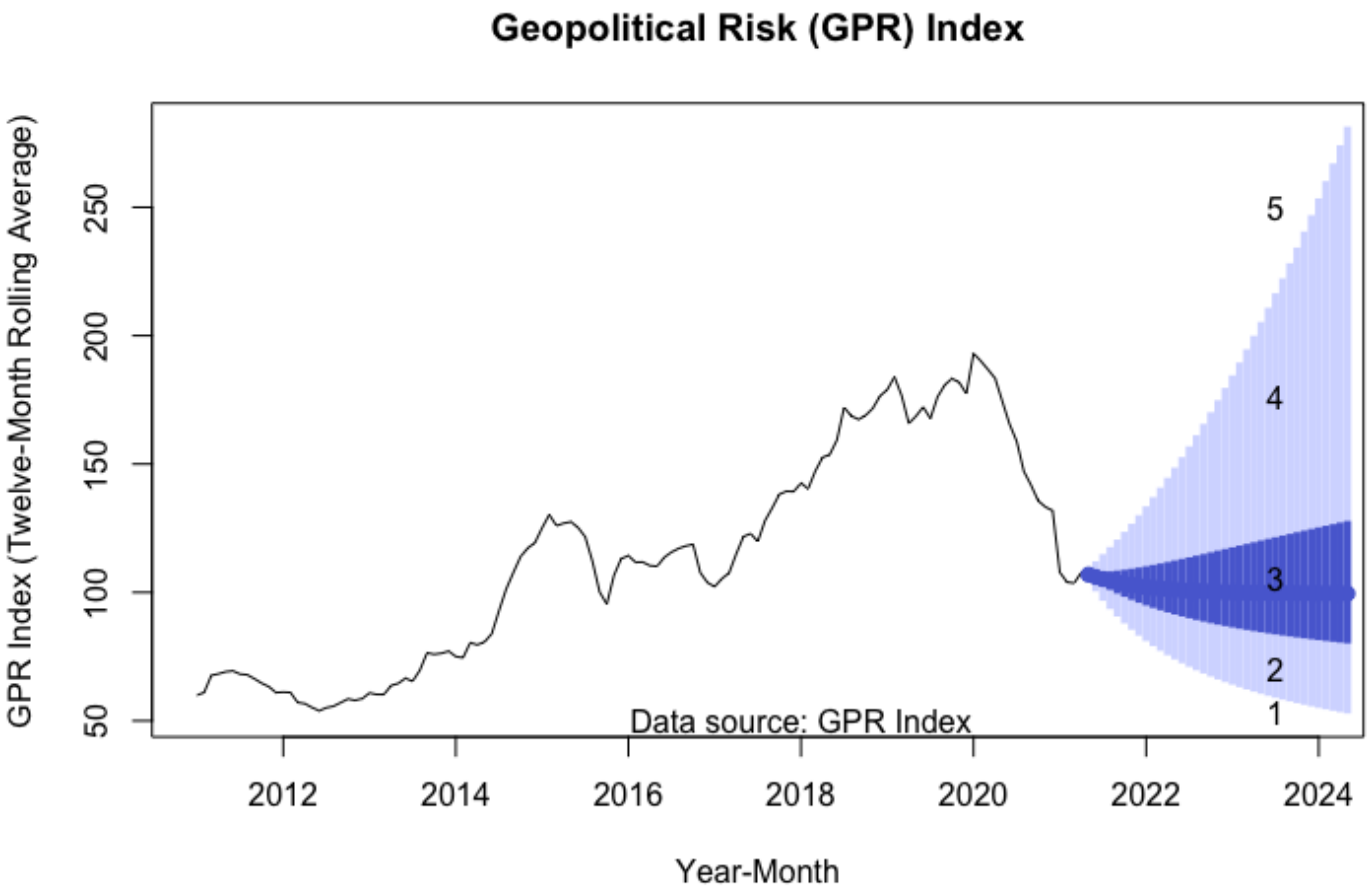
SMIC does not currently report revenue from chips smaller than 14 nanometers. It first included 14 nanometer chips in its revenue reporting in 2019 Q4.

Section III: Factors-General Geopolitical Threats

C. General Geopolitical Threats

7. How will the Geopolitical Risk (GPR) Index change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

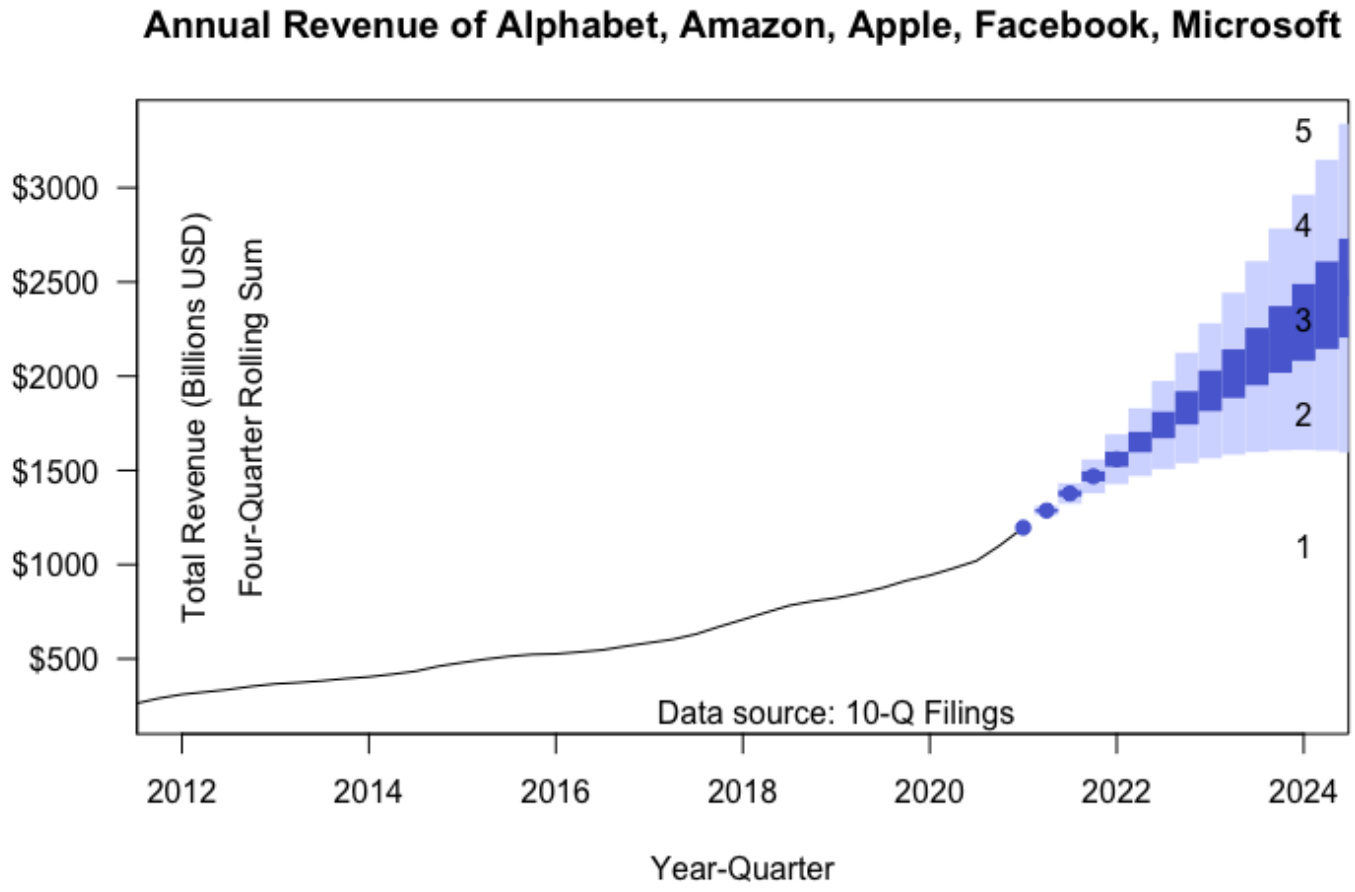
This question is based on the Geopolitical Risk (GPR) Index of Dario Caldara and Matteo Iacoviello, which counts the occurrence of words related to geopolitical tensions in leading international newspapers.

Section III. Factors-Strength of Tech Sector

D. Economic Strength of U.S. Tech Sector

8. How will the combined annual revenue of Alphabet, Amazon, Apple, Facebook, and Microsoft change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○

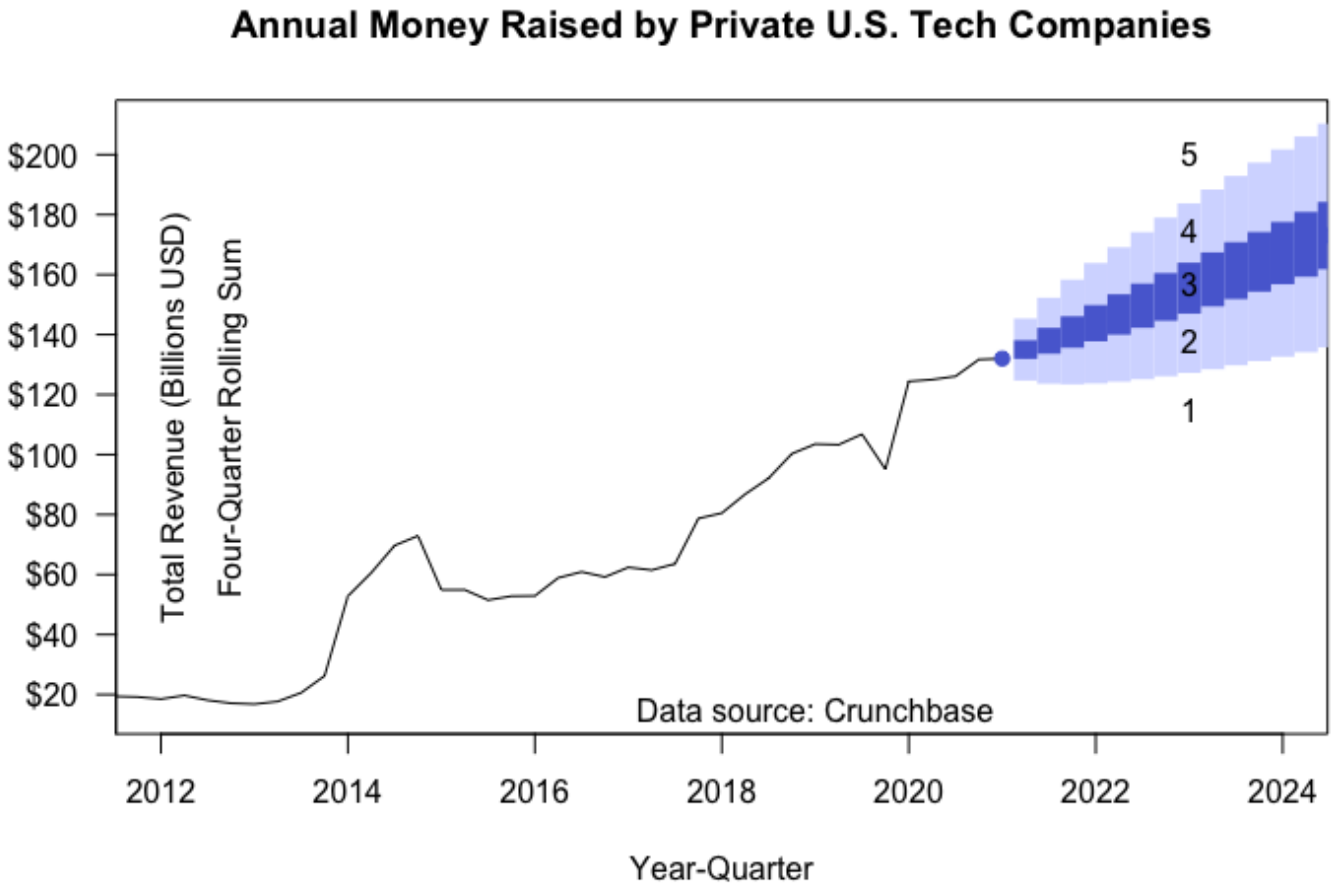


Definitions and clarifications

This question is based on the combined revenue of Alphabet Inc., Amazon.com Inc., Apple Inc., Facebook Inc., and Microsoft Inc.

9. How will funding for private U.S. tech companies change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



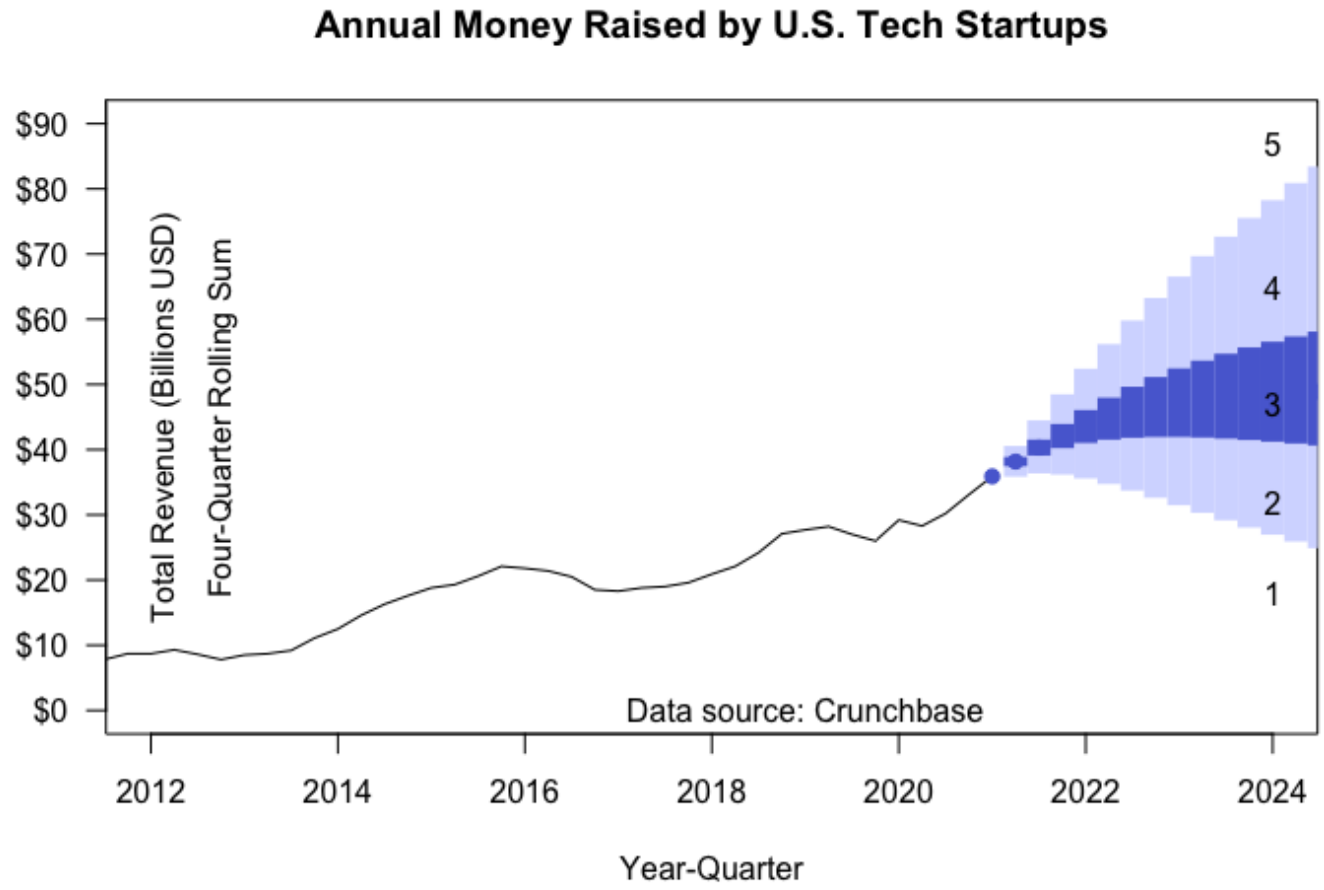
Definitions and clarifications

This question is based on Crunchbase data. Crunchbase classifies every company under multiple "category groups." For this question, companies are classified as *tech* if software, hardware, internet services, or information technology are among their category groups. These categories are overlapping.

A company is *private* if it's not publicly traded.

10. How will funding for U.S. tech startups change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

This question is based on Crunchbase data. Crunchbase classifies every company under multiple "category groups." For this question, companies are classified as *tech* if software, hardware, internet services, or information technology are among their category groups. These categories are overlapping.

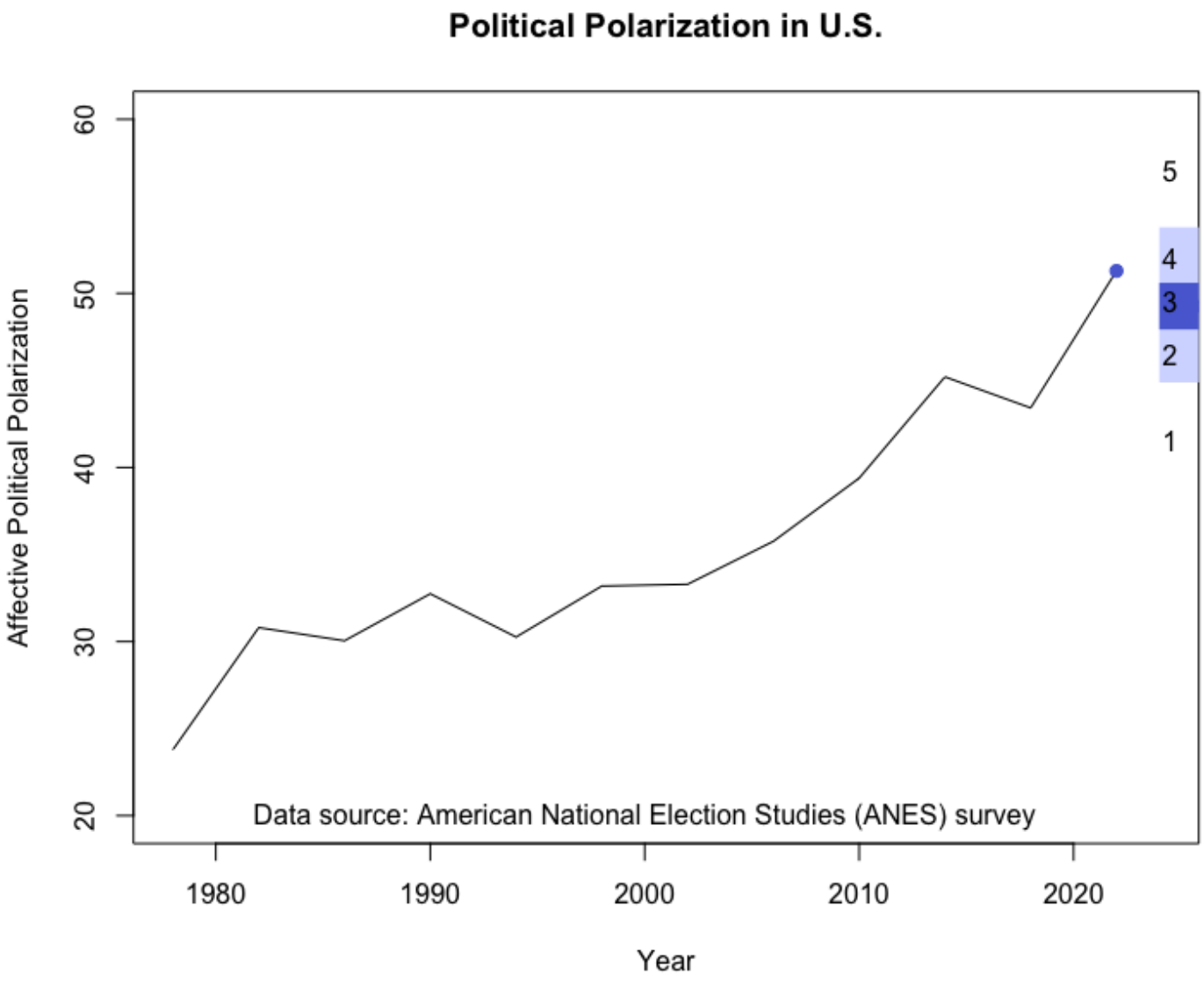
A company is classified as a *startup* if the funding round in question is any of the following: pre-seed, seed, angel, series a, series b, or venture round.

Section III: Factors-Polarization

E. U.S. Political Polarization

11. What will be the level of political polarization among U.S. citizens in 2024, as reflected in the 2024 American National Election Studies survey?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	



Definitions and clarifications

Affective political polarization is the difference between how Republicans and Democrats in the U.S. feel about their own party and the other party.

Section III: Factors-Military Distrust

F. U.S. Trust of Military and Government

12. What is the probability that the U.S. military will acknowledge using an autonomously operated drone to identify and deploy lethal force against a human target in the next 12

months?

0 10 20 30 40 50 60 70 80 90 100

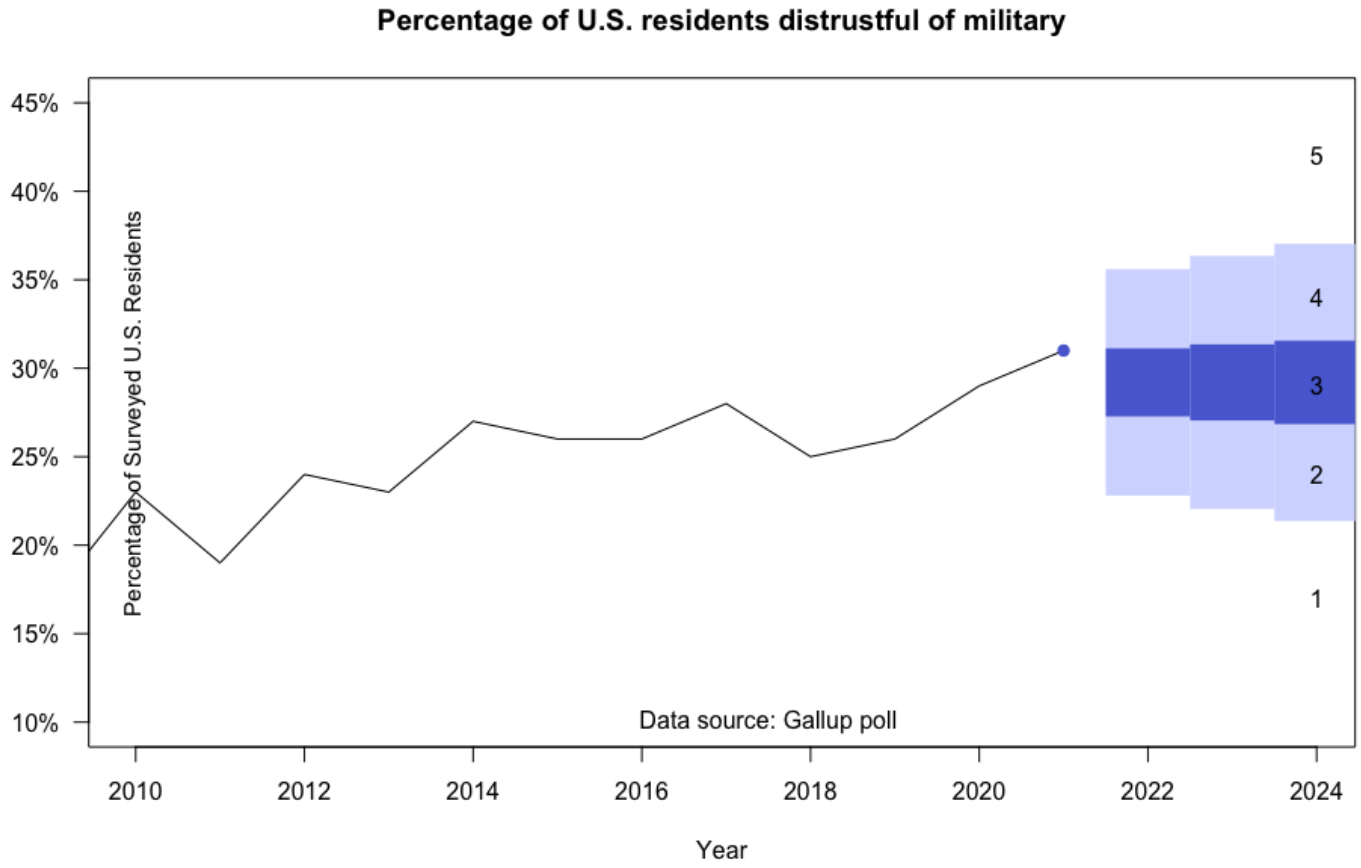
Probability (%) it happens

Definitions and clarifications

To qualify, a drone must meet the International Committee of the Red Cross (ICRC) definition for an autonomous weapons system: "A weapon that can select (i.e. search for or detect, identify, track, select) and attack (i.e. Use force against, neutralise, damage or destroy) targets without human intervention."

13. How will the percentage of U.S. residents with "very little" or "some" trust in the U.S. military change over the next three years, relative to the current trend?

Well below trend (1)	Below trend (2)	On trend (3)	Above trend (4)	Well above trend (5)
○	○	○	○	○



Definitions and clarifications

The gallup poll asks about one's confidence in the military. There are four options: "a great deal, "quite a lot, "some," and "very little." This question asks about the percentage of respondents who select the latter two options: "some" or "very little."

14. According to a June 2019 Pew Research Center survey, 64% of surveyed U.S. residents were "very" or "somewhat" concerned about how the government uses their data. Assuming the same question is asked on August 1, 2022, what will the percentage be?

0 10 20 30 40 50 60 70 80 90 100

Percentage of surveyed respondents with "none" or "not too much" trust in the U.S. military in 2022

Definitions and clarifications

This question is based on the Pew Research Center "Americans and Privacy" survey.

Section III: Factors-DoD-SV Conflict

G. Silicon Valley Protests

15. What is the probability of an organized employee protest at one of the Big 5 tech companies against the company's involvement with DoD in the next 12 months?

	0	10	20	30	40	50	60	70	80	90	100
Probability (%) it happens											

Definitions and clarifications

The *Big 5 tech companies* are Alphabet, Microsoft, Facebook, Amazon, and Apple.

To qualify as an *organized protest*, more than 100 people must take a concerted action, such as signing a petition or letter, resigning, or refusing to work on a particular project.

To qualify, the protest must be reported on in USA Today, The Wall Street Journal, the New York Times, the Washington Post, the Los Angeles Times, or the San Francisco Chronicle.

Block 5

Section IV: Factor-Significance

The questions in the previous section relate to seven factors stakeholders identified as relevant to the future of the DoD-Silicon Valley relationship. Please indicate the impact you think a change in each factor would have on the DoD-Silicon Valley relationship.

What kind of impact would an **increase** in the following factors have on the DoD-Silicon Valley relationship?

	Strong negative impact	Moderate negative impact	No impact	Moderate positive impact	Strong positive impact

	Strong negative impact	Moderate negative impact	No impact	Moderate positive impact	Strong positive impact
China military aggression	O	O	O	O	O
China tech capabilities	O	O	O	O	O
General geopolitical threats	O	O	O	O	O
Strength of U.S. tech sector	O	O	O	O	O
U.S. political polarization	O	O	O	O	O
U.S. trust of military and government	O	O	O	O	O
Silicon Valley protests	O	O	O	O	O

What kind of impact would a **decrease** in the following factors have on the DoD-Silicon Valley relationship?

	Strong negative impact	Moderate negative impact	No impact	Moderate positive impact	Strong positive impact
China military aggression	O	O	O	O	O
China tech capabilities	O	O	O	O	O
General geopolitical threats	O	O	O	O	O
Strength of U.S. tech sector	O	O	O	O	O
U.S. political polarization	O	O	O	O	O
U.S. trust of military and government	O	O	O	O	O
Silicon Valley protests	O	O	O	O	O

Definitions and clarifications

The DoD-Silicon Valley relationship refers to the flow of resources, such as information, technology, and talent, between DoD and Silicon Valley companies. A positive change means more access to these resources, and a negative change means less access to these resources.

Block 12

Can we include your name on a publicly available list of participating expert-stakeholders? Under no circumstances would your individual forecasts be shared publicly.

- ○ Yes
- ○ No

Do you know other people associated with the Department of Defense or Silicon Valley with a professional interest in this topic that you recommend we invite to take this survey? If so, please provide their name and email address.

Questions or comments? Contact CSET.

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