10 TECH PRINCIPLES

For the Biden Administration

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For the Biden Administration

**Evidence-Based Policy**

1. Make evidence-based policy the touchstone of all policy initiatives. “Show me the evidence” should be a mantra recited for every policy proposal. Evidence should consist of rigorous empirical or other real-world analyses, not untested theories or models.

**Broadband**

2. Tackle the digital divide through data-driven approaches and rigorous evaluation of what works and what doesn’t.

3. Continue incorporating demand, in addition to supply, into policy decisions.

4. Do not treat broadband as a public utility, as that is likely to slow investment and innovation and increase prices. Similarly, rethink positions on net neutrality, particularly with respect to paid prioritization or “fast lanes,” which may be useful for socially productive services such as telemedicine and education.

5. Build on progress employing market-based mechanisms for allocating spectrum. Do not allow DoD and other agencies to control spectrum policy.

**Innovation and Global Linkages**

6. Encourage the free movement of people to promote productivity and innovation.

7. Encourage the free flow of information to promote U.S. innovation and technology leadership.

**Antitrust and Competition**

8. Reinforce and strengthen the consumer welfare standard as the U.S. approach to antitrust.

**Regulatory Reform**

9. Make permanent and expand regulatory changes enacted during COVID-19 that lower barriers to entry and help consumers, especially in telehealth.

10. Be cognizant of policy inconsistencies and seriously consider how to address them. More broadly, understand the tradeoffs inherent in many policy decisions.
Evidence-Based Policy

Make evidence-based policy the touchstone of all policy initiatives. “Show me the evidence” should be a mantra recited for every policy proposal. Evidence should consist of rigorous empirical or other real-world analyses, not untested theories or models.

Resources are scarce, making it important that the government allocate them wisely. Broadly speaking, evidence-based policymaking (EBP) means ensuring that policies yield the largest bang for the buck. EBP requires four steps:

1. Understanding what relevant programs exist and how they are working,
2. Estimating expected outcomes from the newly proposed policies,
3. Building rigorous ongoing evaluation into the implementation, and
4. Adjusting course where necessary in response to evaluation.

Using evidence to inform policy seems obvious, yet it is not the norm. A 2017 GAO report found that only:

Forty percent [of federal program managers] reported that an evaluation had been completed within the past 5 years of any program, operation, or project they were involved in. Another 39 percent of managers reported that they did not know if an evaluation had been completed, and 18 percent reported having none.\(^1\)

The lack of evaluation is unfortunate because rigorous evaluation can improve outcomes. Member of the bipartisan U.S. Commission on Evidence-Based Policymaking and TPI Distinguished Senior Fellow Robert Hahn noted several programs that had been improved by evaluation, including “policies aimed at providing stable housing for the homeless; policies aimed at reducing drug abuse (many of which were not effective initially); and policies that provide job training.”\(^2\)

The lack of routine use of evidence helped generate support for the bipartisan Foundations for Evidence-Based Policymaking Act of 2018. Hahn noted that the Act required:\(^3\)

1. “comprehensive risk assessments related to the release of certain data, and it also codifies language directing key agencies to protect trust in data by maintaining confidentiality;”
2. “a learning agenda [by each agency]...related to evidence building that would align evaluation efforts with key questions that policymakers want answered;” and
3. making “it easier for government and academic researchers to gain access to data, and for the public to know what kinds of data are being made available.”

Rigorous experiments and evaluations are key to meaningful EBP, but a sound methodology is not sufficient. Policymakers and program managers must commit to learning from the results of experiments and evaluations regardless of the results. Making a credible commitment to evaluation is difficult because policymakers face political pressure to implement, continue, or avoid certain policies regardless of the evidence. Beneficiaries of government programs, including businesses, interest groups, consumers, or even agencies that run programs, can become constituencies with an interest in opposing changes.

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\(^3\) Ibid.
Political resistance to EBP has no easy answer. Groups will always oppose changes to programs that benefit them regardless of whether the programs are effective or justified.

Proponents of EBP can help reduce those pressures by rewarding evaluation regardless of the outcomes as failure often teaches as much as success. Critics should not use failed experiments or evaluations that yield negative outcomes as evidence of agency or program manager failure. If we want government managers to be willing to consider creative solutions to problems, then we must accept that some initiatives will fail. If no program ever failed an evaluation, that may indicate a failure of the evaluation process or a failure to take sufficient risks rather than successful programs.

**Broadband**

2. *Tackle the digital divide through data-driven approaches and rigorous evaluation of what works and what doesn’t.*

The pandemic has highlighted the importance of connectivity and generated widespread agreement that bridging this divide is crucial. This divide exists despite more than $10 billion in federal broadband subsidies every year. Nearly every objective analysis, including many from the Government Accountability Office, finds that our current spending is largely ineffective. Moreover, we currently fund universal programs through a regressive tax on certain telecommunications services.

The Federal Communications Commission (FCC) has made progress on allocating funds for broadband buildout more effectively. Beginning with Democratic FCC Chairmen Genachowski and Wheeler and continuing through Republican FCC Chairman Ajit Pai, the FCC has allocated some subsidies for rural service through reverse auctions (competitive bidding). Despite opposition from those who receive funds under the old cost-based system, reverse auctions have a proven track record of yielding a much bigger bang for the buck than the traditional method of distributing subsidies.

But only a small fraction of rural subsidies are distributed by auction, and most subsidy programs have not been subject to any rigorous effectiveness or cost-effectiveness test. Solving the digital divide presents an immediate opportunity to apply evidence based policymaking, as described above, to a pressing issue.

A Biden administration should rethink priorities. Today, we spend far more subsidizing buildout in rural areas than on helping low-income people subscribe in areas that have broadband coverage, even though the income-based digital divide is larger than the urban-rural divide. Figure 2.1 shows that while the adoption gap between low and high income (as defined in the figure) is more than twice as large as the urban-rural adoption gap, we spend about four times as much subsidizing high cost areas than we do low-income people.

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4 As recently as October, 2020, the GAO noted that the rural subsidy program goals “are not expressed in quantifiable or measurable terms.”

[https://www.gao.gov/assets/710/709953.pdf](https://www.gao.gov/assets/710/709953.pdf)
The new administration should also fully embrace data analysis and experimentation. Running experiments does not mean delaying action. It is possible to implement several different approaches simultaneously around the country and then evaluate which worked best.

Data collection and analysis should be opportunistic. During the pandemic, the thousands of school districts around the country have taken different approaches to help students access distance learning. As part of learning what approaches might work, the administration should collect detailed information on what each district is doing to address the digital divide to facilitate evaluation and continuation of programs that prove to be especially effective.

3 **Continue incorporating demand, in addition to supply, into broadband policy.**

Broadband policies too often focus explicitly on supply without taking demand into account. This emphasis can result in resources directed at technologies or services that bring little benefit while leaving fewer resources available for people who need them elsewhere. We see this issue most prominently in debates over bandwidth in which (well-meaning) policymakers and advocates declare that everyone should have access to some arbitrary bandwidth, typically 100 Mbps or Gigabit connections.

Policy concerns over bandwidth seem to stem from several misconceptions. These include the beliefs that bandwidth is always the most important indicator of broadband quality, more bandwidth is always better, and that some commonly available plans with lower bandwidth make the connection an inferior and inadequate product.

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USF spending data is from USAC Annual Report [https://www.usac.org/about/reports-orders/annual-report/](https://www.usac.org/about/reports-orders/annual-report/)

These subsidy levels exclude the Rural Health Care and eRate funds as well as spending by the Department of Agriculture’s Rural Utilities Service.
However, broadband quality is a function of many factors, of which bandwidth is just one. Other aspects of service like latency, jitter, and packet loss also affect quality. For many services, particularly real-time interactions like video conferencing and gaming, those other factors can matter more than bandwidth beyond some minimum level.

The minimum level of bandwidth necessary for a high-quality connection is lower than policies tend to acknowledge. Zoom, for example, requires only 1.5 Mbps download and upload speed for 720p resolution and 3 Mbps for HD 1080 resolution. Netflix recommends three Mbps for SD video, five for HD video, and 25 for “Ultra HD” (4K, or four times the number of pixels in HD). Several students can attend virtual classes and others work from home with a 25 Mbps download connection, although 50 Mbps would probably be more comfortable.

Consumers intuitively know this about bandwidth. In recent research, Liu, Prince, and Wallsten (2018) found that consumers place a high value on increasing bandwidth at lower bandwidth levels, but the incremental value decreases sharply as bandwidth increases.\(^7\)

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\(^6\) This is easy for anyone to check. While on a Zoom call, go to “statistics” under the “preferences” menu, which will show real-time bandwidth use.


\(^8\) Ibid.
The FCC has begun to incorporate demand into some universal service funding decisions. The Connect America Fund Phase II and the Rural Development Opportunity Fund auctions both scored proposals not just on the subsidy the bidder requested, but also on the service it promised to provide. Promises to offer higher bandwidth were given higher scores, but the scores did not increase linearly with offered speeds. Instead, the score mapped to the proposed speeds in a way that appeared to match demand fairly well. Similarly, proposals for networks with higher latency received lower scores, reflecting people’s preference for connections with lower latency.9

Calls for so-called “future proofing” can also lead to policies that require more bandwidth than demand would justify.10 “Future proofing” sounds good, but in reality means making long-term predictions about how technology will develop and be used in the future and making investments today that may not be needed for years, if at all.

Broadband networks are constantly being upgraded. USTA estimates annual broadband investment at around $75 billion.11 In this context, “future proofing” is at best a meaningless concept given the large annual investments, and at worst a path towards a massive misuse of resources by accelerating investment in infrastructure that will yield few if any benefits for years. As with most decisions, the right level of investment will maximize the net present value of net benefits, which is the net present value of the benefits less the net present value of the costs (investment).

A societal ideal level of broadband investment may, in fact, be higher than the amount the private sector would make on its own at any given point in time. To the extent this is true, though, we use universal service and various other programs to increase investment beyond the profit-maximizing level. Generating additional investment to guard against other projected uses and demands beyond that is likely to divert resources away from useful activities, such as investment in un- or underserved areas or population groups towards preparing for unknowns that could be addressed in the future.

4 Do not treat broadband as a public utility, as that is likely to slow investment and innovation and increase prices. Similarly, recognize that paid prioritization, or “fast lanes,” may be useful for certain services, such as telemedicine and education

The urgent need to address the digital divide has caused some to call for internet provision to be treated as a public utility based on the idea that could speed buildout and adoption and decrease prices. History, however, shows that belief to be false.

While electrification is rightly regarded as an important achievement, broadband has been adopted more quickly, as Figure 4.1 shows. Electricity required about 25 years to go from ten percent to 70 percent adoption, while it took broadband about 15 years to make that same jump. It took about 50 years for electricity to approach 100 percent adoption.

9 The “latency penalty,” however, appeared to be significantly larger than people’s actual preferences would indicate, suggesting satellite service, which is the technology with the highest latency, was unduly penalized.
Regulated utilities have generally not brought lower prices to consumers over time. According to the Bureau of Labor Statistics, prices have increased faster for electricity than for internet service, as Figure 4.2 shows.

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Additionally, utilities have been slow innovators and a drag on economic productivity. New surveys from the National Science Foundations show that firms classified as “telecommunications carriers” have introduced far more “significantly improved” products and processes than have utilities.

It is still possible to encourage additional innovation. The COVID-19 pandemic has shown that not all internet traffic is equal. Different applications require different levels of connection quality and reliability. Interactive, real-time, connections require higher levels of quality than email or video streaming. Connections that optimize certain aspects of quality could improve children’s ability to engage in distance learning, patients’ ability to interact meaningfully with their doctors via telehealth, and perhaps create services we cannot yet imagine.

During the pandemic, students and teachers often experience glitchy connections and patients and doctors endure frozen screens and intermittent lost audio. These issues are mostly unrelated to bandwidth (see the related recommendation on incorporating demand into broadband policy). Instead, glitches can result from problems anywhere from server to endpoint. Specialized connections could help manage quality issues and improve distance learning and telehealth.

Distance learning and telehealth are not the only possible beneficiaries. Zoom and other video conferencing systems have made working from home easier. But everyone has experienced real-time glitches in their day-to-day work experience. With paid prioritization, companies may be able to purchase connections for their employees specifically tuned to their work needs.

In short, paid prioritization can help people get the service that is most valuable to them without requiring massive new investments that everyone would have to pay for regardless of how much they value those services.
Build on progress employing market-based mechanisms rather than beauty contests for allocating spectrum. Do not allow DoD and other agencies to control spectrum policy.

Over the past decades, the FCC has engaged in a largely successful and bipartisan effort to move away from “beauty contests” and towards market-based spectrum allocation mechanisms. Republican and Democratic FCC chairs have also continued the march towards more flexible spectrum licenses that make it easier to transition to new technologies and types of demand over time.

One aspect of spectrum policy has proven difficult under both parties: moving spectrum from inefficient government use to private and commercial use. Federal agencies, particularly the Department of Defense, like any incumbent user that can’t easily be compensated, have been reluctant to part with what they perceive to be “their” spectrum. Still, progress is slowly being made, with new sharing agreements in the 3.5 GHz band and the DoD providing an additional 50 MHz of mid-band spectrum for the commercial market.

Unfortunately, in the past few years government agencies have increasingly engaged in lobbying NTIA and the FCC to retain use of certain spectrum bands.

Early in the Trump administration, a kerfuffle over interference with weather satellites and GPS in the L-Band showed the capriciousness of federal policy. Both Commerce and Defense Departments sent letters to the FCC with new claims of interference, despite a lengthy administrative record to the contrary. In other spectrum bands, federal agencies became more active in protecting the interests of their constituent industries. The Department of Transportation, for instance, became unusually vocal in its support of the 5.9 GHz “car band,” which had mostly remained fallow despite its predetermined allocation for autonomous vehicle communications. In a divergence from previous administrations, the NTIA and OSTP seemed less visible in coordinating a consistent federal spectrum policy, letting the federal agencies announce and advocate for their own positions.

Worse, some have been arguing in favor of a DoD-run, nationalized 5G network. History and current experience demonstrate how terrible such a plan would be. State-owned telephone networks provided poor service and low quality. Politicians often used them as a way to provide jobs for constituents, not to provide good phone service. By the late 1980s nearly every country in the world had learned that lesson and moved away from state ownership. Some places have recently seen the state re-emerge as a provider, often with unfortunate results. Mexico’s Red Compartida involved giving a single provider free access to valuable spectrum in order to sell wholesale network access. Instead, buildout has been slow, with the network even buying capacity from other carriers to meet its goals.

It has taken decades of policymaking to favor market-based mechanisms for spectrum allocations. Unwinding this progress would have long-lasting consequences.

One important area in spectrum policy that still lacks rigorous, market-based methods for decision making is the initial decision of whether a given band should be used for unlicensed or licensed spectrum. This decision is currently made the same way all spectrum decisions used to be made: through competing arguments and technical reports. New thinking on how to use market signals to make this decision could help make future spectrum allocations yield even larger benefits.

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Innovation and Global Linkages

Encourage the free movement of people to promote productivity and innovation.

Immigration is a key ingredient to economic growth, and the new administration should welcome it. One recent report estimated that immigration was responsible for 15 percentage points of economic growth in the U.S. from 1990 through 2014. The same report also noted that “40 percent of global patent applications are filed by immigrants.” The Center on Budget and Policy Priorities notes that immigrants work at high rates and make up more than a third of the workforce in some industries. Their geographic mobility helps local economies respond to worker shortages, smoothing out bumps that could otherwise weaken the economy. Immigrant workers help support the aging native-born population, increasing the number of workers as compared to retirees and bolstering the Social Security and Medicare trust funds.

Over the past few years, however, the number of people entering the country as immigrants or nonimmigrants declined, as Figures 6.1 and 6.2 below show.

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The largest decline occurred in the F-1 visa program, which allows people to study in the U.S. Making it more difficult for foreign students to study in the U.S. may have long-term effects on innovation and economic growth given the importance of immigrants to U.S. science and engineering. At the most prominent level, immigrants are a key part of the world of high-tech startups, with more than half of all billion-dollar startups having at least one immigrant founder in 2016.17

Foreign-born people play an even larger role in innovation than their role in startups would suggest. More than half of all people with doctorates working in the U.S. in engineering and computer sciences were born outside of the U.S. The figure below shows the very high share of foreign-born people working in several science and engineering fields. Maintaining innovation leadership requires encouraging people to build their careers in the U.S., regardless of where they are from.

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Encourage the free flow of information, research, and investment, which are important for U.S. innovation and technology leadership.

A unique feature of research and innovation is that results can be used in unexpected ways and places. These so-called “spillovers” mean the benefits of innovation extend beyond any particular geographic area or field of study. People in other countries benefit from U.S. innovations, and vice-versa. However, raising barriers to the free flow of information will slow technological progress and innovation generally, including in the U.S.\(^\text{19}\)

Data from the National Science Foundation’s Science and Engineering Indicators report demonstrate the extent to which knowledge-intensive industries are distributed and interlinked around the world. Figure 7.1 below shows the share of total value added in knowledge and technology-intensive (KTI) industries by country and region. In 2014 the U.S. generated nearly one-third of all global value added in these industries, followed by the EU, China, and Japan.

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Figure 9.

19 New research highlights the cost of restricting information flows. Professor Daniel Gross of the Duke Fuqua School of Business found that the longer patents were kept secret during World War II, the less frequently they were cited in future research. The secrecy was intended to make it more difficult for enemies during the war to learn from U.S. innovation. It may have succeeded in its goal, but one cost was the loss of innovation by the U.S. and the rest of the world as it took longer for those new ideas to spread. Gross, Daniel P. “The Consequences of Invention Secrecy: Evidence from the USPTO Patent Secrecy Program in World War II.” NBER Working Paper 25545, February 2019. https://www.nber.org/system/files/workingpapers/w25545/w25545.pdf.
Value-added in a country does not imply that those goods and services remain in that country. Figure 7.2 shows U.S. imports and exports of knowledge-intensive services.


Relatedly, firms will invest where their capital is likely to yield the largest returns. Locations generating the highest returns vary across and within industries, meaning that many firms will invest both domestically and abroad. That generalization applies to non-U.S. firms, as well, meaning that not only do U.S. firms invest abroad, but so, too, do foreign firms invest in the U.S. Figure 7.3 shows this two-way cross-border investment.

![Figure 7.3: Investment in the U.S. by Foreign Firms and in Foreign Countries by U.S. Firms, 2019](image)

Trade includes more than goods and services. Increasingly, for example, cross-border data flows have become important parts of the economy. As Michael Mandel noted in 2017:

> Cross-border data flows allow intangible capital such as scientific knowledge and management technique to spill over to other countries, boosting global macroeconomic performance.

As companies become increasingly automated and the internet’s importance across society continues to grow, data flows will only become more important.

Research and development (R&D), another key to technological progress, is also intertwined around the world. Figure 7.4 shows that non-U.S. companies do a significant amount of R&D in the U.S., and vice-versa. In 2018, the most recent year available, foreign companies spent about $65 billion on R&D in the U.S. while U.S. companies spent more than $70 billion abroad. Companies invest in R&D in particular locations for many reasons, including locations of suppliers and particular groups of researchers, tax policies, and others. Making it more difficult for U.S. firms to invest in R&D abroad is not likely to cause them to move all of that research to the U.S. Some of it would simply disappear, while foreign companies may hesitate to continue investing in the U.S.

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Antitrust and Competition

Reinforce and strengthen the consumer welfare standard as the U.S. approach to antitrust.

The emergence of large tech platforms over the past decade has precipitated intense debates about the direction of antitrust policy. Consumer welfare is the appropriate foundation for antitrust enforcement and should be retained and strengthened. The consumer welfare standard is supported by an extensive body of economic theory and evidence indicating that an effective pro-competition policy must necessarily focus on consumers.

The consumer welfare standard as the basis of antitrust has come under criticism in recent years. The key criticism is that the consumer welfare standard is myopically focused on price at the expense of other considerations. This caricature is misleading because antitrust based on the consumer welfare standard necessarily takes into account other factors such as quality and innovation and competition.

Critics of the consumer welfare standard advocate a return to an earlier approach to antitrust more likely to consider firm size itself to be evidence of a problem, regardless of its effect on consumers. Under this earlier approach, policy is more likely to protect the interest of competitors rather than competition. For example, some critics of the consumer welfare standard allege the lower prices large platforms are able to charge are predatory because competitors may be harmed regardless of the effects on consumers.

The critics also advocate expanding antitrust to consider a range of social and political objectives, potentially including privacy, income inequality, racial justice, and environmental objectives. Although worthwhile objectives, antitrust is not the appropriate tool for achieving them. Targeting a range of potentially conflicting objectives, which allows the enforcer to pick and choose, produces an incoherent policy, creates uncertainty, and can facilitate the politicization of antitrust enforcement.

23 U.S. Bureau of Economic Analysis. https://apps.bea.gov/Table/indexMNC.cfm
Regulatory Reform

9 Make permanent and expand regulatory changes enacted during COVID-19 that lower barriers to entry and help consumers, especially in telehealth.

For years, it seemed like telemedicine was just around the corner and always would be. Privacy rules prevented doctors from talking with patients on widely-available platforms, Medicare and Medicaid paid doctors less for telehealth visits than for in-person visits, and state licensing laws prevented therapists and others from working across state lines.24

The COVID-19 pandemic increased demand for telehealth and caused policymakers to drop rules that had primarily protected the status quo while harming consumers. The Department of Health and Human Services waived some privacy rules so that providers could offer services over widely available platforms, like FaceTime, Skype, and Zoom without fear of penalties. Some states relaxed licensing rules to enable providers to serve patients who moved or vacationed out-of-state. The CARES Act allowed Medicare providers to receive the same payment for telehealth services as they would have for in-person services. Private health insurance generally followed the same approach. Payment parity created an incentive for health care providers to offer telehealth services.

According to a report published by the Centers for Disease Control, the number of telehealth visits increased by 154 percent year-over-year at the end of March. However, as The Washington Post recently reported, many of these changes are set to revert to the status-quo-ante once the health emergency ends. This would be a mistake. Some aspects of health care will rightly revert to in-office visits, but arbitrary rules should not block consumers’ and doctors’ ability to use new technologies when and where they feel appropriate.

10 Be cognizant of policy inconsistencies and seriously consider how to address them. More broadly, understand the tradeoffs inherent in many policy decisions.

The United States Government is too large and complicated for all of its policies to always be consistent with each other. Still, to the extent possible, policies should not work to opposing goals, and if they do, policymakers should at least recognize and minimize the inconsistencies.

Several examples have been unaddressed in the past few years, creating policy confusion.

Data security vs. free flow of data. Policymakers are rightfully concerned about Americans’ data being stored in places where it might be vulnerable to a government with bad intentions. At the same time, the U.S. has long embraced the principle of the free flow of data, as discussed earlier, and opposed data localization laws. Both principles are important, but failing to acknowledge the potential tradeoffs between them may lead to an inability to do either well, while encouraging other countries to take opposing routes.

Data usage vs. competition. Some have expressed concern about how companies use personal data and argue that government should regulate it more stringently. At the same time, companies can differentiate their products and compete with innovative uses of data. Arguments over TikTok provide a good example. On one hand, in addition to concerns about data access by the Chinese government, there has been some concern about ways in which TikTok uses data and how its algorithms tailor feeds to individuals’ own tastes. On the other hand, the way TikTok uses data has allowed it to become a major competitor in the social media space. Thus, policies that restrict how companies can use data may interfere with policy objectives intended to promote competition.

Content moderation and Type 1 vs. Type 2 errors. The past year has seen a particularly bitter debate over whether and how social media companies should police speech on their platforms. Setting aside questions about Section 230 of the Communications Decency Act, per se, policymakers should realize that this debate has no easy answer, even conceptually. Attempts by social media companies to limit content may cause them to take down posts that many think should remain up, while being too lenient may cause them to leave posts up that many think should be taken down.

At a societal level the Founders, as expressed in the First Amendment of the Constitution, decided it was better to err on the side of allowing speech that many or most would ban because the risk of banning speech that should be allowed was too high and the harms much greater. Not only does the First Amendment protect these platforms and allow them, for the most part, to make any content decisions they like, it should help inform our views about which type of error yields the least harm.

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25 Some reports identified racial, ethnic, and other biases in TikTok’s algorithms. Hopefully there is widespread agreement that pernicious costs of these kind of algorithmic biases mean that they must not be tolerated regardless of whether they match someone’s preferences.