



Mobile Zero Rating: The Economics and Innovation Behind Free Data

BY DOUG BRAKE | MAY 2016

The FCC should announce that nonexclusive zero-rating programs are in the public interest.

Zero-rating programs, which allow consumers to access certain Internet content and services without it counting against their monthly data plans, have proven polarizing, being met with reactions ranging from derision to praise. The crux of the controversy is whether the practice of zero rating violates the spirit of network neutrality principles. Strictly speaking, zero-rated data is treated differently than other data in a way that influences consumer behavior. But adhering to such a strict interpretation of net neutrality would be misguided. Zero-rating products are unlikely to harm the open Internet; instead they are a sign of healthy product differentiation that more efficiently allocates scarce resources in a competitive market, ultimately improving consumer value. The Federal Communications Commission—along with other regulators around the world—is examining zero rating, and while its case-by-case approach to overseeing these programs is sound, telecom regulators should make it clear that they believe nonexclusive zero-rating programs are in the public interest.

INTRODUCTION

Mobile carriers across the world have been rolling out what are called zero-rated or free data products, which allow consumers to access to certain Internet traffic without it counting against their monthly data plan. The motivations for these services vary in different markets, but, at least in the United States, mobile carriers are trying to differentiate their services in a competitive fight over who can best meet consumers' ever-increasing demand for streaming video.

Zero rating has run into opposition from some of net neutrality’s more puritanical advocates. One of the more eye-opening harangues, penned by Susan Crawford, claimed that allowing some of the world’s poorest people the choice to access basic information online for free is a “malignant ... surrendering of the Internet” that should be outlawed immediately.¹ Unfortunately, at least a few regulators around the world have taken this advice to heart, with a number of countries either outright banning zero rating, or severely limiting it.

Thankfully, the Federal Communications Commission (FCC) is not quite as hostile to pragmatic solutions to expand access and use of the Internet. In the Open Internet Order, the FCC laid out a case-by-case approach for overseeing zero-rating programs. Later, in a speech touching on zero rating, Chairman Tom Wheeler explained that “the Open Internet Order did not discourage this type of two-sided market” and that zero rating “enables increased competition and increased efficiency—both things that benefit consumers.”² Wheeler has also called zero-rated offerings “highly innovative and highly competitive.”³

But unfortunately, the FCC has since wavered from this initial vote of confidence, sending letters last December to various companies experimenting with zero-rating models.⁴ Given the state of competition in the mobile market and the benefits consumers get from the practice (e.g., cheaper data plans), there should be a strong presumption that these practices are in the public interest. All of these companies are trying to differentiate their services to better gain market share—they are working to please end users. This is a high-functioning market working to best meet soaring consumer demand for mobile video despite constrained and costly radio spectrum resources.

THE RISE OF USAGE-BASED PRICING IN MOBILE BROADBAND

Zero rating only makes sense in the context of usage-based pricing. In a world where there is no usage-based pricing, there is no reason for zero rating; everything is zero rated. But in a world where spectrum is constrained and providing wireless coverage is expensive, it makes sense to charge users based on their data consumption. It is in this environment that companies, both edge providers and carriers, find zero rating to be a valuable business model.

The most straightforward conception of zero rating is where the mobile data of a particular application or service does not count against a consumer’s monthly cap, either paid for by the edge provider or not. For example, T-Mobile’s Binge On program allows for zero-rating video streaming from over 60 services, such as YouTube and Netflix. But other programs opt for a more flexible platform format, allowing sponsors to pay for end-user data. For instance, a new developer could zero rate downloads of her application, or an employer could zero rate business-related data on employee’s devices. Regardless of the particular form zero rating takes, an understanding of the reasons for usage-based pricing is key to grounding a discussion of zero rating.

The switch to usage-based pricing in the United States, and its predominance around the world, is an effect of competitive markets economizing mobile network capacity. That is to say demand for mobile capacity is virtually insatiable, but building the networks to meet that capacity is costly. Usage-based pricing allows carriers to price that capacity to better match supply to those who have a greater demand for mobile data. This pricing also allows carriers to better predict and plan usage growth on the network.

Mobile data traffic is only expected to grow, with Cisco's Visual Networking Index expecting an eightfold growth in global traffic between 2015 and 2020.⁵ Mobile video is an important component of this growing demand. As a number of technology trends—such as faster mobile processors, larger screens, better batteries, advanced mobile application ecosystems, and the rising popularity of video on social networks—have converged to see allow mobile video traffic explode.⁶

Unfortunately, much of the low-hanging fruit in increasing wireless capacity has been picked, and operators are facing a significant challenge in meeting the projected data demand. When it comes to achieving additional throughput and increasing the mobile broadband speeds consumers experience, wireless operators have only a handful of levers they can pull:

Some criticize usage-based pricing for artificially introducing scarcity that forces users to curtail Internet use. These criticisms are not grounded in reality.

- **More spectrum:** Mobile operators are always looking for more spectrum, as this resource is the key pinch-point limiting mobile networks' capacity. Unfortunately, allocating more spectrum for broadband is a long and difficult process, requiring an act of Congress, and efforts by the FCC. Finding more spectrum is important, but can't scale fast enough to meet demand. Moreover, given that spectrum is now auctioned off, often for billions of dollars, any additional spectrum requires additional revenues, either from customers directly or from edge providers paying carriers to offer their content without charging against the customer's data cap.
- **Spectral efficiency:** Encoding more bits of information into a given slice of spectrum would increase efficiency. Unfortunately, there are hard limits to how far engineers can push spectral efficiency, and engineers are already close to those limits. As hard as getting Congress to pass a new law can be, bending the laws of physics is even harder.
- **Spectrum reuse:** Historically this is where far-and-away the most gains have been realized in increasing the overall use of wireless systems. Techniques like making smaller cell sizes or splitting cells into different sectors allow for greatly increased capacity, but this solution is limited as well. As cells get smaller, costs skyrocket. The expenses of additional equipment, backhaul connections, rights-of-way negotiations, and the engineering to avoid self-interference quickly swamp the benefits and cannot easily be borne by additions to consumers' monthly bills alone.

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- Economizing resources: Monthly data plans allow limited capacity to go to those who value it most. Zero rating recognizes the necessity of data caps as a tool to economize network usage and seeks to improve that efficiency by reducing the number of bits in a stream or finding additional revenue streams from edge providers to help pay for costly network upgrades.

Overall, the move toward pricing data in tiers instead of offering unlimited plans has helped to allocate the costs of providing service more efficiently. Under this pricing model, those who use less data generally get a better deal than they otherwise would, while heavier users either pay more or must scale back their data consumption.

Indeed, before the introduction of tiered data plans, there was a fairly dramatic discrepancy between the average users and those who placed the heaviest demand on the network. Prior to the introduction of usage-based pricing by major carriers in 2010, the top 1 percent of heaviest users generated more than half of all mobile data traffic in North America.⁷ Under an unlimited model, such a skew is clearly not ideal. Lighter users effectively subsidized heavier ones, and it was especially problematic because spectrum is a localized resource. While a 1-percenter is streaming video all day, the neighbors might well have difficulties with basic web access on their phones or tablets.

As of November 2015, about five years after usage-based pricing was introduced, “power users” are still responsible for a large share of traffic, with the top fifth of users generating almost 60 percent of all traffic.⁸ But tiered pricing has reined in the long tail of consumption, and the top 1 percent of heaviest users now only claim 7 percent of traffic.⁹ This progressive development makes it easier for low-income households to buy more limited data plans with lower prices, since most people are not “power users.”

Of course, usage-based pricing comes in different shapes and sizes, with different tiers or buckets priced accordingly, or a simple pay-as-you-go model. There may also be various consequences for exceeding a cap, such as paying overage fees for additional data or being shunted to legacy 3G networks—the cost of which has already been recouped. But the important point is that these pricing models introduce economic choices for users about how much data they will use in any given month. This sort of differential pricing increases economic welfare generally, especially for consumers with less ability or willingness to pay.

Some criticize usage-based pricing for artificially introducing scarcity that forces users to curtail Internet use.¹⁰ These criticisms are not grounded in reality, as there is nothing artificial about the scarcity of mobile capacity—data caps simply give operators an additional tool for planning and pricing around this scarcity. Such tools are especially important when operators are competing on their networks’ performance.

Others criticize specific forms of usage-based pricing, preferring some models over others.¹¹ When it comes to zero rating, critics have been particularly vocal about exclusive dealing, where carriers only offer to zero rate particular content, and exclusive deals with affiliated content above all.¹² We agree, as detailed below, that exclusive zero-rating practices are

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problematic and should be prohibited. Fortunately, there is a vigorously competitive mobile market both in the United States and in many markets around the world, and widespread consumer desire for open access to the web means exclusive deals are unlikely to be proposed. Beyond exclusivity, the particular design and pricing of data packages involves complex trade-offs and long-term strategy: The nuances of these programs are undoubtedly questions best left for the market.

Within the context of usage-based pricing, zero rating opens room for two-sided markets and product differentiation, which can offer significant improvements to the mobile marketplace.

CURRENT ZERO-RATING PRACTICES

There are a wide variety of approaches to zero rating mobile traffic around the world. Different markets have unique characteristics and challenges that firms are seeking to solve. Practices vary primarily by the type of content included in the program, the entity doing the zero rating, and who is paying for the data. The carrier may voluntarily zero rate content in an attempt to win new adopters or differentiate its service. Or carriers may enter into business relationships with content “sponsors” who pay to see the data for their applications or websites zero rated, in a practice that is no different economically than providing the consumer with some kind of rebate directly.

Zero Rating Around the World

Mobile Internet access is a unique opportunity for previously unconnected populations to access information. The scale of mobile phone adoption around the world is unmatched, making it the best technology ecosystem for expanding Internet adoption around the world.¹³ But in many countries, access, including data plans, is extremely expensive relative to income. Large numbers forego mobile broadband for other reasons, such as perceived irrelevance or lack of digital literacy skills. Zero rating is well suited to address these challenges, making it quite common internationally, with a number of different solutions successfully offered in overseas markets.

One of the most famous zero-rating projects is run by the Wikimedia Foundation, which works with operators in over 60 countries to offer free access to Wikipedia under the project Wikipedia Zero.¹⁴ Wikipedia Zero is a noncommercial arrangement that abides by a handful of operating principles: There is no exchange of payment; it is not sold as part of a bundle with other services; and it is nonexclusive with any carrier in a region.¹⁵ Wikipedia negotiates with carriers to help support the foundation’s mission of bringing knowledge to the world, as well as introducing new users to the mobile Internet and attracting new customers.¹⁶

These types of zero-rating programs often slim down their applications, to reduce the load on networks from the additional use, allowing carriers to deploy them as effective loss leaders, without swamping their networks.¹⁷ This is done either by offering a text-only version of the site, or by relying on proxy servers that compress content. The Opera Mini Web browser uses this technology—a network of servers that compress Web content, and

is especially popular in developing countries where prepaid data is extremely expensive relative to income.¹⁸ This allows consumers to access more of the content that matters, even if pictures are of a lower resolution.

Facebook initially experimented with zero rating a free, text-only version of its service for feature phones in developing countries under the banner “Facebook Zero.”¹⁹ Facebook did not pay carriers for this content, but instead adapted its application to fit existing, limited infrastructure, helping carriers to use it as a sort of “freemium” model, hoping additional subscribers would pay for full access. Facebook and its partners saw impressive increases in data plan sales for partnering operators, causing it to expand the program.²⁰

After introduction in 2010, Facebook Zero grew to more than 50 mobile operators in over 40 countries, leading to the broader Free Basics platform under the internet.org initiative.²¹ Free Basics is an open platform for governments, nonprofits, and commercial websites to offer a slimmed-down version of their content for free. Some critics gloss over the fact that Free Basics is an open platform—they claim Facebook is creating a “walled garden” where consumers only see the portion of the Internet Facebook allows them to see. In fact, the platform is remarkably open to participation, only requiring that applications be designed to use data efficiently and be compatible with both feature and smartphones.²² If Free Basics is a “walled garden” of free content as some claim, the wall is low and the gate is open.²³

Facebook’s role is one of convener and catalyst—it is the carriers who drive the model, and no money changes hands. Carriers use the free content as a loss leader in an attempt to win subscribers, many of whom sign up for additional mobile services after experiencing a portion of what the Internet has to offer. In an op-ed, Mark Zuckerberg explained that “half the people who use Free Basics to go online for the first time pay to access the full [I]nternet within 30 days.”²⁴ The Free Basics program rose to prominence when it came under fire as a net neutrality violation in India, and was ultimately banned by the Telecom Regulatory Authority of India (TRAI).²⁵

Zero rating abroad is certainly not limited to developing countries. The Digital Fuel Monitor by Rewheel counts 92 zero-rated mobile services in OECD countries alone.²⁶ For example, in technologically advanced Sweden, Telia recently announced that six popular social media platforms, such as WhatsApp and Twitter, would be zero rated on its network.²⁷ Zero rating is an increasingly common practice around the world.

Zero Rating in the United States

All U.S. mobile operators have introduced zero-rating programs of one kind or another. The programs vary considerably as carriers attempt to differentiate their services in a competitive market.

T-Mobile has introduced two zero-rating programs, one for streaming music and another for video, under the brands “Music Freedom” and “Binge On” respectively. The Music Freedom program offers unlimited music streaming from services like Pandora,

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iHeartRadio, iTunes Radio, and Rhapsody that does not count against the user's data allowance. Services do not pay to be included, but instead are decided by something like a popular vote—users may suggest other music-streaming platforms they want in the program.²⁸

“Binge On” is a similar arrangement for streaming video providers.²⁹ Again, video providers do not compensate T-Mobile for inclusion in the program, but they must meet minimum technical requirements, which lowers the capacity impact on the network by offering a lower-resolution version of streamed video than in their wired applications. The key here is that the difference in resolution is barely noticeable (if at all) on mobile devices' small screens, and the reduced load on the network means T-Mobile can cost-effectively offer unlimited streaming to its customers. Without this program, video providers would have little incentive to provide streams differentiated by total bandwidth load.

AT&T has two separate zero-rating programs. One, “Sponsored Data,” is zero rating in its most classic form, where data charges to eligible uses will be billed directly to the sponsoring company instead of the consumers.³⁰ AT&T also offers a data “rewards” type program, called “AT&T Data Perks.” This platform allows sponsors to offer consumers data toward their monthly cap in exchange for actions such as viewing advertisements, trying out an app, or visiting a particular website. It is an open platform, so it could be put to a wide variety of uses, like employers zero rating particular data employees use on their own devices.

Verizon has also introduced a zero-rating service, called “FreeBee Data.” It is a platform for sponsoring data use, similar to AT&T, and allows businesses to sponsor up to 30 seconds of video or 30 minutes of audio streaming, as well as app downloads and use, and browsing particular mobile websites.³¹

ADVANTAGES OF ZERO-RATING PRACTICES

The advantages of zero rating are as varied as the forms it takes. Many international programs, especially those aimed at the world's poor, offer tremendous opportunities to make basic information available where it otherwise would not be, as well as helping to bring individuals online. But zero rating is also advantageous to advanced economies, for a wide variety of reasons.

Zero Rating Is Good Economics to Advance Innovation

In his paper, “The Economics of Zero Rating,” Jeff Eisenach explains that “the welfare effects of pricing schemes and other business practices depend on the characteristics of the markets in which they are deployed.”³² The information technology markets that zero-rating programs exist within are distinguished by dynamism, modularity, and demand-side effects.³³

These markets are dynamic in that firms compete on technological innovation and the ability to offer new and improved products, not simply on price. They are modular in that firms create platforms that exist within a broader system. These platforms complement

each other: wireless connectivity, smartphone devices, and applications combine increase the value of each other. Competition can take place both between and among these different platforms, and can also shift in unpredictable ways. Demand-side effects include demand-side economies of both scale and scope. Demand-side economies of scale—better known as network effects—mean the product increases in value with each additional user. Demand-side economies of scope, on the other hand, see additional value with the diversity of users. For example, the value of a mobile operating system like Android or iOS to application developers, handsets manufacturers, and end-users each depend on the presence of the other participating groups.

As Eisenach explains, because of the characteristics of IT markets—where both content or “edge” firms as well as network operators make large investments in establishing platforms that have relatively low marginal costs, and gain value with each additional user—the ability to identify customers with lower ability or willingness to pay through, and offer them a discount through zero rating will expand a firm’s customer base, enhance the value of the product, and provide additional revenues to defray the costs of up-front investment and additional innovation.³⁴

Eisenach rightly concludes that zero rating generally represents an “economically efficient mechanism for increasing consumer welfare given the unique characteristics of information technology markets, which make it beneficial to offer lower prices and other incentives to expand the size of the market, especially in developing countries where incomes, and market penetration, are low.”³⁵

Zero Rating Expands Access to Information in Developing Countries

It is fairly intuitive that access to information is a good thing. As shown in the now famous work by Robert Jensen, “The Digital Provide: Information (Technology) Market Performance, and Welfare in the South Indian Fisheries Sector,” in areas of the world where information is scarce, mobile phones can dramatically improve welfare by providing to access basic information.³⁶ Jensen studied the ways in which mobile phones allowed fishermen in India to make better choices about which markets to sell their fish to, helping to match supply and demand, reducing waste, and making consumers and producers better off.³⁷

Numerous studies confirm the intuition that broadband can be a powerful tool to help lift communities out of poverty.³⁸ A recent background paper prepared to support the World Bank’s “World Development Report 2016: Digital Dividends” concluded that a 10 percent increase in broadband penetration correlates with a 1.38 percent increase in GDP in developing countries.³⁹ Unfortunately, large segments of the world remain unconnected. This fact led the U.S. State Department to launch the Global Connect Initiative, an effort to bring an additional 1.5 billion people online by 2020—the equivalent of adding 50 percent more Internet users than exist today.

Zero rating can help bridge the digital divide in developing countries in a number of ways. First, zero rating can lower the cost of access to basic communication services and

information for individuals, as with Wikipedia Zero or Facebook’s Free Basics program. As explained by analyst Jan Dawson, “Solving the Internet access problem in a broad-based way is hugely expensive and time consuming. . . Zero rating is a shortcut to some of the same objectives that’s much cheaper, quicker and more focused.”⁴⁰

Cost is often a significant challenge in bringing people online in developing countries. But it is not the only impediment to adoption. It is usually the cost of a mobile subscription, combined with a lack of interest, awareness, or appreciation for the benefits that broadband adoption can provide that causes many to forego access. If access represents a significant investment, many never try mobile broadband, even if that investment is well worth it. This is the adoption problem that introductory zero-rating programs, such as Facebook’s Free Basics, attempt to solve.

As of 2015, mobile broadband networks covered about 78 percent of the world’s population, but only 43 percent were actually using the Internet.⁴¹ That 35 percent—some 2.5 billion people—who have access to mobile networks, but choose not to subscribe, could be given the opportunity to connect at a relatively low cost.

It is important to recognize that technology adoption is a complex social challenge, and no one approach will work in every country. But if one supports the broader objective of expanding broadband access to help empower individuals and communities to improve their economic wellbeing, then the evidence strongly points to zero rating as an effective, practical tool to introduce new users to the Internet.⁴²

Some worry that zero-rating tools will see poor users locked into a small fraction of the Internet; this is unlikely. Facebook’s initial data suggests this is not the case—more than 50 percent of users who tried Free Basics paid for the full Internet within the first month.⁴³ The Alliance for Affordable Internet is gathering empirical data on zero-rating programs to determine how service-specific, zero-rated, and other new data service models impact Internet affordability and usage in developing countries, which will be an important contribution to this debate.⁴⁴

But even if some users stay with the zero-rated package, surely some access to information is better than none at all—those who already can afford Internet access should not deny others the choice of a free alternative. And to the extent zero rating works to spur adoption, a bigger customer base could help operators improve their networks or lower prices.

It is likely these sorts of reasons that prompted Gerald Faulhaber, former chief economist at the FCC, to speak frankly when it comes to blocking zero-rating programs. Of India’s decision to block Facebook’s Free Basics, he says, “I’m afraid India has made a colossal economic blunder.”⁴⁵ He goes on to say that “to force the Internet into this straightjacket is a disaster, to my mind, especially for poor people who otherwise would not have bought Internet services at all. How anyone can think that forcing less choice on customers, and disadvantaging the poor, is a good idea is beyond me.”⁴⁶

Mobile broadband networks cover about 78 percent of the world's population, but only 43 percent actually use the Internet. Zero rating can be a powerful tool to help up to 2.5 billion people connect to existing networks.

Zero Rating Is Generally Pro-Competitive

In their influential 2003 paper on the internalization of complementary efficiencies, Joe Farrell and Phil Weiser explored how Internet platform providers “would prefer that applications—the complements to its product—be cheaply, innovatively, and efficiently supplied.”⁴⁷ Put simply, economic theory teaches us that even a monopoly network would want a flourishing application layer because it makes the network more attractive. Even if the U.S. mobile market were far less competitive, we should expect zero rating to be in the public interest.

Of course, there are additional complications at play in the zero-rating context, most notably that mobile carriers are increasingly active in the application space—and additional regulations at the network level incentivize further migration into other areas of competition with less onerous regulations. Horizontal competition at the application layer potentially increases incentives for anticompetitive leveraging of zero rating programs. The FCC should retain oversight of this area, but rely on competition to do the heavy lifting in ensuring these programs work to consumers’ benefit.

The fact of the matter is that discrimination in the economic sense is not necessarily bad. Antitrust has come to accept price and other forms of discrimination as healthy practices that improve welfare. For example, airlines try to charge business travelers more than casual travelers, and by doing so, are able to maximize revenues and reduce costs, especially for the majority of casual travelers. Of course, from a policy advocacy perspective, no one wants to be in the position of defending the rather loaded term “discrimination.” But net neutrality advocates assert that zero rating can be discriminatory, as if that were the end of the inquiry. What we should be worried about are discriminatory practices that harm consumers or competition.

There is little difference between zero rating and common-place discounts that everyone accepts as normal. As a thought experiment: Content providers could send checks or prepaid payment cards to encourage users to try their services, thus offsetting or discounting the users’ data costs. Zero rating as a coupon or rebate seems silly to outlaw. One reason for zero rating is because many applications or websites are free to begin with, and the only way for a company to discount its price in order to attract more users is to have a negative price (i.e., a rebate, paid either to the user directly or indirectly through the carrier in the form of zero-rated data).

From an economics perspective, sponsored data is not much different from companies establishing toll-free 800 numbers or sender-pays shipping, where the provider of the service pays, not the consumer. Indeed, 800 numbers were a business-model innovation established in the 1960s in response to advances in networking technology, which prior to that required telephone users to place a collect call through an operator. Such toll-free calling meant that the consumer could use network services with the “content provider” (in this case the company providing the service or selling the good) paying. The FCC has long supported 800 numbers as pro-consumer, writing that “toll free service provides potential

customers and others with a ‘free’ and convenient way to contact businesses.”⁴⁸ Instead of providing the payment directly to the customer, the company provides it to the intermediary ISP, who in turn, does not charge the customer for using their network.

Researchers at Aalborg University and the London School of Economics studied the impact of zero-rating programs in several countries, concluding that they “cannot find evidence that shows that zero rating creates harm” to competition, leading the researchers to question why zero rating was so maligned by net neutrality supporters.⁴⁹ Ellen Goodman, professor at Rutgers Law School, explains, “The data seem to show that price differentials do not substantially change consumption patterns or advantage incumbent applications.”⁵⁰ Indeed, it is much more likely that zero-rating programs are a pro-competitive tool for mobile operators to differentiate their services, and for applications to expand their user base.

Allows for Differentiation of Services

With zero-rating offers, mobile operators are looking beyond price, network performance, and devices to differentiate themselves from competitors. Zero-rating offers, especially in vibrant, competitive markets, should be seen as attempts to create a service that best delivers for consumers.

Often, the biggest benefits of expanded ability to differentiate in competitive markets flow to so-called “mavericks,” who look to disrupt the existing terms of competition. In the United States, an obvious example is T-Mobile. The company brands itself as an “Uncarrier,” and its colorful CEO does his best to distance the company from other operators. T-Mobile’s Binge On, offering unlimited streaming video for consumers, is a significant departure from the terms on which firms have competed to date, and in a way that is clearly in consumers’ interest.

Another “maverick” example is the company FreedomPop, a virtual operator attempting to follow the “freemium” model prevalent online. In the United States it offers an introductory wireless service, with 500 MB of data, 500 texts, and 200 minutes for free every month, with the hope that customers buy additional buckets of service.⁵¹ It has also launched in the United Kingdom and Spain with a similar model, and recently announced it will zero rate WhatsApp usage in Spain.⁵²

In general, we should not expect to know in advance the terms on which companies will innovate. Firms—especially maverick firms—should be free to differentiate their services to change the terms on which market participants compete. These kind of disruptive competitors are important to discipline more established Internet service providers.

Gives Consumers More of What They Want

The guiding light for zero-rating policy should be consumer welfare, and there is good reason to think that all of the zero-rating programs introduced to date are strongly welfare-enhancing.

T-Mobile’s experience with zero rating so far shows that this is the sort of innovation we should be encouraging. For example, T-Mobile has announced that customers are watching twice as much video per day than before launch of their zero-rated program, “Binge On,” and that video providers are seeing numbers of viewers spike as much as 90 percent.⁵³ Along similar lines, surveys performed on behalf of CTIA indicate that consumers appreciate and enjoy zero rating.⁵⁴

Put simply, consumers appreciate the ability to use zero-rated apps without having to worry about their data limits. We should celebrate when competitive markets work to provide consumers more of what they want.

Provides New Services a Foothold

Network effects are a predominant characteristic of information economies. Getting the ball rolling with the first set of customers is an important hurdle for any new application or service. Network effects also mean it is important to continue finding tools to attract the next “marginal” customer, to continue to build value.

In discussing the challenges of application discovery on mobile, investment analyst Benedict Evans explains that “today, app stores look a lot like the Yahoo [homepage] of 20 years ago, and they don't work for the same reasons—you can browse 20,000 apps but not a million. Hierarchical directories don't scale.”⁵⁵ Zero rating can provide a way for applications to differentiate themselves and help increase recognition. Zero rating of application downloads can also aid discovery by overcoming consumers’ reluctance to try out multiple mobile applications when away from Wi-Fi.

On the flip side, zero rating also has the potential to enhance discovery of applications or websites not included in zero-rated offerings. If most data-intensive or popular applications are zero rated, consumers will have more data than they otherwise would to explore other services.

The logic behind many criticisms of zero rating entails we have to prohibit anything that large companies can pay for that small companies cannot. This would obviously be bad policy. Not only is it highly unlikely that zero rating will impact the ability for small companies to grow on mobile platforms, there are very narrow tools to ensure it does not, such as disallowing exclusive zero-rating deals. Moreover, if we extend this thinking to its logical conclusion, government should ban advertising, price discounts, and other spending that large firms can engage in better than small firms.

Net neutrality advocates appear to want Robinson-Patman legislation for the Internet. This act, part of the 1930s’ populism wave, attempted to outlaw price discrimination to try to protect small retail shops from the efficiencies of larger chain stores, by fixing a minimum price for retail products. Economists have since recognized the benefits of such price discrimination, leading some to describe the law as “antitrust’s least glorious hour.”⁵⁶ This is not a path we should return to.

Facilitates More Efficient Advertising

Without zero rating, the advertising built into applications and the Web counts against users' monthly data tiers. Users are dis-incented from engaging with advertising, either by installing adblocking software, or closing or clicking past ads. Open zero-rating platforms that allow advertisers to zero rate their content, or otherwise encourage interaction with advertisements, will help provide a value-added revenue stream to help build expensive next-generation networks. But more importantly, more efficient advertising can facilitate more transactions online, ultimately boosting economic growth. Furthermore, advertising is a primary fuel for the Web and mobile applications—more effective advertising through a variety of zero-rating arrangements can help revenue continue to flow into growing this sector.

These kinds of bans on zero rating show the increasingly global dominance of an elitist “neutrality” ideology over sound economics.

Mobile broadband is still a relatively new service, and the appropriate economic model to support it is not yet clear. Just because the industry developed out of mobile voice service, which was supported by monthly user bills alone, does not mean that a blend of advertising services and subscription fees would not more quickly advance next-generation networks.

CRITIQUES OF ZERO RATING ARE OVERBLOWN

Zero rating is in tension with a strict sense of network neutrality in that zero-rated data is treated differently than other data in a way that may influence consumer behavior. Advocates who subscribe to this purist conception would rather see Internet access providers be a simple conduit, even if vertical arrangements of one kind or another would spur additional Internet use and growth of new services. Some simply assert that zero rating is inherently “discriminatory,” with little regard for the actual economics behind these services.

Unfortunately, this point of view has been adopted by some regulators around the world, with both Chile and India blocking zero-rating programs from operating in their jurisdictions outright.⁵⁷

These kinds of bans on zero rating show the increasingly global dominance of an elitist “neutrality” ideology over sound economics. They are policymaking by worst-case scenario. They assume that these programs will be a race to the bottom and a closing off of the open Internet, instead of a supplementary tool to expand Internet use. These bans favor the precautionary principle over experimentation and innovation.

Dystopian theories of zero rating descending into walled gardens—where users chose to only partake in a narrow set of zero-rated offerings—are simply unrealistic. Consumers desire and demand access to full Internet. Facebook's experience with Free Basics shows most customers who are introduced to a stripped-down version of applications will soon migrate to the full Internet.

Furthermore, zero rating does not diminish quality or availability of other services. While paid prioritization would allow for some applications to perform better than others, zero rating leaves other applications fully functional. Sponsored data programs would only make

it easier to discover new services, and would not impede users' ability to discover or use non-sponsored applications. If anything, additional data would be available to explore other services.

Consider the fact that many, if not most, Internet services are free. Usage-based pricing introduces a necessary opportunity cost to using any application—in turn, zero rating provides the ability to restore the cost-free use of applications that has generated tremendous growth in the wired context. Without these tools, providers cannot discount their price absent mailing checks to their subscribers. In this situation, providing a small payment to the ISP to pay for the customer's data charge is the most effective way for an edge provider to offer a discount.

Similarly, where the edge provider uses a stream with a lower bitrate, either on their own initiative or by participating in a carrier's program, they are able to functionally provide a discount—customers are able to stream more content using less data.

Zero Rating Is a Pragmatic Tool to Advance Internet Use

A number of critics of zero rating have taken a firm stance against the practice, not all that surprising given their near-religious defense of a completely dumb pipe and neutral Internet. As noted above, Susan Crawford, for example, called zero rating “malignant.”⁵⁸ Former FTC general counsel Jon Nuechterlein described his reaction to such critiques of zero rating at the 2016 Silicon Flatirons Digital Broadband Migration conference, stating that descriptions of zero rating such as “‘pernicious,’ ‘dangerous,’ ‘malignant,’ ‘discriminatory’ ... these all strike me as epithets in need of analytical content.”⁵⁹

The antagonisms of Crawford and others may be devoid of analytical content, but they do help advance the broader net neutrality debate in that they lay bare the extreme net-neutrality position as one of ideological zealotry, explicitly opposed to pragmatic solutions, indifferent to consumer welfare, and unwilling to seek middle ground.

The activist coalition of organizations like Free Press, Fight for the Future, and Demand Progress has led the charge in bringing this demagoguery to the masses.⁶⁰ Under the banner “Battle for the Net,” these organizations equate zero rating to a “sneak attack” on net neutrality “just as bad as the fast lanes,” and facilitate a form-letter complaint filed against your ISP of choice.⁶¹

Yes, zero rating is in conflict with the absolutist vision of neutrality these organizations espouse, but as the Information Technology and Innovation Foundation (ITIF) has long argued, that hardline stance on net neutrality is severely misguided.⁶² Instead of a blind faith in dumb pipes, we should recognize zero rating as a pragmatic tool that can advance Internet adoption and use and help spur additional investment in advanced networks. Decisions like those of India's telecom regulator, denying some of the world's poorest the choice to access information for free, should alert us to how misguided the position is. The pursuit of absolute neutrality has blinded activists to simple realities and the need of poor people around the world to access information.

We should recognize zero rating as a pragmatic tool that can advance Internet adoption and use, and help spur additional investment in advanced networks.

In a recent report, the Multicultural Media, Telecom and Internet Council (MMTC) explores the importance of zero rating as a tool to help bridge the digital divide. The report lays out the benefits of zero rating, “many of which accrue most immediately to people of color and low-income households—communities that are benefiting from mobile broadband access in much more profound ways than other user groups because it is more likely that they cannot afford other means of home broadband access.”⁶³

Policymakers are faced with a choice: an elitist, academic conception of homogenized Internet access or progressive pricing and pragmatic solutions to grow the use of mobile broadband. In discussing the “Battle for the Net” coalition, Kim Keenan, president and CEO of MMTC, put it succinctly: These groups are “basically saying ‘pay for your data,’ ‘I’m hearing a lot of paternalistic, elitist explanations, I’m not really hearing something that gets to the bread and butter for every day, real Americans.’”⁶⁴

It is remarkable that even the Wikimedia Foundation has been forced to take a defensive posture, distinguishing its charitable Wikipedia Zero work from other, potential net neutrality violations.⁶⁵ Working to provide free access to the knowledge compiled in Wikipedia for the world’s poor should not require a defense; this project, and others like it, does unequivocal good for the world. To put the maximum weight on enabling new encyclopedia competitors ahead of free access to information for those without is a truly bizarre balance of priorities.

Critics seem to think zero rating popular applications will homogenize application use and are willing to make everyone worse off if it means idiosyncratic preferences have “equal” footing with dominant applications of the day. No doubt, the dizzying fount of creativity on the Web and the support of large libraries with long tails of niche content are some of the best virtues of the Internet. But the discriminatory effects of zero rating are tiny in comparison to the low marginal cost of storage and transmission that enables this diversity, and would be far outweighed by the benefits of a new platform to support expanded use of mobile services.

Zero Rating Is Generally Innovation Enhancing

Zero rating has to be understood as a step in the broader transition to a world where all information and communications services converges on the Internet Protocol platform, a platform that is increasingly mobile-first. This indicates a healthy step toward a platform that economically guides scarce resources toward services consumers value most.

It gives providers a tool to direct resources to where they are in highest demand, which paves the way for a model that can help more efficiently recoup the investment needed to upgrade networks.

Some critics took exception to particular practices in T-Mobile’s program. For example, Barbara van Schewick claimed that the technical requirements would “categorically exclude providers that use the User Datagram Protocol (UDP), making it impossible for innovative providers such as YouTube to join.”⁶⁶

The bar for arguing that the public interest directly contravenes consumer preference should be a high one.

Owen DeLong, network engineer at backbone and colocation provider Hurricane Electric, describing the technical requirements to participate in Binge On, remarked, “I don’t see anything onerous in the requirements. In fact, it looks to me like ... an expression by T-Mobile of a willingness to expend a fair amount of effort to integrate content providers.”⁶⁷ DeLong went on to say, “I don’t see anything here that hurts net neutrality and I applaud this as actually being a potential boon to consumers.”⁶⁸

Van Schewick was shown to have underestimated the flexibility of the program and the incentives for T-Mobile to include participants when Google announced it worked with T-Mobile to add YouTube to Binge On a few weeks after her assertions.⁶⁹ Van Schewick’s broader criticisms of zero rating are animated by her ideological preference for minimizing the already uniquely low barriers to entry for unimagined new applications. This preference is wholly disconnected from the economic realities of expanding additional use of mobile broadband.

The fact of the matter is that T-Mobile’s technical requirements are quite low. They are low because T-Mobile, and every other mobile carrier, has a strong incentive to make these programs appealing to consumers. And, as discussed above, customers appreciate these programs, and they appear to be an initial success. The bar for arguing that the public interest directly contravenes consumer preference should be a high one.

Criticisms of T-Mobile lowering the resolution of Binge On videos are also misguided. It is precisely this trade-off that makes this offer economically viable. Lower resolution video takes up significantly less bandwidth, allowing for more hours of content to travel over the network. And on the small screens of mobile devices, the lower resolution has a negligible, if any, effect on viewing quality. T-Mobile has been up-front about this tradeoff.

While defining the exact scope of how these programs operate will be a dynamic process, this should generally be left to consumers and the market, not the elitist ideology of net neutrality purists. The FCC should give the green light to these types of services and let innovators take over.

This doesn’t mean there should be a free-for-all with zero-rating services. For example, exclusive zero rating, where businesses are locked out of participating in zero-rating programs, would artificially limit the growth of new applications, inappropriately reinforce existing network effects, and hinder new application discovery. But as noted above, none of the current U.S. zero-rating programs do this. Also, transparency is important for oversight and accurate channeling of consumer preference.

CURRENT FCC APPROACH TO ZERO RATING

The FCC claimed the authority to oversee these programs in the Open Internet Order. There, it recognized the benefits of zero rating, explaining that “these business models may in some instances provide benefits to consumers” by increasing choice and lowering costs, and they may also “benefit edge providers by helping them distinguish themselves in the marketplace and tailor their services to consumer demands.”⁷⁰ The Commission decided

to take a case-by-case approach to overseeing these business practices, but otherwise has not given much direction.

Benefits

There is an outside potential for ill-designed zero-rating programs to unfairly restrict competition in vertical markets, unduly magnify application lock-in, or otherwise unintentionally diminish the openness of the Internet. The beneficial externalities of an open Internet where innovation is free to flourish is worth protecting. For these reasons, it makes sense for the government to retain oversight of these practices and authority to step in if consumer welfare is diminished.

In the United States, where robust competition disciplines the market, these problems are very unlikely. But expert agency oversight is still wise, in case of unexpected problems. And, of course, the case-by-case model has significant advantages in its flexibility to adapt to changing market practices.

Drawbacks

The primary complaint about the FCC's process to date when it comes to zero rating is one of uncertainty. Mixed messages have been the name of the game. FCC Chairman Wheeler first described T-Mobile's Binge On program as "highly innovative and highly competitive."⁷¹ But the Commission has since backtracked from that position and is now conducting an informal fact-finding into a number of these programs.

Uncertainty in industries with rapidly shifting technology and outdated and relatively open-textured laws is unavoidable. There will always be an irreducible tension between the advantages and disadvantages of rules and standards—we cannot expect perfect clarity. But the goal of policymakers should be to minimize unnecessary uncertainty.

In recent remarks in front of a group of small carriers, Chairman Wheeler acknowledged this charge, if in a rather dismissive fashion: "It is ironic that the same voices that complain that the open Internet rules aren't sufficiently certain also complain about the commission's ability to create certainty through ex-post examination of the market. That's what we're doing with the policy reviews of zero rating and data caps underway right now. There is no definite end date or predetermined outcome for this inquiry, but there are principles."⁷²

Wheeler's blithe dismissal is discomfiting, mostly because his preferred principles are so generalized as to lose all guiding force. (Who could be against "competition, competition, competition"?) The instant speech is no different, where Wheeler went on to say operators should not "use its position as a gatekeeper to unfairly discriminate against unaffiliated content." Fair competition is well accepted as a baseline requirement of business, not an illuminating principle that helps guide risky deployments of new technology under what can be an inconstant regulator.

If the commission agrees that there should be a ban on exclusive zero-rating deals or zero-rating affiliate-only content, it should say so in a formal statement of policy to give certainty going forward.

PREFERRED ZERO-RATING POLICY

Governments around the world have taken a variety of approaches to zero rating. Some, like India, have mistakenly blocked it. Others, such as many developing countries, have either supported it or been silent. Still others, like the FCC, have taken a case-by-case approach to intervening in zero-rating practices, tilting to the side of suspicion. In general, telecom regulators around the world should formally recognize the pro-competitive, pro-consumer benefits of such practices and announce that zero-rating programs are in the public interest, as long as they are nonexclusive. This would send a strong signal to innovators, both at the network and edge level, that this kind of innovation will not be obstructed by governments.

CONCLUSION

These programs are a win for “edge” video providers, who see more use of their products and services. They are also a win for network operators, who are working to gain market share and explore new business models to meet demand. And most importantly, they are a big win for consumers, who end up getting more for less. The only people who lose are the net neutrality purists. The success to date of zero-rating innovations make those who would hold back progress in the name of abstract neutrality principles look rather silly.

ENDNOTES

1. Susan Crawford, “Zero for Conduct” *Backchannel*, January 7, 2015, <https://backchannel.com/less-than-zero-199bcb05a868#.dbs7t699u>.
2. Tom Wheeler, “Prepared Remarks of Tom Wheeler, Chairman, Federal Communications Commission” (speech, Computer History Museum, Mountain View, California, January 9, 2014), FCC, https://apps.fcc.gov/edocs_public/attachmatch/DOC-325054A1.pdf.
3. John Eggerton, “Wheeler: Binge On Is Pro-Competitive, Pro-Innovation,” *Broadcasting & Cable*, November 19, 2015, <http://www.broadcastingcable.com/news/washington/wheeler-binge-pro-competitive-pro-innovation/145940>.
4. Cecilia Kang, “F.C.C. Asks Comcast, AT&T and T-Mobile About ‘Zero-Rating’ Services,” *New York Times*, December 17, 2015, <http://bits.blogs.nytimes.com/2015/12/17/f-c-c-asks-comcast-att-and-t-mobile-about-zero-rating-services/>.
5. The United States, where mobile data traffic is expected to grow 7-fold from 2014 to 2019 (a compound annual growth rate of 47 percent), represents a significant portion of this overall demand. Cisco, “Cisco Visual Networking Index (VNI): Global Mobile Data Traffic Forecast Update, 2015–2020” (white paper, San Jose, California, updated February 1, 2016), www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html. While these predictions are not without controversy (see, e.g., Aalok Mehta and J. Armand Musey, “Overestimating Wireless Demand: Policy and Investment Implications of Upward Bias in Mobile Data Forecasts,” 23 *CommLaw Conspectus*, (2015): 300, available at <http://scholarship.law.edu/cgi/viewcontent.cgi?article=1557&context=commlaw>), ITIF believes mobile broadband to be a key driver of productivity gains and economic growth, and therefore, as a general matter, additional spectrum should be allocated to mobile regardless of the precise trend of data use.
6. Streaming entertainment on mobile networks now accounts for more than 40 percent of downstream traffic during peak hours. Social media, which increasingly includes auto-playing video, accounts for another 22 percent. Sandvine, “Global Internet Phenomena: Africa, Middle East & North America” (Waterloo, Canada: Sandvine, December, 2015), <https://www.sandvine.com/downloads/general/global-internet-phenomena/2015/global-internet-phenomena-africa-middle-east-and-north-america.pdf>.
7. Cisco, “Cisco VNI,” 31.
8. *Ibid.*
9. *Ibid.*
10. For example, see Phillip Dampier, “Issue Tag: Artificial Limits,” *Stop the Cap!* May 22, 2012, <http://stopthecap.com/tag/arbitrary-limits/>; Danielle Kehl and Patrick Lucey, “Artificial Scarcity: How Data Caps Harm Consumers and Innovation” (New America Foundation, June, 2015), https://static.newamerica.org/attachments/3556--129/DataCaps_Layout_Final.b37f2b8fae30416fac951dbadb20d85d.pdf.
11. Usually these preferences revolve around how consumers are treated after they go over their “cap.” Some carriers simply slow consumers’ download speeds, or put their traffic on 3G networks. Others automatically charge fees for additional buckets of data. This is one more point around which networks are competing.
12. For example, the Center for Democracy and Technology has called for a ban on exclusive or affiliate-only arrangements. Erik Stallman and R. Stanley Adams, IV, “Zero Rating: A Framework for Assessing Benefits and Harms” (Center for Democracy and Technology, January 2010).
13. Famously, in 2013, the United Nations announced that more people had access to mobile phones than to toilets, by a margin of 1.5 billion people. “Deputy UN Chief Calls for Urgent Action to Tackle Global Sanitation Crisis,” *UN News Center*, March 21, 2013, <http://www.un.org/apps/news/story.asp?NewsID=44452#.VyoqYPkrKUK>.
14. For a list of partnerships, see “Mobile Partnerships,” Wikimedia Foundation, https://wikimediafoundation.org/wiki/Mobile_partnerships.
15. Principles include no collection of personal information, no compromise of experience, no shift of editorial control, no exchange of payment, no exclusive rights, no commercial bundling, and a commitment to collaboration with other public interest sites. Erik Moeller, “Wikipedia Zero and Net Neutrality: Protecting the Internet as a Public Space,” *Wikimedia Blog*, August 1, 2014, <http://blog.wikimedia.org/2014/08/01/wikipedia-zero-and-net-neutrality-protecting-the-internet/>; Adele Vrana and Smriti Gupta, “Wikimedia and Zero Rating: Clear Principles for Free Knowledge,”

-
- Wikimedia Blog*, January 24, 2016, <http://blog.wikimedia.org/2016/01/24/wikipedia-zero-free-knowledge/>.
16. Amit Kapoor, "The Next Billion Users: Wikipedia on Mobile" (presentation, Wikimedia Foundation, 2012), https://upload.wikimedia.org/wikipedia/commons/6/64/Reaching_next_billion_users_Wikimania_Mobile_2012.pdf.
 17. See e.g., "Free Basics: Participation Guidelines," Facebook, <https://developers.facebook.com/docs/internet-org/participation-guidelines>.
 18. Opera Mini is used most in India, Indonesia, Nigeria, Russia, and Bangladesh, and can remove up to 90 percent of data, allowing for consumers to access more information for less. Pål Unanue-Zahl, "How to Get the Next Billion Online – The State of Opera's Internet.org Initiatives," *Opera Business Blog*, July 29, 2014, <http://www.operasoftware.com/blog/smw/get-next-billion-online-state-operas-internet-org-initiatives>.
 19. See Christopher Mims, "Facebook's Plan to Find Its Next Billion Users: Convince Them the Internet and Facebook Are the Same," *Quartz*, September 24, 2012, <http://qz.com/5180/facebooks-plan-to-find-its-next-billion-users-convince-them-the-internet-and-facebook-are-the-same/>.
 20. Mark Zuckerberg described their experience with Facebook Zero, and hinted at expanding internet.org in a white paper describing Facebook's broader work in expanding connectivity. Mark Zuckerberg, "Is Connectivity a Human Right?" 2013, available at <https://www.facebook.com/isconnectivityahumanright>.
 21. Matt Hicks, "Fast and Free Facebook Mobile Access with 0.facebook.com," May 18, 2010, available at <https://www.facebook.com/notes/facebook/fast-and-free-facebook-mobile-access-with-0facebookcom/391295167130>.
 22. "Free Basics: Participation Guidelines," Facebook, <https://developers.facebook.com/docs/internet-org/participation-guidelines>.
 23. The partner applications differ from country to country, but Facebook lists some "success stories" on their website, including "SmartBusiness, a South African website that helps people launch and run businesses, [which] receives 5x more daily searches since joining the Free Basics Platform, and Maya, a women's health support website, [which now] sees 71 percent of their traffic from Free Basics." "Free Basics Platform: Success Stories," Facebook, <https://info.internet.org/story/platform>.
 24. Mark Zuckerberg, "Free Basics Protects Net Neutrality," *The Times of India*, December 28, 2015, <http://blogs.timesofindia.indiatimes.com/toi-edit-page/free-basics-protects-net-neutrality/>.
 25. Telecom Regulatory Authority of India (TRAI), "Prohibition of Discriminatory Tariffs for Data Services Regulations, 2016" (New Delhi: TRAI, February 8, 2016), http://www.trai.gov.in/WriteReadData/WhatsNew/Documents/Regulation_Data_Service.pdf.
 26. This list appears over-inclusive, counting providers' own specialized services such as IP video products alongside other applications. Rewheel, "Regulating a Borderless Internet: EU vs US Perspectives on Net Neutrality" (presentation at Open Forum Academy round table, Brussels, March 4, 2015), http://www.openforumacademy.org/events/04-03-2015-ofa-round-table-regulating-a-borderless-internet-eu-vs-us-perspectives-on-net-neutrality/Slides_Drossos_040315.pdf.
 27. Services include Facebook, Instagram, Messenger, WhatsApp, Twitter and Kik. See "Now You Surf Free on Social Media," Telia, accessed May 16, 2016, <https://translate.google.com/translate?hl=en&sl=sv&u=https://www.telia.se/privat/telefoni/frisurfsocial&prev=search>.
 28. T-Mobile, "T-Mobile Is Setting Music Free," accessed May 16, 2016, T-Mobile, <http://www.t-mobile.com/offer/free-music-streaming.html>.
 29. "Introducing Binge-On," T-Mobile, accessed May 16, 2016, <http://www.t-mobile.com/offer/binge-on-streamingvideo.html>.
 30. AT&T, "AT&T Introduces Sponsored Data for Mobile Data Subscribers and Businesses," news release, January 6, 2014, <http://www.att.com/gen/press-room?pid=25183&cdvn=news&newsarticleid=37366&mapcode=>.
 31. "Introducing FreeBee Data," Verizon, accessed May 16, 2016, <http://freebee.verizonwireless.com/business/freebeedata>.
 32. Jeffrey A. Eisenach, "The Economics of Zero Rating" (NERA Economic Consulting, March 2015), <http://www.nera.com/content/dam/nera/publications/2015/EconomicsofZeroRating.pdf>.
 33. Ibid.
 34. Ibid.

35. Ibid.
36. Robert Jensen, "The Digital Divide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector," *The Quarterly Journal of Economics* 122, no. 3 (August 2007): 879, available at <https://mmd4d.files.wordpress.com/2009/04/jensen-indian-fisheries.pdf>.
37. Ibid.
38. For a survey of this work, see Raul Katz, "The Impact of Broadband on the Economy: Research to Date and Policy Issues" (Geneva, Switzerland: International Telecommunication Union (ITU), April 2012), https://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf.
39. Michael Mingos, "Exploring the Relationship Between Broadband and Economic Growth" (Washington, DC: World Bank, January 2015), <http://www19.iadb.org/intal/intalcdi/PE/2016/15991.pdf>.
40. Rob Pegoraro, "'Zero Rating': The Pros and Cons of Free Online Access," *The Rules of Tech*, August 26, 2014, <https://www.yahoo.com/tech/zero-rating-the-pros-and-cons-of-free-online-access-95775730069.html>.
41. Pat Wu et al., "State of Connectivity 2015: A Report on Global Internet Access," internet.org, February 2016, <https://fbinternetorg.files.wordpress.com/2016/02/state-of-connectivity-2015-2016-02-21-final.pdf>.
42. Broader critiques of international development (see e.g., Evgeny Morozov, "Facebook's Gateway Drug," *The New York Times*, August 2, 2014, <http://www.nytimes.com/2014/08/03/opinion/sunday/evgeny-morozov-facebooks-gateway-drug.html>) or international efforts to expand broadband adoption as a twenty-first century colonialism (see e.g., Adrienne LaFrance, "Facebook and the New Colonialism," *The Atlantic*, February 11, 2016, <http://www.theatlantic.com/technology/archive/2016/02/facebook-and-the-new-colonialism/462393/>) are beyond the scope of this paper, but ITIF believes these criticisms are deeply misplaced.
43. Zuckerberg, "Is Connectivity a Human Right?"
44. Alliance for Affordable Internet (A4AI), "Affordability Report 2015/16" (A4AI, February 2016), 28 <http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2016/04/A4AI-2015-16-Affordability-Report.pdf>.
45. "How Facebook Lost Face in India," *Knowledge@Wharton*, February 15, 2016, <http://knowledge.wharton.upenn.edu/article/how-facebook-lost-face-in-india/>.
46. Ibid.
47. Joseph Farrell and Philip J. Weiser, "Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age," *Harvard Journal of Law & Technology* 17, no. 1 (2003): 85, <http://jolt.law.harvard.edu/articles/pdf/v17/17HarvJLTech085.pdf>.
48. "What Is a Toll Free Number and How does it Work?" Federal Communications Commission, Consumer and Government Affairs Bureau, <https://www.fcc.gov/consumers/guides/what-toll-free-number-and-how-does-it-work>.
49. Roslyn Layton and Silvia Monica Elaluf-Calderwood, "Zero Rating: Do Hard Rules Protect or Harm Consumers and Competition? Evidence from Chile, Netherlands and Slovenia," August 15, 2015, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2587542.
50. Ellen P. Goodman, "India's Ban on Facebook's Free Service Is an Overreaction," *The Guardian*, February 2016 <https://www.theguardian.com/technology/2016/feb/08/indias-ban-on-facebooks-free-service-is-an-overreaction>.
51. "The First 100% Free Mobile Phone Service," FreedomPop, accessed May 16, 2016, <https://www.freedompop.com/phone>.
52. Ingrid Lunden, "FreedomPop Now Offers Zero-Rated Apps, Starting with WhatsApp Voice and Text in Spain," *Tech Crunch*, April 20, 2016, <http://techcrunch.com/2016/04/20/freedompop-expands-to-spain-adds-in-zero-rated-whatsapp-voice-and-text-to-its-free-plan/>.
53. T-Mobile, "T-Mobile Amps Binge On... Again," news release, March 17, 2016, <https://newsroom.t-mobile.com/news-and-blogs/binge-on-amped-again.htm>.
54. Robert Roche, "Americans Love #FreeData," *CTIA*, April 7, 2016, <http://www.ctialatest.org/2016/04/07/americans-love-freedata/>.
55. Benedict Evans, "Search, Discovery and Marketing," *Benedict Evans*, June 24, 2015, <http://ben-evans.com/benedictevans/2015/6/24/search-discovery-and-marketing>.
56. Roger D. Blair and Christina DePasquale, "Antitrust's Least Glorious Hour: The Robinson-Patman Act," *Journal of Law and Economics* 57, S201 (February 2014).

-
57. Public Knowledge provides a survey of zero rating and regulatory responses around the world. Carolina Rossini and Taylor Moore, “Exploring Zero-Rating Challenges: Views From Five Countries” (working paper, Public Knowledge, July 2015), https://www.publicknowledge.org/assets/uploads/blog/Final_Paper-Jul_28-TM.pdf.
 58. Crawford, “Zero For Conduct.”
 59. Nuechterlein was at the time general counsel of the FTC, but his remarks were in his personal capacity. Silicon Flatirons, “2016 DBM: Regulation and Industry Structure,” YouTube video, 1:31:59, posted February 4, 2016, <https://youtu.be/7r94iAGExXY?t=1h3m40s>. Comments by Jonathan Nuechterlein.
 60. See “Net Neutrality Is Under Attack,” Battle for the Net, accessed May 2016, <https://www.battleforthenet.com/>.
 61. Ibid.
 62. See e.g. Doug Brake and Robert D. Atkinson, “Crafting a Grand Bargain Alternative to Title II: Net Neutrality with Net Adoption” (Information Technology and Innovation Foundation, October 2015), <https://itif.org/publications/2015/10/29/crafting-grand-bargain-alternative-title-ii-net-neutrality-net-adoption>.
 63. Multicultural Media, Telecom and Internet Council (MMTC), “Understanding and Appreciating Zero-Rating: The Use and Impact of Free Data in the Mobile Broadband Sector” (white paper, MMTC, May 9, 2016), http://mmtconline.org/WhitePapers/MMTC_Zero_Rating_Impact_on_Consumers_May2016.pdf.
 64. Giuseppe Macri, “Civil Rights Group Touts Zero-Rating as Net Neutrality Activists Ramp Up Opposition,” *Inside Sources*, May 09, 2016, <http://www.insidesources.com/zero-rating-2/>.
 65. Moeller, “Wikipedia Zero and Net Neutrality.”
 66. Barbara van Schewick, “T-Mobile’s Binge On Violates Key Net Neutrality Principles” (report, Stanford Law School’s Center for Internet and Society, Stanford, CA, January 29, 2016), <https://cyberlaw.stanford.edu/downloads/vanSchewick-2016-Binge-On-Report.pdf>.
 67. Owen DeLong, email message, “Re: Binge On! – And So This is Net Neutrality,” Nanog Mailing List Archives, November 20, 2015, <http://seclists.org/nanog/2015/Nov/349>.
 68. Ibid.
 69. Christian Kleinerman, “Google, YouTube and Binge On,” *Google Public Policy Blog*, March 17, 2016, <http://googlepublicpolicy.blogspot.com/2016/03/google-youtube-and-binge-on.html>.
 70. *Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order, Before the Federal Communications Commission*, 30 FCC Rcd 5601, ¶ 151, Docket No. 14–28 (March 12, 2015).
 71. Eggerton, “Wheeler: Binge On Pro-Competitive.”
 72. Tom Wheeler, “Remarks of FCC Chairman Tom Wheeler” (speech at INCOMPAS Policy Summit, National Harbor, MD, April 11, 2016), http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0411/DOC-338806A1.pdf.

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