11-16-2012

Why Broadband Pricing Freedom is Good for Consumers

Daniel A. Lyons
Boston College Law School, daniel.lyons.2@bc.edu

THE FREE STATE FOUNDATION
A Free Market Think Tank for Maryland.....Because Ideas Matter

Perspectives from FSF Scholars
November 16, 2012
Vol. 7, No. 32

Why Broadband Pricing Freedom Is Good For Consumers

by

Daniel A. Lyons *

Usage-based pricing has rapidly become one of the most high-profile topics in Internet policy. In the past few years, many broadband providers have migrated from all-you-can-eat flat-rate pricing to consumption-based pricing models such as tiered service plans or data caps. This trend has been most prominent in the wireless sector, where monthly limits were an almost inevitable solution to the surge in bandwidth demand unleashed by the smartphone revolution. Some fixed broadband providers have adopted much larger data caps for residential broadband use as well.

While regulators have generally approved this shift,[1] some consumer groups have viewed the change with skepticism. They fear that usage-based pricing will usher in an era of higher prices, deteriorating service, and increasingly anticompetitive conduct.[2] They are concerned that pricing tiers or data caps serve as anticompetitive tools with which broadband providers can protect their legacy cable affiliates from upstarts such as Netflix and Hulu. They also fear that firms will use capacity constraints to create artificial scarcity and pad profits while avoiding necessary network upgrades. These critics may have found a sympathetic ear at the Department of Justice, which has begun investigating whether data caps violate antitrust law.[3]

These concerns are largely misplaced. Usage-based pricing plans such as tiered service or data caps are not inherently anti-consumer or anticompetitive. Rather, they reflect different pricing strategies through which a broadband company may recover its costs from its customer base and fund future infrastructure investment. By aligning costs more closely with actual consumption, usage-based pricing may effectively shift more network costs onto those customers who use the network the most. Companies can thus avoid forcing light Internet users to subsidize the data-heavy habits of online gamers, movie "torrenters," and the like. Usage-based pricing may also help alleviate network congestion by encouraging customers, content providers, and network operators to use broadband more efficiently.

Consumption-based pricing strategies are ways that broadband companies can distinguish themselves from one another to achieve a competitive advantage in the marketplace. Only through experimentation and empirical measurement will providers find the optimal pricing solution — which may vary dramatically from network operator to network operator. Thus far, regulators have correctly rejected the call to interfere with this pricing flexibility absent a showing of market failure and consumer harm.

It is possible that data caps or other forms of usage-sensitive pricing can be anticompetitive, but only if a firm with market power exploits that power in a way that harms consumers. Absent a specific market failure, which critics have not yet shown, broadband providers should be free to experiment with usage-based pricing and other pricing strategies as tools in their arsenal to meet rising broadband demand. Public policies allowing providers the freedom to experiment best preserve and promote the spirit of innovation that has characterized the Internet since its inception and which has served consumers so well.

Usage-Based Pricing as a Cost Recovery Tool

Usage-based pricing is a relatively new phenomenon in the broadband industry. Although early dial-up providers once offered metered per-minute access, America Online's 1996 unlimited flat rate model proved so popular with consumers that the Internet access market abandoned usage-based pricing until recently.[4] But this usage-sensitive pricing strategy is common in many other networked industries with high fixed costs, including telecommunications. For many years, long-distance companies famously competed on the basis of their rate per minute. More sophisticated models charged lower rates on nights and weekends, partly to induce customers to shift call volumes to periods when the telephone network was underutilized. Many wireless providers offered plans allowing customers to purchase a fixed number of minutes per month and charging a per-minute rate for additional consumption, a model that closely resembles many broadband data cap plans.

Broadband providers find usage-based pricing attractive in part because it shifts more network costs onto those consumers who use the network the most. Under a flat-rate system, all users pay the same amount to help cover network costs. But as the Federal Communications Commission has noted, "[r]equiring all subscribers to pay the same

amount for broadband service, regardless of the performance or usage of the service, would force lighter end users of the network to subsidize heavier end users."[5] Heavier users consume significantly more of the network's total bandwidth each month than the average consumer. This means that light users pay a higher effective rate for broadband service, cross-subsidizing the activities of those who spend more time online.

These effects would be unremarkable if most consumers used roughly the same amount of data, because the subsidy would be relatively small. Unfortunately, this is not the case. According to Sandvine's Fall 2011 report on network traffic, the heaviest 1 percent of North American users account for 15 percent fixed downstream traffic and almost 43 percent of total upstream use.[6] By comparison, the lightest 60 percent of users generate only 10 percent of total traffic. And the gulf is vaster in the wireless space, where 90 percent of mobile traffic is driven by only 20 percent of users.[7] Given these disparities, it is perhaps unsurprising that some broadband providers are exploring pricing plans that would mitigate the cross-subsidy and shift more network costs onto those who use the network the most. Some commentators have questioned the value of cost-shifting onto heavier users. Consumer group Public Knowledge notes that statistical multiplexing allows multiple consumers to use bandwidth simultaneously, meaning that each additional user adds only trivial marginal costs onto the network.[8] Similarly, Netflix general counsel David Hyman has written that because "the marginal cost of providing an extra gigabyte of data. . . is less than one cent, and falling," there is "no good reason for bandwidth caps and fees to take root."[9] As a result, these skeptics claim it is "entirely inaccurate" to suggest that average users subsidize "bandwidth hogs."[10] They have called upon regulators to investigate whether data caps have any "legitimate economic justification."[11]

As an initial matter, this argument seems to misunderstand the role of regulation. These critics imply that equitable cost distribution is the only presumptively "legitimate" broadband pricing strategy and that companies must justify to a regulator any deviation from this model. But while equality seems appealing, there is no reason to believe that it represents the only, or even the best, broadband pricing structure. Generally, price experimentation allows companies to test potentially more efficient business models. This experimentation brings consumers the benefits of increased competition and increased choices in the marketplace. Normally, a regulator should intervene only if the practice actually harms consumers and if consumers cannot police the market themselves because the company has market power.

But setting aside this general objection, focusing on only the marginal cost of each gigabyte of capacity tells us little about efficient broadband pricing. Other than during periods of congestion, the marginal costs of additional bandwidth consumption *are* very small. But emphasizing marginal costs ignores the significant fixed costs required to build and maintain a broadband network. Broadband providers have invested over $300 billion in private capital in the past decade to build and upgrade the nation's broadband networks.[12] And these are not one-time costs: Cisco estimates that American Internet traffic will triple by 2016, and mobile traffic will grow sixteen fold.[13] Analysts expect

broadband providers to invest $30-40 billion each year to expand and upgrade their networks to meet this demand.[14] Marginal cost pricing is insufficient because it fails to provide sufficient revenue to recover these huge fixed costs and to fund future network investment.

Thus for broadband providers and other industries with significant fixed costs, the challenge is to design a pricing structure that spreads fixed costs intelligently across the company's customer base. There are many possible ways that a company may do so, but there is no economic reason to believe that, because incremental marginal costs are small, fixed costs should be shared equally across all consumers. In fact, writes economist Scott Wallsten, "efficient pricing will, in general, charge users with high demand more than users with low demand even if those users impose no additional costs on the network."[15] This practice is known as price discrimination.

Although the term may sound sinister to some, economists understand that price discrimination is a common and often socially beneficial way for a firm to spread its costs across its customer base. Airlines, for example, may charge a business traveler more for a seat on a flight from New York to Los Angeles than the student in the next seat over. Business travelers tend to be less price sensitive, in part because their jobs require them to be in town at a specific time. Students tend to have more flexible schedules, and are more likely to shop on the basis of price. Airlines know this and price fares accordingly, for example by charging a discounted rate for round-trips with a Saturday night stay (a schedule that students like but business travelers find inconvenient). Similarly, movie theaters sell discounted seats to children and seniors while the rest of us must pay full price. In both cases, the marginal cost of an additional user is almost zero, yet the price difference between the two consumers is a legal and uncontroversial practice. Similarly, by pricing broadband service based upon the customer's willingness to pay, the firm can spread its costs efficiently across its customer base and may lead firms to extend service at a lower rate to light users unable or unwilling to pay the unlimited flat rate.

Although the impact of price discrimination in particular circumstances may vary, antitrust scholar Herbert Hovenkamp notes that "most price discrimination is socially beneficial" because it often yields greater total output than a forced nondiscriminatory pricing regime.[16] Different customers have different reservation prices – the maximum price he or she is willing to pay for a product. When a firm must choose a single rate for all consumers, those with a reservation price above the actual price receive a windfall. But the windfall comes at a cost: customers who have reservation prices below the actual rate are denied service. Of course, the firm would prefer to serve any customer whose reservation price is above marginal cost – and this would also maximize total output. But a single rate at marginal cost would fail to cover fixed costs. Price discrimination therefore allows firms to expand total output and maximize the number of customers contributing to the fixed cost base, by charging a higher price to those with higher reservation prices and a lower price to those with lower reservation prices.

In the broadband industry, as with many high-fixed-cost industries, price discrimination based on customers' willingness to pay is an efficient way to recover costs with minimal distortion to overall social welfare. This practice, familiar to many regulated industries, is known as Ramsey pricing.[17] Ramsey pricing seeks to approximate as closely as possible the output achieved at marginal cost pricing, by raising prices more on those who are most willing to pay for the service, and less on those who would buy less (or not at all) if the price rose. Or in economic terms, the firm sets prices in inverse proportion to customers' price elasticity of demand. In an ideal world, where the firm can perfectly separate each customer by his or her elasticity, Ramsey pricing would allow the firm to recover all of its costs while ensuring that few if any consumers who value the service at marginal cost will ever be priced out of the market.

Data caps and other usage-based pricing strategies can approximate Ramsey efficiency. By paying for consumption, consumers reveal how much they value broadband access. This form of price discrimination allows providers to put more network costs onto those whose consumption is least sensitive to changes in price. The extent to which the pricing strategy approximates Ramsey efficiency depends on the ability of the pricing structure to separate customers by willingness to pay. Data caps divide the customer base into only two groups (typical users, who do not exceed the cap, and heavy users, who do), but allows further segmentation of the heavy user group through the overage charge. Tiered pricing is a more sophisticated variant of this strategy. By allowing customers to choose from an array of possible caps, the provider can segment its customer base more finely than with a simple cap. The provider can experiment with different tiers and different rates per tier until it finds the pricing structure that covers its fixed costs in the most efficient manner.

Usage-Based Pricing and Broadband Penetration Rates

Usage-based pricing may also make entry-level broadband access more affordable. Boosting broadband penetration rates is one of the Commission's biggest public policy challenges.[18] While 65 percent of Americans use broadband at home according to a 2010 Commission survey, those without access are generally "older, poorer, less educated, more likely to be a racial or ethnic minority, and more likely to have a disability" than those with broadband in the home.[19] According to the Commission's survey, those without broadband access cited cost as the primary barrier to adoption.[20] If broadband providers can shift more network costs onto heavier users, they can offer lower rates for light users. This practice benefits firms and consumers alike: it allows firms to capture more of the demand curve, offering service to more people who value the service above marginal cost, while at the same time it narrows the "digital divide" between those who can afford broadband access and those who cannot.

Of course, price discrimination only leads to higher adoption rates if broadband providers in fact lower prices for lighter users. This appears to be the case. A 2010 study by Scott Wallsten and James Riso surveyed nearly 25,000 broadband plans across several OECD countries.[21] They found that the average household paid, on average, about $164 less per year for a broadband plan with a data cap than for a

similar but unlimited plan, and $152 less per year for a residential triple play plan (which combine broadband, voice, and video) with a data cap compared to a similar but unlimited plan.[22] As a result, Wallsten and Riso conclude that "many consumers, particularly the low-volume users, are likely to pay less for broadband with data caps than they would for plans offering unlimited data transfer."[23]

Usage-Based Pricing as a Congestion Management Tool

Usage-based pricing may also help alleviate network congestion. Unlimited flat-rate pricing encourages overconsumption of network resources, because customers pay no additional charge for consuming additional bandwidth. This dynamic can create network congestion during peak online periods (a phenomenon with which wireless consumers in particular are familiar). Currently, congestion appears to be a much bigger issue for wireless than for fixed broadband providers, though the growth of Content Delivery Networks such as Akamai and Level 3 suggests that at least some Internet content and application providers are willing to pay to avoid congestion on the public Internet. By charging consumers for each additional unit of bandwidth consumed, usage-based pricing leads customers to internalize the costs that additional Internet use places on the network. This, in turn, could lead customers to demand that Internet content application and providers deliver content more efficiently to consumers.

The effectiveness of usage-based pricing to manage congestion turns in part upon the structure of the pricing plan. Critics correctly note that data caps are a somewhat crude tool to address network congestion. Data caps that limit monthly data consumption may help reduce overall traffic on a network, a perk that seems to have helped wireless providers. But caps do not directly target traffic during peak periods when congestion is greatest. This is the equivalent of trying to solve rush-hour highway congestion by placing a limit on the number of miles each driver can drive each month. The cap may have some indirect effect on congestion, if heavy users choose to reduce consumption by reducing peak-time use. But the cap also targets heavy users who generate huge volumes of traffic during off-peak periods (for example, by backing up systems at 2:00 a.m.), whose uses generate virtually no congestion costs.

If feasible, peak-time pricing could be a more effective pricing strategy. But a peak-time plan would depend upon broadband providers' ability to predict peak times and communicate that information clearly to consumers. On the fixed broadband side, the Commission has determined that peak time generally occurs between 7 p.m. and 11 p.m. daily. But wireless networks are less predictable, which makes it more difficult to communicate to customers when they should shift nonessential broadband consumption.

Usage-Based Pricing as an Anticompetitive Practice

Skeptics may be correct that usage-based pricing could be used anticompetitively. Broadband providers that also provide cable service undeniably have incentives to use data caps to protect their legacy cable businesses from Internet-based competitors such

as Netflix. Critics note, for example, that Comcast has estimated that to replace its cable service with an over-the-top Internet-based competitor would require approximately 288 gigabytes per month – a figure close to the 300 gigabyte cap that Comcast is currently test-marketing.[24] Economists call this a vertical restraint on trade: the use of a position in one market to gain an advantage in a related market downstream.

But regulatory intervention requires more than a showing that a vertically integrated firm has incentives to take actions that might harm competitors. The firm must also have the ability to do so. Antitrust law subjects almost all vertical restraints to the rule of reason, which makes these restraints actionable only if the firm has market power and causes consumer harm. Netflix may find that data caps are a threat to its current business model, which relies upon broadband providers to deliver its content to consumers. But the Supreme Court reminds us that antitrust law protects *competition*, not *competitors*. While some vertical restraints raise foreclosure concerns, as shown above, most are procompetitive because they generate efficiencies and enhance consumer welfare.[25]

Broadband providers can offer several procompetitive justifications for data caps. First, as noted above, by shifting more of the network's costs onto those who use it most, consumption-based pricing allow firms to offer a lower-tier of service to lighter users, which can extend service to lighter users who cannot or will not pay the higher unlimited rate. And they encourage consumers, content providers, and broadband providers to use bandwidth more efficiently. As critics point out, caps could also deter customers from canceling cable service in favor of Internet-based video options. This is harmful to those consumers who subscribe to both broadband and cable and who would cancel cable but for the data cap. But it could benefit those customers who subscribe only to broadband service: because cable and broadband service share common network costs, a shrinking base of cable subscribers would force the company to recover those costs by raising broadband rates. The net effect of the practice is difficult to determine with certainty, but the answer is not as clear-cut as critics suggest.

Therefore while regulators should be watchful for potentially anticompetitive conduct, they should also remember that many vertical restraints are procompetitive. One cannot say as a general matter that data caps and other forms of usage-based pricing are inherently anticompetitive. The effect they have on competition turns upon a fact-sensitive inquiry into the broadband provider's market power, and quantification of the impact that the pricing strategy has on different segments of the provider's customer base. Absent market power, consumers can avoid practices they dislike by defecting to more friendly providers. Regulation of pricing practices is warranted only where a company has market power and has wielded that power to harm consumers.

Ultimately, data caps and other pricing strategies are ways that broadband companies can distinguish themselves from one another to achieve a competitive advantage in the marketplace. Innovative pricing models can spread network costs in new ways and can promote greater efficiency by consumers, content providers, and the network operator itself. Only through experimentation and empirical measurement will providers find the optimal pricing solution – which may vary dramatically by network. Thus far, regulators

have correctly rejected the call to interfere with this pricing flexibility absent a showing of market failure and consumer harm. The newest move to data caps or tiered pricing business models should not provide the impetus to deviate from that reasoned stance.

* Daniel A. Lyons, an Assistant Professor of Law at Boston College Law School, is a member of the Free State Foundation's Board of Academic Advisors. The Free State Foundation is a nonpartisan, Section 501(c)(3) free market-oriented think tank located in Rockville, Maryland.

---

[*] For a more detailed discussion of this topic, please see Daniel A. Lyons, *The Impact of Data Caps and Other Forms of Usage-Based Pricing for Broadband Access*, Mercatus Center Working Paper No. 12-28 (October 2012), available at http://mercatus.org/publication/impact-data-caps-and-other-forms-usage-based-pricing-broadband-access.

[1] Yinka Adegoke, FCC Chief Backs Usage-Based Internet Pricing, May 23, 2012, available at http://www.huffingtonpost.com/2012/05/22/fcc-chief-backs-usage-bas_n_1537142.html; Michael Turk, Public Policy Discussion With FTC and FCC Commissioners, http://blog.thecableshow.com/2011/06/15/public-policy-discussion-with-ftc-and-fcc-commissioners/.

[2] See, e.g., Andrew Odlyzko et al, *Know Your Limits: Considering the Role of Data Caps and Usage Based Billing in Internet Access Service*, Public Knowledge White Paper, May 2012; Letter from Free Press, Consumers Union, Public Knowledge, and New America Foundation to Senator John D. Rockefeller and Senator Kay Bailey Hutchison, April 23, 2012, available at http://www.freepress.net/sites/default/files/fp-legacy/PI_letter_Senate_Commerce_OVDtrends_Apr2012_FINAL.pdf (last viewed August 22, 2012).

[3] Cecilia Kang, Justice Department Probes Limits on Web Data, WASH. POST June 14, 2012, at A16.

[4] The company was initially unprepared for the increased demand generated by the shift, which led to numerous blackouts and busy signals. See Matthew T. Bodie, *AOL Time Warner and the False God of Shareholder Primacy*, 31 J. CORP. L. 975, 986 (2006) (citing Nina Munk, FOOLS RUSH IN: STEVE CASE, JERRY LEVIN, AND THE UNMAKING OF AOL TIME WARNER 84 (2004)).

[5] In re Preserving the Open Internet: Broadband Industry Practices, 25 FCC Rcd. 17905, 17945 ¶ 72 (2010).

[6] Sandvine Global Internet Phenomena Report Fall 2011at 5. “Downstream” refers to the flow of information from the Internet to the consumer, while “upstream” refers to the flow of information from the consumer to another destination on the Internet. Note that the top 1% of downstream users may not be the same users as the top 1% of upstream users.

[7] *Id.* at 11.

[8] Odlyzko, supra note 2, at 19.

[9] David Hyman, Why Bandwidth Pricing is Anti-Competitive, *Wall Street Journal*, July 7, 2011.

[10] Odlyzko, supra note 2, at 17.

[11] Letter from Free Press et al, supra note 2, at 2; see also Public Knowledge, *Petition to Enforce Merger Conditions*, Federal Communications Commission (filed August 1, 2012).

[12] Craig Moffett, *U.S. Telecommunications and Cable & Satellite: Capital Punishment*, Bernstein Research Dec. 2010, at 6.

[13] Cisco VNI Forecast Highlights, http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html.

[14] See, e.g., Randolph J. May, *Prices and Profits in the Broadband Marketplace*, August 11, 2011, available at http://freestatefoundation.blogspot.com/2011/08/prices-and-profits-in-broadband.html; Robert C. Atkinson & Ivy E. Schultz, *Broadband in America: Where It Is and Where It Is Going (According to Broadband Providers)*, Report Prepared for FCC’s Omnibus Broadband Initiative, at 11 (2009).

[15] Scott Wallsten, *Data Caps Aren’t Perfect, But That’s OK*, http://arstechnica.com/tech-policy/2012/05/opinion-data-caps-arent-perfect-but-thats-okay/.

[16] Herbert Hovenkamp, ANTITRUST LAW, P 2340c, at 139.

[17] See, e.g., William Baumol and David Bradford, *Optimal Departures from Marginal Cost Pricing*, 60 AM. ECON. REV. 265, 265-83 (1970); Frank Ramsey, *A Contribution to the Theory of Taxation*, 37 ECON. J. 47, 47-61 (1927).
[18] Federal Communications Commission, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN, at 167 (2010).
[19] *Id.* at 168.
[20] *Id.* at 168, 170.
[21] Scott Wallsten and James Riso, *Residential and Business Broadband Prices Part 1: An Empirical Analysis of Metering and Other Price Determinants*, Technology Policy Institute (2010), available at http://techpolicyinstitute.org/files/residential%20and%20business%20broadband%20prices%20pt1.pdf (last visited August 26, 2012).
[22] *Id.* at 16.
[23] *Id.* at 3.
[24] Odlyzko, supra note 2, at 48.
[25] See, e.g., Thomas W. Hazlett and Joshua D. Wright, *The Law and Economics of Net Neutrality*, 45 IND. L. REV. 767, 797 (2012).