

Testimony of Gregory L. Rosston

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Thank you very much for the chance to appear before you today. I have written academic articles about open access and network neutrality and generally my research focuses on the effects of regulation on communications networks so I am pleased to have the chance to share my views.¹

Policy decisions regarding broadband networks and associated content and services can have important effects on the economy. The best broadband policy for the United States would result in lots of choice, innovation, and low prices. Such a utopian policy framework, however, may be hard to achieve.

Today's hearing focuses on how broadband providers' management practices affect consumers. The main issues are not new. Policy analysts and economists have debated broadband network management under names like "openness" and "network neutrality" for more than a decade; these same issues have been debated far longer in other contexts. Nonetheless, there is little agreement even about what the terms mean.

It is hard to be against openness and neutrality – they sound as American as apple pie. In some contexts, openness and neutrality have benefits, such as giving entrepreneurs easy access to networks and providing improvements to our democratic process by permitting fair and open debate of key political issues. But regulated openness and neutrality have costs, too, such as possibly reducing efficiencies from vertical integration.

¹ For articles dealing directly with Network Neutrality, see "[Communications Policy for 2005 and Beyond](#)," Stanford Institute for Economic Policy Research Discussion Paper No. 04-07, August 2004 *Federal Communications Law Journal*, Vol. 58 No. 1, December 2005 (with Hundt, R.), and "[Local Broadband Access: Primum Non Nocere or Primum Processi? A Property Rights Approach](#)," Stanford Institute for Economic Policy Research Discussion Paper No. 02-37, July 2003 in *Net Neutrality or Net Neutering: Should Broadband Internet Services be Regulated*, Lenard, T. and May, R. (ed.s) Springer: New York, 2006 (with Owen, B.)

The economic issues underlying network management, openness, and network neutrality are similar in that they all involve a network operator interacting with its end-user customers and also with companies that may compete with the network operator for other products. My goal is to provide an economic analysis of network management and some recommendations for regulatory policy to mitigate possible problems. Finally, I provide some reflections on wireless open access requirements in light of this analysis.

I. Economics of Network Management

Network management encompasses at least two broad economic issues: 1) management of a scarce resource that exhibits externalities; and 2) possible competitive issues surrounding vertical relationships.

A. Scarce resources, externalities, and pricing

Management of scarce and common resources occurs throughout the economy. For example, restaurants serve dinner to multiple customers who all enjoy the same ambience and service staff. One noisy or especially demanding diner affects how much other patrons enjoy their meals. We rely on market forces (competition among restaurants) to give restaurant owners appropriate incentives to deal efficiently with such patrons, but owner's decisions may not mean that all customers get the same service even in the same restaurant when they order exactly the same meals. In a competitive business like restaurants, management of the common resource will be different based on the demands of customers, costs, and other factors.

Like restaurants, broadband networks must satisfy widely varying demands for service. Some people use their connections sparingly, while others consume large amounts of bandwidth. Initial proposals for network neutrality and openness did not differentiate among different types of users. More recent proposals recognize the need to allow network owners to charge for bandwidth or usage in some circumstances.

If all purchasers face a uniform access price, without regard to usage, the common resource would be allocated inefficiently. Overall benefits to users can be increased by charging users in relation to their usage or to the costs they cause.

In some cases, the cost to monitor and meter may be high relative to the benefits. That means that there may be some benefit to having additional mechanisms in place for traffic management. For example, it may make sense to offer pricing that varies with usage in blocks, rather than continuously, and to find non-price means to limit high usage during peak periods, rather than offering a complex and confusing non-linear price schedule. It might be more transparent for firms to offer higher tier service for more intensive users, with charges based on upstream usage, downstream usage, or both.

Pricing can be an important tool for providing higher-value services. All packets do not have equal value. If consumers pay for bandwidth or capacity and are part of a shared network that treats “all bits equally,” it might not be possible to offer broadband content that requires delivery priority or guaranteed arrival times. For example, high-quality real-time video conferencing requires that packets of bits not be delayed. But, if the local provider is required to treat all bits equally, the packets that are going to the high school student downloading a pirated copy of the new *21* movie and setting up a peer-to-peer upload will have the same priority as the conference call. Given capacity constraints in the network, the lack of prioritization could cause the video conference quality to be suboptimal, even though delay in delivering the movie to or from the student’s hard drive would be completely inconsequential because such transmissions are easily buffered. Requiring that a network operator treat all bits equally would, in this and other cases, needlessly harm high-value services, reducing consumer welfare.

Similarly, some advocates propose that network operators should only be able to charge their own end-user customers for service and bandwidth choices. Such a requirement could actually harm consumers. For example, a network owner may charge its customers low rates for low bandwidth capacity. An unaffiliated content provider may develop a product that requires higher bandwidth. Under some proposals, the unaffiliated provider

could not offer to pay the network owner to increase the user's bandwidth for its application. Essentially, such a regulation would be the equivalent of banning toll-free 1-800 calls. In the same way that changing the nature of payment for telephone calls can increase efficiency, a bar on charging both sides of a broadband "two-sided market" could harm efficiency.

Overall, network management issues are not unique to broadband. Many industries have users that make intensive use of resources, and those users pay for the privilege. Broadband should be no different – those who cause the costs should be charged. The comments about network management above do not depend on the degree of competition among network providers. Most "network management" proposals would be bad for consumers even if there were only a single, monopoly, broadband network.

The next section takes up some of the competition issues that arise in the context of network management.

B. Vertical Relationships

The economics of network management also involves the complex issue of relationships between a network operator and other providers. Vertical relationships between network operators and other providers—for example, the need for network operators to have content flowing over their pipes—are an important part of broadband. No single firm will ever provide all the content consumers want, so firms with conduit and content will have to interact in some fashion to provide service. The relationship between suppliers and conduit providers raises the competitive concern that a network operator could favor its own content (or the content of an affiliate) over that of an unrelated competitor.

The economic literature on vertical relationships has gone through nearly a complete circle, from broad agreement that vertical integration was bad to the Chicago School view that all problems with vertical relationships stemmed solely from horizontal problems, to

the current nuanced “post-Chicago” view that there can be problems with vertical relationships depending on the circumstances.

In the broadband context, the analysis should focus on whether a local broadband provider has the incentive and ability to use its position to extract rents from content providers and harm consumers in the process. Vertical integration may also have beneficial efficiency effects. For example, vertical integration or vertical relationships can align incentives for investment. For example, the early cable operators were the key investors in cable television networks to ensure availability of programming. In theory, vertical relationships could hurt consumers, help consumers, or both help them in some ways and hurt them in others.

Which of these outcomes is most likely depends on supplier incentives, which in turn depend on the market structure and regulation. In almost all models that predict adverse effects from vertical relationships, the problems arise because of market power at one level or another of the vertical chain. But often, vertical relationships raise no competitive issues even if there is market power. In other cases, even if adverse effects arise, the effects are less costly to consumers than inefficiencies that might arise from regulatory intervention. Nonetheless, there are indeed instances where firms do have the ability and incentive to harm competition in vertically-related markets. The *Madison River* case is emblematic of this theory. In that case, the FCC stepped in to protect consumers. The FCC and antitrust authorities (as well as private antitrust enforcers) should intervene when a dominant network takes actions that harm competition and consumers.

In general, an access provider wants to enhance the demand for its own services, in part by promoting complementary services. This was the case with the early cable content investments discussed above. An access provider cannot extract rents from services that do not exist. There may be an incentive to exclude or raise the costs of those that offer content that competes with its own, but only if the substitute content is offered at the same or higher cost or if the content produces negative external effects on the overall

demand for Internet content.² In this context, an access provider can act opportunistically to raise rivals' costs, but it cannot persist in such behavior without reducing the supply of content that it requires.

Yahoo! And AT&T provide an example of the fears and potential efficiencies from vertical relationships. Yahoo! and AT&T have had an agreement jointly to provide service for AT&T's DSL customers. This vertical relationship advantaged Yahoo! relative to other information portals such as AOL, MSN, and Google. But it does not appear to have harmed consumers. Bundled AT&T/Yahoo! service does not prevent subscribers from using any other Internet services, including Yahoo!'s most direct competitors. In principle, AT&T could do a variety of things to make it more difficult for users to turn to rival sources of aggregated content and premium service, but I am not aware of any allegations of such behavior. In these circumstances, a policy that prevents a relationship between AT&T and Yahoo! could deny consumers a more attractive product or lower cost. Rivals to Yahoo! may protest the vertical relationship with AT&T. But their protests need not stem from fear of discrimination; they may fear a more effective competitor.

The key conclusion here is that vertical relationships when a firm has market power can be both pro-competitive and anti-competitive depending on the circumstances and the actions. A preemptive regulation can prevent both types; relying on *ex post* antitrust enforcement can target more closely anticompetitive actions, but has a risk of delay and under-enforcement. These tradeoffs lead to the analysis of what government regulators should do at this point in time.

² See Farrell and Weiser (2002) for a discussion of incentives for a monopolist to exclude downstream content.

II. What should regulators do?

A. Framework

Evaluations of the competitive effect of broadband network management policies depend critically on one's view about the future of competition for broadband access. Policy choices can lead to self-fulfilling prophecies about the future of access competition.

If one believes that there is already as much competition and investment in local broadband access as possible, and one believes that two wireline providers is insufficient to provide a competitive deterrent, then one might think that *ex ante* regulation of actions by network providers would be appropriate. A dominant local access firm could use its power to extract rents from upstream providers through a variety of pricing and discrimination methods. Whether a firm with such power would take advantage of its power would also depend on the nature of demand of its subscribers.

If, on the other hand, one believes that competition for local broadband access is not as vigorous as it could be, then one might have a different conclusion about regulation. With the potential for additional competition, one would not want to institute rules that would frustrate new competitors and new investments. If vertical integration was an important competitive strategy, new entrants might be frustrated from entering if they could not vertically integrate. For example, some new entrants in broadband markets have usage restrictions to manage their networks and make entry more attractive.

Policy can affect the entry incentives of new entrants and investment incentives of incumbents. For any investment to take place, firms have to believe they will be better off from having made the investment than not. If policy reduces the returns to investment, at the margin, firms are less likely to invest. For new entrants, more onerous regulation can affect the scale and scope of entry, or make entry unviable.

B. Specific Proposals

I think that we can have more competition for local broadband access. Therefore, my policy proposals focus on facilitating new entry and investment to reduce the potential problems from vertical relationships. The FCC in particular has tools that can increase local competition, and remove barriers to new entry – it just needs to use them. At the same time, we need to ensure that the regulatory authorities have the power, will and tools to step into the market when there are competitive problems.

Since most of the problems and concerns about vertical leveraging arise from concentration at the local access level, the most important thing that government should do is to stimulate competition at that level. Obviously, it would be great if it were economic for multiple firms to string fiber optic cable around all neighborhoods in the United States. That is unlikely to happen. But the FCC has tools to make facilities-based competition more likely and more viable.

First and foremost, the FCC should get even more spectrum out into the marketplace. And it is probably important that the spectrum not continue to go into the hands of the two incumbent landline telephone companies that also have by far the most valuable wireless spectrum. In the 700 MHz auction, Verizon and AT&T each bought large amounts of spectrum and, in many geographic areas, control more spectrum than the FCC's threshold of 95 MHz. While they each will use the spectrum, they do not have the same competitive incentives that independent competitors would have. The FCC should investigate to see if there are competitive problems in the wireless business and more importantly in the ability of a competitor to use wireless to provide a competitive alternative to the cable and DSL lines.

One quick way to get more spectrum into the market is to push government users to relocate more quickly. Leap Wireless, MetroPCS and T-Mobile all bought spectrum in the AWS band in 2006 and but cannot use it because the US. Government has not

vacated the spectrum. The FCC should do whatever it can inside the government to expedite this process and enable these competitors to use AWS spectrum.

Competition from independent wireless companies should benefit consumers and provide a competitive alternative. Independent broadband wireless providers would provide competitive pressures on the cable and DSL companies not to abuse vertical relationships. Increased competition in broadband access is the best way to “regulate” vertical relationships.

The current universal service program is also a barrier to competition and is so inefficient that it should be scrapped. Instituting a low-cost, efficient and competitively neutral universal service program would be much better for competition. Perhaps the most obvious and egregious problem is the proposal to pay incumbent telephone providers more than new competitors for providing the same services. The incumbents are right that we should not pay the new entrants the high rates that incumbents get – instead, all providers, including the incumbents, should get the minimum amount necessary for the most efficient provider to provide service. But incumbents have been able to use the regulatory process to forestall competition. Getting rid of this bias would help competition and again diminish the need for *ex ante* regulation of vertical relationships.

In addition, the antitrust authorities and the FCC should continue to be vigilant. Until we have more competition, there may be more instances like *Madison River* and the regulatory authorities should be ready to step in when there is abuse.

Increasing the amount of spectrum, speeding the relocation of government users, vigorous antitrust enforcement (including the prevention of excessive aggregation of wireless spectrum) and revamping universal service to be competitively neutral are “easy” economically. The answers are clear, and the benefits are big. The only question is whether we have the political will to do the right thing.

Appendix: The 700 MHz Openness Provisions – the good and the bad

The 700 MHz C block is useful for illustrating some of the issues related to network management: competition, complexity and regulatory uncertainty.

The FCC mandated that the 700 MHz Upper Band C Block have an open platform for devices and applications, subject to “reasonable network management.” The Commissions order was vague on the actual requirements for openness, and it was also vague about the meaning of “reasonable network management.”

It is curious that the FCC required openness for a Commercial Mobile Radio Services (CMRS) when has deemed CMRS to be competitive. As discussed above, the competitive issues in vertical relationships almost always require some degree of market power. While wireless service is not a perfectly competitive market, the FCC competition reports year after year have claimed that the service is competitively provided. As such, it is unlikely that there is a problem that an openness mandate will solve. So, there may be a cost to the provision and enforcement of the provision because other firms will rely upon the “right” to openness and defend that right, while at the same time, there may be little benefit from the new rule.

In addition, the vagueness of the openness requirements and network management exceptions make it difficult to believe that the enforcement will be satisfactory. Proponents of openness are likely to say that the licensee has not gone far enough in opening its network and the network operator is likely to say it has gone further than necessary. In addition, there are likely to be disputes about what “reasonable network management” for a wireless provider means. It may well be different than “reasonable network management” for a wireline broadband operator.

One potential benefit of the imposition of the openness requirements on the C block is the ability to use this “experiment” in openness to shed some light on the costs and benefits of such provisions on a more widespread scale. If openness is problematic, the

interactions between the C block licensee and upstream providers and downstream customers are likely to reflect such problems. If openness provides large benefits and works smoothly, then other carriers, having to compete with an open access provider, may also adopt open platforms.

In addition, by limiting the scope of the openness provisions to a single block of spectrum that it was auctioning for the first time, the Commission was able to avoid any concerns about “takings” due a change in rule for existing licensees. Instead, bidders knew (to some extent) the rules on the spectrum they were buying.