

Micro Economics



Building Broadband ahead of Digital Demand

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.....Many governments today, especially outside the US, are considering making large subsidies for broadband. Some governments, such as South Korea's, have already done so, making next-generation broadband widely available.

In the US, debates about subsidizing broadband touch two sets of overlapping issues. One set considers the benefits and costs of an expensive action: building wire-line broadband in low-density areas. A second set considers stretching the frontier for broadband far beyond its present capabilities to enable next-generation Internet applications (typically video).

In the US today, those favoring building ahead of demand are the most dissatisfied, as are those who want to subsidize rural broadband. This column considers the economic origins behind that dissatisfaction.

Traditional arguments

Examining a class of infrastructure investment other than broadband can illustrate the strengths and limits of traditional economic analysis for subsidies.

Although I do not harbor any sentimental desire to return to Al Gore's metaphor—the *information superhighway*—a comparison between roads and broadband actually provides a useful starting point.

I grew up in a metropolitan area that had two highway systems. Each

system's growth illustrates a different philosophy for building infrastructure. One system was in the east and the other in the west. Never the twain did meet.

The eastern system started 40 years ago with two lanes in each direction, and used an incremental approach to grow. It imposed enormous disruptions on commuters each time it expanded. In contrast, the western system minimized disruption by building ahead of demand, with four lanes almost everywhere from the outset. It went underutilized for decades. Growth eventually caught up to both. Today both freeways have four lanes everywhere, and commuters heavily use all of them.

These two examples provide the equivalent of a policy litmus test. Depending on a politician's tolerance for taxation and government-managed projects, the eastern highway illustrates either prudent government investment or the government's inadequate response to demand. The western highway illustrates either government waste of public financing or foresighted investment.

The current broadband debate reflects a similar philosophical schism. In particular, US policy favors a privately financed building of broadband, which favors gradualism. Proponents for building ahead of demand are unhappy with such gradualism.

Why does private supply favor gradualism? In short, few executives at private

firms would ever deliberately invest resources in an opportunity that was unlikely to generate revenue until much later, especially 20 years later. Corporate boards would not approve of it, and neither would stockholders.

These tendencies toward gradualism are exacerbated when few competitive alternatives beckon users. Why accelerate investment, which steals from profits, if you will not lose users anyway? Hence, proponents for accelerating broadband also complain that the US market is not competitive enough.

Tax and subsidize

More than privatization produces gradualism. If broadband were public infrastructure (instead of private), financing of its growth would tend to be gradual because of how this country typically finances public infrastructure growth.

Once again, a highway upgrade can illustrate. For example, in addition to the benefits improved roads confer to individuals living near those roads, a benefit goes to UPS, FedEx, and thousands of national trucking companies. Governments therefore tax gasoline because those who chew up the road tend to purchase gasoline in proportion to how much they drive.

No comparable association with broadband exists, so constructing a comparable scheme is difficult. Here is why: Broadband makes users better customers for online ads and electronic retailing.

Accordingly, financing broadband would involve taxing Yahoo and Amazon and Google and other national electronic retailers who benefit from better broadband. Needless to say, that will not happen soon.

Let me summarize so far. Privately financed broadband investment favors gradualism. Private firms will not respond to more political pressure, such as a national mandate to invest quickly, without a reason to do so. Moreover, finding a practical way to change that outcome is challenging.

These challenges help explain the seemingly peculiar financing scheme proposed in the US National Broadband Plan, which the Federal Communications Commission completed last winter. The plan proposes financing broadband by changing the US universal service fund, which presently supports rural telephony far in excess of its needs.

There is something ironic about financing the new technology—rural broadband—by taxing the old communications technology—telephone calls—and it is far from optimal. Then why was it proposed? Because nobody has a better idea.

Experiments

Another argument for building ahead of demand has to do with economic experimentation. Although the economic argument is sound, it once again leads down an impractical path.

An economic experiment does not take place in a laboratory; rather, it uses a living marketplace as the laboratory. Many firms do these experiments because they have no other way to learn what a customer values or how much an operation costs, short of giving users options and finding out which of several options work best.

It is not exaggerating to say that the developed world is presently engaged in an online economic experiment that is taking place on a vast scale.

Sometimes these experiments gain publicity, as when Facebook alters its privacy setting, and users push back.

Sometimes careers and money are at stake, as when venture capitalists fund a whole vintage of firms in a new domain, as they did a half dozen years ago in Web 2.0.

Sometimes these experiments move at a subtle pace, as when a major corporation alters its telecommuting policies, and the retention rate among its female employees rises in response. Sometimes experiments seem minor, as when Amazon or Google alter the colors of a webpage for 10 thousand random users and observe whether those users behave differently. The lessons from such minor experiments only add up after months.

Better broadband clearly helps this type of experimentation occur, and would seem to justify building ahead of demand. Why, then, does the gradualism persist? It has to do with the asymmetry of tallying material cost and benefits. Although the monetary costs are easy to tally, the benefits are not. Relatedly, the costs are focused, but the gains are diffuse, making it difficult to show that broadband caused the associated gain, even if, broadly speaking, everyone recognizes that broadband raised firms' productivity and enhanced users' experience.

Consider You Tube, which is just over five years old, and the fourth most popular site on the Internet. This site obviously benefits from the widespread use of broadband. Have You Tube's economic gains been high? There is no way to tell because You Tube has never contributed a positive sum to measured gross domestic product (GDP).

Yes, literally. According to financial analysts, Google has lost several hundred million dollars a year since it bought the site. You Tube incurs heavy expenses transmitting so much data. Moreover, Google's experiments with different forms of advertising have not worked as well as hoped, at least not yet.

Other societal costs and benefits exist as well, of course. You Tube draws viewers away from television,

reducing advertising dollars there, but more recently advertisers have been finding creative ways to use the site for their purposes. The site also reduces some sales for some copyrighted material, such as movies and television shows, but that is a debatable proposition too.

Do the general gains to users outweigh the losses to measured GDP? Probably, because You Tube must be delivering something very appealing to be as popular as it is. However, no balance sheet could ever balance the societal debits and credits, at least not precisely.

More to the point, no politician would ever try basing a national policy to subsidize broadband based on such vague accounting.

As an aside, this partly explains why the US government tends to build ahead of demand in universities but rarely elsewhere. Policy makers are comfortable with the vague benefits that accrue to researchers because there is some accountability through the grant-writing process. Moreover, there is a long history of students and professors stretching the computing frontiers in valuable ways, and eventually yielding economic gains far in excess of the research costs.

Exuberance

The case for building ahead of demand taps into exuberance, another element unique to broadband. Unfortunately, the exuberance is often misapplied.

Let me illustrate with the behavior of one lobby group, Connected Nation. Two years ago this group forecast that building rural broadband would lead to \$134 billion dollars of economic gain. The forecast contained egregious statistical errors, but the people who made it did not care. They were measuring their calculations against a different benchmark—their sense of what the political atmosphere permitted them to (over)claim. Needless to say, such benchmarks generally risk wasting vast

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amounts of public resources, especially when exuberance is high.

This example illustrates the more general problem. Exuberance distracts from the economic reality, because reality is not glamorous. Basically, about five percent of US households lack broadband today because of the high costs of provision. There is no magic beyond that. Residential broadband will not

transform rural economies. At most, broadband will prevent such areas from sliding into economic decline. There is nothing exuberant about it. Subsidized broadband will accomplish the economic equivalent of running in place.

In short, exuberance substitutes for an honest policy conversation. No self-serving politician will use temperate language when endorsing subsidizing rural

broadband. Moreover, even though it might be a worthwhile societal goal to prevent decline in rural economies, the question never arises when false expectations frame the topic.



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