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**A Critical Assessment of Harvard’s “Community-Owned Fiber Networks:
Value Leaders in America” Study**

by

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I. Introduction and Summary

A new study by Harvard University’s Berkman Klein Center for Internet & Society entitled “Community-Owned Fiber Networks: Value Leaders in America” (Berkman Klein study) proclaims that municipal broadband systems and community-owned fiber networks are the “value leaders in America,” relative to broadband provided by private companies.¹ The authors claim their study findings “point to the benefits of community fiber networks in providing broadband to Americans at prices that are more affordable.”² But, in short, this study falls far short of demonstrating the benefits of broadband provided by local governments, or that the prices they offer are indeed lower than private providers in the area.

The data the study’s authors provide (and omit) from specific markets included in the study’s sample and the methodology they employ raise so many questions about the price differences claimed by the authors that they cannot be considered reliable. But even more fundamentally, lower prices by municipal utilities do not necessarily indicate that municipal broadband is a

¹ David A. Talbot, Kira Hope Hessekiel, and Danielle Leah, “Community-Owned Fiber Networks: Value Leaders in America,” Berkman Klein Center for Internet & Society (January 2018), available at: <https://dash.harvard.edu/handle/1/34623859>.

² Berkman Klein study, p.13.

better value than privately-provided broadband. If, as is often the case, the municipal utility is subsidized by local taxpayers, or is not financially viable, calling its broadband a “better value” is a highly questionable claim. Moreover, looking only at past broadband prices ignores all of the dynamic aspects of competition in an evolving market. As we discussed in a previous paper, the presence of a municipal broadband provider creates disincentives for private providers to enter the market, and deprives the local community of the benefits of private capital investment in future broadband capacity and services.³

The Berkman Klein study’s basis for concluding that municipal Internet utilities are the “value leaders in America” is that in 23 out of the 27 markets the authors examine, they calculated that the lowest price offered by the municipal utility was lower than the lowest price from a private provider for qualified broadband. “Qualified broadband” from private providers is defined as having speeds of at least 25 Mbps download and 3 Mbps upload. In making this comparison, the authors calculate a four-year average price for broadband, so that any short-term promotional rates are averaged over four years to make them more comparable to rates that are not discounted for new customers.

Notably, the Berkman Klein study does not make any other adjustments to the prices it finds, other than to make this adjustment for averaging any promotional rates with full-price rates over a four-year time period. In particular, it does not adjust for any differences in download speeds, for customers who receive lower prices after the promotional rate expires by negotiating a better deal with their private provider, or for “bundling” discounts that may be available to customers who purchase more than one service. The authors’ decision to make some price adjustments, but not others, creates results that heavily favor municipal broadband prices.

The conclusion that municipal broadband prices are lower than qualified private broadband prices in 23 out of 27 markets is highly dubious for other reasons. The authors have excluded prices from major private providers, including all prices from Time Warner Cable, AT&T, and Verizon, even though these providers are found in markets in their sample. They also included some questionable municipal providers in their small sample, including some with small coverage areas and two municipal systems that have recently been sold off to private investors.

These flaws in the study’s methodology and data collection alone are enough to invalidate the findings that municipal utilities offer lower prices than private providers in the markets where they compete. But as serious as these flaws are, there are other even more important ones. Even if we set aside the questionable data gathering and methodology, comparing municipal utility and private provider prices in a small number of markets simply does not provide meaningful evidence that community-owned broadband systems are a better value than private broadband services.

Price alone is not necessarily meaningful, especially if it is from a municipal broadband provider that has the ability to subsidize prices with long-term public debt and receives other public benefits not available to private providers. Private broadband networks cannot sustain a negative

³ Theodore R. Bolema and Michael J. Horney, “The Problem with Municipal Broadband and Solutions for Promoting Private Investment, *Perspectives from FSF Scholars* Vol. 12, No. 21 (June 21, 2017), available at: http://www.freestatefoundation.org/images/The_Problem_with_Municipal_Broadband_and_Solutions_for_Promoting_Private_Investment_062017.pdf.

cash flow over a long period of time. Municipal networks, on the other hand, can use taxpayer funds to subsidize the price of broadband below a profitable level. Ultimately, the residents are paying for the broadband project, so if prices are so low that the project has a negative cash flow, that inevitably will have other negative financial consequences for the municipality and its residents.

There are nine municipal projects that were analyzed in both the Berkman Klein study and a recent study of the financial viability of municipal broadband systems by Professor Christopher Yoo, a member of the Free State Foundation Board of Academic Advisors.⁴ Of the nine, four were cash flow negative and four of the municipal projects were not on pace to be paid off within the lifetime of a broadband network, which is generally between 30 and 40 years. Only one of the networks, Bristol, TN, was on track to be paid off within the lifetime of the network.

The municipal projects appearing in both studies with the greatest cost “savings” turn out to be the ones that are the least financially viable. To be clear, we are not arguing that this negative relationship between municipal broadband prices and financial viability applies generally to all markets with both municipal and private providers – the sample is too small to draw such a conclusion. But this comparison does indicate that the particular municipal broadband utilities from the Berkman Klein sample with the greatest price differentials with their private competitors likely are achieving any such savings through significant taxpayer subsidization of municipal broadband prices.

While consumers in Lafayette, LA, for example, might be “saving” money from monthly subscriptions, Lafayette residents, even those who do not subscribe to the municipal network, are still on the hook for the debt used to finance the project as well as the current negative cash flows. Thus, any claims about the value provided by municipal broadband must consider the taxes and fees imposed on residents that cover the cost of subsidizing the network, including the costs imposed on residents who are not customers of the municipal broadband utility.

As we discussed in our June 2017 *Perspectives from FSF Scholars*, having robust competition with multiple broadband technologies usually eliminates any justification for government-provided broadband. But this competition is often discouraged by the presence of a municipal provider. When faced with the prospect of competing with a municipal broadband provider that can use taxpayer resources to build a network and subsidize prices, many private firms will choose to re-direct their investment plans to other markets.⁵

In this way, the very advantage that the Berkman Klein study claims to have found, that municipal providers may be charging less than private providers, may be more of a curse than a blessing for local residents. Any short-term benefits from low municipal utility prices can easily be greatly outweighed by the expenses to local taxpayers over the lifetime of the network. The ability to finance networks with public debt, unique to government-created broadband providers, as well as the regulatory advantages municipalities often give their municipal utilities, may scare

⁴ Christopher Yoo and Timothy Pfenninger, “Municipal Fiber in the United States: An Empirical Assessment of Financial Performance,” University of Pennsylvania Law School’s Center for Technology, Innovation and Competition (May 2017), available at: <https://www.law.upenn.edu/live/files/6611-report-municipal-fiber-in-the-united-states-an>. Professor Yoo is a member of the Free State Foundation’s Board of Academic Advisors.

⁵ Bolema and Horney, p. 5.

off private broadband investment and ultimately harm the same people the network was created to help, the local residents.

Finally, as broadband innovation and new forms of competition continue to increase, the future financial viability of municipal broadband only decreases. Intermodal broadband competition from fixed wireless and satellite technologies is emerging as capable of providing qualified broadband speeds, and the markets identified in the Berkman Klein study show evidence that other entry by private providers is occurring. In addition, more people than ever are turning to mobile broadband. The emerging 5G wireless revolution will make mobile broadband even more competitive with other broadband technologies. This dynamically competitive process subsequently reduces the already waning competitiveness and financial viability of municipal broadband networks.

II. Summary of the *Community-Owned Fiber Networks Study*

The authors of the *Community-Owned Fiber Networks: Value Leaders in America* study (Berkman Klein study) are affiliated with Harvard University's Berkman Klein Center for Internet & Society.⁶ They describe their study as "the first to compare prices for Internet access services that minimally meet the FCC's definition of broadband."⁷ The first sentence of the study states their main conclusion as follows:

Our examination of advertised prices shows that community-owned fiber-to-the-home (FTTH) networks in the United States generally charge less for entry-level broadband service than do competing private providers, and don't use initial low "teaser" rates that sharply rise months later."⁸

Later in their study, the authors reiterate this finding:

Our study, though limited in scope, contains a clear finding: community-owned FTTH networks tend to provide lower prices for their entry-level broadband service than do private telecommunications companies, and are clearer about and more consistent in what they charge. They may help close the "digital divide" by providing broadband at prices more Americans can afford.⁹

The authors choose their 40 markets based on the local area having a community-owned provider offering "fiber to the home," or FTTH broadband delivered over fiber optic cable. This technology is one of several used for providing home Internet service, and it can deliver high-speed service well in excess of the 25 Mbps download and 3 Mbps upload standard the authors identify for entry-level broadband service. Nonetheless, the authors confine their analysis to Internet service that meets this minimum standard, and do not otherwise consider higher-speed

⁶ According to the profiles contained in the study, the lead author, David Talbot, is a fellow at the Berkman Klein Center for Internet & Society at Harvard University. Kira Hessekiel is a project coordinator of Harvard Law School's Cyberlaw Clinic, based at the Berkman Klein Center. Danielle Kehl is a student at Harvard Law School and is a fellow at New America's Open Technology Institute and the Internet Law & Policy Foundry.

⁷ Berkman Klein study, p. 4.

⁸ Berkman Klein study, p. 1.

⁹ Berkman Klein study, p. 6.

services or differences in quality of service.¹⁰ To refer to this standard for broadband with speeds of 25 Mbps download and 3 Mbps upload, we adopt the term “qualified broadband” based on how the Berkman Klein study authors use the term.

The authors next narrow their sample to 27 markets by excluding 13 markets in which either no private competitor “offered service that qualified as broadband” or in which “the private providers’ website terms of service deterred or prohibited data collection.”¹¹ For each of these 27 remaining markets, the Berkman Klein study compares the lowest price of qualifying broadband from a private provider with the lowest price from a municipal utility.¹²

The Berkman Klein study’s basis for concluding that municipal Internet utilities are the “value leaders in America” is that in 23 out of these 27 markets the authors calculated that the lowest price offered by the municipal utility for qualified broadband was lower than the lowest price from a private provider for qualified broadband.

In making this comparison, the authors of the Berkman Klein study make one adjustment to the prices they found – they calculate a four-year average price for broadband. Thus, the comparison the authors make is based on the minimum price paid by consumers over the first four years of qualified broadband service, so that any short-term promotional rates are averaged over four years to make them more comparable to rates that are not discounted for new customers.¹³

Notably, the Berkman Klein study does not make any other adjustments to the prices they found, other than to make this adjustment for averaging any promotional rates over the four-year time period. In particular, they do not adjust for any differences in download speeds, for customers who receive lower prices after the promotional rate expires by negotiating a better deal with their private provider, for “bundling” discounts that are often available to customers who purchase more than one service from their provider, or for subsidies that local governments give to their municipal utilities. As we discuss below, the authors’ decision to make some price adjustments, but not others, creates results that heavily favor municipal broadband prices.

Our review of the Berkman Klein study is organized in two sections that follow. First, we take their analysis on its own terms, and assess whether their data and methodology support their finding that “community-owned fiber-to-the-home (FTTH) networks in the United States generally charge less for entry-level broadband service than do competing private providers.” We note that other recently-released studies criticize the data, methodology, and interpretation of the conclusions in the Berkman Klein study.¹⁴ We make similar criticisms here, but our focus is

¹⁰ Berkman Klein study, p. 2.

¹¹ Berkman Klein study, p. 2.

¹² Berkman Klein study, p. 2.

¹³ The Berkman Klein study also includes in its four-year price certain “one-time costs,” such as installation fees and equipment purchase costs. If equipment is rented rather than purchased, the monthly rental price over the four years is also included. Berkman Klein study, p. 16.

¹⁴ See, e.g., Richard Bennet, “Community Broadband Is Cheaper—and Slower,” High Tech Forum, (January 16, 2018), available at: <http://hightechforum.org/community-broadband-cheaper-slower>; Michael J. Santorelli and Charles M. Davidson, “A Closer Look: Berkman’s Municipal Fiber Pricing Study (January, 2018), available at <http://www.nyls.edu/advanced-communications-law-and-policy-institute/wp-content/uploads/sites/169/2018/01/Closer-Look-Berkman-GON-Pricing-Study-January-2018.pdf>; George S. Ford “A Review of the Berkman Center’s Price Survey of Municipal Broadband Markets, Phoenix Center Policy

more on the final section of the study, in which we turn to the more important question of whether past lower prices for entry-level broadband service supports the claim of a service being a “value leader in America.”

III. Berkman Klein Study Fails to Show Community-Owned Utility Prices Are Lower

According to the authors of the Berkman Klein study: “Put simply, our goal here was to determine what broadband actually costs and whether community-owned FTTH networks provide better deals than private competitors for this essential service. We conclude that they do.”¹⁵ They claim to show this result by showing that the lowest prices offered for broadband by municipal utilities in the 27 markets they identified is lower than the lowest price of qualified broadband by private providers in the same local market. In this section, we set aside the question of whether this finding would be sufficient to show that community-owned networks provide better deals than private competitors. For purposes of this section, we consider only whether the authors have actually made a compelling case that the lowest prices for broadband from municipal utilities is lower than the lowest price of qualified broadband by private providers in the same local market. We conclude that they have not.

Time Difference Between Data Collected from Municipal Utilities vs. Private Providers

The authors report that they collected data from different time periods for the two different types of providers. Their data for municipal broadband utilities was collected from November 2015 to January 2016, while their data for private broadband providers is from May 2016 to September 2016. Thus, for every market, there is a time difference of four to ten months, during which prices may have changed, with no way of assessing how much this time difference affected the results. Broadband consumers compare prices over the same time period, so an analysis of broadband prices should do the same. In any event, this data was already somewhat dated by the time the report was released in January 2018.

Very Small Sample Size

The authors, to their credit, provide two spreadsheets showing their findings. This transparency allows us to examine the data they used for each market. As discussed above, the authors first identified 40 markets in which municipal utilities offer FTTH service.¹⁶ The authors describe their data collection methodology as follows:

We collected pricing data from the websites of 40 community-owned FTTH providers and their competitors. Our source for the existence of these community-owned FTTH providers was a list of municipal networks compiled by the Institute for Local Self-

Perspective No. 18-01 (January 24, 2018), available at <http://www.phoenix-center.org/perspectives/Perspective18-01Final.pdf>.

¹⁵ Berkman Klein study, p. 5.

¹⁶ We note that the spreadsheets for municipal FTTH providers and for private providers attached to the study list data for 43 local markets. We believe that the authors excluded the municipal utilities in three of the markets, which are Loma Linda, CA, Bagley, MN, and Philippi, WV, based on slow download speeds, so that their initial sample of 40 consists of the 43 listed markets less these three markets.

Reliance (ILSR) and a similar list compiled by the White House in 2015 that was based on the ILSR data.¹⁷

Thus, the authors start with a very small sample. The vast majority of these 40 markets have relatively small populations so they cover only a very small proportion of the national market for broadband services. It should be noted that many of the municipal utilities the authors included from these markets are rather problematical. For example, many had coverage areas that appeared to be substantially smaller than the private providers.¹⁸

The authors then narrowed their sample even further to 27 markets based on not having data for private providers in the 13 markets they excluded. The authors describe how they identified the private providers they included from these 27 markets:

Next, we identified competitors in those communities by using the National Broadband Map and a third-party site called Broadband Now. We included all private fiber, cable, or DSL providers who provide broadband speeds, except those whose websites' terms of service prohibited data collection.¹⁹

The National Broadband Map has not been updated since mid-2014, so it was out-of-date by the time the authors were consulting it in mid-2016. We also looked at the Broadband Now site, and found that several markets have more private companies providing qualifying broadband in the zip codes identified by the authors. That is probably not surprising, since the authors' completed their review of private providers in September 2016 and we were visiting the site in January 2018. But the evident increase in the number of providers since the authors collected their data (and for which they therefore did not account) indicates that this is a dynamic market with an increasing number of private providers in the same markets the authors identified.

In any event, the markets examined by the authors give them only a very small sample of comparisons, and some of the comparisons were questionable in 2016 or have become invalid due to competitive entry in the markets since 2016.

Study Excludes Significant Private Providers

The authors of the study acknowledge that they did not consider some of the most significant private providers in the country, even though they provide broadband service in these markets:

We did not collect data from Time Warner Cable, AT&T, or Verizon, all of which included language in their terms of service or disclaimers on the website that prohibited collecting any pricing information from the site by anyone other than an individual who intended to purchase services. Therefore, some communities do not contain complete

¹⁷ Berkman Klein study, p. 15.

¹⁸ One such example is in Holland, MI, which in 2016 was in the early stages of providing service to a small area. The City of Holland did not approve providing service to a broader area until late 2017. *See* Jarrett Skorup, "Holland Should Leave Internet to the Private Sector," Holland Sentinel (September 30, 2017), available at: <http://www.hollandsentinel.com/news/20170930/jarrett-skorup-holland-should-leave-internet-to-private-sector>.

¹⁹ Berkman Klein study, p. 15.

data about competitor ISPs, which we have noted in the data set (emphasis added, citations omitted).²⁰

Moreover, the Berkman Klein study appears to omit other private broadband providers. The authors list 12 specific private broadband companies from which they collected data, and appear to be stating that this is a complete list of the private companies they surveyed.²¹ Yet we observe on the Broadband Now website used by the Berkman Klein authors several other private providers offering qualifying broadband. This discrepancy may be because we are looking at these markets at least 15 months after the authors used this source, so it is possible they were not providing qualifying broadband at the time.

The omission of Time Warner Cable,²² AT&T, and Verizon alone is sufficient to raise serious questions about the results from the Berkman Klein study. The authors claim that the reason they did not include any data from Time Warner Cable, AT&T, or Verizon is because restrictive website terms of service prevented them from using pricing data from these companies in their reported findings.²³ Even if that is accurate, those companies still provide broadband service in many of the 40 markets identified by the authors, and perhaps at lower prices than other private providers. The authors simply cannot back up a headline-grabbing “conclusion” like “community-owned FTTH networks tend to provide lower prices for their entry-level broadband service than do private telecommunications companies” when they are not considering pricing by three of the largest broadband providers, even though the authors acknowledge they are providing service in some of the markets they considered.

²⁰ Berkman Klein study, p. 15.

²¹ Berkman Klein study, p. 4.

²² Time Warner Cable was purchased by Charter in 2016 and is now re-branded as Spectrum in most markets.

²³ Berkman Klein study, p. 12 (“Most websites have policies that govern what users can do in those online spaces. These documents are typically called “Terms of Service,” “Terms of Use,” or “Acceptable Use” policies, and they exist to help protect the entity’s rights to the website’s contents, to give companies grounds for restricting access for users whose behavior is inappropriate or unlawful, and to create grounds for pursuing legal action. Most of the providers whose websites required furnishing an address to access pricing information included terms of service or similar policies. In the case of three companies – AT&T, Verizon, and Time Warner Cable (now owned by Charter) – website language was particularly strong in deterring efforts at collecting pricing information. At the time we collected the data, we encountered the following language on the sites of these providers: Time Warner Cable: “Do not ‘harvest’ (or collect) information from the site using an automated software tool or manually on a mass basis (unless we have given you separate written permission to do so). This includes, for example, information about other users of the site and information about the offerings, products, services and promotions available on the site.” Verizon Fios: “Notice: Authorized use of this page is limited to the review of service availability information, for a particular address or phone number, solely by persons interested in purchasing Verizon service or making changes to existing Verizon service. No other use is permitted. After you use this site, Verizon may contact you with information about our products and services, including special offers and promotions.” AT&T: “[Y]ou will not take any of the following actions with respect to our Site, related Software, or Content [...] in any manner that: [...] is deceptive in any way, such as an offer to sell fraudulent goods or contains an impersonation of any person or entity or misrepresents an affiliation with a person or entity; [...] [or] systematically collects and uses any Content including the use of any data mining, or similar data gathering and extraction methods.” Obeying the letter of these terms of service made it impossible to make complete pricing comparisons in several communities (citations omitted).”).

Municipal Providers in Some of the 27 Markets Are Questionable

Some of the 27 municipal utilities in the Berkman Klein final sample are questionable inclusions. Two of them, in Bristol, VA, and Crosslake, MN, have been sold off to private companies, so they can no longer be considered community-owned providers.²⁴ Both were among the 23 markets in which the Berkman Klein authors claim that the municipal provider charged less than private providers.

A majority of the municipal utilities in the sample are not fully built out, so they have service footprints that cover only a fraction of the area served by their private competitors. We discuss the implication of smaller municipal utility service areas in more detail below. Michael J. Santorelli and Charles M. Davidson, Directors at ACLP, New York Law School, point out that many of these municipal utilities do not offer video service, so they are not subject to the same video franchise obligations that require private providers to serve larger areas.²⁵ This may allow municipal utilities to cherry-pick areas, such as downtown areas where potential customers are concentrated, while delaying their service to areas with lower concentrations of customers where the cost of serving additional customers is higher.

Failure to Consider the Impact of Bundling

The authors' results ignore how consumers often buy bundled packages, which could include pay-tv and/or telephone subscriptions in addition to a broadband subscription. Consumers receive discounts for purchasing these bundles. The authors acknowledge this in the study, claiming that they did not compare the prices of bundled packages because "the complexity of these offerings makes direct comparisons difficult, if not impossible, given the lack of standard definitions of service offerings."²⁶ They also allude to the fact that increases in cord-cutting has made bundled packages less popular over the years. Cord-cutting is increasing, but bundling is still very common, and cord-cutting is not coming close to eliminating the demand for bundled packages.²⁷ Therefore, the discounts that consumers receive through bundled packages cannot be simply dismissed from any broadband pricing comparisons.

The authors also claim that "consumers seeking the cheapest plan that qualifies as broadband will end up with a data-only plan,"²⁸ but they provide no research to back up this claim. It is not unreasonable to think a low-income household might want a qualified broadband and television bundled package at the lowest possible cost.

We agree that it would be difficult to measure the entry-level prices of broadband with bundled discounts. However, the fact that this comparison is difficult does not make the Berkman Klein analysis valid after failing to do so. It is not sufficient to assume, contrary to marketplace

²⁴ See Santorelli and Davidson, p. 6.

²⁵ Santorelli and Davidson, p. 5.

²⁶ Berkman Klein study, p. 5.

²⁷ See, e.g., Jeff Kagan, "Comcast Xfinity Mobile Grows Through Bundling," RCWireless News (December 4, 2017), available at: <https://www.rcwireless.com/20171204/analyst-angle/kagan-comcast-xfinity-mobile-bundling-tag9> ("The secret sauce is the rule we have all learned over the last few decades. If you want to solidify your customer base, you have to get your customers using multiple services. If a customer uses multiple services, they are more likely to stay put. This is where solid, long-term growth comes from.").

²⁸ Berkman Klein study, p. 5.

realities, that bundling is unimportant or is going away and then analyze the market as if bundling discounts have already ended. Rather, if the authors cannot account for bundling discounts, that seriously undermines the comparisons they are trying to make between municipal and private broadband pricing and, of course, this too seriously undermines the validity of their study.

Other Differences Between Municipal and Private Providers Not Addressed in Study

A significant amount of the Berkman Klein study is devoted to discussions of “teaser rates,” or promotional rates offered by broadband providers after starting a new service, often offered for 12 months after signing up, which are followed by a higher rate. The authors are critical of the practice by Internet providers of offering “teaser” rates, which they find is more common among private providers than municipal utilities. But they do not appear to explain why they are so critical of the practice, other than because offering discounted rates in the first year of service makes price comparisons somewhat challenging.²⁹

Thus, the authors adjust for the use of promotional pricing by averaging any promotional rates with full-price rates over the remainder of the four-year time period after the promotional rate expires. Making an adjustment may be reasonable, but theirs is incomplete because it does not fully capture how these promotional discounts work. In particular, the authors acknowledge that some customers receive lower prices after the “teaser” rate expires by negotiating a better deal with their private provider.³⁰ This means the Berkman Klein study ignores the lower prices these private broadband provider customers receive when they re-negotiate their prices after the promotional period ends.

Moreover, the authors also acknowledge that the Berkman Klein study does not adjust for any quality of services differences, such as differences in download speeds.³¹ Once again, this undermines the validity of the study.

Thus, the conclusion that municipal broadband prices are lower than qualified private broadband prices in 23 out of 27 markets is highly dubious, and it does not withstand even a cursory review. The authors have excluded prices from major private providers that are found in markets in their sample, have included some questionable municipal providers in their small sample, and have failed to consider important discounts offered by private providers that lower the prices paid by their customers. These flaws in the study’s methodology and data collection alone are enough to invalidate the findings that municipal utilities offer lower prices than private providers in the markets where they compete. But as we discuss below, as serious as these flaws are, there are other problems with the Berkman Klein study that are as important, or even more so.

²⁹ Berkman Klein study, p. 16 (“Our secondary finding was that community-owned providers furnish consumers with dramatically clearer pricing.”).

³⁰ Berkman Klein study, p. 13 (“But the unavailability of comprehensive data leaves many fundamental questions unanswered. These include... How many consumers attempt to renegotiate after teaser rates expire....”)

³¹ Berkman Klein study, p. 7 (“Some providers' entry-level broadband services offer higher speeds than others; the industry doesn't follow any standard speed tiers.”).

IV. Lower Prices in the Past for Entry-Level Broadband Is a Questionable Basis for Concluding Municipal Broadband Systems Are a Better Value Than Private Providers

Even if we set aside the questionable data gathering and methodology discussed in the previous section, comparing municipal utility and private provider prices in a small number of markets simply does not provide a valid measure of the value of municipal broadband relative to private broadband. In this section, we examine different reasons why the price comparisons presented in the Berkman Klein study, even setting aside these data and methodological problems, do not provide meaningful evidence that community-owned broadband systems are a better value than private broadband services.

Prices Alone Are Not a Good Indicator of Whether Municipal Broadband Provides Value to the Community

The study's main finding claims that in 23 out of 27 communities, entry-level broadband service from a municipal fiber-to-the-home network was less expensive than a comparable service offered by a private competitor. But price alone is not necessarily meaningful, especially if it is from a municipal broadband provider that can subsidize prices with long-term public debt.

A May 2017 University of Pennsylvania study by Christopher Yoo and Timothy Pfenninger (University of Pennsylvania study) identified 20 municipal broadband projects and found that 11 generated negative cash flows.³² Of the nine with a positive cash flow, seven would need more than 60 years to break even. Only two of the 20 municipal broadband projects generated enough cash flow to pay off the debt within the estimated useful life of the broadband network. This is important because private broadband networks cannot sustain a negative cash flow over a long period of time. Municipal networks, on the other hand, can use taxpayer funds to subsidize the price of broadband below a profitable level. Ultimately, the residents are paying for the broadband project, so if prices are so low that the project has a negative cash flow, that inevitably will have other negative financial consequences for the municipality and its residents.

There are nine municipal projects that were analyzed in both the Berkman Klein study and the University of Pennsylvania study. As of the end of 2014, four of these municipal projects were cash flow negative and four of the municipal projects were not on pace to be paid off within the lifetime of a broadband network, which is generally between 30 and 40 years. Only one of the networks, Bristol, TN, was on track to be paid off within the lifetime of the network.

³² Christopher Yoo and Timothy Pfenninger, "Municipal Fiber in the United States: An Empirical Assessment of Financial Performance," University of Pennsylvania Law School's Center for Technology, Innovation and Competition (May 2017), available at: <https://www.law.upenn.edu/live/files/6611-report-municipal-fiber-in-the-united-states-an>. Professor Yoo is a Member of the Free State Foundation Board of Academic Advisors.

Results from Markets Found in Both Studies

Municipal Network	Cost “Savings” according to Berkman Klein Study	Net Present Value (2010-2014)	Adjusted Projected Cost of Network	Years until Project Turns Positive
Lafayette, LA	\$600.00	-\$36,086,333	\$118,789,745	Never
Morristown, TN	\$324.12	-\$4,281,017	\$28,779,887	Never
Clarksville, TN	\$138.75	-\$7,442,513	\$43,253,003	Never
Monticello, MN	\$122.74	-\$25,508,327	\$27,767,517	Never
Pulaski, TN	\$237.24	\$97,948	\$9,602,904	490
Brookings, SD	\$163.13	\$290,521	\$20,252,935	349
Chattanooga, TN	\$107.25	\$2,062,787	\$170,101,635	412
Tullahoma, TN	\$19.22	\$846,549	\$18,264,172	108
Bristol, TN	\$79.22	\$4,168,048	\$28,692,715	34

As the table shows, the municipal projects appearing in both studies with the greatest cost “savings,” according to the Berkman Klein study, also are the least financially viable, according to the University of Pennsylvania study. To be clear, we are not arguing that this negative relationship between municipal broadband prices and financial viability applies generally to all markets with both municipal and private providers. But this table does indicate that the particular municipal broadband utilities from the Berkman Klein sample with the greatest price differentials with their private competitors likely are achieving these purported savings through taxpayer subsidization of municipal broadband prices.

While consumers in Lafayette, LA, for example, might be “saving” money from monthly subscriptions, Lafayette residents, even those who do not subscribe to the municipal network, are still on the hook for the debt used to finance the project as well as the current negative cash flows. Thus, the value provided by municipal broadband should include taxes and fees imposed on residents that cover the cost of the network.

As we noted above, this is not a hypothetical concern. Numerous other municipal broadband utilities have failed, often leaving the municipality with millions of dollars in debt.³³ In the long-term, municipal networks in Lafayette and other markets examined by the authors may well be costing their residents far more than they would pay absent the municipal network, with many of those costs falling on residents who are not customers of the municipal broadband utility.

³³ In July 2016, before the Bristol, VA, and Crosslake, MN, utilities were sold off, the Taxpayers Protection Alliance released “The Dirty Dozen: Examining the Failure of America’s Biggest & Most Infamous Taxpayer-Funded Broadband Networks,” Taxpayers Protection Alliance (July 2016), available at: <https://www.protectingtaxpayers.org/assets/files/TPA-Dirty-Dozen-Report-July2016.pdf>.

When Competition Exists, Municipal Broadband Is Unnecessary and Could Stifle Private Investment

In our June 2017 *Perspectives from FSF Scholars*, we describe how the usual justification for municipal broadband is that having too few broadband providers chokes off opportunities for business and individuals who depend on reliable broadband access. Economists call this the “positive externality” problem. We go on to say:

Rather than resort to government ownership, the usual economic response to a positive externality is to encourage private firms to provide more of the service, usually by offering favorable regulatory treatment, tax incentives, or subsidies. Local governments make similar positive externality arguments for justifying tax breaks, zoning changes, or regulatory changes that favor major employers considering moving to their jurisdiction.³⁴

Thus, if the goal of a municipality is to provide lower-price municipal broadband to its residents, it has other options besides subsidizing a municipal utility. It could use the same funds to subsidize private providers, perhaps in the form of infrastructure improvements. Or it could ease regulatory barriers that are discouraging private providers from entering the market. Some municipalities have been known to do just the opposite, however. For example, when Traverse City, MI, was considering a municipal broadband project in 2017, a private company serving other nearby markets complained that it was forced to abandon plans to enter the Traverse City market when the city added so many restrictions and requirements that the investment no longer made sense.³⁵

Having robust competition with multiple broadband technologies usually eliminates any justification for government-provided broadband. But this competition is often discouraged by the presence of a municipal provider. When faced with the prospect of competing with a municipal broadband provider that can use taxpayer resources to build a network and subsidize prices, many private firms will choose to re-direct their investment plans to other markets. As we stated in our June 2017 *Perspectives from FSF Scholars*:

[O]nce a municipal broadband provider begins operations, the incentives for other providers to enter the market are reduced. If other providers were considering entering the market, in most cases they will be less likely to enter, or they may delay their entry in favor of investments in other markets where they do not have to compete with a government provider. Municipal providers have an advantage over private providers because they can impose the burden of their inefficiencies onto taxpayers. In contrast, inefficient private providers cannot continuously operate at a loss and will eventually lose their customers to more efficient competitors. Therefore, if the problem in the local market is a lack of private broadband investment, having a municipal broadband system can drive off future private investment, and often will lead to the market having fewer

³⁴ Bolema and Horney, p. 3.

³⁵ Michael Van Beek and Jarrett Skorup, “Utility Pushes Risky Taxpayer-Funded Initiative,” *Traverse City Record-Eagle* (Jun 25, 2017), available at: http://www.record-eagle.com/opinion/op-ed-utility-pushes-risky-taxpayer-funded-initiative/article_87bdf088-5ff6-5a7a-abe6-c0c11bbdf518.html.

providers in the long run than if private firms were encouraged to enter by virtue of sound government policy.³⁶

Thus, the very advantage that the Berkman Klein study claims to have found, that municipal providers may be charging less than private providers, may be more of a curse than a blessing for local residents. If a municipal broadband provider emerges in a competitive broadband market, any efforts to compete with private providers, whether through lower prices or updated services, automatically will increase the debt burden of the municipal network. Any short-term benefits from low municipal utility prices can easily be greatly outweighed by the expenses to local taxpayers over the lifetime of the network. The ability to finance networks with public debt, unique only to government-created broadband providers, may scare off private broadband investment and ultimately harm the same people the network was created to help, the local residents.

New Technologies Are Rapidly Reducing the Need for Municipal Broadband

In many underserved areas throughout the United States, technologies like satellite and fixed wireless are providing viable options for residential broadband. As new technologies continue to emerge in the broadband market, the need for municipal broadband is decreasing rapidly.

Satellite broadband is one of the most important of these emerging technologies.³⁷ In March 2017, Hughes Network Systems unveiled a national residential broadband plan called HughesNet Gen5 with speeds of 25 Mbps down and 3 Mbps up.³⁸ And in May 2017, SpaceX announced that it plans to launch nearly 12,000 satellites by 2024 in order to “provide additional broadband capacity to the SpaceX system and further reduce latency where populations are heavily concentrated.”³⁹ Furthermore, the FCC adopted a September 2017 *Report and Order*, which simplifies the regulatory approval process for satellite deployment and relaxes the requirements for frequency-band usage.⁴⁰ This action should spur additional private investment into satellite broadband.

Fixed wireless providers deliver broadband access to consumers at fixed locations through wireless transmitters on towers interconnected by unlicensed or licensed spectrum. Verizon recently announced its plan to use 5G wireless technology to offer fixed wireless service in a

³⁶ Bolema and Horney, p. 5.

³⁷ According to the FCC’s *Internet Access Services Report as of June 30, 2016*, satellite broadband is accessible to 99.1% percent of census blocks at speeds of at least 10 Mbps downstream and 1 Mbps upstream. FCC, *Internet Access Services Report: Status as of June 30, 2016* (“Internet Access Services Report”) (2017), p. 6. While this does not fit the FCC’s definition of broadband, or the standard considered in the Berkman Klein study, it does provide an Internet connection to consumers in very remote parts of the United States.

³⁸ Hughes, Press Release: “Hughes Announces HughesNet Gen5 High-Speed Satellite Internet Service” (March 7, 2017), available at: <https://www.hughes.com/who-we-are/resources/press-releases/hughes-announces-hughesnetgen5-high-speed-satellite-internet?locale=en>.

³⁹ Statement of Patricia Cooper, Vice President, Satellite Government Affairs, SpaceX, Before the Committee on Commerce, Science & Technology, United States Senate, (May 3, 2017).

⁴⁰ FCC, Update to Pats 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters, IB Docket No. 16-408, Report and Order and Further Notice of Proposed Rulemaking, (adopted September 26, 2017).

select group of cities throughout the U.S.⁴¹ A recent report by the Carmel Group forecasts robust growth for the U.S. fixed wireless broadband market. The number of subscribers is projected to increase from just over 4 million in 2016 to 8.1 million by 2021. Additionally, the Carmel Group projects that market revenue will increase from \$2.3 billion in 2016 to \$5.2 billion in 2021.⁴²

One advantage of deploying fixed wireless or satellite services over other broadband technologies is its relatively low fixed costs. Fiber and cable networks require a lot of capital for deployment in residential areas. For residents in areas with low population densities, these capital costs may be sufficiently high to deter deployment, which is why these areas often have limited choices for wireline broadband access. But for many residents in rural or underserved areas, fixed wireless or satellite broadband may be a sufficient low-cost solution to a high-cost problem.

Most examples of municipal broadband are in cities or towns, not rural areas. But that does not make fixed wireless and satellite broadband irrelevant. In many cases, fixed wireless and satellite broadband providers cover a greater percentage of a city's population than the municipal provider. The relatively low costs of deploying fixed wireless and satellite broadband allow for robust coverage compared the heavy construction fixed costs associated with municipal fiber projects.

The top three markets where the Berkman Klein study found the greatest "cost savings" for municipal providers are examples of such markets in which a significant percentage of residents do not have access to the municipal networks. According to Broadband Now, in Lafayette, LA, LUS Fiber, the municipal provider, only covers 86% of the city's population, while two satellite providers are covering 100% of the city's population. In Sebewaing, MI, Sebewaing Light and Water, offers broadband to only 58% of the city's population, while two fixed wireless providers and two satellite providers cover 100% of the city's population. Similarly, in Morristown, TN, the municipal provider only covers 66% of the city's population, while a fixed wireless provider and two satellite providers cover 100% of the city's population.

More people than ever are turning to mobile broadband as a substitute for fixed broadband.⁴³ Throughout U.S. cities, mobile broadband providers are deploying small cell infrastructure for 5G wireless technology, which can target municipal areas in the same way that wireline municipal broadband does, but potentially at a much lower cost. When 5G technology is deployed, "smart cities" will be able to enjoy more efficient use of local government services such as energy, utilities, transportation, and public safety, saving the cities millions of dollars. Additionally, 5G is projected to create \$275 billion in investment, 3 million jobs, and \$500 billion in gross domestic product throughout the United States, which should be much more

⁴¹ Michael J. Horney, "Verizon Plans to Offer Fixed Wireless Residential Broadband," *FSF Blog*, (December 4, 2017) available at: <http://freestatefoundation.blogspot.com/2017/12/verizon-plans-to-offer-fixed-wireless.html>.

⁴² "Ready for Takeoff: Broadband Wireless Access Providers Prepare to Soar with Fixed Wireless," The Carmel Group, *The BWA Industry Report* (2017), p. 10. Similarly, SNS Research predicted that early commercial rollouts from AT&T and Verizon would drive fixed wireless 5G revenue to \$1 billion by the end of 2019. A SNS Research study indicated the fixed wireless 5G market will grow at a compound annual growth rate of 84% from 2019 to 2025, with service revenue increasing to more than \$40 billion by the end of 2025. "5G for FWA (Fixed Wireless Access): 2017 – 2030 – Opportunities, Challenges, Strategies & Forecasts," SNS Telecom, (August 2017).

⁴³ Randolph J. May and Michael J. Horney, "Mobile Broadband Is a Substitute for Fixed Broadband," *FSF Blog*, (January 14, 2016), available at: <http://freestatefoundation.blogspot.com/2016/01/mobile-broadband-is-substitute-for.html>.

attractive to local governments than the financial instability often created by municipal broadband projects. The future of mobile broadband is 5G wireless technology, and with 10 times faster speeds than 4G, 5G will make mobile broadband even more competitive with other broadband technologies.⁴⁴

As broadband innovation and new forms of competition continue to increase, the future financial viability of municipal broadband only decreases. Intermodal broadband competition from 5G mobile, fixed wireless and satellite technologies are emerging as capable of providing qualified broadband speeds, and the markets identified in the Berkman Klein study show evidence that other entry by private providers is occurring. This dynamic process subsequently reduces the already waning competitiveness and financial viability of municipal broadband networks.

Conclusion

The Berkman Klein study proclaims that municipal broadband systems and community-owned fiber networks are the “value leaders in America,” relative to broadband provided by private companies. The authors claim their study findings “point to the benefits of community fiber networks in providing broadband to Americans at prices that are more affordable.”

This study falls far short of demonstrating the benefits of broadband provided by local governments, or that the prices they offer are indeed lower than private providers in the area. The data they provide (and omit) from specific markets included in the study’s sample and the methodology they employ raise so many questions about the price differences claimed by the authors that they cannot be considered reliable.

But even more fundamentally, lower prices by municipal utilities do not necessarily indicate that municipal broadband is a better value than privately-provided broadband. If, as is often the case, the municipal utility is subsidized by local taxpayers, calling its broadband a “better value” is a highly questionable claim. Moreover, as fixed wireless and satellite broadband are becoming more competitive with cable and fiber broadband, that is a benefit for broadband customers everywhere except in municipalities where the financial viability of a municipal utility is threatened.

Looking only at past broadband prices ignores all of the dynamic aspects of competition in an evolving market. As we discussed in a previous paper, the presence of a municipal broadband provider creates disincentives for private providers to enter the market, and deprives the local community of the benefits of private capital investment in future broadband capacity and services.

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⁴⁴ Michael J. Horney, “5G Deployment Projected to Create 3 Million Jobs and \$500 Billion in GDP,” *FSF Blog*, (January 17, 2017) available at: <http://freestatefoundation.blogspot.com/2017/01/5g-deployment-projected-to-create-3.html>.