

New Evidence on Muni Broadband

BROADBAND COMMUNITIES' state-by-state analysis of population growth in 3,144 U.S. counties confirms our preliminary findings. Lack of broadband causes lack of jobs!

By Steven S. Ross / *Broadband Communities*

Detailed state-by-state analysis confirms and highlights the relationship between lack of 25 Mbps broadband access and lack of economic opportunities.

As in previous analyses, I used my county-by-county compilation of National Broadband Map and census data for all 3,144 counties in the United States. I continue to use population change as a proxy for job growth, as population data is generally more accurate and more current than job data at the county level.

The first analysis, published in the November-December 2014 issue of this magazine, showed a relationship, though not necessarily a causal one, between county population changes from 2010 through 2013 and access to 25 Mbps broadband. Although 25 Mbps (the broadband standard the Federal Communications Commission uses) is a somewhat arbitrary metric, the relationship held for lower broadband limits as well.

The second analysis, published in the March-April 2015 issue, compared counties in the 19 states that restricted municipalities from building their own broadband networks with counties in states that had no restrictions. It showed a causal relationship between population growth and access to 25 Mbps broadband. Although no statistical inference is 100 percent certain, this finding had a likelihood of only one chance in about 130 of being spurious.

States that restrict community broadband are, as a group, growing at a rate that exceeds the national average; however, the second analysis found that their broadband “have-not”

counties were growing more slowly than average – and that the lowest-ranked 10 percent of their counties with regard to broadband access lost a full percent of their population over almost four years.

STATE-BY-STATE RESULTS

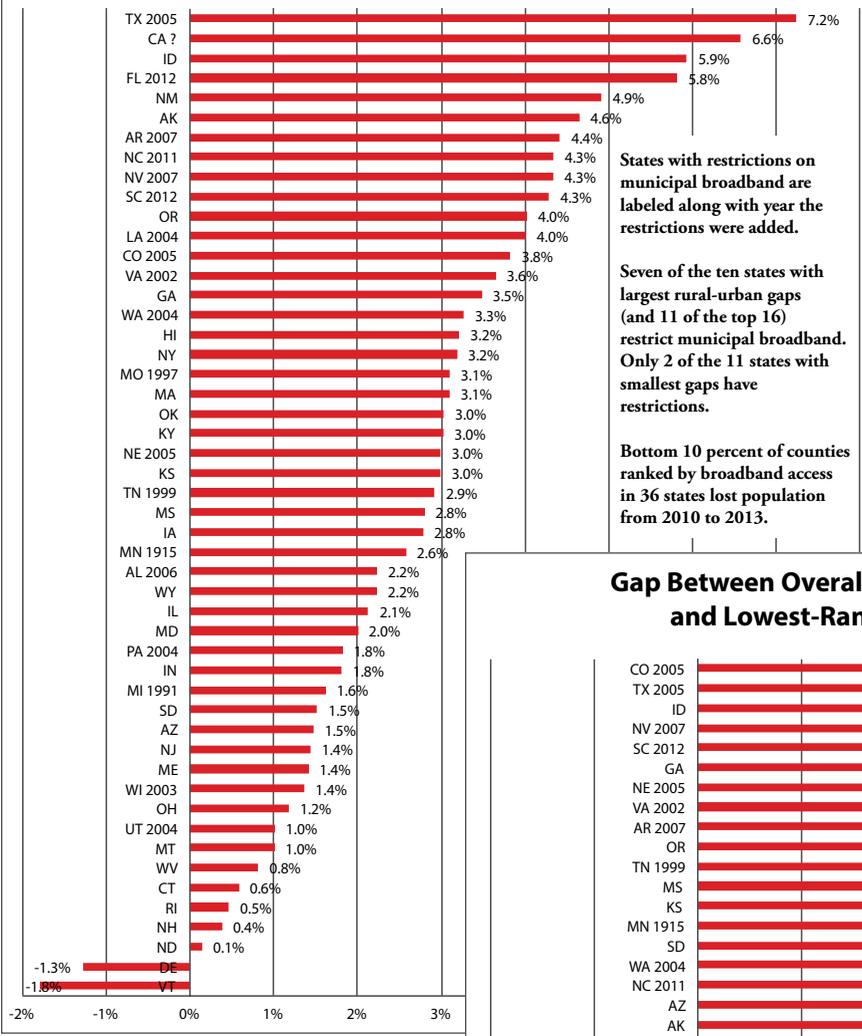
In this article, I show that the relationship between broadband access and population change is remarkably consistent state by state and is not due to results from a few states with unusual circumstances. This is somewhat surprising, considering the differences among the restrictions on municipal broadband and the differing lengths of time since those restrictions were enacted.

The two bar charts on the next page show this most clearly. One catalogs the difference in percentage population growth between each state as a whole and the bottom 10 percent of its counties ranked by access to 25 Mbps broadband. Seven of the 10 states with the largest rural-urban gaps (and 11 of the top 16) restrict municipal broadband. Only two of the 11 states with the smallest gaps have restrictions.

Overall, in 36 of the 50 states, the bottom 10 percent of counties ranked by broadband access lost population between 2010 and 2013.

Comparing total state population growth with the population growth of counties in the bottom half with regard to broadband access shows a remarkably similar pattern. The order of the list changes a bit, but seven of the 10 states with the largest rural-urban gaps (and 11 of the top 17) restrict municipal broadband. Only

Gap Between Overall State Population Growth and Lowest-Ranked 10 Percent of Counties



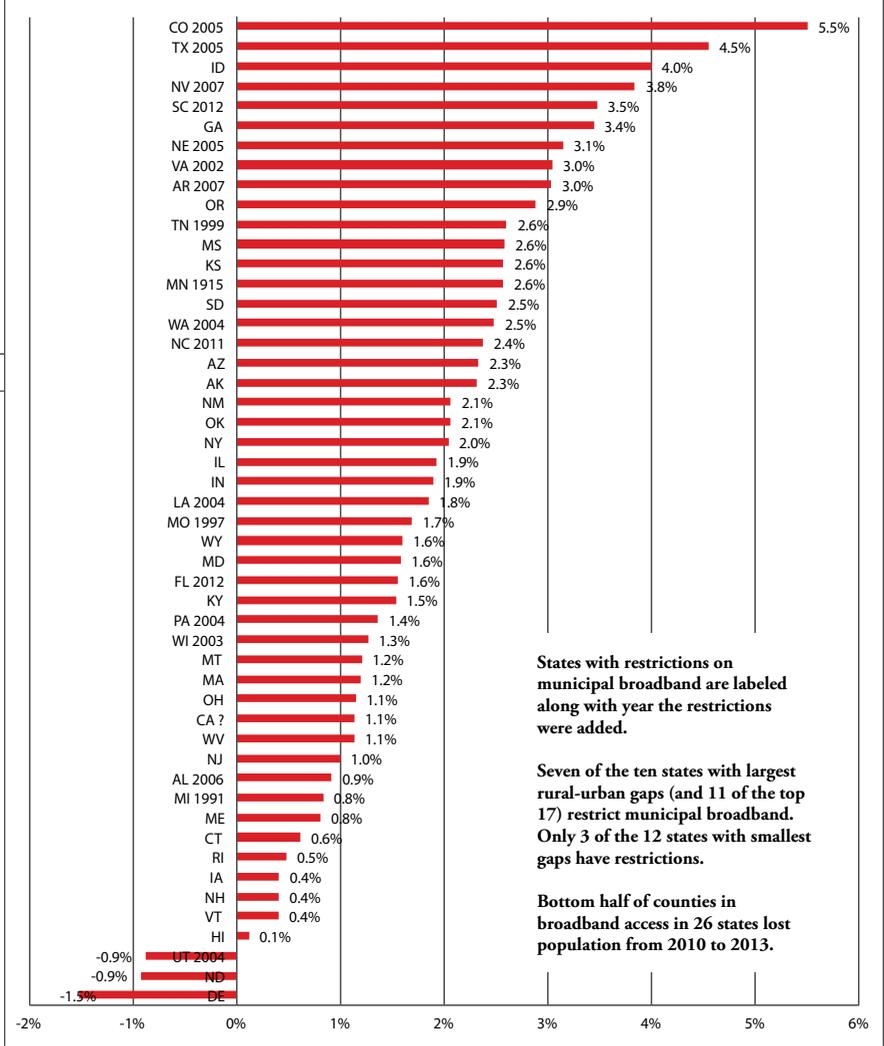
States with restrictions on municipal broadband are labeled along with year the restrictions were added.

Seven of the ten states with largest rural-urban gaps (and 11 of the top 16) restrict municipal broadband. Only 2 of the 11 states with smallest gaps have restrictions.

Bottom 10 percent of counties ranked by broadband access in 36 states lost population from 2010 to 2013.

For each state, the top chart compares the population growth or loss in the bottom 10 percent of counties in terms of 25 Mbps access with total state population growth, and the bottom chart compares the bottom 50 percent of counties with their respective states. The charts show that states that restrict municipalities from building their own broadband networks widen the gaps between urban centers, which have growing economies, and rural areas, which have stagnant or declining populations. This pattern is remarkably consistent even though the state rankings change between the two charts. Seven of the states with the largest gaps between broadband "haves" and "have nots" place restrictions on municipal broadband. In these charts, states with restrictions are listed with the years those restrictions were put into place. California has restrictions that have had a modest but statistically significant impact, but the impact cannot be separated from that of its current water shortage, which affects rural counties.

Gap Between Overall State Population Growth and Lowest-Ranked Half of Counties



States with restrictions on municipal broadband are labeled along with year the restrictions were added.

Seven of the ten states with largest rural-urban gaps (and 11 of the top 17) restrict municipal broadband. Only 3 of the 12 states with smallest gaps have restrictions.

Bottom half of counties in broadband access in 26 states lost population from 2010 to 2013.

three of the 12 states with the smallest growth gaps have restrictions.

Overall, in 26 states the bottom half of counties ranked by broadband access lost population from 2010 to 2013.

Why broadband access is concentrated in high-population areas is not a secret. Wall Street demands a competitive return on investment from national carriers. To meet national and international investors' expectations, national carriers need more than 20 customers per road mile to cover the cost of building fiber to the home. The national average is more than 50 actual premises per mile but the average in rural communities is far lower.

However, rural service providers, both public and private, typically seek only to break even. Their “profit” comes in better quality of life, higher property values and stronger local financial and social institutions. The financial models I developed place the plausible break-even point at roughly eight customers per mile. That still leaves many counties out of the running unless their networks are subsidized by local, state or federal funds, but that is an argument for another time.

REGRESSING THE GAP

The bar charts, though easier to understand, do not show the impact of any other variables. The box below has a discussion of confounding variables.

California is an odd case. Communities there must justify

municipal broadband systems with public referendums, but referendums for any bond issue are the norm in all states. A public system can't be built if there is a good private system in place, but very few localities anywhere try to build broadband when there is a good private system.

More significantly, if a public broadband system is built in California and a private operator then appears, the public system must be sold to the private operator. That has a potentially chilling effect on raising funds for a public system, but I could find no obvious case in which such chilling had occurred.

For these reasons I have been treating California (which has 58 counties and 11 percent of the U.S. population) as a nonrestriction state,

checking only to make sure in earlier analyses that its inclusion or exclusion on either side of the divide would not materially affect the results. In the charts, California's state abbreviation carries a question mark rather than the date of enactment of the most serious municipal restrictions. The new analysis suggests that California should be regarded as a municipal restriction state, which would bring the total of states with such restrictions to 20. Several other states with seemingly minimal restrictions (particularly slightly stronger referendum requirements for broadband than for other municipal borrowing) include Iowa and Montana. This analysis confirms that they should not join the restriction states.

The scatter plots give a more complete picture than the bar charts. Each dot represents a state. The x-axis is total state population growth. On the y-axis, one chart shows population growth in the bottom 10 percent of the state's counties, and the other shows population growth in the bottom half of the state's counties.

As with the bar charts, the fact that each comparison yields similar (but hardly identical) results suggests again that the overall conclusions are not statistically spurious – that is, they are not due to chance. Nevertheless, the linear regression line in each of the charts shows that broadband access accounts for only about 25 percent of the variance in the “bottom 10 percent” comparison and 50 percent in the “bottom half” comparison. Plenty of other factors are involved in population loss or growth at the county level (see box).

In only four of the 20 states that restrict municipal broadband are the bottom 10 percent of counties ranked by 25 Mbps access significantly above the regression line. That is, only four exceed the expected low rural growth rate. Only one of them (Utah, which has larger-than-average family size) has positive rural population growth. Thirteen states with municipal restrictions fall well below the regression line (that is, they underperform expectations for all

CONFOUNDERS

Chicken-and-egg problem: Does population decline in part because of poor broadband, or is poor broadband the result of lousy business cases due to population decline? Or do both result from some other influences, unknown or unexplored?

States have very different ways of dividing themselves into counties. Texas alone has almost 10 percent of all U.S. counties.

States vary in other ways. States have different population densities, distributions and temporary economic advantages (new oil discoveries, retiree attraction, and so forth). States that restrict municipal broadband have different kinds of restrictions enacted at different times. Later analyses will incorporate some of these differences.

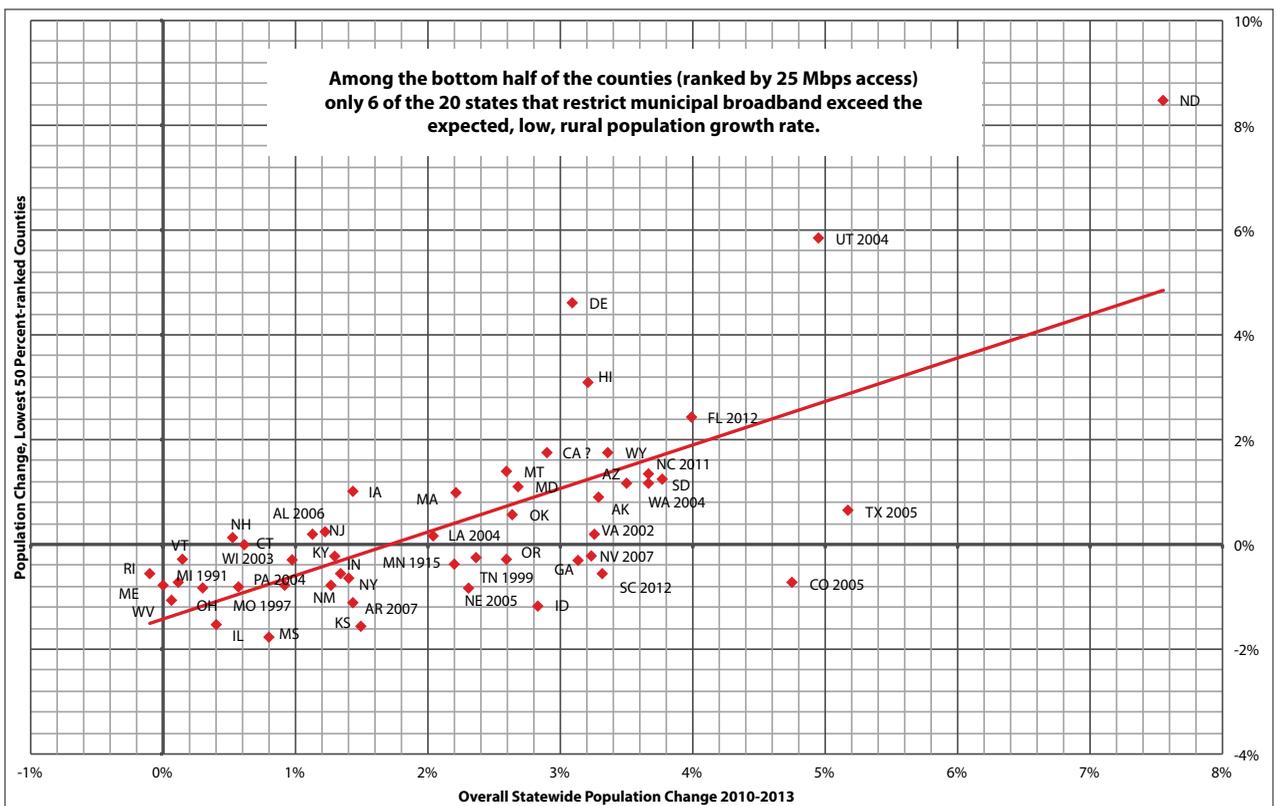
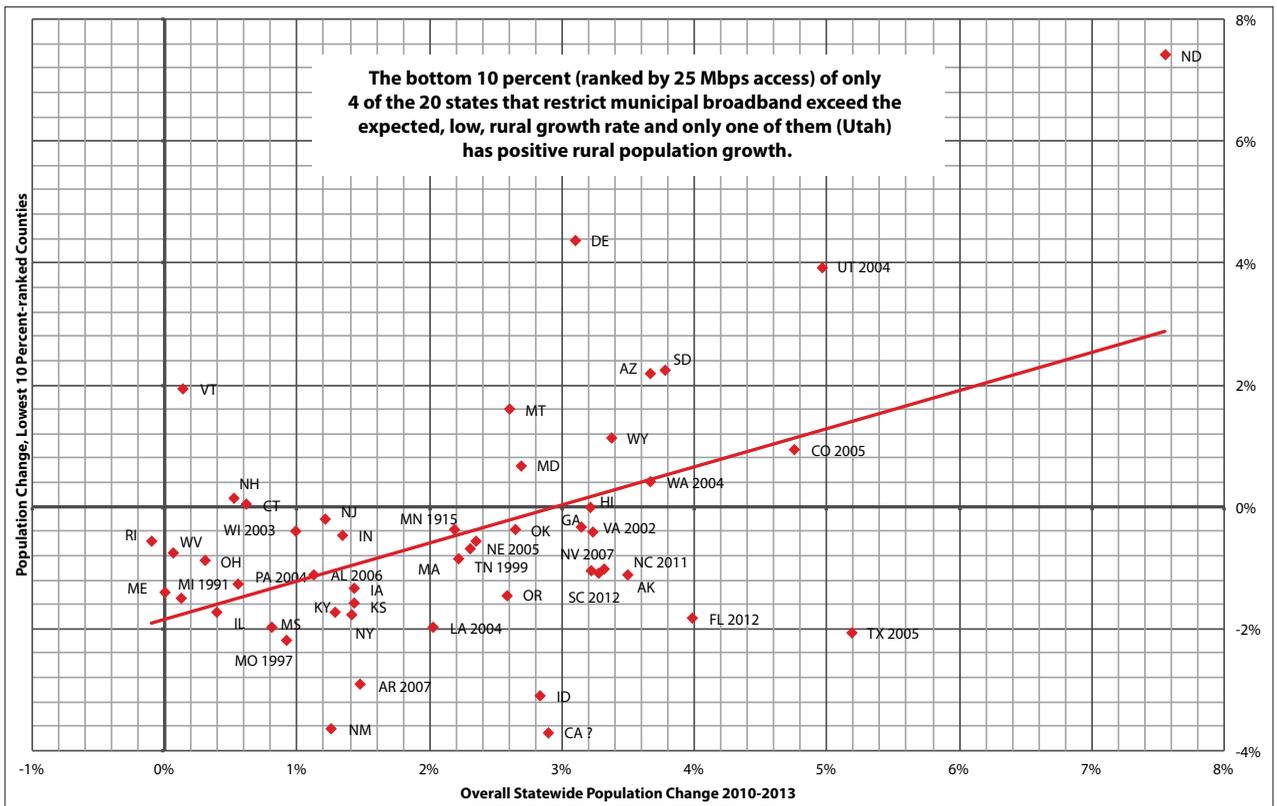
Counties that have very small populations can move the needle with just one new business or housing development.

Moves are not always intrastate. People tend to migrate for work as short a distance as possible, but they could move to a nearby state, softening the link between rural decline and urban growth within a given state.

25 Mbps is the FCC's new threshold for broadband, but that level is somewhat arbitrary.

Variance on x-axis. National Broadband Map data are flaky and tend to overestimate actual access.

Take-rate variance. Even in counties with great 25 Mbps access, only 22 percent of households with supposed access buy it. However, this is up from 17 percent six months earlier.



Scattergrams and regressions give a more complete picture of what is happening in each state. States are plotted by population gain or loss in all counties (x-axis) and by population gain or loss among counties ranked in the bottom half or bottom 10 percent in overall access to 25 Mbps (an entire census tract is deemed to have access if even one customer does). The access data comes from the NTIA's National Broadband Map for summer 2014. The population data comes from the 2010 census (actual counted population as of April 2010, estimated back to January 1, 2010) and the American Community Survey through December 31, 2013. R-squared is 0.25 (+/- 0.035) for the regression against the bottom-10-percent counties and 0.50 (+/- 0.042) for the regression against bottom-half counties. Census error intervals are noted by the Census Bureau and vary by county. On average, the interval is +/- 0.2 percent for smaller counties and +/- 0.1 percent for urban counties. This adds slightly to the error limits of the regression and has been taken into account in the R-squared intervals above.

Is it good business for incumbent carriers to oppose municipal networks?

states). Three (Washington, Minnesota and Pennsylvania) are too close to the line to call. The line itself is pulled up slightly by the strong oil and gas fracking economy of North Dakota in the 2010–2013 period. However, in this case, it makes no difference in the overall results.

I would have expected that states that initiated municipal restrictions in the years 2004 through 2006, before the recession started but after significant amounts of homes started to be passed by fiber, would have fallen farther below the regression line than other states. That pattern, however, is not consistently evident.

In the second scatter plot, which compares the bottom half of each state's counties to total state growth, only six of the 20 states that restrict municipal broadband exceed the expectation marked by the regression line. The relationship between the year restrictions were enacted and the distance from the line is more evident, but it may be spurious.

Several reviewers of this article asked why I did not compare the bottom 10 percent with the top 90 percent or the bottom half against the top half. That would make the case against municipal restrictions appear stronger by expanding the gap, but it

would reduce the defensibility of the conclusions because the data behind the rankings is not perfect.

For instance, having access to 25 Mbps speeds does not mean customers will sign up for those speeds. As of November 2014, 17 percent had. By March 2015, 20 percent of those with access to 25 Mbps were buying it. By May, the industry estimate was almost 22 percent.

Why, then, does there appear to be a fairly strong relationship between access and population growth or loss? Simple: Those who need good broadband to run their businesses buy it – and they create jobs.

THE INCUMBENT CARRIERS' CASE

Executives and spokespeople for the national carriers often consider rural and municipal broadband a waste. They point to several municipal broadband failures. They complain about federal broadband subsidies awarded through the 2009 stimulus program (\$7 billion in loans and grants, or less than 1 percent of all stimulus funds spent) and the emerging transition of the Universal Service Fund to providing broadband in underserved areas.

But is it ethical to stand in the way of community systems while refusing to provide even some of the broadband those communities desire? Is it even good business? After all, national incumbents would almost certainly make more money per customer by allowing community systems, partnering with them and renting the resulting bandwidth.

That requires new thinking on the part of communities and of incumbent carriers. Instead of cooperation, however, we seem to be heading for another court battle. Stay tuned ... your programming will appear in another five years. ❖

Contact the Hawk at steve@bbcmag.com. The first article in this series is a finalist in the American Society of Business Publication Editors competition for best original research by a business publication.

Registration Now Open

Community Toolkit Program

Lexington, KY
September 15-17, 2015

& Economic Development Conference Series

BroadbandCommunities
BUILDING A FIBER-CONNECTED WORLD

FTHH
FIBER TO THE HOME
COUNCIL
AMERICA'S

To Exhibit or Sponsor contact: Irene G. Prescott
irene@bbcmag.com | 505-867-3299

877-588-1649 | www.bbcmag.com