

# Research & Policy Brief Series

## Broadband's Contribution to Economic Health in Rural Areas<sup>1</sup>

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### What is the Issue?

The diffusion of broadband Internet access across America during the 2000s brought with it a significant amount of concern that rural areas might be left behind in terms of the availability, adoption, and benefits of this technology<sup>2,3</sup>. While much has been made about the potential benefits of broadband for rural communities, the presence of a rural – urban broadband “digital divide” is well documented in the economic literature<sup>4</sup>.

There are plenty of examples relating to education, health, telecommuting, entrepreneurship and e-services that suggest broadband can be a panacea for rural economies<sup>5</sup>. But since broadband has been around for a while now, what impact has it made on rural areas? Have the rural areas that embraced broadband grown faster? Do they have lower levels of unemployment or have more businesses or firms?

Several studies have suggested that broadband access positively impacts employment as well as other quality of life issues (health care, education, social linkages) in rural areas<sup>6</sup>, however, many analyses were based on hypothetical assumptions or case studies. Until recently, very little reliable and useable broadband infrastructure data has been available, and assessments of programs designed to improve broadband access and adoption are quite limited. Contemporary empirical evaluations of the economic impacts of broadband in rural areas are generally lacking.

### Examining Broadband Adoption Rates

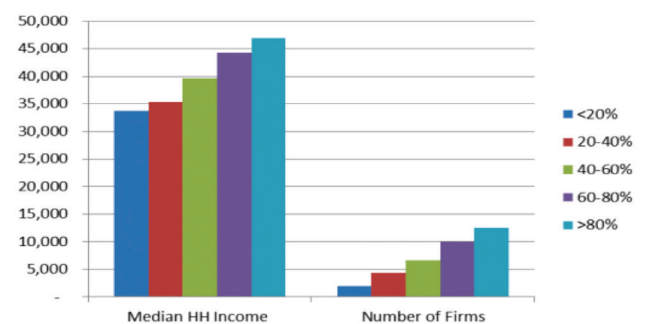
In order to assess the impacts of broadband on rural areas, we examined non-metropolitan counties across the country. Data from the Federal Communication Commission (FCC) provide, at the county level, the percentage of households that have a broadband connection (note that these only include *wired* connections, and meet the traditional FCC definition of broadband of 200kbps in at least one direction)<sup>7</sup>. Using data from 2010, non-metro counties were categorized by broadband adoption rates, from lowest-adopting (with rates of less than 20%) to highest-adopting (more than 80%). These categories of counties were then compared in terms of their 2010 median household income, education levels, number of firms, poverty rates and unemployment rates.

The non-metro counties with the highest levels of broadband adoption are doing well – they have the highest levels of income and education, have more firms and relatively low unemployment and poverty rates (Figures 1 and 2). The non-metro counties with the lowest adoption rates are doing the worst on those same measures. However, correlation does not necessarily imply causation. Counties may have higher levels of broadband adoption *because of* their higher incomes or higher education levels, and not the other way around.

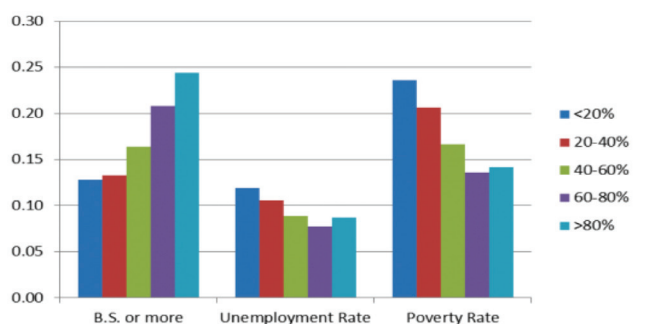
### Does Broadband Adoption Cause Economic Growth?

To attempt to account for the influence of income and educational levels on broadband adoption, we use county characteristics (education, income, age, race) before broadband was even available

**Figure 1:** Median Household Income and Number of Firms for Non-metro Counties, by Broadband Adoption Category, 2010.



**Figure 2:** Education, Unemployment Rate, and Poverty Rate for Non-metro Counties, by Broadband Adoption Category, 2010.



(i.e. during the 1990s or around 2000) to predict the likelihood of that county ultimately obtaining high levels of broadband adoption<sup>8</sup>. Some of the predictions turn out to be true, and some don't. We are left with two groups of non-metro counties that had similar characteristics *before* broadband was even available. One of the groups impressively adopted broadband after that time, and the other did not. Comparing growth rates between these two groups leads us to the conclusion that high (or low) levels of broadband adoption actually *cause* certain types of economic growth.

Non-metro counties that had high levels of broadband adoption (greater than 60%) in 2010 had significantly higher growth in median household income – 23.4% versus just over 22% – between 2001 and 2010 when compared to counties that had similar characteristics in the 1990s but were not as successful at adopting broadband (see Figure 3). Similarly, the unemployment rates of these high-adopting counties increased at a much slower rate during the 2000s – 75% versus a

<sup>1</sup>A version of this article first appeared in The Daily Yonder (8/21/13) and has subsequently been published as a full journal article (12/2014) in Telecommunications Policy (<http://www.sciencedirect.com/science/article/pii/S0308596114000949>)

<sup>2</sup>The Federal Communication Commission's definition of broadband has changed over time. Historically, the definition has been 200 kilobits of data transfer per second (kbps) in at least 1 direction. The most recent (2010) definition is 4 megabits (Mbps) download and 1 Mbps upload. This report incorporates various thresholds, depending on the data used for analysis.

<sup>3</sup>Malecki, 2003; Parker, 2000; Strover, 2001

<sup>4</sup>Whitacre and Mills, 2007; Dicks, Lamie, and Whitacre, 2010; Strover, 2011

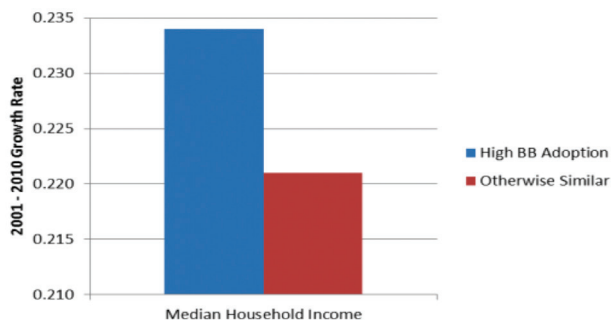
<sup>5</sup><http://www.auburn.edu/outreach/cedi/whatwedo/education/broadbandarticle.pdf>

<sup>6</sup>Katz and Suter, 2009; LaRose et al., 2008; Stenberg et al., 2009

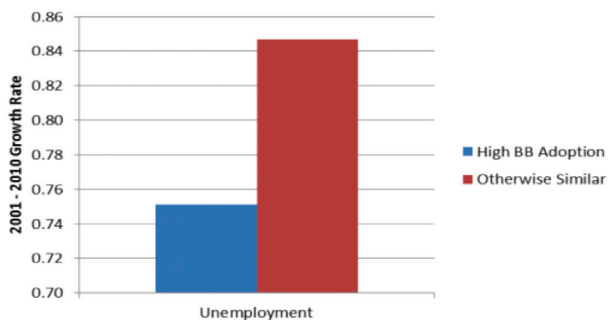
<sup>7</sup><http://transition.fcc.gov/wcb/iatd/comp.html>

<sup>8</sup>[http://en.wikipedia.org/wiki/Average\\_treatment\\_effect](http://en.wikipedia.org/wiki/Average_treatment_effect)

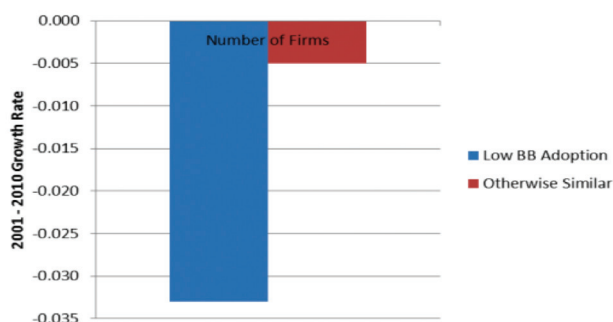
**Figure 3:** Median Household Income Growth for Non-metro Counties with High Broadband Adoption (>60%) and Otherwise Similar Counties, 2001-2010.



**Figure 4:** Unemployment Growth for Non-metro Counties with High Broadband Adoption (>60%) and Otherwise Similar Counties, 2001-2010.



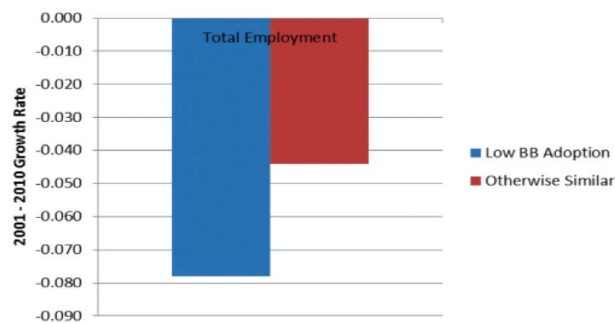
**Figure 5:** Growth in Number of Firms for Non-metro Counties with Low Broadband Adoption (<40%) and Otherwise Similar Counties, 2001-2010.



little over 84% (Figure 4). (Note that nearly all counties had higher unemployment rates over this time due to the recession.)

We also found that counties that had relatively low broadband adoption rates (less than 40%) had lower growth in both the number of firms (Figure 5) and total employment (Figure 6) than did counties with similar 1990/2000 characteristics but higher adoption rates as of 2010. (Again, most non-metro counties lost firms and employment over this time).

**Figure 6:** Total Employment Growth for Non-metro Counties with Low Broadband Adoption (<40%) and Otherwise Similar Counties, 2001-2010.



Interestingly, when we repeated this analysis for levels of broadband *availability* (versus adoption), there were almost no results to report. The only positive result was that when very high download speeds were available (greater than 10mbps), the growth in creative class employment<sup>9</sup> between 2001 and 2010 was larger. All other measures related to simply providing broadband showed no significant differences between the two groups of counties.

## Conclusion & Policy Implications

This research yields important findings on the effect of broadband on economic gains, namely on household income and employment levels in rural portions of the country. The methodology used represents a step forward in the search for a causal relationship between broadband and economic development. The ability to do matched county comparisons, specifically in non-metro counties, demonstrates the influence of adoption (as opposed to availability) in producing these positive outcomes, and constitutes another indication that development efforts should focus on mobilizing populations to subscribe to and use broadband capabilities. Cultivating local leadership, mobilizing the services of cooperative extension educators nationwide, and working more closely with each State Broadband Initiative could be fruitful avenues for targeting adoption. In addition, while promoting adoption should be the first and foremost goal, achieving higher levels of speed in rural areas is also a worthy policy premise.

These results suggest that government policies dealing with rural broadband may need to have a more explicit focus on actually adopting (and effectively using) the technology. The traditional focus of these programs on simply providing infrastructure may not be enough to encourage true economic growth. Inasmuch as adopting (and using) broadband must be a focus of digital divide policy, future options must consider the means to encourage people to subscribe to broadband services once they are present. The endeavors of municipalities and other groups to provide broadband services, particularly when local privately-owned options are deemed insufficient, should be carefully examined and supported when community needs warrant this option.

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<sup>9</sup> [http://en.wikipedia.org/wiki/Creative\\_class](http://en.wikipedia.org/wiki/Creative_class)

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