

Rural regions & Internet access and adoption

- Digital sublime: history of expectations with the Internet
- Some recent findings
- Role of public centers: training and use may not translate into paid “adoption” for certain populations



Early
Adopters...

- Current Population Survey – Internet use supplement
 - Years: 2003, 2010 (most current)
 - 40,000+ observations (10,000+ non-metro); household-level
 - Only differentiates between metro / non-metro (no county ID)
- FCC County-level broadband adoption data
 - Years: 2008,2010, and 2011 (most current)
 - 3,000+ counties
 - 671 micropolitan
 - 1,366 non-core
- National Broadband Map – Neighborhood level
 - Years: 2010, 2011
 - 3,000+ counties
 - Aggregated to county-level

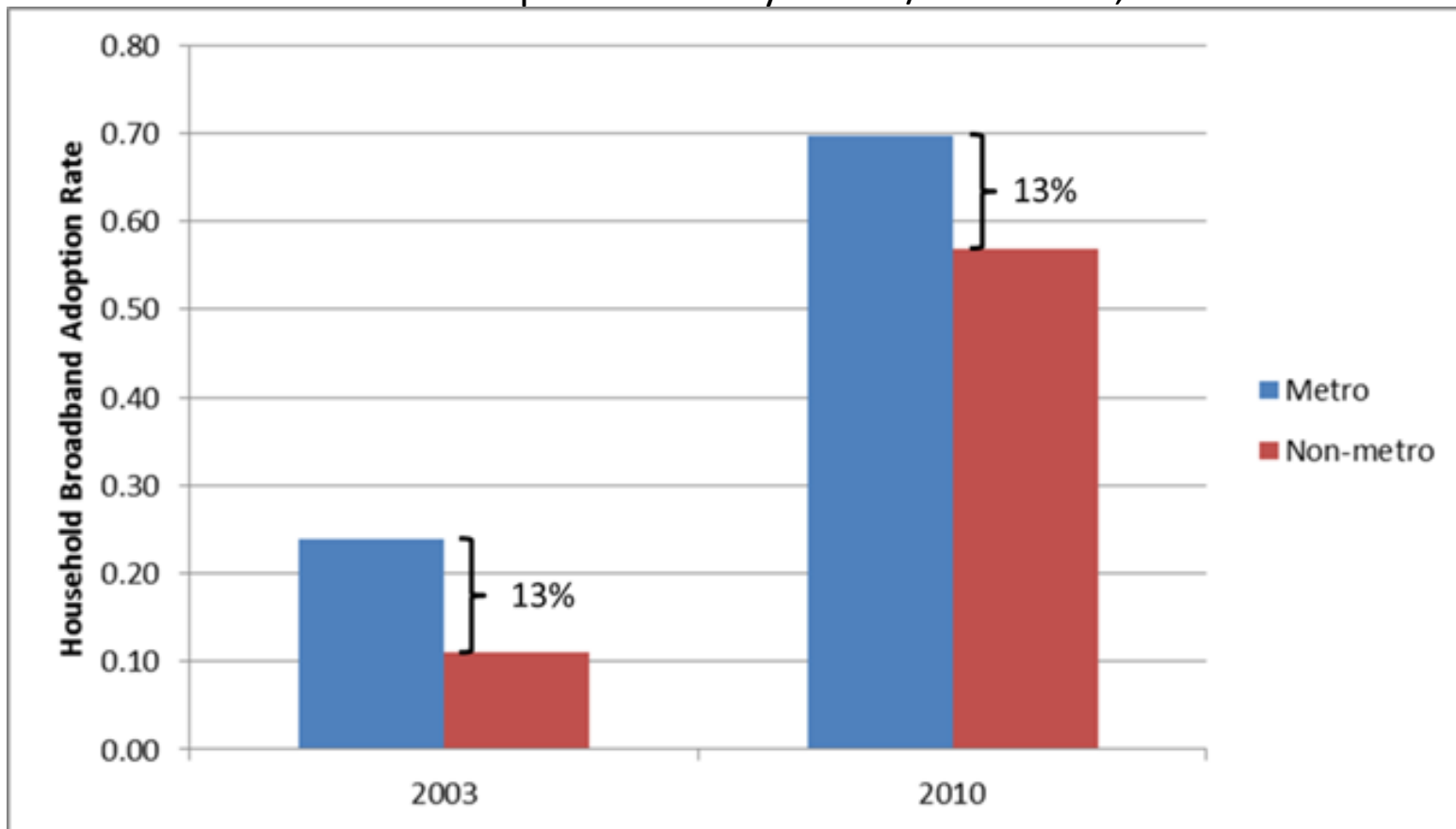
We mesh adoption
data with availability
data

Whitacre, Gallardo, Strover, 2013
Data Used

Metro Vs. Non-Metro Broadband Divide

Metro – Non-metro Gap
consistent since 2003

Household Broadband Adoption Rates by Metro/NM Status, 2003 and 2010

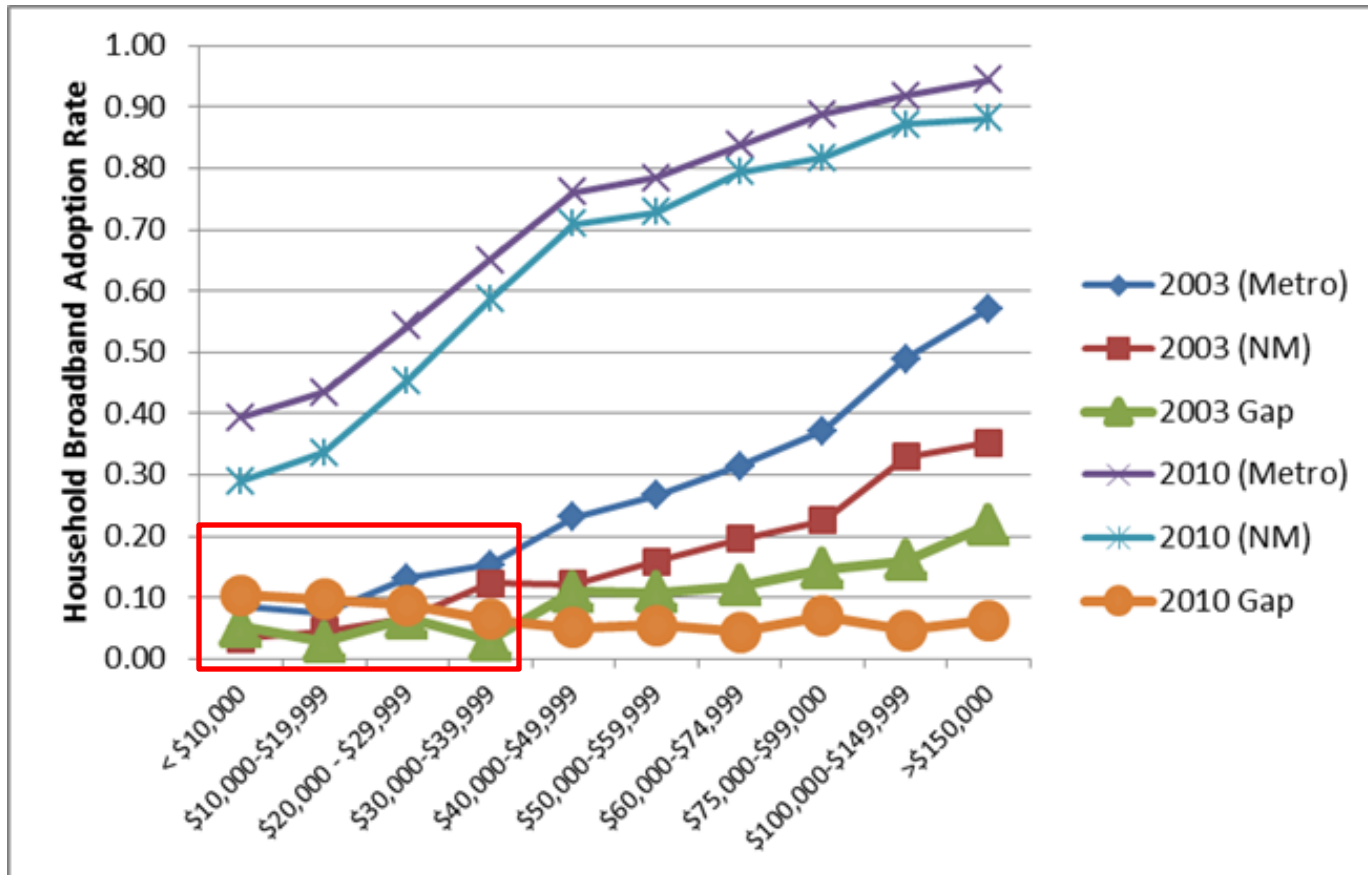


Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Metro Vs. Non-Metro Broadband Divide

Metro – Non-metro Gap
higher in 2010 for lower
income levels

Household Broadband Adoption Rates by Income, 2003 and 2010

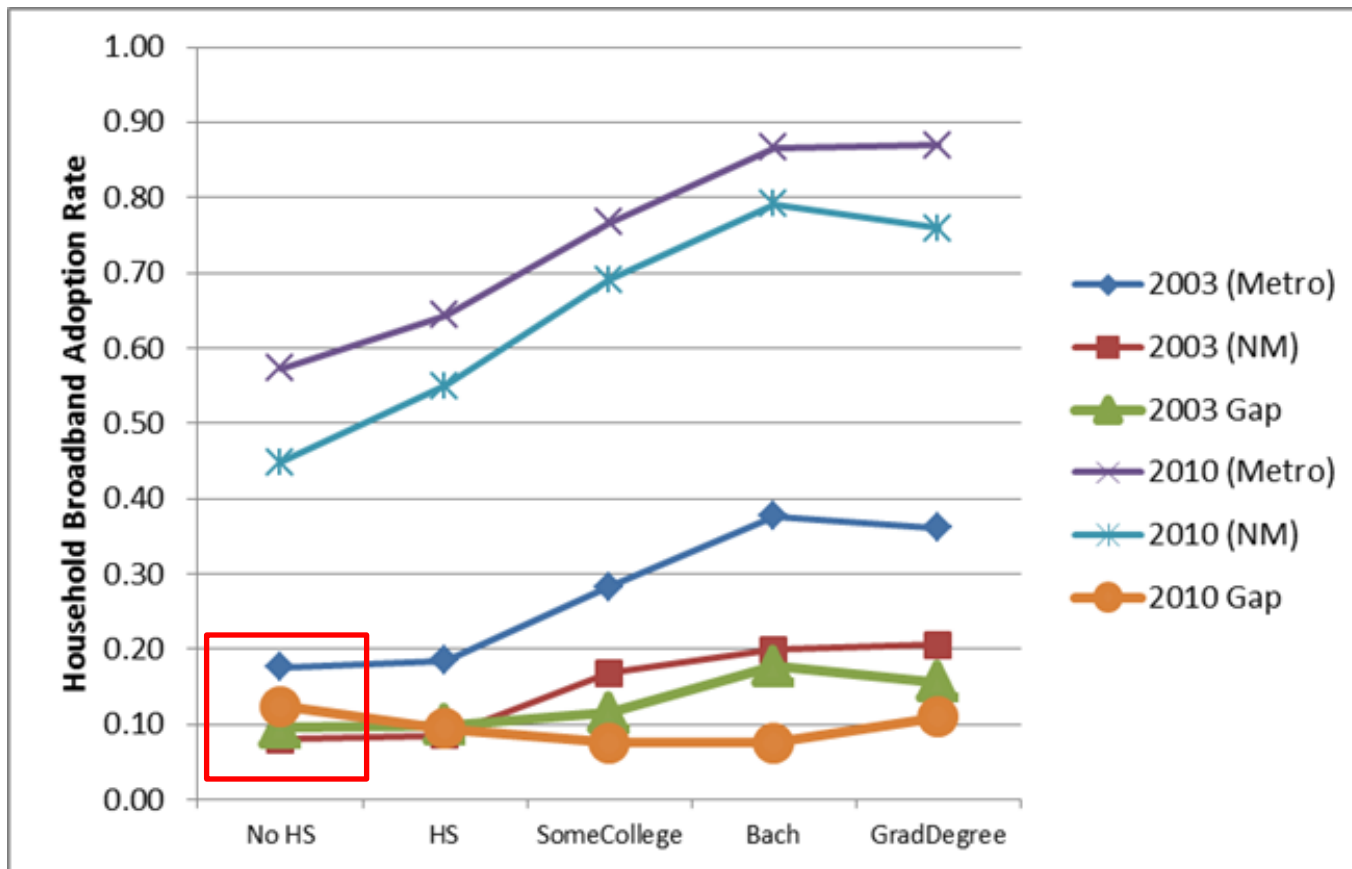


Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Metro Vs. Non-Metro Broadband Divide

Metro – Non-metro Gap
higher in 2010 for lower
education levels

Household Broadband Adoption Rates by Education, 2003 and 2010

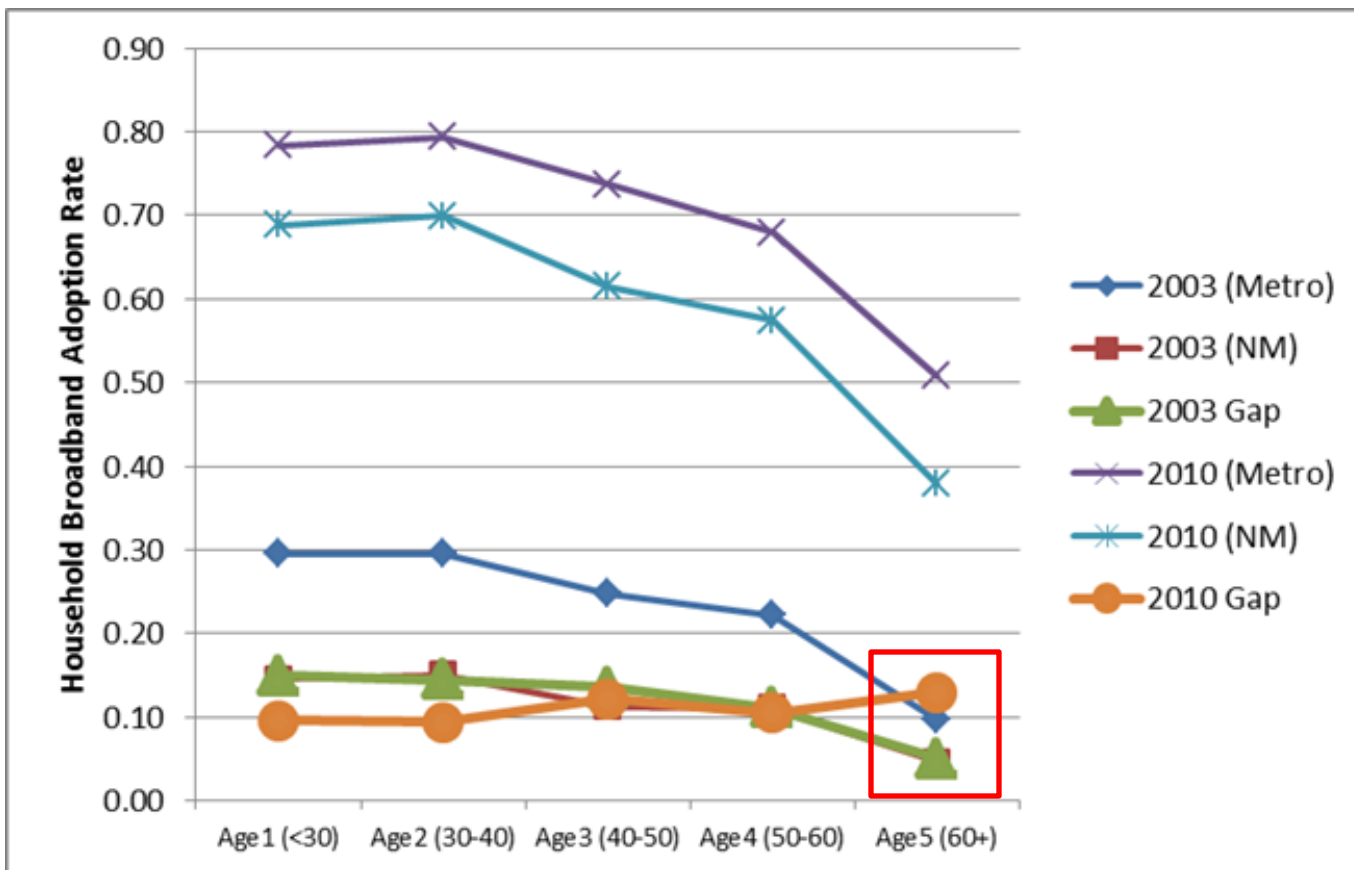


Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Metro Vs. Non-Metro Broadband Divide

Metro – Non-metro Gap
higher in 2010 for those
over age 60

Household Broadband Adoption Rates by Age, 2003 and 2010

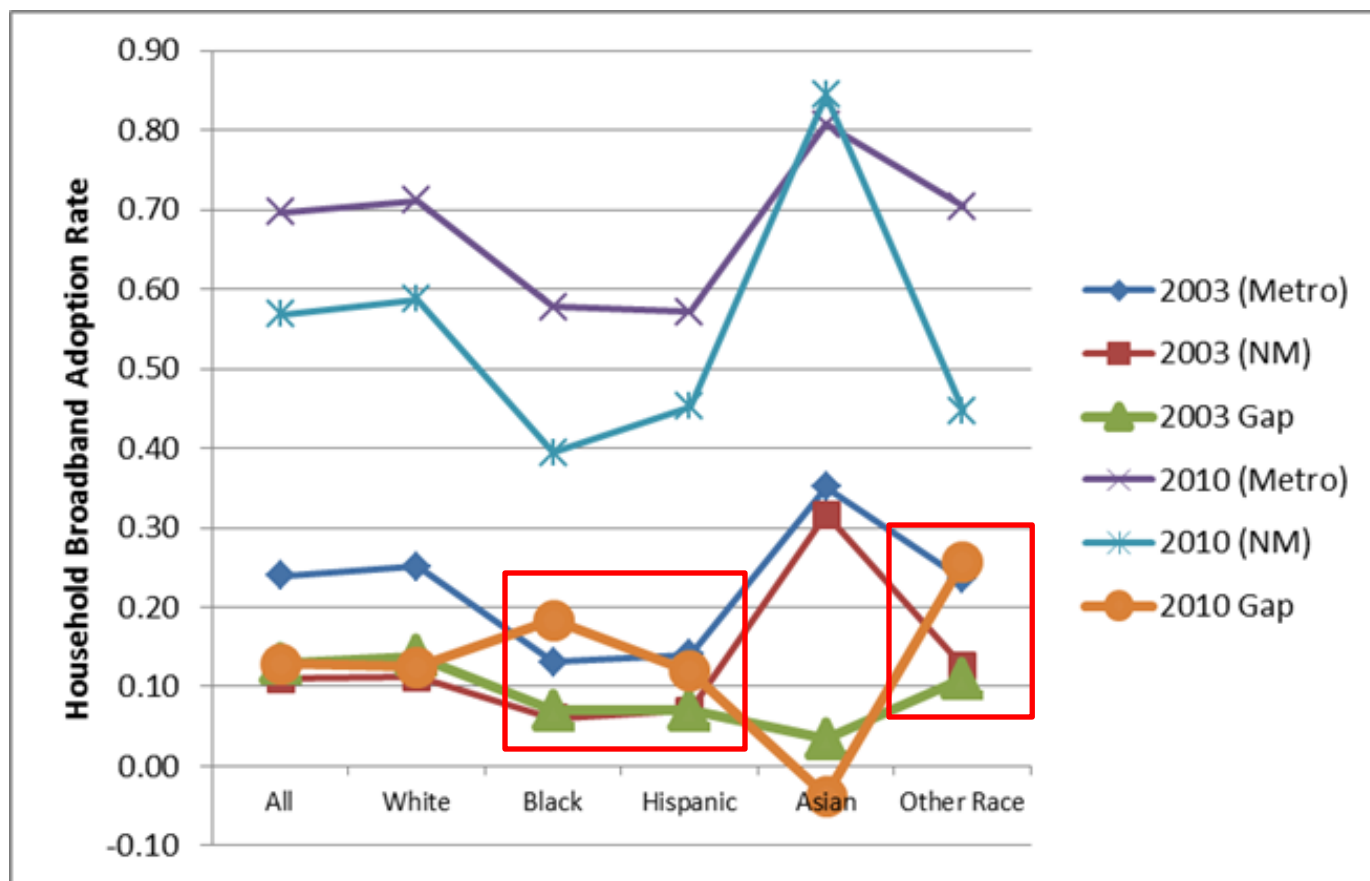


Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Metro Vs. Non-Metro Broadband Divide

Metro – Non-metro Gap
higher in 2010 for Blacks,
Hispanics, Other race

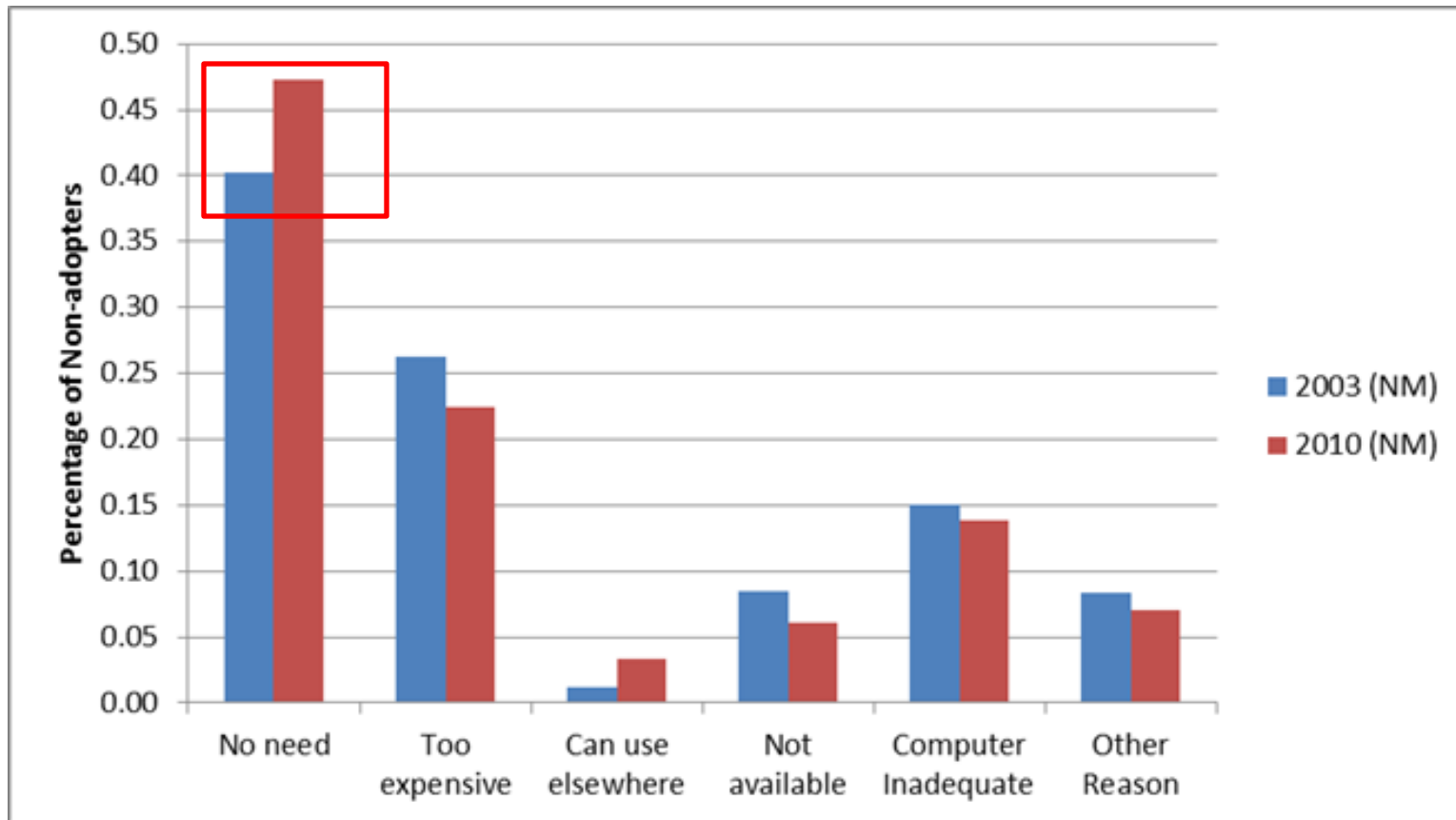
Household Broadband Adoption Rates by Race, 2003 and 2010



Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Metro Vs. Non-Metro Broadband Divide

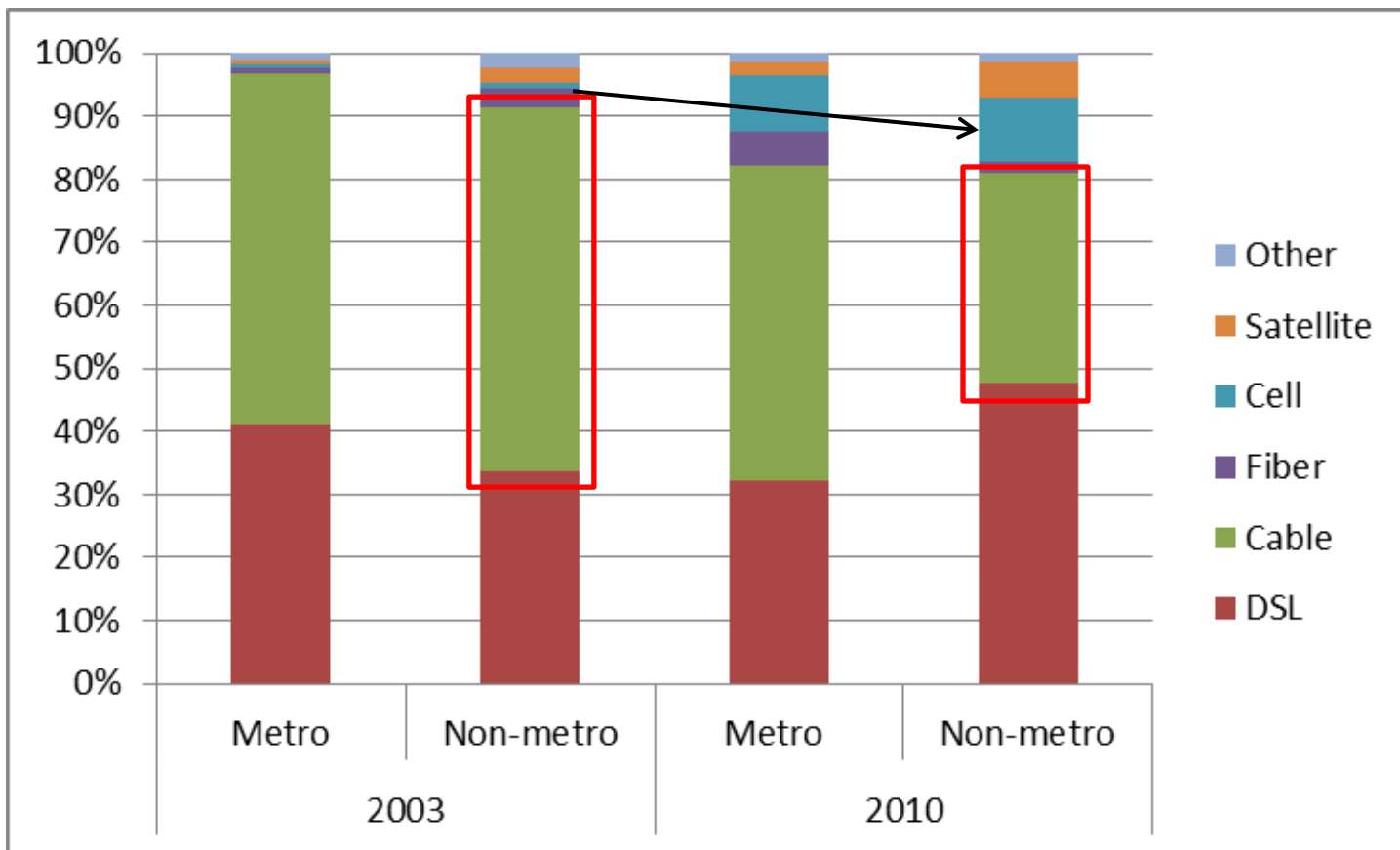
Primary Reason for Non-adoption of Broadband in NM Households, 2003 & 2010



Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Metro Vs. Non-Metro Broadband Divide

Composition of Residential Broadband Connections, 2003 & 2010



Source: Current Population Survey Internet Use Supplement, 2003 & 2010

Broadband's Contribution to Economic Health in Rural Areas

- Cross-section spatial models: 2010 Economic health indicators
 - Population size, educational attainment, age groups, race/ethnicity, unemployment rate, metro status, and natural amenities in addition to multiple broadband adoption/availability variables were used as **control variables**
 - Percentage of population without broadband and low number of providers **impacted all (7)** economic health indicators
 - Increases in the percent population without access to broadband were associated with **decreases in** nonfarm proprietor average income, median household income, total firms with paid employees, and total employed
 - All “**high**” broadband adoption/availability had a **positive** impact on total jobs and number of firms while all “**low**” indicators had a **negative** impact

In summary ...Some gains, but lags remain

- The broadband adoption gap between metro and non-metro areas **remained at 13 percentage points** in both 2003 and 2010; however this gap **increased** among low income, low education, and elderly (CPS data)
- Using FCC county-level data, rural counties experienced a **significant improvement** regarding broadband adoption between 2008 and 2011
- Logistic regressions showed traditional factors – income, education, age, race, and non-metro location – playing a role in adopting broadband between 2003 and 2010;
- Low numbers of providers have a negative impact while higher levels of broadband availability have a positive impact

In summary ...quality of service and employment effects

- Ordered logit modeling:
 - ****employment** in specific industries (real estate and information sectors) as well as **broadband speed** have an impact on **adoption rates**
- Connected Nation case studies:
 - **positive results increasing the **number of providers** in rural counties, but no increase in broadband adoption
- Cross-section spatial models found **low levels of adoption, providers, and broadband availability associated with lower median household income, higher levels of poverty, and decreased numbers of firms and total employment**

Broadband's Contribution to Economic Health in Rural Areas

- Propensity score matching: economic health indicators
 - Compared treated (using broadband availability/adoption criteria) versus non-treated counties; matched based on their probabilities of reaching the broadband threshold

High levels of Broadband adoption (in non-metro counties) **influenced economic growth** increasing median household income and reducing poverty, unemployment

Low levels of Broadband adoption **negatively impacted** changes in number of firms, total employment, and unemployment rates

Broadband adoption thresholds impact economic health more than availability

In summary ...economic impact

- First-differenced regressions showed that **increases in broadband adoption** between 2008 and 2010 resulted in higher levels of **median household income** and **total employment** (for non-metro counties)
- Propensity score matching analysis found that broadband **adoption** thresholds have more impact on changes in economic health indicators than broadband **availability** thresholds in non-metro counties between 2001 and 2010

Policy Options

- Place-based differences have become less important over time (decomposition results)
 - Limited exposure can depress peoples' interest in broadband
 - Policy implication: community anchor sites, highly public demonstrations of broadband's potential
- Build on diffusion factors such as trialability, observability, compatibility to expose non-adopters to the technology
- Re-think adoption as a goal: use is important, adoption may be out of reach.
- Though wireless deployment is helpful, many of the productivity gains and economic advantages of broadband are limited through this technology
- Support data gathering related to price / affordability (including bundles) and service quality (speed)

Policy Options

- Draw broadband infrastructure to less economically robust regions lacking broadband (FCC's Connect America Fund, FCC Broadband Adoption Pilot Program incentives)
- However, availability is not the entire solution
 - Higher number of providers does not translate into increases in adoption, particularly in non-metro areas (Connected Nation case study)
- The demand side – broadband adoption – must receive attention as well
- Focus programs on populations with lower levels of income and education as well as racial/ethnic minorities in rural regions
- Public computing centers may have a role *if* they include training and help for users