ECONOMIC IMPACT OF WIRELESS BROADBAND IN RURAL AMERICA

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RURAL AMERICA COMPRISES THE LARGEST PORTION OF UNSERVED AND UNDERSERVED BROADBAND POPULATION

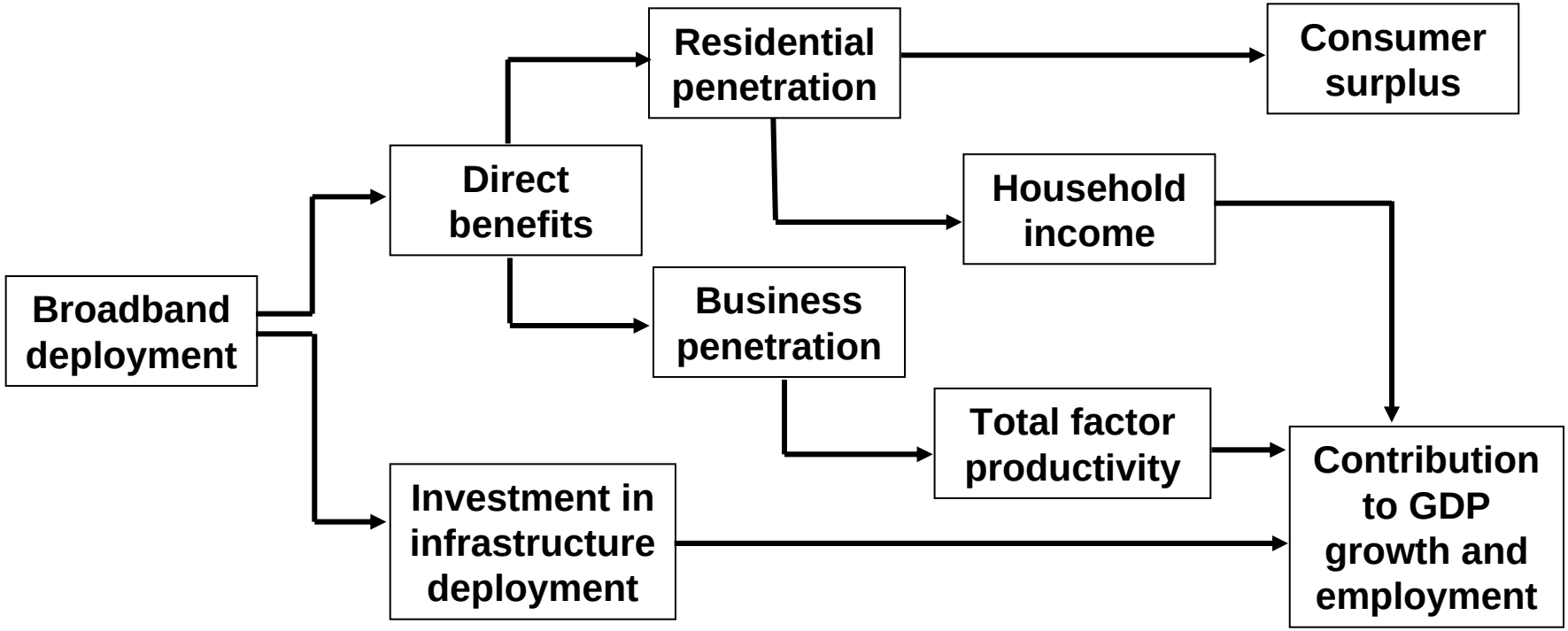
- Of the 7,035,613 housing units identified as either unserved (cannot access broadband service) or underserved by the National Broadband Plan, 4,326,299 are located in what the Census Bureau classifies as rural counties
  - While at the national level, unserved or underserved broadband households represent 6.1% of all households, this metric increases dramatically in rural geographies, for example reaching 14.0% in Kentucky, and 21.8% in West Virginia
- Broadband deployment plans of national carriers do not prioritize rural fixed or mobile broadband capital investment
- Lower customer density and/or populations that are depressed socio-economically do not result in attractive economics of network deployment
- The lack of interoperability and automatic data roaming in the 700 MHz spectrum band risks perpetuating this situation because it represents an insurmountable obstacle to investment by rural carriers

THIS STUDY EVALUATES THE EMPLOYMENT AND INCOME OPPORTUNITY COSTS THAT RESULT FROM NOT MANDATING DATA ROAMING NOR REQUIRING INTEROPERABILITY IN THE 700 MHZ BAND FOR WIRELESS CARRIERS SERVING RURAL AMERICA

- The study focuses on three specific states with different characteristics (Kentucky and West Virginia, with high rural population and Ohio, which exhibits larger urban and suburban concentrations)
- It estimates, by means of econometric analysis, the economic impact that broadband has had in the past years (2004-7)
- With this evidence in hand, the study projects the potential economic impact of wireless broadband deployment in the unserved and underserved areas of the three States
- Then, it extrapolates the results for the nineteen states with less than 90% coverage of broadband service of at least 4 Mbytes

BROADBAND HAS MULTIPLE ECONOMIC IMPACTS: JOB CREATION, HOUSEHOLD INCOME, RESULTING IN ECONOMIC GROWTH AS WELL AS ENHACEMENT OF CONSUMER SURPLUS

Broadband Economic Impact



BROADBAND IMPACT ON JOB CREATION COMPRISES TWO EFFECTS

DEPLOYMENT OF BROADBAND

IMPACT OF BROADBAND CONSTRUCTION

DIRECT JOBS
Employment generated in the short term in the course of deployment of network facilities

- Telecommunications technicians
- Construction workers
- Civil and RF engineers

INDIRECT JOBS
Employment generated by indirect spending (or businesses buying and selling to each other in support of direct spending)

- Metal products workers
- Electrical equipment workers
- Professional Services

INDUCED JOBS
Employment generated by household spending based on the income earned from the direct and indirect effects

- Consumer durables
- Retail trade
- Consumer services

IMPACT OF BROADBAND EXTERNALITIES

PRODUCTIVITY
Employment generated in the short term in the course of deployment of network facilities

- Marketing of excess inventories
- Optimization of supply chains

INNOVATION
Employment generated by indirect spending (or businesses buying and selling to each other in support of direct spending)

- New applications and services
- New forms of commerce and financial intermediation

VALUE CHAIN RECOMPOSITION
Employment generated by household spending based on the income earned from the direct and indirect effects

- Outsourcing of services
- Virtual call centers
- Core economic development clusters

ESTIMATES FROM SEVERAL COUNTRIES INDICATE THAT BROADBAND NETWORK CONSTRUCTION EFFECTS AND MULTIPLIERS ARE SIGNIFICANT

Network Construction Effects Of Broadband

COUNTRY	RESEARCHER / INSTITUTION	STIMULUS INVEST. (US$ million)	NETWORK DEPLOYMENT JOBS ESTIMATE				MULTIPLIERS	
			DIRECT	INDIRECT	INDUCED	TOTAL	TYPE I*	TYPE II **
UNITED STATES	**Katz (Columbia)**	**$ 6,390**	**37,300**	**31,000**	**59,500**	**127,800**	**1.83**	**3.42**
	Atkinson (ITIF)	**$ 10,000**	**63,660**	**165,815**		**229,475**	**2.58**	**3.60**
SWITZERLAND	**Katz (Columbia)**	**~$ 10,000**	**~80,000**	**~30,000**	**N.A.**	**~110,000**	**1.38**	**N.A.**
GERMANY	**Katz (Columbia)**	**$ 47,660**	**281,000**	**126,000**	**135,000**	**542,000**	**1.45**	**1.94**
UNITED KINGDOM	**Liebenau (LSE)**	**$ 7,463**	**76,500**	**134,500**		**211,000**		**2.76**
AUSTRALIA	**Government**	**$ 31,340**				**~200,000**		

(*) (Direct + indirect)/direct
(**) (Direct + indirect + induced)/direct

THE EVIDENCE REGARDING BROADBAND EMPLOYMENT CREATION RESULTING FROM ECONOMIC SPILL-OVERS IS ALSO QUITE CONCLUSIVE

Research results of Broadband Impact on Employment

Country	Study	Data	Effect
United States	Thompson and Garbacz (2009)	46 US States during the period 2001-2005	Positive employment generation effect varying by industry
	Gillett et al. (2006)	Zip codes for the US for the period 1999-2002	Broadband availability increases employment by 1.5%
	Shideler et al. (2007)	Disaggregated county data for state of Kentucky for 2003-4	An increase in broadband penetration of 1% contributes to total employment growth ranging from 0.14% to 5.32% depending on the industry
Germany	Katz et al. (2009)	214 counties	An increase in broadband penetration of 1% contributes to total employment growth ranging from 0.0027% to 0.0061% depending on the region
Chile	Katz (2010)	Panel data for 13 regions	An increase in broadband penetration of 1% contributes to total employment growth ranging from 0.00181% depending on the region

Source: Compiled by the authors

BROADBAND SERVICE AVAILABILITY HAS AN IMPACT ON JOB CREATION AND INCOME IN BOTH METROPOLITAN AND RURAL COUNTIES IN KENTUCKY

Kentucky: Impact of a 1 % point increase in Broadband Availability on Employment and Median Income (2004-9)

	Impact on Median Income	Impact on Employment
Metropolitan Counties	0.0968*	0.0303
Rural Counties Adjacent to Metro counties	0.0704*	-0.1953*
Rural Counties Isolated from Metro Counties	0.0800*	

*Significant at the 1 % level

Source: Data compiled from Connect Kentucky databases, and ESRI Business Analyst Sourcebook for County demographics; analysis by the authors.

BROADBAND PENETRATION CONTRIBUTES TO JOB CREATION IN FINANCIAL SERVICES, WHOLESALE TRADE, AND HEALTH SECTORS, EVEN WITHIN RURAL COUNTIES

Kentucky: Impact of a 1% increase in Broadband Penetration on Industrial Sector Employment

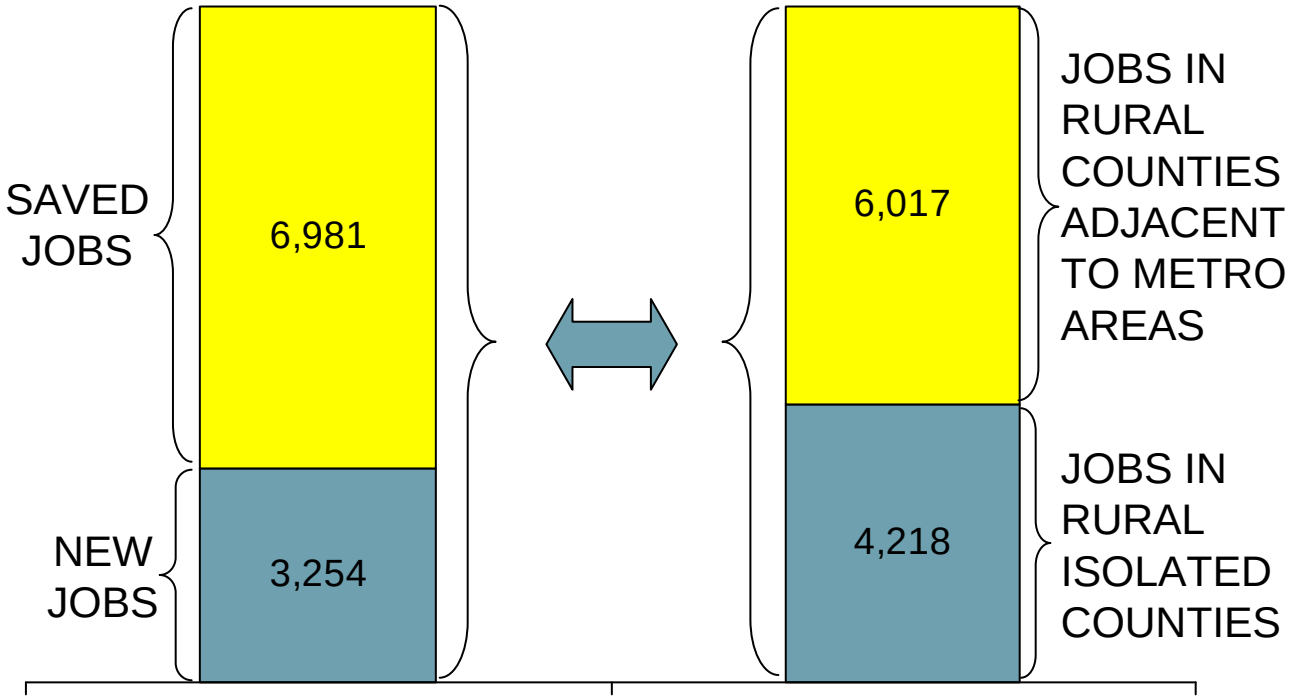
Industry Sector	All Counties	Rural Counties
Financial Services and Insurance	0.678 (**)	0.517 (***)
Wholesale trade	0.846 (*)	0.836 (**)
Health Services	0.126 (*)	0.122 (**)

(*) Significant at 1% level
(**) Significant at 5% level
(***) Significant at 10% level

Source: Data compiled from US Census Bureau, Connect Kentucky databases, and ESRI Business Analyst Sourcebook for County demographics; analysis by the authors.

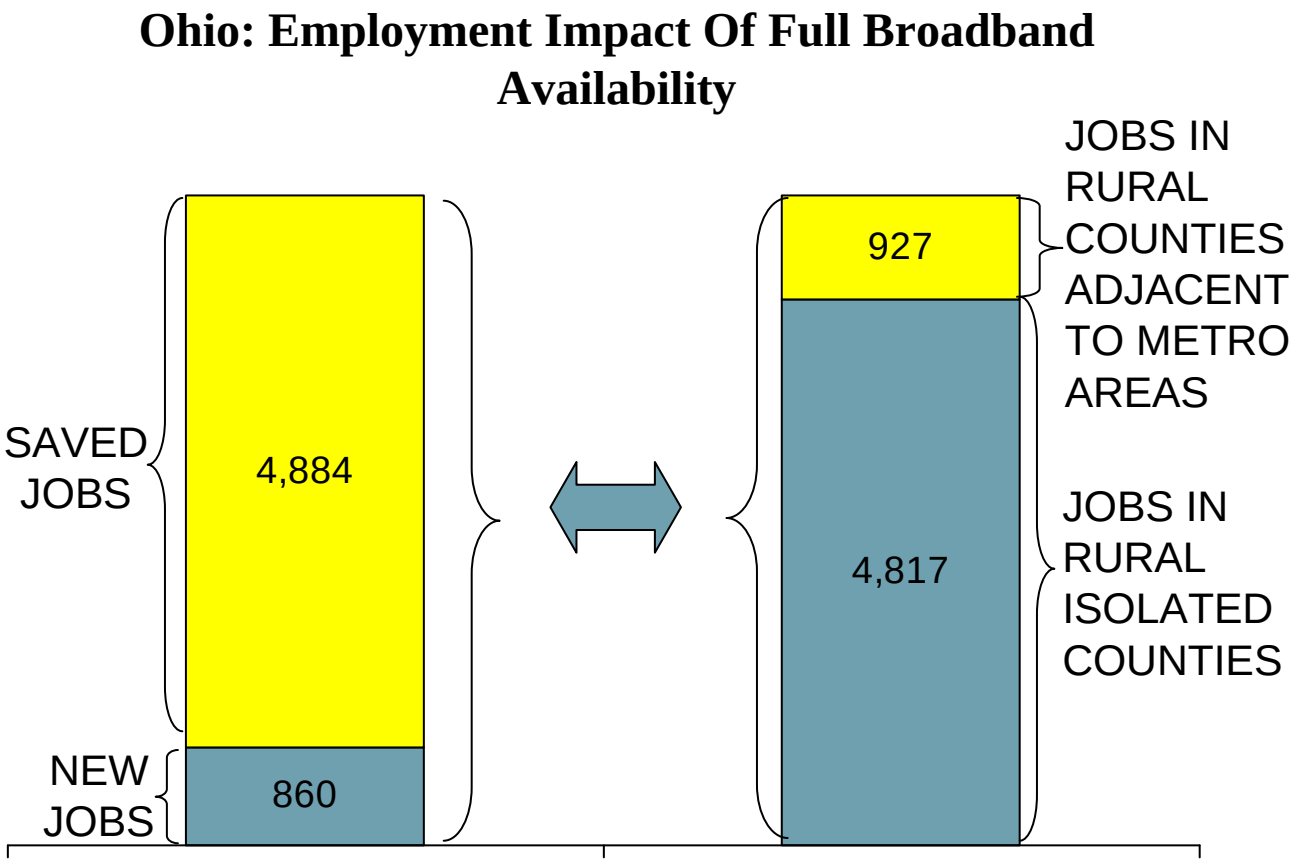
ACCORDINGLY, IF BROADBAND AVAILABILITY REACHED 100 % THROUGH DEPLOYMENT OF 700 MHZ TECHNOLOGY, THIS WOULD RESULT IN 10,235 JOBS CREATED OR SAVED BETWEEN 2011 AND 2014 IN KENTUCKY

Kentucky: Employment Impact Of Full Broadband Availability



Source: Analysis by the authors

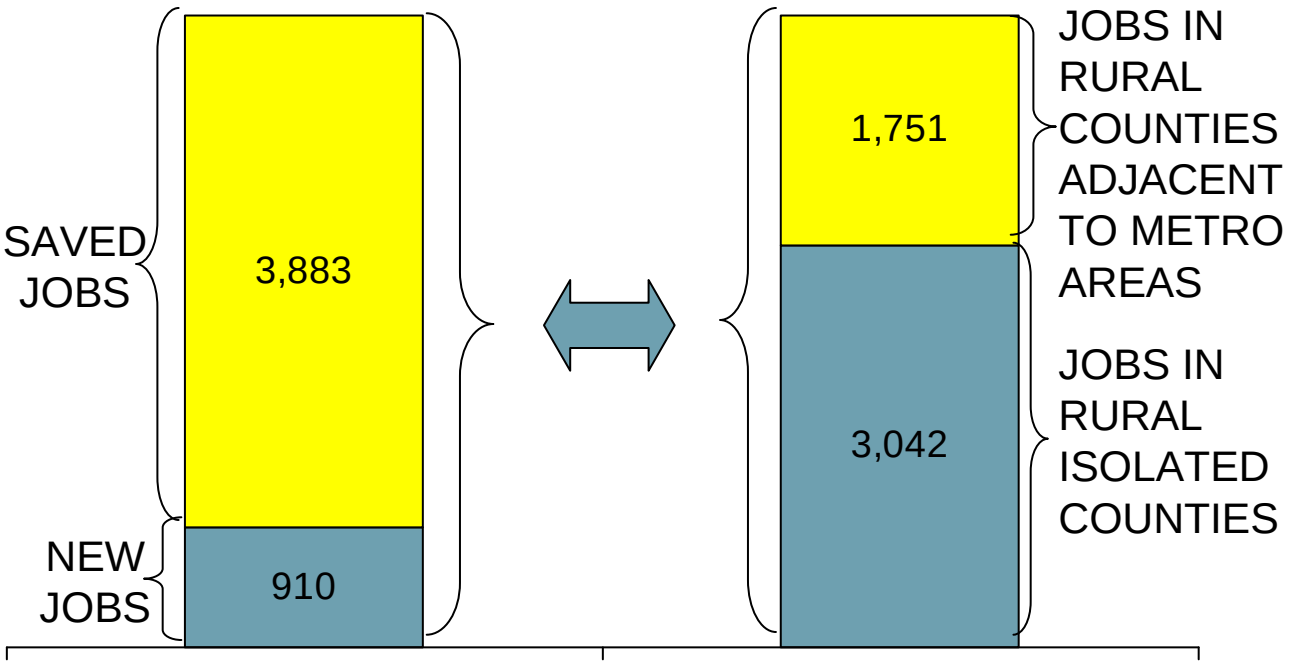
IN OHIO A SIMILAR INCREASE TO 100% AVAILABILITY WOULD RESULT IN 5,744 JOBS CREATED OR SAVED BETWEEN 2011 AND 2014



Source: Analysis by the authors

IN WEST VIRGINIA, JOBS CREATED OR SAVED BETWEEN 2011 AND 2014 WOULD REACH 4,793

West Virginia: Employment Impact Of Full Broadband Availability



Source: Analysis by the authors

THE ESTIMATION OF ECONOMIC IMPACT ON A NATIONAL SCALE WAS CONDUCTED FOR THOSE STATES THAT EXHIBITED THE LOWEST BROADBAND AVAILABILITY

States significantly lagging broadband accessibility

State	Unserved or underserved	Broadband lines	Households	Household penetration	Population	Population Penetration
W. Virginia	26.0 %	442,000	748,517	59%	1,819,777	24%
Arkansas	25.2 %	516,000	1,124,947	46%	2,889,450	18%
Mississippi	23.0 %	447,000	1,095,026	41%	2,951,996	15%
Alaska	20.7 %	162,000	236,597	68%	698,473	23%
S. Dakota	18.7 %	179,000	316,638	57%	812,383	22%
Montana	17.3 %	212,000	375,287	56%	974,989	22%
N. Dakota	16.5 %	155,000	279,014	56%	646,844	24%
Kentucky	15.7 %	876,000	1,694,197	52%	4,314,113	20%
N. Mexico	15.1 %	389,000	742,104	52%	2,009,671	19%
Missouri	13.6 %	1,269,000	2,339,684	54%	5,987,580	21%
Wyoming	13.5 %	122,000	213,571	57%	544,270	22%
Oklahoma	13.1 %	731,000	1,430,019	51%	3,687,050	20%
Louisiana	12.8 %	888,000	1,688,027	53%	4,492,076	20%
N. Carolina	12.3 %	2,172,000	3,646,095	60%	9,380,884	23%
Alabama	12.0 %	901,000	1,848,051	49%	4,708,708	19%
Kansas	11.6 %	659,000	1,104,976	60%	2,818,747	23%
Virginia	11.2 %	1,904,000	2,971,489	64%	7,882,590	24%
Tennessee	10.1 %	1,248,000	2,447,066	51%	6,296,254	20%
Maine	10.0 %	330,000	544,855	61%	1,318,301	25%
Total	14.1 %	13,602,000	24,846,160	55%	64,234,156	21%

Source: US Census Bureau; National Broadband Plan; FCC; analysis by the authors

THE IMPACT ON EMPLOYMENT AND MEDIAN INCOME WAS ESTIMATED FOR THE 19 STATES

Economic impact of full broadband accessibility

State	Jobs created/saved	Increase in median income per county
W. Virginia	4,793	$ 1,273.61
Arkansas	8,960	$ 1,529.39
Mississippi	13,077	$ 1,222.21
Alaska	1,845	$ 2,427.42
S. Dakota	1,314	$ 1,525.99
Montana	2,280	$ 1,217.33
N. Dakota	660	$ 1,341.89
Kentucky	10,235	$ 911.09
N. Mexico	3,771	$ 1,141.53
Missouri	10,016	$ 1,385.28
Wyoming	996	$ 853.49
Oklahoma	5,855	$ 1,075.93
Louisiana	6,237	$ 954.72
N. Carolina	13,288	$ 1,073.90
Alabama	7,587	$ 905.61
Kansas	3,056	$1,484.67
Virginia	10,163	$1,143.15
Tennessee	11,192	$ 978.80
Maine	1,537	$ 517.98
Total	116,862	$ 1,201.11

Source: Analysis by the authors

IN SUMMARY, BY MAKING BROADBAND ACCESSIBLE TO 100% OF HOUSEHOLDS IN THE STATES WITH LOWEST BROADBAND AVAILABILITY, 116,862 JOBS COULD BE CREATED AND/OR SAVED BETWEEN 2011 AND 2014

Employment Impact broken down by New Jobs versus Saved Jobs

State	Jobs created/saved	Ratio of Jobs due to growth	New Jobs	Saved Jobs
Alabama	7,587	34.08%	2,585	5,002
Alaska	1,845	27.45%	507	1,338
Arkansas	8,960	41.67%	3,733	5,227
Kansas	3,056	36.45%	1,114	1,942
Kentucky	10,235	31.80%	3,254	6,981
Louisiana	6,237	28.40%	1,771	4,466
Maine	1,537	15.73%	242	1,295
Mississippi	13,077	26.23%	3,430	9,647
Missouri	10,016	19.61%	1,964	8,052
Montana	2,280	32.54%	742	1,538
N. Carolina	13,288	41.69%	5,540	7,748
N. Dakota	660	31.18%	206	454
N. Mexico	3,771	32.52%	1,226	2,545
Oklahoma	5,855	31.00%	1,815	4,040
S. Dakota	1,314	41.02%	539	775
Tennessee	11,192	37.42%	4,188	7,004
Virginia	10,163	40.75%	4,141	6,022
W. Virginia	4,793	18.98%	910	3,883
Wyoming	996	50.40%	502	494
Total	116,862		38,409	78,453

THE POLICY IMPLICATIONS OF THESE FINDINGS ARE QUITE SIGNIFICANT

- It is critical that interoperability across devices designed to work in any one block of paired 700 MHz spectrum be enforced
- If this requirement for the 700 MHz spectrum is not enacted, it will be technologically impossible for wireless broadband devices to roam from one network to another
- Furthermore, without automatic data roaming (similar to the existing one in voice services), rural carriers will be potentially facing onerous terms when roaming into national carriers
- Consequently, without enforcement of interoperability and automatic roaming, investment in advanced wireless networks in rural geographies will not materialize because rural carriers face a competitive disadvantage
    - More expensive terminal equipment due to lack of scale
    - More expensive roaming plans
- The lack of investment in wireless broadband networks will have a negative impact on the ability to create and retain jobs and increase income in rural environments

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