



Cost as a Barrier to Broadband Adoption: Structuring Subsidy Programs That Work

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Affordability is a key barrier to broadband adoption among many who have not embraced high-speed Internet service. According to Connect South Carolina's 2011 Residential Technology Assessment, 43% of South Carolina households do not subscribe to home broadband service.¹ Among these non-adopters, the top barrier to broadband adoption is affordability – nearly one in three non-broadband adopters (32%) do not subscribe to broadband due to cost and affordability issues.

This affordability gap slows down economic growth, reduces educational opportunities, and limits job creation opportunities for South Carolinians of every socioeconomic group. As more of these opportunities continue to shift online, families and their children who remain disconnected from online resources will face an increasing challenge to overcome poverty and become active and productive members of society. Yet many consider the current cost of broadband service to be out of reach.

Faced with this challenge, state and federal policy makers are debating what policies are appropriate to address this affordability barrier. The Federal Communications Commission (FCC) is evaluating whether to introduce a subsidy mechanism for home broadband subscriptions similar to the existing Low Income Lifeline program, which currently provides a subsidy to low-income families for the monthly subscription of voice service. Later this year the FCC is scheduled to implement a Broadband Lifeline pilot program aimed to test various assumptions about how to structure such a program.²

Private sector stakeholders are also assessing the extent to which broadband subsidies would close the Digital Divide. Models such as Comcast's Internet Essentials,³ CenturyLink's Internet Basics,⁴ Connect2Compete's upcoming discount offerings, and Connected Nation's own Every Community Online program⁵ are offering low-priced broadband subscription service and computer equipment at various price points to vulnerable communities.

All of these initiatives share a degree of uncertainty regarding what price point would attract the most households that are not currently willing to subscribe to broadband at market prices. In fact, the FCC's Broadband Lifeline pilot program is specifically designed to test various assumptions regarding the optimal subsidy amount per household.⁶ How low must the monthly price of broadband be to attract the largest number of subscribers, while not wasting taxpayer money or scarce Universal Service Fund contributions on households that would not subscribe to broadband at any cost? For these programs to efficiently and sustainably invest public funds, they must estimate how many non-adopting households will be motivated to adopt broadband as a result of price subsidies, and perhaps more importantly, how low monthly subscription fees must drop to provide a sufficient motivation to adopt.

In 2011, Connect South Carolina surveyed 2,401 adult heads of households who do not subscribe to home broadband service. The Connect South Carolina non-adopter survey offers a rich database of non-adopters' choices regarding broadband and IT technology, including price sensitivity tests that shed light into this debate. The data indicate that more than one-third (37%) of South Carolina's non-adopters would be willing to subscribe to home broadband service if cost were not a factor, suggesting that approximately 570,000 South Carolina households would subscribe to broadband if the price were lower. But what is the price at which they would be willing to subscribe to the service? And based on this, what range of subsidies should policy makers consider to incent adoption?

1 <http://www.connectsc.org/research/>

2 *Report and Order and Further Notice of Proposed Rulemaking*, Lifeline and Link Up Reform and Modernization, WC Docket No. 11-42. Federal Communications Commission, February 6, 2012. ("Lifeline Reform Order") Available at <http://www.fcc.gov/document/fcc-reforms-modernizes-lifeline-program-low-income-americans-0>

3 For more information on Comcast's Internet Essentials program, see <http://www.internetessentials.com/how/default.aspx>

4 For more information on CenturyLink's Internet Basics program, see <http://www.centurylink.com/home/internetbasics/?rid=internetbasics>

5 For more information on Connected Nation's Every Community Online program, see <http://connectohio.org/every-citizen-online>

6 For more information on the FCC's Lifeline Broadband Pilot program, see *FCC Solicits Applications to Fund Low-Income Broadband Adoption Pilots: A Connected Nation Policy Brief*, May 8, 2012. Available at http://www.connectednation.org/sites/default/files/bb_pp/lifeline_pilot_pn_brief_5_8_2012_final1.pdf

These questions are addressed using a Van Westendorp Price Sensitivity Analysis,⁷ which relates to a range of optimal prices that would maximize the number of non-adopting households who would choose to subscribe to broadband. Based on this analysis, we estimate that in South Carolina the subsidies for a model such as the one contemplated by the FCC in the Broadband Lifeline Pilot Program should range between \$20 and \$30 per month.

The Broadband Adoption Gap in South Carolina

According to the 2011 Connect South Carolina Residential Technology Assessment, 43%, or approximately 1.5 million South Carolina adults, do not subscribe to home broadband service (Figure 1). Among the ten states similarly surveyed by Connected Nation, South Carolina has the largest percentage of adults without home broadband service.

According to the 2011 South Carolina Residential non-adopter survey, nearly one-third of adults who do not subscribe to home broadband service (32%, or approximately 485,000 South Carolina adults) say cost is their main barrier to broadband adoption (Figure 2). This includes 18% of non-adopters who say the monthly cost of broadband service is too expensive, 10% who cite the cost of purchasing a computer, and 4% who report that the activation and installation fees of broadband service are too expensive.

Figure 1.
Percentage of Non-Adopters by State

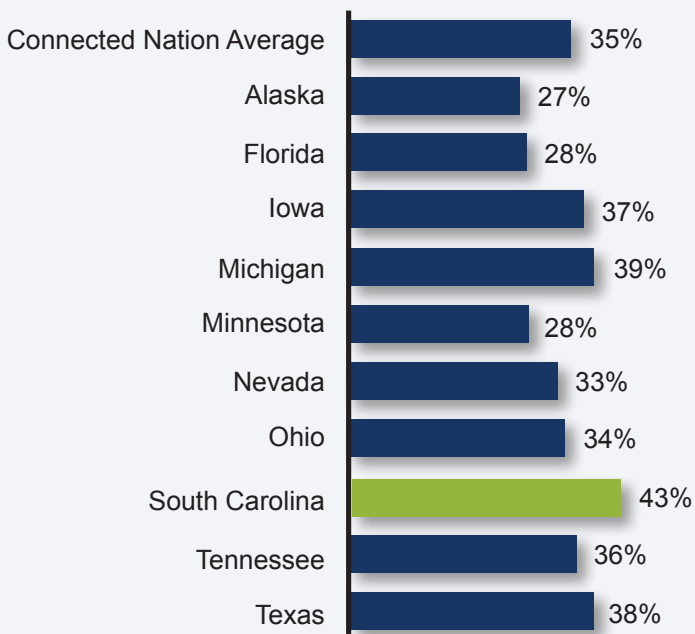
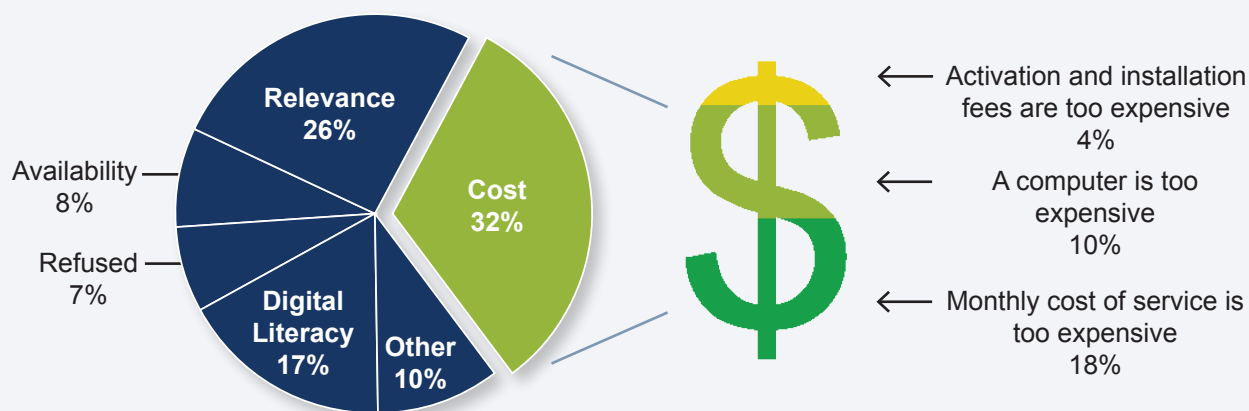


Figure 2.
Barriers to Broadband Adoption in South Carolina

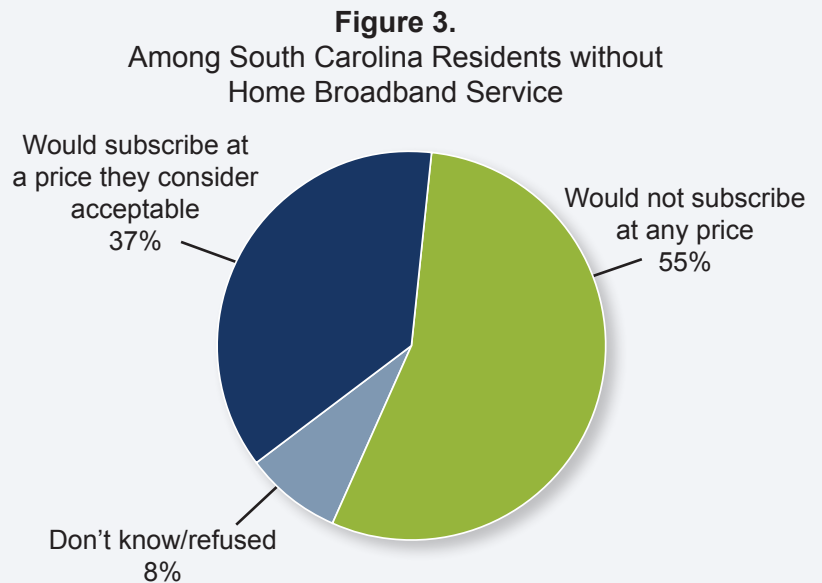


⁷ For more information on the Van Westendorp Price Sensitivity Analysis, see: Van Westendorp, P (1976) "NSS-Price Sensitivity Meter (PSM) - A new approach to study consumer perception of price." Proceedings of the ESOMAR Congress.

Price as a Motivator for Broadband Adoption

While cost is a major barrier to broadband adoption, other factors contribute to this persistent digital gap. Across South Carolina 68% of adults without home broadband service cite reasons other than price for not subscribing. In fact, only 37% of South Carolina adults who do not currently subscribe to home broadband service say they would subscribe at a monthly price that they considered acceptable (Figure 3). This means that making broadband service more affordable is important, as approximately 570,000 more South Carolina households would subscribe to broadband if the price were lower, but reducing the monthly price of home broadband service would not be a cure-all for South Carolina's broadband adoption gap. As such, it is important to learn

not only how many non-adopters could be convinced to subscribe at a reduced (subsidized) price, but what the subsidy range should be to induce the optimal number of non-adopters to subscribe to broadband service.



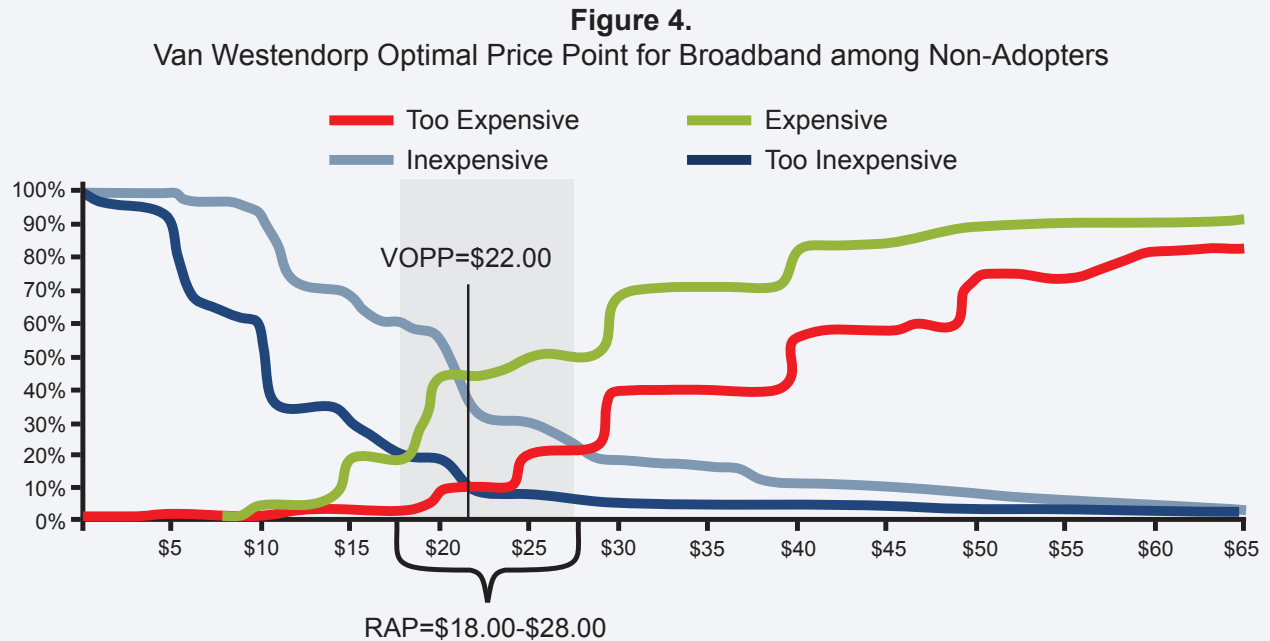
The Van Westendorp Price Sensitivity Analysis: Finding the Optimal Price for Non-Adopters

The Van Westendorp Price Sensitivity Analysis is a technique to assess the willingness to pay for a good or service among consumers who have not yet embraced a product. This method is often used to assess optimal price ranges for new goods entering the market. By asking a series of questions to determine the value that respondents place on acquiring a good or service, as well as the prices they feel would be too high to consider the product worthwhile, researchers are able to derive a “Van Westendorp Optimal Price Point,” or VOPP, and an optimal price range for product entry prices. Although more complicated than simply asking a person “How much would you be willing to pay for home broadband service,” Van Westendorp analyses tend to provide a more accurate snapshot of what new consumers are actually willing to pay for goods or services.⁸

In 2011, Connect South Carolina asked broadband non-adopters across the state a series of questions to determine what value they would place on having home broadband service. The responses to those questions were then used to assess the price point that would induce the optimal number of non-adopting households to embrace home broadband service. The value these respondents place on having home broadband service would theoretically be less than a price they consider as “too expensive,” but higher than a price they would consider so cheap that they would question the value of the service or the integrity of the offer from the provider. By plotting the results from these questions, this analysis allows one to determine the VOPP. In addition, this model shows a Range of Acceptable Prices (RAP) for policy makers to consider when developing a cost-reduction program to attract non-adopters; if the subsidized monthly price is higher than this RAP, many non-adopters would still not subscribe even at the reduced prices, as the service would still be beyond their reach. If broadband prices are subsidized so much that they fall below the RAP, potential consumers may question the value of the service they are being offered and excess tax-payer money would go to over-subsidize broadband adoption. Comparing this VOPP and RAP with current average market prices for broadband service across the state, we are able to estimate the range of optimal subsidies.

⁸ For an explanatory overview of the Van Westendorp Price Sensitivity Analysis, see: Van Westendorp, P (1976) “NSS-Price Sensitivity Meter (PSM)- A new approach to study consumer perception of price.” Proceedings of the ESOMAR Congress.

In South Carolina, the Van Westendorp Optimal Price Point among non-adopters who could be convinced to subscribe at a reduced price is \$22.00 per month (Figure 4).



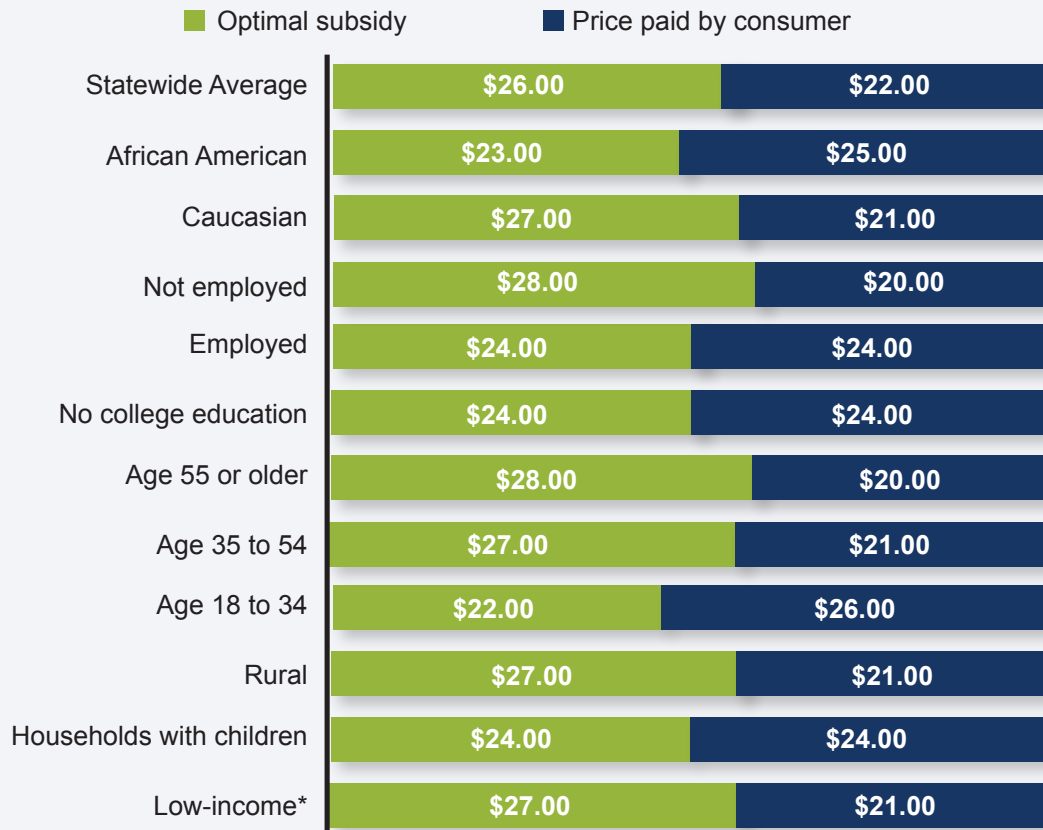
To frame the best price for a low-cost broadband offering, it is also important to consider the Range of Acceptable Prices. Among South Carolina’s non-adopting households, this range goes from \$18.00 to \$28.00. This suggests that a program designed to attract the most new subscribers should not make broadband so cheap that households pay less than \$18.00 per month, while any such program that does not reduce the monthly price of broadband below \$28.00 will not be very effective in attracting households that do not currently subscribe.

By comparison, the average South Carolina broadband subscriber pays over \$48 per month, more than double this VOPP for non-adopters. This suggests that an optimal, sustainable per month subsidy ranges from \$20 and \$30 per month, with an optimal target subsidy equaling \$26.00 per month per household. Statewide, an estimated 242,000 South Carolina adults who do not currently subscribe to home broadband service would be willing to do so as a result of a \$26.00 per month subsidy.

Optimal Subsidies by Demographic

Not every South Carolina household is the same; some may be more keenly aware of the benefits that home broadband service provides, and would therefore be willing to pay more than others who are not as aware of those benefits. Therefore, it is important to look beyond the aggregate non-adopters across the state and evaluate price sensitivity across different demographic groups that may be targeted for broadband price assistance. Based on the average monthly price of \$48 currently paid for broadband service in South Carolina, Figure 5 presents the optimal subsidy price that would incent the largest number of non-adopters to subscribe without excessively subsidizing the cost of home broadband service.

Figure 5.
Optimal Monthly Broadband Subsidies Based on Van Westendorp Price Sensitivity Analyses and an Estimated Average Retail Price of \$48



* Low-income = Annual household income less than \$25,000

Figure 5 indicates that demographic characteristics can have a significant effect on how South Carolina’s non-adopters value a home broadband subscription. These impacts, which will need to be factored into any broadband subsidy program targeting a particular socioeconomic group, are outlined below:

Household Income

As one would expect, non-adopting households with lower annual incomes would need a greater price incentive to subscribe to home broadband service than households with more disposable income. In South Carolina, across low-income households that do not currently subscribe to broadband, the optimal implied subsidy is \$27.00, two dollars higher than households with annual income of \$25,000 or more. If such a subsidy were implemented for these low-income residents, an estimated 103,000 adults with annual household income below \$25,000 who do not currently subscribe to home broadband service would be willing to subscribe.

Age

In general, the optimal subsidy amount increases with age. Among non-adopters age 18-34 the optimal estimated subsidy amounts to \$22.00 per month, while the optimal subsidy for non-adopters age 55 or older is \$28.00. It follows that younger non-adopters would be aware of greater benefits and thus place greater value on having home broadband service, while older non-adopters would tend to require greater economic incentives to be convinced.

Education

South Carolina non-adopters who do not have a college education require less of a price subsidy than the statewide average. This suggests that small price subsidies could provide an incentive for a relatively larger portion of non-adopters who could benefit from online educational opportunities. If non-adopters were targeted for a broadband subsidy of \$24.00 per month, an estimated 134,000 additional adults who do not have college educations would subscribe to home broadband service.

Employment

The optimal subsidy for employed non-adopters would be four dollars lower per month than non-adopters who are not employed. This is understandable, as employed residents would have more access to disposable income than households where the head of household is not employed.

Race

The optimal subsidy price for African American non-adopters is significantly lower than for Caucasians in South Carolina. This, combined with the larger share of African Americans who would be willing to subscribe at an acceptable price, suggests that there is greater pent-up demand for home broadband service within the African American community, while factors other than price are the primary barrier among Caucasian non-adopters in South Carolina. In fact, an estimated 96,000 African American adults in South Carolina would subscribe to home broadband service as a result of a monthly subsidy of \$23.00.

Conclusion

While it is vital that every resident of South Carolina has access to affordable broadband, it is also necessary to ensure that any price incentives provided through state, federal, or private subsidy mechanisms are designed to ensure the greatest impact across the targeted population and result in sustainable broadband adoption. In particular, any governmental subsidies, such as those currently under examination by the FCC under the Broadband Lifeline Pilot program, must have a target price that will attract the most new subscribers while remaining careful not to over-spend taxpayer money.

This study shows that a subsidy equal to \$26.00 per household per month would attract the greatest number of non-adopting households in South Carolina, while not over-extending the subsidy program in an attempt to attract subscribers who will not be convinced by price incentives. In addition, programs that target low-income, rural, or elderly populations would need to reduce the final monthly price of broadband even further to be effective. On the other hand, this data suggests that there is pent-up demand for affordable home broadband service among non-adopting African Americans and young adults in South Carolina, many of whom would be willing to pay slightly higher monthly prices to have the benefits of broadband service at home.

Overall, programs aimed to address the affordability barrier to broadband adoption through price subsidies alone will not close the broadband adoption gap in South Carolina; other issues such as digital literacy and perceptions of broadband service's value must also be addressed. For many in South Carolina, though, reducing the monthly price of home broadband service through subsidies or other mechanisms may provide the incentive they need to bring broadband into their homes.

Methodology

2011 Residential Technology Assessment

Between June 28 and August 18, 2011, Connect South Carolina conducted random digit dial telephone surveys of adult heads of households across South Carolina. This sample included 999 adults age 18 or older who were contacted via landline and 201 adults who were contacted via cell phone. Once the respondent agreed to participate, these surveys took approximately eleven (11) minutes to complete.

Of the 1,200 respondents surveyed in 2011, 673 respondents reported having broadband service at home (adopters). The results of this survey have been compared to similar surveys that Connected Nation conducted across ten states in 2011 (Alaska, Florida, Iowa, Michigan, Minnesota, Nevada, Ohio, South Carolina, Tennessee, and Texas). Altogether, Connected Nation surveyed 12,004 residents across these ten states in 2011 for this study, including 7,682 broadband adopters.

Quotas were set by age, gender, and county of residence (urban, suburban, or rural), based on 2010 United States Census data. The data were weighted using a rim weighting process to account for any minor variances between the statewide population and the survey sample based on these factors. Based on the effective sample size for this statewide sample, the margin of error = $\pm 3.04\%$ at a 95% level of confidence for the sample of South Carolina respondents. The survey results were subsequently reviewed by experts in the fields of survey design and statistics at Clemson University.

2011 Residential Non-Adopter Assessment

Between June 22 and August 4, 2011, Connect South Carolina also surveyed a total of 2,401 adult heads of households who do not subscribe to home broadband service (including 200 adults who were contacted on a cell phone) to explore barriers to broadband adoption and measure these adults' willingness to subscribe at different prices. Once respondents agreed to participate, these surveys took approximately seven (7) minutes to complete. This sample was also weighted by age, gender, and county of residence using a rim weighting process to account for any variances between the sample and the population of non-adopters, as identified through the residential survey. At a 95% level of confidence, this sample provides a margin of error of $\pm 2.62\%$ among all residents who do not subscribe to home broadband service.

As with any survey, question wording and the practical challenges of data collection may introduce an element of error or bias that is not reflected in these margins of error. For this report, "rural" residents are defined as those living in counties that are not part of a Metropolitan Statistical Area (MSA). Surveys were conducted by Thoroughbred Research, with weighting and research design consultation provided by Lucidity Research LLC. The survey results were subsequently reviewed by experts in the fields of survey design and statistics at Clemson University.

In order to use the Van Westendorp Price Sensitivity Model to estimate optimal prices for non-adopters, four price-related questions were asked in the non-adopter survey. Altogether, 451 respondents provided answers to all four questions:

1. At what monthly price would you consider a home broadband subscription to be 'too expensive to consider?' (Too expensive)
2. At what monthly price would you consider a home broadband subscription to be 'getting expensive, but still worth the cost?' (Expensive)
3. At what monthly price would you consider a home broadband subscription to be 'a bargain, definitely worth the money?' (Inexpensive)
4. At what monthly price would you consider a home broadband subscription to be 'so inexpensive that you would question the quality of the service and not consider subscribing?' (Too inexpensive)

The cumulative frequencies for “too expensive and expensive” questions were calculated in ascending order, and cumulative frequencies for “too inexpensive and inexpensive” questions were obtained in descending order. Then the cumulative frequencies were plotted. The point at which the “Inexpensive” and “Expensive” response intersect is considered the Indifference Price Point (IDP); the point of intercept between “Too Expensive” and “Too Inexpensive” is considered the Van Westendorp Optimal Price Point (VOPP); the point at which the “Too Inexpensive” line crosses the “Expensive” line is described the Point of Marginal Cheapness (PMC); the intersection of “Inexpensive” and “Too Expensive” represents the point of Marginal Expensiveness (PME).

APPENDIX 1: Select Questions and Sample Sizes

2011 Connected South Carolina Non-adopter Residential Survey

Which one of these is the main reason why you do not subscribe to home broadband service?	<i>n</i> Respondents
Affordability	658
Digital literacy	502
Relevance	704
Availability	145
Other	198
Don't know/Refused	194

At what monthly price would you consider a home broadband subscription to be ‘too expensive to consider’? at what monthly price would you consider a home broadband subscription to be ‘getting expensive, but still worth the cost?’ at what monthly price would you consider a home broadband subscription to be ‘a bargain, definitely worth the money?’ and at what monthly price would you consider a home broadband subscription to be ‘so inexpensive that you would question the quality of the service and not consider subscribing?’	<i>n</i>= Respondents
Statewide	451
African American	173
Caucasian	242
Not employed	244
Employed	201
No college education	258
Age 55 or older	156
Age 35 to 54	189
Age 18 to 34	106
Rural	165
Households with children	159
Low-income* households	196

* Low-income = total annual household income less than \$25,000