PERSPECTIVES

PHOENIX CENTER FOR ADVANCED LEGAL & ECONOMIC PUBLIC POLICY STUDIES

Challenges to Universal Adoption: A Look at NTIA's New Data

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In a recent post by the National Telecommunications Information Administration ("NTIA"), the agency discusses the latest release of the NTIA's Internet Use Survey (November 2021).[1] Despite the Covid pandemic, the data gathered from 43,000 households shows the percentage of Americans using the Internet increased a paltry one-percentage point between 2019 and 2021 (79% to 80%).[2] The nation is far from universal adoption and progress seems slow. Despite the small increase in overall subscription, there was some encouraging news: the data show "outsized increases in connectivity along other demographic lines, including seniors, persons with disabilities, and those in low-income households."[3]

The NTIA worries that there are "enduring barriers to closing the digital divide," and for good reason. When respondents were asked why they don't use the Internet at home, nearly 60% said the main reason is that they "don't need it or not interested." In a distant second at about a 20% response rate, respondents said using the internet was "too expensive." The pattern in responses is nothing new—the relative shares are consistent with prior survey years.[4] Many Americans choose to stay offline because they are uninterested in what the Internet has to offer or else are afraid of what the Internet has to offer, which is a valid concern.

A lack of interest in using the Internet as a barrier to adoption may become a bigger problem in the future. Using data from the last four iterations of the Internet Use Survey (2015, 2017, 2019, and 2021), I show that as Internet adoption rises, the share of persons saying they "don't need it or are not interested" rises, and those saying it is "too expensive" falls. The upward trend in adoption suggests that closing the Digital Divide completely will become increasingly challenging, as "need" and "interest" are difficult to address. To some extent, the lack of need is beyond the influence of policy actions, though some effort such as "digital navigator" programs, are attempting to help non-adopters recognize the benefits the Internet can provide.

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Data

Data from the Internet Use Survey is obtained from the NTIA Data Explorer Tool for years 2015, 2017, 2019, and 2021.[5] Variables included in this analysis are the main reasons for non-adoption and the adoption rate. The data is at the state

level. All data is in percentages. For the main reasons for non-adoption, the shares are calculated as the number of responses for each reason divided by the sum of responses for all reasons. The raw data did not include the "Other" category for non-adoption, but it can be computed from the other categories.

Some Descriptive Analysis

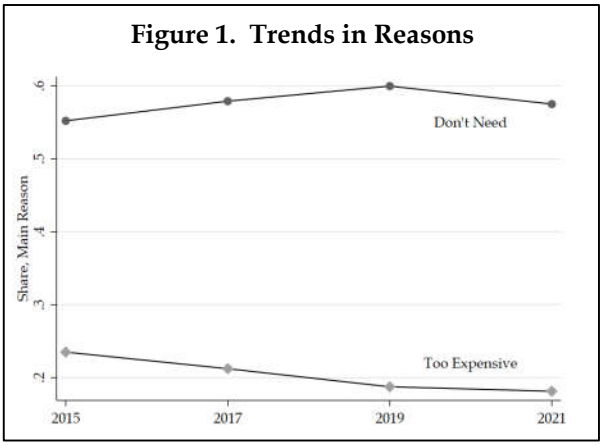
Summary statistics of responses for years 2015 and 2021 are provided in Table 1. The means are household-weighted. By far, the most common reason for non-adoption is "don't need it" with share above 55% in both years. "Too expensive" is a distant second at rates of about 20%. Between the two years, the share of "don't need" responses has risen while the "too expensive" response has declined. The lack of a computer as a barrier to adoption has fallen materially over time, while "not available," "privacy concerns," and "other" have risen.

Table 1. Reasons for Non-Adoption (%)

Main Reason	2015	2021
Don't Need/Not Interested	55.2	57.6
Too Expensive	23.5	18.0
Not Available	2.3	3.9
No Computer	7.4	2.7
Use Elsewhere	2.1	2.1
Privacy/Security Concerns	1.4	2.4
Other	8.1	13.3
Adoption in the Home	73.4	81.8

In Figure 1, the trend in the two most popular responses and their sum are illustrated. The data are for the U.S. in total. The figure shows the "too expensive" reason for non-adoption is declining over time, while the "don't need" response is rising until 2021, when it slightly declines (shifting share to the "other" category). Affordability appears a less important contributor to the Digital Divide than the policy debate might suggest.

Figure 1. Trends in Reasons



Of course, since the shares sum to one, all the responses are correlated (see Table 2), and usually negatively, but the "don't need" and "too expensive" responses have the largest correlation coefficient by far (-0.59). All reasons other than "don't need" are negatively correlated with the "don't need" response.

Table 2. Correlation Matrix

	Need	Exp	Avail	Comp	Else	Priv	Other
Need	1.00						
Exp	-0.59	1.00					
Avail	-0.35	-0.03	1.00				
Comp	-0.31	0.27	-0.21	1.00			
Else	-0.16	-0.17	0.10	-0.14	1.00		
Priv	-0.01	-0.25	-0.04	-0.18	0.19	1.00	
Other	-0.29	-0.34	0.09	-0.29	0.00	0.01	1.00

Note that one of the few positive correlations is between "too expensive" and "no computer," which is sensible and suggests that the "too expensive" response may not point to broadband prices but the total cost of being online.

Figure 2. Adoption and Reasons

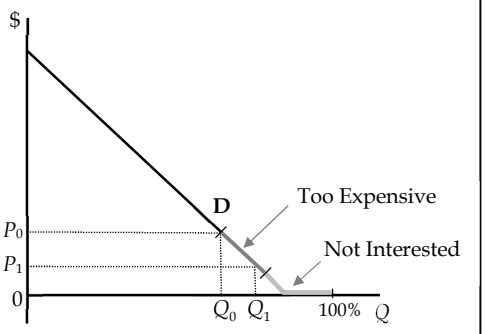


Figure 2 provides a graphical depiction of the empirical question posed here. (Note that the response options are not clearly defined in an economic sense, so this analysis is admittedly loose.) Price is measured on the vertical and quantity (adoption) on horizontal axes. The demand curve for Internet service is the downward sloping curve labeled D. At the market price P_0, the quantity is Q_0. (A quantity of 100% is universal adoption.) The demand curve has three segments. Above the market price are households with reservation prices above the market prices (i.e., subscribers). Just below the market price is a segment of the demand curve representing households that value Internet service at near, though below, the market price. These are households that might say Internet service is "too expensive." The third and lowest segment of the demand curve is the "don't need/not interested" group, which has a low or zero willingness to pay for Internet service.[6]

Now, consider the effects of a price reduction (possibly via a subsidy). If price falls to P_1, then quantity rises to Q_1—that is, Internet adoption increases.[7] Those motivated to subscribe by the price reduction are likely homes in the "too expensive" group, not the "don't need" group. At higher levels of adoption, therefore, we might expect the share of respondents saying they "don't need/not interested" the Internet is greater than at low adoption rates.

With the Affordable Connectivity Plan ("ACP") and low-priced services offered by providers as part of the ACP, it may be (or should be) that "too expensive" becomes a very small share of reasons not to adopt broadband, with "don't need" (and perhaps privacy concerns) making up an increasingly large share of reasons the Internet is not used at home.

The analysis indicates that as adoption rises over time, the remaining pool of non-adopters increasingly will be households that have little interest in using the Internet.

Empirical Model

My interest is in the relationship between the reasons for non-adoption and the adoption rate. Specifically, the empirical question is: are the reasons for non-adoption constant across adoption rates? For reasons described above, we might expect that the response rate of "too expensive" (or other) responses might shift toward the "don't need" response at higher adoption rates.

The empirical approach is straightforward. Let y_{rit} be the share of non-adopters in state i at time t stating reason r is the main reason for not having Internet service in the home, and let a_{it} be the average adoption rate in the state. The relationships between the reason for non-adoption and the adoption rate may be estimated by,

$$y_{rit} = \beta_r a_{it} + \mu_{ri} + \lambda_{rt} + \varepsilon_{rit} \ , \qquad (1)$$

where μ_{ri} is a state fixed effect for reason r, λ_{rt} is a time fixed effect for reason r, and ε_{rit} is the econometric disturbance term. The data provide six reasons for non-adoption: (1) don't need it or not interested it; (2) too expensive; (3) don't have a computer; (4) it's not available; (5) privacy/security concerns; (6) use it elsewhere;

and (7) other reasons. Since the shares sum to one, six equations are estimated and the coefficient on the "other" category is derived (the sum of the coefficients must sum to zero). To account for correlations among the residuals, the models are estimated jointly with robust standard errors.[8]

Results from the estimation of Equation (1) for each y_r are summarized in Table 3. Note that since the shares sum to one, the coefficients will sum to zero. The β coefficients may be interpreted as the percentage point change in the response rate y_r given a one-percentage point change in Internet adoption.

Table 3. Reasons for Non-Adoption

Main Reason	β
Don't Need	0.449***
Too Expensive	-0.110
No Computer	-0.056
Not Available	-0.044
Use Elsewhere	-0.070
Privacy/Security Concerns	-0.039
Other	-0.125
Year Fixed Effects	Yes
State Fixed Effects	Yes
Obs. (each equation)	200

Stat. Sig. * 10% ** 5% *** 1% .

In Table 3, we see that as adoption increases, the share of the "don't need" response increases, while the other responses have negative β coefficients. A one-percentage point increase in adoption increases the share of "don't need" responses by about 0.449 percentage points. Note the sum of the negative β coefficients equals -0.449, matching the β coefficient on the "don't need" response. As the "don't need" response increases in adoption, the bulk of the additional share is taken from the "too expensive" and "other" responses. The remainder of the higher "don't need" share is taken roughly equally from the other reasons for non-adoption.

The analysis indicates that as adoption rises over time, the remaining pool of non-adopters increasingly will be households that have little interest in using the Internet. Thus, closing the adoption gap may become increasingly more difficult over time. In fact, universal adoption may be impossible. The telephone was never universally adopted, suggesting the Internet may likewise fall short of universal adoption.

NTIA's new data on Internet use confirms what the data has said in the past: the Digital Divide is predominantly a problem of a lack of interest, not affordability.

Conclusion

NTIA's new data on Internet use confirms what the data has said in the past: the Digital Divide is predominantly a problem of a lack of interest, not affordability, at least with respect to adoption. Affordability is not the dominant driver of non-adoption, a result spanning many years. Also, as adoption rises over time, a lack of interest will increasingly explain non-adoption and price less so. This result comports with economic reasoning.

Efforts to close the Digital Divide as adoption rises will be increasingly challenging, since public policy must deal with households that have no interest in the Internet. At high levels of adoption, devoting significant resources to the affordability issue, presumably via subsidies, may not render large payoffs, though getting to a "high adoption" outcome may be the consequence of such subsidies.[9]

NOTES:

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1 R. Goldberg, *New NTIA Data Show Enduring Barriers to Closing the Digital Divide, Achieving Digital Equity*, NTIA (May 11, 2022) (available at: https://ntia.gov/blog/2022/new-ntia-data-show-enduring-barriers-closing-digital-divide-achieving-digital-equity).

2 *Id*.

3 *Id.*

4 G.S. Ford, *Confusing Relevance and Price: Interpreting and Improving Surveys on Internet Non-Adoption*, 45 TELECOMMUNICATIONS POLICY (March 2021); originally published as G.S. Ford, *Subsidizing Broadband: Price, Relevance, and the Digital Divide*, PHOENIX CENTER POLICY PERSPECTIVE NO. 20-05 (July 7, 2020) (available at: https://www.phoenix-center.org/perspectives/Perspective20-05Final.pdf). Arguments suggesting "too expensive" is the main reason for non-adoption of the Internet are based on surveys that exclude the "don't need or not interested" option, which merely shifts respondent answers to the "other" category (thus hiding the ball).

5 Data available at: https://www.ntia.doc.gov/data/explorer#sel=noNeedInterestMainReason&disp=map.

6 For an analysis of price responsiveness of these groups, *see* Ford, *supra* n. 4.

7 The demand elasticity of broadband service is provided in G.S. Ford, *Assessing Broadband Policy Options: Empirical Evidence on Two Relationships of Primary Interest*, PHOENIX CENTER POLICY PERSPECTIVE No. 21-04 (July 28, 2021) (available at: https://www.phoenix-center.org/perspectives/Perspective21-04Final.pdf).

8 Estimates are obtained using -suest- in Stata 17.

9 *See* T.R. Beard, G.S. Ford and M. Stern, *Bridging the Digital Divide: An Empirical Analysis of Public Programs to Increase Broadband Adoption*, 67 TELEMATICS AND INFORMATICS (February 2022) (available at: https://doi.org/10.1016/j.tele.2021.101754), originally published as *Bridging the Digital Divide: What Has Not Worked But What Just Might*, PHOENIX CENTER POLICY PAPER NO. 56 (June 2020) (available at: https://www.phoenix-center.org/pcpp/PCPP56Final.pdf).