Policies to Increase Broadband Adoption at Home

BY ROBERT D. ATKINSON | NOVEMBER 2009

If the United States is to achieve near universal broadband adoption—on the order of telephone adoption rates—at least in the near to moderate term, the federal government will have to develop and implement policies designed to spur broadband adoption.

An effective national broadband strategy entails policies to both expand the supply of broadband infrastructure demand for broadband service. However, both supply and demand side policies are a means to an end—the principal goal of a national broadband strategy is to increase the number of individuals who use broadband Internet in effective ways that drive productivity, enhance their quality of life, and benefit society.

The level of adoption of broadband in the United States remains relatively low. While between 92 to 94 percent of U.S. households can subscribe to broadband (i.e. their residences are served by fixed broadband other than satellite), only approximately 65 percent subscribe.[1] This means that additional demand side policies can spur adoption and use of broadband. Moreover, increased adoption can play an important role in spurring deployment, including deployment of next generation networks. If broadband infrastructure providers can sell their services to more customers without incurring additional fixed costs, this makes the financial risk-reward proposition of investing in unserved areas or upgraded networks more appealing.

The data and studies regarding the reasons for non-adoption suggest that there are a variety of factors that explain why individuals who could subscribe to broadband choose not to. The three key factors are affordability (e.g., the cost of broadband service, the cost of a PC), usability (e.g., lack of digital literacy skills,

physical handicaps), and lack of relevance or perceived value (e.g., consider Internet a waste of time). The relative importance of these factors in limiting adoption differs by individual and generally by the type of individual. For example, for some wealthier, older Americans a lack of interest and/or knowledge of the value proposition of broadband Internet may be a more important factor than the cost. In contrast, for some low-income, non-elderly households, cost may play more of a deterrent factor.

While some information is known about the reasons for not adopting broadband, considerably less is known about the kinds of policies and programs that are effective in spurring broadband adoption.[2] While logic and discussion with experts and practitioners can inform the question of what are the best policies and programs, any efforts will have to be seen as experimental in nature. However, the challenge is such that policymakers cannot wait until the social science research community gains a stronger understanding of what are the

most effective practices. Rather, policymakers need to act now, at least to spur more experimentation. Given that necessity, this report discusses a number of steps federal policymakers could take to increase the rates of broadband adoption. Given the reality of budget deficits and the importance that some policymakers are placing on fiscal discipline, even at the expense of needed public investments, this report focuses on policies that have a relatively small or moderate budgetary impact. However, in our view the case for considerable investment of federal funds (in partnership with the private sector) in broadband demand programs is quite strong, even in the face of fiscal pressures.

To spur broadband deployment, Congress, administration and FCC should take the following steps:

1. Fund a competition for ISPs to attract new subscribers in low-income communities.

2. Support innovative pricing plans by ISPs.

3. Allow Lifeline to be used for broadband.

4. Use E-rate funds to help defray the costs of low income families owning a computer.

5. Extend and expand the moratorium on Internet taxes.

6. Fund digital literacy programs.

7. Create a digital literacy and broadband adoption clearinghouse.

8. Establish a reinvented TOP program.

9. Pass along cost savings to citizens that use e-government services.

INTERNATIONAL COMPARISONS

According to OECD data, the United States lags behind a number of nations in broadband adoption. There are a number of factors that play a role in determining international ranking, including the extent of broadband network deployment. But ubiquitous supply is not enough. In Japan 99 percent of households can subscribe to wired broadband, with over 80 percent being able to subscribe to very fast fiber to home connections. Yet its adoption rate is approximately the same as the United States, 61 percent vs. 65 percent.

In fact, demand factors play a more important role in determining national adoption rates. In comparison with most leading nations, the United States suffers from lower levels of Internet and broadband use.[3] And programs to spur demand can be effective. Take Japan and South Korea for example. Both enjoy widely deployed, high speed broadband networks. Probably fewer than 2 percent of homes in South Korea cannot subscribe to broadband and fewer than one percent in Japan. Yet, the take up rate in South Korea is 34 percentage points higher than in Japan, around 95 percent vs. 61 percent.

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One reason for this difference is that South Korea put in place a wide range of well-funded programs to spur broadband adoption, while Japan has done less. Indeed, perhaps the nation with the most comprehensive policies in this regard is South Korea. It has created a number of demand-side programs to target affordability and usability. South Korea has digital literacy programs that target population groups that otherwise would be less likely to use the Internet. The "Ten Million People Internet Education Project (2000-2002)" worked to provide Internet education to approximately a fourth of South Korea's citizens. Government made efforts to provide these free or subsidized training programs for groups like the elderly, military personnel, and farmers.[4] In addition, the South Korean government provided subsidies to around 1,000 private training institutes for the purpose of educating housewives, in order to create demand in households. Under this "Cyber 21" program the government offered 20-hour, week-long courses to housewives for only about $30. In just the first 10 days, 70,000 women signed up for the courses.[5] The Korean Agency for Digital Opportunity and Promotion (KADO) also has a variety of programs to promote digital literacy and access to computers. These include establishing 8,263 Local Information Access Centers where the public can access the Internet for free, distributing free used personal computers to the disabled and to those receiving public assistance, and education and training programs for the elderly and disabled.[6] Other policies have also targeted affordability. Realizing that broadband demand would not increase if its citizens did not have

access to a personal computer at home, the South Korean government provided subsidies for the purchase of personal computers by low-income citizens. The personal computer diffusion promotion established in 1999, aimed to provide personal computers at low-prices, partly through a personal computer purchase installment plan using the government-run postal savings system. The next year the government purchased 50,000 personal computers and provided them to low-income families on a reasonably priced 4-year lease, with full support for broadband free for 5 years.[7]

Other nations have established programs as well. In the U.K., the "Home Access" program to provide computers and broadband access to low-income families is being expanded from a pilot program to a nationwide program.[8] The program aims to benefit more than 270,000 households by March 2011. Portugal established a program to provide free laptops to 650,000 school age children.[9] The Swedish government implemented a successful program that subsidized personal computer purchases by enabling companies to provide them to their employees' on a pre-tax basis. Sweden now has one of the highest rates of computer ownership.[10]

POLICIES FOR BROADBAND ADOPTION

If the United States is to achieve near universal broadband adoption—on the order of telephone adoption rates—at least in the near to moderate term, the federal goverment will have to develop and implement policies designed to spur broadband adoption. These policies should satisfy several criteria. First, and most obviously, demand-side broadband programs need to be effective. While there is a lack of high quality studies of the effectiveness of different types of broadband adoption programs, there is some evidence to suggest what types of programs are effective.[11] More successful programs appear to be comprehensive (e.g., addressing many of the barriers at once), have a local, grassroots presence (e.g., with representatives of the community involved in program design and delivery), and be guided by strong oversight and accountability for results. Second, programs also need to be able to be at a sufficient scale to make a difference. There are programs around the nation that appear to be successful in getting people to adopt and use broadband, but many are quite small in scale, serving only hundreds of people, not tens of thousands. The only way to get to

scale is for the federal government to take a leadership role in funding broadband demand initiatives, ideally in partnership with the private sector and the civic sector. Third, programs need to target their resources efficiently, limiting expenditures on activities that would have happened anyway without the program.

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With these guidelines in mind, the report lays out a number of recommendations for local, state and national policymakers to consider to spur broadband adoption and effective use. These are organized into four categories: lowering cost, improving usability, increasing real or perceived value, and comprehensive initiatives that address all three factors.

Comprehensive Initiatives

The most ambitious and effective programs are those that try to remove all—or nearly all—barriers to adopting broadband in a unified manner.

1. Fund a competition for ISPs to attract new subscribers in low-income communities. Broadband appears to be widely available in most low income communities located in urban and suburban areas.[12] But adoption rates are much lower than in higher income areas. One way to encourage adoption would be to provide stronger incentives for broadband service providers to sign up new customers, particularly in low-income neighborhoods. Currently, they have limited incentives to do so because the costs of getting new customers in these areas can exceed the revenues expected. These costs may include digital literacy training, computer subsidies, and marketing to explain the benefits. But harnessing the competitive spirit of providers to get more customers could prove a cost-effective way to increase adoption.

Therefore, the National Telecommunications and Information Administration (NTIA) should establish a competition that rewards broadband service providers who attract the most new subscribers in low income communities. NTIA would define the eligible areas as

low-income census tracts around the nation. To be eligible for the competition, broadband service providers would have to apply to the NTIA and report the number of their subscribers in each census tract they intend to compete in. At the end of the competition period (ideally one year) broadband service providers would again report the number of their subscribers in each eligible census tract. The individual service provider that signed up the most new customers would win an award of $250 per customer. To further interest participating companies, companies that succeed in signing up the greatest number and/or share of new customers could be honored in a public ceremony, perhaps at the White House.

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In order to spur competition, awards would be made to only one service provider per tract. In order to ensure strong efforts in the few census tracts where there may be only one provider, eligible winners would have to add a minimum number of subscribers to be eligible. And customers would have to remain subscribed for a minimum length of time (e.g., one year). Increasing broadband adoption nationally by 5 percentage points would cost approximately $970 million.[13]

There are two key advantages of this approach. First, public expenditures are made only if people actually start subscribing to broadband at home. Second, because it relies on market competition to figure out the best way to get subscribers, it is likely to spur innovative efforts. Some service providers may develop novel payment plans, such as prepaid broadband services for the unbanked. Others may develop new outreach efforts, such as providing computer and Internet training in their local stores. Some might aggressively market the availability of Lifeline programs for broadband (assuming that Congress allows Lifeline to extend to broadband). Still others may partner with third party organizations, like community technology centers or broadband assistance organizations, to help them expand their scope.

Affordability

A number of studies suggest that broadband adoption in particular is sensitive to costs (having what economists call a high elasticity of demand). As the U.S. Government Accountability Office (GAO) has reported, the "price of broadband service remains a barrier to adoption of broadband service for some consumers" and noted that "households with high incomes were 39 percentage points more likely to adopt broadband than lower-income households."[14] Likewise, in 2009, the Pew Internet and Society project found that just 35 percent of low income American households with less than $20,000 annual income subscribe to broadband services, compared to 85 percent of households with over $75,000 in income.[15] Moreover, almost one-third (32 percent) of dial-up users and 10 percent of non-Internet users say that price is the major reason for not switching to broadband. And studies of the impact of price on adoption suggest that price does matter. Goolsbee finds that overall economic welfare loss from $1 of taxes on broadband (wireless or wired) is between $3.46 and $5.15.[16] In other words, for every dollar raised in taxes on broadband, society as a whole loses at least $3.46. This suggests that efforts to reduce costs can play a role in spurring demand, particularly among lower income households.

2. Support innovative pricing plans by ISPs. Compared to the wireline and wireless phone industries, there is a relative paucity of different pricing plans in the broadband industry. Many ISPs have discounts for service that is bundled with other services (e.g., TV and/or phone). And some charge less for service with lower speeds. But no company appears to sell low cost plans based on limited use. Yet, for many consumers, particularly lower income consumers, having access to a plan that is priced on the basis of limited bit use might be quite attractive. Likewise, some consumers might be more willing to adopt broadband if a computer was included for free (just as consumers today subscribe to cell phone plans and get a free phone).

Yet, when some ISPs have attempted to pilot innovative pricing programs, including ones using bit caps, they have been criticized by some legislators and advocates for unfairly limiting user's access and raising prices. But such differential pricing can not only enable the network to be used more efficiently (by charging heavy users relatively more and light users relatively less), they

could lead to broader availability in the marketplace of lower cost basic "no frills" broadband plans. Likewise, the cellular industry has been criticized for the use of long term contracts that enable them to bundle into plans a free or low cost handset.[17] Bundling a PC into a broadband service plan would also require long-term (e.g., two year) contracts with cancellation penalties involved. If companies feel that such a business model is going to make them subject to regulatory uncertainty, they will be less likely to experiment with it.

However, if the FCC made it clear through their national broadband plan that it wants to encourage such innovative pricing plans, particularly if there was evidence that such plans were leading to lower priced alternatives that could spur adoption rates, then ISPs might be more willing to engage in such innovative service offerings.

3. Allow Lifeline to be used for broadband. Lifeline is a federally mandated government program that offers low-income households a discount on their monthly local telephone bill for basic telephone service.[18] In a world where many households have the ability to use broadband for voice services (VOIP), it is anachronistic for this program to not allow consumers to use the subsidy for either traditional voice service (wired or wireless) or broadband. Congress and the FCC should reform the program by allowing Lifeline recipients to use the support for whatever service they choose: plain old telephone service (POTS), mobile telephony, or broadband. If budgetary issues are a concern here, one option might be to allow Lifeline to be used for broadband but to limit the subsidy only to those customers whose ISPs are willing to cover a portion of the cost reduction themselves. Some ISPs already offer such cost reductions today.[19] And it may make some economic sense for them, beyond just increasing community good will. Since the marginal costs of adding a new customer are lower than the average costs, differential pricing based on income (e.g., lower prices for lower income subscribers) can maximize revenue if the lower price brings customers onto the network that in the absence of the subsidy would not otherwise be on and if the revenue exceeds costs. In addition, it may be that if such subsidies are temporary in nature (e.g., for the first year or two) that low income subscribers may be willing to pay the regular rate after they have firsthand experience with the benefits of broadband.[20]

4. Use E-rate funds to help defray the costs of low income families owning a computer. Without owning a computer or similar device there is no reason to subscribe to broadband. One proposal that could significantly expand computer ownership is to allow E-rate funds to be used to subsidize computer purchases by low-income families with students enrolled at E-rate eligible schools.

There is increasing evidence that having an Internet-connected computer at home increases education performance.[21] Yet, as of 2007 approximately one quarter of American households with children under the age of 18 did not have an Internet-connected computer at home. And for children living in households with incomes less than $30,000, 49 percent did not own a computer in their homes.[22]

Spurring broadband deployment and computer adoption among families with children can play a key catalytic role of not only helping other direct family members to become computer and Internet literate, but also their extended family and neighbors. Indeed, there is evidence that when households subscribe to the Internet, their neighbors are more likely to subscribe.[23] As such policymakers should invest funds to help low income families with children afford to purchase a computer and get subsidized broadband service for one year. If such a program provided a subsidy (up to $300) equal to two-thirds of the cost of purchasing a PC, it would cost $450 million per year to prvide PCs to 1.5 million low income households.[24]

While ideally the funds for this should come from general fund revenues, in an era of fiscal shortfalls another option would be to transfer funds from the existing Schools and Libraries Universal Service program (e.g., the E-rate program). The E-rate program has been a success at getting schools wired to broadband. According to the OECD, the United States leads OECD nations in the share of classrooms connected to broadband with 97 percent of primary and secondary schools having broadband access.[25] The next step is to help low income families with students to afford computers. Therefore, allocating 15 percent of the E-rates funds now going to schools for computers in the homes of the students at these schools will go along way in accomplishing that goal.

The program would be administered by the Universal Service Administrative Company (USAC). As with the Lifeline/Linkup program, broadband service providers would be the ones to directly relate to consumers, and would submit reimbursements to the USAC for two thirds of the costs of the computers they sell to customers. In addition, groups that work to bring digital opportunity to disadvantaged communities and individuals (such as ConnectedNation and One Economy), could market the program to individuals that they work with.

5. Extend and expand the moratorium on Internet taxes. The Internet Tax Freedom Act established a moratorium prohibiting state and local governments from imposing three types of taxes: Internet access taxes, multiple taxes on online transactions, and discriminatory taxes on online transactions. By limiting the ability of states to impose taxes on Internet access, the Internet Tax Freedom Act (ITFA) has reduced the cost of Internet access and spurred investment in the digital economy.[26] However, the Act can be improved in several ways.

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First, the current moratorium on Internet access taxes should continue to be extended until at least the vast majority of American households (e.g., 90 percent plus) subscribe to broadband.

Second, Congress should eliminate the grandfather clause which allows certain states to continue to tax Internet access. The prohibition on taxes on Internet access should be consistent across all states and not reward states that early on imposed taxes on Internet access.

Third, the ban on Internet taxes should be clarified to include the underlying transport services acquired by ISPs, such as the wire, cable, or fiber used to carry traffic from customers to the Internet. Currently, some states tax the underlying transport for broadband Internet access, a cost which ISPs then pass on to consumers in the form of a tax recovery fee.

Finally, Congress should ban state and local discriminatory taxes on wireless services. Given that the average tax on telecommunication services is 13.5 percent, more than twice the average tax rate on all other goods and services, Congress should act to ensure that the short-term fiscal interests of states do not trump the long-term strategic interests of the nation.[27]

Usability

Many individuals choose not to subscribe to broadband Internet access because they feel using the Internet is too difficult. These individuals cite a variety of reasons including lack of experience or understanding about personal computers (i.e. digital illiteracy) and physical accessibility issues. Some individuals with disabilities cannot get online because they lack and cannot afford special equipment to make computing possible. For example, visually impaired users may not have screen reading technology and physically impaired users may not be able to operate a standard PC.

6. Fund digital literacy programs. Given that lack of digital literacy appears to be an important factor limiting broadband take-up, simply providing USF-like subsidies (such as Lifeline and Linkup) is unlikely to be enough. When telephones were first adopted, "telephone illiteracy" was not the major barrier to deployment because phones were relatively easy to use. Notwithstanding constant improvements in usability, computers and the Internet are, in comparison, quite complicated and difficult to use. Despite the fact that an increasing number of applications rely on broadband, many people who cannot live without a phone feel perfectly comfortable living without the Internet. This suggests that a universal service policy focusing solely on subsidizing costs will not be enough to maximize broadband adoption. Any policy to expand broadband use must include efforts to make non-users comfortable with, and interested in, computers and broadband.

In support of increased digital literacy, Congress should enact and fund a competitive, community-based broadband access grant program, focused not just on broadband connectivity, but also on digital literacy and technological device access. Such a program could catalyze the creation of even more local, nonprofit, and voluntary approaches to bringing most, if not all, of a community's residents online.

7. Create a digital literacy and broadband adoption clearinghouse. One challenge with expanding the scope and effectiveness of community-based digital literacy and broadband adoption programs is that there is considerable work that gets duplicated. Notwithstanding the fact that communities differ, there is considerable commonalities efforts share. For example, effective programs may deal with issues such as the optimal design of a computer donation and refurbishment program; optimal design of curriculum for community technology centers; etc. Often communities and organizations within communities are investing valuable resources to what often is a case of "reinventing the wheel." As a result, there is a need for a national organization to track effective practices and compile and disseminate shared tools (e.g., curricula, how-to manuals, software tools, etc.) that can be easily customized for local initiatives. Toward that end, the NTIA should fund an organization to work to provide these shared services.

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INCREASING VALUE

Individuals also choose not to subscribe to broadband because they do not see the value of the service. Sometimes this is because the individuals do not understand what content and applications are available online. Other times it is because the content that is online is not relevant to them. For example, many websites do not conform to accessibility standards, and cannot be viewed by some visually-impaired users. Policies that increase the real or perceived value of broadband Internet access can help increase home adoption.

8. Establish a reinvented TOP program. More compelling public-interest broadband applications will also play a role in encouraging broadband adoption. One programmatic tool used to spur digital adoption in the past was the Technology Opportunity Program ("TOP"), administered by the National Telecommunications and Information Administration ("NTIA"). The NTIA notes that between 1994 and 2004, "TOP made 610 matching grants to state, local and tribal governments, health care providers, schools, libraries, police departments, and community-based non-profit organizations."[28] In general, TOP grants helped organizations build and deliver technology capability to local residents.[29] TOP accomplished much, but its major limitation was that it funded the development of many community-focused Internet and software projects that were used in that particular community alone.

In the American Recovery and Reinvestment Act of 2009, Congress fund the Broadband Technology Opportunities Program (BTOP) but most of the funds are dedicated to broadband deployment efforts. Congress should provide ongoing funding for a broadband application program. Such a program should focus less on individual community projects that are not replicated, and more on developing national Web-based tools that can be used in any community around the nation, or indeed the world. There are numerous applications that could be developed just once, and be made available on the Internet for all to use. For example, Canada initially developed AlphaRoute, an online adult literacy application, as a pilot project in Ontario, but now allows any publicly funded literacy and adult education center in the country to use it without charge. The AlphaRoute program supplements online courses with discussion boards, live chats, and e-mail to foster interaction between students, instructors, and mentors. It includes special guidance for deaf students who can access online video to teach them American Sign Language.[30] A revived TOP program should have as its primary focus the development of nationally scalable Web-based projects that address particular social needs, including law enforcement, health care, education, and access for persons with disabilities.

9. Pass along cost savings to citizens that use e-government services. If citizens, particularly lower income citizens, could save more money by being online, they would be more able to afford to subscribe to broadband. One way for government to enable this is to pass along the savings from online interactions to citizens. For many governmental activities it costs government less if citizens use an online channel, as opposed to using mail, telephone, or in-person channels. This includes services like paying taxes, fees, and fines (e.g., parking tickets), renewing permits and licenses, and other activities where citizens pay. Some governments provide a discount for citizens using the lower-cost e-government channel. More governments should

do the same. By doing this, they will provide stronger financial incentives for citizens to get online and use broadband. Some advocates will object that this is regressive since it would mean that at least in the short term that higher income households (who are more likely to be online) would be more likely to interact with government online and enjoy the savings. But if government is simply passing along the savings to online users, it is not charging more for offline users. But they are providing a real financial incentive for lower income households to get online.

CONCLUSION

The United States, and indeed all developed nations, are in the midst of a transition in which over the next few decades virtually all of their citizens are likely to be connected at home on broadband networks. Even just a few years ago one could legitimately argue that Internet access generally, and broadband access specifically, was not something that most Americans needed to have and to be able to use to effectively participate in society. But that has changed. Individuals still don't "have to have" broadband the way they have to have food, shelter, health care, indoor plumbing and even telephone service. But while broadband may not qualify as this type of basic need, it is certainly vastly more important than a typical consumer discretionary item like pay TV services. For broadband increasingly is the platform on which individuals can engage in an array of activities that make their lives much easier including commerce, e-government, education, health care, and of course, access to a vast array of information.

Waiting for "the market" to bring everyone onto broadband networks will not only consign tens of millions of American households to years without broadband services, and all the benefits it provides, but it will reduce the economic and social benefits enjoyed by the rest of Americans by reducing the "network effect" of broadband Internet access. This is not to say, as some claim, that government should pressure people to subscribe to broadband or that individuals who choose not to subscribe are making decisions that are somehow inappropriate. It is to say, though, that many Americans who do not subscribe, do so because they can't afford it, are unable to use it, or don't understand its value. As such, it's incumbent upon the federal government to take serious steps to addressing these challenges and help millions of Americans avail themselves of the broadband Internet.

ENDNOTES

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13. This is based on an estimate of 111.1 million households, and the assumption that the winning ISP would on average sign up 70 percent of the additional subscribers in a particular area.

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17. Richard Bennett, "Sharing the Risks of Wireless Innovation," (Washington, D.C.: Information Technology and Innovation

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18. In order to receive Lifeline, a consumer must be a current recipient of one of the following low income: assistance programs, Medicaid, food stamps, Supplemental Security Income (SSI), Federal Public Housing Assistance (Section 8), Low-Income Home Energy Assistance Program (LIHEAP), Temporary Assistance to Needy Families (TANF), or The National School Lunch Programs Free Lunch Program. See: http://www.lifeline.gov/lifeline_Consumers.html.

19. Hauge and Prieger, Demand-Side Programs, p. 7.

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22. U.S. Census Bureau, "Computer and Internet Use in the United States: October 2003," http://www.census.gov/population/www/socdemo/computer/2003.html, (accessed October 27, 2008).

23. Goolsbee and Klenow found that people are more likely to buy their first computer if they live in areas where a high proportion of households own computers or if a high fraction of their friends and family own computers – even controlling for other factors affecting computer ownership. If ownership rates are 10 percent higher in one city than another in a given year, the gap will be 11 percent the following year, assuming all else stays constant. They explain this effect on the basis that the number of experienced and intensive computer users creates a "spillover" effect for non-users. Austan Goolsbee and Peter Klenow, "Evidence on Learning and Network Externalities in the Diffusion of Home Computers," *Journal of Law and Economics*, October 2002, Vol XLV (2, part 1): 317-344.

24. This is based on the following calculations. The program pays two-thirds of the costs of purchasing a computer (estimated at $300 for the share and $450 total).

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