# Winners and Losers from the Universal Service Subsidy Battle

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## I. Introduction

In the name of universal service, regulators have historically used implicit cross subsidies to keep local rates relatively uniform across markets.[3] Rates for long-distance, business, and other services are held artificially high to subsidize local rates, especially in high-cost rural areas. An explicit federal universal service program has augmented these implicit programs by taxing long-distance services and redistributing these monies to carriers with high costs. In 1999, these explicit federal high-cost programs cost approximately $1.7 billion.[4] The Telecommunications Act of 1996 allowed competitors to enter local markets. While the inefficient use of implicit cross subsidies was sustainable under a regime of regulated monopoly, this practice is not sustainable in a competitive environment. As a result, state and federal regulators are reexamining their historical universal service programs. The Telecommunications Act also attempts to move from implicit to explicit subsidies. Even so, universal service is one of the most expensive, controversial, and competitively important portions of Act. To implement the Act, the FCC recently adopted a new federal universal service program for large carriers. This new program will be implemented in 2000 and all federal high-cost subsidy

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[3] Mueller (1997) provides an extensive background on the history and evolution of universal service policy in the U.S.
[4] The Universal Service Administrative Corporation (1999) reports that the total projected funding requirement for the high cost programs for the fourth quarter 1999 is $433.328 million. Simply annualizing the quarterly requirement derives our $1.7 billion estimate. This estimate does not include any increases that will come about because of the adoption of the new universal service program, which will begin in

programs are now funded through a tax on all interstate end-user telecommunication revenues.

The basis of the new federal program is to divorce a carrier's subsidy from its historical book costs by using a cost model to determine the size of subsidies. The new plan is intended to be competitively neutral and allows both new entrants and incumbent carriers access to subsidies as long as they are deemed eligible by state commissions.[5] The new federal program has been divided into two parts – one for "rural", or small, telephone companies and the other for "non-rural", or large, telephone companies.[6] This paper focuses on subsidy plans for non-rural telephone companies and their impacts.

The purpose of this paper is to take a closer look at universal service programs and who benefits from them. We begin with a short review of the theory underlying universal service and then move on to a summary of the FCC's cost estimates for providing service. The cost model suggests that only a small percentage of lines should be considered high-cost lines. We then summarize the results of the recently adopted federal program. Given current rates in rural areas and the large amount of implicit subsidies within the system it is unlikely that the federal program alone will prevent major changes in rates if competition moves rates toward costs.

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2000. In addition to the high-cost program, the FCC also provides subsidies to low-income subscribers. This program provides approximately $500 million of federal support annually.

[5] The definition of eligible carriers is a contentious issue, see Rosston and Wimmer (1999) for a discussion of this issue.

[6] The distinction between "rural" and "non-rural" is somewhat misleading. A rural company is defined to be, among other things, one that serves less than 100,000 lines in a state. We focus our attention on the "non-rural" carriers because the Telecom Act's and the FCC's treatment of "rural" telephone companies is significantly different from the treatment of non-rural companies for purposes of universal service. In addition, the rural telephone companies account for less than 10 percent of the lines. While small companies account for a very small percentage of total lines, they receive the lion's share of subsidies provided by historical universal service programs. We believe that there is no economic reason for the artificial regulatory distinctions between small rural telephone companies and large telephone companies that serve similar areas.

We therefore examine the magnitude of potential intrastate universal service schemes. We assume that states will adopt programs that are consistent with the federal program and will target support to high-cost wire centers. We assume that states will provide subsidies to wire centers by taking the difference between estimated costs, net of federal subsidy, and a benchmark.[7] To understand the effects of such programs, we compare the costs of a $32.18 and a $50 benchmark. In addition to providing state regulators information about the effect of such programs and their costs, our analysis gives a rough estimate of the amount of implicit cross subsidies presently in the system.[8] Finally, we augment the cost-model data with demographic data to examine the characteristics of consumers who receive support under the federal and potential state programs.

Increasing subsidies to high-cost areas has a large impact on the size of the program, but is likely to have a de-minimus effect on subscribership. Furthermore, cost-based programs do a poor job of targeting subsidies to low-income households and minorities are more likely to be net contributors under such programs. We estimate that targeting support to low-income households, rather than basing support on costs, would save about $1.7 billion per year. If such a program were extended to rural telephone company customers as well, the savings would be even greater.

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[7] Because it is very difficult to reverse any flow of subsidies, it is likely that the new federal program will remain in place for some time. We therefore believe that examining potential state programs is likely to be more pertinent to policy makers. An analysis of only the federal program gives similar results although the magnitude of the effects is smaller.

[8] We are unaware of any efforts to set local service rates in line with costs.

## II. Theory of "Universal Service"

The essential goal of the universal service is to ensure that people stay connected to the network. Two primary reasons have been put forth to justify universal service subsidies. It has been argued that telephone service is an essential service that all households need, and that there are "network effects."[9]

If the goal is to keep people connected to the network,[10] economists agree that targeting subsidies to consumers who would disconnect in the absence of a subsidy is more efficient than basing subsidies on the cost of providing service. Under a cost-based plan, much of the subsidy may be directed to consumers with high incomes who would remain connected even if prices reflect costs. This makes the program larger than is necessary and requires higher tax rates, which distort market outcomes. Low-income consumers living in low-cost areas may subsidize high-income users living in high-cost areas. Thus, it is likely that the program tends to be an income transfer program that makes one group better off at the expense of others, rather than a program that ensures people remain connected to the network. By contrast, if the subsidy is targeted to those who are not presently connected the network or who might choose to disconnect in the absence of a subsidy, penetration rates would remain high and the distortions caused by taxes would be less severe. Moreover, because taxes on telecommunication services will be used to raise revenues, a large program, and concomitant high tax rates, may actually

[9] For a summary of the history of universal service, see Mueller (1997).
[10] High penetration rates are obviously one of the goals at the FCC, as evidenced by their periodic monitoring of these levels.

decrease penetration levels because the cost of using the network increases for those not receiving a subsidy.[11]

Others have studied this problem, and generally come to the conclusion that it is inefficient to tax a relatively elastically demanded service (long distance) to subsidize the price of a relatively inelastically demanded service (local monthly service). Crandall and Waverman (1998) provide the most extensive discussion of the problem, along with a review of prior literature. They summarize the results of research, all of which come to the same conclusion: the price of local service has very little impact on the decision to subscribe to telephone service. Crandall and Waverman present evidence from the literature that the elasticity of demand for local service ranges from -0.006 to –0.17, with most of the more recent estimates well below –0.1. In their own estimates, Crandall and Waverman find the local monthly rate is insignificant in the subscription decision. However, they do find that the installation charge has a small impact on subscription rates. As a result, they conclude that if there is any subsidy, it should be in the form of a Link-up program that subsidizes initial connection fees.

The FCC recognizes the effectiveness of targeted subsidies to increase penetration rates and provides subsidies based on need through its Lifeline and Link-up programs. These programs provide support to low-income consumers by lowering monthly flat-rated charges and providing support to reduce the cost of connecting to the network. As part of the new universal service plan, the FCC increased these programs. However, the

[11] Hausman, Tardiff, and Belinfante (1993) find that because consumers base decisions to purchase a service based on the total surplus they receive from it, artificially increasing the price of services, such as long distance, decreases the net value consumers receive from connecting to the network.

new high-cost universal service plan will continue to provide support based on the cost of service, regardless of consumers' abilities to pay.

**III. What does it cost to provide phone service?**

The FCC (with significant input from interested parties) has developed a model that estimates the cost of providing local telephone service. The Hybrid Cost Proxy Model (HCPM) divides regions served by non-rural carriers into roughly 12,493 geographic areas based on the current location of incumbent local exchange carrier wire centers (or switches and those served by a particular switch). For each wire center, the model estimates the cost of the various components used to provide local telephone service: loop, switching, signaling and transport, etc. Based on the differences in local conditions, population density and other factors, the model estimates the cost of providing local service in each wire center. These wire centers serve approximately 161 million switched access lines.

The HCPM estimates that average cost of local telephone service is $23.84 for the non-rural companies. Table 1 presents average costs and standard deviations by state. In addition, using information obtained from the FCC's most recent Penetration Report, we include the percentage of households with a telephone unit in the household, which is commonly referred to as the penetration rate.

**Table 1—Average Cost and Standard Deviation by State**

This summary table shows a wide range in the cost of providing local telephone service. Chart 1 below shows the distribution of costs.

**Chart 1 – Percent of Monthly lines by cost**

As shown in Chart 1, the majority of lines have cost estimates that are less than $30 per month and only a small minority of lines are estimated to cost more than $50 per month. Approximately 45 percent of the lines have estimated costs that are less than $20 per month. Nearly 90 percent of the lines (87 percent) have costs below $30; 94 percent are below $40 per month; and 97 percent have costs below $50 per month. It is clear that only a small percentage of all lines are estimated to have costs that are substantially higher than current local spending. The intention of the universal service program is to provide a subsidy to companies (and ultimately consumers) living in areas with high costs in order to keep rates down in these areas.[12]

## IV. The New Federal Program

The recently adopted federal plan uses the cost-model estimates of each state's average cost and compares these with a "benchmark." The FCC determined that its program should attempt to keep rates between states comparable, but left the states to adopt programs that would keep intrastate rates comparable.[13] For these purposes, the FCC determined that an appropriate benchmark is $32.18, or 135 percent of average cost in non-rural areas. For states whose average cost exceeds the benchmark, the federal program provides explicit funding for the intrastate portion (76 percent) of the difference between estimated costs and the benchmark. For example, if the FCC estimates a state's

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[12] Loop Length is the primary driver of costs and is a function of population density. To gain a clearer understanding of this relationship, we regressed the natural logarithm of average monthly cost per line in each wire center on the natural log of population density. Population density is measured as the ratio of the number of total switched lines in a wire center to the total number of square miles in that wire center. This simple regression indicates that a 10 percent increase in switched lines per square mile results in a 2.6 percent reduction in a wire center's average cost per line and explains about 80 percent of the total variation in costs.

average cost to be $50 per month, the $32.18 benchmark leads to a subsidy of $17.82 x 0.76 or $13.44 per month per line. The subsidy is then directed to the highest cost wire centers in each subsidized state. Political considerations led the FCC to adopt an interim "hold-harmless" provision that ensures each state will receive at least as much aid under the new program as it did under the old program.

Based on the cost model and benchmark, seven states qualify for new non-rural, cost-based support. This amounts to $252 million per year. The majority of this money goes to two states – Mississippi and Alabama.

**Table 2 – New FCC High Cost Support**

Under the "hold-harmless" provision, another 15 states (including Puerto Rico) will receive "hold-harmless" support.[14] These states continue to receive the same amount of explicit high-cost support they received prior to the current order for some undefined transition period. The bulk of the hold-harmless money goes to Puerto Rico.

**Table 3 – FCC "Hold Harmless" Support**

## V. Who gets the subsidy?

Before examining who receives subsidies, it is worthwhile to examine penetration rates and how they vary across various demographic groups. Using Current Population Survey (CPS) data to estimate the percentage of households with telephone service, the FCC (1999) reports that 94 percent of all households in the United States had a telephone in their homes in March 1999. This level of penetration is down slightly from 1998 levels (94.2 percent in November 1998), but significantly higher than the levels obtained

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[13] Regulators have generally taken comparability to mean rates should be the same across markets. An alternative definition would be to mean that rates reflect the cost of providing service. Each state will decide whether or not to have a state-specific universal service program.

in the early 1980s (91.4 percent in November 1983). This same report finds that penetration rates differ significantly across ethnic groups, income categories, states, employment status, age and composition of householders. Table 4, below, reproduces the FCC's summary of penetration levels by income categories and race for March 1999.

**Table 4--Percentage of Households with Telephone Unit in Household**

Table 4 shows that there is a strong correlation between household income and penetration rates. Households with less than $5,000 in annual income have a penetration rate of only 75.9 percent, compared to a rate of 98.6 percent for households with annual incomes over $75,000. These data also show households with incomes exceeding $15,000 annually have penetration rates that exceed 90 percent. Columns 3 through 5 give the same breakdown in penetration rates by race. Overall, whites have a penetration rate that exceeds that of Blacks and Hispanics. These differences, however, are likely to be closely tied to levels of income as the differences in penetration rates across races narrow as income rises. These data suggest that an effective universal service program would target its subsidies to low-income households in a fashion similar to the FCC's Lifeline and Link-up programs that provide subsidies to households based on income.

Because it is likely that states will adopt explicit programs of their own, we next provide estimates of the cost of such additional programs. The following estimates use $32.18 and $50 as possible benchmarks above which lines would receive universal service funding. We assume that the Federal fund will continue using both the new need-based funding as well as the hold-harmless support. We then assume that each state will subsidize all wire centers with costs (net of federal subsidy payments) above $32.18.

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[14] Only Wyoming would have receive support under the need-based definition.

These estimates also provide a rough estimate of the amount of implicit subsidies in the present system because most states require rates be close to uniform in all areas of the state.[15]

**Table 5—Residence Subsidies—State Subsidies Only**

**Table 6—Business Subsidies—State Subsidies Only**

Table 5 shows that the total monthly subsidy of these potential programs falls off quite rapidly as the benchmark is increased. This happens for two reasons. First, the size of the subsidy received on a per-line basis will fall for those lines subsidized under the various benchmarks. More important, the number of subsidized lines is cut by two-thirds when the benchmark is moved from $32.18 to $50. Increasing the benchmark saves a great deal of money. Moreover, for the nearly 10 million lines losing support, the increase in price will only be a fraction of the $18 difference – most of these lines have an estimated cost below $40. While only a small percentage of total lines will be supported, a large percentage of wire centers will be subsidized. For example, for residential lines at the $32 benchmark, about 13 percent of all lines receive a subsidy, but more than half of the wire centers (7,160 out of 12,493) are supported. The number of wire centers supported drops to 4,337 or 35 percent of wire centers with a $50 benchmark. Table 6 shows that the subsidies flowing to business lines are only a small fraction of the residential subsidies. As a result, the remainder of the paper focuses on the residential subsidy calculations only.

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[15] To examine the amount of implicit cross subsidy within the system we plan to acquire data on local rates, which will then be compared to estimated costs. Our analysis is only a rough estimate of the amount of cross subsidy because we implicitly assume rates are the same everywhere and that total revenues equal 135 percent of average cost. For these reasons, the size of potential explicit programs are, at best, a lower bound on the amount of implicit subsidy.

To estimate effects on subscribership, we use of elasticity estimates from previous econometric studies. These calculations are meant to be illustrative. If the demand elasticity for local service *alone* is –0.075,[16] then increasing rates for the 14.3 million lines with average loop costs above $32 by at most 56 percent (from $32 to $50 or to cost whichever is lower) would lead to a decease in residential lines of 339,000.[17] With a base of 106 million residential lines, the penetration rate would decrease by 0.3 percent. This decrease, however, would be offset to some extent by additional subscriptions in low-cost areas where prices would decrease under a higher benchmark.[18] For those subscribers that are relatively intensive users of telecommunications, the increase in local rates would be offset by decreases in other telecommunications services that are taxed, either through explicit or implicit subsidies, to fund the programs.[19] This improves the welfare of the users of the 92 million residential lines that do not qualify for a subsidy under the $32 benchmark.

The cost of the program to keep these 0.3 percent connected is $146 million per month (the difference between the cost of subsidy with a $50 benchmark and a $32 benchmark). A large portion of this $146 million is not targeted to people who are in

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[16] See Crandall and Waverman (1998), p 5-4 for a summary of estimates of demand elasticity for local monthly service. –0.075 is at the upper end of the range of recent studies. We realize that the elasticity estimates for local service do not generally use data where prices have increased by the magnitude used here. To mitigate this effect, we use the upper end of the reported elasticity estimates. We also note that the increased availability of substitutes, such as wireless alternatives, will be important for such large increases and effect elasticity estimates. If the goal is to keep people connected to the network, we find that such alternatives should be considered.

[17] For most (68%) of these lines (9.6 million of the 14.2 million), the increase would be less than $18 per month because their costs fall somewhere between $32 and $50. We estimate that the average increase for these customers would be $6.63 per month and the average increase for all customers whose local bill would increase would be $10.22 per month.

[18] We have not estimated this offsetting effect.

[19] Hausman, Belinfante and Tardiff (1993) make the case that some subscribers disconnect because of high toll rates. If toll charges are the source of subsidy dollars, then decreasing toll rates should offset at least some of the predicted decrease in subscribership

danger of falling off the network, but rather given to people who live in high-cost areas and have relatively high incomes. An alternative plan would use the $32 benchmark for low-income households and a $50 benchmark for households with higher incomes. There are roughly 5.7 million residential lines in high-cost areas whose subscribers have household income below $20,000 per year.[20] Thus, if households with incomes less than $20,000 continue to be subsidized using the $32 benchmark, the cost of the program would be reduced substantially. We estimate that the cost of providing a subsidy to only low-income households is approximately $61 million a month. Adding this to the $99 million in subsidy at a $50 benchmark gives a total cost of approximately $160 million a month – a savings of approximately $84 million a month (slightly over $1 billion per year) compared to a program that subsidizes all subscribers using the $32 benchmark. Moreover, because these low-income households would continue to be supported at the $32 level, the number of those disconnecting from the network would be lower. Low-income households account for approximately 40 percent of all subsidized lines with a $32 benchmark. If all income categories are equally likely to disconnect from the network when prices are raised -- an unlikely possibility -- the total number of people disconnecting would be 197,000, a 0.19 percent reduction in penetration under the targeted plan.

We also examine the effect on penetration if the benchmark is eliminated entirely and prices are allowed to reflect costs. We assume a maximum monthly subscription rate of $100 since consumers are likely to move to alternatives such as wireless if prices were

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[20] The number of low-income households comes from data obtained from PNR. We discuss these data below. These data are from 1990, actually 1989 incomes. Adjusting the $20,000 cut-off for inflation since 1990 gives a low-income cut-off of $25,080 in 1998 dollars.

allowed to rise to such levels.[21] Without a universal service program, subscribership would fall by 534,000 lines, a decline of about 0.50 percent. The cost of the universal service program falls from $244 million per month to zero. Continuation of a $32 benchmark for low-income households results in 339,000 fewer subscribers and costs approximately $98.5 million a month, a savings of $146 million per month ($1.75 billion per year).

Another beneficial effect of increasing the benchmark is to move prices more in line with costs. Beyond simple economic efficiency in production and consumption, this will be beneficial in terms of competition policy.[22] The less distorted the marketplace, the truer the signals given to new entrants. In making their entry decisions, new entrants will be relieved of the job of weighing the probabilities that certain subsidies will continue or whether new taxes will be levied on them depending on the changes in political will. All of these risk factors affect entrants' (and incumbents') decisions by increasing regulatory risk. In addition, a decrease in the amount of subsidies given to carriers will decrease the importance placed on which companies are eligible to receive universal service support, which may result in more choices for consumers in high-cost areas.

A proposal to continue supporting low-income households at a lower benchmark and allowing it to increase for higher income groups is attractive for a number of reasons. As discussed above, the FCC and many states have already implemented low-income programs, such as Life Line and Link-up, so adoption of a two-tiered program could be

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[21] See Crandall and Waverman (1998) for a similar exercise.
[22] For a fuller discussion of some the competitive implications of universal service policy, see Rosston and Wimmer (1999).

implemented easily by adopting a relatively high benchmark and increasing low-income programs. Additionally, low-income households are likely to be relatively more sensitive to price increases. A subsidy targeted at low-income groups will therefore minimize the majority of the potentially adverse effects of a high benchmark.

Finally, no matter what benchmark, if any, is adopted, it should be adjusted automatically. Since the benchmark is used to measure affordability and tied to the ability to stay on the network, it should increase over time as nominal incomes rise. There may be some push to decrease the benchmark over time as costs decrease (like a price cap),[23] but this would be exactly the wrong way to adjust an affordability benchmark. Hopefully, as technology and competition advance, costs and prices will decrease and the benchmark will become unnecessary. An alternative plan would be to force subsidies to fall over time by placing a cap on subsidies.

Table 7 contains estimates of the amount each state would have to raise, or is currently raising through implicit subsidies, to keep rates in line with $32 and $50 benchmarks. Again, we assume that the federal program remains in place under the various scenarios.

**Table 7—State Universal Service Support**

Table 7 shows that the required revenue ranges from zero to $5.62 per line per month to achieve a $32 benchmark. Montana, Vermont and Maine all need to raise more than $5 per line per month in subsidies. With a $50 benchmark, the maximum required revenue generation is $3.47, still in Montana. It is interesting to note that Vermont's required subsidy falls much faster than other states when the benchmark is raised,

indicating that a lot of its subsidized lines, net of the federal subsidy, cost between $32 and $50.

## VI. Demographic Information

To better understand the effects of the new universal service program (and any program that keeps rates low in high-cost areas by inflating rates in low-cost areas), we have combined the results of the cost model with demographic data. The demographic data were obtained from PNR and Associates, a consulting company that is involved with several aspects of the cost modeling effort. PNR matched demographic data from the 1990 Census with the wire center boundaries used by the HCPM. From PNR we were able to obtain, among other things, the number of households in each wire center that were headed by people of different races or ethnic groups, a breakdown by income, family type, and several other factors.

Because we are using data from the 1990, the number of households in each wire center does not match the numbers provided by the HCPM. To assign lines to households, we simply multiplied the ratio of each category's households to the number of households by the number of residential lines. This may bias our results because, for example, low-income households have lower penetration rates than higher income households. However, the bias this calculation introduces attributes more subsidy money to classes with low penetration rates than will actually flow to these groups.[24] Additionally, line counts do not equal the total number of households because of second

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[23] The FCC's adoption of a benchmark that is 135 percent of the national average cost may result in the benchmark falling over time as technological advances decrease average cost.

[24] In research, we are considering using the information from the FCC's Penetration Report to obtain more accurate estimates of line counts by income categories. We recognize that the methodology used assumes

and tertiary lines.[25] Because we simply multiplied the number of residential lines in a wire center by the proportion of households in the particular category, second lines were allocated uniformly across all households in a wire center. Because of this, the share of lines for white households, for example, is higher than the share of white households. This reflects the fact that the HCPM appears to predict that wire centers populated with proportionately more by white households have more second lines than other wire centers. This also holds for high-income households. Finally, the PNR data does not include demographic information on Puerto Rico and we omit these observations from our analysis.

The purpose of our analysis is to determine whether or not basing support on costs also targets funds to groups with low levels of penetration. If this is the case, claims that all users of the network benefit from the subsidy program because it increases penetration rates may have some merit. However, if the subsidy program benefits groups who have high levels of penetration and are not likely to fall off of the network in the absence of a subsidy, the program is probably best characterized as a simple transfer program that benefits those who choose to live in high-cost areas.

In order to give some idea of the magnitudes, Table 8 presents some summary information on the households in each category. Information is presented for different income categories, ethnicity, age of the head of household, family status, and home ownership status. For each of the five breakdowns, we have calculated the percentage of

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penetration rates of 100 percent. Additionally, because the model includes estimates of second lines, the methodology used assumes that second lines are allocated uniformly to all households within a wire center.

[25] In addition, the number of lines reported here are slightly fewer than those reported in earlier tables. This is because there were 8 wire centers in the HCPM data for which the PNR 1990 Census data contains zero households. This may be explained by growth over the intervening 9 years.

lines for household in each category in the second column. The third, fourth and fifth columns show the amount of the total residential subsidy from Table 6 above and the federal subsidies that would go to each group for the different subsidy levels. The final column shows the percentage of the total residential subsidy at a $32 benchmark from either a state or federal program that each group would receive. Because the federal program includes "hold-harmless" support, a small number of lines whose estimated cost is below $32.18 will continue to receive federal support. These lines are included in are calculation of subsidized lines.

**Table 8—Subsidy Flows Based on Demographics**

All categories in each breakdown get subsidy money. This is because we only consider where subsidies are given and do not consider the sources of these funds. It is also likely that business customers are net payers since their monthly rates tend to be higher and businesses tend to be located in denser areas, leading to a lower cost of service. Second, wireless carriers are required to pay into the universal service system. Finally, it may be the case that nearly every residential subscriber receives local exchange service for a fixed monthly fee below the cost of providing that service because monthly rates are held down by taxes on other services (primarily long distance). Even though all income categories receive a subsidy, if all are equal payers into the system, then those categories that receive more are net winners and those that receive less are net losers. As a result, it is important to compare the percentage of subsidy dollars received to the percentage of lines accounted for by each category. In the income breakdown, the lowest income category accounts for 14 percent of access lines, but receives 21 percent of the

subsidy dollars. In contrast, the highest income group accounts for 32 percent of the access lines and receives 17 percent of the subsidy dollars.

The race categories show that whites have the only positive differential, indicating they account for a smaller percentage of lines than subsidy dollars. This is probably due to the fact that non-white racial groups tend to be more concentrated in cities. In the age category, there are not many differences between the percentage of lines and the subsidy percentages. In the family categories, married couples with and without kids tend receive a disproportionate share of the subsidy dollars. Single mothers receive a lower proportion of the subsidy than indicated by their share of lines. Homeowners account for more of the subsidy dollars than renters. This is probably because apartment buildings are typically located in denser areas.

The question of whether or not a specific demographic group will be harmed by or benefit from the universal service program depends on factors that affect decisions to live in densely populated areas or not. These factors may include constraints on mobility, proximity to schools and employment opportunities, the cost of housing, and a variety of other factors. Rather than try to incorporate all of these factors into a model that examines the factors that affect where different demographic groups choose to live, we simply examine the relationship between whether or not a wire center is in a high-cost area and its demographic makeup. This analysis allows us to determine whether or not programs that subsidize high-cost areas target support to groups with low levels of penetration or not.

The data we present continues to assume that states adopt plans consistent with the federal program and decide to fund programs that bring monthly cost per line in each

wire center down to $32.18 (or $50) per month. A wire center is subsidized if either a state program subsidizes it, (i.e. its estimated monthly cost minus any federal support exceeds the benchmark under consideration) or federal support is targeted to the wire center but it would not receive any state support.

Table 9 below provides estimates of the probability that certain demographic groups will receive a subsidy. The first column gives the total number of lines in the various categories. We then examine the number and proportion of lines in different types of households that will receive a subsidy under the two different benchmark scenarios. The second group of numbers (% Total) under each benchmark gives the share of total lines that will be supported under the various scenarios, this can be thought of as an estimate of the unconditional probability a line used by a particular demographic group will be subsidized. The final column under each benchmark (% Group) gives our estimate of the conditional probability that a line will be subsidized given it is included in a particular group. This final column is calculated as the ratio of the total number of supported lines in each category to the total number lines in that category. The first set of rows gives the breakdown by race, the second by income. We then examine probabilities based on age, family type, and housing status. The last set of numbers examines racial breakdowns for households with incomes less than $10,000.

**Table 9—Estimated Probability of Support**

Table 9 confirms the notion that demographic groups with higher concentrations of population in more densely populated areas are less likely to receive a subsidy under the cost-based universal service plans. As discussed above, support will flow primarily from dense, urban regions to more rural settings. The data show that the probability that

Blacks, Hispanics, and Asians will receive a subsidy is much lower than the probability that Whites and Native Americans living in non-rural carriers' territories will receive subsidies.[26] For example, under a $32 benchmark, the conditional probability (% Group) that Hispanics will receive a subsidy is one-third of the probability that Whites will receive a subsidy. The differential is lower for Blacks and much larger for Asians.

The second set of numbers shows that the conditional probability (% Group) that poor households receive a subsidy is much higher than that of more affluent households. Under a $32 subsidy, only 18.4 percent of the poorest households will receive a subsidy. The penetration rate for poor households is around 80 percent. These numbers suggest that over 80 percent of the lowest income category subscribers will be net contributors and will subsidize those living in high-cost areas. Moreover, under the $32 benchmark, over 2.9 million lines connected to the households in the highest income category will receive support. The number of high-income lines supported exceeds the number of those supported in the lowest income category. Thus, a substantial amount of support will come from the lowest income category and flow to households with incomes in excess of $45,000 in 1990 dollars.

The remaining results show that young heads of households are less likely to receive support, while married couples, with and without children, and those who own, rather than rent, are more likely to receive subsidies. Finally, within the lowest income category, we find that the majority of subsidy flows to white households, with Asians and households classified as "Other" receiving the least. According to these results, ignoring

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[26] We note that the FCC is currently examining factors that result in many Native American territories not be connected to the network. These territories, of course, are not included in the areas examined here.

low-income support programs, less than one-fifth of low-income households will receive a subsidy.

Overall, this analysis calls into question the efficacy of the universal service program. Our results suggest that low-income consumers, especially low-income minorities, are less likely to receive subsidies under the new program and pay higher prices because of universal service programs. Additionally, single mothers, Blacks and Hispanics are less likely than others to benefit from the universal service programs. The program is not likely, however, to provide the majority of subsidy dollars to high-income households.

## III. Conclusions

The universal service program is very important to the future of the telecommunications sector. The FCC's recent universal service decision for non-rural high-cost support and the subsequent state universal service decisions are multi-billion dollar decisions, both in terms of the cost of the plan and the potential welfare implications.

The FCC plan does not cover most of the difference between cost and the chosen benchmark. Since the majority of the difference may be covered in the state jurisdiction, and because states control local rates, there may be real benefits for state regulators (and legislators) to understand the implications of the structure of the universal service program they choose.

The most obvious implication is that raising or eliminating the benchmark can save a lot of money with very little impact on penetration. In addition, it may be possible

to offset reductions in subscribers with a targeted low-income subsidy that costs significantly less than the proposed broad-brush program.

A second implication is that while the proposed program is somewhat progressive in giving more benefits to low-income subscribers, the vast majority of low-income customers end up with no subsidy dollars, yet they are forced to pay rates above cost to fund the universal service program. At the same time, there are high-income customers who benefit from subsidized rates. A true universal service program would target subsidies to low-income consumers in danger of falling off the network and would not require these households to contribute to a program that subsidizes the telephone lines of high-income households.

We hope to extend this analysis in the future by incorporating the prices for local service in each wire center, and customer-specific information. In this way we will be able to complement the work we have done by understanding not only where the subsidies will flow, but also examine who will bear the burden of the higher taxes associated with a larger universal service program. We also hope to be better able to estimate the characteristics of who might disconnect so that a better, more targeted subsidy can be developed.

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## Table 1—Average Cost and Standard Deviation by State

| | Wire Centers | Switched Lines | State Avg. Cost | SD Cost | Pene |
|---|---|---|---|---|---|
| **AK** | 8 | 155,426 | $22.72 | 6.77 | 94.9 |
| **AL** | 236 | 2,159,703 | $35.62 | 15.57 | 91.9 |
| **AR** | 133 | 960,914 | $27.96 | 16.59 | 88.9 |
| **AZ** | 138 | 2,719,294 | $21.05 | 10.14 | 92.8 |
| **CA** | 878 | 22,285,909 | $20.10 | 8.50 | 94.7 |
| **CO** | 166 | 2,651,630 | $22.99 | 10.09 | 95.9 |
| **CT** | 124 | 2,284,859 | $24.22 | 4.84 | 94.9 |
| **DC** | 13 | 980,551 | $16.43 | 1.76 | 92.3 |
| **DE** | 33 | 559,794 | $22.34 | 7.08 | 98.2 |
| **FL** | 411 | 9,477,138 | $23.44 | 8.09 | 92.6 |
| **GA** | 178 | 4,033,311 | $26.18 | 8.99 | 92.3 |
| **HI** | 85 | 716,211 | $21.77 | 9.22 | 95.6 |
| **IA** | 157 | 1,113,218 | $23.82 | 9.68 | 96.1 |
| **ID** | 64 | 528,261 | $26.89 | 14.97 | 93.6 |
| **IL** | 752 | 7,653,397 | $21.96 | 11.13 | 91.2 |
| **IN** | 374 | 3,109,293 | $27.56 | 12.14 | 93.8 |
| **KS** | 167 | 1,351,910 | $24.41 | 11.94 | 97.1 |
| **KY** | 252 | 1,800,011 | $33.27 | 15.75 | 93.5 |
| **LA** | 228 | 2,286,640 | $29.12 | 14.86 | 90.3 |
| **MA** | 266 | 4,411,630 | $19.46 | 4.78 | 95.4 |
| **MD** | 205 | 3,688,106 | $21.15 | 6.44 | 96.8 |
| **ME** | 138 | 668,153 | $33.21 | 19.18 | 97.5 |
| **MI** | 525 | 5,945,887 | $26.12 | 11.01 | 94 |
| **MN** | 295 | 2,402,305 | $25.01 | 18.49 | 95.9 |
| **MO** | 390 | 2,858,071 | $28.04 | 19.50 | 94.6 |
| **MS** | 204 | 1,247,558 | $42.16 | 20.89 | 87.1 |

| | Wire Centers | Switched Lines | State Avg.Cost | SD Cost | Pene |
|---|---|---|---|---|---|
| **MT** | 72 | 362,570 | $31.98 | 26.67 | 95.4 |
| **NC** | 389 | 4,157,795 | $30.16 | 11.62 | 93.3 |
| **ND** | 35 | 253,381 | $26.34 | 19.64 | 95.7 |
| **NE** | 209 | 808,955 | $28.65 | 21.89 | 94.8 |
| **NH** | 117 | 769,880 | $26.72 | 12.15 | 95.8 |
| **NJ** | 203 | 6,348,573 | $19.53 | 2.68 | 95 |
| **NM** | 65 | 787,901 | $25.85 | 13.90 | 90 |
| **NV** | 65 | 1,178,639 | $20.96 | 30.97 | 93.4 |
| **NY** | 567 | 11,334,782 | $19.05 | 7.19 | 95.2 |
| **OH** | 722 | 6,204,775 | $26.66 | 11.27 | 95.5 |
| **OK** | 239 | 1,733,722 | $26.41 | 15.10 | 90.8 |
| **OR** | 136 | 1,852,964 | $23.51 | 12.07 | 95.1 |
| **PA** | 465 | 6,837,008 | $22.26 | 7.64 | 96.9 |
| **PR** | 81 | 1,087,749 | $27.89 | 5.02 | n/a |
| **RI** | 30 | 648,885 | $21.13 | 4.44 | 95.1 |
| **SC** | 148 | 1,612,233 | $29.50 | 10.45 | 94.4 |
| **SD** | 45 | 275,570 | $27.31 | 24.61 | 91.3 |
| **TN** | 218 | 2,865,589 | $29.93 | 11.47 | 93.3 |
| **TX** | 1037 | 11,477,745 | $23.54 | 15.63 | 92.2 |
| **UT** | 71 | 1,094,308 | $20.87 | 10.94 | 95.5 |
| **VA** | 402 | 4,472,486 | $25.16 | 14.04 | 93.1 |
| **VT** | 83 | 315,612 | $36.35 | 20.39 | 95.4 |
| **WA** | 181 | 3,280,515 | $21.80 | 10.58 | 95.9 |
| **WI** | 322 | 2,604,627 | $26.53 | 13.25 | 96 |
| **WV** | 142 | 813,899 | $36.83 | 17.78 | 93.1 |
| **WY** | 29 | 241,197 | $33.68 | 32.91 | 95.2 |

## Table 2 – New FCC High Cost Support

| State | Switched Lines | Average Cost | Subsidy/Line/Month | Annual Support |
|---|---|---|---|---|
| **ME** | 668,153 | $33.21 | $0.78 | $6,269,997 |
| **KY** | 1,800,011 | $33.27 | $0.83 | $17,981,159 |
| **WY** | 241,197 | $33.68 | $1.14 | $3,292,267 |
| **AL** | 2,159,703 | $35.62 | $2.61 | $67,688,526 |
| **VT** | 315,612 | $36.35 | $3.17 | $12,016,843 |
| **WV** | 813,899 | $36.83 | $3.54 | $34,538,551 |
| **MS** | 1,247,558 | $42.16 | $7.59 | $113,564,228 |
| **Total** | | | | $255,351,571 |

## Table 3 – FCC "Hold Harmless" Support

| State | Switched Lines | Average Cost | Subsidy/Line/Month | Annual Support |
|---|---|---|---|---|
| **MI** | 5,945,887 | $26.12 | $0.01 | $586,272 |
| **CA** | 22,285,909 | $20.10 | $0.02 | $5,771,700 |
| **VA** | 4,472,486 | $25.16 | $0.02 | $1,184,748 |
| **TX** | 11,477,745 | $23.54 | $0.04 | $5,229,972 |
| **GA** | 4,033,311 | $26.18 | $0.04 | $1,882,608 |
| **AZ** | 2,719,294 | $21.05 | $0.05 | $1,667,100 |
| **CO** | 2,651,630 | $22.99 | $0.06 | $1,973,628 |
| **NC** | 4,157,795 | $30.16 | $0.16 | $7,740,468 |
| **MO** | 2,858,071 | $28.04 | $0.19 | $6,652,188 |
| **SC** | 1,612,233 | $29.50 | $0.27 | $5,191,896 |
| **AR** | 960,914 | $27.96 | $0.32 | $3,726,060 |
| **MT** | 362,570 | $31.98 | $0.39 | $1,687,692 |
| **NM** | 787,901 | $25.85 | $0.47 | $4,424,016 |
| **WY** | 241,197 | $33.68 | $1.52 | $4,404,012 |
| **PR** | 1,087,749 | $27.89 | $10.21 | $133,283,784 |
| **Total** | | | | $185,406,144 |

**Table 4—Percentage of Households with Telephone Unit in Household**

March 1999[27]

| Categories | Total | White | Black | Hispanic Origin |
|---|---|---|---|---|
| Total | 94.0 | 95.1 | 87.3 | 89.2 |
| < $5,000 | 75.9 | 78.8 | 70.5 | 73.4 |
| $5,000 - $7,499 | 81.4 | 83.2 | 76.4 | 79.5 |
| $7,500 - $9,999 | 89.7 | 90.8 | 86.0 | 85.5 |
| $10,000 - $12,499 | 88.7 | 90.4 | 81.6 | 83.1 |
| $12,500 - $14,999 | 89.6 | 90.4 | 85.9 | 82.9 |
| $15,000 - $19,999 | 92.4 | 93.5 | 87.2 | 87.2 |
| $20,000 - $24,999 | 93.5 | 94.3 | 89.6 | 90.4 |
| $25,000 - $29,999 | 95.4 | 95.9 | 91.6 | 95.4 |
| $30,000 - $34,999 | 96.5 | 97.0 | 93.8 | 93.8 |
| $35,000 - $39,999 | 97.3 | 97.9 | 93.6 | 95.1 |
| $40,000 - $49,000 | 98.2 | 98.4 | 96.6 | 96.4 |
| $50,000 - $59,999 | 97.9 | 98.0 | 97.0 | 97.7 |
| $60,000 -$74,999 | 98.5 | 98.6 | 96.3 | 98.8 |
| $75,000 + | 98.6 | 98.7 | 97.8 | 97.7 |

[27] Reproduced from the FCC (1999a), Table 4.

**Table 5—Residence Subsidies—State Subsidies Only**

| Benchmark | Monthly Subsidy | Lines Supported | % of Residential Lines Supported |
|---|---|---|---|
| $32.18 | $244,882,518 | 14,252,483 | 13.4% |
| $50 | $99,245,092 | 4,572,126 | 4.3% |

**Table 6—Business Subsidies—State Subsidies Only**

| Benchmark | Monthly Subsidy | Lines Supported | % of Business Lines Supported |
|---|---|---|---|
| $32.18 | $27,361,000 | 2,999,296 | 5.4% |
| $50 | $5,070,798 | 417,355 | 0.8% |

## Table 7—State Universal Service Support

(Monthly)

| | | $32 Benchmark | | $50 Benchmark | |
|---|---|---|---|---|---|
| | Total Lines | Support | $/Line | Support | $/Line |
| AK | 155,426 | $69,626 | $0.45 | $41,721 | $0.27 |
| AL | 2,159,703 | $7,771,614 | $3.60 | $1,612,613 | $0.75 |
| AR | 960,914 | $2,833,397 | $2.95 | $1,393,481 | $1.45 |
| AZ | 2,719,294 | $2,265,298 | $0.83 | $1,199,665 | $0.44 |
| CA | 22,285,909 | $9,465,604 | $0.42 | $5,380,529 | $0.24 |
| CO | 2,651,630 | $2,709,437 | $1.02 | $1,086,086 | $0.41 |
| CT | 2,284,859 | $688,849 | $0.30 | $59,951 | $0.03 |
| DC | 980,551 | $0 | $0.00 | $0 | $0.00 |
| DE | 559,794 | $390,519 | $0.70 | $36,032 | $0.06 |
| FL | 9,477,138 | $7,264,914 | $0.77 | $2,636,809 | $0.28 |
| GA | 4,033,311 | $5,142,764 | $1.28 | $1,311,556 | $0.33 |
| HI | 716,211 | $821,017 | $1.15 | $257,616 | $0.36 |
| IA | 1,113,218 | $1,322,540 | $1.19 | $525,726 | $0.47 |
| ID | 528,261 | $1,441,980 | $2.73 | $726,330 | $1.37 |
| IL | 7,653,397 | $10,464,765 | $1.37 | $5,489,625 | $0.72 |
| IN | 3,109,293 | $7,861,779 | $2.53 | $3,038,094 | $0.98 |
| KS | 1,351,910 | $2,056,408 | $1.52 | $959,694 | $0.71 |
| KY | 1,800,011 | $8,708,492 | $4.84 | $2,608,898 | $1.45 |
| MT | 362,570 | $2,037,134 | $5.62 | $1,259,213 | $3.47 |
| NC | 4,157,795 | $12,412,645 | $2.99 | $3,246,206 | $0.78 |
| ND | 253,381 | $941,791 | $3.72 | $606,811 | $2.39 |
| NE | 808,955 | $3,850,302 | $4.76 | $2,528,800 | $3.13 |
| NH | 769,880 | $1,994,297 | $2.59 | $656,964 | $0.85 |
| NJ | 6,348,573 | $162,799 | $0.03 | $0 | $0.00 |
| NM | 787,901 | $1,351,608 | $1.72 | $453,702 | $0.58 |
| NV | 1,178,639 | $2,707,702 | $2.30 | $2,180,830 | $1.85 |
| NY | 11,334,782 | $6,282,888 | $0.55 | $2,371,328 | $0.21 |
| OH | 6,204,775 | $12,884,313 | $2.08 | $4,273,540 | $0.69 |
| OK | 1,733,722 | $4,900,644 | $2.83 | $2,391,271 | $1.38 |
| OR | 1,852,964 | $2,544,624 | $1.37 | $957,986 | $0.52 |
| PA | 6,837,008 | $5,321,325 | $0.78 | $1,588,813 | $0.23 |
| PR | 1,087,749 | $0 | $0.00 | $0 | $0.00 |
| RI | 648,885 | $114,266 | $0.18 | $3,581 | $0.01 |
| SC | 1,612,233 | $3,629,458 | $2.25 | $423,452 | $0.26 |
| SD | 275,570 | $1,016,836 | $3.69 | $658,792 | $2.39 |
| TN | 2,865,589 | $8,649,346 | $3.02 | $2,264,361 | $0.79 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LA** | 2,286,640 | $7,978,082 | $3.49 | $3,328,747 | $1.46 | **TX** | 11,477,745 | $23,778,245 | $2.07 | $13,294,865 | $1.16 |
| **MA** | 4,411,630 | $831,291 | $0.19 | $259,039 | $0.06 | **UT** | 1,094,308 | $784,540 | $0.72 | $464,838 | $0.42 |
| **MD** | 3,688,106 | $1,668,444 | $0.45 | $361,805 | $0.10 | **VA** | 4,472,486 | $13,211,506 | $2.95 | $5,497,435 | $1.23 |
| **ME** | 668,153 | $3,605,786 | $5.40 | $1,470,197 | $2.20 | **VT** | 315,612 | $1,748,148 | $5.54 | $541,318 | $1.72 |
| **MI** | 5,945,887 | $10,844,692 | $1.82 | $3,251,820 | $0.55 | **WA** | 3,280,515 | $2,836,012 | $0.86 | $1,243,205 | $0.38 |
| **MN** | 2,402,305 | $7,155,356 | $2.98 | $4,253,099 | $1.77 | **WI** | 2,604,627 | $6,812,867 | $2.62 | $2,511,818 | $0.96 |
| **MO** | 2,858,071 | $11,955,049 | $4.18 | $6,837,537 | $2.39 | **WV** | 813,899 | $3,747,458 | $4.60 | $719,713 | $0.88 |
| **MS** | 1,247,558 | $5,026,508 | $4.03 | $638,885 | $0.51 | **WY** | 241,197 | $594,095 | $2.46 | $167,762 | $0.70 |

## Table 8—Subsidy Flows Based on Demographics

| | Total Lines | % of Lines | Federal Support | State $32 Benchmark | State $50 Benchmark | % of Subsidy w/$32 Benchmark |
|---|---|---|---|---|---|---|
| **Totals** | 105,291,431 | 100% | $450,757,715 | $244,882,518 | $99,245,092 | 100% |
| **Income** | | | | | | |
| inc<10 | 15,045,855 | 14.3% | $6,139,957 | $50,695,740 | $21,337,290 | 21% |
| 10<inc<20 | 17,660,544 | 16.8% | $5,361,985 | $55,093,424 | $23,212,866 | 23% |
| 20<inc<30 | 17,272,506 | 16.4% | $4,065,043 | $46,406,332 | $19,090,662 | 19% |
| 30<inc<45 | 21,879,200 | 20.8% | $3,932,162 | $49,457,832 | $19,668,070 | 20% |
| inc>45 | 33,433,326 | 31.8% | $3,259,465 | $43,225,348 | $15,932,650 | 17% |
| **Ethnicity** | | | | | | |
| White | 84,296,144 | 80.1% | $17,873,314 | $216,319,568 | $87,870,752 | 88% |
| Black | 10,921,687 | 10.4% | $4,309,492 | $17,761,692 | $5,996,635 | 8% |
| Hispanic | 6,994,414 | 6.6% | $296,628 | $6,977,636 | $3,504,334 | 3% |
| Native American | 533,275 | 0.5% | $240,744 | $3,058,610 | $1,604,868 | 1% |
| Asian | 2,484,094 | 2.4% | $36,701 | $709,443 | $241,375 | 0% |
| Other | 61,818 | 0.1% | $1,732 | $51,729 | $23,576 | 0% |
| **Family Status** | | | | | | |
| Married/Kids | 27,711,408 | 26.3% | $6,658,377 | $73,786,304 | $29,787,498 | 30% |
| Married/No Kids | 31,342,982 | 29.8% | $7,226,235 | $85,139,936 | $35,184,044 | 35% |
| Father/Kids | 1,441,309 | 1.4% | $329,320 | $3,576,834 | $1,462,128 | 1% |
| Mother/Kids | 6,651,434 | 6.3% | $1,494,151 | $11,617,567 | $4,176,216 | 5% |
| Not Family | 38,144,301 | 36.2% | $7,050,529 | $70,758,031 | $28,631,653 | 29% |
| **Age** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| age<24 | 5,577,699 | 5.3% | $965,197 | $9,352,163 | $3,571,737 | 4% |
| 24<age<34 | 22,842,338 | 21.7% | $4,159,929 | $44,404,456 | $17,526,730 | 18% |
| 34<age<44 | 23,563,072 | 22.4% | $4,700,263 | $51,070,900 | $20,223,402 | 21% |
| 44<age<54 | 16,426,300 | 15.6% | $3,605,208 | $39,199,812 | $15,771,586 | 16% |
| 54<age<64 | 14,141,411 | 13.4% | $3,395,222 | $37,004,672 | $15,313,911 | 15% |
| 64<age<74 | 13,172,238 | 12.5% | $3,290,458 | $36,228,200 | $15,143,848 | 15% |
| age>74 | 9,568,375 | 9.1% | $2,642,335 | $27,618,468 | $11,690,325 | 11% |
| **Housing** | | | | | | |
| Own | 67,057,916 | 63.7% | $17,679,658 | $190,565,248 | $77,270,528 | 78% |
| Rent | 38,233,516 | 36.3% | $5,078,955 | $54,313,432 | $21,971,014 | 22% |

## Table 9—Estimated Probability of Support

| | | | $32 Benchmark | | | $50 Benchmark | | |
|---|---|---|---|---|---|---|---|---|
| | Total lines | % Total | Lines Supported | % Total | % Group | Lines Supported | % Total | % Group |
| **Total** | 105,291,432 | 100% | 14,413,760 | 13.69% | 13.69% | 6,542,790 | 6.21% | 6.21% |
| **Ethnicity** | | | | | | | | |
| White | 84,296,144 | 80.1% | 12,710,562 | 12.07% | 15.1% | 5,722,892 | 5.4% | 6.8% |
| Black | 10,921,687 | 10.4% | 1,161,325 | 1.10% | 10.6% | 620,090 | 0.6% | 5.7% |
| Hispanic | 6,994,414 | 6.6% | 360,428 | 0.34% | 5.2% | 121,021 | 0.1% | 1.7% |
| Native Am. | 533,275 | 0.5% | 128,564 | 0.12% | 24.1% | 58,532 | 0.1% | 11.0% |
| Asian | 2,484,094 | 2.4% | 49,868 | 0.05% | 2.0% | 19,246 | 0.0% | 0.8% |
| Other | 61,818 | 0.1% | 3,013 | 0.00% | 4.9% | 1,009 | 0.0% | 1.6% |
| **Income** | | | | | | | | |
| inc<10 | 15,045,855 | 14.3% | 2,761,869 | 2.62% | 18.4% | 1,403,183 | 1.3% | 9.3% |
| 10<inc<20 | 17,660,544 | 16.8% | 3,047,373 | 2.89% | 17.3% | 1,461,554 | 1.4% | 8.3% |
| 20<inc<30 | 17,272,506 | 16.4% | 2,660,212 | 2.53% | 15.4% | 1,218,078 | 1.2% | 7.1% |
| 30<inc<45 | 21,879,200 | 20.8% | 2,989,191 | 2.84% | 13.7% | 1,299,193 | 1.2% | 5.9% |
| inc>45 | 33,433,326 | 31.8% | 2,955,115 | 2.81% | 8.8% | 1,160,783 | 1.1% | 3.5% |
| **Family** | | | | | | | | |
| Married/kids | 27,711,408 | 26.3% | 4,361,711 | 4.14% | 15.7% | 1,966,050 | 1.9% | 7.1% |
| Married/No kids | 31,342,982 | 29.8% | 4,869,075 | 4.62% | 15.5% | 2,222,246 | 2.1% | 7.1% |
| Male/kids | 1,441,309 | 1.4% | 206,659 | 0.20% | 14.3% | 92,254 | 0.1% | 6.4% |
| Female/kids | 6,651,434 | 6.3% | 776,254 | 0.74% | 11.7% | 347,162 | 0.3% | 5.2% |
| Non-family | 38,144,301 | 36.2% | 4,200,061 | 3.99% | 11.0% | 1,915.079 | 1.8% | 5.0% |
| **Age** | | | | | | | | |
| age<24 | 5,577,699 | 5.3% | 610,300 | 0.58% | 10.9% | 269,112 | 0.3% | 4.8% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24<age<34 | 22,842,338 | 21.7% | 2,733,960 | 2.60% | 12.0% | 1,208,241 | 1.1% | 5.3% |
| 34<age<44 | 23,563,072 | 22.4% | 3,109,708 | 2.95% | 13.2% | 1,372,905 | 1.3% | 5.8% |
| 44<age<54 | 16,426,300 | 15.6% | 2,319,767 | 2.20% | 14.1% | 1,047,169 | 1.0% | 6.4% |
| 54<age<64 | 14,141,411 | 13.4% | 2,106,291 | 2.00% | 14.9% | 977,780 | 0.9% | 6.9% |
| 64<age<74 | 13,172,238 | 12.5% | 2,022,766 | 1.92% | 15.4% | 947,712 | 0.9% | 7.2% |
| age>74 | 9,568,375 | 9.1% | 1,510,967 | 1.44% | 15.8% | 719,870 | 0.7% | 7.5% |
| **Housing** | | | | | | | | |
| Own | 67,057,916 | 63.7% | 11,020,596 | 10.47% | 16.4% | 5,063,185 | 4.8% | 7.6% |
| Rent | 38,233,516 | 36.3% | 3,393,163 | 3.22% | 8.9% | 1,479,605 | 1.4% | 3.9% |
| **Low Income --Race** | | | | | | | | |
| White | 10,911,306 | 72.5% | 2,224,766 | 14.8% | 20.4% | 1,112,066 | 7.4% | 10.2% |
| Black | 3,102,755 | 20.6% | 456,812 | 3.0% | 14.7% | 258,758 | 1.7% | 8.3% |
| Native Am. | 135,651 | 0.9% | 37,567 | 0.2% | 27.7% | 18,185 | 0.1% | 13.4% |
| Asian | 318,484 | 2.1% | 7,522 | 0.0% | 2.4% | 3,287 | 0.0% | 1.0% |
| Other | 577,659 | 3.8% | 35,202 | 0.2% | 6.1% | 10,886 | 0.1% | 1.9% |
| Total | 15,045,854 | 100.0% | 2,761,869 | 18.4% | 18.4% | 1,403,183 | 9.3% | 9.3% |