Trends in Telephone Penetration in the United States 1984-1994

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1. Introduction

The purpose of this paper is to compare and contrast the demographic characteristics of Americans with telephones and those who lack home telephone service. The project draws on data extracted from the decennial census of the United States, the Current Population Survey of the Census Bureau, and findings drawn from studies in the public domain. It covers the period 1984-1994; taking as its baseline conditions that existed prior to and through the period of the break-up of AT&T. The paper's focus on telephone penetration at state and national levels, nevertheless, imposes constraints on the analysis. Conditions existing below the level of the states (e.g., contrasting patterns of penetration in specific metropolitan areas, or contrasting rural patterns within states) could not be examined, leaving a gap in our understanding that demands further research.

2. Overview of Empirical Studies

Of the hundreds of studies concerned with universal service, only a few address telephone penetration; the vast majority focus on issues relating to cross-subsidy supports for universal service. Consequently, those few studies on telephone penetration cannot be considered a literature in the traditional sense of a cumulative and self critical body of work. Nonetheless, these studies reflect several themes that have come to be seen as conventional wisdom in telecommunications policy discourse. First, the current telephone penetration rate per household of approximately 94% is generally regarded as evidence of the success of long-term universal service policy.[1] Second, though most authors express some concern for those without phones, until the late 1980s the weight of opinion seems to have been that existing subsidy programs adequately included all those that could reasonably be connected.[2] Third, in the period immediately after the break-up of AT&T, some voices have focused on the social dynamics of those without telephone service and have pointed to poverty related factors as causes of phonelessness.[3] These studies constitute the empirical source of the call to rethink universal service accomplishments in light of the emergence of a new information infrastructure. Finally, recent research indicates that those at the margins of society are particularly vulnerable to isolation and its socioeconomic consequences as a result of lacking access to a telephone.[4]

3. Summary of Census Data

The last ten years have seen a general increase in penetration for the nation as a whole (See table 1), as a result of an increasing number of households and an increasing percentage of subscribers. For November 1993, telephone penetration reached 94.2%; however, the March 1994 data report a drop in penetration to 93.9%. We roughly estimate 5.6 million households without telephone service in 1993, from which we estimate 14.8 million affected individuals.[5] In this section, we discuss findings based on the CPS data available to the FCC, as compiled in the following tables.

Subscribership data show an increase in penetration from 91.4% national penetration in 1983 to a plateau of 94.2% for the whole of 1993. The data for March 1994 show a decrease in penetration from 94.2% to 93.9%. However, since the drop (-1.9%) is less than the critical value for the decrease or increase in penetration, statistical significance cannot be ascertained. We can't tell if the drop reflects a sampling error or a real phenomenon. Succeeding surveys will be watched closely to track the persistence of the decline. If the decline continues for the next two surveys, it may be significant because it will be a yearly average. If penetration rebounds, the drop for March was probably due to a sampling error. Our concern stems from the flatness of the curve in 1993. It may be that the flatness results from a substitution of wireless telecommunications technologies for land line phones. At the least, we can say that the trend toward higher penetration has apparently stalled. The change over the last ten years has been a significant increase in penetration.(+/- 2.5% increase, Nov. 1983 - March 1994) But whether this latest drop is significant is impossible to tell for now.

3.1. Households with Telephone Service in March 1984-1993

Telephone penetration is highest in the suburbs. Phone penetration there is 4.6% higher than in the central cities, and 4.1% higher than in households outside of Metropolitan Statistical Areas (MSAs). These differences appear to be significant. However, since 1984, the biggest increases in penetration have been in non-metropolitan areas (Not in MSA) -- 89.2% to 92.5%.[6] There is a possibility that this increase might reflect regulatory stimuli in the subsidies that are provided through the Universal Service Fund. Given the data available, we can't say whether this is a direct cause and effect relationship or a coincidence.

3.2. Percentage of Households with Receipt of Energy Assistance.

Telephone penetration among those households receiving energy assistance, has largely plateaued since 1990. For 1990, 1991, and 1992, penetration rested at 80%; for 1991, penetration rose to 81.7%. In the context of those who receive some kind of non income assistance, "Receipt of Energy Assistance" does not mean cash payments to individuals. Rather, these are subsidies to the service provider, in order to support the individual. The individual's bill is paid without the individual seeing any cash payment. We hypothesize that the receipt of energy assistance acts as an indirect subsidy that frees up some disposable income in poor households. At least in some of those households, that additional disposable income is used to purchase telephone service -- therefore, the positive correlation observed.

It appears that the energy assistance program is mostly operating in cold winter states and represents a regional relationship between telephone penetration and energy assistance. Because of this, its impact on telephone penetration is limited. Nevertheless, it illustrates the complex web of subsidy interactions that affect penetration.

Table 1.Household Telephone Subscribership in the United States(millions).

Month	Year	Households (millions)	Households with Phones	Percentage with Phones	Households without Phones	Percentage without Phones
November	1983	85.8	78.4	91.4%	7.4	8.6%
March	1984	86.0	78.9	91.8%	7.1	8.2%
July	1984	86.6	79.3	91.6%	7.3	8.4%
November	1984	87.4	79.9	91.4%	7.5	8.6%
March	1985	87.4	80.2	91.8%	7.2	8.2%
July	1985	88.2	81.0	91.8%	7.2	8.2%
November	1985	88.8	81.6	91.9%	7.2	8.1%
March	1986	89.0	82.1	92.2%	6.9	7.8%
July	1986	89.5	82.5	92.2%	7.0	7.8%
November	1986	89.9	83.1	92.4%	6.8	7.6%
March	1987	90.2	83.4	92.5%	6.8	7.5%
July	1987	90.7	83.7	92.3%	7.0	7.7%
November	1987	91.3	84.3	92.3%	7.0	7.7%
March	1988	91.8	85.3	92.9%	6.5	7.1%
July	1988	92.4	85.7	92.8%	6.7	7.2%
November	1988	92.6	85.7	92.5%	6.9	7.5%
March	1989	93.6	87.0	93.0%	6.6	7.0%
July	1989	93.8	87.5	93.3%	6.3	6.7%
November	1989	93.9	87.3	93.0%	6.6	7.0%
March	1990	94.2	87.9	93.3%	6.3	6.7%
July	1990	94.8	88.4	93.3%	6.4	6.7%
November	1990	94.7	88.4	93.3%	6.3	6.7%
March	1991	95.3	89.2	93.6%	6.1	6.4%
July	1991	95.5	89.1	93.3%	6.4	6.7%
November	1991	95.7	89.4	93.4%	6.3	6.6%
March	1992	96.6	90.7	93.9%	5.9	6.1%
July	1992	96.6	90.6	93.8%	6.0	6.2%
November	1992	97.0	91.0	93.8%	6.0	6.2%
March	1993	97.3	91.6	94.2%	5.7	5.8%
July	1993	97.9	92.2	94.2%	5.7	5.8%
November	1993	98.8	93.0	94.2%	5.8	5.8%
March	1994	98.1	92.1	93.9%	6.0	6.1%

Table 2 Percentage of Households March Telephone Service

Metropolitan Statistical Area City Status	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
In Central Cities	90.1	89.4	90.3	90.6	91.0	90.9	91.4	91.7	91.5	92.0
Outside Central Cities	95.3	95.4	95.7	95.7	95.9	96.1	96.1	96.6	96.7	96.6
City Status in MSA Not Identifiable	89.9	90.2	92.6	93.5	93.8	93.8	94.1	93.7	94.1	94.5
Not in MSA	89.2	89.6	89.0	89.1	89.9	90.5	90.8	91.2	91.7	92.5
MSA Status Not Identifiable	92.3	92.5	92.6	92.4	93.6	93.7	95.4	95.9	92.7	94.3
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 3 Percentage of Households with Telephone Service in March

Receipt of Energy Assistance	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Assistance Received	76.5	76.5	76.2	77.6	78.4	79.2	80.4	80.0	80.8	81.7
Assistance Not Received	92.7	92.7	93.1	93.4	93.6	93.7	93.9	94.2	94.4	94.7
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

3.3. Receipt of Food Stamps and Telephone Service

For foodstamps, penetration (75.6% in 1993) has gone up 6.6% during the last ten years. Still, a significant gap persists -- households on foodstamps lag 20.4 percentage points behind those households not on foodstamps. Moreover, as with energy assistance, people on foodstamps cannot use the stamps to buy other goods. Still, the reception of foodstamps frees up disposable income, so that in an indirect way, telephone penetration should benefit from the presence of the subsidy. Table 4a indicates that such optimism might be misplaced. The two groups contrasted in this table, those households receiving foodstamps for a full 12 months versus those households receiving foodstamps for less than 12 months, points to the meager resources available to people on foodstamps.

From 1984 to 1991, the differences between the two groups fluctuated within a range. But in the last two years, the differences between the two groups have increased, with the full-year recipients lagging farther behind the part-year recipients. Furthermore, there has been a rise in full-year recipients. The persistence of low levels of penetration among these groups raises questions.

Does the persistence of these penetration levels reflect a permanent underclass? Are there important differences between those households who have been on foodstamps for at least one year versus those households who have been on foodstamps for less than a year? We hypothesize that families who qualify for foodstamps have few flexible resources to spend on telephone service. However, with the gradual improvement of the economy, the numbers of people getting off foodstamps is likely to grow and this will contribute positively to telephone penetration.

3.4. Participation in School Lunch Programs

Families with children participating in school lunch programs represent one more indirect reflection of poverty; and, not surprisingly, they fall significantly below the national average. Their penetration rate for 1993 was 81.7%. As with energy assistance, the lunch program is also not a direct payment. The data on subsidies from lunch programs, foodstamps, and energy assistance present parallels worth mentioning. There have been notable increases over the last 10 years, with households receiving energy assistance increasing penetration by 5%. Still, tables 4, 4a, and 4b, show the same flat penetration trend between 1990 and 1993; and, in the case of families on foodstamps for a year or more, they appear to have declined in penetration during 1991 and 1992. For 1993, the data look more optimistic. The overview is that people receiving energy assistance, school lunch subsidies, and food stamps, have penetration rates that are significantly low. We hypothesize that these three groups overlap in demographic characteristics; and, though they only partially overlap, they constitute a semi-permanent underclass. To increase telephone penetration for them will require programs that take them into account.

3.5. Telephone Service and Receipt of Farm Income

Households receiving farm income are the people who own farms, as opposed to farm workers who do not own farms. They enjoy telephone penetration rates that are higher than those for the nation as a whole. Because farms are small businesses, there is a tendency for farmers to enjoy greater telephone penetration due to their need for a phone and their ability to deduct the telephone as a legitimate business expense. Moreover, it is worth noting that telephone penetration is higher for those households receiving non-farm self employment income, for the same reasons. The self employed in general enjoy higher penetration rates.

Table 4. Percentage of Food Stamps Received

Receipt of Food Stamps	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Food Stamps Received	69.0	67.7	69.0	69.4	69.2	71.3	73.6	73.0	74.2	75.6
Food Stamps Not Received	93.9	94.0	94.2	94.4	94.7	94.8	94.9	95.4	95.6	96.0
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 4a Monthly Account of Households Receiving Foodstamps

Number of Months in Past Year Food Stamps Received	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
12	68.2	67.7	69.4	68.8	69.7	70.5	74.0	72.1	72.5	74.3
1 - 11	70.3	67.8	68.1	70.5	68.1	73.0	72.9	74.8	77.7	78.2
Food Stamps Not Received	93.9	94.0	94.2	94.4	94.7	94.8	94.9	95.4	95.6	96.0
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 4b Percentage of Participation in School Lunch Programs

Participation in School Lunch Programs	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Some Children Get Subsidized Lunch at School	74.8	73.1	75.7	77.4	75.4	76.0	78.1	78.8	79.5	81.7
Children Eat at School Without Lunch Subsidy	96.6	96.2	96.5	96.6	96.7	96.3	96.8	97.6	97.4	97.4
Children in School But Don't Eat Lunch There	95.0	95.1	95.0	94.4	94.7	94.7	94.9	95.3	95.2	95.4
No Children in School	92.1	92.2	92.5	92.9	93.5	93.7	93.9	94.1	94.5	94.7
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 5 Receipt of Farm Income

Receipt of Farm Income	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Income Received	96.3	96.4	97.4	97.5	97.8	98.3	98.2	98.0	97.9	98.6
Income Not Received	91.7	91.8	92.1	92.4	92.8	93.0	93.3	93.6	93.8	94.1
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

We hypothesize that self employment, as an effect, supersedes rurality. Alex Belinfante notes that many of the self employed have below average incomes yet their phone penetration rates remain higher than average. The fact that the phone can be deducted as a business expense for the self employed, and that phone penetration for the self employed is high, indicates the beneficial effect on telephone penetration of a tax subsidy that receives little attention.

3.6. Receipt of Welfare or Public Assistance Income

Welfare or public assistance income constitutes a direct payment to a household, in contrast to those subsidies discussed above. Households on public assistance suffer among the lowest levels of penetration, lower even than households on food stamps. Still as with other groups, penetration rates have been rising, from 65% in 1984, to 73% in 1993. These increases accompany the general rising trend of penetration observed over the last ten years.

This category is an important one because it is generally considered to include the poorest households. Moreover, households receiving assistance represent the most difficult test for any policy aiming to increase telephone penetration. To further understand the potential for assistance programs, we need to know more about regional differences, as well as differences within and across metropolitan areas. However, the level of data available to the F.C.C. from the CPS -- the current size of the sample cells -- constrains in-depth analysis. For example, the small sample size makes it difficult to determine the effects of differing public assistance and lifeline eligibility requirements. Were it possible to project this data to individual states, we would be in a position to evaluate the impact of federal and state assistance programs. To do so, will require a more extensive database than is currently collected.

3.7. Receipt of Supplemental Security Income Benefits

Supplemental Security Income (SSI) does not have a strict income restriction; consequently, the penetration rate is higher than it is for households receiving welfare assistance.

SSI like subsidies depend on state regulations for qualification and payment schedules. Often SSI is meant for people with below average income but who do not qualify for welfare. Some of these people, such as those with disabilities, are locked out of decent paying jobs but are not themselves disadvantaged by education or ethnicity. The states vary in payment and administration of the programs. It may be that this results in a variety of effects that impact on telephone penetration at the regional level. It should be noted that this is not the same group as those receiving welfare or public assistance income benefits, since the penetration rates differ significantly -- 73.3% of households receiving public assistance income have telephone service compared to 86.2% of households receiving supplemental security income benefits. Nevertheless SSI constitutes an income effect on penetration.

3.8. Receipt of Retirement Payments Other Than Social Security or VA

Households receiving retirement income other than social security enjoy penetration at a level (98.8%) that is significantly higher than for the rest of households. Moreover, those receiving payments other than social security have even higher penetration rates than social security which is higher itself than the national average (see table 7). This is an important point because the problem of low penetration appears to be largely confined to younger households (see Table 12). The "Payments Not Received" category that provides the contrast for this table includes mostly those who are not retired.

Table 6 Percentage of Households with Telephone Service in March

Receipt of Welfare or Public Assistance Income	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Income Received	65.1	64.9	67.0	68.1	67.7	69.4	70.6	70.6	70.7	73.3
Income Not Received	93.2	93.2	93.5	93.8	94.1	94.2	94.5	94.9	95.1	95.3
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 7 Percentage of Households with Telephone Service in March

Receipt of Supplemental Security Income Benefits	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Benefits Received	81.8	82.2	84.7	83.3	82.3	83.8	84.8	85.3	86.0	86.1
Benefits Not Received	92.2	92.2	92.5	92.9	93.3	93.5	93.7	94.0	94.2	94.5
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 8 Percentage of Households with Telephone Service in March

Receipt of Retirement Payments Other Than Social Security or VA	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Payments Received	97.7	97.7	97.9	97.7	98.1	98.4	98.2	98.3	98.6	98.8
Payments Not Received	90.9	90.9	91.3	91.7	92.2	92.3	92.7	93.0	93.1	93.5
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 8a Percentage of Households with Telephone Service in March

Receipt of Social Security or Railroad Retirement Payments	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Payments Received	94.9	95.1	96.1	95.2	95.2	95.5	95.8	96.2	96.4	96.6
Payments Not Received	90.7	90.6	91.1	91.6	92.1	92.2	92.5	92.7	92.9	93.3
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

3.9. Receipt of Social Security or Railroad Retirement Payments

Age is an important factor in understanding penetration. The numbers have significance because we are parsing out one group, the aged. Therefore, Tables 8 and 8a are best understood when read in conjunction with Table 12 (Percentage of Households With a Telephone by Householder's Age). A comparison of the three tables demonstrates that the retirement age population is well served by telephone service. Those households in Table 8 with a penetration level of 98.8% for 1993 come mostly from families receiving retirement income from IRAs, private pensions, and 401Ks. They are better off than the households reflected in Table 8a who are receiving retirement income from Social Security or from railroad retirement plans. Still, households in Table 8a enjoy a level of penetration at 96.6%. Given the scarcity of resources available for subsidies, it seems prudent to suggest that the aged should not be a target for subsidies.

3.10. Housing Status of Household

There exists a strong relationship between housing status and telephone penetration. The primary distinction can be found in a comparison between households who own the house of domicile (98% for 1993) versus households who rent (84.8%, averaged across all rental categories for 1993). Among rental households, penetration ranges from a low of 81.4% (1993) for households living in public housing to a high of 88.2% for households that pay regular rent. These penetration rates still fall significantly below the penetration rate for people living in houses that they own. For those owning a home (98%), they are probably close to natural saturation.

To the extent that ownership of one's home is a measure of wealth, those living in suburbs are more likely to own their homes and therefore have greater penetration.

3.11. Number of Housing Units in Structure

Following from Table 9, telephone penetration is lower in multiple unit housing. Some of the households in this category include condominiums where people own their dwelling and presumably have the level of wealth necessary to afford a phone. If this group is removed from the category, then the level of telephone penetration seems likely to approach the 84.4% for the average of rental housing.

3.12. Receipt of Dividend, Rental, and Interest Income

This table describes telephone penetration according to the receipt of dividend, rental, and interest income -- that is, forms of income other than wages and salaries. Households receiving two or more kinds of income averaged 99% penetration in 1993. Households receiving only one kind of income averaged 95.9%, while households receiving neither dividend, rental, nor interest income lagged at 86.4% penetration. The group receiving none of these incomes is of interest for several reasons. First, this group has experienced a low level of progress between 1984 and 1993 -- from 82.1% to 86.4%. Second, the number of households without telephone service in this group is 3,825,044; and, therefore, of significance. Furthermore, the overall size of the group is large, encompassing 28.1 million households or 30% of the total number of households in the U.S.[7]

Taking Tables 9, 9a, and 9b, as a whole, the implication for policy is for a cross subsidy to focus, not on age per se, but on the ownership of assets and household status.

Table 9 Percentage of Households with Telephone Service in March

Housing Status of Household	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Public Housing	78.9	79.9	79.4	77.9	78.5	81.4	82.7	81.2	81.3	81.4
Subsidized Rent	84.0	79.4	80.1	81.1	81.6	80.6	80.8	78.4	80.6	82.4
No Cash Rent	80.0	79.3	81.2	80.4	81.4	81.4	84.1	85.3	86.9	87.3
Regular Rent	82.8	83.4	84.7	85.2	86.0	86.1	86.7	87.6	87.7	88.2
Owned or Buying	97.0	96.9	97.0	97.3	97.5	97.6	97.6	97.8	97.9	98.0
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 9a Percentage of Households with Telephone Service in March

Number of Housing Units in Structure	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
One	94.1	94.4	94.6	94.8	95.2	95.2	95.4	95.6	95.7	96.1
More Than One	87.4	87.1	87.7	88.3	88.8	88.7	89.4	90.1	90.4	89.9
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 9b Percentage of Households with Telephone Service in March

Receipt of Dividend, Rental, and Interest Income	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
None Received	82.1	81.6	82.6	83.1	83.0	83.6	84.2	84.6	85.6	86.4
Dividend Only	94.2	94.6	96.2	95.1	93.6	94.9	96.0	95.4	95.7	96.6
Rental Only	92.1	91.7	95.3	95.1	92.0	93.1	92.6	95.2	95.9	93.4
Interest Only	96.0	96.3	96.3	96.5	96.8	96.9	96.9	97.4	97.2	97.7
Dividend and Rental	90.4	98.9	94.7	92.4	99.9	93.7	95.8	97.3	98.1	98.8
Dividend and Interest	98.6	98.6	98.8	98.8	98.9	98.8	98.8	98.9	99.0	99.1
Rental and Interest	97.7	98.0	98.2	98.8	98.6	98.2	98.5	98.9	99.1	98.6
Dividend, Rental, and Interest	99.0	99.1	99.0	98.9	99.3	98.9	99.3	99.2	99.1	99.2
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

Table 10 Percentage of Households with Telephone Service in March

Number of Families in Household	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
One	92.3	92.3	92.6	93.0	93.4	93.6	93.8	94.0	94.2	94.6
More Than One	86.1	87.0	88.1	87.4	88.2	88.5	89.3	90.2	90.2	90.1
Total	91.8	91.8	92.2	92.5	92.9	93.1	93.4	93.7	93.9	94.2

3.13. Number of Families in Household

The number of families in a household has a slight negative relationship to telephone penetration. For 1993, 94.6% of single family households had telephones, whereas 90.1% of multiple family households had telephones. It seems likely that households with multiple families have lower average income than single family households, and that translates into lower penetration. The pattern of stagnated penetration between 1990 and 1993 observed in other tables is also present here.

Table 10 is a difficult one from which to draw inferences because it lumps together households of different characteristics. The category includes households of extended families but may also include households of non-relatives. For example, in Table 10, three generation families are considered multiple families, as are two non-related people living together. The category creates an impression of fragmentation that may be misleading. Furthermore, extended families are more likely to be stable units contributing to higher telephone penetration; whereas, households of non-relatives are more likely to be unstable with lower telephone penetration. Thus, the nuclear family bias that lumps all other living arrangements together results in variables that do not predict very well.

3.14. Heads and Types of Households

"Group Quarters," which includes homeless shelters, has the lowest level of penetration (70.9% for 1993). "Single Civilian Female with Children" has the second lowest penetration (82.6%). In addition, this category has shown little improvement, 80.1% in 1984 to 82.6% in 1993. The other single female categories are much higher. However, in the case of single males, the particular category doesn't seem to affect penetration. In line with the findings in Table 10, intact families do best (97.3% average penetration for those three categories).

The lesson for policy makers is that women with children are at risk. And, since this category includes single women with children of both high and low incomes, it is reasonable to expect penetration levels to be much lower for those women who head households with children and who live at or near the poverty line. Therefore, subsidy programs should identify and target women in these low income households.

3.15. Percentage of Households With a Telephone by Householder's Age

This table makes the point that younger households -- whites, blacks, and Hispanics -- suffer lower penetration levels than do households headed by older people. The presence of a telephone in black households presents the most extreme example of this tendency. In November 1983, telephone penetration in black households headed by 15-24 year olds stood at 49.9% (These households are mostly headed by women.). By 1988, penetration had risen to 65.6%, an increase of 31%. Between 1988 and 1992, the penetration curve flattens, and then turns up slightly in 1993. In white households headed by 15-24 year olds, increases in penetration are much less dramatic (the 1983 level is 76.6%), but also show increases to 1988, followed by the same flat and upturn in the curve. Telephone penetration among young Hispanic households begins at 71.9% in 1988 and fluctuates to 73.9% in 1991, after which a significant increase takes place evening out at around 77% in 1994. At present, younger households seriously lag behind households headed by older people.

Households headed by 15-24 year olds experienced significant increases in penetration through most of the 1980s. The flatness of penetration in the 1990s also attracts attention. The

Table 11   Percentage of Households with Telephone Service in March

HEADS AND TYPES OF HOUSEHOLDS	1988	1989	1990	1991	1992	1993
Married Civilian Couple With No Others	97.5	97.5	97.7	97.9	98.0	98.1
Married Civilian Couple With Children	93.9	94.5	94.4	94.8	94.9	95.5
Married Civilian Couple With Adults Only	97.9	97.9	97.7	98.1	98.3	98.4
Single Civilian Male Alone	84.4	84.5	84.9	85.8	86.8	87.8
Single Civilian Male With Children	84.0	83.5	80.5	84.8	85.3	85.9
Single Civilian Male With Adults Only	89.7	89.4	91.1	90.3	90.7	89.7
Single Civilian Female Alone	94.8	95.5	95.4	95.4	95.8	96.2
Single Civilian Female With Children	80.1	80.2	82.2	82.6	82.1	82.6
Single Civilian Female With Adults Only	93.7	93.5	94.7	95.1	95.0	94.7
Military Person Alone Or With Spouse Only	95.7	95.6	91.0	95.9	97.2	98.4
Military Person With Others	93.4	96.4	98.0	96.7	96.6	95.3
Group Quarters	70.5	56.5	63.9	68.6	74.0	70.9
Total	92.9	93.1	93.4	93.7	93.9	94.2

Table 12 Percentage of Households with a Telephone by Householder's Age

	Total		White		Black		Hispanic	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
November 1983								
Total Households	91.4	93.7	93.1	95.0	78.8	83.9	80.7	84.6
16-24 Years Old	76.6	84.1	80.2	86.2	49.9	68.2	64.9	71.9
25-54 Years Old	91.5	93.7	93.4	95.2	78.7	83.3	81.8	85.6
55-59 Years Old	95.0	96.1	96.1	97.0	86.3	88.5	89.3	89.3
60-64 Years Old	95.5	96.4	96.4	97.2	89.5	90.7	87.3	90.2
65-69 Years Old	95.5	96.2	96.5	97.0	87.2	89.0	90.7	90.7
70-99 Years Old	95.4	96.5	96.0	97.0	90.1	92.3	85.5	89.1
1984 Annual Average								
Total Households	91.6	93.7	93.2	94.9	79.8	84.5	80.9	84.3
16-24 Years Old	77.0	83.6	79.6	85.4	58.2	70.8	60.9	69.2
25-54 Years Old	91.7	93.7	93.4	95.1	79.6	84.1	83.1	85.7
55-59 Years Old	94.9	96.1	96.1	97.1	86.6	89.2	87.1	90.1
60-64 Years Old	94.9	96.0	96.0	97.0	86.6	88.8	87.1	89.1
65-69 Years Old	96.2	96.8	97.1	97.6	87.9	89.9	90.2	91.5
70-99 Years Old	95.3	96.5	96.0	97.1	88.2	90.9	84.4	87.6
1985 Annual Average								
Total Households	91.8	93.9	93.3	95.0	81.1	85.2	81.3	84.4
16-24 Years Old	77.9	83.8	80.3	85.8	60.0	69.4	64.8	70.8
25-54 Years Old	91.9	93.9	93.5	95.2	80.7	85.0	82.5	85.2
55-59 Years Old	94.9	96.0	95.8	96.8	87.8	90.0	87.4	89.2
60-64 Years Old	94.9	95.9	95.8	96.5	88.4	90.2	89.7	91.3
65-69 Years Old	95.9	96.8	96.8	97.5	88.2	90.9	89.1	91.7
70-99 Years Old	95.5	96.6	96.2	97.3	89.1	90.7	87.6	90.9
1986 Annual Average								
Total Households	92.3	94.1	93.7	95.2	81.6	85.9	81.4	84.1
16-24 Years Old	79.0	84.4	81.5	85.9	59.8	72.2	63.4	67.4
25-54 Years Old	92.2	94.0	93.8	95.3	81.1	85.2	82.9	85.5
55-59 Years Old	95.2	96.3	96.1	97.0	88.0	91.3	87.6	90.4
60-64 Years Old	95.4	96.2	96.2	97.0	88.9	90.4	89.1	90.3
65-69 Years Old	95.8	96.7	96.7	97.4	88.4	90.6	90.4	91.9
70-99 Years Old	96.0	97.0	96.5	97.4	91.3	92.9	87.5	89.8

Table 12 Percentage of Households with a Telephone by Householder's Age

	Total		White		Black		Hispanic	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1987 Annual Average								
Total Households	92.4	94.2	93.8	95.4	81.8	85.9	83.0	85.4
16-24 Years Old	78.9	84.4	81.4	86.1	61.8	72.3	65.2	70.8
25-54 Years Old	92.3	94.2	93.9	95.4	81.4	85.5	84.4	86.5
55-59 Years Old	95.2	96.2	96.4	97.2	87.0	89.6	89.1	90.7
60-64 Years Old	95.7	96.4	96.6	97.3	88.0	90.2	90.9	92.0
65-69 Years Old	95.9	96.7	97.0	97.5	87.1	89.3	88.8	88.8
70-99 Years Old	96.0	97.0	96.5	97.5	91.9	93.0	91.6	93.1
1988 Annual Average								
Total Households	92.7	94.5	94.1	95.6	83.0	86.8	82.1	85.1
16-24 Years Old	80.2	85.1	82.3	86.8	65.6	73.5	64.0	70.9
25-54 Years Old	92.6	94.4	94.1	95.6	82.2	86.3	83.5	86.1
55-59 Years Old	95.1	96.4	96.1	97.2	88.3	91.0	88.5	89.9
60-64 Years Old	95.3	96.2	96.3	97.0	87.6	89.9	87.3	90.0
65-69 Years Old	96.4	97.1	97.2	97.7	89.6	92.0	89.6	91.2
70-99 Years Old	96.2	97.5	96.7	97.9	92.3	93.9	92.2	94.3
1989 Annual Average								
Total Households	93.1	94.9	94.5	95.9	83.2	87.1	83.0	86.0
16-24 Years Old	80.5	85.9	82.9	87.7	65.3	75.2	64.8	72.3
25-54 Years Old	92.7	94.6	94.3	95.8	82.2	86.4	83.6	86.5
55-59 Years Old	95.4	96.5	96.4	97.4	88.7	90.7	90.1	91.2
60-64 Years Old	95.7	96.7	96.6	97.3	89.2	91.6	89.8	90.0
65-69 Years Old	96.0	97.0	97.1	97.7	90.3	91.9	88.8	91.0
70-99 Years Old	96.4	97.4	97.1	97.9	91.1	92.6	89.8	92.0
1990 Annual Average								
Total Households	93.3	95.0	94.6	96.1	83.5	87.0	82.7	85.3
16-24 Years Old	81.2	86.5	83.6	88.2	66.4	75.3	67.8	73.5
25-54 Years Old	92.6	94.5	94.1	95.7	82.4	86.1	82.0	84.6
55-59 Years Old	95.4	96.4	96.5	97.4	87.3	89.6	89.9	90.7
60-64 Years Old	96.2	96.9	97.1	97.6	89.7	91.6	90.6	91.1
65-69 Years Old	96.3	97.1	97.0	97.8	90.7	91.7	90.7	92.5
70-99 Years Old	96.9	97.8	97.4	98.3	91.9	93.3	93.2	94.1

Table 12 Percentage of Households with a Telephone by Householder's Age

	Total		White		Black		Hispanic	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1991 Annual Average								
Total Households	93.4	95.1	94.8	96.2	83.5	87.2	84.1	86.7
16-24 Years Old	81.0	86.1	83.4	88.0	65.7	74.5	68.5	73.9
25-54 Years Old	92.7	94.6	94.3	95.8	82.3	86.3	84.1	86.7
55-59 Years Old	95.5	96.7	96.5	97.5	88.0	90.9	89.8	90.5
60-64 Years Old	95.9	96.9	96.9	97.6	88.5	90.8	88.3	90.4
1992 Annual Average								
Total Households	93.8	95.3	95.2	96.4	84.2	87.9	85.8	88.2
16-24 Years Old	82.0	87.4	85.0	89.6	64.2	74.1	72.8	80.4
25-54 Years Old	93.1	94.8	94.6	95.9	82.9	87.0	85.5	87.7
55-59 Years Old	96.0	96.8	97.0	97.5	89.6	91.9	91.5	92.3
60-64 Years Old	96.3	97.1	97.0	97.7	91.2	92.6	89.3	91.2
65-69 Years Old	96.6	97.3	97.5	98.0	89.8	92.0	92.0	92.4
70-99 Years Old	97.5	98.0	98.0	98.5	93.1	94.0	94.2	95.0
1993 Annual Average								
Total Households	94.2	95.6	95.5	96.6	85.2	88.3	86.7	88.8
16-24 Years Old	83.3	87.3	85.7	89.2	70.1	77.3	71.8	76.3
25-54 Years Old	93.5	95.1	95.0	96.3	83.5	87.0	86.4	88.7
55-59 Years Old	95.9	96.8	96.7	97.5	90.0	92.2	91.3	92.1
60-64 Years Old	97.0	97.6	97.7	98.3	91.9	93.3	92.5	93.7
65-69 Years Old	97.0	97.6	97.5	98.1	92.8	93.5	92.9	93.9
70-99 Years Old	97.6	98.2	98.0	98.6	93.2	94.1	94.7	95.4
1994 Annual Average								
Total Households	93.9	95.6	95.3	96.6	85.1	89.0	86.9	89.0
16-24 Years Old	84.9	90.1	86.3	90.9	74.6	84.1	72.1	77.1
25-54 Years Old	93.2	95.0	94.8	96.2	83.7	88.0	86.3	88.5
55-59 Years Old	95.8	96.8	96.6	97.6	90.3	91.6	93.0	94.1
60-64 Years Old	96.8	97.6	97.6	98.3	89.7	91.2	96.6	97.0
65-69 Years Old	97.1	97.6	97.7	98.1	91.7	93.7	94.6	94.6
70-99 Years Old	96.9	97.9	97.4	98.3	92.4	93.4	95.2	96.7

causes of both phenomena are unclear but worth investigating. Tables 3-11 presaged the dominant theme of Table 13 -- level of income predicts telephone penetration. Between 1993 and March 1994, decreases in penetration are evident for some cells; but, given the smallness of the CPS sample in these cells, the decreases are probably not statistically significant. It is safer to infer that penetration levels continue to remain flat.

3.15. Percentage of Households With a Telephone by Labor Force Status

This table parallels Table 13. It further illustrates the relationship between telephone penetration and level of income, poverty, and optimistic assessments of the future. "Labor Force Status" reflects all of these conditions. Not surprisingly, penetration levels are higher among the employed for all groups. And, as in Table 13, indications of the flatness of penetration since 1993 are fairly clear. Cells showing decreases from 1993 to 1994 are probably not significant, with the possible exception of unemployed blacks (80.9% in 1993, 77.9% in march 1994).

The following states show numerical decreases in telephone penetration from 1993 to March 1994: Alabama; California; Colorado; Connecticut; Delaware; District of Columbia; Florida; Illinois; Indiana; Iowa; Kansas; Maine; Maryland; Massachusetts; Michigan; Missouri; Nevada; New Hampshire; New Jersey; New Mexico; North Dakota; Ohio; Pennsylvania; South Carolina; Texas; Washington; West Virginia; and, Wyoming. However, none of these decreases are of statistical significance with the exception of the District of Columbia, although Nevada and New Mexico also decreased several percentage points. Nevertheless, the lack of advances in telephone penetration are evident, as they have been for the last several CPS measurement periods. Moreover, stagnation in telephone penetration is widespread and not confined to any particular region.

4. Method, Measurement, and Measurement Limitations

Households that have telephone service constitute the conceptual basis for all measures of universal service. The most widely used measure is the percentage of households with telephone service -- sometimes referred to as telephone "penetration."[8] Yet this statistic, though seemingly obvious, can harbor multiple definitions and be subject to errors in operationalization. Prior to the 1980 census, precise calculation of telephone subscribership -- one definition of penetration -- received little attention. In the days of one phone, one household, one service provider, telephone penetration was traditionally measured by dividing the number of residential telephone lines by the number of households. As households added second lines and as the number of second homes increased measurement based on the number of residential lines became subject to a large margin of error. By 1980, the traditional penetration measure (residential lines divided by the number of households) reached 96% while the number of households reporting that they had telephones in the 1980 census lagged at 92.9%.

The 1980 census exposed discrepancies in the unobtrusive measure of counting residential lines versus the direct measure of the census questionnaire. It also highlighted the need for precise periodic measurements of subscribership between censuses. With this in mind, the FCC requested that the Bureau of the Census include questions on telephone penetration as part of its Current Population Survey (CPS), which monitors demographic trends between decennial censuses. The CPS is a staggered panel survey in which individuals residing at a particular addresses is included for four consecutive months in one year and the same four months the

Table 13 Percentage of Households with a Telephone by Income

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
NOVEMBER 83								
TOTAL	91.4	93.7	93.1	95.0	78.8	83.9	80.7	84.6
UNDER $5,000	71.7	78.4	75.7	81.9	62.7	70.4	58.3	64.6
$5,000 - $7,499	82.7	87.2	84.5	88.5	74.7	82.0	71.1	76.5
$7,500 - $9,999	88.2	90.9	89.6	92.2	80.5	83.9	72.6	77.9
$10,000 - $12,499	89.7	92.7	91.2	93.9	82.0	86.2	76.8	82.1
$12,500 - $14,999	92.1	94.6	93.4	95.2	82.5	90.7	89.8	91.7
$15,000 - $17,499	94.6	96.2	94.9	96.4	91.7	95.1	86.9	90.8
$17,500 - $19,999	95.7	97.4	96.1	97.7	91.4	95.0	88.4	91.5
$20,000 - $24,999	96.9	97.8	97.4	98.2	91.2	93.2	93.1	94.3
$25,000 - $29,999	98.0	98.9	98.2	99.0	96.1	97.2	98.3	99.0
$30,000 - $34,999	98.8	99.1	99.0	99.2	95.1	97.7	97.7	98.9
$35,000 - $39,999	99.0	99.5	99.1	99.5	98.4	98.4	92.1	98.2
$40,000 - $49,999	99.2	99.5	99.4	99.7	97.3	97.3	100.0	100.0
$50,000 - $74,999	99.4	99.7	99.5	99.7	98.5	100.0	99.6	100.0
$75,000 +	99.4	99.6	99.4	99.6	100.0	100.0	100.0	100.0
1984 ANNUAL AVERAGE								
TOTAL	91.6	93.7	93.2	94.9	79.8	84.5	80.9	84.3
UNDER $5,000	71.2	77.5	74.5	80.4	63.2	70.5	55.1	62.3
$5,000 - $7,499	83.3	86.9	85.5	88.7	74.8	80.2	69.8	73.6
$7,500 - $9,999	86.5	89.6	88.3	91.0	77.2	82.7	75.0	79.7
$10,000 - $12,499	89.7	92.6	91.1	93.6	81.1	86.3	79.7	84.6
$12,500 - $14,999	92.1	94.4	93.0	95.0	85.4	89.5	87.3	90.5
$15,000 - $17,499	93.7	95.7	94.2	96.0	88.5	92.2	88.4	90.0
$17,500 - $19,999	95.1	96.4	95.6	96.7	91.7	94.4	91.0	92.8
$20,000 - $24,999	96.8	97.8	97.1	98.0	93.3	95.8	92.5	94.5
$25,000 - $29,999	98.1	98.8	98.4	98.9	95.1	97.2	96.4	97.2
$30,000 - $34,999	98.7	99.1	98.8	99.3	96.8	97.2	98.8	99.1
$35,000 - $39,999	99.2	99.5	99.3	99.6	97.7	98.3	98.2	98.5
$40,000 - $49,999	99.3	99.6	99.4	99.7	96.6	96.9	98.9	99.3
$50,000 - $74,999	99.4	99.8	99.5	99.8	98.0	98.4	100.0	100.0
$75,000 +	98.9	99.6	98.9	99.6	96.5	100.0	98.0	100.0

Table 13 Percentage of Households with a Telephone by Income

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1985 ANNUAL AVERAGE								
TOTAL	91.8	93.9	93.3	95.0	81.1	85.2	81.3	84.4
UNDER $5,000	71.9	78.1	75.3	81.3	63.9	70.6	61.6	67.0
$5,000 - $7,499	82.7	86.5	84.8	88.1	74.0	79.8	66.6	71.3
$7,500 - $9,999	86.8	90.0	88.1	90.9	80.3	85.0	75.0	79.4
$10,000 - $12,499	89.6	92.2	90.8	93.2	82.3	86.0	80.4	82.8
$12,500 - $14,999	91.0	93.7	92.2	94.5	82.7	87.8	82.8	85.8
$15,000 - $17,499	93.4	95.6	94.2	96.2	88.2	91.8	85.7	88.6
$17,500 - $19,999	94.7	96.2	95.1	96.6	91.5	93.4	90.4	92.8
$20,000 - $24,999	96.3	97.5	96.5	97.6	94.4	96.3	91.3	93.7
$25,000 - $29,999	97.6	98.5	97.8	98.6	95.8	97.3	93.0	95.9
$30,000 - $34,999	98.6	99.0	98.7	99.1	97.3	98.4	97.3	97.3
$35,000 - $39,999	98.8	99.2	98.9	99.4	96.9	97.8	98.2	99.4
$40,000 - $49,999	99.1	99.4	99.1	99.4	97.8	98.2	97.5	98.2
$50,000 - $74,999	99.3	99.7	99.4	99.7	97.9	98.8	99.5	99.5
$75,000 +	99.2	99.5	99.2	99.5	97.6	97.6	98.5	98.5
1986 ANNUAL AVERAGE								
TOTAL	92.3	94.1	93.7	95.2	81.6	85.9	81.4	84.1
UNDER $5,000	71.6	77.4	74.9	80.1	63.9	71.0	57.5	62.9
$5,000 - $7,499	83.1	86.5	85.2	88.2	74.3	79.6	68.1	72.1
$7,500 - $9,999	86.9	90.2	88.4	91.1	78.6	85.2	72.9	75.8
$10,000 - $12,499	89.6	92.1	90.7	93.0	82.6	86.4	80.3	82.6
$12,500 - $14,999	91.2	93.8	91.9	94.4	86.4	90.3	83.9	87.8
$15,000 - $17,499	93.1	95.1	94.3	95.7	85.3	91.6	86.3	88.9
$17,500 - $19,999	94.9	96.3	95.3	96.7	92.2	94.2	87.2	90.1
$20,000 - $24,999	96.5	97.5	96.9	97.9	92.8	94.6	93.0	94.1
$25,000 - $29,999	97.7	98.4	98.0	98.7	94.5	95.9	93.9	95.2
$30,000 - $34,999	98.4	98.9	98.6	99.0	96.7	97.5	97.5	98.4
$35,000 - $39,999	98.9	99.3	99.0	99.4	97.6	97.9	98.1	99.3
$40,000 - $49,999	99.1	99.4	99.1	99.4	98.2	98.2	98.5	98.8
$50,000 - $74,999	99.5	99.8	99.6	99.8	99.4	99.4	99.4	99.7
$75,000 +	99.4	99.6	99.4	99.6	98.0	99.5	97.5	100.0

Table 13 Percentage of Households with a Telephone by Income

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1987 ANNUAL AVERAGE								
TOTAL	92.4	94.2	93.8	95.4	81.8	85.9	83.0	85.4
UNDER $5,000	71.5	77.4	75.0	80.3	63.7	71.0	60.7	65.7
$5,000 - $7,499	83.4	86.7	85.5	88.4	74.8	80.2	69.9	72.4
$7,500 - $9,999	86.7	89.6	88.1	90.6	79.3	84.0	75.8	78.9
$10,000 - $12,499	89.5	92.3	90.4	93.1	83.2	87.5	81.0	84.1
$12,500 - $14,999	90.8	93.2	91.9	94.1	83.8	87.7	85.2	86.9
$15,000 - $17,499	92.6	94.9	93.5	95.5	86.9	90.8	85.6	88.7
$17,500 - $19,999	94.4	96.0	95.1	96.4	89.0	92.7	89.3	90.6
$20,000 - $24,999	96.4	97.6	96.8	97.9	93.5	95.1	93.1	94.9
$25,000 - $29,999	97.5	98.4	98.0	98.7	93.4	95.3	96.4	97.1
$30,000 - $34,999	98.1	98.9	98.3	99.0	96.1	97.2	96.9	97.7
$35,000 - $39,999	98.8	99.2	98.9	99.3	96.5	98.6	97.4	97.7
$40,000 - $49,999	99.4	99.7	99.5	99.7	98.7	98.7	99.7	99.8
$50,000 - $74,999	99.5	99.8	99.5	99.8	99.1	99.4	98.7	99.6
$75,000 +	99.5	99.8	99.5	99.8	98.5	99.6	98.6	100.0
1988 ANNUAL AVERAGE								
TOTAL	92.7	94.5	94.1	95.6	83.0	86.8	82.1	85.1
UNDER $5,000	72.0	78.4	74.9	80.8	65.8	73.2	58.5	64.5
$5,000 - $7,499	83.3	87.1	85.1	88.4	76.9	82.3	66.4	71.7
$7,500 - $9,999	85.6	88.7	87.2	90.3	77.7	81.4	67.3	72.8
$10,000 - $12,499	88.8	91.5	90.1	92.4	81.7	86.5	77.5	80.9
$12,500 - $14,999	91.3	93.7	92.2	94.4	85.1	88.8	81.5	84.5
$15,000 - $19,999	93.6	95.3	94.3	95.9	88.5	91.1	88.6	90.6
$20,000 - $24,999	96.2	97.4	96.5	97.6	93.5	95.7	91.1	93.1
$25,000 - $29,999	97.6	98.4	97.9	98.5	94.4	96.7	95.0	96.4
$30,000 - $34,999	98.4	99.0	98.7	99.2	95.4	96.7	98.6	99.0
$35,000 - $39,999	98.8	99.2	98.9	99.3	97.8	98.4	97.2	97.7
$40,000 - $49,999	99.3	99.6	99.4	99.7	97.3	98.5	98.7	99.7
$50,000 - $74,999	99.5	99.8	99.6	99.8	99.2	99.3	99.4	99.8
$75,000 +	99.5	99.9	99.4	99.9	100.0	100.0	97.8	100.0

Table 13 Percentage of Households with a Telephone by Income

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1989 ANNUAL AVERAGE								
TOTAL	93.1	94.9	94.5	95.9	83.2	87.1	83.0	86.0
UNDER $5,000	74.4	80.4	78.1	83.2	65.6	73.5	62.1	67.3
$5,000 - $7,499	83.7	87.4	85.7	89.1	77.4	82.0	68.8	73.8
$7,500 - $9,999	86.6	89.8	88.5	91.3	78.4	83.6	75.9	80.2
$10,000 - $12,499	88.4	91.3	90.0	92.6	79.3	84.9	73.2	76.8
$12,500 - $14,999	91.3	93.7	92.4	94.5	84.5	88.8	79.2	83.7
$15,000 - $19,999	93.2	95.0	94.2	95.8	85.9	89.2	86.3	88.8
$20,000 - $24,999	95.9	97.2	96.4	97.5	91.6	94.3	92.0	94.4
$25,000 - $29,999	97.5	98.4	97.9	98.6	94.0	96.0	93.3	96.3
$30,000 - $34,999	98.3	98.8	98.5	98.9	96.1	97.0	95.6	96.2
$35,000 - $39,999	98.7	99.3	98.9	99.4	96.7	98.0	95.8	97.5
$40,000 - $49,999	99.1	99.5	99.2	99.6	97.2	97.7	97.0	98.2
$50,000 - $59,999	99.5	99.7	99.5	99.8	98.7	99.0	98.7	99.2
$60,000 - $74,999	99.5	99.7	99.5	99.7	99.3	99.3	95.7	96.8
$75,000 +	99.5	99.8	99.5	99.8	99.5	99.5	99.7	99.7
1990 ANNUAL AVERAGE								
TOTAL	93.3	95.0	94.6	96.1	83.5	87.0	82.7	85.3
UNDER $5,000	75.4	81.0	79.1	84.2	66.1	72.8	61.1	66.1
$5,000 - $7,499	82.6	86.8	84.9	88.8	74.9	80.1	66.7	70.6
$7,500 - $9,999	86.9	89.9	89.0	91.6	77.3	82.4	74.8	77.8
$10,000 - $12,499	88.9	91.7	90.2	92.8	81.9	85.5	74.1	77.1
$12,500 - $14,999	91.7	93.9	92.7	94.7	85.9	88.7	82.0	84.3
$15,000 - $19,999	93.3	95.3	94.2	96.0	87.7	91.0	85.1	88.6
$20,000 - $24,999	95.6	97.0	96.1	97.4	91.9	93.7	89.4	91.3
$25,000 - $29,999	97.0	98.0	97.7	98.5	90.9	93.2	94.2	95.5
$30,000 - $34,999	97.9	98.6	98.4	98.9	93.3	95.4	96.0	97.0
$35,000 - $39,999	98.7	99.3	98.8	99.4	97.0	98.0	94.1	96.3
$40,000 - $49,999	99.1	99.4	99.2	99.5	98.5	98.8	97.8	97.8
$50,000 - $59,999	99.4	99.6	99.5	99.7	98.7	98.7	97.5	98.2
$60,000 - $74,999	99.5	99.7	99.6	99.8	98.3	98.8	98.8	99.1
$75,000 +	99.5	99.8	99.5	99.8	98.6	98.6	97.7	99.6

Table 13 Percentage of Households with a Telephone by Income

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1991 ANNUAL AVERAGE								
TOTAL	93.4	95.1	94.8	96.2	83.5	87.2	84.1	86.7
UNDER $5,000	73.9	80.1	78.3	83.7	63.3	71.2	65.2	71.3
$5,000 - $7,499	82.9	86.8	85.2	88.8	75.0	80.3	69.6	74.7
$7,500 - $9,999	86.5	89.7	88.1	91.0	79.1	83.7	73.1	76.9
$10,000 - $12,499	88.9	91.6	90.0	92.5	82.4	86.2	76.0	79.2
$12,500 - $14,999	91.1	93.4	92.1	94.3	85.5	88.4	82.4	84.6
$15,000 - $19,999	93.4	95.2	94.3	95.9	87.1	90.7	87.0	89.8
$20,000 - $24,999	95.5	97.0	96.0	97.5	91.2	93.3	91.6	93.5
$25,000 - $29,999	96.8	97.9	97.3	98.2	93.6	96.0	90.9	92.4
$30,000 - $34,999	98.3	98.9	98.6	99.2	95.4	97.1	95.8	97.1
$35,000 - $39,999	98.7	99.1	98.8	99.3	97.0	97.7	96.2	97.3
$40,000 - $49,999	99.1	99.5	99.2	99.6	98.1	98.6	98.2	98.8
$50,000 - $59,999	99.5	99.7	99.5	99.7	98.6	99.0	97.9	98.6
$60,000 - $74,999	99.7	99.9	99.7	99.9	99.3	99.5	98.8	99.2
$75,000 +	99.7	99.9	99.7	99.9	99.6	100.0	98.5	99.6
1992 ANNUAL AVERAGE								
TOTAL	93.8	95.3	95.2	96.4	84.2	87.9	85.8	88.2
UNDER $5,000	72.0	78.1	75.5	81.1	64.1	71.3	65.0	70.7
$5,000 - $7,499	83.2	86.8	85.4	88.3	76.3	82.3	72.0	75.5
$7,500 - $9,999	87.5	90.2	89.2	91.4	79.9	84.9	76.2	79.9
$10,000 - $12,499	90.5	92.9	91.6	93.9	84.6	87.9	82.1	85.3
$12,500 - $14,999	91.5	93.7	92.7	94.7	85.1	88.4	85.7	88.8
$15,000 - $19,999	93.3	95.0	94.3	95.7	86.6	90.6	86.7	89.5
$20,000 - $24,999	95.9	97.1	96.5	97.5	91.2	93.7	93.2	94.5
$25,000 - $29,999	97.1	98.0	97.6	98.5	92.6	94.6	94.8	95.6
$30,000 - $34,999	98.2	98.9	98.4	99.0	96.3	97.4	96.1	97.1
$35,000 - $39,999	98.6	99.0	98.9	99.3	96.4	97.4	96.6	97.5
$40,000 - $49,999	99.2	99.5	99.4	99.6	97.6	98.5	98.2	98.7
$50,000 - $59,999	99.4	99.7	99.4	99.7	98.9	99.6	98.3	98.5
$60,000 - $74,999	99.5	99.8	99.5	99.8	99.3	99.6	98.9	99.7
$75,000 +	99.4	99.7	99.5	99.8	97.7	97.9	99.1	99.1

Table 13 Percentage of Households with a Telephone by Income

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1993 ANNUAL AVERAGE								
TOTAL	94.2	95.6	95.5	96.6	85.2	88.3	86.7	88.8
UNDER $5,000	72.9	78.9	76.4	82.0	65.5	72.7	66.3	70.7
$5,000 - $7,499	84.0	87.2	85.7	88.8	78.7	82.4	75.7	78.6
$7,500 - $9,999	87.4	90.1	89.1	91.4	80.1	84.6	79.7	82.8
$10,000 - $12,499	90.6	92.7	91.9	93.8	82.9	86.7	85.7	88.3
$12,500 - $14,999	92.0	94.1	93.2	95.1	84.8	88.7	84.0	86.2
$15,000 - $19,999	93.6	95.2	94.5	96.0	88.0	90.4	85.3	88.3
$20,000 - $24,999	96.3	97.5	96.8	97.8	92.6	94.6	91.9	94.6
$25,000 - $29,999	97.7	98.5	98.1	98.8	94.5	96.1	95.5	96.9
$30,000 - $34,999	98.3	98.9	98.6	99.1	96.3	96.9	96.2	97.3
$35,000 - $39,999	98.6	99.0	98.8	99.2	96.3	97.1	95.7	96.3
$40,000 - $49,999	99.2	99.5	99.3	99.5	98.2	98.6	96.9	97.4
$50,000 - $59,999	99.5	99.7	99.5	99.7	99.0	99.3	98.4	99.1
$60,000 - $74,999	99.6	99.8	99.6	99.8	99.3	99.3	100.0	100.0
$75,000 +	99.5	99.8	99.5	99.8	99.4	100.0	100.0	100.0
MARCH 94								
TOTAL	93.9	95.6	95.3	96.6	85.1	89.0	86.9	89.0
UNDER $5,000	76.1	81.9	80.4	84.6	66.9	76.4	65.6	71.0
$5,000 - $7,499	83.1	87.3	85.6	89.5	76.6	81.3	75.2	79.1
$7,500 - $9,999	87.7	90.8	90.3	93.0	79.0	83.6	82.0	84.2
$10,000 - $12,499	89.7	92.2	90.5	92.8	85.4	88.6	83.3	86.1
$12,500 - $14,999	91.7	94.5	93.5	95.7	82.9	89.1	89.2	90.0
$15,000 - $19,999	94.1	95.7	94.7	96.2	90.8	93.2	88.3	90.8
$20,000 - $24,999	95.6	97.3	96.1	97.6	92.2	95.0	92.2	94.0
$25,000 - $29,999	96.2	97.3	96.9	98.0	90.3	92.7	91.3	93.2
$30,000 - $34,999	97.1	98.2	97.6	98.6	92.2	94.6	91.8	94.7
$35,000 - $39,999	97.9	98.5	98.0	98.5	96.6	97.9	95.6	96.4
$40,000 - $49,999	98.3	99.1	98.7	99.4	94.8	96.6	96.5	97.2
$50,000 - $59,999	98.9	99.2	99.0	99.2	97.3	99.2	100.0	100.0
$60,000 - $74,999	99.5	99.7	99.5	99.7	99.1	99.9	100.0	100.0
$75,000 +	99.4	99.7	99.4	99.7	98.4	99.4	100.0	100.0

following year. For national studies, use of the CPS has several advantages: a) it is conducted every month by an independent and expert agency; b) the sample is large; and, c) the questions are consistent. Thus, changes in the results can be compared over time with a great deal of confidence. The reliance on CPS data carries with it an inherent bias against the use of wireless and mobile services for telecommunications purposes. Address-based measurement excludes the presence of new wireless technologies if they are used as substitutes for wired service to the home. Both the census and the CPS ask the following question: "Is there a telephone in this house/apartment?" Then, in the CPS, but not in the census, a series of follow-up questions may be invoked. If the answer to the first question is "no," a second question seeks to know the extent of telephone availability and asks, "Is there a telephone elsewhere on which people in this household can be called?" The interviewer of the CPS then asks two additional questions: "Can we call you for follow-up surveys in subsequent months?" and, "What is the phone number where we can reach you?"

The idea is that the CPS fills in the gaps between the benchmarks of the decennial censuses. Unfortunately, the telephone penetration results of the CPS cannot be directly compared with the penetration figures contained in either the 1980 or 1990 census. The problem lies with differences in the sampling and survey methodologies that produce discrepancies.

First, although the survey is conducted every month, not all questions are included every month. The telephone questions are asked once every four months -- in the month that a household is first included in the sample, and in the month that the household reenters the sample a year later. Since the sample is staggered, the information that is reported for any given month actually reflects responses over the preceding four months. Aggregated summaries of the responses are reported to the FCC, based on the surveys conducted through March, July, and November of each year.

Second, the questions were written long before the breakup of AT&T and reflect realities of the monopoly era, when having a phone also meant having service. But in the post divestiture era encompassed by the 1990 census, the question "Is there a telephone in this house/apartment?" inadvertently focuses on the instrument of the telephone, instead of the real issue, which is the presence of telephone service. Anyone answering this question who does not currently have telephone service, but had it in the past, will probably possess a disconnected telephone and can truthfully -- if literally -- answer yes. Therefore, one potential for statistical bias stems from a literal response to this question. In the case of the census, the respondent could truthfully answer yes to the question and confound the results with an upward bias; and, since there is no follow-up to the census, the upward bias would go uncorrected. In the case of the CPS, follow-up questions and surveys can potentially correct for this bias; however, they contain the potential for a downward bias.[9] The questions are only asked once, so that households that add telephone service in the months after the first interview will not reflect the added service.[10] In addition, the follow-up technique takes the form of a repeated phone call in subsequent months. Therefore, it will catch a household that originally had telephone service and lost it, but will not catch a household that did not originally have telephone service but subsequently received it -- thus, the downward bias.

Third, the CPS is based on a nationwide sample of about 58,000 households (1993, September). Because it is a sample, the estimates are subject to sampling error. Between consecutive reports, changes in the nationwide totals of telephone penetration of less than or equal to 0.5% are likely to be due to sampling error and cannot be regarded as statistically

significant.[11] When comparing annual averages (i.e., the average of the three surveys of the year in question), changes of less than 0.3% are not statistically significant.[12] For individual states or other subgroups of the U.S. population, the amount of sampling variability is much greater; therefore, it is difficult to track local changes in penetration.

Fourth, the data in the CPS are not seasonally adjusted. Seasonal analysis of the data indicates that, for the nation as a whole, there is no significant seasonal variation in the statistics on telephone availability. There is, however, a significant seasonal pattern in the month to month statistics for the presence of a telephone in the household/apartment. If one allows for the effects of the general upward trend in the data, one observes an increase of 0.3% from November to March, followed by a decrease of 0.2% from March to July, followed by a decrease of 0.1% from July to November.[13] This seasonality should be kept in mind when comparing estimates for different months.

Fifth, correlations of census and CPS demographic data with penetration data require extensive preparation. Alex Belinfante estimates that to correlate penetration data with other demographic data in the census requires extensive preparation, which is likely to take as much as 6 to 9 months to construct and run one correlation. Numerous correlations and regressions have been suggested which might provide useful insights, but they are currently impractical. An attractive solution is to invest in one of several low cost commercially prepared databases that specifically aim to facilitate statistical analysis of the census and CPS data.

For the researcher, the problem is that the census is not strictly comparable with the CPS. The differences -- some correctable some inherent -- result in a gap in the final numbers. According to the 1990 census, 94.8% of all households in the United States have telephones. However, CPS data show penetration at 93.3% for 1990. This difference is statistically significant and appears to indicate that the CPS may be on the low side while the census may be on the high side, with the truth lying somewhere in between. For purposes of this paper, we will split the difference and accept telephone penetration at 94% for 1990.

There is an additional problem with the organization of the data that inhibits in depth analysis. Both the Census and CPS survey consist of state aggregates. For purposes of constructing national penetration calculations, this level of abstraction has been quite adequate. But as a result of our interviews and investigations in the first half of the year, we are now aware of the wide variation in intrastate conditions. The implementation of distinct state policies, and the range of conditions within the states, offers exceptional lessons on the varying impact of universal service policies as applied in many of the states. With the present data, it is impossible to statistically analyze conditions within the states, or to compare local penetration within one state against local penetration within another state. The inability to do so, results in an overly crude picture of the conditions affecting telephone penetration.

5. Federal and State Regulatory Efforts to Increase Penetration Among Low-Income Households

From 1984 to 1994 among households earning $9,999 or less, the biggest gains in penetration have taken place in twelve states: Connecticut, Georgia, Hawaii, Michigan, Nevada, New Mexico, North Carolina, South Carolina, Tennessee, Vermont, Washington, and Wyoming (See Table 15a.). Taken together, these states account for the bulk of increases in penetration for the nation. The theme connecting them is that Connecticut, Hawaii, Michigan, Nevada, New

Table 14 Percentage of Adults with a Telephone by Labor Force Status

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
NOVEMBER 83								
TOTAL CNP	92.8	94.5	94.1	95.6	82.7	86.6	83.4	86.5
EMPLOYED	94.1	95.9	95.0	96.6	85.7	89.8	86.3	89.6
UNEMPLOYED	82.5	86.5	84.8	88.1	74.6	81.2	76.6	79.9
NOT IN LABOR FORCE	92.1	93.4	93.8	94.9	80.8	83.7	80.4	83.0
1984 ANNUAL AVERAGE								
TOTAL CNP	92.8	94.5	94.1	95.5	82.9	86.7	83.0	85.6
EMPLOYED	94.0	95.7	95.0	96.4	85.9	89.8	85.7	88.3
UNEMPLOYED	81.7	85.3	84.0	87.0	74.7	80.2	74.0	77.4
NOT IN LABOR FORCE	92.1	93.5	93.8	95.0	80.7	83.9	80.3	82.8
1985 ANNUAL AVERAGE								
TOTAL CNP	93.0	94.6	94.2	95.6	84.1	87.4	83.5	85.8
EMPLOYED	94.2	95.8	95.0	96.5	87.3	90.4	85.1	87.5
UNEMPLOYED	82.3	85.8	84.2	87.3	76.3	81.1	73.8	76.9
NOT IN LABOR FORCE	92.2	93.6	93.8	94.9	81.5	84.5	82.6	84.6
1986 ANNUAL AVERAGE								
TOTAL CNP	93.4	94.8	94.6	95.8	84.6	88.1	83.3	85.4
EMPLOYED	94.7	96.1	95.5	96.6	87.7	91.1	85.3	87.4
UNEMPLOYED	82.3	86.0	84.5	87.6	74.8	80.7	75.3	78.2
NOT IN LABOR FORCE	92.6	93.9	94.1	95.1	82.3	85.4	81.4	83.4
1987 ANNUAL AVERAGE								
TOTAL CNP	93.5	94.9	94.7	95.9	84.7	88.1	84.5	86.4
EMPLOYED	94.6	96.1	95.4	96.7	87.9	91.0	86.3	88.3
UNEMPLOYED	82.7	86.1	85.3	88.2	74.0	79.3	77.0	79.6
NOT IN LABOR FORCE	92.7	93.9	94.2	95.2	82.2	85.5	82.5	84.1
1988 ANNUAL AVERAGE								
TOTAL CNP	93.8	95.2	94.9	96.1	85.6	88.7	83.6	86.1
EMPLOYED	94.9	96.2	95.6	96.8	88.5	91.5	85.4	87.7
UNEMPLOYED	83.3	86.8	85.9	88.9	75.4	80.5	76.7	80.3
NOT IN LABOR FORCE	92.8	94.2	94.3	95.5	83.1	86.0	81.5	84.0

Table 14 Percentage of Adults with a Telephone by Labor Force Status

	TOTAL		WHITE		BLACK		HISPANIC ORIGIN	
	Unit	Avail	Unit	Avail	Unit	Avail	Unit	Avail
1989 ANNUAL AVERAGE								
TOTAL CNP	94.1	95.5	95.3	96.4	85.8	89.0	84.7	87.0
EMPLOYED	95.2	96.5	96.0	97.1	88.8	91.7	86.6	89.0
UNEMPLOYED	83.9	87.1	86.2	88.8	77.0	82.5	75.1	78.6
NOT IN LABOR FORCE	93.1	94.4	94.7	95.7	82.8	85.9	82.6	84.6
1990 ANNUAL AVERAGE								
TOTAL CNP	94.2	95.5	95.3	96.5	86.1	88.8	84.5	86.6
EMPLOYED	95.3	96.6	96.0	97.2	89.4	91.8	86.3	88.4
UNEMPLOYED	85.0	88.0	87.9	90.4	75.3	80.0	77.0	80.4
NOT IN LABOR FORCE	93.0	94.3	94.6	95.6	83.2	85.8	82.4	84.1
1991 ANNUAL AVERAGE								
TOTAL CNP	94.3	95.7	95.5	96.6	86.3	89.1	85.5	87.7
EMPLOYED	95.6	96.8	96.3	97.3	89.8	92.4	87.5	89.6
UNEMPLOYED	86.4	89.5	88.3	91.0	78.9	84.1	78.2	81.6
NOT IN LABOR FORCE	93.1	94.4	94.7	95.8	82.6	85.3	83.5	85.4
1992 ANNUAL AVERAGE								
TOTAL CNP	94.7	95.9	95.8	96.8	86.9	89.8	87.8	89.7
EMPLOYED	95.8	97.0	96.5	97.5	90.1	92.8	89.5	91.6
UNEMPLOYED	88.1	90.3	90.0	91.8	81.2	85.0	83.4	85.8
NOT IN LABOR FORCE	93.6	94.8	95.2	96.1	83.6	86.5	85.8	87.4
1993 ANNUAL AVERAGE								
TOTAL CNP	95.0	96.1	96.0	97.0	87.5	90.0	88.2	89.9
EMPLOYED	96.1	97.1	96.8	97.6	90.6	92.8	89.7	91.5
UNEMPLOYED	88.6	90.6	90.7	92.3	80.9	84.7	85.0	87.1
NOT IN LABOR FORCE	93.8	94.9	95.3	96.2	84.5	87.0	86.1	87.6
MARCH 1994								
TOTAL CNP	94.5	95.9	95.7	96.9	86.7	90.2	87.8	89.7
EMPLOYED	95.5	96.8	96.4	97.4	89.1	92.3	89.1	91.1
UNEMPLOYED	87.2	90.3	89.9	92.3	77.9	83.4	85.6	87.1
NOT IN LABOR FORCE	93.6	95.1	95.1	96.3	85.1	88.4	86.0	87.8

Mexico, North Carolina, Vermont, and Washington were all early adopters of assistance programs and proactive participants.

The programs in place, Lifeline (monthly assistance of telephone bills for people below the poverty line -- waives the subscriber line charge) and Link Up America (lifeline connection assistance -- pays up to $30 of the local connection tariff), show results where state commissions and local telephone companies have been proactive in educating consumers.
On the down side, in the same ten year period for the same income group, the District of Columbia, Illinois, and Louisiana, show the largest declines in telephone penetration (See Table 15b.).

In the case of the District of Columbia, it has had Lifeline and Link Up America programs certified since 1986. However, DC did not offer the program to people under the age 65 until the end of 1992. For both programs, the numbers of subscribers were only 500 per year for connection assistance (Link Up America), and less than 3,000 for lifeline. At the end of 1992 a change in policy was enacted that made both programs more inclusive. Participants jumped 12,000 for lifeline, doubled in 1992, and then tripled in 1993 for Link Up America.

In Illinois, the Illinois Commerce Commission responded to a class action suite against discriminatory subsidies, by delaying the implementation of both programs. At present, there are no Lifeline subscribers. As for connection assistance, 45,000 were connected before the class action. In 1992 nobody was connected; it appears that 21,000 were connected in 1993. Louisiana became certified for connection assistance in 1988, with 88,000 connected. There is as yet no Lifeline program. New Jersey presents a useful example illustrating the importance of proactive policies even when a program is in place. NJ has connection assistance only. Since 1988, they've signed 3,600 people -- suggesting little motivation on the part of the phone company to connect people through the assistance programs. Of the two participating companies, United Tel New Jersey Inc. received $710, and New Jersey Bell received $83,485 in subsidies. Warwick Valley, another phone company in the state, did not receive any subsidy payments.

The lesson is that proactive inclusive programs appear to contribute positively to advances in universal service, but that the assistance programs themselves are applied quite differently from state to state. We should study the experiences of the states more closely in order to gain a better understanding of the dynamics of successful policies.

6. Recommendations for Further Empirical Study

It is our contention that much can be learned from continued study of the conditions of phonelessness. The present study offers insights into this national phenomenon, wherein we have identified race, gender, income, youth, and housing, as contributing factors. In addition, we note the limits of our investigative abilities given the data at hand, especially our inability to study varying conditions within states and across regions. More detailed studies are likely to inform us as to the effectiveness of states' programs. Telephone penetration holds particular significance in the information age. Lack of telephone service creates a significant barrier to job searching, access to public services, health and safety, as well as one's general contributions to society. If someone lives without a television or a radio, their choice might be interpreted as rebellion, or the adoption of a Bohemian lifestyle. But when a person lacks access to a telephone, he or she is functionally isolated. Telephone service acts as one's passport to the economy, to social networks, and to political discourse.

Table 15
States with increases in telephone penetration of 9 percentage points
or more among households earning $9,999 or less 1984-1993

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Connecticut	80.5	71.4	91.7	92.5	91.4	86.9	88.6	85.6	85.5	89.1
Georgia	69.1	75.0	73.3	70.0	81.9	79.5	80.3	76.5	77.7	81.9
Hawaii	76.1	74.6	80.1	85.7	85.9	83.4	89.6	81.1	78.0	86.7
Michigan	80.9	81.0	85.0	82.7	84.5	84.3	82.7	84.2	81.1	90.2
Nevada	78.4	85.2	76.9	78.8	77.9	74.9	80.4	78.4	90.0	88.0
New Mexico	61.8	67.4	67.8	73.6	70.3	73.8	75.3	71.5	71.7	75.5
North Carolina	73.5	75.7	78.4	77.5	77.1	82.4	82.7	84.1	83.6	85.0
South Carolina	66.1	73.0	77.1	75.5	75.7	72.2	76.8	75.3	73.1	76.4
Tennessee	71.1	75.0	79.4	80.4	80.5	86.7	86.0	75.6	89.6	83.0
Vermont	75.3	77.2	83.5	90.8	88.4	87.7	90.8	83.5	83.6	87.9
Washington	82.7	82.9	80.2	81.2	83.3	84.8	92.1	92.3	87.5	93.0
Wyoming	74.2	84.6	73.1	85.6	79.6	84.3	83.1	84.0	76.4	85.5

Table 15b
States with statistically significant decreases in telephone penetration
among households earning $9,999 or less -- 1984-1993

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
District of Columbia	92.5	84.8	81.7	81.5	81.8	89.5	84.8	87.3	79.5	68.3
Illinois	87.8	84.6	82.5	85.2	84.5	85.8	84.4	83.3	83.7	82.3
Louisiana	80.9	79.6	78.2	72.2	68.8	79.7	77.5	85.3	84.2	77.3

With these concerns in mind, the federal government has consistently supported the goal of telephone service for all Americans at an affordable cost since passage of the Communications Act of 1934. This recognition -- of the importance of universal service -- has led nearly all policy researchers to concur that 6% of households without telephone service represents too many Americans. This paper reinforces that view.

The demographic influences that contribute to phonelessness speak to a group of Americans on the periphery of their society. If government intends to pursue the goal of a national information infrastructure that is inclusive and works for all Americans, then there is much more to be done.

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Notes

1. The *Current Population Survey* of the Bureau of the Census gives a figure of 93.3% penetration, while the 1990 Census which gives a figure of 94.8%. For the purposes of this paper, we have chosen 94% as an interpolated estimate. A fuller discussion of the reasons behind this discrepancy can be found in section 4. Method, Measurement, and Measurement Limitations.

2. Booker (1986), Dordick (1990), Dordick and Fife (1991), Gilbert (1987), Hills (1989).

3. Perl (1983), Hausman, Tardiff, and Belinfante (1993), Schement (1994), Williams and Hadden (1991), Williams and Hadden (1992).

4. Furthermore, it seems fairly clear that regional differences interact with ethnicity and income to produce dissimilar levels of penetration. Schement (1994).

5. We arrived at the figure of 14.8 million individuals by multiplying the number of households (5.6 million) by 2.64, the average number of individuals per household in the United States according to the 1990 census.

6. Between 1985 and 1986, the Census changed definitions for "MSA status not identifiable." Many of those households were moved into "City status in MSA not identifiable." But this does not change the overall tendency.

7. It should be noted that although people with no interest income received are mostly without assets, they could still be people living on an inherited homestead, or in a rural community with low taxes; and, therefore, have a comfortable life.

8. According to the Bureau of the Census, "A household includes the related family members and all the unrelated persons, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household. ... The figures for number of households are not strictly comparable from year to year. In general the definitions of household for 1790, 1900, 1930, 1940, 1950, 1960, and 1970 are similar. Very minor differences result from the fact that in 1950, 1960, and 1970, housing units with 5 or more lodgers were excluded from the count of households, whereas in 1930 and 1940, housing units with 11 lodgers or more were excluded, and in 1790 and in 1900, no precise definition of the maximum allowable number of lodgers was made." *Historical statistics of the United States, colonial times to 1970* (Bicentennial Ed. ed.). Washington DC: GPO, 1975, p. 6. According to the CPS, "A household consists of all the persons who occupy a house, an apartment, or other group of rooms, or a room, which constitutes a housing unit. A group of rooms or a single room is regarded as a housing unit when it is occupied as separate living quarters; that is, when the occupants do not live and eat with any other person in the structure, and when there is direct access from the outside through a common hall. The count of households excludes persons living in group quarters, such as rooming houses, military barracks, and institutions. Inmates of institutions (mental hospitals, rest homes, correctional institutions, etc.) are not included in the survey. Department of Commerce (1993). We use the term "household" to refer to the individuals living together in one housing unit; whereas, we use the term "home" to refer to the dwelling.

9. The *Current population survey* is a panel survey for which households are included in the survey for the same four consecutive months in two consecutive years.

10. The telephone questions are only asked in the first of the four months that the household is in the survey in each year.

11. The determination of statistical significance is derived from coefficients of variation supplied by the Bureau of the Census for use with the Current Population Survey.

12. Because the telephone questions are asked once in four months, the survey results are only published three times a year -- for March, July, and November.

13. These differences, though seemingly small, are statistically significant. Significance was determined by conducting a regression with time trends and seasonal dummies. The seasonal coefficients were statistically significant in this regression.