
Public Data Use: A View From The Telecommunications Industry In The United States

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Bell Atlantic is one of eight U.S. telecommunications firms resulting from the breakup of the AT&T owned Bell System on January 1, 1984, the largest divestiture and reorganization in corporate history. Bell Atlantic owns an assortment of companies engaged in various aspects of providing telecommunications services and products. These companies can be divided into two categories which we call the "Enterprises Group" and the "Network Services

Group."

The Enterprises Group provides services and products to a variety of geographic locations in the United States and Canada and it is a relatively unregulated entity. Activities of the Network Services Group are concentrated in the seven political jurisdictions of Washington D.C., Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia. Management Services, Incorporated (MSI) and the operating telephone companies are part of the Network Services Group.

The Economic Analysis District (EAD), my organization, is located in the Business Planning and Financial Management Department of the MSI. The primary occupation of staff members in the EAD is the provision of internal consulting support to the Network Services Group, which is dominated by the concerns of the operating telephone companies: the Chesapeake and Potomac Telephone Companies of Washington, D.C., Maryland, Virginia, and West Virginia, New Jersey Bell Telephone Company, Bell of Pennsylvania, and Diamond State Telephone Company in Delaware. These concerns can be divided into four functional areas: Regulatory, Personnel, Facilities Planning, and Marketing.

Because the network services group is almost wholly comprised of regulated telephone companies, "regulatory issues" are the most important concern of the EAD. State regulatory agencies, often called Public Utility Commissions, determine, through pricing decisions, who will bear the burden of the rates the companies charge to recoup operating expenses and guarantee the investors in Bell Atlantic stock a competitive rate of return on their investment dollar. Demographic and economic analyses of the size, distribution and composition of each company's market provide the basis for determining the effects of various pricing configurations.

Analytical work undertaken by Bell Atlantic economists and demographers has been made more complicated by the divestiture, since the breakup of the Bell System literally led to the breakup of telephone-served geography. The seven jurisdictions we serve contain 19 "local access and transport areas" or LATAs, which do not correspond to any other political or statistical entity, although they are associated with Metropolitan Statistical Areas (MSAs) in many cases. These LATAs, or large exchange areas, obtain their external communication links from the Interexchange Carriers (IECs), telecommunications companies engaged in long distance calling services which the local telephone companies (such as those owned by Bell Atlantic) are constrained from offering, owing to federal regulatory restrictions. Relations between the IECs and the local telephone companies are regulated by Federal Communications Commission (FCC) rulings, legislative requirements established by the U.S. Congress, and Executive Branch decisions made through entities such as the Justice Department and the Federal Court System. In order to comply with the various rulings and legislative mandates, and sometimes question their logic, Bell Atlantic must have knowledge of the size, distribution and composition of the market within and between the LATAs.

In addition to the Regulatory function, another important activity of the companies the EAD supports is the Personnel function. Whether we are addressing Equal Employment Opportunities issues, employment site location studies, force planning or how to strategically locate our work crews relative to population growth and migration churn, we turn to data available in the public domain to answer questions about the size, distribution and composition of the local labor force and the telephone-served population.

Our third major area of support for the operating telephone companies involves the "Facilities Planning" function. The telephone companies operate networks, which consist of

central offices containing switching systems (large computers), miles of cable, and microwave towers. We are constantly concerned with plant capacity and demand for our services which translates into changes in demand for central office switching and transmission capability. Population and economic forecasts based on public data make the forecasting of demand possible and enhance our ability to plan efficiently and effectively.

Although we are heavily regulated by the government, we do have many marketing concerns, and the market we serve constitutes the fourth area of functional responsibility for the EAD. Some of the more familiar marketing efforts the telephone companies engage in include the distribution of the white and yellow pages directories, and the provision of operator services such as call completion and information retrieval. In addition, we offer products such as business to business directories, and services such as cable television access. We serve the government at the national, state and local level. We serve large industries, such as the steel mills in West Virginia and Pennsylvania, and small enterprises such as a savings and loan company in Maryland. We serve the elderly, the handicapped, homeowners, travellers, and, a new customer since the divestiture, Interexchange Carriers [sic]. Knowledge of the constituents of this market is derived from public data coupled with our own internal surveys.

What are the kinds of public data used by Bell Atlantic? Generally, we use as much of the demographic and economic data as we can obtain from the federal, state and local governments, whether it comes from censuses, surveys or administrative records, but our most important source of demographic or socio-economic information is the 1980 U.S. Census of Population and Housing. These data are available in many forms: published, on microfiche, and on magnetic tapes. The problem is that there is more data than we can handle, so we have implemented an online

demographic data retrieval system to assist us.

As I mentioned earlier, Bell Atlantic has a unique problem. The divestiture left the company with odd service areas called LATAs. In order to provide information to our companies, the EAD modifies public data from the economic and demographic censuses and surveys to make it conform to the geographic area Bell Atlantic serves.

Prior to the divestiture, the operating telephone companies were concerned with the same geographical areas they serve today. The unit of concern, however, was the wire center area or central office district (COD) as it is sometimes called. To complicate matters further, local exchange areas (smaller and different from the LATAs described above) were also a concern. Fifty years ago, all three entities were represented by the same geographic area, corresponding to a community or settlement. Technological change, which allowed the newer central offices to serve more than one of the old wire center areas, population change, and concessions to consumers with regard to their calling access led to an erosion of this one-to-one correspondence. As a result, the telephone companies not only have served and continue to serve areas unlike any other known political or statistical geographical areas, they serve a number of entities that do not correspond to one another.

Because of the continuous need to determine the demographic/economic characteristics of telephone service areas, in order to address the functional areas described above, the requirement for tailored public data arose long before the divestiture. The key to tailoring the demographic and economic data used to develop construction plans, engage in force planning and answer the questions of the regulators is Census geography.

Census tract and block group information, aggregated to user described areas, is the

Rosetta stone of managers engaged in economic and demographic analysis. With the advent, in 1970, of the first fully automated census, the laborious task of aggregating census tract and block group information by hand became, mercifully, obsolete.

Today, there are three major methodological approaches underlying the automated demographic data retrieval systems which provide information for user defined geography.

1. Federal Information Processing Codes (FIPS) are assigned to every political and statistical entity in the United States. This means that all political and statistical geographic units, such as states, counties, MSAs, and census tracts, have unique identification codes. In the automated system, the user can retrieve information associated with these codes. This approach is efficient if the user is seeking information for a list of states, counties, or municipalities. The first attempts to aggregate data for user described areas, such as wire center areas, were based on combinations of block groups/census tracts, and relied on this mechanism. When thousands of geographic units were involved, however, (the old Bell System had 10,000 wire center areas) this particular approach proved to be extremely time consuming, even after automation.
2. The assignment of geo-coordinates (latitudinal/longitudinal coordinate points) to census data provided the basis for a major breakthrough in the automation of demographic data retrieval. Every census block in the United States received, in 1970, a centroid assignment of a unique set of coordinate points. The centroid is the geographic or population center of a block area; there are variations in the way these assignments are made, but discussion of this topic is beyond the scope of this paper. In 1970, point assignments developed by the U.S. Bureau of the Census, were listed in the Master Enumeration Districts List (MEDS) and in 1980, Census Bureau point assignments were listed in

the Master Area File Reference List (MARF). In 1990, they will probably be found in the Topographically Integrated Geographic Referencing and Encoding System (TIGER).

In themselves, the centroid assignments are useless for solving the problem of demographically describing user defined areas. Software linking the coordinate assignments and user described boundaries of study areas, which have been transcribed into binary code, are needed to complete the demographic data retrieval operation. To date, most of the software for this type of application is owned by non-governmental sources, and licensing arrangements must be purchased in order to make use of the private sector product. Before the divestiture, the operating telephone companies in the jurisdictions now served by Bell Atlantic had transcribed their wire center area boundaries into binary coded polygon files. Census data based on the MEDS and MARF assignments could be aggregated to produce demographic profiles of the user described areas. Since LATAs are aggregations of wire center areas, all that had to be done after the creation of the LATAs was to aggregate the wire center polygons into LATA polygons. As was mentioned earlier, LATAs are also aggregations of the smaller exchange areas, and/or COD areas. At the LATA level, however, the difference between the three telephone entities (wire center areas, central office districts, and exchanges) disappears. Thus, aggregating the wire center areas to equate to LATAs does not cause discrepancies. The final result is census data tailored to our LATA areas.

3. The third type of geographic linking system available for tailoring government produced demographic data to meet user defined needs is the Geo-Based Files/Dual Independent Map Encoding or GBF/DIME process. Briefly, this process makes possible the matching of Census address records for urbanized areas with user records. In the case of the telephone company,

these are customer records. Customer records processed through the GBF/DIME program can be linked, at the census tract level, with specific socio-economic characteristics. This process was used to provide the Washington, D.C. Public Utility Commission with information concerning links between telephone availability and characteristics of the inhabitants of areas under study. This process is more limited than the other two, however, since the GBF/DIME files are only available for urbanized areas.

At Bell Atlantic, economic data available from the government for political or statistical areas are disaggregated into user defined telephone service areas through the use of population weights derived from the centroid point assignment process described above, or the FIPS code process. Since economic data are available from the government for the whole counties contained in the LATAs, disaggregation only occurs in the case of split counties. The census tract components of counties are assigned to their respective LATAs using the procedures outlined in 1. and 2. above.

The census profiles developed through the use of the geographic linking systems provide the basis for developing time series data and forecasts of population through iterative proportional fitting schemes, when linked to historic and forecast information for the aggregates of counties which correspond to the LATAs. Economic data, in turn can be derived through the use of the time series and forecast versions of the population weights.

Thanks to the geographic linking processes developed jointly by the government and private sector firms with software capabilities, Bell Atlantic is able to address problems in the major corporate functional areas outlined earlier in this paper, utilizing public data as they relate to our odd geographic areas. □