Using Population Data to Improve Public Sector Frame Coverage[1]

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Abstract
Statisticians within the Governments (GOVS) Division of the U.S. Census Bureau are entrusted with maintaining the Governments Master Address File (GMAF) a comprehensive frame of government entities. The GMAF is being re-engineered, which allows an opportunity to build paradata into the frame processing. Complete coverage is imperative as this repository acts as the sampling frame for all of the division's surveys. The availability of lists of local governmental units varies significantly from state to state and poses challenges in frame coverage. Historically, we have recorded changes in governmental organization (mergers, reductions, reincarnations, and births) through a combination of legislative research, the Government Units Survey, and Quality Improvement Program trips. In this paper, we hypothesize that an influx in population may help serve as a predictor of births of governments, specifically special districts. We examine population counts and changes logged by the last four decennial censuses by state/region against that of historical governmental units to test this theory.

Key Words: Governmental units, Governments Master Address File, Government Units Survey, paradata

1. Introduction

Coverage improvement of sampling frames is challenging. The frame from which the methodologist selects samples is fundamental to any survey's success as it forms the basis for which units are to be included in the survey. The undercoverage, the inability of the frame to cover all of the units in a target population (the population of interest), or duplication of units in the frame leads to coverage error. An evaluation of such coverage errors can lead to a discovery of coverage bias, or a measure of how incorrect an estimate may be because of over- or under-coverage of the population estimate if one were to estimate using only the units in the given frame. See Kreuter (2013).

Sampling frames for public sector surveys are a particular challenge to construct and maintain. Although it seems that coverage of state and local governments should be complete, an understanding of the complexity of governmental structure and of surveying public sector entities shows that some of survey methodology's most challenging issues are actually found in public sector surveys. In this paper, we examine the construction and maintenance of public sector sampling frames, in particular using examinations of how to use survey paradata and administrative data from the frame to improve the frame.

[1] *This report is released to inform interested parties of research and to encourage discussion. Any views expressed on statistical, methodological, technological, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau.*

In the Background section we cover basic terminology that will be used in the paper, the uniqueness of public sector surveys, the challenges that we have faced with some of our surveys, and the approaches that we have tried in our attempts to improve our sampling frames. We also review the literature on frame improvement, particularly the use of paradata in frame coverage improvement. In the remaining sections of the paper, we discuss the methodology that we used to improve coverage, as well as a discussion of our results and conclusions. Finally, we complete this paper with a listing of our ideas for future research in improving frames of public sector units.

2. Background

2.1 Basic Survey Terminology

In this paper, we use the terminology described in chapter 3 of Groves (1989). The population of inference is the set of units to be studied or estimated. As Groves discusses in that chapter, this population may not be finite, and definitely may not be known or obtainable. As a public sector example, a survey may collect one-day count of inmates on June 30, but there are an infinite number of moments on that day for which the population could be counted. Likewise, the population of inference for the count of local governments may be those at the current moment or those incorporated and active in a certain year.

The target population is the actual set of units that will be studied or used in the estimation process. This is a finite set of units. In the previously described examples, it would be the listing of inmates at a specified time on June 30. The target population of local governments would be the number of local governments that were incorporated on a specific date; for example, the reference date for the Government Units Survey is as of October 11, 2011.

The frame population is the set of units that can be developed prior to sampling and mailout. It includes contact information, but also includes any data that are needed for sample design: data for stratum boundary determination, measures of size for probability proportional to size sample designs, cost for optimum allocation, or response propensities. The frame population for the Government Units Survey was the listing of those governments that had been found as of the freeze date for mailout.

Finally, the survey population is the set of units that can be listed and will respond to the survey. For our example of the Government Units Survey, it is those local governments that will respond to the survey.

As alluded to in the Introduction, coverage error is a failure to include all units in the target population in the frame population or to include units in the frame population that should not be included. Under-coverage may result from incomplete listings of the target population. Over-coverage may result from duplications or a failure to delete units that are no longer active, or in the case of public sector, no longer incorporated as governmental units. Coverage bias occurs if the units that are under-covered or duplicated tend to have characteristics that are different from those units that are in the frame population. For example, if the units are predominantly from one area of the country or of the state, or if they are all small units, the results may be biased. If these frame units are modeled, their model will not be the same as those units that are in the

target population. Descriptive statistics from these units will not be the same as those arising from the target population, as discussed in Groves (1989).

2.2 Public Sector

The Census of Governments is conducted every five years and has three components. The first component of the Census is the Organization component, which uses the Government Units Survey (GUS) to determine which units on its frame were incorporated or active on October 11, 2011, to determine the accuracy of the contact information, and to determine the various characteristics of the units on the frame (for example, does the county have an airport, library, etc., or does the government impose a sales tax, etc.).

The quinquennial, annual, and quarterly public sector surveys at the U.S. Census Bureau collect data on federal, state, and local government full- and part-time employment and payroll, state and local government taxes, charges, expenditures, assets, long- and short-term debt, pension plan membership, and various governmental organization characteristics.

As discussed in Chapter 1 of the Classification Manual (2006), the Census Bureau's definition of a government is an organized entity, which in addition to having governmental character, has sufficient discretion in the management of its own affairs to distinguish it as separate from the administrative structure of any other governmental unit. Although this is a standardized definition for the Census Bureau, governmental entities do not always classify themselves as governmental units. Most general purpose governments (cities, counties, and townships) recognize themselves as governments, but single purpose special districts (mosquito abatement districts, utilities, housing authorities, drainage ditch districts, etc.) sometimes do not classify themselves as the Census Bureau does. They do not recognize themselves as governmental units and do not consider themselves as a correct recipient of a public survey questionnaire.

The Census Bureau is the only source for a listing of all local governments in the United States. In fact, several states have no single source for the local governments in their state, particularly listings of special purpose governments, public employee pension systems, and state and local dependent agencies (those units that are not autonomous or fiscally independent from a parent government). The development and maintenance of sampling frames for public sector surveys is challenging. In the past five years, the Census Bureau has made an effort to re-engineer its address file to be an integrated listing of all governmental entities for its sample surveys and censuses. The Governments Master Address File (GMAF) is the foundation of all of the public sector survey processing systems for sampling, data collection, editing, imputation, and estimation.

2.3 Efforts to Improve Public Sector Frames

As a part of the re-engineering of the GMAF, Census took a two-pronged approach to not only modernize the database, but also to conduct the necessary research to provide the most accurate, up-to-date listing of governments prior to migrating the units for each public sector survey into the GMAF. This research included the traditional "legal research" or review of state legislation to determine if any new governments had been authorized legally, as this is the precursor to incorporation of local governments. The initiation of the new Government Units Survey was able to determine if the units that were on the directory listing of governments in 2007 were still incorporated in 2012 with accurate contact information.

Staff also conducted "state research." This was an in-depth, several months undertaking to attempt to obtain listings of local governments and local pension systems from state governments or professional association resources, either by internet research or through phone calls. This was very successful in some states, but of limited value in states that did not keep a listing of its local governments (particularly special districts and local defined-benefit pension systems). The effort revealed that the coverage of general-purpose governments (cities, counties, and townships) was very good. In the pension system research, if the usual website research or outreach to state and local pension systems failed to uncover possible missing pension systems, auxiliary information in searches of Comprehensive Annual Financial Reports (CAFRs) of state and local governments could reveal pension asset information that could lead to additional pension systems.

Another improvement effort was the start of the Quality Improvement Program (QuIP) trips. As described in Latimore (2012), multi-disciplinary teams of from four to seven mathematical statisticians, survey analysts, and survey methodologists were sent to selected state capitals to conduct cognitive interviews to test questionnaires, records-keeping studies to discover difficulties in collecting content, usability of web collection instruments, nonresponse follow-up, outreach to State Data Centers, and/or interviews with state and local governments to determine if a unit had moved, if units in the area had been newly created, or if a unit had been disincorporated. Because of resource limitations, the states that were visited in these trips had to be prioritized. Trips were initially taken to one state every other month, but more recently trips have included multiple states. It was important to visit those states where the greatest coverage efforts were needed.

As discussed in Smith (2011), paradata and auxiliary data may be used to detect and adjust for nonresponse bias in surveys. It may also be used to determine where there may be pockets of inaccurate sampling frame information. The sites for the first trips were selected based on available paradata on the location of nonresponse. It was thought that chronic nonresponse across all of Governments Division's surveys could be an indication that a unit had been disincorporated. The first states visited on QuIP trips were selected because they had the largest number of chronic nonrespondents across all surveys. These trips focused on finding individual local governments. The team usually found that it was true that a government had either moved or disincorporated. The addresses were often abandoned, and often no one knew what had happened to the previous occupants. As we progressed through the states, the priority changed to those units where state research (either on the web or telephone calls) was failing to uncover adequate information. Now, QuIP trips are usually centered in the state capitals as these units can sometimes provide Census with listings of all governments in the state. This is particularly helpful for identifying special district governments. To date, trips have been taken to nearly two-thirds of the states.

2.4 Another Approach for Improving the Governments Master Address File

As Stephanie Eckman states in Chapter 5 of Kreuter (2013), coverage is an understudied area of survey methodology. Despite the fact that the quality of the frame is crucial to the accuracy of the estimates from the census or sample survey, there is limited research on frame improvement. The bias introduced by either undercoverage or overcoverage can be detrimental to the frame and the resulting estimates. Eckman theorizes that the limited research in this field is in large part due to the difficulty in measuring frame errors. She states that paradata and auxiliary data can begin to complete the missing data that are needed to improve sampling frames.

For governmental units, most undercoverage is in special districts and dependent agencies (such as, universities or hospitals) of state and local governments. We had two theories on the incorporation and disincorporation of units of these kinds. First, we theorize that the growth or decline of these units might be correlated with population in the geographic region. On the GMAF, population is available for cities, counties, and townships. Enrollment is available for school districts. Substantial changes in these variables may mean a change in the number of special district governments or dependent agencies, although the growth or decline of these governments may be evident years later. Auxiliary data on population age distributions may also be an indicator of changes in governmental structure. A second theory is that changes in economic conditions, times of economic boom or recessions, may also be an indicator of where there will be incorporation or disincorporation of governmental units. Once again, these governmental organization changes may lag. In this paper, we begin to examine the first of these theories.

3. Methodology

Economic surveys are different in nature from demographic surveys. Most economic surveys do not utilize field interviewers, the main source of paradata for demographic programs. Therefore, other sources of paradata are relied upon for similar information and subsequent analysis. One such source for the Government Units Survey (GUS) is the use of population estimates in an attempt to predict an influx or decline of government units. A correlation study was conducted using the last twelve Censuses of Governments and population estimates produced from the Population Estimates Program.

3.1 Locate/Securing Relevant Data

The decennial census is conducted every 10 years whereas the census of governments is conducted every five years; years ending in ‘2’ and ‘7’. In addition to the two census programs not collecting data in the same year, there is the issue of the CoG having twice as many years of data collection than that of the decennial. In the interest of having closely related collection years for a more effective study, intercensal population estimates were used for the comparison. The Population Estimates Program annually produces population and housing unit estimates based upon the last decennial census. Each year, the estimates are recalculated in the time series for previously released years using the most up-to-date demographic components of change and legal boundaries available.

These times series are distinguished by their “Vintage” year, which is the latest year in the times series. For example, if the latest year in the time series of estimates is July 1, 2011, then the Vintage year for all estimates in this time series are identified as belonging to “Vintage 2011.” All estimates in Archives are from Vintages that have been superceded by estimates shown in Current Estimates Data.

Estimates taken from the Census Bureau website were compiled into an Excel spreadsheet by state for quinquennial population totals estimated between years 1957 and 2012. CoG totals were extracted directly from final in-house tables and/or databases. Special districts, school districts, and school enrollment are specific counts taken from GUS and used in the correlation analysis along with population estimates.

3.2 Data Processing

Two data sets were imported into SAS for this research: GUS counts and population estimates. The two data sets were concatenated so that these data were housed together, making it easier to maneuver across variables. For each state, the count of governments from GUS (COG) and the population (Pop) were merged. Once this initial data set was built, it was augmented to include counts of school districts (Sch_Dist) and special districts (Spec_Dist). One derived variable, cog_min_sch = overall COG counts minus that of school districts, was created. An example of the resulting data set is illustrated in Figure 3.1.

State	Year	Cog	Pop	Sch_Dist	Spec_Dist	cog_min_sch
Alabama	1957	617	3109000	112	119	505
Alabama	1962	733	3323000	114	202	619
Alabama	1967	797	3458000	119	251	678
Alabama	1972	876	3539400	126	286	750
Alabama	1977	950	3780403	127	336	823
Alabama	1982	1019	3925266	127	390	892
Alabama	1987	1054	4015264	129	421	925

Figure 3.1: Census of Governments Counts and Population Estimates from 1957 to 2012 Source: U.S. Census Bureau. 1957 through 2012 Census of Governments and Population Estimates-Historical Data

3.3 Correlation Analysis

Once these data were formatted properly and housed in a central location, a correlation analysis was conducted. Correlation coefficients range from +1 to -1. A perfect negative correlation of -1 indicates that an increase in one variable reliably predicts a decrease in the other one. A perfect positive correlation of +1 indicates that an increase or decrease in one variable always predicts the same directional change for the second variable. Zero indicates a lack of correlation; there is no tendency for the variables to fluctuate in tandem either positively or negatively.

Pearson correlation coefficients were calculated for the following variable pairs: number of governments (COG) and population estimates (POP), number of special districts and population estimates, and number of school districts and population.

4. Results

Figure 4.1 shows the correlation coefficients per state for counts of governments and population estimates.

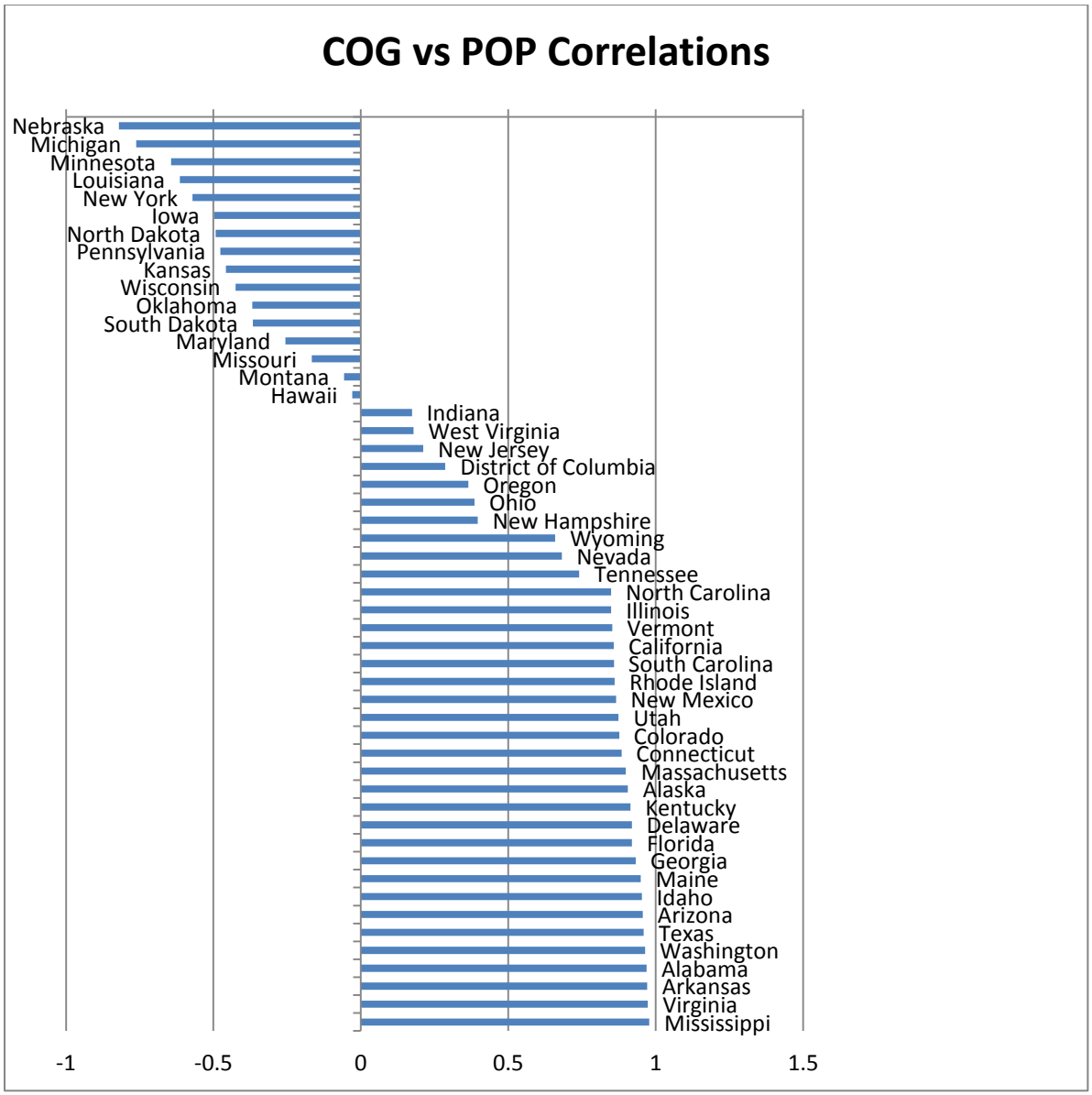

Figure 4.1: Correlation Coefficients by State for Counts of Governments vs Population (1957-2012)
Source: U.S. Census Bureau. 1957 through 2012 Census of Governments and Population Estimates-Historical Data

Of the 51 states, about 55 percent have strong positive relationships with coefficients greater than +0.40 leaving the rest to show weaker positive correlations or even negative relationships.

Weak correlation patterns are present for the states of New Hampshire, Ohio, Oregon, District of Columbia, New Jersey, West Virginia, Indiana, Hawaii, Montana, Missouri, Maryland, South Dakota, and Oklahoma. The largest negatively correlated states are Nebraska, Michigan, Minnesota, Louisiana, and New York. Further analysis was conducted on the five most negatively correlated states and are discussed in Section 4.1 of this paper.

Correlation analysis was also performed for the number of special districts by population estimates as illustrated in Figure 4.2.

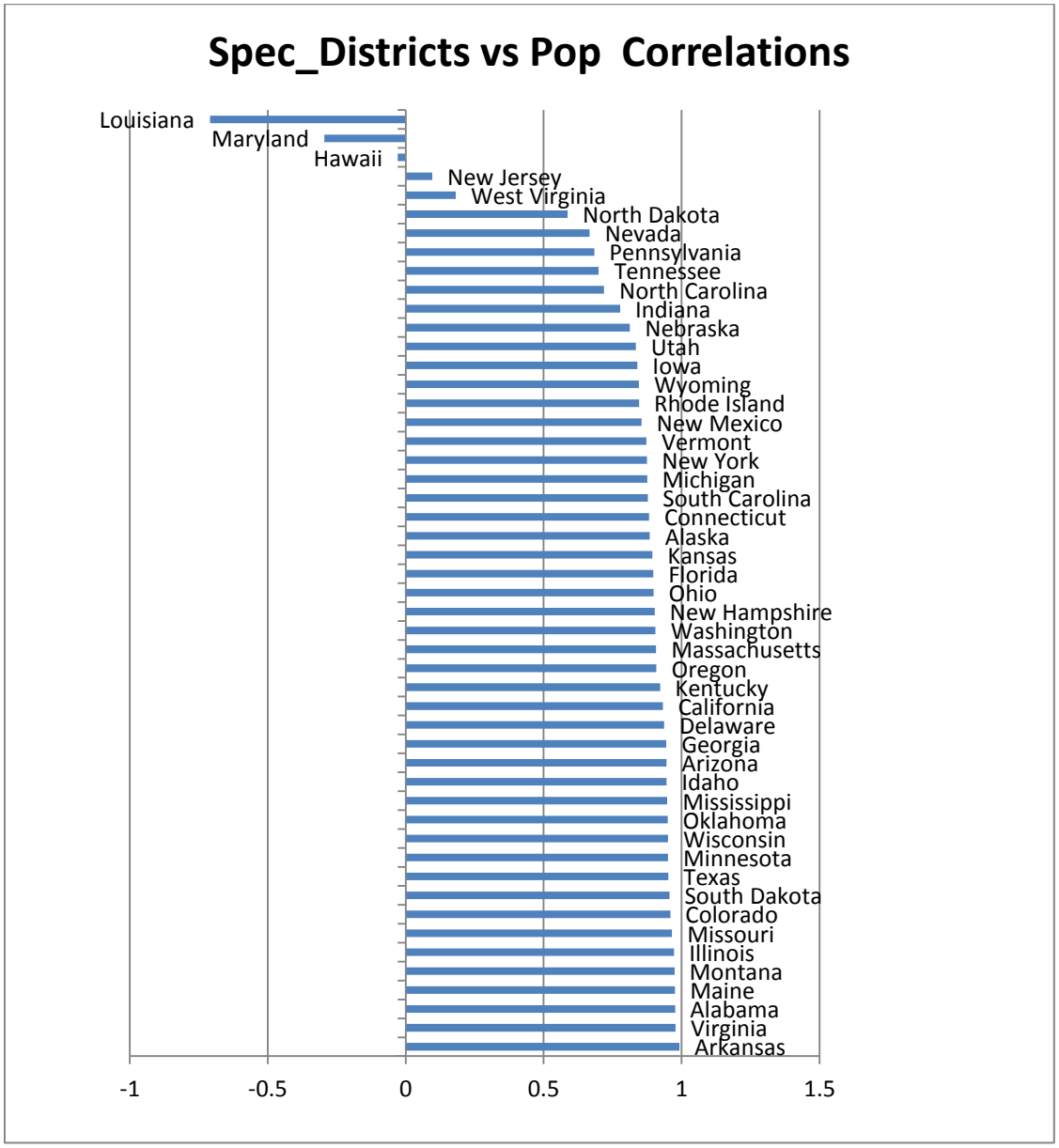

Figure 4.2: Correlation Coefficients by State for Counts of Special Districts versus Population (1957-2012)
Source: U.S. Census Bureau. 1957 through 2012 Census of Governments and Population Estimates-Historical Data

This figure illustrates that special districts and population estimates are very strongly correlated for over 80.0 percent of the states with coefficients greater than +0.70. Weak relationships exist for West Virginia, New Jersey, Hawaii, and Maryland. Louisiana is the only state exhibiting a strong negative correlation.

During data processing, we conducted further investigations into discrepancies in the number of special districts. For example, there was a sharp decline in the number of

special districts for Louisiana in between 1972 and 1977. The count dropped from 419 to 30. Other questionable data showed sharp increases in the number of special districts. One example was New Mexico with an increase to 653 in 1997 from 116 in 1992. Again, further analysis was conducted and will be discussed in Section 4.2 of this paper.

A third correlation analysis was performed to examine the number of school districts versus population estimates as illustrated in Figure 4.3

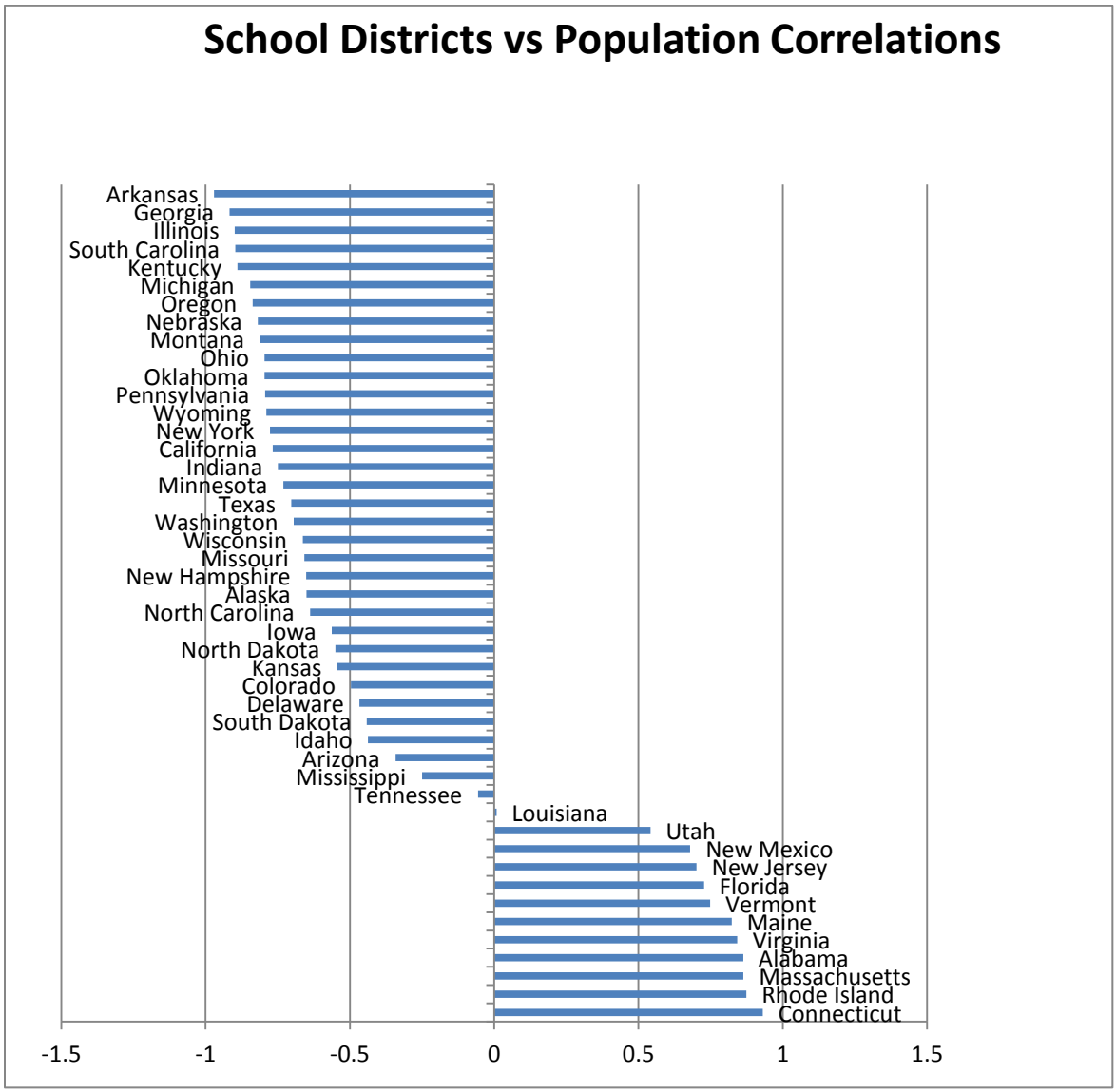

Figure 4.3: Correlation Coefficients by State for Counts of School Districts versus Population (1957-2012)
Source: U.S. Census Bureau. 1957 through 2012 Census of Governments and Population Estimates-Historical Data

Unlike the other two correlation studies described above, Figure 4.3 illustrates that the relationship between school districts and population estimates across a majority of the states is negatively correlated. Only eleven states show correlation coefficients above 0.5. Section 4.1.1 of this paper provides deeper investigation into this phenomenon.

The next correlation study focuses on the number of schools by enrollment. Annual enrollment data were pulled from the Census Bureau internet site housing the Current Population Survey (CPS) historical time series tables. These tables house school enrollment data from October 1955-2012. The only data used for this research were for those quinquennial years starting with 1957 and ending in 2012.

School enrollment captures the population who report being enrolled in a regular school. A regular school advances a person towards an elementary school certificate, high school diploma, or college, university, or professional school (such as law or medicine) degree. These data were not disseminated by state so the correlations were analyzed at the national level, and the national coefficient was calculated to be -0.8045, representing a strong negative correlation. As enrollment has increased, the number of school districts has decreased.

4.1 Examining Weak Correlations Patterns

Weak correlation patterns are present for the states of New Hampshire, Ohio, Oregon, District of Columbia, New Jersey, West Virginia, Indiana, Hawaii, Montana, Missouri, Maryland, South Dakota, and Oklahoma when testing the correlation of the count of all government units to population.

Weak relationships exist for West Virginia, New Jersey, Hawaii, and Maryland when testing the correlation of the count of special districts to population. Please note the states having a weak correlation pattern for special districts versus population also exist in the weakly correlated group of all government units to population. Those weak patterns tended to exist predominantly in the Midwest and mid-Atlantic states. Hawaii, New Hampshire, Oregon, Indiana, West Virginia, and Maryland counts of all governments remained nearly unchanged over the years even though their corresponding population sizes increased. Although the overall counts of governments remained fairly consistent, it bears mentioning that school districts seemed to decline while special districts offset the decline in many states. Section 4.2 delves into this subject a little more.

Correlations can be hard to interpret. The first synopsis would be a simple one in that these states' government and population data do not have a strong linear relationship and should not be used to model where QuIP trips should be taken. Further study of shorter time series should probably be conducted.

4.2 Examining Negative Correlations between Government Counts and Population

When analyzing the correlation of the count of all government units (i.e., general purpose, school district, and special district governments) to population, about 55 percent have strong positive correlations with coefficients greater than +0.65. The following section will focus on four states with strong negative correlations (Nebraska, Michigan, Minnesota, and New York) to understand what may have led to this result.

4.2.1 Decline of School District Governments

Throughout the United States, the total count of governments declined between 1957 and 1962. Michigan, Minnesota, Nebraska, and New York exhibited similar behavior as their populations grew in the same period, leading to the strong negative correlation results presented in this paper. This decline in governments across the country can be attributed

to the consolidation of school district governments. Over that same period, however, special districts grew.

According to William Fischel (2009), the school district decline around this time was caused by the extinction of one-room schools. Many of these one-room schools were the only schools in certain districts; hence, consolidation of one-room schools often meant the consolidation of school district governments. For Michigan, Minnesota, Nebraska, and New York, the decline in school district governments accounted for the majority of the decrease in government counts for the earlier censuses. Nebraska's government count has continued to decline, but again related to school district consolidation.

It is important to note that the decrease in school district governments over time has been somewhat tempered by the increase in special district governments. Examining the correlation results between special district governments and population will provide more telling results for the research question at hand.

Upon the re-examination of the correlation of government counts and population excluding school districts, new anomalies in the data have surfaced. These are examined in Section 4.3.

4.3 Examining Negative Correlation and Discrepancies between Special District Counts and Population

When only examining the correlation between special district and population growth, there was a very strong correlation (greater than 0.70) among all but five states. Negative correlation is present for only Hawaii, Louisiana, and Maryland. Other data discrepancies were sharp increases in the number of special districts in New Mexico and Pennsylvania. These data anomalies will be discussed in detail below.

4.3.1Louisiana

Louisiana exhibited a strong negative correlation for both the tests of all government counts and population as well as special district counts and population. There was a sharp decline in the number of special districts between the 1972 and 1977 censuses. Provisions in the 1974 State Constitution substantially reduced the fiscal and administrative autonomy of districts created by parish or municipal governments, leading several districts to be reclassified from independent special districts to dependent agencies of parish or municipal governments. The provisions state that the governing authority of a local government shall have power over any agency to abolish the agency and require prior approval of any charge or tax levied or bond issued by the agency (U.S. Census Bureau, 2013.)

There was a large decrease in the population between 2002 and 2007 while the state's government counts continued to increase. According to Sastry (2007), the decrease in population was due to Hurricane Katrina. The increase of 53 governments was the largest increase in governments for the state. In 2006, the state's Legislative Auditor provided a directory listing of governments that allowed for a comprehensive view of governments for the first time. Between this directory and an improvement in research quality, some of the births in the frame were actually from governments incorporated prior to 2002.

4.3.2 New Mexico

New Mexico showed a sharp increase in special district governments in 1997, growing to 653 from 116 in 1992. There were 602 acequia districts added to the government counts for the state in the 1997 Census. Prior to 1997, all acequias were considered private organizations and therefore out of scope for the Census of Governments. Upon further consideration and a re-examination of the authorizing legislation, acequias established by three or more property owners are considered independent special district governments. While reclassified in 1997 and added for that Census, not all were actually established between 1992 and 1997.

4.3.3 Pennsylvania

The number of special districts in Pennsylvania increased from 34 in 1957 to 1,398 in 1962. For the 1962 Census, municipal authorities were reclassified from subordinate agencies of their creating municipality to independent special district governments. The revised treatment involves an exception to the tests of autonomy that are ordinarily applied to identifying governments for Census Bureau statistics. The classification of all municipal authorities as special districts (including those that have only a single sponsoring government as well as those sponsored jointly by two or more governments) was largely dictated by the difficult problems which the dependent agency approach raised in this instance for developing reliable statistics on local government finances (U.S. Census Bureau, 1963.)

5.0 Conclusion

Changes in variables such as population, age, or economic activity will affect the demand for public services and what governments should be providing. As a result, we may see a shift in government resources to provide these demanded services to their constituents.

Our research for this paper has determined that population growth is positively correlated with the growth of governments over time and should be considered in decisions of where QuIP trips are taken or as a focus for website and legislative research.

Measuring governments and maintaining a frame for public sector surveys is difficult. Governments do not exhibit the same behavior as business or people, as they are more restricted in what they can or cannot do. Additionally, this will vary within each state. As long as the researcher can appreciate these differences and understand how governments behave, we can use paradata to improve the coverage of the frame.

6.0 Future Research

How areas respond to these changes will depend upon what actions they are authorized to take (e.g., form new governments, issue additional debt, create new agencies). The tenth amendment of the Constitution allows for states to act independently of the federal government when establishing governmental structure within their boundaries. This has given each state the autonomy to decide how services in their state will be provided. For example, the majority of electric power in Nebraska is provided by special purpose governments, but Michigan yields a majority of that service delivery to private industry. So how a government responds to changes in demand for services will depend on how that state is structured.

This paper has shown that there is a strong positive correlation between population and the growth of governments, but it is not necessarily causation and not the only cause for a change in government structure (as the case in 1974 Louisiana Constitution shows). One also needs to look at the local attitudes towards government. Is the area looking at more of a consolidation effort (e.g., the case of school district governments); or is the area looking at creation as an alternative to restriction on the existing governments (e.g., creating a special district to meet a specific need.) Are there economic considerations for consolidating or growing governments?

The negative correlation results are attributed to the decline in school districts, changes in legislation, improvements in research, environmental impacts, or changes for data presentation. One can presume if these shocks to the time series did not occur, positive correlation would exist throughout. This paper has opened the door to other research possibilities for the use of other paradata to improve the frame of governments. These results can be used to determine QuIP trip destinations, which state governments to contact or research online. A sudden increase or decrease in population or enrollment may signify a need to look at the frame. Some future research ideas are discussed in detail below.

6.1 Exploring Overcoverage through Respondent Claims

Through the survey process of the Census of Governments, some governmental units surveyed will call disclaiming themselves as governments because they were already included in the Economic Census. Using a record of these phone calls as paradata can be used to show potential overcoverage in the Census of Governments; however, past examination of these calls have shown that these entities were correctly classified as governments. We can also examine a record of these calls for potential overlap between the Census of Governments and the Economic Census, where entities may be incorrectly canvassed for one of the surveys.

6.2 Using Geographic and Construction Data as Predictors

Geographic and construction data may be canvassed to yield information on census blocks or construction permits to highlight an influx of houses to determine if there is an up and coming community. Based on the results of that research, the frame analysts can pool more resources into the data collection efforts for those areas. Population data may be used at the tract level over time, overlaying special district shapefiles in states where available. Here we can study whether there was an increase in population in the period up to the incorporation of a given special district. Further examination can look at the predominant changes in the areas where certain types of special districts were created.

6.3 Examining the Lagged Response of Special District Growth to Population Changes

This paper has confirmed the positive correlation between special district and population growth. One known issue to exist within the COG is the amount of time it takes for a special district government to be incorporated. If a ‘new’ government entity is identified but has not been ratified, the unit falls out of scope to our census program. Even though the unit may meet the criteria to be classified as a government, it cannot be included as such until the due process of its incorporation is complete. Because we complete our COG every 5 years, these changes are not immediately identified leading to some level of undercoverage.

Future research can test the lagged response of special district growth to population changes over time. This research can determine whether population changes are a predictor in the behavior of governments.

6.4 Identifying Governments by Association

Research can be conducted by changing the method of data collection and nonresponse follow-up to identify new governments through either geographic or formal associations. In the indirect approach, the GUS survey would modify the questionnaire form by asking for association participation. If participation existed, a follow-up question would ask the association for participation contact information allowing analysts to further investigate a now known professional association. In the direct approach, analysts can call responders of certain special purpose governments to inquire about the status of other known special purpose governments of the same type that are non-respondents to the survey.

6.5 Modeling

QuIP trips are used to mitigate poor response or basic nonresponse. Usually, analysts seek to travel to the respective state's capital in the interest of securing data we were unable to collect via the CoG process. Future research seeks to find commonalities or patterns in these data so that methodologists will be able to eventually model where such trips should be taken. Based off the current progress of this research, this modeling could be based on predetermined growth factors where we see population shifts or legal research which may prompt us when to expect government growth based on the incorporation of new legislation. Staff also seek to hone in on specific areas instead of assuming and relying on the capital city to be the hub for the state's governmental activity. This would lead to a more comprehensive frame and may even diminish travel costs or eradicate hapless visits.

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