SCHOOL DISTRICT-CENSUS GEO-REFERENCE FILE FOR ILLINOIS FOR 1980

Vernon C. Pohlmann
Ramesh B. Chaudhari

A Joint Publication of
The Community Research Center and
The Center for the Study of Educational Finance
Illinois State University
Normal, Illinois 61761

December 1981

School District-Census Geo-reference File for Illinois for 1980

by
Vernon C. Pohlmann and Ramesh Chaudhari
Illinois State University

Each decade the U.S. Bureau of the Census collects census data for various political and non-political entities, but not for school districts. In order to access the wealth of information in the census by school districts it is necessary to prepare a geo-reference file in which each enumeration district or block group is matched with the appropriate school district or districts. To explain the purposes, procedures, limitations, and results of this process for Illinois for 1980 is the subject of this paper.

PURPOSE

There are many individuals and organizations who have considerable interest in and, in fact, have an urgent need for demographic, social, economic, and housing statistics for school districts. The most viable way to obtain such information is from the decennial census of population and housing.

Probably the most significant reason for preparing a geo-reference file is to apply it to the income and poverty data in the 1980 Census to determine the number of ESEA Title I eligibles in each district. Over one hundred million dollars per year is being distributed from the Elementary and Secondary Education Act grants for the purpose of upgrading the education of children from families below the poverty level. Moreover a portion of state funding to local schools in Illinois depends on an updated count of low income children. There is no other source for this information in Illinois which can take the place of the 1980 Census.

Along the same line there are other data items in the census which will be useful in developing educational programs to meet the needs of various groups.

For example, information on languages spoken at home as well as ability to speak English will be useful in assessing the need for bilingual programs. Similarly the number of persons in each age category not in school and/or with limited years of school completed will indicate needs for continuing education.

A third major purpose in preparing the geo-reference file is to obtain census data on the number and distribution of various minorities. Both state and local administrators need adequate information on blacks, Spanish Americans, and others for purposes of desegregation planning.

Forecasting future enrollments should be improved by having the latest census data. Application of the geo-reference file to Summary Tape File Number One will produce information on the number of pre-school children by age as well as indicators of overall population trends for each school district. Trends in marital status and number of women in various child-bearing age categories should offer clues to future fertility and enrollments.

Finally a very broad reason for developing the geo-reference file is to facilitate a wide range of research projects as well as funding for such studies. Thus a researcher in preparing a grant application will find it essential to use "official" census statistics in order to gain approval for funds from a governmental agency. Such census information will provide baseline data even though conditions may change during the coming year for the analysis of educational variables in relationship to income, occupation, race, ethnicity, rural-urban residence, mobility, and so forth. The large number of dissertations completed during the seventies using census data attest to the importance of this point.

PROCEDURES

The basic plan adopted for this research project was to account for each line of population and geographical information listed in the 1980 Census file produced under Public Law 94-171 by assigning the proper proportion of each such

referenced area and its population to the appropriate school district. As specified in the law the Census Bureau was required to issue the official count of population by April 1, 1981 for each geographical area, primarily so that appropriate bodies could redraw various legislative district lines. Thus every block and enumeration district in Illinois was accounted for and could be matched with the maps issued by the Bureau. In turn the census maps could be compared to the school district maps and in practice the percentage of each block group and enumeration district falling inside the boundaries of each school district was determined.

Step-by-step the procedures involved first the review of the latest set of school district maps available from the Illinois Department of Commerce and Community Affairs with maps acquired from a variety of sources in recent years by Community Research Services at ISU. Differences were identified on each county map and sent to the superintendents of the appropriate Educational Service Regions. They were asked to determine which of these boundaries were correct as well as any other recent changes and to return the corrected maps to us. In cases where the county maps failed to show exact detail we asked the school districts involved to send larger maps and to indicate the precise relationship of boundaries to streets, alleys, and other physical features. Unfortunately some districts did not respond and a few admitted that they do not have a map of their boundaries.

The second step involved the identification of each enumeration district and block group listed in PL 94-171 on the census maps and to draw the boundaries on the corresponding maps of school districts. For larger cities and metropolitan areas the process was reversed; the school district lines were drawn on the census maps. When it was feasible, equipment was used in the Cartography Laboratory to project the boundaries from one map to the other to assure maximum accuracy. In performing this step we experienced some frustration in matching the codes from

PL 94-171 with the codes on the census maps. In some cases an ED was found on the map, but not on the PL printout; in other cases the reverse was true. Most commonly we found a different enumeration district code on the map than that shown in the listing. Calls to the Census Bureau were made in some cases, but with limited staff the Bureau required five or six weeks to research each problem and in at least one case revealed that their maps were still different from both the maps they supplied us and the PL listing. Given our very tight time schedule we proceeded as follows:

1. We assumed the most likely resolution of the discrepancies. For example, if the listing called for the existence of a block which was not numbered on the map, we tried to find a block in the numbering sequence which was unidentified on the map and assigned the number from the PL listing to it. Or if the code for an enumeration district was shown as 0956 on the map but 0965 on the listing, we assumed a clerical error was made in transposing digits.
2. We made sure that every code in the PL listing was used and assigned to the most likely school district(s), so that we would pick up the population associated with the code in the PL listing. We ignored temporarily codes on the map which were not in the PL listing, because it would be impossible to assign any population to such codes. In other words we assumed that the PL listing accounted for all of the geographical areas and all the population. We made sure that we matched every block group and enumeration district in the PL with the appropriate school district(s).
3. We devised a standardized form to provide detailed information about each discrepancy to mail to the Census Bureau for resolution. Where our assumptions made above were in error, we will eventually need to make adjustments.

The third step in the procedures was to identify areas on the maps which have unusual population distributions. For example, state parks, conservation areas, lakes, and forest preserves were sketched in to indicate no population; whereas rural subdivisions were noted for their population concentrations.

Next it was necessary to code completely each segment of each school district in each enumeration district on the maps. This step was extremely important in properly identifying the county code associated with district numbers where such districts extend into two or more counties. It is very common to find the same number associated with two or more separate districts within a county, except for differentiating county codes.

The fifth step was done in two different ways depending on the type of area. In essentially rural areas we used a digitizer to calculate the area of each segment of each school district falling inside each enumeration district. Except for areas noted in step three above we assumed an even distribution of the population and calculated the percentage of the population in each school district on the basis of the percentage of land area. Uninhabited areas were removed from both the numerator and denominator in calculating these percentages, and estimated adjustments were made for known population concentrations within a certain school district as its portion of a given enumeration district. Density of roads, proximity to towns, and density of dwelling unit symbols on county highway maps were used as additional indicators of uneven population distribution. The second approach to this fifth step involved the tabulation of population counts for each block in urban areas for which the Census Bureau provided block statistics. Thus if a block group was split into two or more school districts, we could get a very accurate population count by aggregating the block data, except when the boundary also split a specific block. In the latter such cases we had to resort to methods such as those used in rural areas above as well as make actual field surveys where possible. The above procedures were followed for each elementary and each

high school district unless they were combined into a unit district. Boundaries were drawn in red, blue, and yellow, respectively, to differentiate elementary, high, and unit districts.

The final step involved the creation of the geo-reference tape by associating the proper percentages of each ED/BG with the appropriate school districts. By computer we matched the resultant tape with the PL tape to make sure that 100 percent of each line was accounted for, no more and no less.

LIMITATIONS

As implied repeatedly above there are serious limitations in the geo-reference file at this point. Any user should be aware of these shortcomings in the work which he/she does and the conclusions derived.

First of all the set of 1980 Census maps available at this time is very preliminary and is subject to revision. Many of the maps are faint and difficult to read. There are omissions of significant codes, transposition of digits in codes, association of codes with the wrong area, and inconsistencies between the maps and the listing of geographical areas on tapes such as PL 94-171. We are in the process of identifying the discrepancies and will hopefully obtain corrected maps and/or listing of geographical areas in the near future.

Second, there is no complete set of accurate school district maps in Illinois. In spite of repeated efforts on our part, we still find serious unresolved differences in the maps of adjacent districts. In some cases both maps differ from the map in the office of the educational service region and the maps published by the Department of Commerce and Community Affairs.

A third limitation arises out of the need to estimate population distribution among districts which split a census enumeration district or city block. Although we did make field checks and phone calls to people in the local area about population concentrations in one part of a large or irregular area, we could not in a few months check out every area thoroughly. This problem is compounded when

boundaries not only cut through a block, but even through a set of houses and apartments.

There are other limitations, of course, but worthy of note here finally are the errors which we ourselves made in coding, transposing numbers, data entry, and the like. Work of each person was checked on a regular basis and controls were introduced at each phase of the project to determine the accuracy of the work, but it is likely that some errors did occur. Hopefully current evaluations will eliminate such errors.

PRELIMINARY EVALUATION

So far two steps have been taken in an attempt to evaluate the accuracy of the school district geo-reference tape. These are clearly preliminary measures and additional checks should be made when 1980 Census enrollment figures are available to compare against actual enrollments.

The first check involved matching the school district geo-reference tape against PL 94-171, applying the percentages to the total population for each BG/ED, and aggregating the population for each school district. These population figures were compared to the population derived from the 1970 Census. For districts showing unusually large increases or decreases we reviewed the trends which occurred in the general area of the district. For example, if a district containing a city of 20,000 declined by 2,000, we noted what happened to the population of this city to see if the trends in the district and the city were consistent. Inconsistencies were noted and we are now reviewing all of the work done on such districts.

For the second check we prepared a profile for each school district from P1 94-171, showing the racial and Hispanic breakdowns of the population as well as the total population. A copy of this profile was mailed to each superintendent with a request that he/she comment on the reasonableness of the data. Eighty-six percent of them responded so far including many with significant information

about their districts for judging the validity of the data. These returns are now being reviewed and will be the basis for careful reconsideration of the geo-reference file.

CONCLUSIONS

A first draft of a School District-Census Geo-Reference File for Illinois for 1980 has been completed. With this file users can compile various data sets released by the Bureau of the Census by school districts. Companion files have also been developed for community college district, area vocational education districts, and for a limited number of attendance areas within selected school districts.

TECHNICAL APPENDIX

For the researcher interested in using the geo-reference file it is possible to work from a computer printout, but it will be more efficient to use a magnetic tape if the programming and computing facilities are available. The following is the description of the geo-reference file as it is stored on a magnetic tape.

Description of Geo-Reference File:

This file contains 24,549 records. Each record represents an enumeration district, a block group or a part thereof that falls within the boundaries of a school district. If an enumeration district or a block group falls in a dual (elementary or high school) district, there are two records for that ED/BG - one for the elementary school district and the other for the high school district. Because of this duplication, the geographic areas represented by the records are not mutually exclusive. The records are arranged in ascending order of the school district county, school district, and serial number. The following is the list of items of information contained in each record.

COLUMNS	ITEMS
1-3	School District County Code
4-7	School District Code

COLUMNS	ITEMS
8-13	Serial Number (Used for file maintenance)
14-15	Region Code (To be added later)
16	School-level Code 1 = Unit District 2 = Elementary District 3 = High School District
17-19	Federal County Code
20-22	MCD--Minor Civil Division (Townships in northern counties and precincts in southern counties)
23-26	Place Code (City, town, village)
27-32	Census Tract
33	Block Group
34-38	Enumeration District
39-54	Name of the Area
55	Rural/Urban Code 1 = Rural 0 = Urban
56-58	Percent of ED/BG in This School District
59-69	Filler

The tape is nine-track, 1600BPI, EBCDIC, and fixed record length.

ORDER FORM

File Requested: Illinois School District Geo-Reference File

Ordered By: Name _____

Address _____

_____

Telephone (____) _____

Tape Specifications:

All tapes mailed will have the following characteristics.

9 Track
1600 BPI
EBC DIC
Fixed Record length

OPTIONS:

LABELS: ☐ NO Labels ☐ IBM Standard Label

DSN= _____

BLOCKING: ☐ Unblocked ☐ Blocked

Max.Blocksize _____

Note: For price quotation please contact Dr. Vernon Pohlmann

(309)438- 2387

Send Order forms to: Dr. Vernon Pohlmann
Community Research Center
Department of Sociology/Anthropology
Illinois State University
Normal, Illinois 61761