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UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE INFLUENCE OF PUBLIC SCHOOLS ON RESIDENTIAL GROWTH IN THE URBAN FRINGE OF OKLAHOMA CITY

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

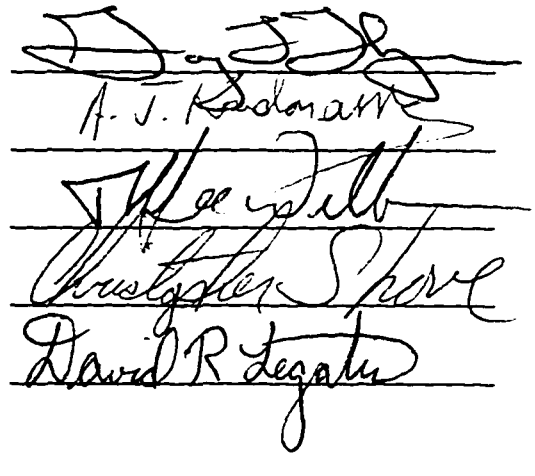
By

BINITA SINHA
Norman, Oklahoma
1997

THE INFLUENCE OF PUBLIC SCHOOLS ON RESIDENTIAL GROWTH
IN
THE URBAN FRINGE OF OKLAHOMA CITY

A Dissertation APPROVED FOR THE
DEPARTMENT OF GEOGRAPHY

BY



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ABSTRACT

The Influence of Public Schools
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In the United States highways and expressways, affordable automobiles and cheap gasoline have increased the zone of influence of cities and metropolitan areas by encouraging the growth of residential suburbs. Also, preferences in the choice of residential location are influenced by the amenities of suburban life. One significant policy issue that brought the question of urban education into national prominence was that of bussing students to achieve racial balance in schools. This plan fueled urban sprawl and suburbanization between 1950 and 1970 as the "white flight" syndrome developed. New schools grew in the suburbs which were perceived to be better in terms of quality as compared to the central city schools . This dissertation has established that the quality of schools has influenced peoples choices of residential relocation. Good suburban schools that resulted from outward migration of population appear to have become a major pull-factor attracting further growth and development of residential areas. This dissertation analyzes relationship between school quality and suburban growth patterns and measures the influence of school

district quality on residential growth in the metropolitan fringe area of Oklahoma City.

There are four essential components of this research which include quantitative analysis of quality of school districts; analysis of patterns and trends in residential growth; the integration of results; and interview and field checks of data. Quality of schools has been measured with the help of input variables. Growth of residential area has been measured with the help of census data on number and median value of occupied residential units. A Spearman Rank Correlation analysis has been done to see if there is a significant correlation between quality of school districts and trend in residential growth. Findings of this dissertation research indicate that quality of school districts has a significant influence on people's choice of residential location in the Oklahoma City Metropolitan Area.

Chapter 1

INTRODUCTION

The purpose of this dissertation is to examine the significance of school quality on people's choice of residential location. It attempts to analyze the complex relationship between school quality and suburban growth pattern. Current trends in postindustrial societies have indicated that housing choice is the most obvious way in which social preferences are translated into land use influence (Kivell 1993). In the United States construction of highways and expressways, associated with affordable automobiles and cheap gasoline, has increased the zone of influence of cities and metropolitan areas by encouraging the growth of residential suburbs. After World War II, residents of all large cities began to seek larger, new homes outside the central core, resulting in a ring of affluent suburbs encircling most cities. This intraurban migration pattern was dominated by white middle- and upper-income families, though not exclusively. This trend changed the structure of American cities and proved that preferences in the choice of residential location were influenced by the amenities of suburban life or the stressful character of life in the central city.

One significant policy issue that brought the question of urban education into national prominence was that of bussing students to achieve racial balance in schools. The United States Supreme Court in the Brown v. Board of Topeka (1954) education case ruled that segregated schools did not provide equal opportunities to black students and

therefore were unconstitutional. Eventually, this led to strategies such as bussing students away from their neighborhood schools to create a more balanced distribution of white and black students in all schools. Bussing for desegregation was widely resented among the inner city whites, and an exodus of the white population occurred from school districts that were affected by desegregation plans. Thus, desegregation plans fuelled urban sprawl and suburbanization during the years between 1950 and 1970 as the "white flight" syndrome developed. New schools grew in the suburbs that were perceived to be better in terms of quality as compared to central city schools. Such schools were not subjected to desegregation and bussing, hence they maintained student bodies that were largely white. Remarkable outward migration of white population from central cites was recorded in the first years of the desegregation policy (Lord 1983).

The phenomenon of white-flight and its implications have been widely studied by sociologists and geographers. However, no study has tried to relate the influence of school quality and residential growth in urban fringe areas. The hypothesis of this study is that the quality of schools has influenced people's choices of residential relocation, intracity migration and population growth. This dissertation is an attempt to measure the influence of the quality of schools on the relative growth of residential patterns.

Statement of the Problem:

Urban land use study has been an area of comprehensive and diversified research. Within its broad purview, residential land use studies, residential choice and references have been some of the prime issues. With changing residential preferences and underlying factors that shaped residential location decisions, there have been remarkable shifts in

research emphasis pertaining to residential land-use studies. Bassett and Short (1980) observed different approaches to the study of residential land use including the earlier holistic approaches and suggested a four-fold classification (Table 1.1). The earliest of these approaches, such as Burgess' study of the city of Chicago (1920s), emphasized on the residential land-use pattern and the organization of space within urban areas. Later studies highlighted the impact of transportation and resulting changes in the organization of urban space (Hoyt 1939). During the 1960s, with the revival of bid-rent theory, urban land began to be considered a commodity and its organization was believed to be as a result of utility maximization (Lowry 1964, Alonso 1964).

Earlier research problems focused on the socio-economic aspects of land (Burgess 1924, Barlow 1958, Isard 1958, Wingo 1961, Alonso 1964, Lowry 1964, and Muth 1969). Lowry's model was one of the earlier attempts to describe the decision- making processes of individual households and developers.

Post-World War II studies of residential land use also highlighted the influence of highways and commuter trains on the suburban sprawl. They addressed the issue of middle-class aspirations of suburban housing and the tendency to move away from the central city (Adams 1969, Hughes 1975, Patel 1980). Thus, a new phase was introduced in urban land-use studies following the expansion of transportation, increasing affluence, and demographic shifts. It brought into the limelight the phenomenon of so-called white flight which became a hallmark of urban development (Goodman 1978). There was a significant racial undertone attached to this phenomena because of a higher concentration of the minority population particularly, African-Americans, in the inner cities.

Table 1.1 Four Approaches to Housing and Residential Structure

Approach	Wider Social Theory	Areas of Inquiry	Exemplar Writer
1. Ecological	Human Ecology	Spatial pattern of residential structure	Burgess (1925)
2. Neo-Classical	neo-classical economics	Utility maximization, Consumer choice	Alonso (1964)
3. Institutional managerialism, locational conflicts	Weberian sociology	Gatekeepers, Housing constraints, Power groupings.	Pahl (1975)
4. Marxist	Historical materialism	Housing as a commodity Reproduction of labor force.	Harvey (1973) Castell (1977)

(After Bassett and Short, 1980)

The Supreme Court ruling on bussing for desegregation of public schools seemed to trigger the process of whiteflight. Most desegregation activities were undertaken during the late 1960s and early 1970s. It has been observed that most of the white flight occurred in the period preceding and following the implementation of a comprehensive desegregation plan (Hawley et.al, 1983). There was a significant outward movement of a segment of population from the districts that were bussed or were likely to be desegregated in the near future. As a consequence, the suburbs became characterized by new, all-white schools. This raised questions regarding the effectiveness of desegregation policies since white flight seemed to be defeating the very purpose of desegregation (Rossell 1975). Due to demographic shifts, the new suburbs had high percentages of school-aged children, hence they were faced with the task of constructing new schools. These new schools enjoyed better equipment and more funding. Simultaneously, the inner city faced deteriorating schools and lower tax bases plus high crimes and other poverty-related problems.

The issue of bussing for desegregation raised questions regarding the safety of students, education quality and freedom of choosing schools. From a general dissatisfaction with the public school system,the so-called "school choice movement" arose which, according to Cookson (1994), became a crusade for people who believe that in the absence of educational liberty there cannot be educational justice and educational innovation. Rigid school district boundaries and limitation on school choice caused widespread discontent and seems to have become an important factor behind residential relocation decisions. Clearly, other amenities were also considered in a move to the

suburbs.

Good suburban schools that resulted from outward migration of the population appear to have become a major pull-factor attracting further growth and development of residential areas. Newspaper reports indicate that educational facilities and quality of public schools have significant influence on people's choice of residential location. Affluent school districts are able to afford higher quality. In turn, this causes increased growth in the district due to an improvement in housing value. As a onsequence, housing prices have increased in better quality school districts, and residential areas within reputed school districts have grown faster. Communities served by quality school districts are least likely to experience erosion of property values over the long term (Christian Science Monitor, June 5, 1993).

The Los Angeles Times (June 5, 1994), reported that houses in top school districts may sell for several thousand dollars more than those near less-desirable school districts in suburban Los Angeles. Also, the value of homes in good school districts tends to rise faster than in less-desirable ones. "All over the country, parents ... who are forced to send their children to private schools because of poor conditions or inferior education at some local public schools find that the cost of private schooling can be crippling. Often, instead of paying tuition ranging between $2,000 and $10,000 a year, they opt to buy (houses) in top school districts even when that imeans they must pay more for a less desirable home (Los Angeles Times, June 5, 1994)." However, no attempt has been made to measure these hypothetical trends. This dissertation attempts to analyze this complex relationship between school quality and suburban growth patterns. It examines the significance of

school quality on the people's choice of residential location.

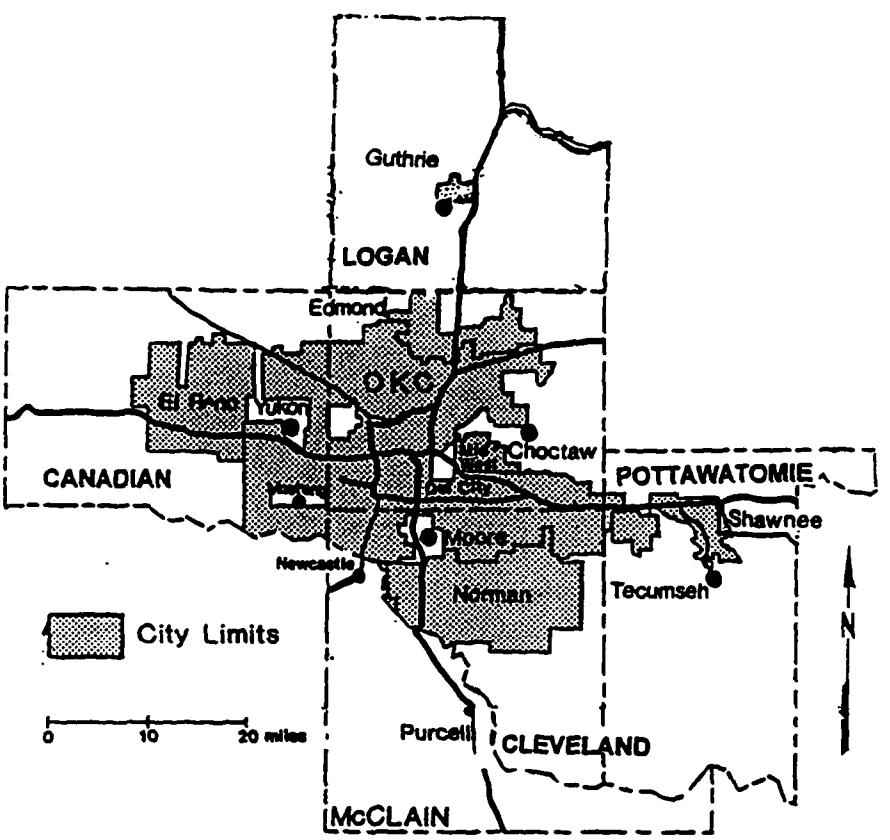
Study Area:

This dissertation measures the influence of school district quality on residential growth in the metropolitan fringe area of Oklahoma City (map 1.1). This study area was selected because Oklahoma City has registered remarkable spatial growth in recent decades, and it has been identified as one of the significant areas of urban sprawl among metropolitan areas in the United States (Clark 1985). Following the Supreme Court ruling requiring school desegregation in 1954, the Oklahoma City area began to experience significant shifts in ethnic composition of the population resulting from the white flight of people who preferred to avoid mandatory bussing to achieve racial balance in public schools. However, white flight was not completely a product of school desegregation. The process of white out-migration from the central city to the suburbs was due to a general desire for a new family home away from a crowded central city.

The history of desegregation and equal rights movements by blacks in Oklahoma City dates back to mid-1950s. In early 1950, Oklahoma City began to attract the black population from rural areas seeking work in the government and service sectors, and manufacturing. With an increase in the percentage of black population in the central city, white residents started moving out to the suburbs. However, segregation continued to be maintained in housing, educational establishments, and public facilities. Consequently, blacks in Oklahoma city started a movement for equal rights. In 1955, the Oklahoma City School Board declared its policy to end segregation in public schools. This was in support of the Supreme Court ruling on the Brown v. Board of Education case. In 1957, a

Figure 1.1

OKLAHOMA CITY METROPOLITAN STATISTICAL AREA
1990



After E.Loiselle

movement toward integration of restaurants started in Oklahoma City. It took seven years before the Oklahoma City Council could enact "an ordinance forbidding anyone to refuse service to anybody because of race, religion, or color (Franks and Lambert 1983)."

De facto segregation in Oklahoma City public schools continued even after the declaration of the policy by the Oklahoma City School Board. It happened in light of another declaration by the Supreme Court in a South Carolina case (Briggs v. Elliott), which denied mandatory power to force integration. Furthermore, there was a transfer policy that allowed white students from a majority black district to transfer to a majority white school and vice versa. As a result, those who could not move out of the central city were able to transfer their children to schools with a predominantly white population. In 1963, the transfer policy was restricted by the Federal District Judge, Luther L. Bohanon. In his decision on the Robert Dowell case, Bohanon ruled that transfer policy be restricted to cases of scholastic study requirements or to a valid good-faith reason. The Dowell case marked the beginning of a series of rulings and arguments on the issue of desegregation in Oklahoma City. It culminated into the Finger Plan that was prepared by John Finger, professor of Education, Rhode Island University. It was formulated after a good deal of investigation following the report of Dowell's attorney, John Walker. According to Walker, the Oklahoma City Board of Education had failed to achieve a unitary school system. He suggested that a complete dismantling of segregation was required immediately. The Finger Plan recommended restructuring of the high school attendance zone so that both black and white students could be enrolled in each district. Bussing was an essential element of the Finger Plan. On the issue of bussing students to

complete the integration of Oklahoma city schools, Judge Bohanon commented: "This court has never ordered a single child to be bussed and does not intend to do so. Bussing of children to attend the public schools in Oklahoma City District is neither new or novel. Thousands of students are bussed daily in the district and as a matter of fact, throughout the state.bus transportation as a means to eliminate segregation may be validly employed. Although not specially relied upon by the Defendant School Board, the court should observe that the law enacted by the 1970 Oklahoma State Legislature...is no obstacle to the performance of its constitutional duty by the School Board (Franks and Lambert 1983)."

The Finger Plan laid a strong foundation to bussing for desegregation in the Oklahoma City public school system. However, this plan, also known as "A New Plan of Unification for the Oklahoma City Public School System ," proved to be of far-reaching consequences. As reported by Franks and Lambert (1983), "the breakdown of racial barriers in Oklahoma City schools was not accomplished easily. One student was killed in a racial confrontation at Grant High School. Boycotts were organized to disrupt bussing of students from one school to another: Judge Bohanon received threats against his life, was hanged in effigy, and confronted in his front yard by an angry mob of school patrons opposed to ending school segregation, for his part in the case." There was almost a 50 percent decline in enrollments of Oklahoma City schools between 1970-80. A substantial part of this decline was caused by an exodus of the white population in an effort to avoid integration (Boulton 1983). The new private schools outside the city sped up white flight. Thus, during 1970-80, fringe areas of Oklahoma City developed as a result of white

flight. It provides a good case study to analyze further impact of schools on residential choice. Currently, the Oklahoma City metropolitan statistical area (MSA) extends over 5 counties. There are 25 school districts within the metropolitan area.

History of Education and School Districts:

The history of formal and organized school education in Oklahoma dates back to 1890. A year after the opening of new Indian territory, the Organic Act provided for school systems for the territory of Oklahoma besides local administration and congressional representation. Before that, the earliest education available in Oklahoma was provided by the Indian schools. Other schools were established by churches and missionaries. In the mission schools, religious training was combined with instructions in reading, writing and mathematics (Morris et al. 1976). The first official year of the public school opened in January 1891 and closed in September of the same year. During these months, 400 school districts were organized for the children who lived in the frontier homes and in the new towns (Dale, Wandell 1948). Under the Organic Act of 1891, each locale was responsible for its own school, and single-teacher schools were set up within walking distance in each neighborhood. However, there was not much provision for expanding education beyond the 8th-grade-level. Most of the schools were operational for two months only, and teachers' average salaries of $15 per month were too little to attract job-seekers. Teachers were certified by the respective county superintendents on the basis of examinations prepared by the Territorial Department of Education (Lambert, Rankin 1985).

Oklahoma school district boundaries were set by the Territorial Legislation in

1891. These boundaries were three miles apart in all directions on a half-mile line so that a school building could be constructed near the center of the district. The rationale was that children would not have to walk more than one and one-half miles to attend school. Furthermore, public education in Oklahoma received due attention in the First Legislature of 1891. The Legislature adopted laws regarding textbook commission with the objective of providing a uniform education at all levels in the state's public school system. "It also established a system of separate schools. One for the white and Indian students, and another for the black students. It was made unlawful for black students to attend the same school as the other students. Similarly, it was unlawful for white teachers to teach black students or for black students to teach the other students (Gibson 1984)." Thus, the history of racial segregation in the public school system of Oklahoma started as early as 1891, which continued until the Supreme Court's decision in Brown v. Board of Education, Topeka, in 1954.

The Normal School, established in December 1890 at Edmond, is one of the earliest school systems in the Oklahoma City metropolitan area. It was designed to provide two years of higher education for teachers. This school continued to be held in a church building until its own building was ready in 1893. Eventually, this was expanded to a four-year college and became the site of a university.

The Yukon school system, another of the earliest school systems in the present-day Oklahoma City metropolitan area, started in 1891 at a Baptist church building under the name of Subscription School. Until 1895, the school was held in the Methodist Episcopal South Church when a bond was passed to construct the first brick school building. This

was one of the pioneers among schools serving grades 1-12 (Office of the Superintendent. Yukon School District).

The Piedmont School system started in 1893 in the northwestern part of the present-day Oklahoma City metropolitan area on a site acquired by Mr. James Dean in 1889 during the land run. This system prospered with the expansion of the Piedmont township following the construction of the St. Louis-El Reno-Western railroad in 1904 (Office of the Superintendent, Piedmont School District)

In 1898, a superintendent of Indian Territories was appointed by the Federal Government, and funds were made available to facilitate more schools and teachers. The federal control of education in the Indian Territory improved the then school system by broadening the curriculum, raising teachers standard, defining administration and organizational set up, and by making possible for towns to be incorporated.

In 1902, the Mustang Valley school system was started at the town site of Mustang. This town site was located amidst four school districts, namely Shiloh; Pleasant Hill or Coon Ridge; Tippet, Raw Hide or Clear Creek; and Center Valley or Petty. The Shiloh school district conducted a seven-month school term. With eight pupils enrolled in 1902, it reported to have perfect attendance. In Pleasant Hill or Coon Ridge school district there were 35 students enrolled with the average daily attendance of 23. This school district maintained an eight-month term. In 1902, the enrollment at Rawhide or Tippit school district was 70. This district also operated on an eight-month term. The Petty school district operated on a seven month term, and in 1902 it had 59 students with an average daily attendance of 41. There was a general interest that these four school

districts could be consolidated into one under the Mustang district. However, the first proposition for consolidation was defeated in 1903.

Another landmark in the history of education in Oklahoma was brought by the declaration of statehood in November 1907. The Constitution defined the State Board of Education as being composed of a superintendent along with the Governor, Secretary of State and Attorney General as ex-offico members. It was clearly stated in the constitution that "the legislature shall establish and maintain a system of free public schools wherein all of the children of the state may be educated (Oklahoma Constitution)." According to the constitution, each county within the State was required to elect a superintendent who was to be responsible for administration and control of local schools. Teacher training and certification were managed by the superintendent and federal supervisors. In 1911, the State Board of Education was created, which advocated the consolidation of school districts, particularly in rural areas with the objective of ensuring better instructional facilities. Between 1911-1922, the state of Oklahoma recorded remarkable increase in the number of teachers (70%), and three times the increase in public funds expenditure.

During 1920-30, individual schools within Oklahoma worked on improvising the curriculum and expanding the available facilities. Consolidation of school districts was also active during this period. In 1920, communities from the districts of Bell, Diamond and Kansas voted for their consolidation with the Piedmont school district. In the following year (1921), Pleasant View and Mathewson districts were consolidated into the Piedmont district. Yukon constructed an additional high school in 1925. Two years later, in 1927, it became one of the pioneers among school districts to offer a home economics

program.

The Great Depression of 1930 brought economic hardships. As a consequence, several small communities registered a decline in population. This slowed down the process of development programs in the area of education. However, the situation began to improve by the early 1940s. During 1941-50, the Yukon school district expanded its facilities by adding a gymnasium and agricultural buildings. More school districts were annexed into the Piedmont school system. During 1947-48, Racine, Harmony, Texas, Scott and Pleasant Valley were consolidated into Yukon school system.

In 1946, the Better Schools Amendments was presented by the Oklahoma Education Association. It facilitated more improvements in the education system of Oklahoma by increasing the amount of aid from the state and by giving more decision-making authority to teachers in regard to text books and curriculum. Following this, the state legislature approved the Oklahoma School Code in 1947, which has been in force since then with only minor revisions and alterations. The effectiveness of this code is revealed by the following comments from the Oklahoma State Department of Education.

"The code not only repealed some outdated and unworkable statutes, but it grouped all pertaining to particular subjects in a convenient manner and improved the administration of the system considerably. Perhaps the best proof that this code was wisely written and satisfied a real need in the state is that subsequent sessions of the Legislature have not changed it except for minor revisions, and the state's administration of public schools has encountered fewer difficulties than before."

(Oklahoma Department of Education)

One of the challenging and most pressing tasks before the legislatures and administrators was to consolidate the numerous school districts within the state so that resources and man power could be channelized in the most effective manner. To keep school buildings within walking distance, earlier school districts were based on townships of 36 square miles. Each of these 36-square-miles townships was further divided into four sections of 9 square miles each. The school building was located in the center of each section of the township. At the time of statehood, Oklahoma had 5,656 school districts (Stephens 1990). Rural areas had elementary and junior schools. Higher grade schools were located in urban areas. Thus, students from rural areas were required to travel a considerable distance in order to be able to attend higher grade schools.

By 1900, a shift in economy was visible. From being predominantly agricultural. Oklahoma was now becoming more urban-oriented since new methods of cultivation and mechanization were relieving farm labor to work in urban areas. With the shift in population from rural to urban areas, many countryside schools became less viable. With these changes, consolidation of school districts became essential. In 1908 President Roosevelt started the National Commission on Country Life. Its purpose was to provide solutions to rural problems, not the least of which was rural school problems (Stephen 1990). With the construction of better roads and availability of transportation, rural schools were no longer required to be within walking distance. This called for consolidation of school districts in rural Oklahoma.

In 1909, the Convention of Oklahoma Teachers' Association asked for the establishment of rural high schools in all areas of the state. Following this, in 1911 the

state board of education advocated consolidation of rural school districts. In 1919, county superintendents were given the authority to annex school districts at their discretion. Districts with less than eight pupils were considered nonviable and were to be annexed into an adjacent district. However, this measure did not bring desired results since county superintendents were elected officials and were reluctant to act against the interest of their respective communities.

Active consolidation of Oklahoma school districts started during the period of World War I, when the transportation system was improved considerably. By 1918, many districts were providing transportation. Initially, local districts paid the cost of transportation. Later, by the 1935 Law of General Equalization Aid, transportation became a part of the minimum program for Oklahoma public schools. Since World War II, Oklahoma added more to its highway system. As a result most of the rural areas were transporting their students through districts.

As further reported by the Oklahoma Department of Education, the total number of school districts reduced from 4,450 in 1947, to 2,117 in 1950. There was a remarkable reduction in the number of home schools. Financial hardships and inadequate standards made many elementary and secondary schools nonviable. Consequently, the consolidation effort gained momentum, and by 1965 there were 1,118 districts. This number further reduced to 998 in 1966.

The subsequent years have recorded a continued progress toward consolidation of school districts in the state of Oklahoma. In 1994, the total number of school districts in Oklahoma was 551. Of these, 25 districts are within the Oklahoma City metropolitan

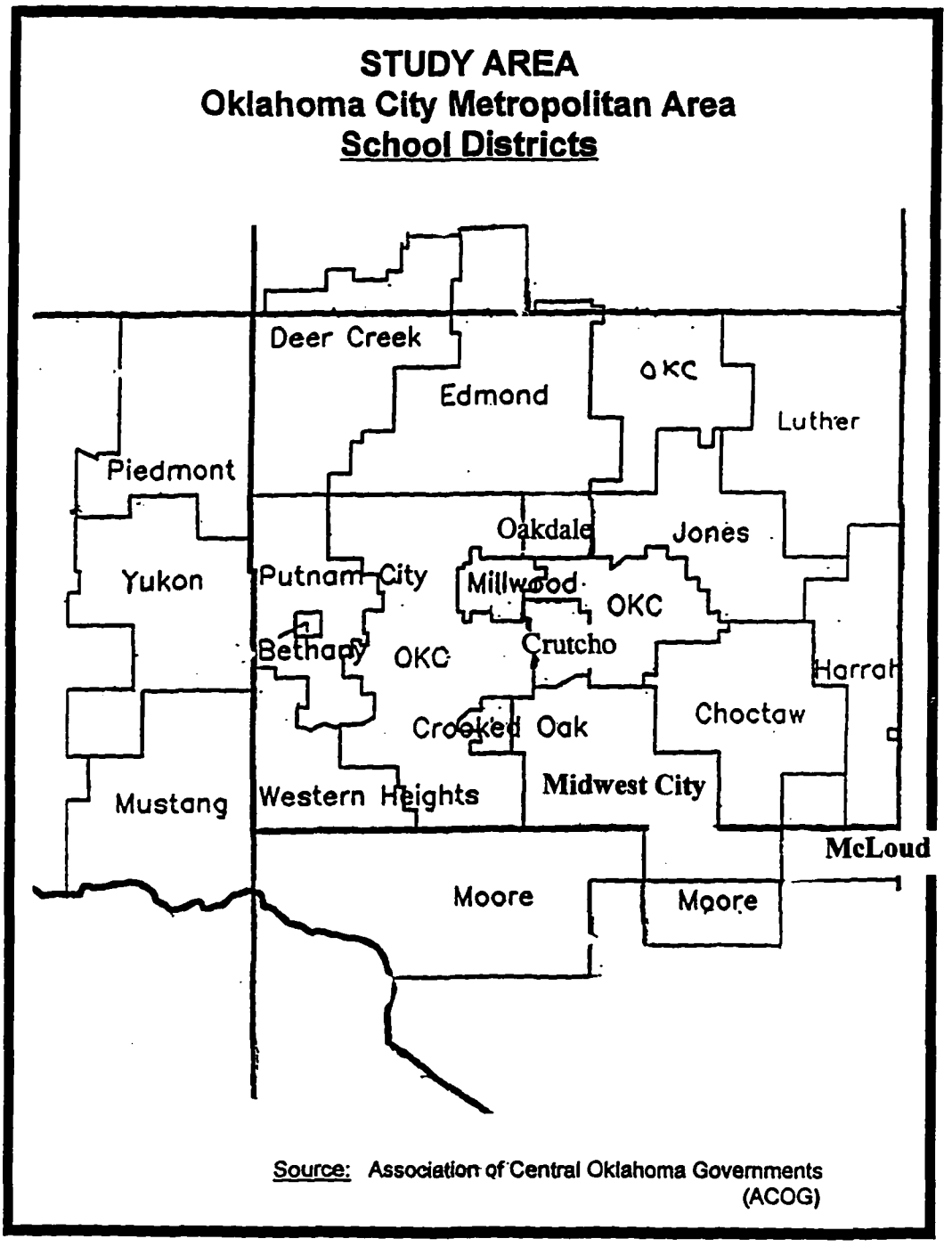
area, four of which are elementary school districts. In order to maintain the comparability of data, the elementary districts have been eliminated from this analysis. Of the remaining 21 districts, three had to be eliminated because of non-availability of census tract-based housing data. These districts are Tuttle, Newcastle and Bridge Creek. All of these fall within the same census tract. In the absence of comparable information regarding the amount of residential growth, it was not possible to include these three independent districts within the scope of present research. Thus, 18 school districts from the Oklahoma City MSA have been selected for this study (Figure 1.2).

Topographic condition and physical environment are reasonably uniform throughout the metropolitan area, thus minimizing the possibility of any undue influence of such factors on an individual's choice of residential location. Furthermore, no study has been done to analyze residential land use in the Oklahoma City metropolitan area. Thus, it has been selected as a case study to measure the influence of school districts on people's choice of residential location.

Objective:

The objective of the proposed work is to investigate whether the choice of residential location as determined by the quality of public schools has affected the expansion of residential suburbs in recent years. Previous studies in urban land use and growth of suburbs have indicated that land use is an outcome of interplay of several factors. Those - such as accessibility, land use control, land availability, and land rent etc. definitely influence the choice of residential location. So far, no study has been done to investigate the impact of amenities such as the quality of schools on residential land use.

FIGURE 1.2



Note: Oakdale and Crutcho are elementary school districts and are not included in the analysis.

With this objective, this dissertation attempts to see whether or not the quality of school districts has had any impact on people's choice of residential location, thus causing expansion of residential units in the better quality school districts. Besides schools, other amenities such as landscape aesthetics, recreation facilities, availability of water for domestic use, etc., could also be studied, but this research focuses on the quality of school districts.

Hypothesis:

This dissertation will test the hypothesis that there is significant spatial variation in the quality of school districts within the Oklahoma city metropolitan area, and residential location decision is influenced by the quality of schools therefore residential areas in better quality school districts have grown faster. In the initial phases of white flight, good schools emerged as an effect of migration of a relatively affluent population to the suburbs. However, a few decades later, these new schools became a factor behind residential relocation. Thus, in recent decades residential growth in good quality school districts has been perceived to be high.

Outline of Research Design and Methodology:

The four essential components of this research are a quantitative analysis of quality of school districts, an analysis of patterns and trends in residential growth, the integration of results and interviews with real estate agents.Quantitative analysis of the quality of school districts measures and compares the quality of the 18 school districts of Oklahoma City metropolitan area. Temporal variation is measured over the time period of 1980-94. Based on discriminant analysis, the selected school districts are classified into eight

categories to conform to the classification scheme adopted by the Department of Education, State of Oklahoma.

The residential growth pattern has been analyzed with the help of data on population and housing, collected from the census of 1990, 1980, and 1970. Net decadal change in the number of occupied residential units and median value of residential units have been calculated to examine pattern and trend in the growth of residential areas.

Both, residential areas and school districts have been categorized into eight groups. A Spearmasn's Rank Correlation has been calculated to find the relationship between residential growth pattern and school district quality. Based on median and quartile deviations, the value of residential units in each school district has been classified into eight categories, and a rank correlation analysis has been done to find if the two are significantly correlated. To test the findings from statistical analyses, sample interviews are conducted with real estate agents to find out if the quality of school has been an important factor among buyers in choosing a particular residential neighborhood. Educational indicators are placed in three categories namely, input, process, and output (Archbald 1996). Input indicators include resource variables such as expenditures, student-teacher ratio, and staff characteristics. Process variables include instructional techniques, discipline procedures, and school environments, while output indicators include graduation rates, test scores, and statistics that reflect on students' performance. In this research, analysis of school districts is based on the assumption that school-quality is different from education-quality. The quality of a school is measured by input factors such as student-teacher ratio, per student expenditure, etc. Thus, school quality is a

measurement of resources available to the school district with reference to manpower, finance, and infrastructure. On the other hand, quality of education is measured by output such as- score on achievement tests, and college-going rate. In this way, educational quality refers to achievement and success rate among students of a given school district. This research is an attempt to measure the quality of school districts. Therefore, it evaluates financial, manpower and physical resources of school districts, selected for the case study. It is a separate issue whether a good quality school provides an equally good quality education and is outside the scope of this research.

Contribution and Policy Relevance:

Urban studies and housing analyses have been complex issues. This dissertation will examine the impact of educational facility on residential land use, and the results will provide an insight into the complex interplay of factors that shape urban land use and residential location.

In accordance with the Oklahoma Education Reform Act, approved in 1990, the Office of Accountability, Oklahoma, publishes an annual report on performance of schools and school districts. Findings of this dissertation provide a comparative assessment of the performance of school districts within Oklahoma City metropolitan area over a period of the last fifteen years (1980-95), which is not available with the Oklahoma Department of Education.

In recent years, satellite data is emerging as a valuable tool for the analyses of urban and suburban patterns. To illustrate this technique, which could be applied in areas of indefinite data, satellite imagery is used. Also, this dissertation examines the

comparability of IRS-1B and Landsat TM satellite imageries for residential change detection analysis. Studies have been done to compare Landsat TM and Spot satellite imageries for land use change detection, but no study has been done so far comparing IRS-1B with Landsat TM.

Distribution of Chapters:

Urbanization and housing choice have been studied by geographers and demographers. On the other hand, urban sociologists have addressed the issues of urban education, impact of bussing and residential segregation. The second chapter presents a comprehensive description of relevant research and available literature on the issues of urbanization and urban schools. It also presents an overview of the use of remote sensing in urban land use studies.

This research is based on secondary data obtained from the Bureau of Census and the Oklahoma State Department of Education. In addition, some primary data has been collected through satellite imageries and interviews with realtors. These primary sources have been used to supplement information collected from the secondary sources. A detail of research design is presented in chapter three, which provides a description of data and analytical techniques applied to this research, along with the objectives and rationale behind selection of variables and methodology.

In 1990, the Oklahoma Department of Education, in accordance with the Educational Reform Act, started compiling the School Indicators. According to the indicator program, each school district in Oklahoma has been grouped into one of eight categories based on its quality. Chapter four presents a comparative profile of the 18

school districts, selected for this case study. It presents the ranking of these 18 districts to conform with the ranking by the Oklahoma Department of Education.

The Oklahoma City metropolitan area has gone through a long period of expansion and growth. Chapter five presents the trend and pattern of growth in Oklahoma City metropolitan area. It also describes the current pattern and trend in residential growth with reference to the 18 school districts.

Housing choice is a complex issue. It is based on an individual's perception of reality and is highly subjective. Even though statistical analysis can prove the behavioral pattern and decision-making with certain levels of significance, it is important to explore other factors that may affect an individual's perception of the reality and decision on issues such as housing choice. These factors have been highlighted in chapter six, which presents analysis and implications of finding. Finally, chapter seven presents summary and conclusion along with suggestions for further research.

Chapter 2

REVIEW OF LITERATURE

Land is a raw materiai defined in terms of a number of natural characteristics, such as climate, geology, soil, topography, hydrology, and biology (Aldrich 1981), while land use is man's activities and relation to land. Land use has been studied from many diverse viewpoints and no single definition is appropriate in all contexts (Campbell 1983). Urban land use and urban analysis have been complex issues for geographers, planners and regional developers. Urban land use has been an area of diversified research with numerous foci ranging from a holistic approach of land usepattern in general to more specific issues of housing and shelter. Currently, most of the analyses have been inter-disciplinary and described as urban economy, urban sociology, or urban planning. In the post-1960s with the Supreme court ruling on desegregation of schools, urban education became an area of intensive research. More particularly, residential choice and preferences have been one of the primary issues in urban land use. The patterns of residential land use have changed from time to time with changes in housing preference. This chapter highlights some of the major trends in urban research over the past years. Section one focuses on the major issues, section two highlights research in urban education, while section three presents some examples of remote sensing applications in urban studies.

Major Issues

The current pattern of land use is a cumulative result of decades of development. The dynamic nature of urban land use calls for a revision of the existing hypotheses and models as well as the formulation of new ones. Changes have occurred since the beginning of the century more particularly during the post World-war II period. Advent of the automobile and expressways weakened the central business district causing decentralization and massive urban sprawl. At the same time expanding highways nullified the bid-rent curve suggested by earlier macro economic theories. The earlier models of urban land use, based on von-Thunen's classic bid-rent theory, assumed the dominance of city-center as the most desirable location and hence of highest value. Other activities were observed to have spread around the center in accordance with their potential for profit maximization.

One of the classics in the study of urban land use and particularly residential pattern was Burgess' (1925) concentric zone theory that explained land use pattern of Chicago in 1920s. With the expansion of transportation, it was subsequently modified by Hoyt (1939). Though Burgess did not use bid-rent theory, and his approach was more like an urban sociologist, his findings draw close similarity with the bid-rent theory in that commercial and industrial functions occupied the central location in a city. Subsequent theorists such as Barlow (1958), while discussing locational factors of land use, referred to von Thunen's classical theory. Supporting the principles of comparative advantage, he stated that organization of urban land use pattern results from the rent-paying ability of different urban functions that compete for a particular piece of land.

The model propounded by Burgess set a trend to which belonged the study by Walter Firey (1947). Analyzing the land use in central Boston, Firey stressed the role of cultural and social systems, and propounded that properties of space and the ends of the social system using the space are derived from the cultural system. Although criticized severely, Firey's hypothesis did provide insight into the study of land use and social systems (Rodwin 1966).

Significant research was done on land use during the 1960s. However, von Thunen's bid-rent theory continued to dominate the land use model developed during 1955-70, notably in the works of Isard (1956), Wingo (1961), Alonso (1964) and Muth (1969). Also, the earlier attempts were organized around the interdisciplinary approach that were derived from the operations research and systems analyses approach of the post World-War II decades (Putman 1978). Earlier models failed to understand the complex relationship of factors behind urban growth. Besides, these projects were treated as part of an ongoing policy analysis and planning activity.

During the 1960s, efforts were made to understand the urban spatial pattern and processes through theoretical development and empirical testing. Behavioral models like Lowry's (1964) attempted to describe the decision making processes of individual households and developers. The Lowry model and its derivatives comprised the largest class of urban simulation models. The procedure of the Lowry model involved use of the location of a "basic" employment assumption about work-trip behavior in order to generate a spatial distribution of residences of the employees in the "basic" employment sectors that included manufacturing, wholesale trade, government sectors, etc. Household

allocation was explained as the function of accessibility to employment. Lowry's model and its derivatives (Crecine 1964, 1968; Goldner 1968) proved to be too static when applied to the real world cases.

Urban analyses pertaining to pattern and processes of ex-urban development, socioeconomic characteristics and residential preferences, became noticeable in 1960s. Contribution of highways and commuter trains to sub-urban sprawl was recognized (Adams 1969, Hughes 1975). The urban sprawl was further reinforced by middle-class aspiration of suburban housing, and a tendency to move away from the central city (Patel 1980).

According to Sargent (1972), "it is increasingly accepted that the geographic analysis of an urban area is also best carried out within a conceptual framework that is capable of providing insight into the pattern, timing, and processes of urban growth; that there is need for nomothetic studies concerned with the formulation of generalizations about the forces behind the spatial aspects of urban growth to supplement earlier ideographic studies aimed at discovering what is "unique" about individual cities or districts within cities." In search for generic and universal factors, Sargent advocated that the growth of residential settlements - their location, physical extent and mode of occupation - is due to nesting of spatial factors, occupational factors and temporal factors. Furthermore, he suggested three spatial entities: the transportation frame, which creates the corridor for potential settlement; the speculative realm that determines the rate and extent of land occupance and finally, the settlement sphere or the actual occupied land.

Expansion of transportation combined with increasing affluence and demographic

shift continued to influence urban land use pattern during late 1970 and the early 1980s. Goodman (1978) commented that 1 out of 20 moves from the central city to the suburb was motivated by neighborhood considerations of schools, race or crime, while dwelling needs or changes in marital status continued to be the prime factor behind most of the residential moves. Some authors even noted a reversal in intra city migration as a result of gentrification and inner city renewal (Voith 1996).

Goodman's study noticed the white flight as a hallmark of urban development. It did not specifically point out as to whether the white flight was racially motivated or was due to employment and housing opportunities in the suburbs. It was noted that the white flight was largely a response to deteriorating economic and environmental conditions within central cities. In general, moves within metropolitan areas seemed to be housing-related, whereas long-distance moves were motivated by employment considerations. However, it had not been established whether the shift in migration was an established pattern or just an accident.

During 1975-1990, numerous studies focused on the intra-city migration and its land use implications (Beale 1975, Berry 1976, Vining and Strauss 1977, Hall and Hay 1980, Hall 1985, Champion 1989, Frey 1989, Pivo 1990, Hay 1990, Goodchild 1990). Some of the explanations of the emerging trends in urbanization cited in these studies included changing pattern of urban employment, changes in socio-demographic structures such as family size, marriage pattern, increasing affluence and changing life-style preference; better living conditions in small towns; transportation, and government policies. Gappert (1985) identified the following transitional phases: industrial to

postindustrial; material flows to information flows; modern to postmodern; mechanical to electronic; public welfare to privatism; compact to spread metropolitan, and monocentric to polycentric, in which a city was most likely to fall. Of these cases, transition from industrial to postindustrial and from modern to postmodern received the maximum attention. The concept of postmodernism (Harvey 1989) and postmodern design of cities added a new dimension to the urban analysis. Knox (1991) probed into the radical changes that occurred within the cities as a result of interplay of various economic, social, political, and cultural forces shaping the transition from capitalism to advanced capitalism.

In general, the 1980s witnessed a more practical and comprehensive approach to urban land use. Carr and Duensing (1983) expressed land use as a dynamic, interacting system and highlighted the profound impact of urban transportation and rapid rail transit on the location and distribution of residential areas in big cities. Thrall (1987) stated that the consumption of land is inversely related to a household's access to the central location. According to Thrall, population density increases directly in proportion to the proximity to the central location. The quantity of land consumed increases at an increasing rate, away from the central city. Because of transportation costs, households at more remote locations have lower disposable income than households at locations more proximate to the Central Business District (CBD). When there is substantial income or welfare inequality, the high-income residential areas tend to be located at the city center. On the other hand, if the ratio of rich households to poor is larger, the high-income areas are located at the urban margins. The more remote a location from the central city, the greater change in land rent and population density following a change in the means of

transportation. Furthermore, taxes such as property, sales, and income have significant effect on the occupance of land by the individual residences.

Fujita (1989) presented the basic theory of urban land use with reference to residential location and city size in a unified framework of the static theory of residential land use and city size. This theory assumed that land prices and rent per unit of land are constant over time and that the choice of residential units is based on basic factors such as accessibility, space, and environmental amenities, besides budget and time constraints. Using mathematical models it was suggested that in a monocentric city, the wage-poor will tend to reside close to the city center, followed by the middle-income group, and finally, rich households with large families and few commuters will reside in the outermost zone.

Most of the land use studies, particularly the earlier ones, had a holistic approach. Very little attention was paid to the pattern and processes of residential areas. As Robson (1979) pointed out the housing problem came within the purview of Geography very recently. Kirby (1983) noted that until the early 1970s, housing was a much neglected aspect of urban geography. Bassett and Short (1980) observed the different approaches to the study of residential land use including the earlier holistic approach and suggested a four-fold classification.

Bourne (1981) observed eight different areas of research in urban housing which varied in scale, subject matter, philosophy and methodology. Kivell (1993) studied the current trends in urban land use and noted that the pattern of land use is determined by several economic, technological and social changes. He noted that economic forces are

the most powerful ones shaping the structure and land use of urban areas. However. social factors do play a decisive role when old economic influences fade, particularly in affluent societies. According to Kivell, housing choice is the most obvious way in which social preferences are translated into a land use influence.

Urban Areas and Education

Significant works have focussed on the relationship between urban areas and the quality of schools education. Most of these efforts came during the late 1960s and early 1970s when deteriorating urban areas saw a decline in the quality of education offered by urban schools. These studies tried to assess the impact of urban crises on school districts and education quality.

Kerber and Bommarito (1965) noted that mass population shifts have made the urban school districts essentially composed of "culturally disadvantaged" children. Jacobi (1960) noted that suburban school districts have excellent educational programs and capable teachers. Some suburban communities are preplanned and designed to attract people of high-income group who pay handsomely for their schools. Zintgraff (1960) similarly noted that the rapid migration from city to suburbs has changed the neighborhood which, in turn, has changed the school systems by altering the financial resources available. During 1970-1980, major efforts were focussed on improving the quality of education and evaluating the success of measures taken to improve the efficiency of school systems. Dissatisfaction toward rigid school district boundaries, that restricted peoples choice of school was reflected in the writings of the late 1980s and early 1990.

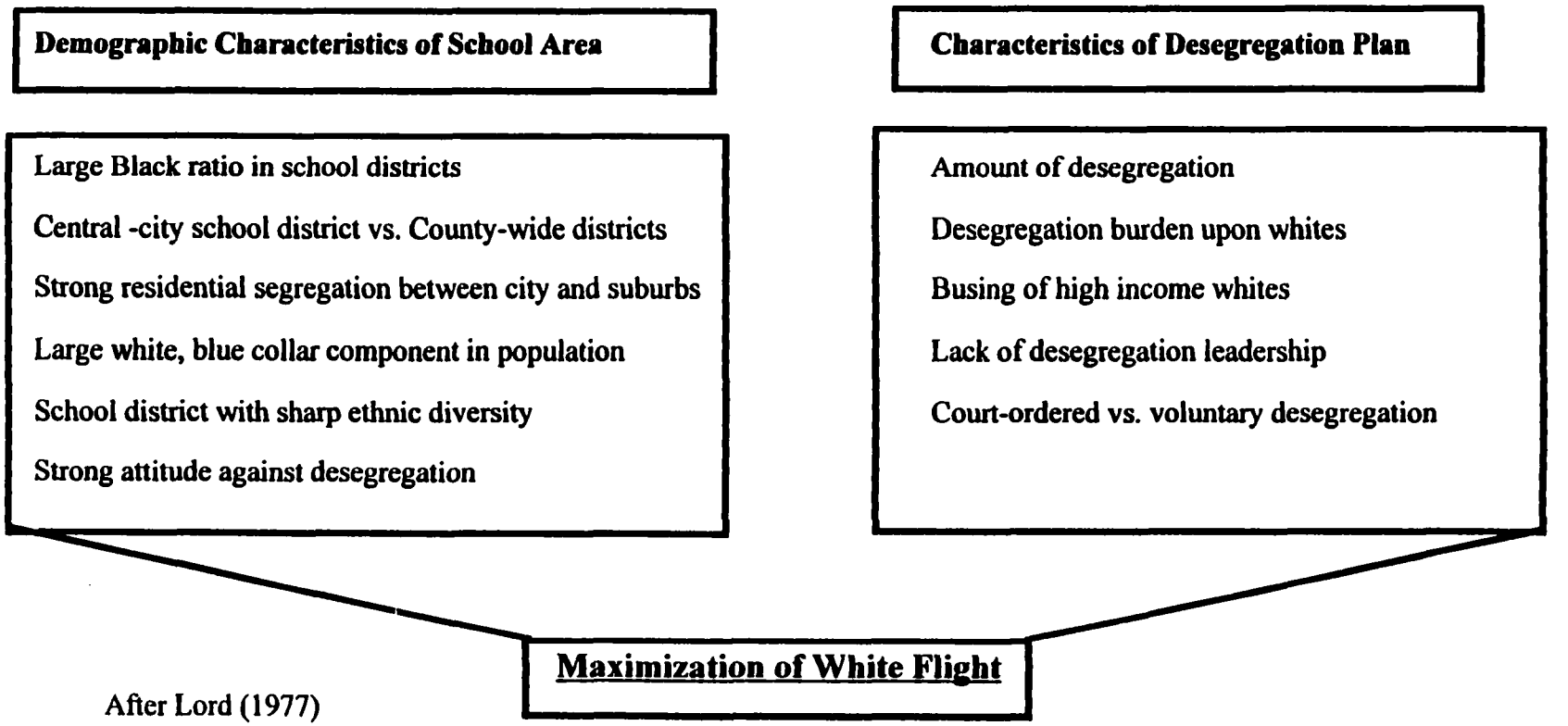
One significant policy issue that brought the question of quality education to limelight in the 1960-70s, was that of bussing students for desegregation purposes. As Hayes (1981) noted that bussing for desegregation had shaken the foundations of American education. On this policy citizens and media expressed their concern as regards the safety of students, quality of instructional programs, and freedom of choosing schools. These concerns eventually speeded the white flight i.e., decisions of the white population to leave a school district that had a desegregation plan already implemented or to be implemented in the near future. Such a tendency did trigger the process of suburbanization. Hawley et.al (1983) noted that late 1960s and early 1970 was the period of greatest desegregation activities and most of the white flight occurred in the period immediately prior to and during the first year of implementation of a comprehensive desegregation plan. Coleman (1975) observed that desegregation had accelerated the decline in number of white students. However, Coleman's finding was challenged on the ground that the sample was designed to show maximum impact of desegregation on white loss (Farley 1975, Pettigrew and Green 1976).

Lord (1977) noted the possibility that the desegregation plan stimulated residential relocation decisions as white households sought to avoid undesirable school assignments for their children. However, he added that the impact of desegregation and white flight had significant regional variation. Areas with a higher concentration of African American population recorded a greater magnitude of white flight (Pettigrew and Green 1976).

However, white flight itself was an outcome of several factors (Figure. 2.1). It was a manifestation of demographic and policy issues such as racial composition of population,

Figure - 2.1

FACTORS INFLUENCING WHITE FLIGHT



After Lord (1977)

defacto residential segregation, ethnic diversity within school districts, income distribution, and voluntary v. forced desegregation. The magnitude of white flight varied following variation in these demographic characteristics and their combination with the policies of desegregation.

By late 1980s, the difficulties involved in defining and quantifying the quality of education were widely accepted. In the context of institutes of continuing education, Freedman (1987) observed that there is no consensus among educators regarding the definition of quality. With reference to the institute of higher education, Bogue and Saunders (1992) pointed out certain conceptual assumptions held by academics and laymen regarding quality. They pointed out that cost, resources, and national recognition continue to be used as the yardsticks of quality. Much of the earlier discussions focused on quality in corporate sectors (Crosby 1984, Garvin 1988). Astin (1985, 1991) advocated four conventional views of excellence as measures of quality: reputation, resources, outcomes, and contents.

Cookson (1994) observed the growing dissatisfaction with the public school system as the cause of "school choice" movement. He comments that since 1980s, school choice movement has become a crusade for people who believe that there cannot be educational justice and innovation in the absence of educational liberty. It is thus a grass-root movement similar to other social movements such as gun control, abortion rights and school prayer. With the implementation of the school choice plan it will be possible for students to attend schools outside their district, city, or town which will have profound effects on student assignment policies and education.

Earlier, Du Pont (1991) noted that declining education quality in public schools on the one hand and rigid school district boundaries on the other have resulted into increasing discontent. Furthermore, he suggested a five point plan that would lead to an educational choice and correct what he called a "bureaucratic logjam that impeded the school system." Du Pont proposed that school districts should give parents the right to choose the public or private schools that their children would attend. Du Pont's study also suggests that people may move out of a school district, if they can, to gain access to better educational programs and facilities somewhere else.

Urban Studies and Remote Sensing

Remote sensing has increasingly been used as a tool for monitoring and mapping urban land use and land use change. Aerial photography in its different forms such as black and white, color and thermal infrared, has been the oldest among remotely sensed data applied for land use studies (Tuyahov et. al 1973, Reeves et.al 1976, Gautam 1976). Application of aerial photography in urban analyses has been based on certain image characteristics such as shape, size, shadow, texture, tone, pattern, site, and association. Tuyahov et. al (1973) detected urban blight using black-and-white and color infrared photography and identified 18 indicators on image signatures of various socioeconomic classes. The study concluded that because disadvantaged persons tend to concentrate in areas of substandard housing units, aerial remote sensing in combination with the ground-truth data allows relevant socioeconomic and demographic data to be extracted on individuals residing in poverty neighborhoods. In a similar study, Lo (1981) found that texture, tone, and pattern help interpretation of land cover, while association helps to infer

human activities, i.e. land use. Radar imageries have been used as another remote source of information. These are similar to aerial photography in terms of image characteristics such as tone, texture, pattern, shape, and association. An additional advantage of radar imagery over aerial photography is wider coverage. However, in terms of resolution, aerial photographs have a greater advantage. On the other hand, the advantage of radar sensor seems to lie in giving additional information by virtue of its exploitation of the microwave portion of the electromagnetic radiation (Lo 1986).

The most recent approach to land use analysis and mapping has been the application of satellite data. For land use mapping, the wide and repetitive coverage afforded by satellite is important with regard to the cost-effectiveness of collecting and ease of updating the land use data. Furthermore, computer-based digital analysis of data has made the interpretation easier and more accurate. This new approach requires integration of a base map such as topographic map, ground-truth, and may be aerial photography.

Lo (1981), used Landsat imageries for the production of land use maps of Hong Kong. Feasibility of land use mapping was evaluated on the basis of planimetric accuracy and accuracy of land use interpretation. Results showed that land use mapping of a small area can be carried out at a reasonable degree of planimetric and thematic accuracy at a certain scale. Urban change detection, i.e. monitoring and discerning changes within the urban system, has been a important area of interest. Most of the earlier studies integrated aerial photograph with satellite imageries to improve the resolution and to gather historical data (Gupta and Munshi 1985). A number of remote sensing applications in urban land

use studies have focused on urban fringe. The urban fringe is characterized by a conflict with competing demands for land from many types of development. Jensen (1982) applied Landsat MSS band 5 data to detect changes in the fringe area of Denver and developed heuristic model to identify stages of residential development through which a parcel of land may progress. One of the latest approaches in land use change detection has been the use of artificial intelligence or expert systems. This is done virtually automatically with very little human interaction. However, this technique is still in infancy. Morgan et al. (1992) integrated MSS data with radar imageries to study land use classification of central Spain. This produced a resolution of 20 meters against the original 80 meters. Satellite data integrated with GIS (Geographic Information System), is emerging as the valuable tool for analysis of regional, urban and suburban land use studies. Once incorporated into a GIS database, areas can be measured and the spatial distribution of growth pattern can be analyzed. Ehler (1990) showed that merged SPOT multispectral and panchromatic data can be effectively used in a GIS environment to routinely map and monitor land use changes. They indicated an integration of image processing and GIS technology for comprehensive land use planning. Harris and Ventura (1995) used integrated GIS and Remote Sensing techniques to improve the accuracy and specificity of a land use classification from Landsat TM imagery for nonpoint source pollution in Beaver Dam, Wisconsin. Their study found an increase in the number of identifiable classes as well as improvement in the accuracy of classification.

A review of previous works indicated that the impact of expanding transportation and improved accessibility on land use has widely been established. The importance of

choice and preferences regarding amenities, particularly housing, has been recognized as a factor influencing land use. Education and the quality of schools seem to be significant amenities that may influence an individual's decision regarding residential location. This has a potential to be translated into land use. Studies on the aspects of residential location have focused on factors like transportation, employment, land-rent, open space, and environment, etc., which may influence an individual's choice of residential location. However, quality of school as a factor in residential choice has not been studied so far in urban geography. This research, thus, will examine the growth of residential areas in the fringe of Oklahoma City MSA and test the hypothesis that residential areas in good quality school districts are growing faster than those in relatively poorer school districts. Change in residential land use will be monitored with the help of satellite imageries.

Chapter 3

RESEARCH DESIGN AND METHODOLOGY

This research is based on the assumption that people's choice of residential location is influenced by the quality of school districts and that good quality school districts are growing faster than the ones that are perceived to be not so good. In order to test this hypothesis, the 18 school districts have been classified into one of eight different categories. This scheme of classification conforms with that of the Oklahoma State Department of Education. However, measurement of quality and classification methodology used in this research are not the same as those used by the State Department of Education. In the present study, a different set of variables and methodology have been used that replicate the classification adopted by the State Department of Education. It was required to measure the pattern of residential growth so that pattern and trend in residential growth can be classified and compared with the school district quality. The residential growth pattern in 18 school districts was measured and arranged into one of eight categories in the same order as the classification scheme adopted by the State Department of Education. Rank one thus indicates the highest growth rate, while rank eight represents the lowest rate of growth in the number of occupied residential units. This chapter explains research design with reference to data, techniques of analysis and methodology. The important components of this research are: quantitative analysis of

quality of school districts, analysis of pattern and trend in residential growth, integration of results obtained from the analyses of school district quality and residential growth, and interviews and survey of real estate agents. This chapter presents a detailed description and the relevance of these components.

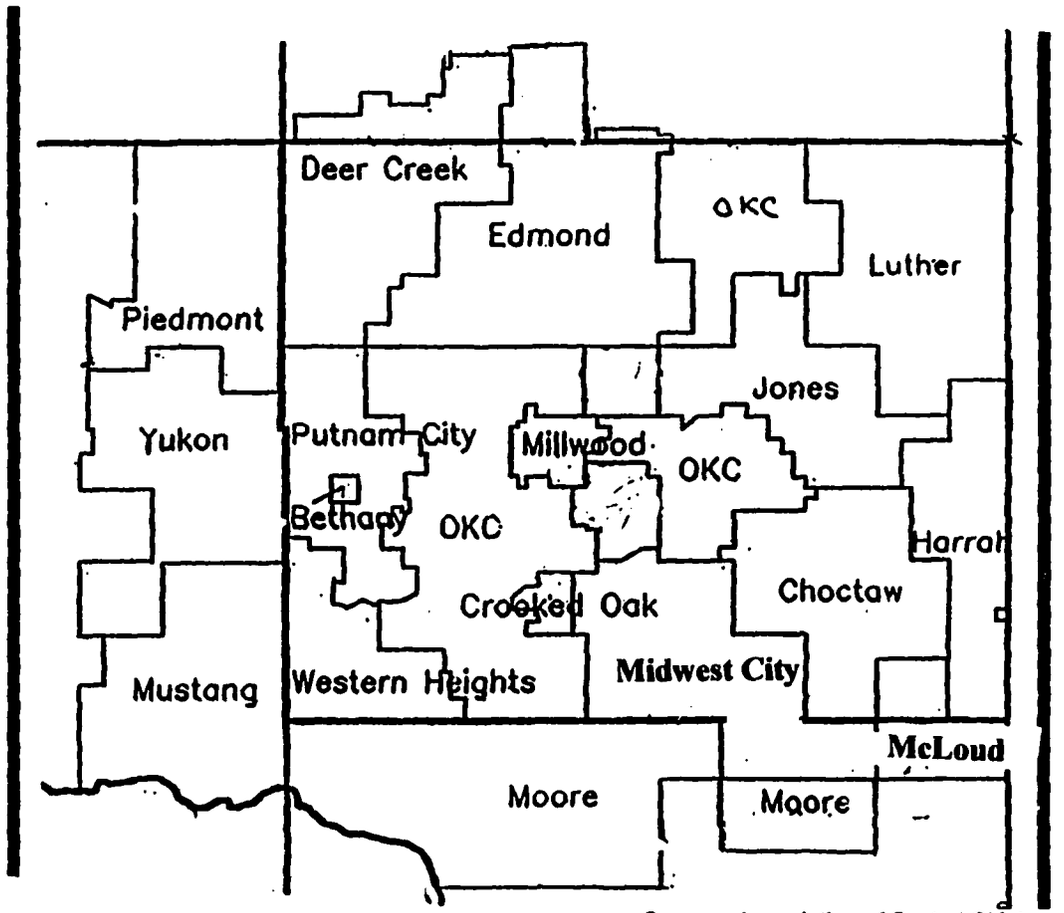
Analysis of School Districts:

The quantitative analysis of school districts measures and compares the quality of 18 public school districts of the Oklahoma City metropolitan area. It also examines the temporal variations in the quality of school districts. The objectives of quantitative analyses are twofold: to develop a methodology that will replicate the Educational Indicator Program developed by the Office of Accountability, Department of Education; and to measure spatial and temporal variations in the quality of school districts. The Educational Indicator Program started in 1990 and, therefore, classification of the quality of school districts is not available for prior to 1990. Thus it was necessary to replicate the classification of Educational Indicator Program so that a cluster of similar school districts may be identified using historic data. There are 25 public school districts within the Oklahoma City metropolitan statistical area (OKC MSA) out of which four are elementary districts, offering Kindergarden through Grade 7 (K-7). To maintain comparability, uniformity and consistency of data, these elementary districts have been excluded. Temporal variation is measured with reference to 1980-1981, 1984-1985, 1990-1991, and 1994-1995. (Figure 3.1) Quantitative analysis of school districts is based on the assumptions that school quality is different from educational quality. The quality of a school is measured by input factors such as- student-teacher ratio, per student

Figure 3.1

OKLAHOMA CITY AREA SCHOOL DISTRICTS

1994



Source: Association of Central Oklahoma Governments (ACOG)

expenditure, attendance rate, percent of teachers with advance degrees, and teachers' average years of experience. Quality of education is measured by output factors such as score on achievement tests, college-going rate, etc (Archbald 1996). In other words, the quality of school districts refers to the physical, financial and manpower resources, while the quality of education refers to the achievements and success rate of students. This work focuses on the quality of school districts as measured by input factors such as financial resources, teachers' experience, and percent of teachers with advanced degrees.

Much research has measured the significance of school quality on student achievement (Jacobi 1960, Kerber and Bommarito 1965, Coleman 1975, Hawley 1981, Cookson 1994). It is a separate issue whether a good quality school produces an equally good quality of education, and is outside the scope of this research.

The Oklahoma Educational Indicators Program was established in May 1989 following Senate Bill 183. Its provisions were eventually included in House Bill 1017, also known as the Oklahoma Education Reform Act. This Act was approved in April 1990 by the Governor of the State of Oklahoma. The twofold purposes of this act are:

1) to assess the performance of public schools and school districts, and
2) to report to students, parents and concerned publics the progress being made in meeting the provisions of the Educational Reform Act.

In accordance with the provisions of the Act, "the indicators authorized by the Reform Act have been compiled for the 1992-1993 school year separately for each school site, each school district and the entire state, to the extent that the applicable data is available for each of these entities. The reports prepared for each entity are contained in a

separate volume, under the master title of *Results 1993* (Oklahoma Department of Education)." The report contained school report, district report, and state report.

The State Report presents state-level results for the major categories of measurement along with a summary showing the progress made in complying with the Education Reform Act. The School Report includes achievements and writing test scores, enrollment figures, free-lunch eligibility data, teacher information, early childhood enrollment, dropout rate, ACT score and college-going rate. State averages were also presented to facilitate quick comparison. The District Report contains graphic representation of teacher characteristics, student outcomes, student achievements, and financial information pertaining to each school district. School districts were classified based on factors found to be important to student performance to facilitate reasonable comparison.

In the District Classification Method, all school districts are placed into one of eight classification groups. These groups are ranked so that group 1 represents the ***most advantaged*** district, while group 8 represents the ***least advantaged*** district. The propose is to create a grouping of similar school districts to facilitate equitable comparison between and among the various school districts. The following 21 variables were examined as indicators of school district quality by the State Department of Education .

1. Total enrollment
2. Total number of teachers
3. Average salary of teachers
4. Total number of school sites
5. Percentage of teachers with advanced degrees
6. Average attendance rate
7. Teachers' average years of experience
8. Drop-out rate

9. Expenditures on instruction
10. Expenditures on instructional support
11. Expenditures on district administration
12. Expenditures on district support
13. Expenditures on school administration
14. Expenditures on student support
15. Expenditures on transportation
16. Revenue from local sources
17. Revenue from state
18. Revenue from federal sources
19. Percentage of minority students
20. Percentage of students on free lunch
21. Percentage of students on special education programs.

In its methods, the Indicators Program included these variables in a multiple regression model that produced a weighted value for each variable in relation to studentachievement based on test scores from Iowa Tests of Basic Skills/Tests of Achievement and Proficiency (ITBP/TAP) mandated in the Oklahoma School Testing Program. Predicted scores were arranged in descending order, and groups were formed based on 1/2 Standard Deviation blocks, thereby identifying eight clusters (see Appendix- I)

It was necessary to replicate this classification so that a cluster of similar school districts may be identified using historic data. Since Educational Indicators Program was ratified in 1990, classification of school districts prior to 1990 was not available. This research problem required similar grouping of school districts for the years 1980-81, 1984-85, 1990-91, and 1994-95. It was not possible to use the same regression model as used by the Department of Education because of a lack of certain data for previous years. Care had to be taken to maintain the reliability and validity of the data. Any variable whose definition changed over the last 14 years, had to be excluded from analysis. For

example, the State Board of Regents started compiling districtwide data on the college going rate and scores on achievement tests only since 1989. Such data for prior years are available in piecemeal. Therefore, the purpose of replication was to provide data reduction, to select variables that define quality, and to select the most appropriate technique and procedure of classification of school district using historic data. Thus, the objective of replication was to develop a method that presents similar results as the Multiple Regression Model of Indicators Program using data that has been available since 1980.

Initial diagnostic univariate analysis indicated remarkable spatial variation in ethnic composition and student performance. The distribution of the ethnic population was found to be typical of a metropolitan area with a relatively higher concentration of minorities in the central part. A correlation analysis indicated that student performance as reflected on ACT scores is negatively associated with the percentage of minority students. (Table 3.1)

A contextual analysis of this correlation is required along with socioeconomic variables such as household income, parental motivation and incentives. Multiple regression was performed after controlling the "minority" variable to detect other factors that may account for variance in student performance. A forward selection method of regression analysis listed five significant variables - - expenditures on student support, dropout rate, expenditure on district administration and total number of teachers. Results from this analysis were inconclusive and could not be applied since the definition of the dropout rate has changed over the years.

Table 3.1

Minority Students and Indicators of Achievement

Variable	r- value	Significance
ACT	-.83	.001
TAP12th	-.55	.01
TAP7th	-.81	.001

TAP12th = Test of Achievement and Proficiency 12th Grade
TAP7th = Test of Achievement and Proficiency 7th Grade.

This table indicates the correlation between two variables namely- minority students and scores on achievement tests.

Discriminant Analysis was used to analyze the sample data. In this case- ranks 1 through 8 were taken as grouping variables. The output reproduced 1993 classification with 100% accuracy. The discriminant variables were extracted by the Wilks and Rao methods of stepwise selection. This was required to remove the redundancy in the data set and to select the most significant variables on the basis of their discriminating power. In the stepwise selection method, a single variable with the highest value on selection criteria is entered into the computation and is paired with the next important variable until all significant variables are selected. At each step, the previously selected variable is collectively examined and is retained only if it maintains its significance as a discriminating variable. Any variable that loses its significance in conjunction with other variable is considered redundant and is discarded .

Despite larger similarities, the selected variables are not exactly the same, and the order of selection is different (Table 3.2). This is because Wilks' method selects a variable that maximizes the 'F' ratio as a measure of group discrimination. This selection method focuses on the difference between and homogeneity within groups. Rao' s method, on the other hand, measures distance between groups. In Rao's method, a variable is retained on the basis of whether it contributes to the maximum separation of the groups.
(see Appendix II- Summary Statistics)

Further data reduction was required since two variables, namely ACT Scores and College-Going Rate, were not available for prior to 1989. Similarly, reliability of information on teacher's salary became questionable in light of the inflation rate over the past years.

Table 3.2

Selection of Variables

WILKS	RAO
Local Revenue	Local Revenue
ACT Score	ACT Score
Students on Mid-day Lunch	Other Expenditures
Other Expenditures	Dropout Rate
Attendance Rate	State Revenue
Teachers Average Experience	Expenditure on School Administration
Dropout Rate	Expenditure on Student Support
Expenditure on School Administration	Teachers Average Salary
Expenditure on District Administration	Expenditure on Institutional Support
Percent Teachers with Advanced Degrees	Students on Mid-day Lunch
Students on Special Education	Attendance Rate
Total Enrollment	
College-Going Rate	

Table 3.2: Selection of variables by Wilks and Rao Methods of Discriminant Analysis.

However, expenditure and revenues were calculated as percentage of total expenditures and total revenue, hence these could be compared. Thus, based on continuity, comparability and reliability of available data, the following nine variables were selected that reflected teacher's characteristics, students' characteristics, and financial characteristics of the school districts under consideration:

1. Full-time equivalency teachers.
2. Teachers' Average Years of Experience
3. Percentage of Teachers with Advanced Degrees
4. Attendance Rate
5. Special Students
6. Local Revenue
7. Administrative Expenditures
8. Instructional Expenditures
9. Expenditures on Plant and Management

Using these nine predictor variables, a discriminant analysis was perfomed on 1994 indicators that were classified with 80% accuracy. The remaining 20% of misclassified cases fell within the second highest probability group. This presented sufficient reliable results for further application of this procedure to classify school districts using data prior to 1989.

Analyses of Patterns and Trends in Residential Growth:

Landsat TM and IRS-1B satellite imageries have been used to collect a holistic picture of growth pattern since it was difficult to discern the amount of change and net change in the number of residential units using satellite imageries as the primary source of information. Residential land use change detection during 1983-94 has been studied with the help of Landsat TM dated August 8, 1983 Bands 1 through 4 (Figure 3.1) and IRS1B dated August 12, 1994 Bands 1 through 4 (Figure 3.2).

LANDSAT TM

Figure 3.1 LANDSAT TM
Acquired in August 1983, the Oklahoma City Metropolitan Area is shown in RGB combination of Bands 3,2 and 1.

IRS- 1B

Figure 3.2 IRS-1B
Acquired in August 1994, the Oklahoma City Metropolitan Area is shown in RGB combination of Bands 3,2 and 1.

Each of these imageries has been georegistered with a low RMS error of less than 0.20 of a pixel. The pixels have been resampled to a uniform size of 25 meters by 25 meters. Supervised and unsupervised classification algorithms have been applied to each of these imageries to classify the housing areas and residential land use zones. Three areas of residential land use have been identified as high density, moderate, and low density housing areas.

Change detection is analyzed through band ratioing and post-classification comparisons. Band subtraction of 1983 imagery from the 1994 imagery indicated the areas of new housing. The analyses is primarily based on census data collected from the report on Housing and Population characteristics for the Oklahoma City MSA for 1970, 1980 and 1990. These reports have been used to calculate net change in the number of occupied residential units and the median value of residential units. Since the school district boundaries did not exactly match with the census boundaries, information had to be collected for each census tract within the school district The census tracts were aggregated to get the district wide total for occupied residential units and the median value of occupied units over different time periods. Another problem associated with these data was that census tract boundaries have not remained the same over the time period. Each decade registered some modifications in the census boundary, therefore following the guidelines from the Bureau of Census, required adjustments were made before calculating data on housing pertaining to each school district.

(see Appendix-III)

Integration of Results:

Both residential areas and school districts have been categorized into eight groups. Rank one in district quality represents the most advantageous while rank eight represents the least advantageous among all school districts. Similarly, regarding residential growth, rank one represents the district with the highest growth rate while rank eight represents the district with the lowest growth rate. The classification of residential areas is based on a decadal growth in the number of total occupied housing units within each school district. Median and quartile deviations have been used as classification criteria and for ranking the 18 districts into one of eight categories. A Spearman's Rank Correlation also has been calculated to find the relationship between residential growth pattern and school district quality. Similarly, based on median and quartile deviation, value of housing units in each school district has been classified into eight categories, and a rank correlation analysis was used to find if the two are significantly correlated.

Interviews and Survey with Real Estate Agents:

Housing choice is based on an individual's perception. It is a subjective evaluation of various factors such as neighborhood quality, utility services, proximity to place of work, accessibility, and cost of housing, etc (Johnston 1971). In this case study, it was important to investigate the actual behavior pattern and importance of school districts as a perceived factor. The proposed work is based on analyses of information obtained through secondary sources. Since the research problem falls within the subject matter of human behavior, it is important to test the accuracy of results obtained from such analyses. Structured interviews with real estate agents were conducted. The objectives of these

interviews was to findout whether school district has been important factor in making residential location decisions. If people are not aware of the Educational Indicator Program, how do they perceive school district quality? Finally, the interviews also inquired about other factors that influence decision making as regards housing choice and residential relocation.

Chapter 4

COMPARATIVE PROFILE OF SCHOOL DISTRICTS IN THE OKLAHOMA CITY METROPOLITAN AREA

Of the 551 school districts in the state of Oklahoma in 1994, 18 districts that fall within the metropolitan area of Oklahoma City have been selected for further analysis and quality assessment. The elementary-only school districts have been excluded in order to maintain consistency and comparability of data. In this chapter a comparative analysis of these 18 school districts has been presented along with temporal variation and trends in quality indicators. Temporal variation has been measured over a period of 14 years (1980-1994), and the analysis is based on published and unpublished data from the Office of Accountability, Department of Education, State of Oklahoma. The comparison is based on the following variables as selected by discriminant analysis:

1. Full-time Equivalency Teachers: This refers to the classroom full-time equivalency teachers (FTE), in all grades rounded to the nearest whole number.

2. Experience: Teachers' average years of experience obtained by dividing the total years of experience for classroom teachers by the classroom FTE.

3. Advanced Degree: Percentage of teachers with advanced degrees (Masters and above),calculated by dividing the total number of FTE teachers with advanced degrees by the total classroom FTE teachers.

4. Attendance Rate: Attendance rate obtained as percentage by dividing the average daily attendance (ADA), with average daily membership (ADM).

5. Special Education Students: This refers to students in special education listed under nongraded (NG), ungraded (UG), and special education (SE), calculated as percentage of total ADM.

6. Local Revenue: Revenue from local sources, county, and ad valorem funds calculated as a percentage of total revenue from local, state, and federal sources.

7. Administrative Expenditures: Expenditures on general administration measured as a percentage of total general fund expenditure.

8. Instructional Expenditures: Expenses on instructional activities measured as a percentage of total general fund expenditures.

9. Operational Expenditures: Expenditures on plant and management calculated as a percentage of total general fund expenditures.

A univariate analysis of the selected variables indicated that the average years of teachers' experience for the 18 school districts was 7.15 years, which increased to 11 years in 1994. Piedmont registered a declining trend between 1990 and 1994, while Bethany remained stable (Table 4.2; Figure 4.1). Three districts of Yukon registered the highest (13 years) followed by Crooked Oak, and Oklahoma City (12 years each). Yukon and Oklahoma City are two of the older school districts in the state hence the average years of teachers' experience seem to be high in these districts. It also indicates that fewer teachers have changed jobs or moved out of the district.

The number of full time equivalency (FTE) instructional staff conforms with the size of the districts. The maximum number of instructional staff (FTE) is in the Oklahoma City school district which is also the largest school district in terms of enrollment. (Table 4.3) This variable (FTE) may be a significant measure of school district quality when calculated as a ratio of total enrollment. Smaller student-teacher ratio reflects upon, better attention to individual better district quality as it facilitates better control of

Table 4.1
Basic Statistics

Variable	Unit	Mean	Std.Dev	Min	Max
ADMEXP80	Percent	4.02	1.27	1	6
ADMEXP84	Percent	4.73	2.72	1	15
ADMEXP90	Percent	4.09	1.52	2	7
ADMEXP94	Percent	4.08	1.53	2	7
ADV80	Percent	39.52	9.48	20	62
ADV84	Percent	42.39	7.92	26	52
ADV90	Percent	43.35	9.71	24	61
ADV94	Percent	37.38	8.46	20	48
ATTEND80	Percent	94.49	1.62	92	97
ATTEND84	Percent	94.38	1.38	91	97
ATTEND90	Percent	95.32	1.26	92	98
ATTEND94	Percent	94.8	1.13	92	96
EXPER80	Year	7.15	1.03	5	9
EXPER84	Year	8.49	1.02	7	10
EXPER90	Year	9.69	1.01	8	12
EXPER94	Year	11	1.38	8	13
FTE80	Number	370.48	607.82	26	2626
FTE84	Number	384.1	588.91	45	2531
FTE90	Number	418.38	604.17	54	2471
FTE94	Number	399.1	567.45	47	2261
INSTEXP80	Percent	59.95	13.36	4	69
INSTEXP84	Percent	61.26	4.59	50	70
INSTEXP90	Percent	66.11	2.66	60	71
INSTEXP94	Percent	64.3	2.87	57	70
LOCALREV80	Percent	27.3	10.25	13	47
LOCALREV84	Percent	28.69	8.88	16	46
LOCALREV90	Percent	27.75	10.19	13	55
LOCALREV94	Percent	29.16	9.94	5	47
OPEXP80	Percent	11.14	2.42	8	17
OPEXP84	Percent	12.28	2.55	8	18
OPEXP90	Percent	9.03	1.45	6	12
OPEXP94	Percent	9.52	1.92	7	14
SPECIAL80	Percent	1.41	2.26	0	9
SPECIAL84	Percent	1.54	2.35	0	10
SPECIAL90	Percent	0.43	1.39	0	6
SPECIAL94	Percent	0.39	0.54	0	2

Key:

ADMEXP	Administrative Expenditures	ADV	Advanced Degree
ATTEND	Attendance Rate	EXPER	Teachers' Experience
FTE	Full-time Equivalency Teachers		
INSEXP	Instructional Expenditures	LOCALREV	Local Revenue
OPEXP	Operational Expenditures	SPECIAL	Special Education Students

Table 4.2

Teachers' Average Years of Experience By School Districts

District	1994	1990	1984	1980
Bethany	8	8	9	8
Choctaw	11	10	7	7
Crooked Oak	12	12	9	7
Deer Creek	10	9	8	5
Edmond	10	9	8	7
Harrah	11	10	9	9
Jones	10	9	7	7
Luther	11	8	7	7
McLoud	11	9	7	6
Midwest City	13	10	10	9
Millwood	11	10	10	7
Moore	11	10	9	7
Mustang	11	10	8	7
Oklahoma City	12	10	10	9
Piedmont	10	11	8	7
Putnam City	11	10	10	9
Western Heights	12	11	9	7
Yukon	13	12	9	7

Average years of experience is obtained by dividing the total years of experience for classroom teachers by the classroom FTE.
(Based on data obtained from Oklahoma State Department of Education)

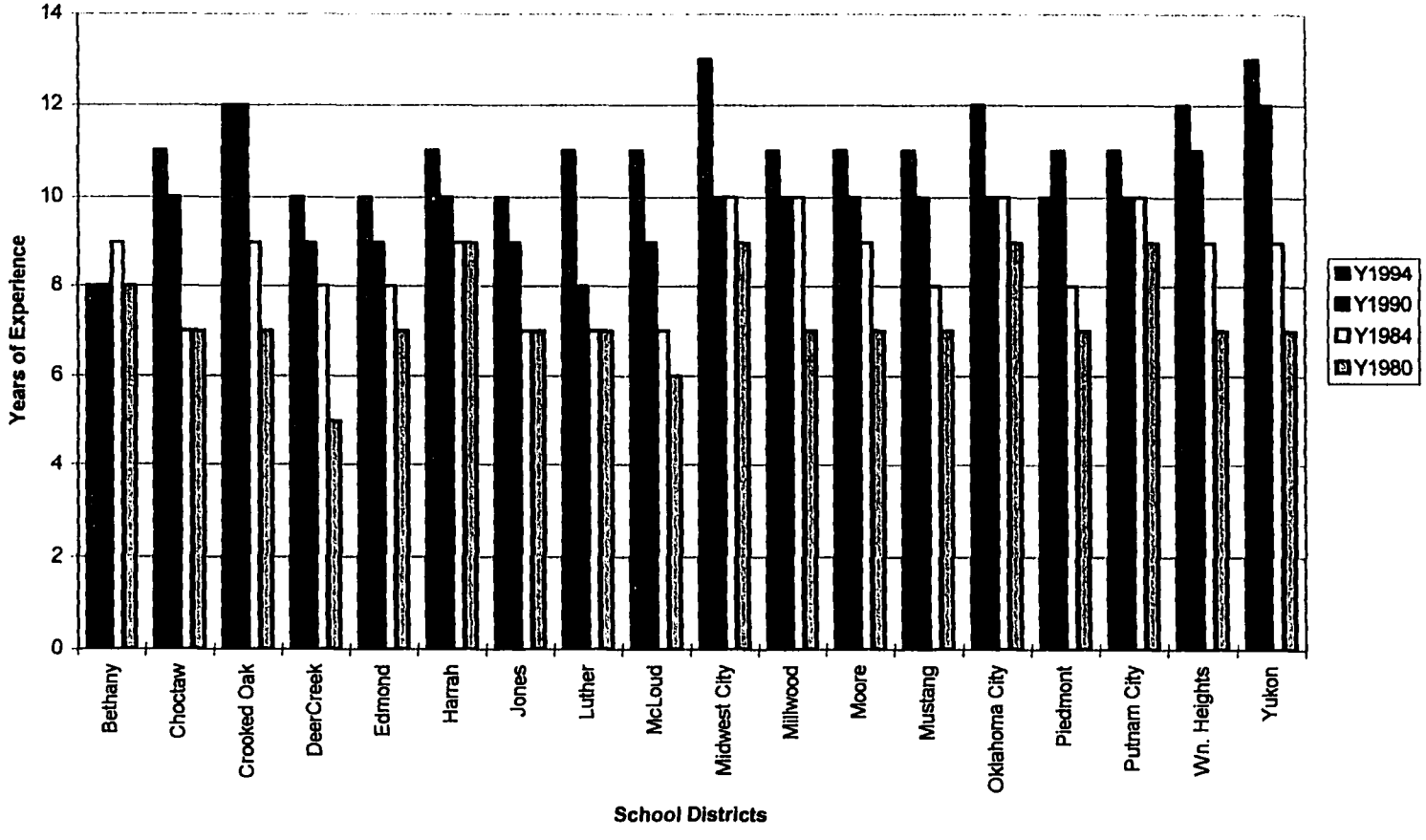


Figure 4.1: Teachers' Average Years of Experience By School Districts. 1980-1994

Table 4.3

Number of Full-Time Equivalency Teachers
By School Districts

District	1994	1990	1984	1980
Piedmont	64	65	65	59
Yukon	328	327	360	333
Mustang	323	334	275	223
Moore	1113	1094	890	912
Putnam City	1175	1195	1086	1054
Luther	47	56	47	32
Choctaw	285	305	278	220
Deer Creek	64	59	59	53
Harrah	127	135	130	117
Jones	73	79	65	56
Edmond	873	812	591	467
Millwood	71	71	78	75
Western Height	201	212	232	220
Midwest City	942	1057	949	949
Crooked Oak	55	54	65	69
Bethany	58	59	48	53
Oklahoma City	2261	2471	2531	2626
McLoud	109	120	103	83

Full-time equivalency teachers (FTE) in all grades by school districts, rounded to the nearest whole number.
(Based on data obtained from Oklahoma State Department of Education)

classrooms needs and more opportunity for classroom participation (Harrison 1994).

The percentage of teachers with advance degrees has a fluctuating trend and does not have a clear pattern (Table 4.4; Figure 4.2). The average for 1994 was 37.38 percent while the average for 1990 and 1984 was 43.35 and 42.39 percent respectively. Thus, more than a third of school teachers in these districts had qualifications beyond a Bachelor's degree. However, this does not conform with the state average. The state average for this indicator has registered a declining trend in recent years, which has happened due to an increase in the number of young entry-level teachers with bachelor's degrees.

Table - 4.4

Percent of Teachers with Advanced Degrees

By School Districts

District	1994	1990	1984	1980
Piedmont	33	52	35	36
Yukon	35	46	46	37
Mustang	32	43	47	44
Moore	37	44	47	38
Putnam City	40	48	52	50
Luther	46	34	41	31
Choctaw	23	34	31	28
Deer Creek	..46	44	42	42
Harrah	48	61	52	62
Jones	34	47	37	31
Edmond	43	51	50	50
Millwood	42	48	50	45
Western Height	47	60	50	45
Midwest City	48	51	48	43
Crooked Oak	38	35	42	35
Bethany	31	36	44	42
Oklahoma City	40	43	50	48
McLoud	44	48	37	29

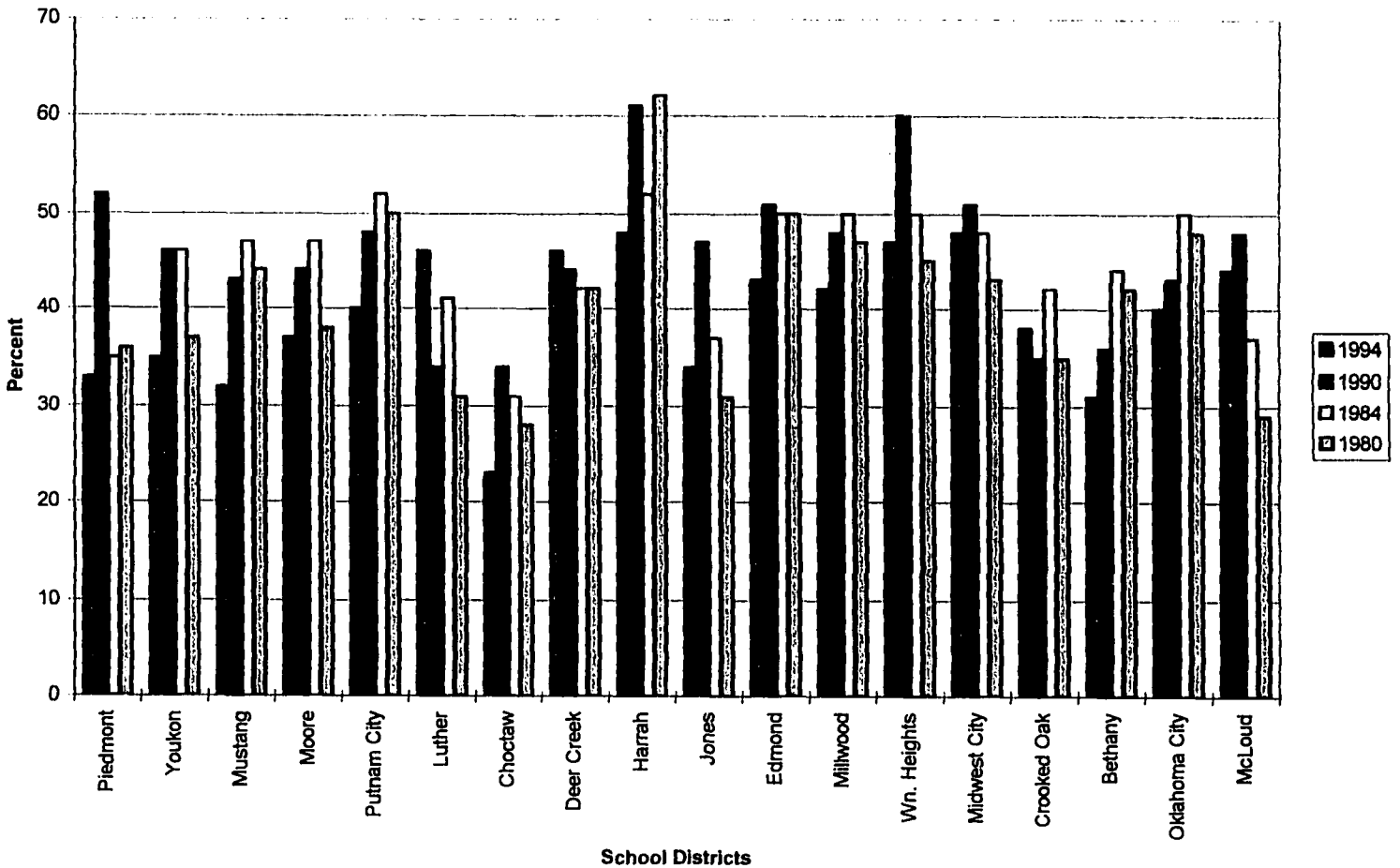


Figure 4.2: Percent of Teachers With Advanced Degrees. By School Districts. 1980-1994

The average attendance rate has remained consistent over the study period and is uniform throughout the district. Those that registered improvements in the attendance rate over the past 14 years are Edmond, Mustang, Choctaw and Bethany. The highest attendance rate for 1994 was 96 percent recorded in the districts of Piedmont and Luther. In 1980, the highest attendance rate of 97 percent was recorded in four districts, namely- Luther and Millwood (Table 4.5 Figure 4.3). Oklahoma City school district has consistently recorded a low attendance rate. Normally, student absence is caused by illness or an unavoidable situation at home. However, a higher absence or low attendance rate may reflect on other underlying factors such as ineffective teaching, poor curriculum or poor administration. (Harrison 1991).

Table - 4.5
Average Daily Attendance Rate By School Districts
1980-1994

District	1994	1990	1984	1980
Piedmont	96	96	95	96
Yukon	95	96	95	95
Mustang	95	95	94	94
Moore	95	96	94	94
Putnam City	94	96	96	96
Luther	96	97	96	97
Choctaw	95	95	94	93
Deer Creek	96	96	96	94
Harrah	95	98	93	94
Jones	94	95	95	93
Edmond	95	95	95	95
Millwood	95	96	97	97
Western Height	92	94	93	93
Midwest City	95	96	94	94
Crooked Oak	93	93	93	92
Bethany	95	95	93	93
Oklahoma City	93	92	91	92
McLoud	94	95	94	94

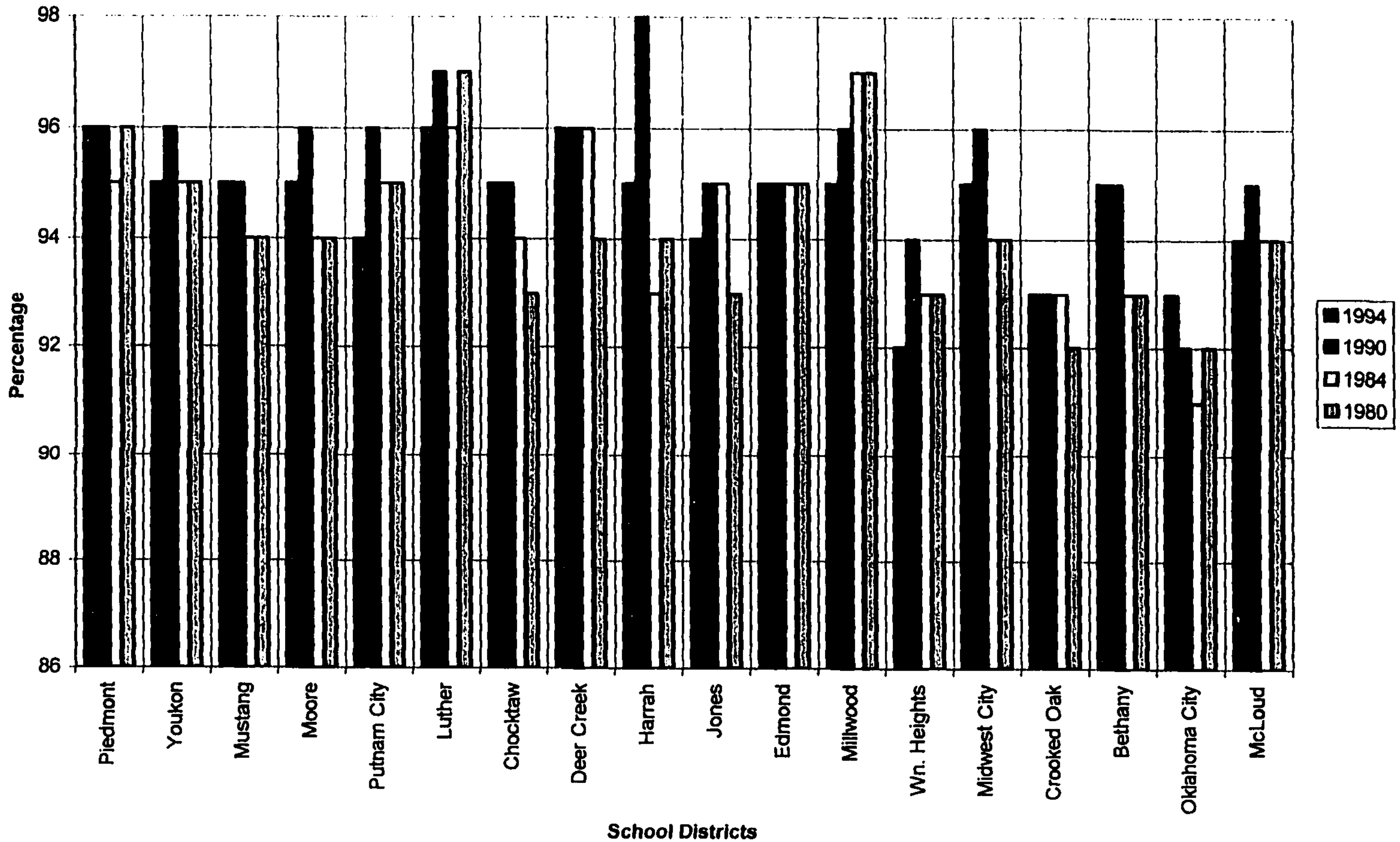


Figure 4.3: Average Daily Attendance By School Districts. 1980-1994

On average, the 18 school districts earned 28.2 percent of their revenue from local sources. In 1994, the Oklahoma City district earned only 5 percent of its total revenue from local sources (Table 4.6; Figure 4.4). This reflects on the poor local tax base of the city. In recent years the Oklahoma City school district has been receiving a higher percentage of financial resources from the federal and state sources. On the other hand, districts that collected more than 40 percent of total revenue from local sources were Edmond (47%), Crooked Oak (42%), and Putnam City (40%). Of these three districts Edmond and Putnam City have a higher income level and better local tax base as compared to Oklahoma City. However, in 1994-95, the Oklahoma City school district recorded a higher per-student expenditure than the Edmond school district.

Instructional expenditures have increased from an average of 59.95 percent of the total expenditure in 1980 to 64.30 percent in 1994. Districts that registered consistent increase during this period are - Midwest city, and Western Heights (Table 4.7). This reflects on efforts to improve instructional qualities.

Overall, the number of students in special education has declined from an average of 1.41 in 1980 to 0.39 in 1994. In the last year (1994), special education students were registered in only four districts: Putnam City, Choctaw, Western Heights and Bethany (Table 4.8). This decline is due to a current policy that does not support special education.

Table 4.6

Percent of Revenue from Local Sources
By School Districts 1980-1994

District	1994	1990	1984	1980
Piedmont	31	35	32	29
Yukon	33	27	28	28
Mustang	25	29	41	39
Moore	32	25	26	22
Putnam City	40	36	38	40
Luther	28	21	22	29
Choctaw	36	21	17	17
Deer Creek	39	39	39	37
Harrah	21	32	35	47
Jones	16	17	21	19
Edmond	47	33	35	34
Millwood	33	35	27	24
Western Height	39	55	38	36
Midwest City	23	26	23	20
Crooked Oak	42	35	46	37
Bethany	21	17	19	18
Oklahoma City	5	36	36	30
McLoud	17	14	28	15

Local Revenue: Calculated as percentage of total revenue from local, state, and federal sources.
(Source: Oklahoma State Office of Accountability)

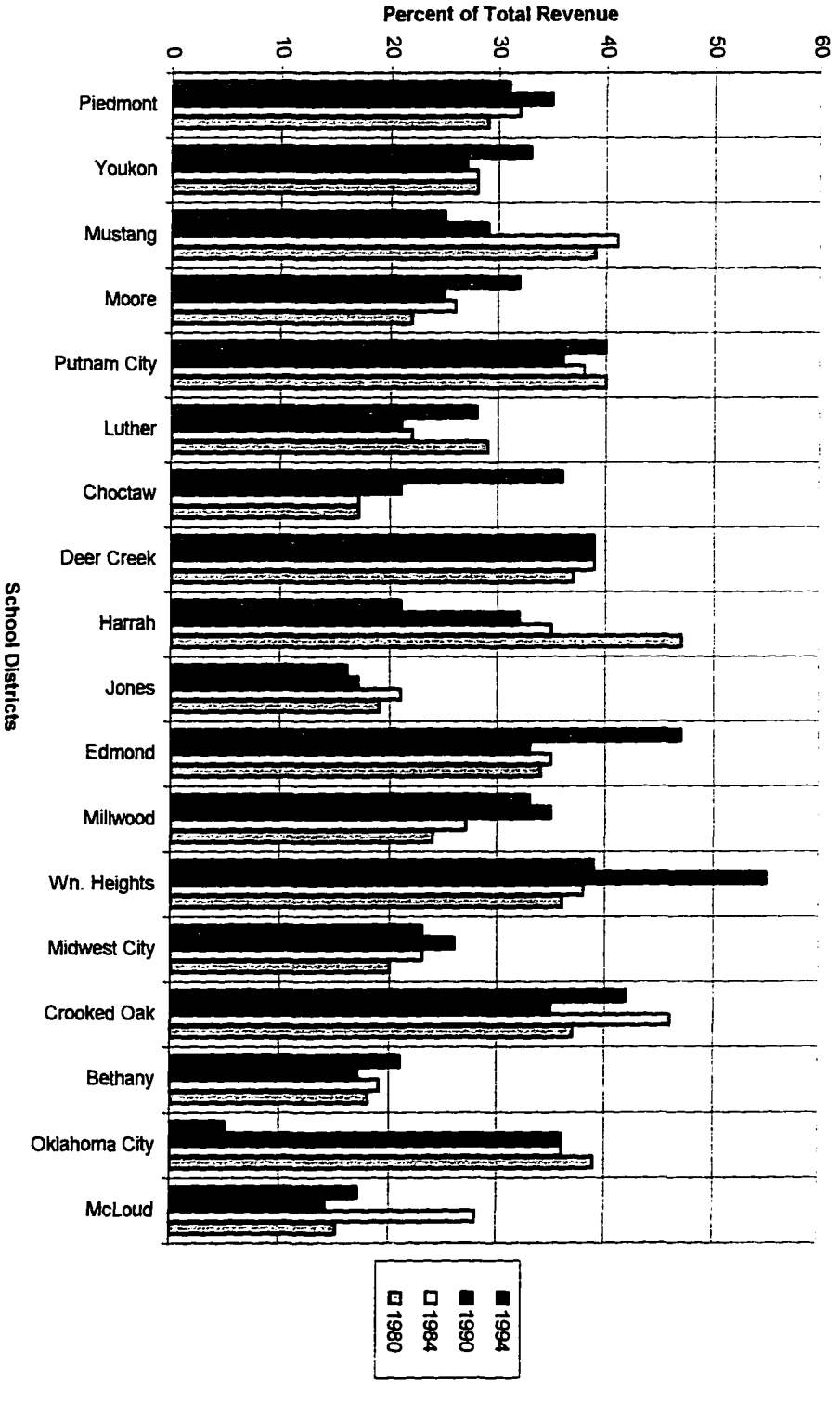


Figure 4.4: Revenue form Local Sources By School Districts. 1980-1994

Table 4.7

Expenditures on Instruction

By School Districts

District	1994	1990	1984	1980
Piedmont	65	64	64	61
Yukon	64	70	65	63
Mustang	66	68	69	66
Moore	66	65	64	69
Putnam City	65	66	67	67
Luther	64	66	61	61
Choctaw	63	64	60	56
Deer Creek	66	67	64	66
Harrah	62	66	62	64
Jones	63	65	61	65
Edmond	62	67	63	64
Millwood	61	68	70	67
Western Height	66	66	62	64
Midwest City	64	61	55	62
Crooked Oak	67	68	61	4
Bethany	57	60	63	67
Oklahoma City	62	65	64	66
McLoud	67	69	50	56

Instructional expenditures: Expenses on instructional activities measured as total general fund expenditures.
(Source: Oklahoma State Office of Accountability)

Table 4.8

Number of Students on Special Education

1980-1994

District	1994	1990	1984	1980
Piedmont	0	0	0	0
Yukon	0	0	1	5
Mustang	0	0	0	0
Moore	0	0	1	1
Putnam City	1	0	1	1
Luther	0	0	10	0
Choctaw	1	0	6	1
Deer Creek	0	0	3	1
Harrah	0	0	0	0
Jones	0	0	1	1
Edmond	0	0	0	1
Millwood	0	0	1	2
Western Height	1	0	1	1
Midwest City	0	0	1	2
Crooked Oak	0	0	1	6
Bethany	2	6	4	9
Oklahoma City	0	0	1	1
McLoud	0	0	0	0

Students on special education calculated as percentage of Average Daily Membership.
(Source: Oklahoma State Office of Accountability)

Table 4.9

Expenditures on District Administration

1980-1994

District	1994	1990	1984	1980
Piedmont	4	4	5	4
Yukon	4	2	2	2
Mustang	2	3	4	3
Moore	2	3	4	5
Putnam City	2	2	1	2
Luther	7	7	4	5
Choctaw	3	3	5	3
Deer Creek	6	6	7	6
Harrah	6	6	4	5
Jones	4	4	4	5
Edmond	2	3	3	2
Millwood	7	6	5	5
Western Height	5	3	4	4
Midwest City	2	3	5	3
Crooked Oak	4	5	6	6
Bethany	4	7	7	5
Oklahoma City	2	4	3	3
McLoud	5	4	3	4

Expenditures on general district administration measured as percentage of total general fund expenditures.
(Source: Oklahoma State Office of Accountability)

Table 4.10

Operational Expenditures

1980-1994

District	1994	1990	1984	1980
Piedmont	7	9	13	14
Yukon	11	8	10	9
Mustang	9	10	11	10
Moore	9	9	11	10
Putnam City	11	9	14	14
Luther	8	9	11	8
Choctaw	9	10	18	11
Deer Creek	9	9	10	9
Harrah	11	9	12	9
Jones	13	11	16	14
Edmond	12	10	13	12
Millwood	9	8	9	11
Western Height	7	12	14	17
Midwest City	7	9	8	12
Crooked Oak	8	6	13	8
Bethany	14	11	14	11
Oklahoma City	11	10	12	11
McLoud	8	8	14	11

Operational expenditures: Expenditures on plant and management calculated as percentage of total general fund expenditures.
(Source: Oklahoma State Office of Accountability)

Results of Classification

The 18 districts have been classified into eight categories in accordance with the classification category adopted by the State Department of Education. Category 1 represents the most advantaged while category 8 refers to the least advantaged among the school districts. This classification thus created a cluster of similar districts to facilitate comparison. A trend in rank order indicates that during 1980-94, the relative quality of school districts has largely remained the same except in four cases namely- Piedmont, Mustang, Moore, and Luther. In 1980, Piedmont belonged to category 6, while since 1980 it has been classified as rank 1. In 1980-84, Mustang was classified as 6, but shifted to category 3 in 1990 and 1994. On the other hand Moore was classified under group 1 during 1980-84, but in 1990 and 1994 it was grouped under category 3. In 1984 Luther's rank changed from 2 to 3. (Table 4.11; Figure 4.5)

Results from discriminant analysis indicate that the relative quality of school districts has largely remained the same. It provides a reasonably stable background information for measuring the influence of school districts on residential location choice. It will be compared with the pattern and trend in expansion of residential areas.

Table 4.11

Rank - Order of School Districts

1980-1994

District	1994	1990	1984	1980
Piedmont	1	1	1	6
Yukon	2	2	2	2
Mustang	3	3	3	6
Moore	3	3	1	1
Putnam City	3	3	3	3
Luther	3	3	3	2
Choctaw	3	3	3	3
Deer Creek	1	1	1	1
Harrah	5	5	5	5
Jones	5	5	5	5
Edmond	1	1	1	1
Millwood	8	8	8	8
Western Height	6	6	6	6
Midwest City	3	3	3	3
Crooked Oak	7	7	7	7
Bethany	4	4	4	4
Oklahoma City	5	5	5	5
McLoud	6	6	6	6

Rank Order of School Districts calculated from discriminant analysis.

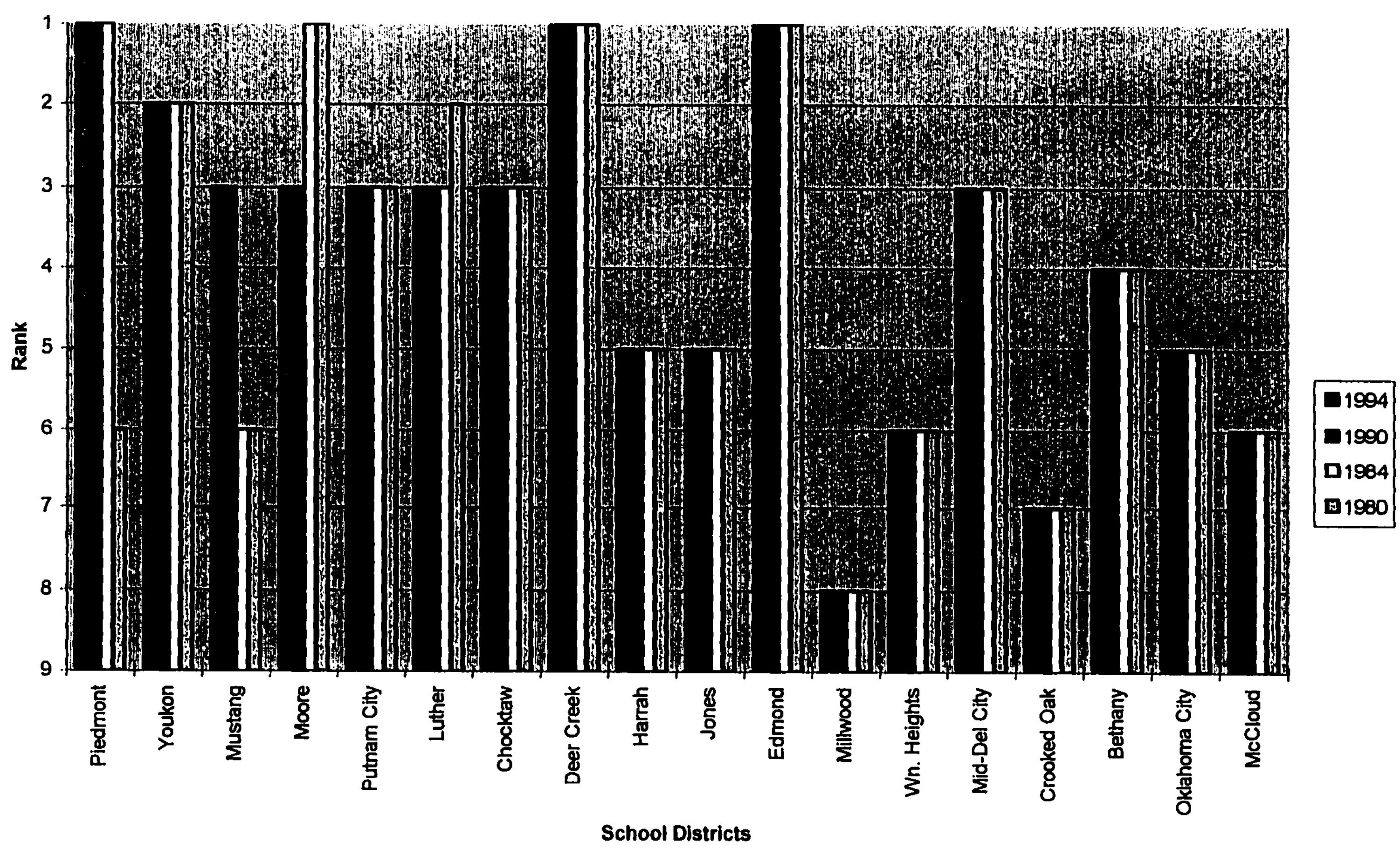


Figure 4.5: Rank of School Districts 1980-1994

Chapter 5

TREND AND PATTERN IN RESIDENTIAL GROWTH IN THE OKLAHOMA CITY METROPOLITAN AREA

This chapter analyzes the trend in growth and expansion of the Oklahoma City metropolitan area along with a brief history of the incorporated cities. This chapter examines growth in the residential areas and change in the median value of residential units within the 18 school districts of the metropolitan area. The study area extends over four counties: Oklahoma, Cleveland, Canadian and Pottawatomie. The analysis is based on decadal change in the number of occupied housing units within each school district. As defined by the Bureau of Census, occupied housing unit refers to "the usual place of residence of the person or group of persons living in at the time of enumeration or if the occupants are only temporarily absent, e.g. away on vacation."

Growth of the Metropolitan Area

Oklahoma City is the center of metropolitan dominance. Its history dates back to 1889 with the first land run on April 22, when the unassigned lands were opened for staking claims. On April 23, 1889, a provisional government was set up, and within a month businessmen had organized themselves into a volunteer group to promote the city and business (Oklahoma Almanac 1995). The original site was marked by three landmarks: the Santa Fe railroad, prairie land and the Canadian river.

In 1910, the city of Bethany, a stronghold of the Nazarene community was incorporated. In the same year, Oklahoma City was selected to be the state capital after a 38 day deliberation, in which Guthrie and Kingfisher contested for the status of state capital. " Guthrie...was strong enough politically to keep the capital through congressional action, and even the statehood bill, passed in 1907, provided that Guthrie should remain the capital until 1913. But after the matter was submitted to the people by an initiated bill and Oklahoma City won the popular verdict, Governor Haskell, without waiting for 1913, literally took the capital into his own hands and transferred it by night to Oklahoma City. In this action, he was subsequently sustained by the Supreme Court of the United States on the ground that such a matter as fixing the location of the capital was wholly within the control of the state and that the congress had exceeded its authority in attempting to deal with it (Scott 1939)."

Thus, despite strong lobbying from supporters of Guthrie, Oklahoma City was selected the state's capital city by a popular vote in 1910. Its population recorded a rapid increase in the following years. In 1920, the population of Oklahoma city was recorded to be 91,000, a 15 fold increase over that of 1889. Again during 1920 and 1930, the population doubled to reach 185,000. Most of the areal expansion has taken place as a result of annexation by petition. Oklahoma city had a very small geographic area in 1931, and it was very closely built. Residential development took place in proximity with trolley lines that connected downtown to the nearby towns: Britton, Edmond, Norman, Guthrie, and El Reno. Residential properties remained located near the downtown area (OKC Comprehensive Plan).

The opening of the Santa Fe railroad added to the locational advantage of the present-day Oklahoma City metropolitan area and in new settlements evolved as rail-stops and service points along the railroad. The city of Moore was settled by the participants of the land run along the railroad tract and has been named after one of the conductors of the Santa Fe Railway Company. In its early phase, growth was concentrated along the interurban railway service. Its area and population expanded during 1960-70 due to a petition by settlers who did not want to be annexed into the Oklahoma City area. This rapid growth continued until 1980 since Moore provided proximity to the central city and distance from the crowds and congestion. (Table - 5.1; Figure -5.1)

In the absence of a definite plan, the residential areas developed in a haphazard way. These were marked with areas of narrow streets, and dead ends that hampered traffic movement. There was a deficiency of park spaces and recreational land. One of the significant developments in the history of Oklahoma City has been the establishment of the Will Rogers World Airport in 1940. This was followed by the incorporation of Midwest City in 1943 and annexation of the Tinker Air Force Base in 1959.

Initially, the economy of Oklahoma city was based on trade and agriculture. Booming production of oil and natural gas were the major factors behind the rapid growth of the population. This attracted immigrants from the neighboring areas and diversified the ethnic composition of the population. Towards the end of the 20th century, whites constituted more than 85 percent of the total population while there were significant amount of African Americans by 1930 who added to the booming city in search of

Table - 5.1

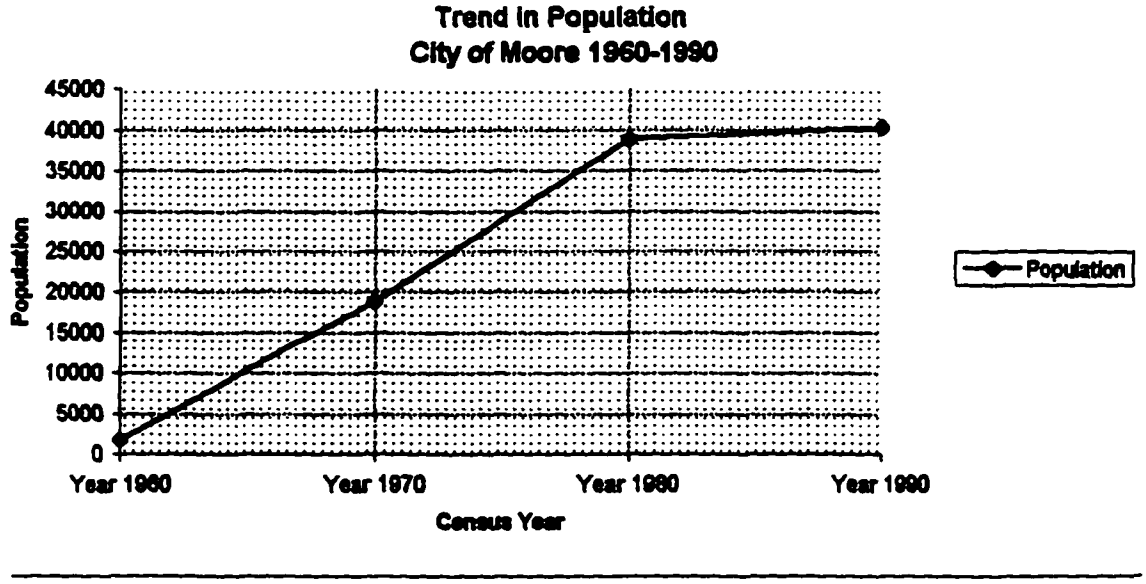
City of Moore

Population Growth

1960-1990

Census	Population
1960	1763
1970	18761
1980	38806
1990	40318

Figure - 5.1



employment. However, there was noticeable segregation based on ethnicity, with African Americans concentrated in the northeastern part of the city. At present, the Oklahoma City metropolitan area has developed into an increasingly diversified economic base that includes agriculture; energy; aviation; federal, state and local governments; health; education; manufacturing; trade; processing and distribution.

In response to the challenges of World War II and need for more Air-Force bases and military installations, the Tinker Air Force base was created in 1941. This became the economic base for the Midwest City, as this city started to provide housing and community facilities for the employees of Tinker Air Force base. While this military installation continues to serve as an important economic base for the Oklahoma City metropolitan area, Midwest City has been growing at a constant rate. The growth pattern was rapid during 1960-70, and has stabilized since 1970. (Table 5.2 Fig. 5.2). As a characteristic part of the sunbelt, the Oklahoma City metropolitan area has largely grown due to inmigration. Population growth and expansion of urban areas has responded to the economic cycle of the region. The booming oil-based economy of this region was responsible for the rapid growth in population of the Oklahoma City during 1950-70.

Since 1980, the population of the Oklahoma city area has registered a sharp decline. On the other hand, the overall population of the metropolitan area has increased at a regular rate since 1960 (Table 5.3; Figure - 5.3). It has been observed that most of the total population increase has taken place in the perimeter and fringe areas of the MSA, particularly in Choctaw, Moore, Edmond, Mustang, New Castle, and Yukon. Areal

pattern of growth tends toward 'sprawl' with more concentration of population and intraregional migration toward the perimeter

Table 5.2

City of Midwest City
Population Growth - 1960-1990

Census	Population
1960	36053
1970	48212
1980	49559
1990	52267

Figure - 5.2

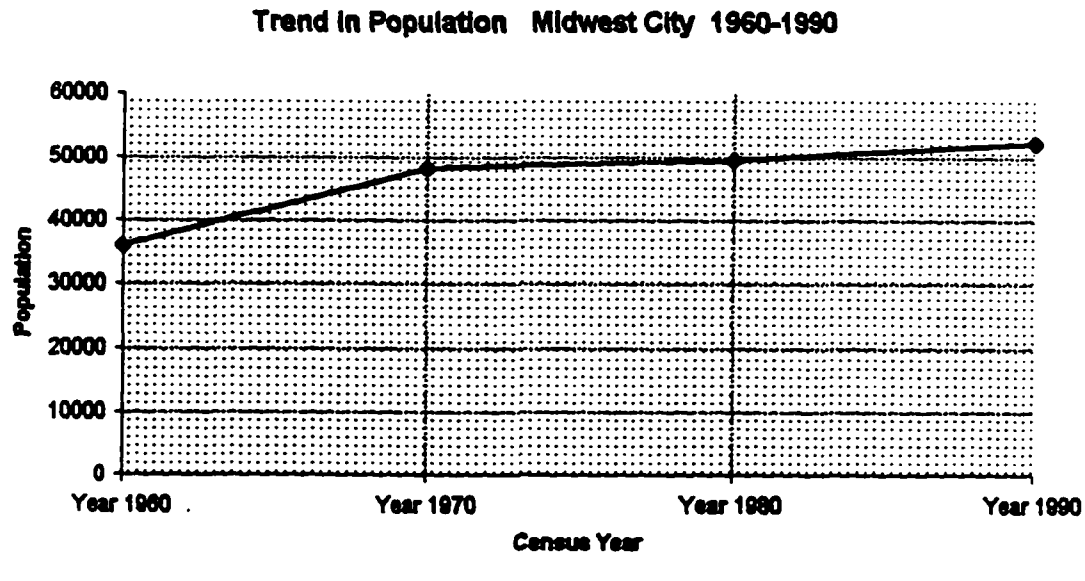


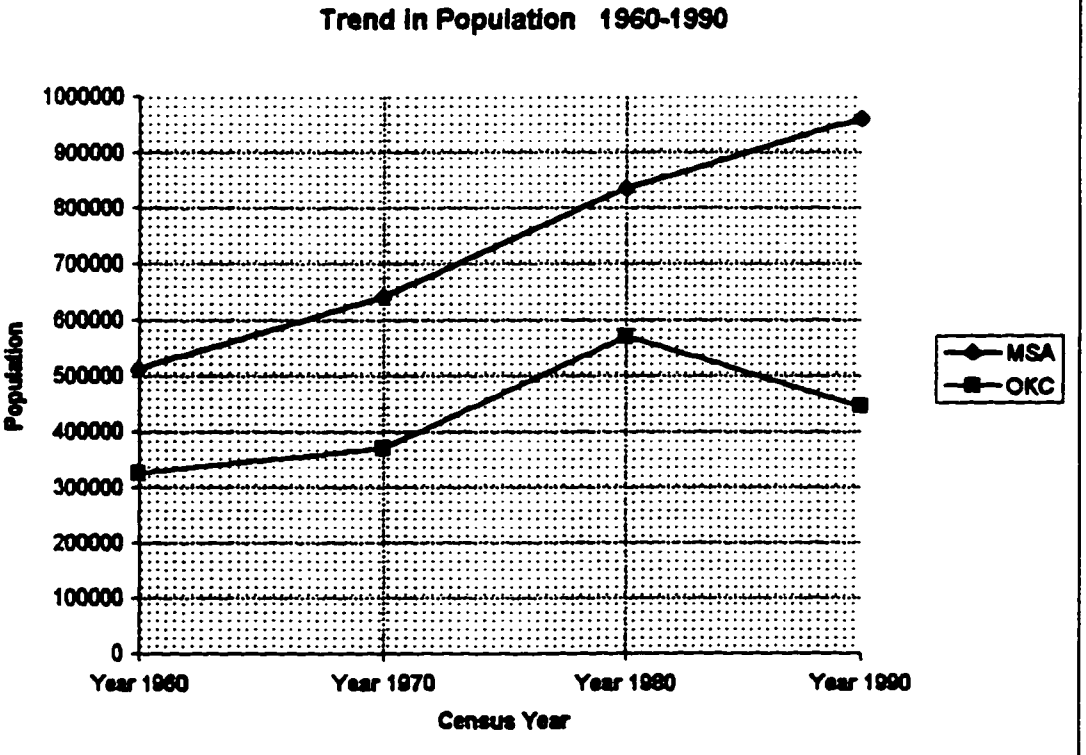
Table - 5.3

Oklahoma City Metropolitan Statistical Area (MSA) and City Of Oklahoma City (OKC)

Population Growth 1960 -1990

Census	MSA	OKC
1960	511833	324253
1970	640888	368856
1980	834088	568933
1990	958839	444730

Figure - 5.3



and fringe areas. A geographic factor favoring sprawl of the metro area is the presence of flat topography and easy accessibility facilitated by interstate highways. Reserve areas along Edmond, Piedmont, Yukon, Mustang, Moore, Midwest City, Spencer and Jones are areas of future growth and expansion. During recent years, the inner loop areas of Oklahoma City have declined (Figure 5.4), while urban growth has occurred outside of the inner loop. The fringe areas have gained higher potentialities for growth due to the availability of land and improved accessibility. In case with the Oklahoma City, most of the areal expansion has taken place during the thirty-year period of 1960-1990 (Figure 5.5). In recent years, the peripheral parts of Oklahoma city have recorded low density residential development (Figure 5.6).

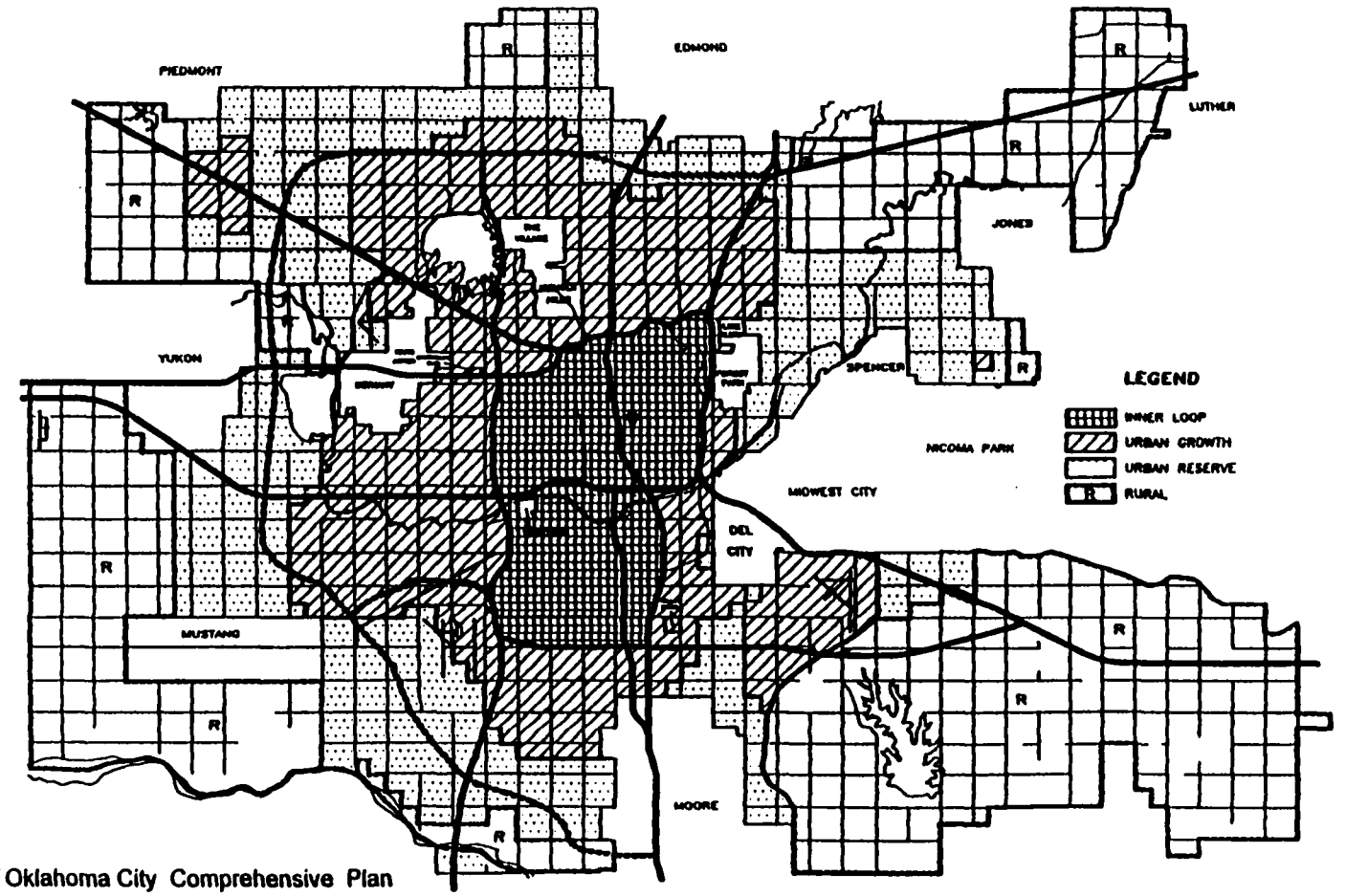
Residential Growth since 1970

Between 1970 and 1980, a high growth rate in housing development took place in Piedmont, Luther, Midwest City, Edmond, Deer Creek, Putnam City, Mustang and Moore. Thus a trend of sprawl and growth towards the outer fringe was very clear. Although inner city decline had started, it recorded a small positive increase in the number of occupied housing units in the central part of the Oklahoma City area. Negative growth rate was recorded in the school districts of Crooked Oak, Bethany and Jones. Maximum growth of this period was recorded in Moore, while the largest decline occurred in Crooked Oak. (Table-5.4, Figure 5.7) During 1980-90, more decline was recorded in the central city. For the first time Oklahoma City registered a negative growth rate in the number of occupied housing units Other districts that recorded a negative growth rate during this period are Luther, Moore, Putnam City, Midwest City, Millwood, Bethany,

Map - 5.1

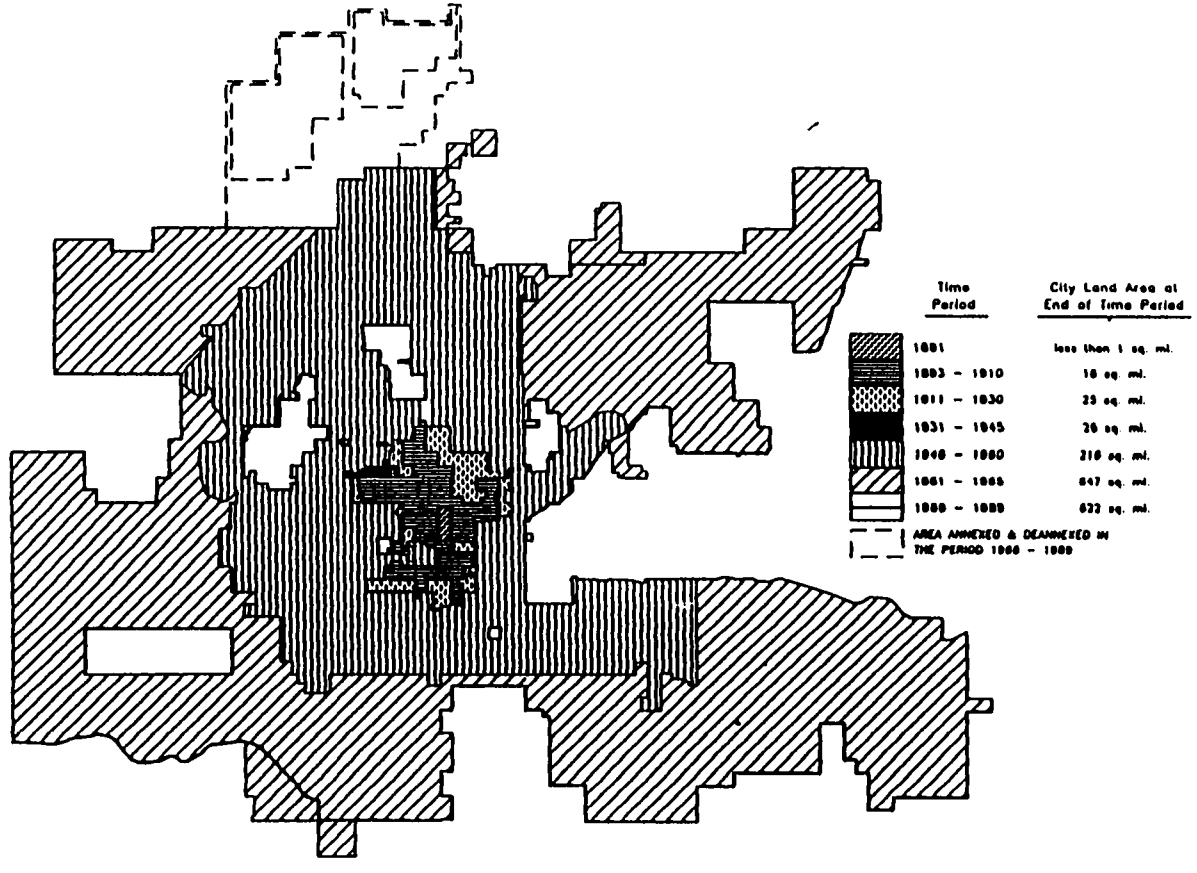
Oklahoma City Development Areas

1990



Source: City of Oklahoma City Comprehensive Plan

Map - 5.2
Growth of Oklahoma City
1891-1989

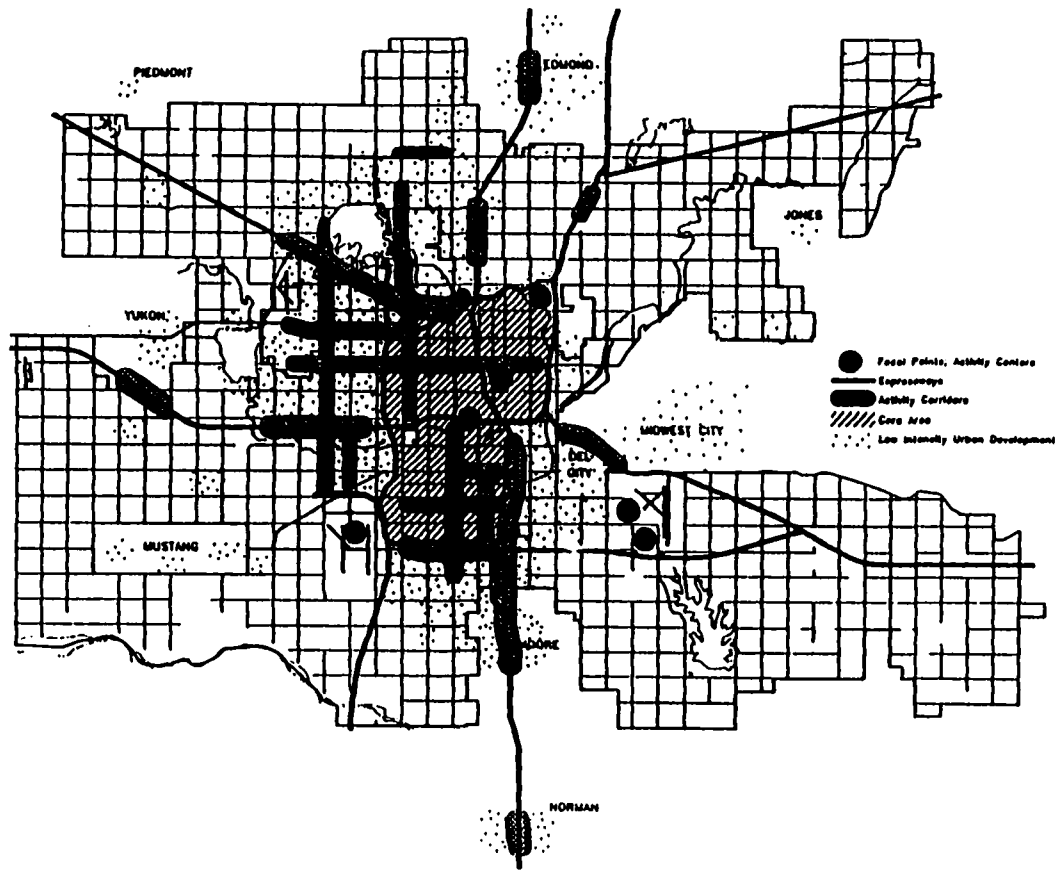


Source: City of Oklahoma City Comprehensive Plan

Map - 5.3

Oklahoma City : Urban Form

1990



Source: City of Oklahoma City Comprehensive Plan

Table 5.4

Growth in the Number of Occupied Residential Units
1970-1980

District	Percent Growth
Bethany	-3.92
Jones	0.03
Millwood	4.45
Crooked Oak	13.58
Oklahoma City	43.49
Yukon	63.03
Harrah	103.78
Moore	113.91
Choctaw	130.91
Western Heights	156.71
Piedmont	218.84
Luther	241.02
Midwest City	248.29
Edmond	256.39
Deer Creek	406.94
Putnam City	413.49
McLoud	856.69
Mustang	1416.35

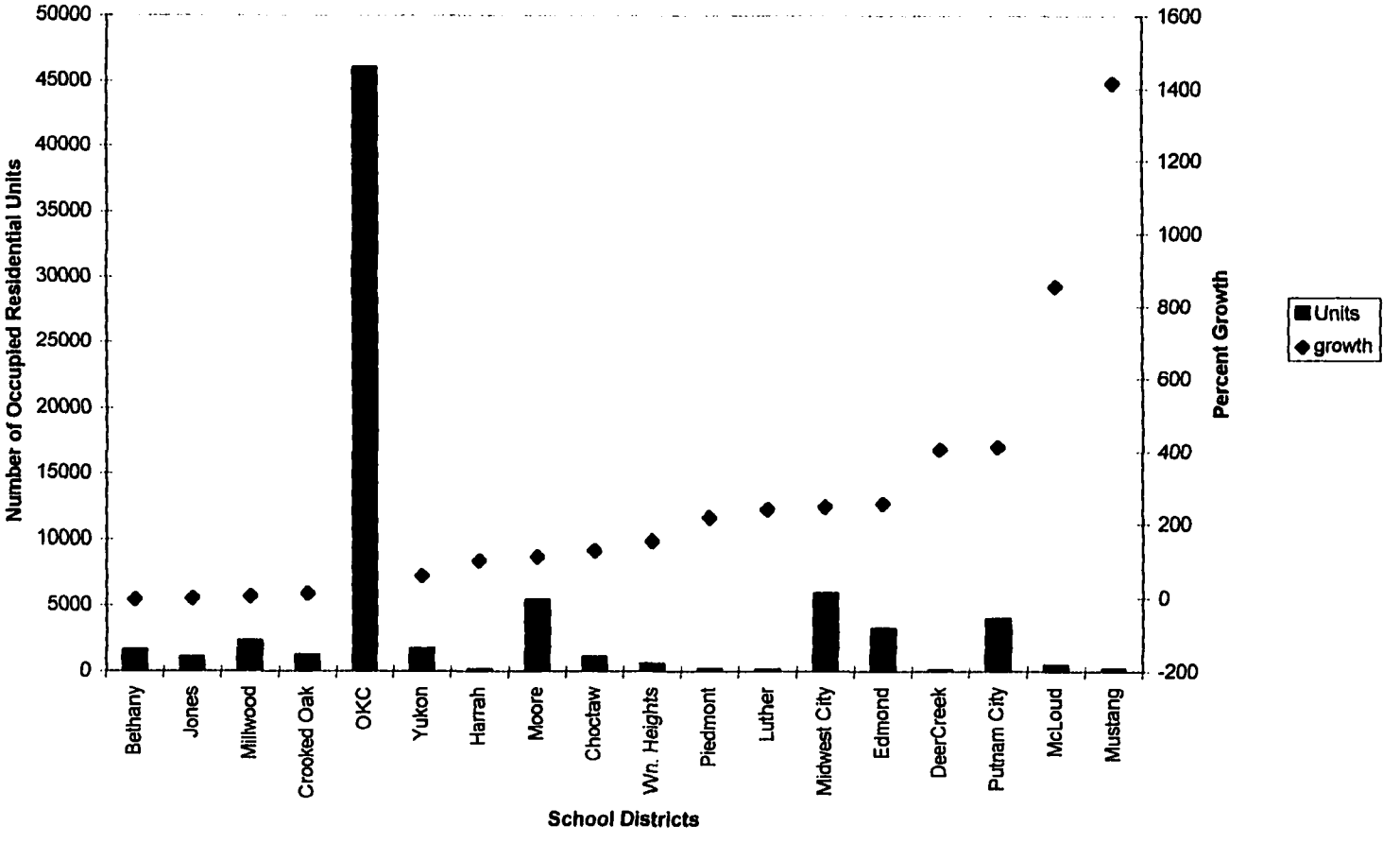


Figure 5.7: Trend in Number of Occupied Residential Units By School Districts. 1970-1980

Jones and Crooked Oak. Positive growth occurred in the fringe areas of Piedmont, Harrah, Edmond, Yukon, Mustang and Choctaw. Thus, during 1980-90, urban sprawl and growth in the fringe areas of the metro region became very obvious.

(Table-5.5, Figure 5.8)

Table - 5.5

Growth in the Number of Occupied Residential Units 1980-1990

District	Percent Growth
Luther	-68.92
Putnam City	-23.90
Midwest City	-21.20
Crooked Oak	-20.22
Millwood	-4.14
Bethany	-3.19
Western Height	-0.56
Oklahoma City	-0.42
Jones	-0.30
Moore	0.26
McLoud	22.15
Piedmont	34.39
Deer Creek	39.45
Harrah	60.22
Edmond	60.36
Yukon	117.81
Mustang	120.23
Choctaw	132.74

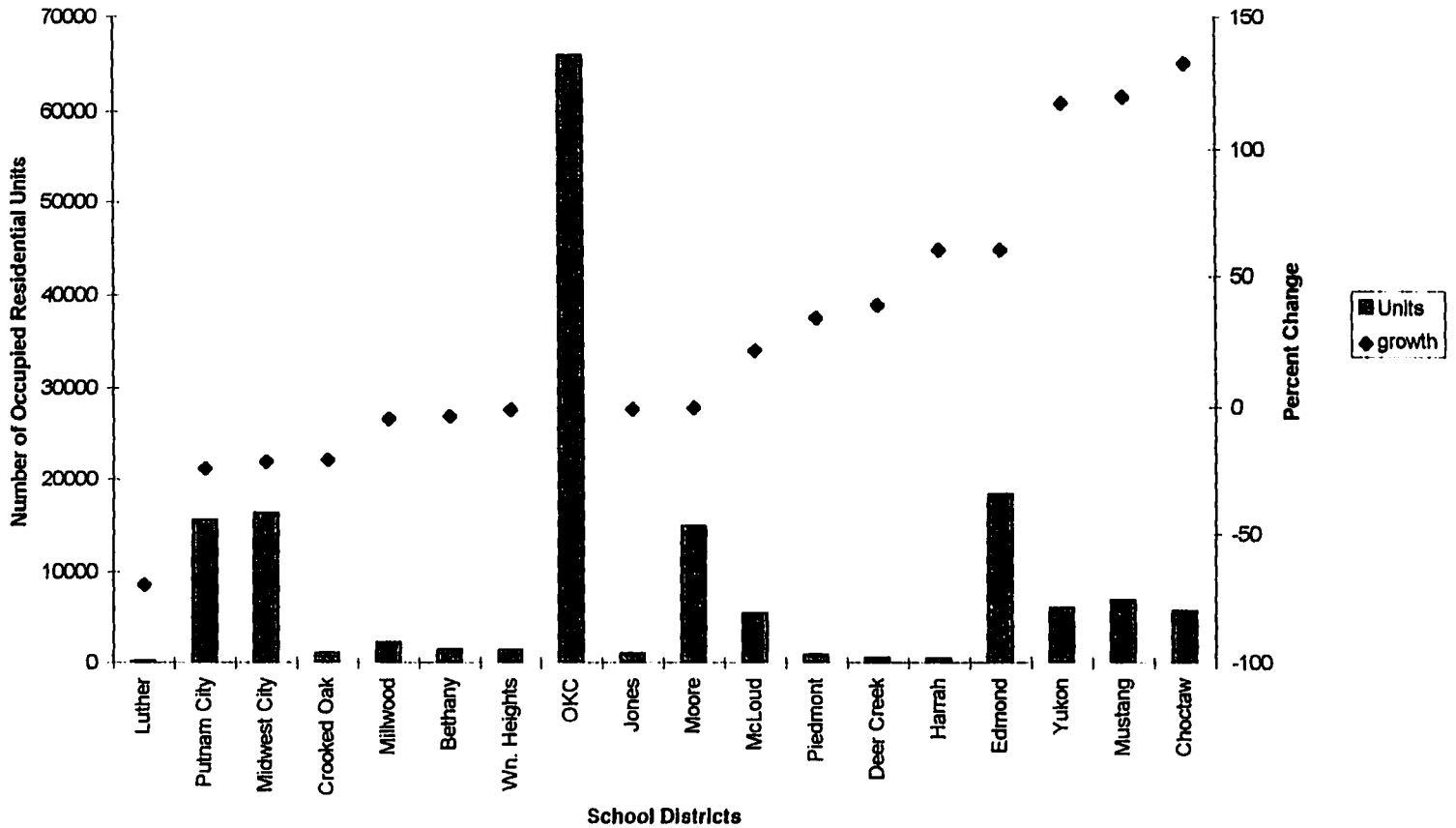


Figure 5.8: Trend in Number of Occupied Residential Units By School Districts 1980-1990

Areas of residential growth over the period of 1983 to 1994 were detected using the write function memory insertion. In this case band 3 was selected and displayed as False Color Composite. The 1993 imagery was displayed in green while the 1994 imagery was displayed in red. When the two imageries were displayed through write function memory, areas of change between 1983 and 1994 were depicted in orange-red while areas of no change were shown in yellow (Figure 5.9). The change detection methodology shows that during 1983-94, residential areas have sprawled remarkably along the north and northwestern segments of the metropolitan fringe. Also areas of growth have been depicted in the south and southeast, which correspond with the cites of Moore and Midwest City. New housing development and zoning areas are clearly depicted along Lake Hefner and a general pattern of new residential developments are clearly visible between Lake Overholser and west of I-35 through Lake Hefner and the city of Edmond. The satellite imagery shows the new construction of Kilpatrick Turnpike and non-built-up areas east of I-35 in Edmond (Figure 5.10). This corresponds with the fact that no residential growth has occurred east of I-35 during recent years in Edmond. This area falls within the Oklahoma City school district.

Change Detection

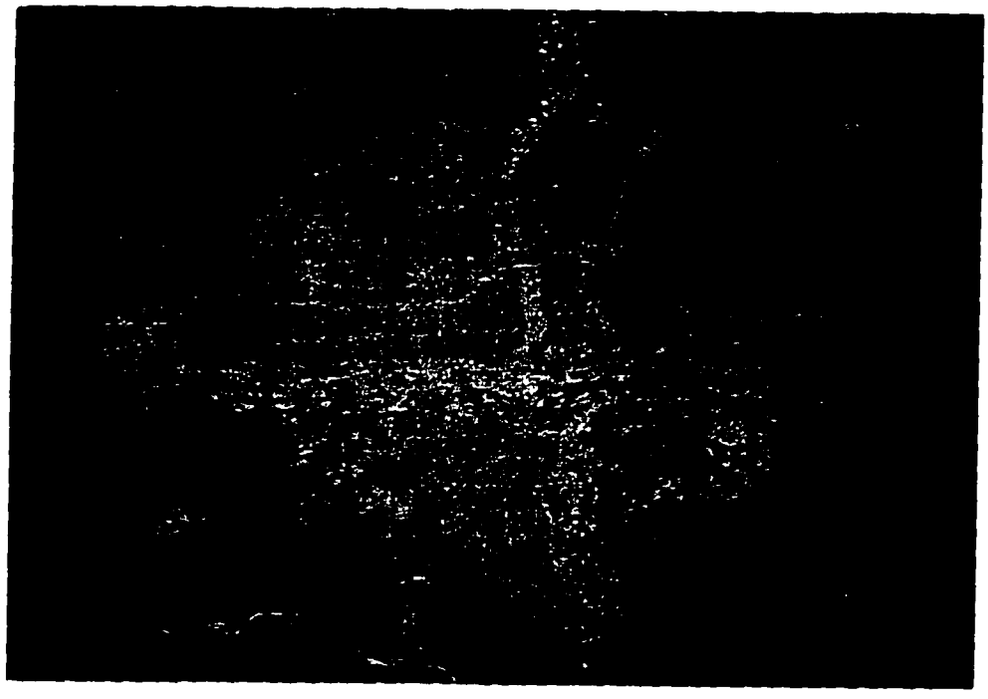


Figure - 5.9 Land Use Change Detection through write memory function. Areas of no change are shown in yellow while areas of change are shown in shades of orange.

Areas of Urban Sprawl

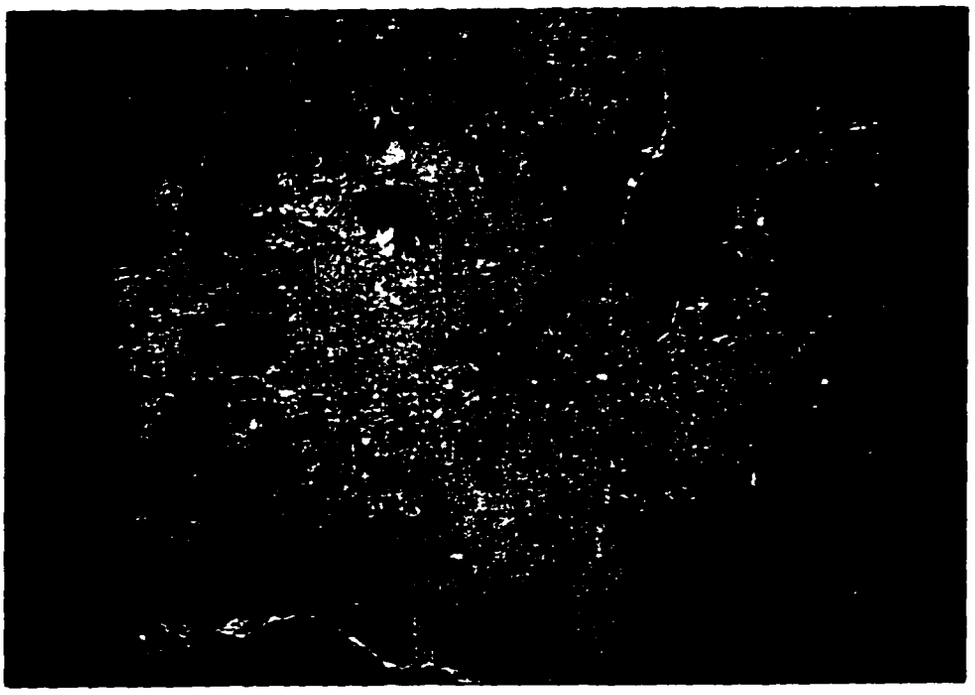


Figure 5.10: Areas of urban sprawl in the north and northwestern fringe of Oklahoma City. New housing developments and zoning areas seen in the north around Lake Hefner and in the west along Lake Overholser.

Chapter 6

SUMMARY OF RESULTS AND ANALYSIS OF FINDINGS

In this chapter, results obtained from an analysis of school districts and growth of residential units have been compared and correlated. Spearman's rank correlation has been used to find if there is a significant correlation between school quality and residential choice. The results of statistical analysis have been compared with Realtors' observations and responses to the issue. Finally, the implications of findings from statistical analysis and interviews with realtors have been discussed with reference to school as a factor in current intraurban residential relocation and residential choice.

School District Quality and Residential Growth Compared:

Results from discriminant analysis indicate that the quality of school districts has remained relatively the same over the last 14 years. It, thus, provides a reasonably stable background for measuring the influence of school districts on residential location choice. The trend of growth in residential areas has been measured over a period of 20 years starting from 1970. Data on the number of occupied residential units and the median value of residential units has been collected for each school district under study. This data referred to the census years of 1970, 1980 and 1990. Decadal change in the number of occupied housing units is calculated for 1970-80, and 1980-90. Based on the percent change, median and quartile deviation are calculated and districts are arranged into a rank order of 1 through 8. Rank 1 represents the district with the highest growth rate, while rank 8 represents the one with the lowest growth rate. This rank order, thus, conforms

with the rank order of school district quality.

Table 6.1 shows the percentage of change in the number of occupied residential units during 1970-1980. Out of the 18 school districts, 17 recorded positive increase in the number of occupied residential units. The only district with negative growth was Bethany. On the other hand, maximum growth in the number of occupied residential units was recorded by the school district of Mustang, followed by McLoud, Putnam City, Deer Creek and Edmond (Figure 6.1).

Table 6.1

Rank Order of the Number of Occupied Housing Units By Districts (1970-1980)

Districts	Housing Units Percent Growth (1970-1980)	Rank
Bethany	-3.92	6
Jones	0.30	6
Millwood	4.45	6
Crooked Oak	13.58	5
Oklahoma City	43.49	5
Yukon	63.03	5
Harrah	103.78	5
Moore	113.91	5
Choctaw	130.91	5
Western Height	156.71	5
Piedmont	218.84	4
Luther	241.02	4
Midwest City	248.29	4
Edmond	256.29	4
Deer Creek	406.94	3
Putnam City	413.49	3
McLoud	856.69	1
Mustang	1416.35	1

(Rank order is based on quartile deviations)

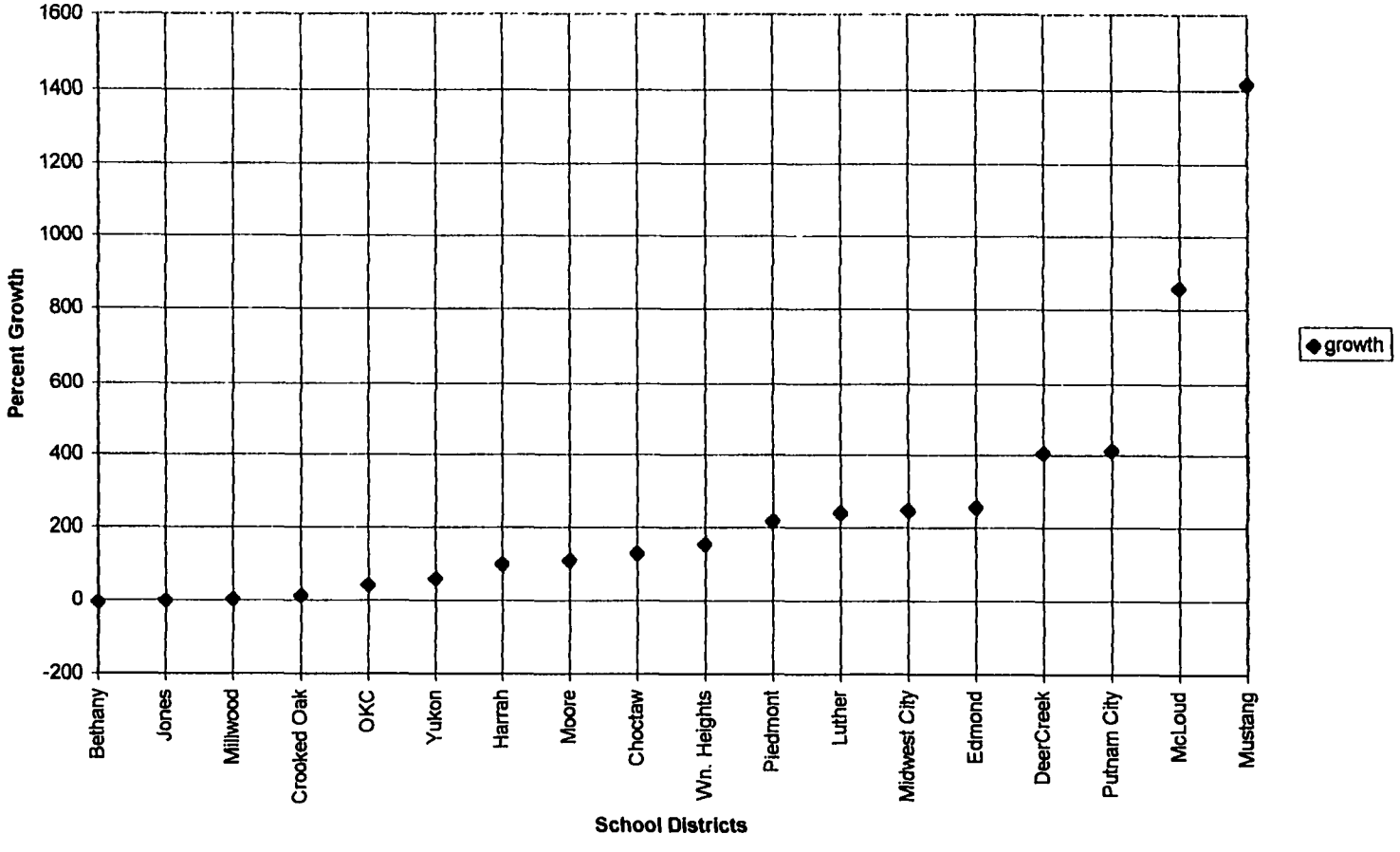


Figure 6.1: Growth in Occupied Residential Units. 1970-1980

Spatial pattern of trends in the number of occupied residential units (Figure 6.2) shows that the central city school districts of Oklahoma City, Millwood, Jones and Choctaw had a low growth rate, while higher growth in the number of occupied residential units occurred in the school districts of Mustang, Piedmont, Deer Creek, Edmond, Luther and McLoud. A deviation from the general pattern of decline in the central city and growth in the peripheral areas is reflected in the lower rate of growth in some peripheral areas such as Yukon and Harrah. Also, an outlier of the Oklahoma City school district which is in the northeastern part of the metropolitan fringe enclosed within Luther, Jones, and Edmond, recorded lower growth thus representing a deviation from general pattern. The central city decline and relatively higher growth in the peripheral areas became more prominent during 1980-90. In this decade, nine out of 18 school districts recorded negative growth in the number of occupied residential units.
(Table- 6.2; Figure - 6.2).

However, the census of 1980 showed a reversal in this trend by registering areas of growth in metropolitan cities in different parts of the country. In the case of Oklahoma City, it appears that there was a general decline in the central city population during 1970-80 which became more prominent during 1980-1990. It shows that the reversal of migration and growth of the central city areas as experienced by other metropolises of the United States did not happen in case of Oklahoma City. Its central city area continued to decline during 1970 through 1990. However, although a general trend of growth in the fringe areas was recorded, not all sectors of the Oklahoma City fringe area registered

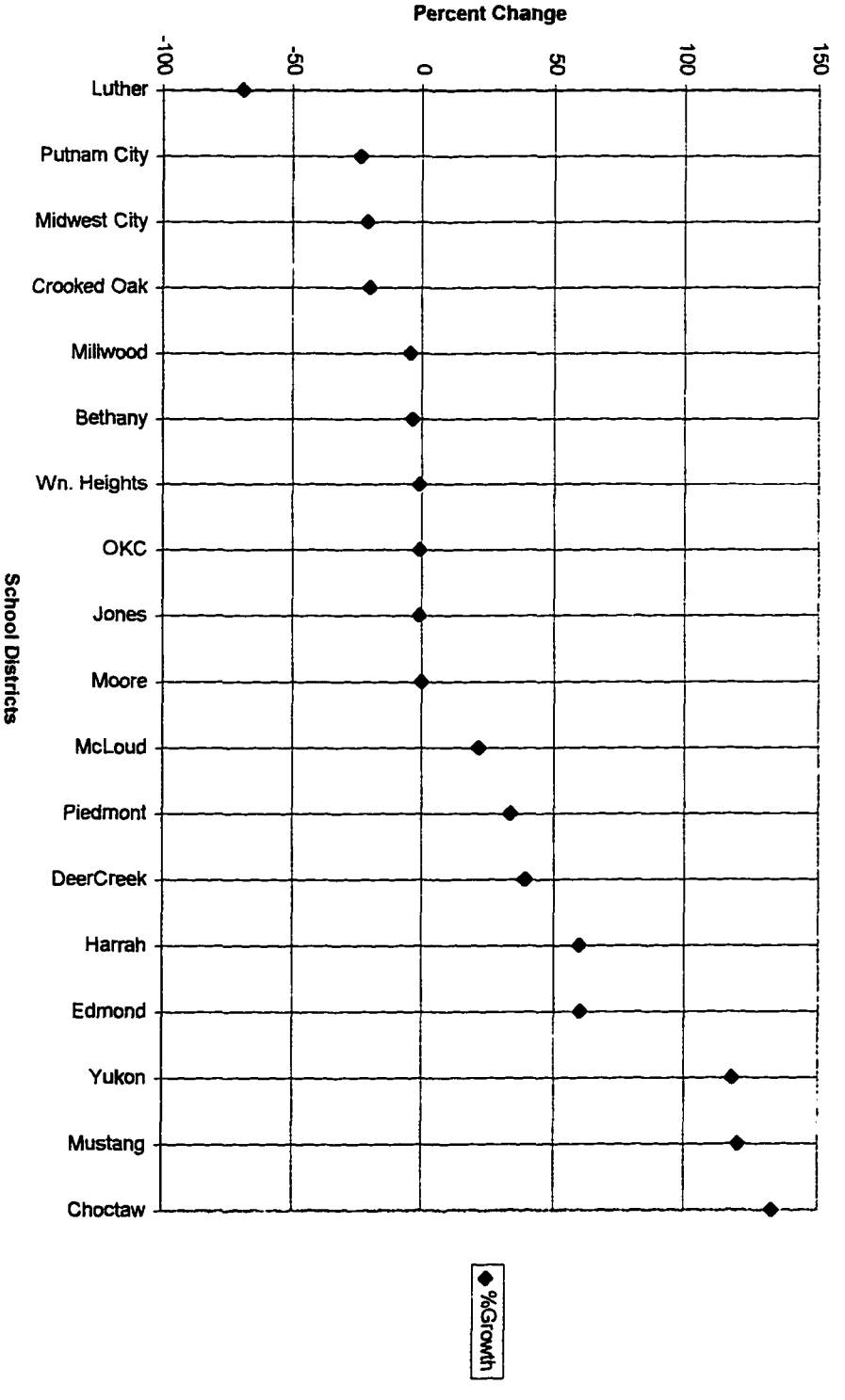


Figure 6.2: Growth in Occupied Residential Units. 1980-1990

Table 6.2
Rank Order of Occupied Residential Units
By School Districts (1980-1990)

Districts	Housing Units Percent Growth (1970-1980)	Rank
Luther	-68. 92	7
Putnam City	-23.90	5
Midwest City	-21.20	5
Crooked Oak	-20.22	5
Millwood	-4.14	5
Bethany	-3.19	5
Western Height	-0.56	5
Oklahoma City	-0.42	5
Jones	-0.30	4
Moore	0.26	4
McLoud	22.15	4
Piedmont	34.39	3
Deer Creek	39.45	3
Harrah	60.22	2
Edmond	60.36	2
Yukon	117.81	1
Mustang	120.23	1
Choctaw	132.74	1

(Rank order is calculated from quartile deviations)

growth. A constant decline and negative growth was registered in the northeastern fringe area of Oklahoma City enclosed within the school districts of Luther, Jones and Edmond. Furthermore, the amount of growth varied among different sectors of the fringe area.

Intracity migration and residential relocation is an outcome of push and pull factors that interact within the sphere of metropolitan areas. Also, different sectors of the fringe area may be perceived differently due to spatial variation in pull factors of migration. The spatial variation in the pattern of residential growth in the Oklahoma City area is therefore examined in relation with the quality of school districts, considering that schools and variation in the quality of schools may be two of the factors of intra-city migration and residential relocation.

The rank order of trend in residential growth is compared with that of school district quality using Spearman's Rank Correlation Coefficient. For the decade of 1970-1980 the correlation coefficient is measured to be 0.88 (Table 6.3). Similarly, the r^2 value for the rank of school districts and trend in number of occupied residential units for 1980-1990 is measured as 0.92. (Table 6.4). The strong positive correlation between the rank order of school district quality and residential growth suggests that school district quality may have significant influence on residential choice and that better quality school districts have grown faster.

Regarding the median value of occupied residential units, the Spearman's rank correlation indicates that there is a strong positive correlation between price of residential units and school district quality. The correlation coefficient for 1970-1980 is 0.91 while the coefficient for 1980-1990 is 0.86 (Table 6.5 and Table 6.6).

Table 6.3

Spearman's Rank Correlation Of Number of Occupied Housing and Quality of Schools By Districts. 1970-1980

District	School-Rank (r)	Housing-Rank (rs)	$(r-rs)^2$
Bethany	6	4	4
Jones	6	5	1
Millwood	6	8	4
Crooked Oak	5	7	4
Oklahoma City	5	5	0
Yukon	5	2	9
Harrah	5	5	0
Choctaw	5	3	4
Western Height	5	6	1
Piedmont	4	6	4
Luther	4	2	4
Midwest City	4	3	1
Edmond	4	1	9
Deer Creek	3	1	4
Putnam City	3	3	0
McLoud	1	6	25
Mustang	1	6	25
Moore	5	1	16

$6 \times (r-rs)^2 = 690$ $\quad n^3 - n = 5814$

$690/5814 = 0.12$ $\quad 1 - 0.12 = 0.88$

$r^2 = 0.88$

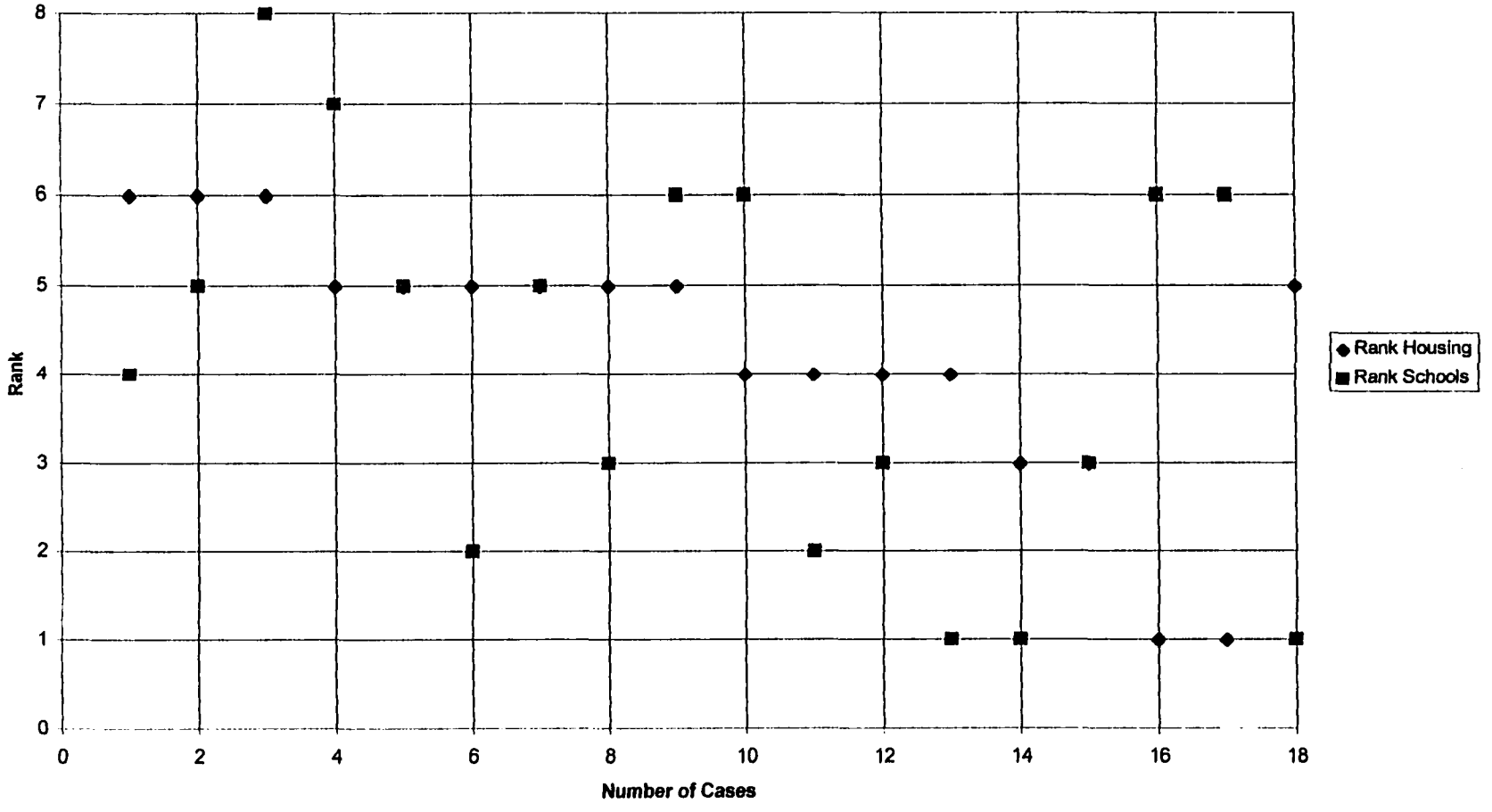


Figure 6.3 Scatter Plot
Housing and School Ranks 1980

Table 6.4

Spearman's Rank Correlation Of Number of Occupied Housing and Quality of Schools By Districts. 1980-1990

District	School-Rank (r)	Housing-Rank (rs)	$(r-rs)^2$
Bethany	5	4	1
Jones	5	5	1
Millwood	5	8	9
Crooked Oak	5	7	4
Oklahoma City	5	5	0
Yukon	1	2	1
Harrah	2	5	9
Choctaw	1	3	4
Western Height	5	6	1
Piedmont	3	1	4
Luther	7	3	16
Midwest City	5	3	4
Edmond	2	1	1
Deer Creek	3	1	4
Putnam City	5	3	4
McLoud	4	6	4
Mustang	1	3	4
Moore	4	3	1

$6 \times (r-rs)^2 = 480$ $\quad$ $n^3 - n = 5814$

$480 / 5814 = 0.08$ $\quad$ $1 - 0.12 = 0.92$

$r^2 = 0.92$

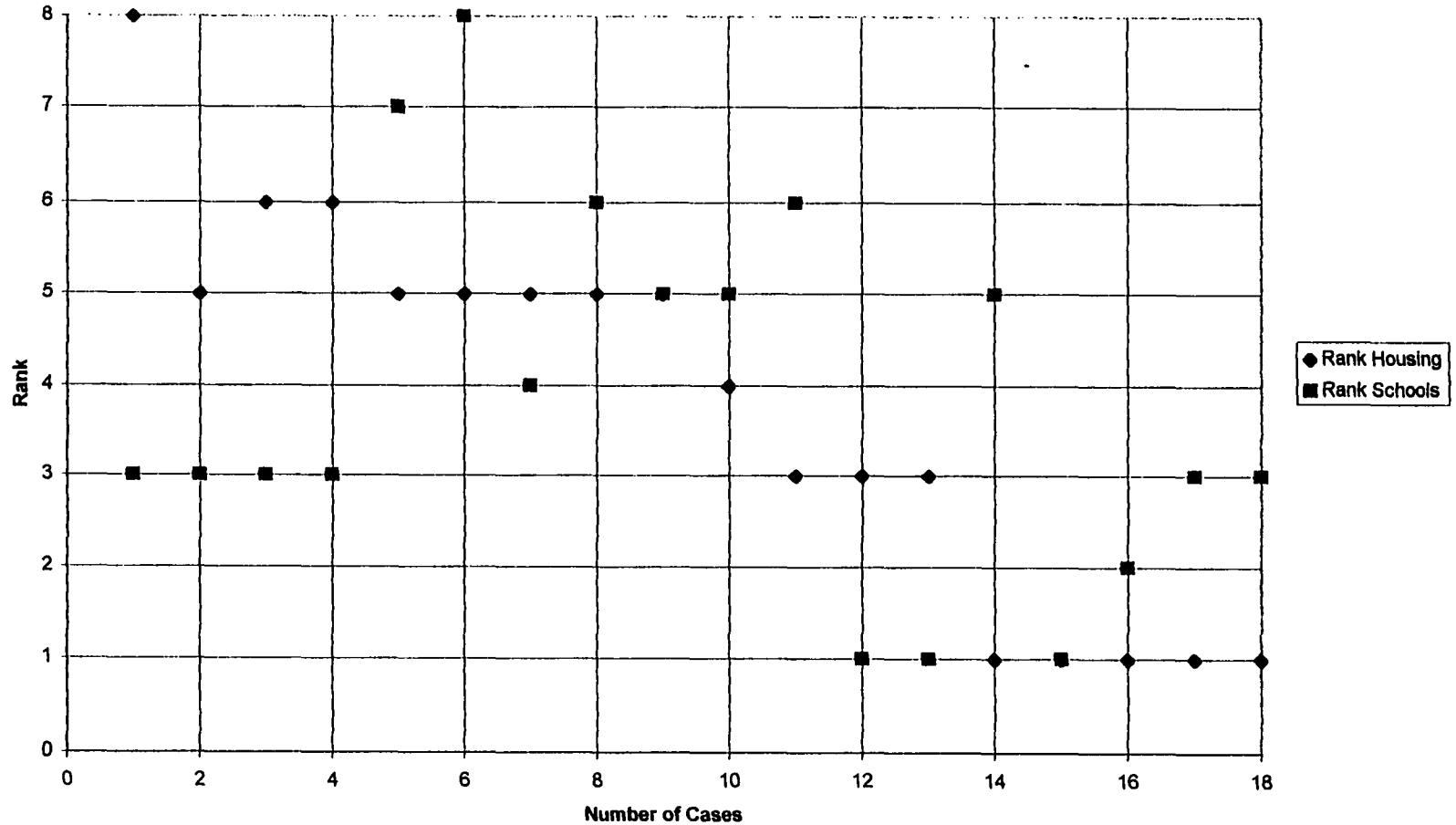


Figure 6.4 Scatter Plot
Housing and School Ranks 1990

Table 6.5

Spearman's Rank Correlation of Value of Occupied Housing and Quality of Schools By Districts. 1970-1980

District	School-Rank (r)	Housing Value-Rank (rs)	$(r-rs)^2$
Bethany	7	4	9
Jones	4	5	1
Millwood	N/A	...	...
Crooked Oak	5	7	4
Oklahoma City	5	5	0
Yukon	5	2	9
Harrah	3	5	4
Choctaw	4	3	1
Western Height	4	6	4
Piedmont	6	6	0
Luther	2	2	0
Midwest City	5	3	4
Edmond	5	1	16
Deer Creek	3	1	4
Putnam City	3	3	0
McLoud	3	6	9
Mustang	4	6	4
Moore	5	1	16

$6 \times (r-rs)^2 = 510$ $\quad$ $n^3 - n = 5814$

$510/5814 = 0.09$ $\quad$ $1 - 0.09 = 0.91$

$r^2 = 0.91$

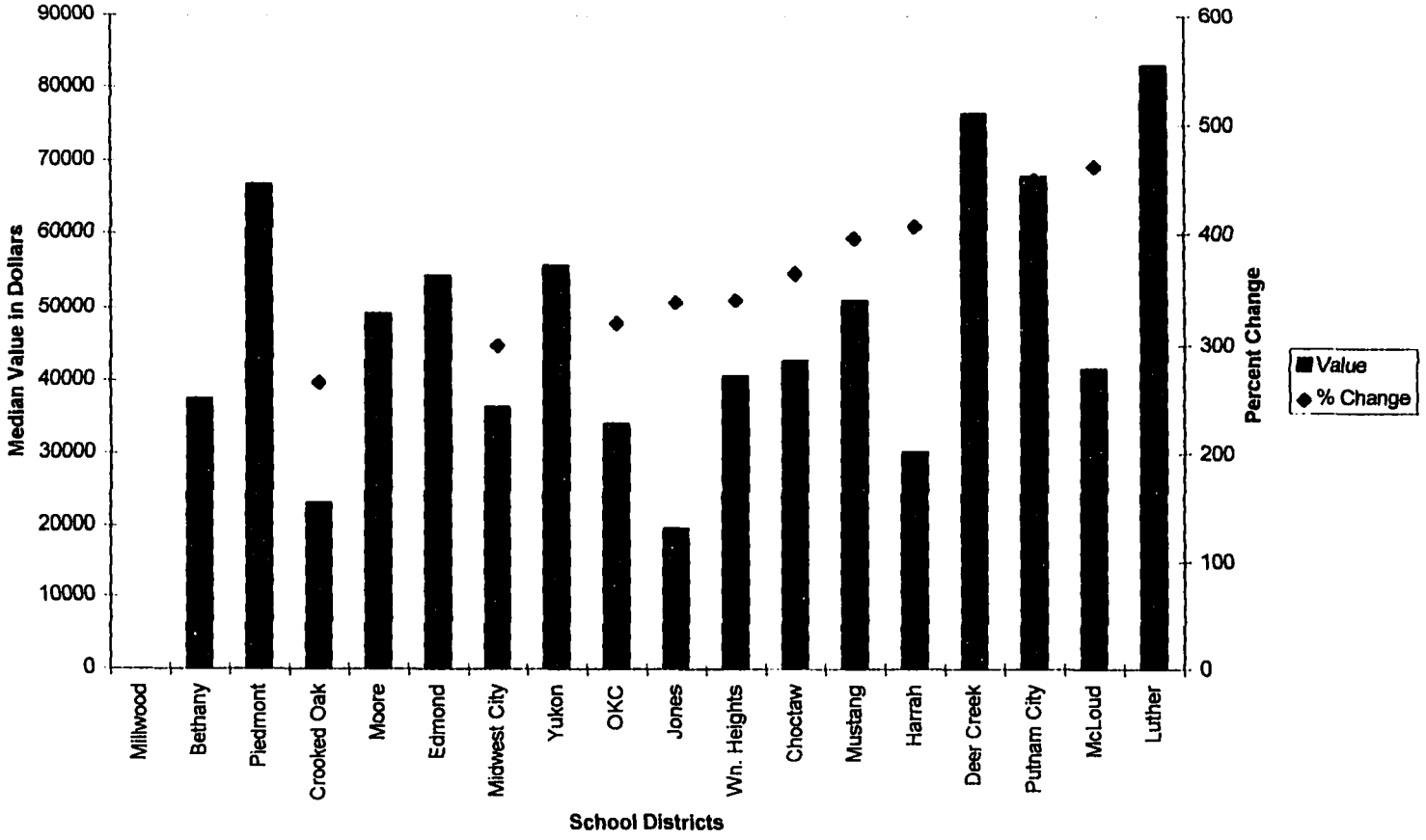


Figure 6.5 **Trend in Median Value of Occupied Residential Units By School Districts 1970-1980**

Table 6.6

Spearman's Rank Correlation Of value of Occupied Housing and Quality of Schools By Districts. 1980-1990

District	School-Rank (r)	Housing-Rank (rs)	$(r-rs)^2$
Bethany	5	4	1
Jones	1	5	16
Millwood	4	8	16
Crooked Oak	5	7	4
Oklahoma City	4	5	1
Yukon	6	2	16
Harrah	1	5	16
Choctaw	3	3	0
Western Height	5	6	1
Piedmont	6	1	25
Luther	6	3	9
Midwest City	5	3	4
Edmond	4	1	9
Deer Creek	3	1	4
Putnam City	5	3	4
McLoud	4	6	4
Mustang	6	3	9
Moore	3	3	0

$6 \times (r-rs)^2 = 834$ $\quad$ $n^3 - n = 5814$

$834/5814 = 0.14$ $\quad$ $1 - 0.14 = 0.86$

$r^2 = 0.86$

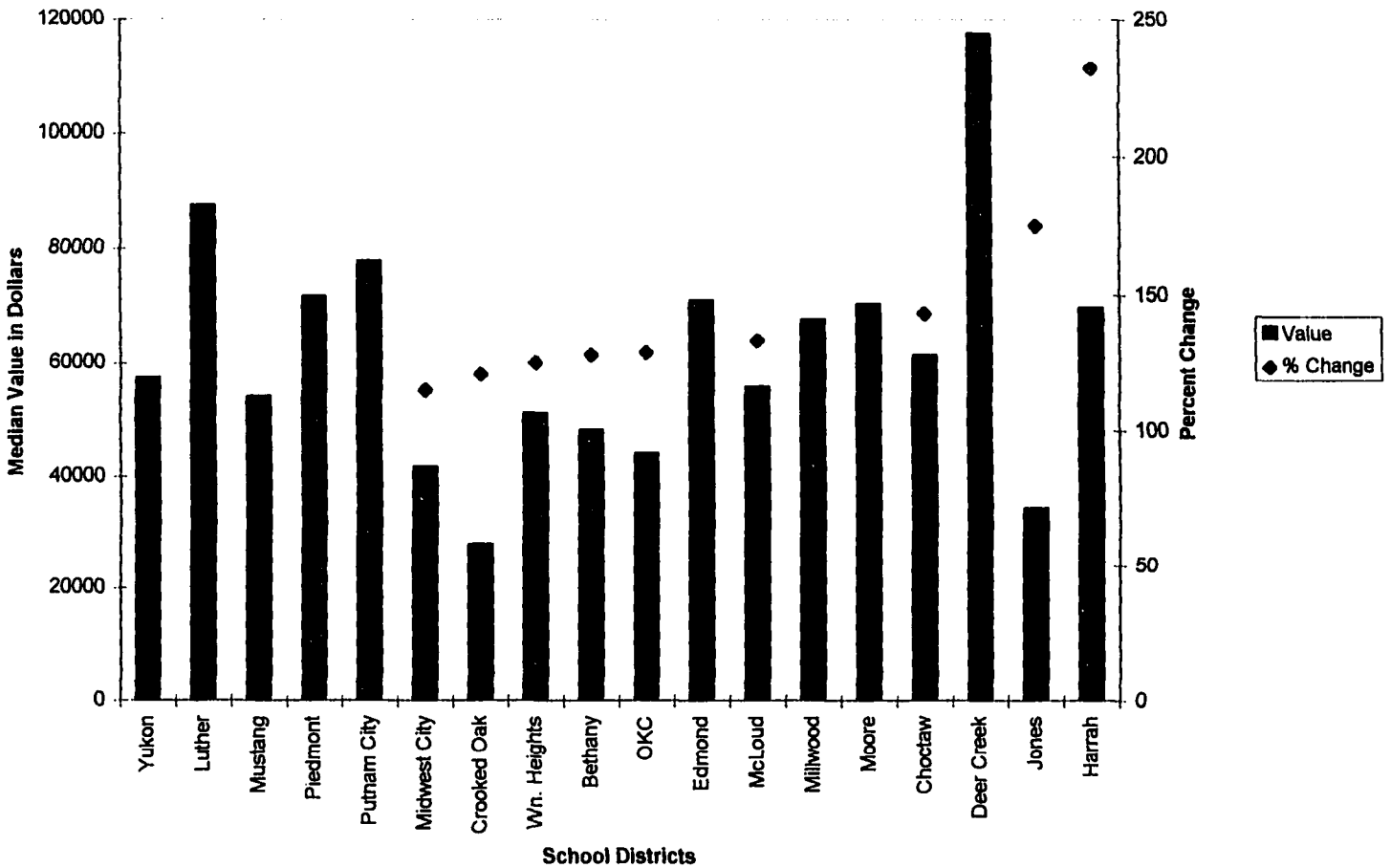


Figure 6.6 **Trend in Median Value of Residential Units By School Districts 1980-90**

School District Quality and Real Estate: Survey with Real Estate Agents -

Since housing choice and residential relocation is a subjective issue, and since the decision to buy a new house, or move from one residential neighborhood to another may be influenced by several factors, it was important to investigate the importance of school districts as a factor in real estate markets. A sample interview with real estate agents was therefore conducted to get insight into the housing market and factors that determine residential location. The objectives of this interview were to find:

a) whether school district quality has an important influence on residential location

b) how people evaluate school district quality

c) what are the other common factors that influence the decision-making process

d) whether the real estate agents deal with comparative assessment and ranking of school districts in the Oklahoma City MSA

e) whether the results from this survey can be quantified and compared with information obtained through secondary sources and statistical analysis.

Eight relators from different parts of the metropolitan area were selected for interview. It was anticipated that these realtors work strictly within their respective zones. However, there is no such zonal distribution of market areas among the real estate agents. It is more due to convenience than any rule. All realtors interviewed had a comprehensive knowledge of the housing market of the Oklahoma City metropolitan area.

In response to the issue of school district quality as a factor in residential location

and residential choice, all realtors indicated that school quality is an important factor in residential location. However, the strength of its influence may vary depending upon certain factors or a combination of factors such as age and family structure, average household income and personal preferences or priorities other than school quality. In general, middle-age people with school-age children are more concerned about school district quality. Others are concerned too since the quality of school district affects resale value and appreciation of property. Thus, real estate agents did support the statistical finding that price value of residential units and quality of school districts are positively correlated. However, the issue of public school quality is of lesser concern for a high-income group people and those who buy houses priced at $250,000 and above in the Oklahoma City Metropolitan Area. Also, the issue of school district quality is of a little concern for buyers interested in a house itself, aesthetics, or a personal preference for the property.

Regarding availability and source of information, it appeared that realtors do not provide a detailed information about the school district quality to their prospective customers. Generally, they furnish some statistical information such as class size, student-teacher ratio, extracurricular programs and scores on achievement tests. These ire obtained from the office of the school district superintendent. Realtors and real estate agents prefer not to praise one school district over the others. Most of the agents interviewed were defensive on this issue and preferred to evade the issue of quality assessment. They are aware that considerable differences exist among school districts in terms of quality, but they cannot categorically identify them and rank them into an order.

Not all of them are aware of the Oklahoma State Board of Education's School Indicator program that provides relative ranking of school districts in the state of Oklahoma. Real estate agents leave it up to buyers to do the quality assessment. Mostly, buyers have a preconceived idea about school districts either through word of mouth or use their own judgment. According to realtors, prospective customers also collect first-hand information from school district administrators and do a comparative evaluation of school districts. Their evaluation is based on certain basic indicators such as student-teacher ratio; scores on achievement tests; college going rate; availability of special programs such as extracurricular activities, sports, art, etc.; school policy and administration; safety and community.

Generally, school districts with low student teacher ratios are perceived to be better. From this point of view, some of the real estate agents predict that the Edmond school system is now over crowded, and that is likely to make Edmond a less desirable area as far as future growth is concerned. However, the city of Edmond has planned for an additional school. This is likely to keep Edmond as a desirable school district as it is currently perceived.

Other than school quality, factors that affect decision making as regards housing choice are neighborhood characteristics, safety and security, landscape and aesthetics. Preference for fringe areas is also important because it offers a small-town atmosphere as well as proximity to a big city. Realtors commented that accessibility and commuting distance are not of concern in the Oklahoma City MSA, since interstate highways facilitate easy accessibility to all parts of the metropolitan area. However, expansion and growth of

residential areas within school districts is determined by aesthetics, land availability and zoning laws.

Thus, interviews with realtors provided first-hand information and insight into housing markets in the Oklahoma City metropolitan area. One of the objectives of the interviews was to quantify and compare the findings with statistical analysis. It was not possible to do so because the agents prefer not to rank school districts, and also there was a considerable amount of personal bias involved.

Real estate agents prefer not to give out judgments about school districts. They provide some basic statistical information about the school districts and leave it to their customers to reach a decision. However, they all agree that school district quality varies within the Oklahoma City MSA and that it is a very important factor affecting residential location choices.

Analysis of Findings

The present work has indicated that the quality of school districts has significant influence on people's choice of residential location in the Oklahoma City metropolitan area. However, housing choice is a complex issue. Although, a high correlation has been found between the quality of school districts and trend of growth in residential areas, other factors need to be investigated, as well. Analysis of residential growth in historic perspective may throw more light on this complex issue.

Schools emerged as an important factor in residential location following the Brown v. Board of Education case. It may not be considered to be the triggering factor behind white flight, but it did fuel the tendency of the white population to move away from the

central city. The process of suburbanization had already started in the Oklahoma City area before the implementation of school desegregation. In early 1950, with in-migration of black population from the surrounding rural areas, the relatively affluent white population started to leave the central city. Thus influx of the black population served as the "push-factor." On the other hand there were several "pull factors" associated with the suburban areas, such as greater space, greenery, lower-cost family housing, low-tax rates, federal suburban housing loan policy and transportation. These pull factors were stronger than push factors (Katzman 1978).

While the positive attraction of a suburban environment continued to be dominant, the desegregation policy added to the negative image of the central city. However, the magnitude of white flight resulting from desegregation varied based on age and related demographic characteristics such as ethnic composition of the district. Greater white flight was registered in the areas of elementary school desegregation thus indicating that age was a factor affecting the magnitude of white flight. Besides, the flight also appeared to be a function of proportion of white enrollment in the district. Greater flight occurred in areas where whites were assigned to formerly black school districts. The flight to suburbs was higher where schools were not desegregated. Continuing uncertainty about where one's children would be attending school was another crucial factor that added to white flight (Hawley et al. 1981). Similarly, busing per se was not a factor behind white flight. It was busing for desegregation that contributed to out-migration of the white population from the central city and unified school districts. However, this protest against busing was not overtly expressed (McCnahay and Hawley 1977).

Analyzing the relative importance and significance of push and pull factors, as well as implications of busing on white-flight, Hirschman (1970) noted that people will consider exiting from the public school system when they perceive that the cost of seeking other options is lower than the current cost. In this context he referred to both economical cost and psychological cost. This cost factor was weighed in light of the following assumptions:

1. Under desegregation, the quality of education is declining or will decline.
2. Children will be subjected to violence and harassment.
3. Children will be exposed to values that are not in their interest.
4. Parents will lose their influence over their children's education
5. The property value will decline because of a decline in school quality

Thus, school desegregation plans stimulated residential relocation as white households sought to avoid undesirable school districts. Realtors seem to have added to this process. During the peak busing controversy in Charlotte, North Carolina, newspaper ads for house sales used "no busing for the neighborhood" as a selling point (Lord 1977).

Travers (1996) observed that educational choice is becoming increasingly popular because of the prevalent belief that public schools cannot fulfill all the needs. Other factors like drug abuse, violence, and financial destitution are the problems associated with public school systems that force people to look for a better school district. According to Travers, choice in this context is a relative word implying a diversity of parental or school district options.

In light of the historic perspective of white flight, the importance of school districts

on residential relocation may be re-examined. School quality as an important factor of residential relocation operates with a combination of other factors. These include income, transportation, accessibility, utilities, aesthetics, neighborhood, demographic characteristics, personal preferences, etc. (Johnston 1971). An individual's decision is based on a relative assessment of these factors. Housing decisions, thus, tend to be highly subjective.

The choice between public and private schooling is affected by household income and cost of private schooling (Clotfelter 1976). For people who can afford the cost of private schooling, quality of school districts may not be a determining factor in residential location. However, there is a trade off. The price of houses in better quality school districts tend to be higher than those in less desirable school districts. On the other hand, the cost of private school may be tremendously high. Comparing the cost-benefit situation, many people find that it is profitable to buy houses in top school districts even though it costs more per unit of area. Another factor that adds to it is that property taxes and mortgage payments are tax-deductible, unlike private school tuition. Over the past years, both private school tuition and housing values have escalated. By buying a house in a better quality school district, one can avoid the cost of private tuition and get a larger mortgage deduction. As in the Oklahoma City metropolitan area, realtors in other parts of the United States such as Los Angeles have observed that the value of homes in good school districts tend to rise faster than those in less desirable school districts. However, if the school district loses quality, homeowners can lose the value of their house too. (Kristof 1994). Family size and age group play a significant role. School quality appears

to be an important factor among households with school-age children. It is not a prime factor among the elderly and retired, who are more interested in aesthetics and neighborhood qualities.

Although during the interview most of the realtors refused to comment on school district quality, they do use this as a selling point, particularly when it comes to better quality school districts. The fact that a house is located in good school district is emphasized in advertisements. The Edmond city and realtors in Edmond take pride in the good schools of Edmond as one of its qualities and attractions besides safe neighborhoods. open space and proximity to the metropolitan area of Oklahoma City.

The case of Arcadia in Edmond indicates the importance of school districts on residential growth and development (Lawson 1996). This township, located in the southeastern section of Edmond, falls under the Oklahoma City school system, which is perceived as less advantageous as compared to the Edmond school system. According to Oklahoma Educational Indicators, the Edmond school district ranks as number 1 while Oklahoma City school district ranks as number 5. The school district of Arcadia extends over an area of 48 square miles, the majority of which falls within Edmond city limits. Currently, Arcadia has an elementary school. Students beyond grade six are bussed to Oklahoma City schools, which means a bus-ride of approximately 90 minutes every day. Since Edmond schools do not accept children from other school districts, some of the residents have chosen to send their children to private schools and other outlying schools in order to avoid the Oklahoma City schools. Originally, Arcadia was an independent school district that was annexed by the Oklahoma City school district in the 1960s.

Currently, surrounded by Edmond, Luther, Jones and Guthrie school districts, Arcadia looks like an outlier of the Oklahoma City school district. Residents of Arcadia complain that annexation of independent Arcadia was against the laws since the annexation ordinances held that a district must be contiguous to any land it annexed. In 1994, Arcadia residents filed a petition for de-annexation, which was rejected by the Oklahoma City school boards. Therefore, residents of Arcadia are planning to take the issue to court (Lawson 1996). In this case, if the residents win the lawsuit, then Edmond public schools may end up with the area of Arcadia since the majority of it falls within Edmond city limits. Although Arcadia is along I-35 and enjoys favorable location, little growth is taking place in this region.. Over the past five years the community of Arcadia have demanded consolidation with the Edmond school system. It is believed that Arcadia's integration with Edmond school system will trigger its residential development.

From a historic perspective, it appears that good schools in the suburban areas emerged as a result of the migration of relatively affluent population that provided a stronger tax base and income level for better schools. In due course of events, these schools became a point of attraction for more migration. In stead of being an effect, the good school districts became the cause of migration to the suburban area. People wanted to avoid the crowd and congestion of the central city and were looking for more open space and better amenities, such as good schools. The effects of this trend is now more perceptible 40 years after the implementation of school desegregation and bussing.

Chapter 7

SUMMARY , CONCLUSION

AND

SUGGESTIONS FOR FURTHER RESEARCH

A general trend of sprawl in metropolitan areas in the United States started in the post-World War II period. It has been associated with the middle class desire of single-family detached homes. They aspired to move away from the crowd and problems of the central city. Cheap gasoline and affordable cars helped the majority realize their dreams. Open space, low population density a cleaner environment, low crime, more integrated neighborhoods, social interaction, low tax, and better utilities and services were the incentives behind movement toward the suburbs. This tendency was fueled by the Supreme Court's decision in 1954 to implement the policies of desegregation in order to maintain a racial balance in public schools across the United States. The policies for desegregation were implemented at varying scales and generated flight of white population from central city and out of the public school districts. Thus, public schools and quality of school education became factors behind the movement of the population from the central city or public school districts to the fringe areas where schools were not subject to policies of desegregation. In this context, school choice and school quality became important issues.

The present research has indicated that public schools have been important factors in housing choice and residential relocation. The issue of quality education in light of the Brown

v Board of education case of 1954 increased the flight to the suburbs and resulted in segregated neighborhoods in the fringe areas of the city. It added a significant amount of racial undertone to the phenomenon of white flight. The characteristics of the population that moved from the central city to the suburbs were of a relatively affluent white population. The vacant central city was, in turn occupied by relatively low income minorities and blacks who migrated to cities in search of urban employment. This phenomenon was clearly noticed in big cities. Boston, Chicago and Philadelphia were cited as examples where busing and desegregation became controversial issues.

Racial desegregation in educational institutions and community places were important issues for almost four decades in the state of Oklahoma. During 1950-70, Oklahoma city recorded substantial out migration of the white population. Initially, it was in response to the black influx into the city who came from the surrounding rural areas in search of employment. Later, this tendency was aggravated by the court order and stringent measures adopted to implement the Supreme Courts' directive for desegregation. Under the Finger Plan, students were bussed from the central city to maintain more uniform racial balance in public schools. Such a policy was strongly resented. However, resentment against racial desegregation was never overtly expressed. People were against the fact that students were forced to go to a distant school. They decided to move to an outer city location where busing was not enforced. There was marked spatial variation in magnitude of white exodus as a result of busing. Areas with less than a 30 percent black population recorded a lesser magnitude of white flight even though busing was enforced in these areas. This indicated that busing per se was not an issue of resentment. It was busing for desegregation that was strongly resented and expressed in a

rather subtle ways.

Out migration of a higher magnitude during 1950-70 became an issue of concern for city administrations as the tax base of the city was adversely affected. Vacant units and declining cost attracted more minority and low-income migrants to the central city. As the concentration of poverty increased, the tax base for providing basic services such as public safety, sanitation and schools declined. Eventually, the percentage of the black and other minority population became very high in Oklahoma City particularly in the central city and northeastern areas. Current reports indicate that because of residential segregation in the central city and fringe areas, the purpose of busing has been defeated.

As a consequence of the migration of the relatively affluent population to the suburbs, new schools emerged in the fringe areas. These were supported by relatively better tax base and favorable response to bond issues. In the Oklahoma City metropolitan area, the Edmond school district takes pride on the fact that its school system is strongly supported by the residents and they enthusiastically vote on bond issues aimed at improving educational facilities in the district.

The present research indicated that there is a marked variation in the education system and quality of schools within the Oklahoma City metropolitan area. As indicated by discriminant analysis and univariate analysis of selected indicators, relatively better quality schools are located in the fringe areas of the metropolitan region. These are also predominantly white in racial composition. Central city schools, namely Oklahoma City, Millwood and Crooked Oak have a very high percentage of minorities. Millwood is 100 percent black in its racial composition.

Oklahoma City came into existence mainly due to its site advantage in 1889. It emerged as a center of metropolitan dominance since its designation as the state capital in 1910. A rapid increase in its population was recorded between 1910 and 1920. The city also spread in its fringe areas and most of the areal expansion took place as a result of annexation by petition. The early residential developments took place along trolley lines which connected the downtown with the surrounding small towns. Initially, the economy of Oklahoma City was based on trade and agriculture. This was reinforced by the production of oil and natural gas which added to the basic economy of the state. Since its statehood, the city became an administrative headquarters. Also, higher education institutions in the metropolitan area expanded the economic base of this city. The Tinker Air-Force base, created in 1941 during the World War II, brought a new dimension to the economic base of the Oklahoma City metropolitan area. The booming oil-based economy caused a rapid growth in the population of the Oklahoma City area during 1950 to 1970. However, a decline in the central city population was registered in the census of 1980, while the overall population of the metropolitan area increased during the same period. This indicates that the metropolitan area developed as a result of a shift in population from the central city toward the fringe and periphery. Between 1970 and 1980, a high growth rate in housing development took place in Piedmont, Luther, Mid West City, Edmond, Deer Creek, Putnam City, Mustang and Moore, all located in the periphery of the metropolitan area. The central city recorded only a small growth in the number of occupied residential units during this period, which amounted to less than one percent. Between 1980 and 1990, more decline was recorded in the central city and Oklahoma City recorded a negative growth rate for the first time. Negative growth rate was also

recorded in the inner townships of the metropolitan area namely, Millwood and Crooked Oak. However, in fringe areas of the metropolitan region a trend in the number of occupied residential units varied ranging from high positive growth rate in the northwestern sector to a low to negative growth rate in the eastern and southeastern sectors. High positive growth occurred in the townships of Mustang, Yukon, Piedmont and Edmond, while negative growth was registered in Mid West City, and Jones in the northeastern sectors of the metropolitan fringe. This pattern of growth has been depicted by satellite imageries that clearly indicate areas of urban sprawl in the northwestern parts of the Oklahoma City metropolitan area, particularly between Interstate Highways I-40 and I-35. A high density of growth has occurred between Lake Hefner and Lake Overholser during 1983 and 1994. This shows that although a general trend in the growth of fringe areas was noticed, its extent and magnitude varied considerably.

It has been established by earlier research in the area of urbanization and metropolitan evolution that intra-city migration and residential relocation is an outcome of push and pull factors that interact within the sphere of metropolitan areas. Also, different sectors of the fringe area may be perceived differently due to spatial variation in pull factors of migration. Current trends also suggest that there is a significant relationship between the quality of school districts and residential growth. The central city schools are perceived to be less efficient. Hence, these do not serve as desirable districts for residential location. This observation was therefore tested in case with Oklahoma City metropolitan area. Both the trend and pattern in the number of occupied residential units and quality of school districts were arranged into rank order. These were then compared to see if any significant correlation exists between the school

quality and growth of residential areas within the Oklahoma City metropolitan region. In this case study, rank correlation analysis has indicated a very high positive correlation between quality of school districts and growth of occupied residential units during the decades of 1980 and 1990 (0.88 and 0.91, respectively). Also, a very strong positive correlation has been found between median value of occupied residential units and the quality of school districts during 1980 and 1990 (0.90 and 0.86, respectively). Thus an objective statistical analysis indicates that good quality school districts are growing more than the ones which are not perceived to be so good.

Implications and Relevance

Housing decision and residential relocation is an outcome of a complex set of factors. The factors may include income, age, size of household, number and age of children in a household, proximity to workplace, accessibility and transportation, tax base and utility services, quality of the neighborhood, amenities, environmental conditions, personal preferences, etc. The final decision is based on a relative analysis of a cost and benefit situation. Quality of school districts seem to be an important influence since it affects the appreciation of property and real estate value. Also, a good school district is more likely to coincide with a good neighborhood. The central city area of Oklahoma city is an area of least advantageous school districts. This is also an area of a less desirable neighborhood. However, although a very high correlation has been found in the present analysis, careful consideration must be given to other factors before arriving at a conclusion. Quality of a school and the neighborhood are perceived factors. Most of the information regarding schools and neighborhood are disseminated as word of mouth. Also, community and racial segregation

serve as indirect factors that may affect an individual's decision pertaining to residential relocation. In behavioral research and social science, it is important to take into consideration the complex interplay of all possible factors (Figure 7.1).

It is expected that findings of this research will add a new dimension to the understanding of the process of urbanization. The impact of economic factors such as land rent, income distribution on urban land use and organization of urban space has widely been studied. Also, policy issues such as zoning laws and taxation, local government and expansion of utility services have been proved to have significant influence on suburbanization. The demographic component and racial composition of the population in urban areas has been extensively studied and analyzed with the objective of explaining segregation in urban residential neighborhoods and intracity migration. Urban sociologists have extensively studied the impact of bussing and desegregation of schools, to analyze whether racial desegregation in school was actually achieved and whether it was successful in providing equal educational opportunities to blacks.

Findings from this research indicate that nearly four decades after the implementation of school desegregation, central city schools in the Oklahoma City area continue to be of relatively poor quality. On the other hand, schools in the fringe areas are of relatively better quality. Also, it indicated that school choice may significantly affect people's choice of residential location, and it is likely to be reflected into urban land use and pattern of growth of residential areas.

Second, this research presented a comparative profile of 18 independent school

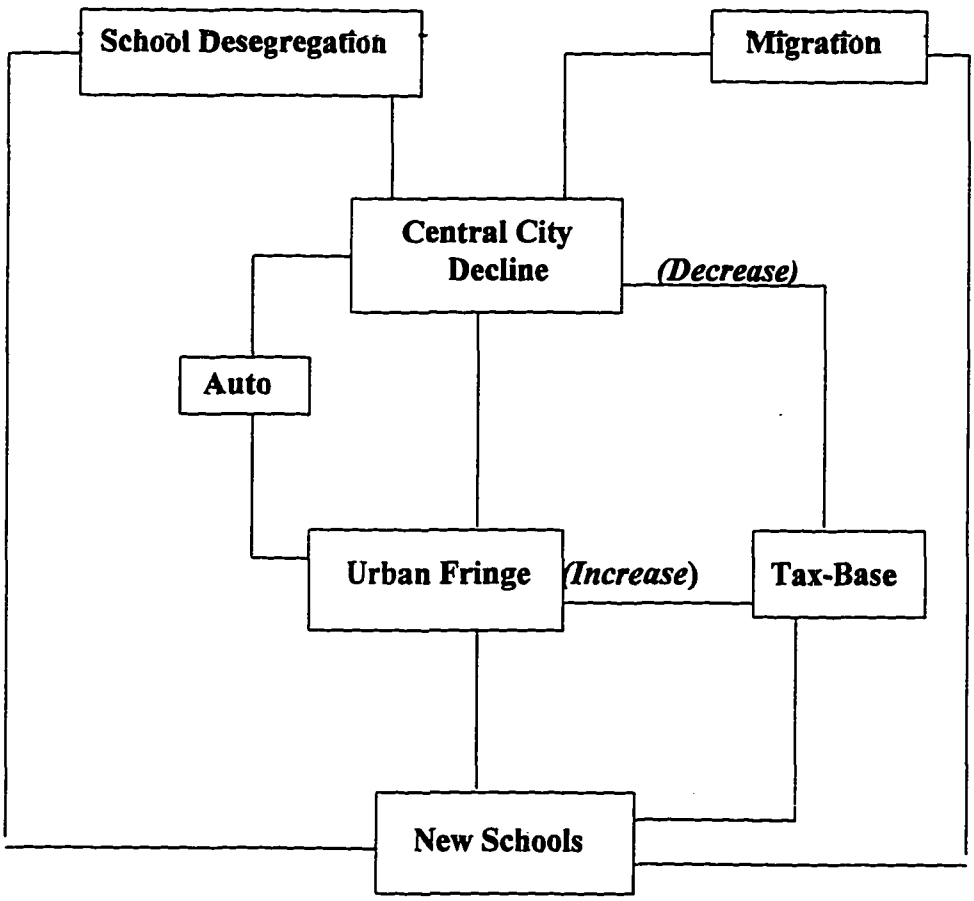


Figure 7.1: The complex interplay of factors that affect residential relocation decisions.

districts in the Oklahoma City metropolitan area for the period starting from 1970-71. It presents a relative rank order of school districts based on their quality. This may supplement the information furnished by the Oklahoma School Indicators Program, as the rank order conforms with that of the Oklahoma School Indicators Program.

Third, this research establishes that satellite imageries may be used as a primary source of information and for change detection analysis of residential land use. It also may be used for collecting a comprehensive information about the pattern and direction of sprawl of metropolitan areas. In this case, the primary information collected from satellite imageries was supplemented with more detailed information on number and median value of occupied residential units obtained from the Bureau of Census. This research has indicated that schools do have a significant influence on people's choice of residential location.

Suggestions for Further Research:

Due to limitations of the present work, it was not possible to investigate all other factors that may act in association with the school choice and school quality, thus affecting the issue of residential relocation and intracity migration. This research has been done in a very controlled manner by limiting the analysis of residential growth in light of school district quality. It is believed that although strong correlation exists between the two, the findings must be applied with caution.

First of all, it is suggested that the same research may be conducted in other cities where significant migration has taken place due to school desegregation. A different case study will indicate whether the findings of this research is a chance or a general rule.

Second, an extensive questionnaire survey may be conducted in areas where residential

growth is very high to find out whether residents consider the quality of schools as one of the important issues while making residential choice decisions. In this research, real estate agents were surveyed and they unanimously supported the research hypothesis that school quality is an important factor affecting the decision making process of a prospective buyer. A detailed survey of residential neighborhoods of Edmond, Moore, Deer Creek, Yukon and Mustang will indicate whether the quality of schools in these neighborhoods was one of the prime attractions for the current residents.

Third, it is important to correlate the quality of school districts with the median income distribution pattern. It has been suggested that good schools emerged as a result of migration of relatively affluent population from the central city to the suburbs. This provided a stronger tax base and prospective investment toward quality schools. However, once these schools were established they became pull factors for more migration and residential relocation. It is important to investigate whether the pattern of income distribution is significantly correlated with school quality.

Also, it is relevant to investigate whether good quality schools as measured by input indicators excel at performance indicators such as graduation rates, test scores, college going rates, etc. Measurement of performance indicators or output variables was ignored in the present work.

Findings of this research provide more insight into the dynamics of urbanization. In a postindustrial society such as in the United States, environmental qualities and amenities seem to be controlling people's choice of residential location. During the early phases of metropolitan evolution, central city areas served as the focal points of business and residential

location. This was followed by the phase of transportation expansion and subsequent decentralization of metropolitan areas. As a result, central city areas were caught in a vicious circle of out-migration and economic decline. On the other hand, suburban areas thrived. These areas enjoyed a stronger tax-base and residents who were willing to support issues for the benefit of communities such as bonds for school improvement. Better community facilities and amicable atmosphere attracted more population to the suburban fringe areas. In this way metropolitan areas sprawled at the cost of the central city.

Findings of the current study suggest that urbanization is a cyclic process. It is more obvious in post-industrial societies where people's preference regarding residential choice is clearly imprinted on land use pattern. In the last four decades since the implementation of bussing and desegregation, schools have become a cause rather than an effect of migration. Thus, real estate price and demand for housing are higher in areas where schools are perceived to be of better quality. Furthermore, since the process of urbanization is cyclic, the current trend may not continue for very long. A change in the current trend may happen as a result of population growth which is likely to cause stress on services and community facilities in the fringe areas. Crowd and congestion have negative impact on residential location choice. If fringe areas get crowded, these will become less desirable. For example, Edmond's population growth has resulted in a higher enrollment in Edmond schools. As a result, in order to maintain its low student-teacher ratio, Edmond decided to construct an additional school.

Another probability that may alter the current trend of metropolitan sprawl is that with a shift in age-cohort, the newly developed residential neighborhoods will eventually have a more upper-middle and elderly population. This will adversely affect local income and the tax

base. Unless these neighborhoods and townships maintain their own economic base, a slow-down and reversal of growth may happen. During the course of the present study, it appeared that low growth in Putnam City has occurred due to a natural shift in age-cohort and the resulting income stagnation. On the other hand, Edmond is growing also largely due to its own economic base. It is important to study these dynamics of metropolitan growth and development.

BIBLIOGRAPHY

Adams, J. S. (1969): Directional Bias in Intra Urban Migration. *Economic Geography*, vol. 45, no. 4

_____ (1970): Residential Structure of Midwestern Cities, *Annals of the Association of American Geographers*; vol. 60, no. 1

_____(1987): Housing America in the 1980s. *A Census Monograph Series*. Russell Sage Foundation, NY.

Aldrich, F.T. (1981) - Land Use Data and their Acquisition, in Lounsbury, J.L., Sommers, L.M. and Fernald,E.A. (eds.) Land Use A Spatial Approach. Kendal Hunt Publishing Co. U.S.A. and Canada.

Alonso,W (1960): A Theory of the Urban Land Market, *Papers and Proceedings of the Regional Science Association*, vol 6, 149-58.

_____(1964): Location and Land Use. Harvard University Press. Cambridge, MA

Archbald, Doug (1996): Measuring School Choice Using Indicators. *Educational Policy*. vol.2

Armor,D.J.(1978): White Flight, Demographic Transition, and The Future of School Desegregation. Rand Corporation, Santa Monica,CA.

Astin, A.W. (1985): Achieving Educational Excellence. Jossey-Bass, San Francisco, CA

_____ (1991): Assessment for Excellence: The Philosophy and Practice of Assessment and Evaluation in Higher Education. McMillan, Toronto: NY.

Barrett, F.A.(1973): Residential Search Behavior: A Study of Intra-Urban Relocation in Toranto, Geographical Monographs no.1, York University, Toranto.

Barlow, R.(1958): Land Resource Economics: The Political economy of Rural and Urban Land resource Use, Prentice Hall, New Jersey.

Bassett,K. and Short,J.R.(1980): Housing and Residential Structure: Alternative Approaches, Routledge and Kegan Paul, London.

Bather, N.J.(1976): The Speculative Residential Deveoper and Urban Growth, Paper 47, Department of Geography, University of Reading.

Beale,C.L. (1975): The Revival of Population Growth in Non-Metropolitan America, Economic Research Service, US Department of Agriculture.

Bell,W.(1958): 'Social Choice, Life Styles and Suburban Residence', in Dobriner,W.(ed.)The Suburban Community, Putman, New York.

Berry, B.J.L. (1975): Urbanization and Counterurbanization, Sage, Beverly Hills.

_____ (1976): Ghetto Expansion and Single Family Housing Prices: Chicago 1968-1972. Journal of Urban Economics. Vol. 3

_____ (1973): Growth Centers in the American Urban System. Bollinger Publishing Co. Cambridge, MA.

_____ (1986): The Nature of Cities and Beyond, In Michel P. Conzen (ed.) *World Pattern of Modern Urban Change- Essays in Honor of Chauncy D. Harris*, The University of Chicago, Department of Geography Research Paper, No. 217-218

Bogue,E.G. and Saunders,R. L.(1992):The Evidence for Quality: Strengthening the Test of Academic and Administrative Effectiveness. Jossey-Bass Publishers, San Francisco.

Bourne,L.S.(1981): The Geography of Housing, Arnold, London.

Boulton, S.W.(1983): Desegregation of the Oklahoma City School System. *Sunday Oklahoman*, February 13.

Bowden (1979): Using Remote Sensing for Planning Applications in Kristina Ford (ed.) *Remote Sensing for Planners*, Center for Urban Policy Research, Rutgers, The State University of NJ.

Bradford. D.F. and Kelejian, H.H.(1973): An Economic Model of the Flight to the Suburbs. *Journal of Political Economy*. vol. 81

Brown, L.A. and Moore, E.G. (1970):'Migration Flows in Intra-Urban Space: Place Utility Considerations', Annals, AAG, 60, 368-87.

Burgess, E.W.(1925): The Growth of the Citiy. in R.G. Park, E.W.Burgess, and R.D. McKenzie eds. *The City*, University of Chicago Press, Chicago.

_____(1928): Residential Segregation in American Cities. *Annals of the American Academy of Political and Social Science*. No. 140

Campbell, J.B.(1983): Mapping the Land: Aerial Imagery for Land Use Information. Resource Publications in Geography, AAG, Washington D.C.

Carr, J.H.and Duensing, E.E.(1983):Land Use Issues of the 1980s, CUPR, New Jersey.

Carrison, M.P.(1978): Beyond Busing, Journal of Education, 160 (2), 63-74.

Champion, A.G.(1989): Counterurbanization: The Changing Pace and Nature of Population Deconcentration. Edward Arnold, NY

Checkoway,B.(1980): 'Large Builders, Federal Housing Programmes and Postwar Suburbanization', International Journal of Urban and Regional Research, 4, 21-45.

Clark,D.(1985): Post-Industrial America: A geographical Perspective, Methuen, New York: London.

Clotfelter, C.T. (1975): Spatial Rearrangement and the Tiebout Hypothesis: The Case of School Desegregation. *Southern Economic Journal*. Vol. 42

Coleman, J.S. (1975): Recent Trends in School Integration. *Educational Researcher*, Vol. 4.

_____ (1966): Equality of Educational Opportunity. U.S. Department of Health, Education, and Welfare, Office of Education, Washington DC

Coleman, J.S., Kelly, D.S., and Moore, J.A. (1975): Trends in School Segregation, 1968-1973. Urban Institute, Washington D.C.

Cookson,Jr. Peter W.(1994):School Choice: The Struggle for the Soul of American education, Yale University Press, New Haven: London.

Crecine, J.P. (1964): Time Oriented Metropolitan Model. Pittsburgh Community Renewal Program, Technical Bulletin # 6, Reprinted in S.H. Putman ed. *Urban Residential Location Models*, Studies in Applied Regional Science, Martin Niijhoff Publlishing, Boston, MA.

_____(1968): A Dynamic Model of Urban Structure, Rand Corporation, Santa Monica.

Crosby,P.(1984):Quality Without Tears. New York: McGraw Hill.

Cross, G.L. (1975): Blacks in White Colleges: Oklahoma's Landmark Cases. The University of Oklahoma Press, Norman, OK

Cunningham,G.K.,Husk,W.L. & Johnson,J.A.(1978): The Impact of Court-Ordered Desegregation on Student Enrollment and Residential Patterns (White Flight), Education, 1978, 160 (2), 36-45.

Dale, E.E., Wandall, M.L. (1948): History of Oklahoma. Prentice Hall, NY.

Du Pont, Pete (1991):Educational Enterprise Zones, in David Boaz (ed.) Liberating Schools: Education in the Inner City. CATO Institute, Washington D.C.

Ehler, M. (1990): Application of SPOT Data for Regional Growth Analysis and Local Planning . *Photogrammetric Engineering and Remote Sensing.* Vol 56, no. 2

Evans,A.W.(1973): The Economics of Residential Location, McMillan, London.

Farley, R. (1975): Residential Segregation and Its Implications for School Integration. *Law and Contemporary Problems.* vol. 39

Farley, R. and Taeuber, A.F. (1974): Racial Segregation in the Public Schools. *American Journal of Sociology.* vol. 79

Farley, R., Richards, T., and Wordock, C. (1979): School Desegregation and White Flight: An Investigation of Competing Models and Their Discrepant Findings. University of Michigan, Ann Arbor.

Feagin,J.R. and Parker,R.(1990): Building american Cities: The Urban real Estate Game, Prentice Hall,Englewood cliffs, NJ.

Fiery, Walter (1947):Land Use in Central Boston. Harvard University Press, Cambridge, MA

Fife,B.L.(1992): Desegregation in American Schools: Comparative Intervention Strategies, Praeger, New York.

Fisher, E. M. (1933) *Speculation in Suburban Land*; American Economic Review, vol. xiii, No. 1 *Supplement*

Franks, K.A. and Lambert, P.F. (1983): The Legacy of Dean Julien C. Monnet: Judge Luther Bohanon and the Desegregation of Oklahoma City's Public Schools. The University of Oklahoma Press, Norman, OK

Freedman, L (1987):Quality in Continuing Education: Principles, Practices, and Standards for Colleges and Universities.Jossey-Bass,
San Frncisco:London.

Frey, W.H.(1979): Black Inmigration, White Flight, and the Changing Economic Base of the Central City. University of Wisconcin, Madison.

_____(1989): Regional and Metropolitan Growth and Decline in the United States. Russell Sage Foundation, NY.

_____(1989): United States; Counterurbanization and Metropolis Depopulation, in A.G. Champion ed. *Counterurbanization*, Arnold, London.

Fujita, M (1989): Urban Economic Theory: Land Use and City Size. Cambridge University Press. Cambridge, MA

Gappert (1985):Urban Issues in an Advanced Industrial Society, in P. Hall and A. Markusen eds. *Silicon Landscapes*, Allen Unwin, Boston.

Gautam, N.C. (1976): Aerial Photo Interpretation Techniques for classifying Urban Land Use. *Photogrammetric Engineering and Remote Sensing.* Vol 42

Garvin,D.(1988):Managing Quality.New York:Free Press.

Getis, A.(1969): `Residential Location and the Journey from Work', Proceedings, AAG, 1, 55-9.

Gibson, A.M.(1984): The History of Oklahoma. University of Oklahoma Press. Norman, OK

Grace,G.(1984): Education and The City: Theory, History and Contemporary Practice, Routledge and Kegan Paul, London: Boston: Melbourne: Henley.

Goldner, W. (1968): Projective Land Use Model: A Model for the Spatial Allocation of Activities and Land Uses in a Metropolitan Region, Bay Area Transportation Study Commission, Berkeley.

Goodchild, B. (1990): Planning and the Modern/Post-Modern Debate. Town Planning Review. vol. 61, no. 2

Goodman, J L. Jr. (1978): Urban Residential Mobility: Places, People, and Policy, The Urban Institute, Washington D.C.

Goodnew,R.K. and Marsden,W.E.(1992) eds.,: The City and Education in Four Nations, Cambridge University Press, N.Y.

Grunig, J.E. and Hunt, T. (1984): Managing Public Relations. Holt, Reinhart, and Winston, NY.

Gupta, D.M. and Munshi, M.K. (1985): Urban Change Detection and Land Use Mapping of Delhi. *International Journal of Remote Sensing.* vol. 3, no. 3 and 4.

Hall, P.(1985): Great Planning Disasters, Weidenfield and Nicolson, London.

Hall,P and Hay, D.(1980):Growth Trends in the European Urban System, Heinman, London.

Harris, Paul M. and Ventura, Stephen J.(1995):The Integration of Geographic Data with Remotely Sensed Imagery to Improve Classification in an Urban Area, Photogrammetric Engineering and Remote Sensing, Vol. 61, No. 8

Harrison, C. (1991): Public Schools USA: A Comparative Guide to School Districts. Peterson's Guide.

Harvey, D.(1973): Social Justice and The City, Edward Arnold, London.

_____ (1987): Urban Land Economics, McMillan.

_____(1989): The Condition of Post-Modernity. Blackwell, Oxford.

Hay, D. (1990): On the Development of Cities, in D. Cadman and G. Payne eds. The Living City, Routledge, London.

Hayes,E.J.(1981): Busing and Desegregation: The Real Truth, Charles C. Thomas, Springfield. IL.

Hawley , W.D., Crain, R.L., Rosell, C.H., Fernandez, R.R., Schofield, J.W., Smulie M.A., Tompkins, R., Trent, W.T., and Zlotnik, M.S.(1981): Strategies for Effective School Desegregation. In Hawley, W.D. (ed.) *Assessment of Current Knowledge about the Effectiveness of School Desegregation Strategies.* Institute for Public Policy Studies, Center for Education and Human Development Policy, Vanderbilt University, Nashville, TN.

Hawley,W.D.(1981) ed.: Effective School Desegregation: Equity, Quality and Feasibility, Sage Publications, Beverly Hills, London.

Hirschman, A.O. (1970): Exit, Voice, and Loyalty. Harvard University Press, Cambridge, MA.

Hoyt, H. (1939): Structure and Growth of Residential Neighborhoods in American Cities. FHA, Washington DC.

Hughes, James W. (1975): Dilemmas of Suburbanizationand Growth Contols, The Annals of the American Academy of Political and Social Science, 422, Nov. 1975

Ingram,G.K. ed. (1977):Residential Location and Urban Housing Markets. Cambridge, MA.

Isard, W.(1956): Location and Space Economy. MIT Press. Cambridge, MA

Jackson, J.(1950)History of Education in Eastern Oklahoma. Ph.D. Dissertation. University of Oklahoma, Norman.

Jacobi, Fern H (1960): Changing Pupils in a Changing School, Educational Leadership, 17. reprinted in Kerber and Bommarito (ed.) The Schools and the Urban Crisis (1965), Holt, Rinhart, and Winston, N.Y.: Chicago: San Francisco.

Jensen, J. R. (1982): Detecting Residential Land Use Development at the Urban Fringe. *Photogrammetric Engineering and Remote Sensing*. vol. 48, no. 4

Johnston, R.J.(1971): Urban Residential Pattern: An Introductory Review, Bell & Sons, London.

Katzman, M.T. (1978): The Quality of Municipal Services, Central City Decline, and Middle Class Flight. Harvard University Press. Cambridge, MA.

Kerber, A.and Bommarito, B.(1965):The Schools and the Urban Crises: A Book of Readings, Holt, Rinehart, and Winston. N.Y.: Chicago: San Francisco.

Kirby, D.A.(1983):Housing, in M.Pacione (ed.), Progress in Urban Geography, CroomHelm. London: Canberra.

Kivell,P.(1993): Land and The City: Pattern and Processes of Urban Change, Routledge, London: New York.

Knox (1989,1991): Urban Social Geography: An Introduction. Longman Scientific and Technical, NY.

Kristof, K.M. (1994):Three Keys to Real Estate: Location, Location, Location, Los Angeles Times, June 5

Lambert, G. and Rankin, G. (1968): An Outline History of the State Department of Education 1900-1965, Oklahoma Commission on Educaational Adminstration, Department of Education, State of Oklahoma.

Laurrent, Perrin (1990): The Developemnt of Urban Fringe Seetlemnet in Sub-Saharan Africa: A GIS Model of Informal Urbanization Based on Remotely Sensed Data, unpublished dissertation, Harvard Univ.

Lawson, L. (1996): Parents: Arcadia De-annexation only Solution , *The Edmond Evening Sun*, March 22.

Lo, C.P.(1981): Land Use Mapping of Hong Kong from LANDSAT Images: An Evaluation. *International Journal of Remote Sensing.* vol. 2, no. 3

Lo, C.P. (1986): Applied Remote Sensing. Longman Scientific and Technical. NY

Long,R.E.(1991) ed.: The State of U.S. Education, The Reference Shelf, vol. 63, no. 5, The H.W. Wilson Company, New York.

Lord, D.J.(1977): Spatial Perspective on School Desegregation and Busing. Resource Paper for College Geography. Association of American Geographers. No. 77-3 Washington DC

Lowry,I.S. (1964): A Model of Metropolis, RAND Corp. Santa Monica, CA.

Louis,K.S. and Miles,M.B.(1990): Improving the Tuban High school: What Works and Why, Teachers College Press, Columbia University,
New York: London.

McCanahay, J.B. and Hawley, W.D. (1977): Attitudes of Louisville and Jefferson County Citizens toward Busing for Public School Desegregation: Results from the Second Year. Institute of Policy Science and Public Affairs, Duke University, Durham, NC

McReynolds, E.C. (1954): History of the Sooner State. University of Oklahoma Press. Norman, OK

Morris, J.W. Goins, C.R., McReynolds (1976): Historical Atlas of Oklahoma. The Unoiversity of Oklahoma Press. Norman, OK

Muth, R.F.(1969): Cities and Housing: The Spatial Pattern of Urban Residential Land Use, The University of Chicago Press, Chicago: London.

Oklahoma Department of Education: Results 1993

_____: Results 1994

Orfield,G.(1975): White Flight Research: Its importance, Perplexities and Possible Policy Implications, In Symposium on School Desegregation and White Flight, Center of National Policy Review, Washington D.C.

Pacione,M.(1983) ed.: Progress in Urban Geography, Croom Helm, London: Canberra.

_____(1990): Development Pressures in the Urban Fringe, Land Development Studies, vol. 7

Patel, D.I.(1980): Exurbs: Urban Residential Developments in the Countryside, University Press of America, Washington D.C.

Peters,T., and Austin,N.(1985):A Passion for Excellence. New York: Random House.

Pettigrew, T.F. and Green, R.L.(1976): School Desegregation in Large Cities: A Critique of the Coleman 'White Flight' Thesis. *Harvard Educational Review.* Vol. 46

Pivo, G.(1990): The Net of Mixed Beads: Suburban Office Development in Six Metropolitan regions, *Journal of American Planning Association*, vol. 4, No. 56.

Putman, Stephen H. (1978):Urban Residential Location Models, Martin Nijhoff Publishing, Boston: The Hague: London.

Reeves, R.G ; Anson, A; Landen, D(1975): Manual of Remote Sensing. American Society of Photogrammetric and Remote Sensing. Fall Church. VA.

Rivkin, S.G. (194): Residential Segregation and School Integration. Sociology of Education. Vol. 67.

Relph,E.(1987): The Modern Urban Landscape, The Johns Hopkins University Press, Baltimore, Maryland.

Robson, B.T.(1979): `Housing,Empiricism and the State', in Herbert,D.T. and Smith,D.M. (eds.) Social Problems and the City: Geographical Perspectives, Oxford University Press, Oxford.

Rodwin, Lloyd (1966): The Theory of Residential Growth and Structure, In William L.C. Wheaton, grace Milgram, and Margy Ellin Mearson (eds.) *Urban Housing*, The Free Press, N.Y.

Rossell,C.H.(1975-76): School desegregation and White Flight. *Political Science Quarterly.* vol. 90.

Sargent, Charlse,S.(1972): Toward a dynamic Model of Urban Morphology, Economic Geography, vol 48, no. 4

Scott, A.C. (1939): The Story of Oklahoma City. Times Journal Publishing Co. Oklahoma City, OK

Simmons,J.W.(1968): 'Changing Residence in the City: A Review of Intra-Urban Mobility', Geographical Review, 58,622-51.

Stephens, D.M.(1990): One Room School: Teaching in 1930s Western Oklahoma. University of Oklahoma Press, Norman, OK

Thrall, Grant Ian (1987): Land Use and Urban Form: The Consumption Theory of Land Rent, Methuen, N.Y.

Timms, D.(1971): The Urban Mosaic: Toward a Theory of Residential Differentiation, Cambridge University Press, Cambridge.

Travers, P.D. (1996): Academic Privatization and Choice in Public Education K-12. Education. Vol. 1

Troy, P.N.(1973):Residents and Their Preferences: Property Prices and Residential Quality, Regional Studies, 7, 183-92.

Tuyahov , A.J. Davies S. Holtz, R.K.(1973): Detection of Urban Blight Using Remote Sensing Technique. In Sharokhi F. (ed.) Remote Sensing of Earth's Resources. Conference on Earth Resources Observation and Information Analysis System. vol. II, Tullahoma, TN.

U.S. Bureau of the Census (1970, 1980, 1990): Census Data on Housing and Population Characteristics. Oklahoma City MSA

_____(1984, 1992): American Housing Survey. Oklahoma City MSA.

Vining and Strauss (1977): A demonstration that the Current Deconcentration of Population in the United States is a Clean Break from the Past, *Environment and Planning*, vol. 9

Voith, R (1996): Central City Decline: Regional of Neighborhood Solutions. Business Review. Vol.1

Whitefold, G.T. (1972): The Municipal Enclaves of Oklahoma City: An Analysis of their Functional Relationship to Oklahoma City. Ph.D. Dissertation, The University of Oklahoma.
Wilson, A.G.(1974):Urban and Regional Models in Geography and Planning, Wiley, London.

Wingo, L. Jr. (1961): Transportation and Urban Land Resources for the Future. Washington D.C.

Wong,K.K.(1990): City Choices: Education and Housing, SUNY, Albany.

Zintgraff, Paul (1960): Bedroom Communities and the Schools, reprinted in Kerber and Bommarito (ed.) The School and the Urban Crisis (1965), Holt, Reinhart and Winston, N.Y.: Chicago: San Francisco.

APPENDIX - I

Oklahoma Educational Indicators

Results 1994
DISTRICT REPORT

I. EXECUTIVE SUMMARY

Results 1994 is the "Report Card" prepared by the Oklahoma Office of Accountability to reflect progress in various categories of educational performance, as provided in the Oklahoma Educational Indicators Program. Statistical information on a wide array of educational indicators is presented by school site, school district, and the total state. For the major indicators, changes in state results for the most recent four-year period, where available, are highlighted in the following paragraphs.

Oklahoma's student enrollment in public schools has increased from 573,323 in 1990 to 599,451 in 1994, based upon average daily membership (ADM). This reflects an increase of 4.6% during this period. There has also been a change in the ethnic makeup of our student population since 1990. The number of students in each ethnic category stated as a percentage of the total student population is shown as follows for 1990 and 1994:

	1990	1994	Change
Native American	11.4%	13.6%	2.2%
Hispanic	2.6%	3.3%	0.7%
Black	9.9%	10.3%	0.4%
Asian	1.1%	1.2%	0.1%
White	75.0%	71.6%	-3.4%

The number of Full-Time Equivalent (FTE) classroom teachers increased from 35,559 in 1990 to 39,021 in 1994, resulting in a growth rate of 9.2%. During this same time period, the average teacher salary went from $24,659 to $29,358, for an increase of 19%. The percent of teachers with advance degrees decreased from 41.1% in 1990 to 38.0% in 1994, while the average years of teaching experience was 11.8 in 1994, compared to 11.7 in 1990.

For student achievement, there was an increase in test scores at the state level in 1994 over 1990 in all grades taking the current Iowa Tests of Basic Skills and Tests of Achievement and Proficiency (ITBS/TAP), which were introduced in 1990. The composite percentiles are shown as follows for each grade:

	3rd	5th	7th	9th	11th
1990	55	58	57	59	53
1994	63	65	61	60	58

Oklahoma's average composite score for the American College Test (ACT) improved to 20.3 in 1994 from 20.2 the previous year. This compares to a score of 20.0 in 1990, the first year the current test was introduced. The national average for 1990 and 1994 was 20.6 and 20.8, respectively. On the Scholastic Achievement Test (SAT), Oklahoma's verbal and math scores in 1994 (482 and 537, respectively) were well above the national average and were both higher than in 1990 (478 and 523, respectively).

Results 1994
DISTRICT REPORT

I. EXECUTIVE SUMMARY
(Continued)

All districts in the state converted to the new Oklahoma Cost Accounting System (OCAS) during the 1991-92 school year. These procedures not only ensure uniform reporting from all districts, but also provide much greater accounting detail. Whereas the revenues and expenditures reflected in *Results 1994* involve the General Fund only, it is possible under OCAS to obtain details for other funds as well. Accordingly, we have prepared separate financial reports for each district this year showing revenues and expenditures from all funds. These reports will be issued in a separate publication entitled, *District Financial Results for 1994.*

More than $2.26 billion in total revenues was funded for common education in 1994, which is an increase of 31% over the $1.73 billion funded in 1990. Of the 1994 total, $1.61 billion (71%) was in state appropriated funds. This is an increase of 49% over the $1.08 billion in state revenues appropriated in 1990. Between 1990 and 1994, local revenues decreased from $519 million to $490 million, whereas federal revenues increased from $123 million to $164 million.

There was a total of more than $2.25 billion in expenditures on common education in Oklahoma in 1994, which was an increase of 29% over the $1.74 billion spent in 1990. Of the 1994 total, $1.43 billion (63.5%) was spent on instruction. This was an increase of 30% over the $1.10 billion spent for instruction in 1990.

Other student information is shown as follows for 1990 and 1994:

	1990	1994	Change from 1990 to 1994
Dropout Rate	3.6%	3.6%	0.0%
% Eligible for Free or Reduced-Payment Lunch	36.0%	43.1%	7.1%
% Identified for Special Education	11.3%	11.9%	0.6%
Graduation Rate	78.0%	77.1%	-0.9%

Results 1994
DISTRICT REPORT

II. INTRODUCTION

The Oklahoma Educational Indicators Program was established in May 1989, by Senate Bill 183. All provisions of the program were later included in House Bill 1017, commonly referred to as the Oklahoma Education Reform Act, which was approved by the Governor in April 1990. As a result of an initiative petition, this act was also approved in a vote by Oklahoma's general populace in October, 1991. The Indicators Program is a system developed for the dual purpose of: (1) assessing the performance of public schools and school districts, and (2) reporting to students, parents, and the general public the progress being made in meeting the provisions of the Reform Act. It is intended that there be no undue reliance placed upon any single type of indicator.

The statutes provide that a summary report be prepared each year to inform the people of Oklahoma of the latest results for all categories of measurement included in the Indicators Program. In accordance with this provision, the indicators authorized by the Reform Act have been compiled for the 1993-94 school year separately for each school site, each school district, and the total state, to the extent that the applicable data is available for each of these entities. The reports prepared for each entity are contained in a separate volume, under the master title of *Results 1994*. Each of the three volumes is explained briefly as follows:

1. School Report. This volume contains achievement and writing test scores in tabular form by grade level and subject for each individual school site in the state for the 1993-94 school year. State averages are included for each category so that comparisons may be readily made. Also included in this volume are student enrollment figures, free-lunch eligibility data, and teacher information. In addition, there are appendices showing data for early childhood enrollment, student dropouts, ACT scores, Oklahoma college-going rates, and grade point averages (GPAs) for freshmen in Oklahoma colleges in 1994 who graduated from public high schools in the state the previous year.

2. District Report. This volume contains a separate page for each school district showing indicators in graphic form for the 1993-94 school year. Major categories included are teacher characteristics, student outcomes, student achievement, student characteristics, revenue sources, areas of expenditures, and revenues and expenditures per pupil. School districts have been placed in groups based upon factors related to student performance so that reasonable comparisons may be made among districts.

3. State Report. This volume contains graphs of state-level results for 1993-94 and the preceding school years, where available, for the major categories of measurement. Also included in this volume is a summary of provisions of the Education Reform Act showing the progress made thus far in complying with the various provisions of the Act.

The information contained in *Results 1994* has been compiled for the purpose of informing the public of the progress which has been made during the year towards achieving the state goal of top quality education, as Oklahoma moves forward with its comprehensive education reform program.

III. DESCRIPTION OF DATA IN THE DISTRICT REPORTS

The District Report of *Results 1994* is comprised of separate pages for each district, with each page containing graphs and charts of data for the 1993-94 school year unless otherwise indicated. Charts containing district, similar district, and state information represent data for the individual district, the average of all districts in that group, and the state average, respectively. The group number in the upper right corner of the page represents the classification group for the district, as explained in Section V. Districts with the same group number have the same "similar district" group membership. Shown immediately under the district name is school board information, i.e., the number of school board members in the district and the number reported as having a high school diploma or equivalent certificate. The remaining information for each district is explained as follows:

Membership/Staffing Data

1. **Student Enrollment:** This figure reflects the average daily membership (ADM) in the district across the entire school year rounded to the nearest whole number. ADM is calculated by dividing the total days of membership throughout the school year by the number of days taught.

2. **Attendance Rate:** The student attendance rate is calculated by dividing the Average Daily Attendance (ADA) by the Average Daily Membership (ADM) for the entire school year.

3. **# Classroom Teachers:** This figure represents the classroom full-time equivalency (FTE) among instructional staff throughout the school year rounded to the nearest whole number. The classroom FTE includes kindergarten, elementary, middle school, junior high, high school, and specialty teachers, as well as one-half (.5) FTE for each teaching principal.

4. **# Administrators:** This category includes superintendents, assistant superintendents, administrative assistants to each of these groups, all nonteaching principals, and one-half the Full Time Equivalency (FTE) of teaching principals.

5. **# Counselors:** Only those with the job classification of counselor are in this category.

6. **# Support Staff:** This category includes business managers, treasurers, secretaries, clerical staff, bus drivers, doctors, nurses, food service employees, and teacher assistants.

7. **Students per Teacher:** This is the ratio of the number of students (based on ADM) per teacher (based on FTE).

8. **Students per Administrator:** This is the ratio of the number of students (based on ADM) per administrator.

9. **Teachers per Administrator:** This is the ratio of the number of teachers (based on FTE) per administrator.

High School Indicators

1. **High School Enrollment:** This is the ADM for those students enrolled in Grades 9-12.

2. **Dropout Rate:** The dropout rate is calculated by dividing the number of reported dropouts in Grades 9-12 under age eighteen (statutory definition) by the ADM in Grades 9-12.

3. **Graduation Rate:** This is the number of graduates reported on the Annual Statistical Report (ASR) compared to the ninth grade enrollment of the graduating class (1993-94 graduates ÷ 1990-91 ninth grade enrollment). Net in-migration during this four-year period may cause this rate to exceed 100%. Conversely, net out-migration may result in the rate being understated.

III. DESCRIPTION OF DATA IN THE DISTRICT REPORTS
(Continued)

District Characteristics

1. **# of Board Members:** This is the number of local board member seats in the district.

2. **Length of Term:** This is the length of the term in years for each local school board member.

3. **# Reported with HS Diploma/GED:** This is the number of current board members who have furnished proof of attaining a high school diploma, GED, or postsecondary diploma.

4. **Number of Sites:** This is the number of individual schools (sites) within the district.

5. **Highest Grade Served:** This is the highest grade level served by the district.

6. **# Square Miles:** This is the number of square miles geographically contained within the school district boundaries.

7. **Students per SQM:** This is the number of students (based on ADM) enrolled per square mile.

Graphical Depictions

1. **Student Achievement:** These results are from the Oklahoma School Testing Program, which tests students in Grades 3, 5, 7, 9, and 11, using a nationally-normed standardized achievement test. The Iowa Tests of Basic Skills (ITBS) were selected for use in Grades 3, 5, and 7. The Tests of Achievement and Proficiency (TAP) were selected for use in Grades 9 and 11. A nationally-normed writing test from the Stanford Writing Assessment Program is given to students in Grades 7 and 10.

   A nationally-normed achievement test is developed by randomly selecting a nationally-representative sample of students by factors such as race, gender, socio-economic level, and geographic location. Normative (average) performance by test item and subject area is determined during the pilot testing phase of development from the test results of the sample group. The normative outcomes from the nationally-representative sample become the basis for gauging the performance of students who are subsequently administered the final published and commercially-available versions of the test.

2. **Student characteristics:** Included under this heading are: (1) the percentage of students who were eligible to receive free or reduced-payment lunches from the federal school lunch program, (2) the percentage of students from minority groups, and (3) the percentage of students served in special education. These percentages were based on total district enrollment. The free and reduced lunch percentage is derived by dividing the number of students eligible for free or reduced lunch by the ADM. The percentage of minority students is computed by dividing the cumulative fall membership count among Native American, Asian, Hispanic, and Black students into total fall membership. The Special Education percentage is derived by dividing the nonduplicated special education student count by the ADM.

3. **Revenue & expenditure per student:** The revenue figure used in this calculation was based on the total money available to the district in 1993-94, excluding carryover funds. Expenditure figures were calculated both on total expenditures and the amount spent on instruction. ADM was used to calculate the "per pupil" amounts for both revenues and expenditures, as well as instructional expenditures.

III. DESCRIPTION OF DATA IN THE DISTRICT REPORTS (Continued)

High School Indicators (Continued)

4. **Average ACT Score:** As reported by the Oklahoma State Regents for Higher Education (OSRHE), this is the average composite score on the American College Test (ACT) for 1994.

5. **% Taking ACT:** This percentage was developed by relating the number of students taking the ACT during 1993-94 to the 12th grade ADM for 1993-94.

6. **Oklahoma College-Going Rate:** Also reported by the OSRHE, this rate is computed by taking the number of students in the 17 through 19 age group, as identified in OSRHE's post-secondary Unitized Data System (UDS) file, divided by the number of Oklahoma students reported as graduating from high school in May 1993. The UDS database contains a record for each student enrolled in public and private colleges and universities in Oklahoma in the Fall of 1993. The following caveats exist in the identification of postsecondary students:

   a) The UDS file does not include students who were accepted at an institution but did not enroll, students who enrolled but did not attend classes, or students who enrolled but withdrew within two weeks after classes started.

   b) Students who attend college out-of-state are not included in the UDS system and consequently are not accounted for in the Oklahoma college-going rates.

7. **% College GPA ≥ 2.0:** This is the percentage of 1993-94 college freshmen from the May 1993 graduating class who had a composite Grade-Point Average (GPA) of 2.0 or higher.

Program Participation

1. **% Chapter I:** This is the number of students (unduplicated count) in the district served in Chapter I compared to the districtwide ADM. This percentage represents students served in Chapter I during the 1992-93 school year.

2. **% Gifted/Talented:** This is the number of students identified as gifted/talented compared to the student enrollment in grades 1-12 (based on ADM) during 1993-94.

3. **# Early Childhood:** This is the number of students served in an early childhood (pre-kindergarten) program during 1993-94.

4. **# Adv. Placement Courses:** This is the number of unique Advanced Placement (AP) courses offered during 1993-94. Throughout the state, 17 distinct AP courses are offered.

5. **# Adv. Placement Classes:** This is the total number of AP classes offered during 1993-94. This total could include more than one class of the same type of course. During 1993-94, 537 AP classes were offered statewide from the 17 types of AP courses available.

Teacher Characteristics

1. **Average Teacher Salary ($):** This figure was computed by dividing the gross salaries and fringe benefits by the number of classroom teachers (FTE) for the 1993-94 school year.

2. **% Advanced Degree:** This percentage was computed by dividing the number of classroom teachers (FTE) with an advanced degree by the total classroom FTE.

3. **Avg. Yrs. of Experience:** This figure was computed by dividing the total years of experience for classroom teachers by the classroom FTE.

IV. DISTRICT CLASSIFICATION METHOD

Results 1994 contains district information for the 1993-94 school year for all districts which were in operation for 1993-94, as well as those which were annexed or consolidated for the 1994-95 school year. All school districts in the report have been placed into one of eight classification groups. The purpose of classifying school districts is to formulate groups of districts on the basis of a combination of all factors related to student performance. Student performance is based on test scores from the Iowa Tests of Basic Skills/Tests of Achievement (ITBS/TAP) mandated in the Oklahoma School Testing Program.

The primary goal of performing the district grouping was to create clusters of similar districts in order to allow for equitable comparisons of school districts. In the statistical analyses performed, all available factors were included in a multiple regression procedure using a model that yielded a weighted value for each variable in relation to student achievement. The weighted value represents the extent to which a variable is a predictor of student scores on the standardized tests.

Modifications were performed on two variables prior to conducting the regression procedure. The first modification was made on the dependent variable itself, student achievement. The composite NCE (Normal Curve Equivalent) was aggregated across all the grades which took the ITBS/TAP tests in order to create an "overall" district composite score. By performing a weighted aggregation of scores across grades, the aggregated score is more stable because it is based upon a larger number of students tested. This is especially useful in school districts that test only a small number of students at each grade. In these districts, one or two extremely high or low test scores in any given grade may have a dramatic effect on the district average score in that grade. Performing a cross-grade aggregation results in minimizing the effect of scores at both ends of the distribution. In addition, cross-grade aggregation is advisable since all the predictor variables in the model are based on an overall district average. For example, the percentage of students eligible for free or reduced lunch is based on a districtwide calculation and is not readily available on a grade-by-grade basis. Since no grade-specific data is available for most of the predictor variables, it seems inappropriate to analyze districtwide background data in relation to individual grade-level outcome measures. Therefore, it seems appropriate for the dependent variable, student achievement, to be "overall" as well.

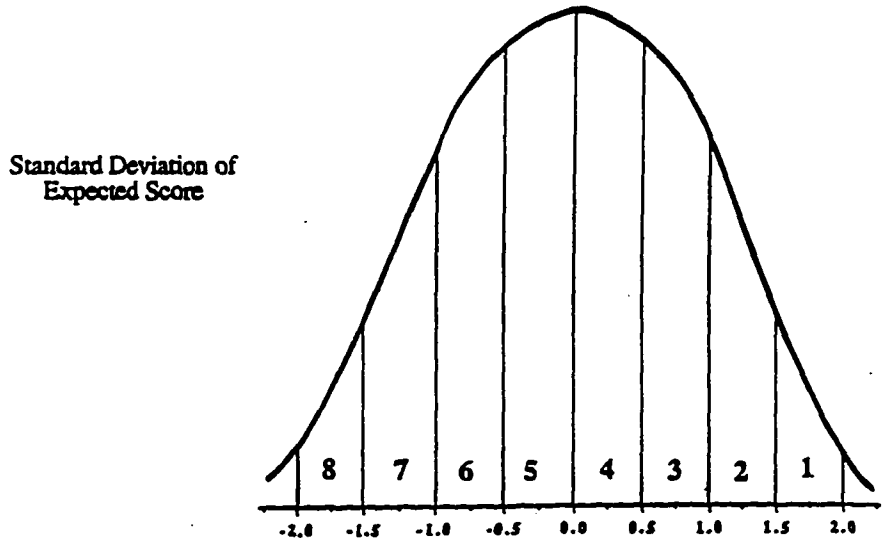
The other variable that was modified prior to conducting the analyses is the free or reduced-payment lunch eligibility. It is well known that there is a significant nonapplication for free or reduced-payment lunch eligibility at the high school level. This results in an underestimation of the low socio-economic status in districts that have high schools. School districts that do not have high schools are not affected by this under-reporting. Thus, comparing the free or reduced-payment lunch eligible percentages of elementary districts (Grades K-8, K-6) with independent districts (Grades K-12) would be spurious. To correct this problem, separate distributions for elementary districts and independent districts were created. Standard scores (Z-scores) were calculated for each distribution and then combined into one single measurement. This was performed because the Z-score value for free or reduced-payment lunch eligibility would be a better representation of a school district's actual socio-economic level than the raw percentage. For example, a 50% free or reduced-payment lunch enrollment for an independent district would result in a Z-score most probably representing a lower socio-economic status level than a 50% free or reduced-payment lunch socio-economic level for an elementary district.

In the aggregation process, a minimum of 30 students must have been tested across all grades given the ITBS/TAP tests in order to be included in the statistical model. This is based on the generally-recognized minimum required to have a normal distribution of scores. A total of 502 out of the 554 districts in this report met the minimum requirement of 30 or more students tested overall. The remaining districts were slotted into a group on the basis of examining the data on those variables generally recognized as having the most potent influences on test scores. These variables include the percent of enrollment eligible for free or reduced-payment lunch, the percent of minorities in a district, and the percent of revenue from local sources.

IV. DISTRICT CLASSIFICATION METHOD
(Continued)

The regression equation that came forth from the analyses yielded a predicted score for every school district which qualified to be in the model (502 districts) based on the weighted value for all variables in the model in relation to student achievement. Predicted scores were then sorted from highest to lowest. The predicted score variable had a normalized distribution, meaning that there was more "bunching" of districts in the middle of the distribution than at either end. Groups were formed on the basis of one-half standard deviation blocks (see below) using the statewide average expected score (standard deviation of 0.0) as the mid-point. Positive standard deviations represent expected scores above the statewide average expected score while negative standard deviations represent expected scores below the statewide average expected score. Thus, the formation of the eight groups of districts shows the largest group memberships in groups 4 and 5 (102 members and 115 members, respectively) while the smallest group memberships are in groups 1 and 8 (35 members and 29 members, respectively). The groups are ordered so that group 1 represents the most "advantaged" districts while group 8 represents the most "disadvantaged" districts.

A regression model using all available predictors was used in the analysis. However, it is useful to identify the variables that had the greatest impact on the predicted score. The most potent variable was prior-year achievement on the standardized tests, which had a correlation with achievement of greater than 0.7. Since such a strong relationship exists between prior-year and current year achievement, prior-year achievement determines to a great extent the district classification group membership. This effect reflects the notion that once a level of performance in achievement is demonstrated, such performance levels should be maintained over time even as new student cohorts with different sets of preabilities move through the system. This expected consistency in achievement performance is probably more easily maintained in those districts with large student enrollment since group to group homogeneity is more likely and the effect of preability outliers is minimized. Beyond prior-year achievement, the next most influential variables in this year's prediction model were free or reduced-payment lunch eligibility, minority enrollment, and local revenue.



APPENDIX - II

Summary Statistics of Discriminant Analysis

- - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

On groups defined by INDEX94

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 7
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .12500

Classification Function Coefficients
(Fisher's Linear Discriminant Functions)

INDEX94 =	1	2	3	4
EXPER94	946.4288	998.6097	959.8216	912.9552
ATTEND94	964.0046	983.2883	965.6908	944.3354
ADV94	-53.35820	-55.87938	-53.90266	-52.08108
OM94	247.7930	263.7653	251.7185	238.2738
194	78.80760	86.88385	80.55227	74.53472
INS94	81.19429	85.76451	82.68259	77.36254
LOCAL94	42.30747	43.02690	42.27319	41.11425
SP94	-1.215368	-15.38845	-3.675170	9.175855
FTE94	.4701102	.4712982	.4675318	.4623144
(constant)	-54632.60	-57485.17	-55050.15	-52114.85

Classification Function Coefficients
(Fisher's Linear Discriminant Functions)

INDEX94 =	5	6	7	8
EXPER94	952.4348	940.5348	957.2488	958.3831
ATTEND94	950.9077	943.8332	948.3867	962.9740
ADV94	-53.52436	-52.36625	-53.33222	-54.18111
OM94	253.0847	245.9794	251.6917	252.1341
ADM94	83.66260	78.19164	81.55476	85.07712
INS94	81.11175	83.12696	83.57954	80.29745
LOCAL94	41.26013	41.34061	41.79271	42.18175
SP94	-15.71363	4.519793	-8.772174	-13.12488
FTE94	.4638815	.4526603	.4540086	.4735884
(constant)	-53483.43	-52779.29	-53458.75	-54638.22

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0000	120.613	63	.0000
1*	49.1751	70.03	70.03	.9900	: 1	.0014	75.584	48	.0067
2*	11.5135	16.40	86.43	.9592	: 2	.0175	46.526	35	.0921

3*	6.5711	9.36	95.79	.9316	:	3	.1325	23.246	24	.5053
4*	1.5711	2.24	98.02	.7817	:	4	.3406	12.386	15	.6496
5*	.8641	1.23	99.26	.6808	:	5	.6349	5.224	8	.7334
6*	.3880	.55	99.81	.5287	:	6	.8812	1.454	3	.6930
7*	.1348	.19	100.00	.3446	:					

* marks the 7 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3	FUNC 4	FUNC 5	FUNC 6
EXPER94	2.79768	-.30118	-.04170	-.23591	-.23583	.08013
ATTEND94	1.56219	1.66591	-.27996	-.07587	.22646	.31997
ADV94	-1.48923	-.35652	.74981	.46757	.81794	.11267
OM94	1.98623	-.70593	-.76368	-.12903	.34600	-.34995
ADM94	.86096	-.64382	-.90187	.51856	-.69565	.84347
INS94	.76594	-.35372	.97172	-.16059	.62617	-.00664
LOCAL94	.74065	.88172	.34411	.54633	-.40159	-.21778
SP94	-.51524	.56712	.95860	-.73589	.01579	.55133
FTE94	.34572	.88763	-.88732	.66420	.11357	.67699

	FUNC 7
EXPER94	-.17732
ATTEND94	.07767
ADV94	.34622
OM94	.69086
ADM94	.17310
INS94	.57334
LOCAL94	-.00033
94	.00985
FTE94	-.51747

Structure Matrix:

Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1	FUNC 2	FUNC 3	FUNC 4	FUNC 5	FUNC 6
INS94	.11603	-.04426	.37236*	.04030	.20233	-.12560
OM94	-.02688	-.02024	-.33191*	-.24797	.18443	-.30808
SP94	-.09920	.04887	.09190	-.51823*	-.10489	.27344
ADV94	-.00857	-.10766	.08655	.50057*	.34468	.47920
LOCAL94	.02203	.18748	.28549	.44044	-.44764*	-.43929
EXPER94	.27024	-.25776	.22599	.13391	.14568	.28405
FTE94	.00493	-.02721	-.08170	.06578	.50526	-.06872
ADM94	.00135	-.07640	-.03059	.20853	-.45311	.57845
ATTEND94	.08027	.38177	-.15289	.02366	.04953	.39628

	FUNC 7
INS94	.24498
OM94	.31874
SP94	-.00357
ADV94	-.00329
LOCAL94	.17457
EXPER94	-.75352*
FTE94	-.69518*
ADM94	.59884*
ATTEND94	.56081*

Total 1.98326 604.16657

- - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - -

On groups defined by INDEX94

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 7
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .12500

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0000	117.442	63	.0000
1*	30.9366	51.37	51.37	.9842	: 1	.0012	77.609	48	.0043
2*	20.5143	34.06	85.43	.9765	: 2	.0252	42.318	35	.1844
3*	6.0445	10.04	95.47	.9263	: 3	.1777	19.868	24	.7043
4*	1.9791	3.29	98.76	.8151	: 4	.5294	7.314	15	.9483
5*	.4475	.74	99.50	.5560	: 5	.7663	3.061	8	.9305
6*	.2897	.48	99.98	.4740	: 6	.9884	.135	3	.9874
7*	.0118	.02	100.00	.1079	:				

* marks the 7 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3	FUNC 4	FUNC 5	FUNC 6
EXPER90	3.81828	1.04254	-.15713	-.00760	.06566	.52853
ADV90	-2.47993	1.74264	1.48544	.22167	-.24005	.21449
LOCAL90	-2.25422	-.56334	-.90482	.30244	.53799	-.92990
ATTEND90	3.74610	-2.22335	-.08491	.53084	.64210	-.25640
ADM90	.83384	1.19290	1.27531	-.30403	.86365	.55442
SP90	.95117	.31575	-.08447	-.71461	-.29500	-.41095
INS90	2.97248	1.29695	1.07185	-.10643	-.22380	-.29128
OM90	3.39055	-.84022	1.24835	-.20726	-.12983	-.04347
FTE90	2.47755	-1.27915	.93818	.36379	.50418	.69117

	FUNC 7
EXPER90	-.61525
ADV90	-.05240
LOCAL90	.38636
ATTEND90	-.23504
ADM90	-.09111
90	.21818
...S90	.42020
OM90	-.23260
FTE90	.51050

Structure Matrix:

Total 1.98326 588.90881

- - - - - - - - DISCRIMINANT ANALYSIS - - - - - - - -

On groups defined by INDEX94

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 7
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .12500

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0007	82.890	63	.0473
1*	10.3271	52.60	52.60	.9548	: 1	.0084	54.977	48	.2274
2*	4.5562	23.21	75.81	.9055	: 2	.0466	35.255	35	.4561
3*	1.8663	9.51	85.32	.8069	: 3	.1336	23.145	24	.5112
4*	1.4703	7.49	92.80	.7715	: 4	.3301	12.745	15	.6220
5*	.8584	4.37	97.18	.6796	: 5	.6135	5.619	8	.6898
6*	.3076	1.57	98.74	.4850	: 6	.8022	2.534	3	.4691
7*	.2465	1.26	100.00	.4447	:				

* marks the 7 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3	FUNC 4	FUNC 5	FUNC 6
EXPER84	.28145	.19806	-.38586	.80343	1.65638	.03418
ADV84	1.19290	1.02426	1.43032	.52513	.06048	-.65224
LOCAL84	.10013	-1.22410	-.72786	.91488	-.15387	.20299
ATTEND84	-1.12836	.05521	.55401	.96507	.32342	-.17722
ADM84	.62535	1.23814	-.11021	.75006	-.06663	.15304
INS84	-.82563	.83670	-.63702	-.62345	-1.16442	.33890
OM84	.92479	.14309	.58339	.85409	.47980	-.40012
SP84	.61916	-.34805	.22187	.76974	.68443	.75863
FTE84	-.84646	-.11817	.90660	.27144	-.42374	.62012

	FUNC 7
EXPER84	.65766
ADV84	.66898
LOCAL84	-.15515
ATTEND84	-.13658
ADM84	-.03252
INS84	.13716
OM84	.27043
SP84	-.01208
FTE84	-.33409

Structure Matrix:

Total 1.98326 607.82215

- - - - - - - - - D I S C R I M I N A N T A N A L Y S I S - - - - - - - - -

On groups defined by INDEX94

Analysis number 1
Direct method: All variables passing the tolerance test are entered.
Minimum Tolerance Level..... .00100

Canonical Discriminant Functions

Maximum number of functions..... 7
Minimum cumulative percent of variance... 100.00
Maximum significance of Wilks' Lambda.... 1.0000

Prior probability for each group is .12500

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr	After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					: 0	.0004	90.155	63	.0140
1*	51.8614	87.86	87.86	.9905	: 1	.0208	44.527	48	.6160
2*	3.2359	5.48	93.34	.8740	: 2	.0882	27.925	35	.7965
3*	2.2027	3.73	97.07	.8293	: 3	.2824	14.539	24	.9335
4*	1.0496	1.78	98.85	.7156	: 4	.5789	6.286	15	.9745
5*	.5969	1.01	99.86	.6114	: 5	.9245	.903	8	.9988
6*	.0722	.12	99.99	.2596	: 6	.9913	.101	3	.9917
7*	.0088	.01	100.00	.0935	:				

* marks the 7 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3	FUNC 4	FUNC 5	FUNC 6
EXPER80	.35591	.51496	-.55916	-.90871	-.06851	.30647
ADV80	-.07076	.68879	1.39861	.18309	.54100	.53210
LOCAL80	.35605	-.65430	-1.10312	.65156	.24494	-.67690
ATTEND80	.24508	-.65376	.86609	.06782	.42607	.26045
ADM80	1.18582	.81277	.52308	-.06069	.54898	-.13531
SP80	1.45633	.01803	.65629	-.04114	-.14958	-.42833
INS80	-1.62029	.21757	-.10678	-.03028	-.05680	-.26471
OM80	.36468	.33713	.15911	.63801	-.29751	.39441
FTE80	.65914	-.15840	.23220	-.14650	.68843	.29098

	FUNC 7
EXPER80	-.08608
ADV80	.23052
LOCAL80	.22598
ATTEND80	.10226
ADM80	-.41158
P80	.54079
INS80	.01225
OM80	.15372
FTE80	.08557

Structure Matrix:

APPENDIX - III

Census Tract Data

Census Data on Number Occupied Housing Units and Median Value By School Districts

Mustang	1990		1980		1970	
tract	units	value	units	value	units	value
3010.01	31	36300	35	34200		
3010.02	3423	69270	943	64900	99	10500
3014.01	2443	49800	1001	52500	109	15300
3014.02	1049	65300	1175	49800		
	6946	54100	3154	51150	208	12900

Moore	1990		1980		1970	
tract	units	value	units	value	units	value
2016.01			1502	47800		
2016.02	990	42800	1040	40400		
2016.03	1382	36500	1513	33500		
2017	233	79600	172	57500	119	11500
2018	1208	111500	239	91800	33	16900
2019			1623	65900	99	18500
2020.01	466	43500	479	38700		
2020.02			2993	42000		
2020.03	1001	70200	533	64400		
2021	61	88000	2505	50600	29	18400
2022	128	70800	421	60300	19	26700
2023			19	32500	466	12300
	5469	70500	13039	49200	765	17650

Note: Data for 2016.01, 2019, 2020.02, and 2023 were not available for year 1990. According to State Data Center, Oklahoma. The number of Occupied housing units in Moore was 5441 (1970); 11753 (1980); and 14824 (1990).

Edmond	1990		1980		1970	
Tract	Units	value	units	value	units	value
1081.04	1162	145400	719	97400		
1081.05	3399	125900	1719	101100		
1082.01	1563	75100	1688	54000	1114	14400
1082.03	1230	42900	1083	39300	400	9800
1082.04	612	45100	410	38400	242	10500
1082.05			812	72500	150	19000
1082.06	861	116000	515	99500	108	21900
1082.07	430	43300	519	34100		
1082.08	1692	53200	1317	35100		
1082.09	1252	73400				
1082.1	1603	64300				
1082.11	1106	87900				
1083.03	765	71600	764	64800	127	26700
1083.04	1837	60600	1880	54400	1065	18200
1083.12	811	70600				
	18323	71100	11426	54400	3206	18200

DeerCr	1990		1980		1970	
Tract	units	value	units	value	units	value
1085.11	123	129700	60	70000	72	17800
1085.12	386	105000	305	83100		
	509	117350	365	76550	72	17800

Piedmon	1990		1980		1970	
tract	units	value	units	value	units	value
3008.01	887	71800	660	66700	207	27500

Yukon	1990		1980		1970	
tract	units	value	units	value	units	value
3009	3236	58400	201	64400	107	20800
3012	2865	56300	2600	47000	1611	14300
3013						
	6101	57350	2801	55700	1718	17550

Putnam C	1990		1980		1970	
tract	units	value	units	value	units	value
1067.02	1447	44000	533	34500		
1067.03	2559	84100	2610	75800	219	28700
1067.05	903	68700	538	65200		
1067.06	1740	67600	1155	63300		
1068.04	1567	46500	634	42500	1486	13800
1069.05			3035	46800	1518	16300
1069.06	1169	88500	1172	76900		
1069.07	885	77800	813	65300		
1069.08			3440	49200		
1069.09	645	66200	651	61400		
1069.11	641	77800	636	68300		
1085.02			1385	86300	237	0
1085.03			229	113200	37	42500
1085.04	1938	82200	893	80100	16	0
1085.08	690	82500	791	76200	468	30500
1085.1			948	62900	0	0
1085.13	1373	80100	979	74200		
1085.14	1754	91800	1509	88600		
Total	**15557**	**77800**	**20442**	**67800**	**3981**	**15050**

Bethany	1990		1980		1970	
tract	units	value	units	value	units	value
1067.04	919	61700	904	46000	970	16500
1068.01	599	34400	664	28800	662	9300
	1518	**48050**	**1568**	**37400**	**1632**	**25800**

W.Height	1990		1980		1970	
tract	units	value	units	value	units	value
1071.01	27	45000	36	23800	33	8800
1086.01	552	53200	424	48400	183	12400
1086.02	409	48800	484	40100	171	11400
1086.03	439	58300	491	41200	172	13200
	1427	**51000**	**1435**	**40650**	**559**	**11900**

Jones	1990		1980		1970	
tract	units	value	units	value	units	value
1088.03	550	31400	576	17000	588	5000
1088.04	456	34500	433	19700	418	5800
1089	1006	38100	1009	21800	1006	5800
	1006	**34500**	**1009**	**19700**	**1006**	**5800**

CrookOak	1990		1980		1970	
tract	units	value	units	value	units	value
1053	**1081**	**28000**	**1355**	**23100**	**1193**	**8700**

Mid-Del	1990		1980		1970	
tract	units	value	units	value	units	value
1074			4680	46900	1106	12100
1075			271		269	
1076.06	199	29500	286	24700		
1076.07	1236	52700	895	35800		
1077.03	1263	49600	1102	36300	1057	12500
1077.04	598	38700	608	33300		
1077.05	949	43100	708	36000		
1077.06	1239	45800	1273	37000		
1077.07	561	35800	593	28100		
1078.04	1113	37900	1193		1711	11000
1078.05	1138	40500	1480		1360	14100
1078.09	699	35600	736			
1078.1	1094	32400	1184			
1080.06	1433	69500	1412	59300		
1080.07	1354	74000	1333	60000		
1080.08	1586	40100	1373	31900		
1080.09	1028	47700	842	39600		
1087.01	759	89300	653	63200	418	11300
	16249	**41800**	**20622**	**36300**	**5921**	**12100**

Choctaw	1990		1980		1970	
tract	units	value	units	value	units	value
1087.02	1470	71600	762	34500	655	9600
1087.03	1108	75600	46	47500	35	11700
1088.01	1978	51300	578	44100	384	11800
1088.02	1216	54500	1094	41400		
	5772	**61450**	**2480**	**42750**	**1074**	**11700**

Harrah	1990		1980		1970	
tract	units	value	units	value	units	value
1087.05	386	67100	242	27800	120	7400
1090	45	72500	27	32500	12	
	431	**69800**	**269**	**30150**	**132**	**7400**

Luther	1990		1980		1970	
tract	units	value	units	value	units	value
1081.03	124	87500	399	83100	117	15800

Millwood	1990		1980		1970	
tract	units	value	units	value	units	value
1061	1210	58800	1243	45200	1247	0
1064	1128	76150	1196	55700	1088	0
	2338	67725	2439	50450	2335	n/a

OKC	1990		1980		1970	
tract	units	value	units	value	units	value
1001	1549	39900	1784	34200	1805	12000
1002	2674	39800	2795	34000	2857	12700
1003	1199	80800	1323	54600	1344	19300
1007	591	31700	780	29800	758	10600
1008	1088	36600	1240	33700	1258	11900
1014	619	36500	849	24500	899	9400
1015	753	54900	1119	39900	1224	14500
1016	228	33300	430	32300	423	12500
1019	1156	48300	1440	39800	1607	14500
1020	1282	38400	1527	35700	1506	12600
1021	900	44000	1029	34900	1123	12700
1022			1087	26600	1152	10000
1023	1217	31400	1538	28800	1567	10600
1024	1170	22600	1481	23800	1685	9500
1025	394	52500	683	16300	775	13100
1026	147	62500	433	26300	750	9000
1027	8	62500	8	32500	588	11300
1030	334	39400	512	25500	1149	9100
1032	698	43300	968	21300	1462	10500
1037	143	18100	273	10000	554	5100
1039	1316	17900	1658	13800	1801	5700
1040	161	25000	200	12600	297	6900
1047	583	21100	812	20900	658	8100
1048	1065	23100	1251	18600	1273	9300
1049	1252	25200	1579	21200	1628	8300
1050	750	36600	824	26900	847	11100
1054	709	22600	792	19100	901	7100
1059.02	1445	46100	1065	35200	933	0
1059.04	1481	35400	1584	30600	1551	0
1060	303	65100	309	45900	195	0
1062	667	62700	720	47600	765	0
1063.01	1170	34900	1273	33200	1209	0
1063.03	1216	39100	1348	34200	1392	0
1064.01	1018	180400	1044	99800		
1064.03	305	80000	356	60100	271	0
1065.01	1562	90200	1589	72800		
1065.02	1729	56500	1934	48200		
1065.03	874	88600	686	57300		
1066.01	1377	45200	1498	39300	1386	14200
1066.02	1310	60800	786	49900	835	18800
1066.09	668	54600	604	43700		
1066.1	630	74100	708	62100		
1071.03	618	34100	655	29800		
1071.04	938	36100	843	32800		
1072.06	1551	50100	1578	45200	1015	15900
1072.07	938	60600	610	56300	265	12100
1072.09	1959	52500	2245	42500	1285	16300

1072.1	415	51300	434	43200		
1072.11	943	57300	908	50900		
1072.12	2237	45200	1370	40100		
1072.15	1298	39000	1373	33400		
1072.16	1182	33000	1245	2800		
1072.17	709	32700	759	27600		
1072.18	1160	37200	1153	30900		
1072.23	1184	37000	1249	31200		
1073.02	1020	31100	1197	29700	1002	11100
1073.03	285	49200	240	41900		
1073.04	2027	35900	1940	32400		
1080.03	124	36500	142	31800		
1080.05	188	50400	197	21300	157	7900
1080.11	450	44000	376	35000		
1081.03	748	52700	108	41900	117	15800
1083.01	463	59000	501	43500	361	17600
1083.02	928	71100	358	60000	193	18700
1083.06	3920	63600	426	69200	16	2500
1083.07	2163	76200	1891	74000	915	30100
1085.07	663	117200	410	96200	330	42700
	65852	**44000**	**66127**	**34000**	**46084**	**10600**