THE EFFECTS OF AN EXPANDING UNIVERSITY ON PERIPHERAL PRIVATE REAL PROPERTY VALUES

by

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I hereby recommend that this dissertation prepared under my direction by David Sirota entitled THE EFFECTS OF AN EXPANDING UNIVERSITY ON PERIPHERAL PRIVATE REAL PROPERTY VALUES be accepted as fulfilling the dissertation requirement of the degree of Doctor of Philosophy

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ABSTRACT

This study is an investigation of the effects of an expanding university on the value of real properties peripheral to its main campus. It tests the hypothesis that the anticipation of taking by purchase or condemnation of properties surrounding an expanding university results in their market values increasing in direct relationship to the approaching taking-time. The University of Arizona at Tucson was chosen as the subject university, and the study concerns the fluctuations of the values of real properties surrounding its main campus during the twenty years, 1949-1968.

The impact of this university's lateral expansion on adjoining property values was measured by considering a study area comprised of properties located within the 135 blocks immediately surrounding the 1949 central campus. The 2,576 individual parcels within these blocks were researched in the public records for prices paid for all properties changing hands during the study period. Utilizing a common measuring unit of average dollars paid per square foot of land, the value fluctuations of properties purchased by The University of Arizona were compared to those of non-university purchasers.

The results of this study indicate that The University of Arizona had no measurable effect on its
peripheral real property values during the years 1949-1968. The values of properties purchased by the University did show an approximate 7% rising trend over the study period, and the values of properties transferred to non-university purchasers also increased approximately 28-1/2%. However, these rising property values paralleled a national inflationary trend of approximately 28% for home ownership prices for this period. Therefore, in real dollar terms, the property values for University acquisitions showed a net loss of approximately 21% and the values of non-university transfers did not change.

A comparison of the study area property with other representative properties in the general Tucson community indicated a relatively parallel increase in their assessed evaluations during the study period, affirming that The University of Arizona had no measurable effect on its peripheral property values despite an active lateral expansion program.

The relatively slight increase in value of properties purchased by the University illustrates the ability of this institution to maintain its property acquisition costs at a generally consistent level over time. This ability can partially be explained in that The University of Arizona consistently paid more than the market value for those properties it acquired during the study period. These premiums were probably the result of the University's reluctance to
enforce its condemnation powers. Only 6 of its 453 purchases were obtained by condemnation.
CHAPTER I

INTRODUCTION

Statement of the Problem

There has been an explosion of enrollment at most of our colleges and universities ("Money Crisis for Colleges: Why," 1970). The reasons for this increased interest in higher education are many and complex. They include the postwar (World War II) baby boom, the demands of an advancing technological society, broader participation in our national affluence which allows for wider participation in such educational endeavors, student deferments during this time of international conflict, and many more equally motivating. All combine to bring extreme pressure upon the physical facilities currently in use.

Colleges and universities have devised various methods to solve their problems of providing land and space facilities adequate to serving this increased demand. Some have raised their academic entrance requirements to limit enrollment, while others have limited attendance by restricting entrants to state residents or raising out-of-state tuition to the point of effectively eliminating non-resident students. Simultaneously, many schools have embarked on physical expansion programs, building vertically for more
intensive use of existing facilities or building laterally on adjoining properties purchased for this purpose. Some have reached optimum expansion at their present campuses and are inaugurating a series of branch campuses to relieve the loads at the main campus. The burgeoning junior college movement is a corollary of this effort to bring the undergraduate courses closer to the demand and to partially relieve the universities of the pressures of attending to the needs of freshmen and sophomores.

Still the pressures prevail, and the purchase of properties adjoining existing campuses has been and will continue to be used as a means of providing additional lands necessary for building facilities and for expanding those units now being utilized at their maximum. Thus a tremendous interest is generated concerning the value of adjoining properties, from the viewpoints of both the private property owners and university planners.

Private owners have located on universities' peripheries for several reasons: to provide residences within walking distance of the campus for those students, faculty, and staff who desire this accommodation; to provide homes and appartments with ready access to cultural and athletic activities for non-university people; and to provide buildings for the retailers and service facilities for all the residents of the university area. These desires for locating close to the magnetism of a university should act
as a positive force for maintaining or increasing the values of properties surrounding the main campus. Any anticipated expansion program could involve the absorption of those properties whose values would be affected by the expanding agency itself.

The establishment of a university includes the selection of a parcel of land to act as the site for the construction of facilities necessary to serve the needs of the students, faculty, and staff. The final decision for the choice of a specific location is usually achieved after resolving many political and economic factors. Many times the locational decision is reached as a compromise between two communities or other political entities, or as a result of the donation of land from the federal or state government, or as a private gift of land.

Any lateral expansion of publicly-supported institutions of higher learning is subject to allocations granted by respective state legislatures for capital expenditures. Each year requests are made for funds necessary to acquire adjoining properties to provide needed facilities for increasing student enrollments. Depending on the fiscal conditions prevailing in the state, as well as the political make-up of the legislature, funds are allocated to the institution to be utilized according to a priority of needs. Thus the value of adjoining real properties emerges as a
vital budgetary consideration and the effects of a current expansion program assume long-range planning significance.

This study explores the measurement of the effects of an expanding university on its peripheral real property values. It seeks to test the hypothesis that the anticipation of taking by purchase or condemnation of properties surrounding an expanding university results in their market values increasing in direct relationship to the approaching "taking-time." It also explores the possibilities that an institution invested with the powers of eminent domain can, with the judicious use of these powers, influence to its advantage the values of its surrounding real properties.

Objective of This Study

The objective of this study is to measure the effects of an expanding university on its peripheral real property values. By investigating the actual dollars paid for all peripheral campus properties sold during the study period, a measurement of the impact of a university's lateral expansion program on the value of the properties can be determined. The concurrent analyses will attempt to develop significant trends in value fluctuations which could be useful in planning for future expansion programs for the subject university or any other public or quasi-public agency involved in similar circumstances.
Procedures Used in the Study

The University of Arizona at Tucson was chosen as the research unit. The author is most familiar with its expansion efforts, being a participant-observer as a Tucson resident for twenty-three years during its expansion period, and as owner of property in the path of this expansion. Having determined that the bulk of this University's lateral growth had taken place during the years 1949-1968, this twenty-year period was used as the investigative time. Data concerning all sales or purchases during this time period of real properties falling within specifically designated expansion boundaries surrounding the main campus were accumulated, tabulated, and analyzed to determine any value fluctuations or prevailing trends.

These data were arranged chronologically on an annual basis for the first ten years of the study period for an annual analysis of value fluctuations during a relatively light university acquisition period. The data for the latter ten-year, more active, university acquisition period were arranged chronologically on a monthly basis to allow for more intensive regression analyses of the cogent variables.

The data were collected from the public records maintained by the office of the Pima County Recorder, and from the records of the Tucson branch of the Transamerica Title Company. A reduction of recorded information onto
plats of the lots and blocks of said properties defined the lot sizes, enabling an accumulation of square footages which acted as the common comparison unit in this study.

Since the entire population of properties under investigation and every transaction involving these properties were studied, no sampling techniques were utilized. However, regression analyses were made of cogent variables to aid in isolating and analyzing significant value trends.

**Delimitations of the Study**

This study is based on officially recorded information of real property sales made during a twenty-year period and, for purposes of this study, this information is assumed to be correct.

The study district is defined as all those real properties found within the boundaries of East Mabel Street, North Olsen Avenue, East Eighth Street, and North Euclid Avenue (Figure 1). This district consists of 135 blocks and includes 2,576 lots. There were 1,902 sales involved, with 453 made to The University of Arizona, and 1,449 made to non-University purchasers.

**Organization of the Study**

Chapter II, Review of Related Literature, includes thoughts on urban development, locational theory, and property values as they relate to this study. The works of Burgess, Hoyt, Harris, Ullman, Murphy, Chapin, and others
Figure 1. Study Area Location in City of Tucson
are reviewed for information pertinent to the establishment of a format for discussing the results of this research.

Chapter III, Historical Review, includes the history of the land-grant college movement, and the growth of The University of Arizona as a part of this movement. Both histories are reviewed in relationship to growth and sources of funds available for development and expansion of physical facilities. The works of Eddy, James, Stewart, Lyon, Allen, Axt, and Martin, among others, are explored for insights into a land-grant college's efforts to meet its responsibilities in providing the additional facilities necessary to meet increasing demands for higher education.

Chapter IV, Methodology, includes the methods and techniques utilized to accumulate and analyze the data. It contains a discussion on the decision to use actual sales data rather than recorded assessed property values, and the decision to use a basic comparison unit of dollars paid per square foot of land.

Chapter V, Analysis of the Data, includes a detailed description of all the data acquired together with this sales information being presented in both tabular and graphic form. Explanations and interpretations accompany all of the material.

Chapter VI, Conclusions and Recommendations, contains an overview of the entire study, and includes a discussion of implications found in the data for campus
planning and for planning expansions of other public or quasi-public agencies in the same circumstances. Particular emphasis is placed upon the ramifications which relate to peripheral property values as a university expands into areas adjoining its campus.
CHAPTER II

REVIEW OF RELATED LITERATURE

To more fully comprehend the impact of The University of Arizona on the values of its surrounding properties, some thoughts on urban development theory need examining. A city may be viewed as a living organism buffeted by internal and external forces which shape its physical appearance while it acquires its individual characteristics or personality. Nelson (1955, p. 203) described communities in terms of the definition of their major occupations. He classified cities as: public administration cities where they are capitals of states or nations or military bases; finance, insurance, or real estate cities such as New York, Hartford, or Fort Lauderdale; personal service cities as in retirement and resort communities; manufacturing cities such as Gary, Indiana; and professional cities that cater to medical and health or educational services. Since most cities are combinations of almost all such activities, these classifications become somewhat blurred.

Still the functions of each city are in some respects different from those of all other cities, and each then tends to develop an intrinsically individual pattern of land uses. Despite these dissimilarities, the pattern of each
city is presumed to be rational and essentially functional. Gallion (1958) wrote that "... the physical form of cities has been shaped by the economic, social and political forces of society" (p. 4). He went on to say that "Few cities begin with a plan but develop by a process of accretion . . . are sensitive to changes in the habits of people and are dynamic in character" (p. 4).

Hurd (1924) wrote that "Cities originate at their most convenient point of contact with the outer world and grow in the lines of least resistance or greatest attraction, or their resultants" (p. 13). Hoyt (1939) interpreted this observation in relation to residential development by stating "... residential growth tends to proceed from the given point of origin, along established lines of travel or toward another existing nucleus of buildings or trading centers" (p. 117). These observations describe Tucson's historic growth patterns, particularly explaining the magnetism of The University of Arizona which early attracted residential and commercial developments to its periphery.

Three major concepts of urban development, now considered classics in their field and widely quoted whenever land problems are discussed, are known as the Concentric Zone Concept, the Sector Concept, and the Multiple Nuclei Concept. These were attempts by their authors to seek rational explanations of the existing land use patterns (Figure 2). Burgess' concentric zone theory attempted to
CONCENTRIC ZONE CONCEPT
1. Central Business District
2. Zone of Transition
3. Zone of Workingmen's Homes
4. Zone of Better Residences
5. Commuters' Zone

SECTOR CONCEPT
1. Central Business District
2. Wholesale Light Manufacturing
3. Low-Class Residential
4. Middle-Class Residential
5. High-Class Residential

MULTIPLE NUCLEI CONCEPT
1-5. Same as Sector
6. Heavy Manufacturing
7. Outlying Business District
8. Residential Suburb
9. Industrial Suburb

Figure 2. Generalized Explanations of the Land Use Patterns of Cities -- Source: Harris and Ullman (1945).
explain city growth in terms of the circles of land uses surrounding a core central business district. Hoyt's sector theory accepted the Burgess concept as a basic premise but refined it to describe the radial transgressions to the pureness of the concentric circles manifested by developments along major transportation arteries. Finally, Harris and Ullman recognized some obvious divergencies to these earlier descriptions, and in their multiple nuclei theory explained how clusters of land uses can exist outside of either of these strictly patternistic definitions.

**Concentric Zone Concept**

Burgess' (1925) overall concept of the city's land use is a pattern of concentric circles extending outwards from a central business area, which is labeled in Chicago as "the loop." This central area consists of a large, downtown, high-intensity district composed of shopping areas, theaters, hotels, high-rise office buildings, banking houses, and other land uses requiring a central location.

Included in this central business area is a ring of complementary commercial activities, such as the wholesale and warehouse districts, which overlap into the second ring known as the "zone of transition." Within this intermediate area are industries not needing large land areas, and many concentrations of heavier land uses along railroad lines. These railroad developments also cut across the outer rings,
creating a sector effect not recognized by Burgess in his diagram.

The transition zone is identified by a variety and change of uses. There is a mixture of business and residential uses, with some of the city's early fine homes retaining their distinction through preservation by current owners. Others have been converted to rooming houses or business uses. Some older sections have been renewed with large scale apartment projects, while others, especially those near the factories or railroad lines, contain residential slum areas. This second zone blends into the third zone of workingmen's homes consisting of low and low-middle class residences.

The fourth zone of better residences contains the homes of the white collar worker and middle-class families. In the fifth ring, a commuter's zone, are found the bedroom communities of the suburbs, housing the executives and upper-class persons who settled at the terminals of high speed transportation arteries. Burgess explained that as growth occurs, the uses of the inner zones tend to invade the next outer zone. The rate of progression is a function of the community's economic and population expansion.

This simplistic explanation of land use patterning is followed to some extent by the land uses in Tucson, with development having occurred in a somewhat similar circular pattern around the central business district. It does not,
however, explain some of the irregularities that occur in city growth as caused by physical barriers of mountain and stream, and the establishment of other "central business districts" or magnetic nodes outside of the downtown areas.

**Sector Concept**

Hoyt's (1939) investigation of the structure and growth of residential areas in the United States provided some cogent insights into the pattern of land uses. His approach utilized a description of residential land uses as wedge-shaped sectors radiating from the city's center and forming along major transportation facilities. His theory went one step further, however, and stated that different income groups tend to cluster in like areas. These areas are described as sectors of a circle centered on the central business district. He indicated that similar types of uses originate near the center of the city and tend to migrate within the same sector and away from the center.

Hoyt (1939) described the dominant influence of the high value uses on their adjacent areas thusly:

1. high-grade residential growth tends to proceed from the given point of origin, along established lines of travel or toward another existing nucleus of buildings or trading centers;
2. the zone of high-rent areas tends to progress toward high ground . . . ;
3. the growth of high-rent neighborhoods continues in the same direction for a long period of time (p. 117).

This sector concept provides a more detailed explanation of residential land use patterns than does the
concentric zone concept and is probably closer in describing the University area than the Burgess theory. Much of the historic residential development in the University area took place along the major arteries connecting the campus with the downtown area.

Multiple Nuclei Concept

More relevant to explaining a university's position in the patterns of city land use is the multiple nuclei theory, developed in 1945 by Harris and Ullman, based on observations made by McKenzie (1933) in his book, The Metropolitan Community. McKenzie had written that frequently there are series of nuclei in the patterning of urban land uses rather than the single central core described by Burgess and Hoyt (McKenzie, 1933, pp. 197-198). In expanding on this concept, Harris and Ullman observed that there are certain distinctive nodes in the metropolitan area which persist as nodes as the intermediate areas are developed. They indicated that the city develops in clusters wherein separate areas are devoted to commerce, industry, residences, and even more distinctly into areas for heavy industry, light industry, wholesaling, cheap tenements, expensive homes, and so on.

The authors develop their theory around the following four factors: (1) the inter-relationship of certain types of activities requiring close physical proximity to
one another; (2) the formation of a cluster of certain types of activities which find it mutually profitable to congregate in an area; (3) the evolution of centers to accommodate activities which have a common relationship such as railroad or truck terminals; and (4) the costs of land or rent which act as catalysts into classifications of land use.

This concept, more than the others, describes how The University of Arizona acts as a nucleus in the pattern of Tucson land uses. From its location as a focus of interest, the University extends its dominance over surrounding properties, attracting activities needing close proximity, such as housing and commercial uses, to serve the school's population. This clustering of persons using and serving the University facilities creates a pressure on the finite areas within walking distance to the campus. This pressure in turn, explained by the economic theory of supply and demand, is the basic ingredient of the land costs to be found in the University district.

**Urban Land Use Theory**

Chapin (1965) discussed three interpretations of the term "urban land use" in contemporary literature. He indicated that some of the current writings were involved with the spatial distributions of city functions such as residential, industrial, commercial, institutional, and leisure-time functions. In others, urban areas are examined in terms
of human activity patterns and the physical facilities needed to house these activities. Finally, in addition to this latter explanation of land use, attention is also directed to the personal value systems displayed by the cities' occupants as they affect land use patterns.

Chapin further wrote that the land economist looks upon land use in terms of economic theory, where land is viewed as a commodity traded in the market and subject to the forces of supply and demand. Price then becomes a function of the return realizable on making land productive. All land is considered as being available in competing for development, and consumers' decisions to buy and sell are predicated on rational business decisions for maximizing returns (Chapin, 1965, p. 8). Where monetary returns are not actually measurable, such as the transfer of residential property, profits are equated with personal satisfaction and decisions to buy or sell are based on the maximization of these personal needs by comparing available alternatives.

Rams (1964) wrote that "The value of city land is a consequence of the needs and wants of people. More particularly, land as an immovable and indestructable scarce resource, both from an economic and physical viewpoint, derives value from its position in the context of the social and economic organization of man in a central place—a city." He went on to state that "The value of land is traceable to
the services it renders and . . . is a direct consequence of its proximity and access" (pp. 1-2).

The economic determination of the value of an investment property was described by Turvey (1957) as " . . . the present value of the anticipated net income discounted at a rate of interest equal to the yield obtainable on alternative investments with similar characteristics" (pp. 8-9). This view reiterated that of Hoyt (1933) who described land value as

. . . the sum of all net land incomes that will accrue in perpetuity discounted for the period of time that will elapse before they are received. Since incomes due one hundred years in the future have only a negligible value today, the valuation of land involves a prophecy as to the net income of the land for the next thirty or forty years (p. 449).

It would appear that the economic value of land approaches the selling price under conditions of perfect competition in the market. Weimer and Hoyt (1960) stated that the economic value of land

. . . may deviate from price and often does, especially since value is often identified with specific purposes, such as value for mortgage-lending purposes, for tax purposes, for insurance purposes, for estate settlement, for condemnation, for quick sale in a current market, and for many others (p. 114).

The market value of land is also affected by its inclusion into the functional type of area in which it is located. Ratcliff (1949) wrote that

Each parcel of land occupies a unique physical relationship with every other parcel of land.
Because in every community there exists a variety of land uses, each parcel is the focus of a complex but singular set of space relationships with the social and economic activities that are centered on all other parcels. To each combination of space relationships, the market attaches a special evaluation, which largely determines the amount of the bid for that site which is the focus of the combination. Thus certain locations are more highly valued for residential use than other sites because of greater convenience to shops, schools, centers of employment, and recreational facilities (p. 283).

How appropriate to the status of the property surrounding the University!

Thus, according to the economists, choices for land utilization are affected by the value established by available alternative uses of the land, and the specific land uses are finally determined by the prices offered in the market.

As stated earlier, social forces also affect the location and arrangement of land use. Chapin indicated that much of the writings in this area had not progressed sufficiently to enable a clear distinction between social and economic determinants on land use patterns. In the light of the increased accent on ecological processes in our society, social scientists are currently directing their attention more toward describing the role that social values play in urban land problems. They are involved with the description of the interplay of the physical, spatial, and material aspects of urban life in terms of the organizational process of the city. They are concerned with human values,
behavior, and interactions as molding forces of the urban scene (Chapin, 1965, pp. 20-23).

Ericksen (1954) explained the evolutionary aspects of a community's development by a process he called "aggregation" (also see Colby, 1933). Ericksen described aggregation as:

(1) concentration and dispersion of services and population; (2) centralization and decentralization; (3) segregation of population into various distinct areas; (4) dominance and the gradient of receding dominance in the successively more peripheral sub-areas of the community; and (5) invasion of areas by groups, giving rise to succession of one group by another (p. 155).

We will be concerned with the three ecological processes of dominance, gradient, and segregation only as they apply to this research.

Dominance can be viewed in the sense of one area exerting a controlling social or economic position in relation to other areas. This is descriptive of The University of Arizona's position in relation to its surrounding properties. Gradient is a term used to describe the receding degrees of dominance of such a central function. Thus, the University's influence would diminish with distance. Segregation is a related process of clustering. It is a selection process by which homogeneous units group together. Hence, the area immediately surrounding the University would exemplify this point by the clusters of student-oriented housing and service facilities.
These ecological processes were identified by Burgess as part of his concentric zone theory with the central business district identified as one center of dominance, and the gradient of its influence over other areas described in each successive concentric zone. The clustering influence is described as the complementary uses in which medical services, wholesale districts, and apartment areas congregate.

Hoyt's sector theory also explained the distribution of nuclei of dominant land uses. High value districts would dominate the surrounding land uses with downward gradients noted in the adjoining sectors. Also noted are the clustering of uses of like character and intensity within the pattern. Re-emphasizing these observations is the multiple nuclei concept, which is particularly graphic in describing the segregation theory.

Of the pertinent writings in this area, Firey's (1947) work on Boston's land use is widely quoted as adding the human dimension to the historic economic approach to land use theory. In his empirical investigation on the role of social values in the evolution of land use patterns, Firey concluded that "... social values are indeed self-sufficient ecological forces and that they have a very real causative influence upon land uses" (p. 130).

Both of the aforementioned concepts of land use patterning, the economic and the social, are leavened by the
controls imposed by the public agencies entrusted with the health, welfare, morals, and safety of the community. These controls are manifested through: the imposition of zoning regulations controlling heights and densities of land use; minimum housing codes controlling the physical conditions of improvements to the land; subdivision planning regulations establishing acceptable land use criteria; controls over hazardous areas such as dangerous industrial uses; emerging stringent pollution controls; provisions for open spaces such as parks and lakes; and finally, the provisions for land acquisitions for educational uses. These public controls are in turn controlled by the political climate and the fiscal capabilities of the community.

As summarized by Chapin (1965):

Land patterns are affected as a consequence of the economic behavior of the urbanite in the urban land market and further influenced by the urbanite's behavior in response to such culture-bound phenomena as customs, traditions, and beliefs, and finally shaped by the pressures of the common public interest (p. 63).

How then does a university complex fit the general urban land pattern? Campus planners have long found their task one of balancing pressures for expansion into needed new facilities against a paucity of funds available for such expansion. The problem for institutions, initially established on seemingly adequate sites which were quickly surrounded by private development, is to solve their land
needs with the funds available while recognizing their responsibility to the private land owners surrounding them.

Bartholomew (1955) reported that "Institutions such as churches, clubs, schools, police and fire stations, government buildings, and other public or quasi-public establishments classified as such, occupy an average of almost 11% of the developed area of a city" (p. 68). This in itself does not shed much light on the share of land utilized specifically by universities, but it does illustrate the impact on the property tax burden that the removal of approximately 11% of the land inventory imposes on the remaining property owners. Add to this 11% the quantities of land used for streets, roads, highways, and parks, and the effect of this impact becomes significant.

Philbrick (1949) indicated that

." . . by reason of the small land area involved in proportion to the relatively large share of the tax dollar invested and the large proportion of the population directly participating, educational land use is one of the most intensive uses of land in a community (p. 10).

Castaldi (1969) wrote recently that "The college campus is more than a collection of educational facilities. It is in reality a total environment that stimulates teaching, learning, introspection, and creative thinking" (p. 75). He went on to say that

There is currently no standard by which to determine the optimum size of a college or university site. Its size will depend on the availability and cost of land. A rule of thumb derived from a review of
current practices calls for a site having an area of at least fifty acres per thousand students (p. 75).

To meet this standard, The University of Arizona in 1969 would need 1,000 acres of land for its 20,000 students.

Barnes and Spaeth (1968) wrote that

The University has a clear responsibility to use its lands as fully and efficiently as possible . . . any expansion . . . must result in high costs to the taxpayers and loss of vitally needed and irreplaceable land and tax revenue to the city. Land developed for University purposes should not be scattered throughout areas adjacent to the central campus, but should be planned as contiguous extension of the campus itself (p. 146).

When Dober (1967) writing from London said:

People want to live near universities because they are vigorous, audacious, controversial, and full of ferment, . . . our universities are becoming new . . . urban centres in an urban environment carrying out a wide variety of programmes and activities (p. 120),

he added the extra dimension to the university district land use—the cultural magnetism of the institution.

Fink (1967) revealed in a staff report on the community impact of the University of California's campuses at Berkeley and Santa Cruz that "... if, in total, students regard living in the core (university) area as beneficial, and as the demand for this land increases, the price of land and cost of housing will also tend to increase" (p. 15).

This rise in value is offset to a degree by a report on blighted areas near universities included in Murphy's (1966) book, The American City, An Urban Geography. Murphy wrote:
Attractive as many university campuses are, their presence often seems to have a blighting effect upon the housing in the vicinity. This is largely because rooms are in great demand near the campus, and houses which may at one time have been occupied by faculty families have long since gone over to a roominghouse function. Places of this type take on a battered appearance (p. 144).

He continued

As the need for office space, laboratories, and classrooms expands, the university buys adjacent property, thereby pushing the blighted rooming-house district farther and farther into the better residential areas. Even the small commercial centers near the larger universities suffer from the encroaching campus. Often when the university has not acquired the land outright, it is held under option, thus giving a temporary and somewhat shoddy character to the business activities. As these enterprises are forced out, they are likely to find new locations by edging into the surrounding residential areas, pushing the roominghouse district ahead of them (p. 144).

Established educational institutions thus find themselves in a cost-space squeeze. The very existence of the university attracts intense peripheral property development affecting the values of the surrounding land. At this time, no previous research can be found on the effects of a university on its peripheral property values. Two studies have been done on the effects of public transit facilities and freeways on land values. These have some applicability to the understanding of The University of Arizona’s influence on its surrounding property.

The first is a report by Spengler (1930) on Land Values in New York in Relation to Transit Facilities. Analyzing the assessed valuations of properties adjoining
newly installed mass transit routes in New York City both before and after their installation, Spengler concluded that

The influence of transit facilities on property values does not seem to display any uniformity. In some cases, increases (in value) have been found to exceed 1,000%. In others, on the other hand, actual losses have been experienced. . . . Rather than to be considered a cause of land value changes, a transit facility should more properly be regarded as a construction which permits or facilitates, under certain circumstances, an emergence of land values, the values being determined largely by other factors (p. 130).

The second is A 15-Year Study of Land Values and Uses Along the Gulf Freeway by Norris and Elder Consulting Engineers (1956) for the Texas Highway Department. This report was a supplement to and an extension of a report made by this same firm five years earlier. The basis of the work is a comparison of the changes in land values and land uses in those sections of Houston, Texas, served by the Gulf Freeway with the corresponding changes in other sections of the city not so served. Their conclusions are that: (1) downtown properties along the Freeway increased in value several times faster than similar properties in other parts of the city, and (2) values of land along the Freeway had increased considerably while similar properties in other parts of the city had practically no change in values.

We thus find the dilemma of a university faced with the problems inherent in expanding into its neighboring lands. On one hand, the university's very existence attracts
a high demand for intensive private peripheral development, probably raising the prices of these properties accordingly. On the other, this institution is charged with a responsibility to its supporters to maximize the use of property taxes or private contributions by judicious expenditures of these funds. Thus, an expanding university faces a situation of spending funds for adjoining properties whose value is primarily a function of the university's existence.
CHAPTER III

HISTORICAL REVIEW

Land-Grant College Movement

Moving out of the shadow of the church, higher education in the United States in the middle 1800's required the financial support of the federal government. The need was great and the response came in the establishment of the land-grant college movement. The University of Arizona located in Tucson began as a land-grant college.

Fundamentally, most educational support is based on the value of land since real property taxes are a major source of funds for the establishment and maintenance of local school systems. However, the concept of federal aid to higher education was a consequence of the desire to bring advanced college training to larger segments of our citizens. Eddy (1957) wrote of Andrew Jackson's efforts to offset "... the rigidness of the existing ecclesiastical college curriculum" (p. x), and bring the needed expansion of educational opportunities to the masses. Jackson's desires were promulgated by those travelling lecturers who brought education to the villages and towns, stimulating interest in a national college system.
In the early years of the nineteenth century the average American had little incentive to learn to read and write. Most were involved in agricultural pursuits and with the conquering of the western frontier. The existing classical colleges followed a curriculum designed around "... philosophy, the dead languages, and mathematics only" (Eddy, 1957, p. x). The industrial revolution with its concomitant growth of city dwellers brought a new need for businesses and professions hitherto reserved for the elite. The road was paved for the proponents of higher education for the masses.

The leaders of the land-grant college movement visualized a system of colleges and universities in which the search for new knowledge in neglected fields was of fundamental importance to the American people.

The land-grant college is a peculiarly American institution. It developed under native conditions and provided an essential element in the national educational system. ... The material base for the establishment of such a democratic system (education for all) lay in the peculiar national resource, the public domain" (Ross, 1942, p. 2).

Eddy (1957) wrote that

When the Revolutionary days were over and the new nation became an entity, the American people were concentrated on a thin line along the Eastern seaboard. To the west lay the national bounty. The United States, as a government unit, came into possession of countless acres of land. This was the great national resource. It became the incentive for much of the improvement in life during the first three-quarters of the 19th
century. It also was the chief component of the public treasury (p. 20).

James (1910) wrote that Abraham Lincoln, realizing the importance of the movement, helped institute the Federal Aid to Education Act which he signed into law July 2, 1862. This milestone marked the beginning of a comprehensive policy of federal endowments for higher education. Each state was granted 30,000 acres of federal land "... for each senator and representative ... for the purpose of promoting the liberal and practical education of the industrial classes in the several pursuits and professions in life" (James, 1910, p. 8).

The precedent for using the assets of the public domain for educational purposes came from the English support of Oxford and Cambridge Universities which had received their initial endowments in this fashion.

... in fact, King James instructed the Virginia Company to "reserve 10,000 acres in the territory of Henrico, Virginia, of which 9,000 acres were to be used to endow a university, and 1,000 acres for a college" (Records of the Virginia Company, i, 220-268, quoted in Sawyer, 9). Harvard had received a maintenance grant of 500 acres from the Massachusetts Colonies government in 1640 and, in somewhat similar fashion, William and Mary, Yale, Dartmouth, and Princeton were recipients of varying amounts (Eddy, 1957, p. 21).

The Education Act, also known as the first Morrill Act of 1862, was followed by The Hatch Act of March 2, 1887, which provided a permanent appropriation to each state of $15,000 per year for establishing an agricultural
experiment station; The Morrill College Aid Act of August 30, 1890, which provided a permanent appropriation to each state of $15,000 annually, increasing by $1,000 each year to $25,000 annually, for the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts; The Adams Act of 1906, which provided $30,000 annually for the states' maintenance of agricultural experimental stations; and the Nelson Act of March 4, 1907, providing $50,000 annual endowments for agricultural colleges (James, 1910, pp. 8-9).

The federal government made a special grant of 72 sections of unappropriated public lands to the territory of Arizona in 1881. These lands were to be "... immediately selected and withdrawn from sale and located under the direction of the Secretary of the Interior, and with the approval of the President of the United States, for the use and support of a university in said territory when it shall be admitted as a state into the Union" (General Land Grants, Ordinances, and Regulations Governing the University of Arizona, n.d.).

The State of Arizona in its Enabling act of 1910, set aside 200,000 acres of land for general university purposes, 150,000 acres for agricultural and mechanical colleges, 150,000 acres for a school of mines, and 100,000 acres for military institutes (Arizona Enabling Act of 1910). The Arizona State Constitution provides
The revenue for the maintenance of the respective state educational institutions shall be derived from the investment of the proceeds of the sale, and from the rental of such lands as have been set aside by the Enabling Act for the use and benefit of said institutions. In addition to such income, the legislature shall make such appropriations, to be met by taxation, as shall insure the proper maintenance of all state educational institutions, and shall make such special appropriations as shall provide for their development and improvement (Art. XI, §10).

Financing Institutions of Higher Education

In these current times of multi-million dollar university budgets, the early allocations based in terms of thousands of dollars seem incomprehensible. However, these initial endowments and reservations of land formed the nucleus for the giant higher educational system of today. The appropriation of funds has invariably fallen short of what is desired for bringing to fruition the dreams and desires of those vested with the responsibilities of supervising this education system. Difficulty in meeting these goals and aspirations for more adequate educational services has been the rule rather than the exception. As the individual institutions grow, so also grow the demands for funds to adequately serve the increasing student populations.

Requests for funds for operating expenses, capital improvements, and maintenance of facilities are annually presented by the Boards of Regents to the legislatures in the various states. Depending upon the fiscal capabilities and the political climates of these states, decisions are
made as to what proportion of the states' incomes will be allocated for higher educational purposes. Invariably these requests are pared and reduced to that sum seemingly appropriate to the times, with resultant postponements and adjustments in the universities' plans. Various alternative sources of support have been explored with the present mix consisting of funds from the federal government, state government, student fees, special endowments, and private donations. Some institutions have adopted financing with the issuance of bonds to solve their monetary needs.

Illustrating the use of this latter method, a report prepared by Stewart and Lyon (1948) for the Purdue Research Foundation, investigated this technique for raising funds for expansion. Among the institutions questioned, The University of Arizona reported issuing 4% coupon primary pledge bonds in 1935 for $712,000 to build a new science building and to make needed repairs and additions to other existing structures. These bonds were issued under authority of the Arizona Educational Institutions Act of 1934, whose legality has been upheld by the Supreme Court of Arizona (Board of Regents of The University of Arizona v. John L. Sullivan, Attorney General, 1935).

Payments on the above described bonds were to be derived from various sources but primarily from tuition
fees. "Certain ancillary funds were pledged should the tuition fees be insufficient. These would be income from fees charged for agricultural extension services, experimental farm sales, feed experiments, matriculation, mimeographing and mailing, miscellaneous student fees, summer school tuition, etc." (Stewart and Lyon, 1948, p. 69).

In a 1952 study by Allen and Axt on financing state institutions of higher education, 400 state controlled colleges and universities established since the Morrill Act of 1862, were questioned as to receipts and expenditures of funds. These schools reported that state appropriations were the largest single source of educational and general income with 45.6%; student fees were second with 29.5%; then local governments, gifts, endowments, etc., at 13.7%; and finally federal grants and gifts of 11.1%. Competition for allocations between higher education and other state activities was always very active.

In those states investigated, average allocations of state funds in 1949 were: 34.3% to local governments, which included support for elementary schools; 18.1% for highways; 12.7% for public welfare; 9.4% for higher education; and 25.5% for other various activities. In this same year, average state tax sources were: property taxes 40%; general sales tax 12%; gasoline tax 9%; payroll tax 7%; liquor, auto license, and miscellaneous business taxes 5% each; personal income and corporate income taxes 4% each; tobacco and
miscellaneous taxes 3% each; other sales taxes 2%; and death taxes 1% (Allen and Axt, 1952).

Thus we find the university structure being supported primarily from state appropriations and secondarily from student fees. The universities have consistently found their money requests being challenged by other important state endeavors and they have continually been forced to adjust their expansion plans. These cutbacks have been accomplished in the face of regularly increasing enrollments with resultant inadequate and outmoded facilities.

**History of The University of Arizona**

Despite the provisions for a broad school system incorporated into the plans for Arizona by the First Territorial Legislature in 1864, it took twenty-one years to bring to fruition the dreams of those pioneers who championed a university for this area. The University of Arizona was founded at a time when the western frontier of the United States was just beginning to mature. Tombstone, Arizona was renowned for its toughness as a mining camp and the Pony Express was still competing with the newly developing railroad system for mail service. The Indians had been subdued but lawlessness was still a problem with numerous robberies and hangings adding color to the local atmosphere.
It was not until the Thirteenth Territorial Legislature session of 1885, and only after a bitter political battle, that The University of Arizona was located at Tucson, Arizona. In seeking to determine a location for the school, the legislators were embroiled in a fierce competition between the cities of Phoenix and Tucson for the Territory Mental Asylum with its allocation of $100,000. Both cities vied for this plum to enhance their community's economic position. Neither wanted the University since the development funds for this enterprise amounted to only $25,000. Few citizens thought it was necessary to develop a school for higher education at a college level since the territory did not have a single high school in existence at that time.

Unhappily for Tucson at that time, the Asylum was awarded to Phoenix, and the University was assigned to the city of Tucson, including a provision that a site of forty acres would have to be provided within one year or this assignment would be forfeited. The local citizens were extremely disappointed in this outcome and evidenced their disapproval by refusing to cooperate in securing the required acreage. As legend would have it, it is to the credit of a saloon owner and two gamblers that The University of Arizona was born. Anticipating the deadline by one month, W. S. Reid, E. C. Gifford, and B. C. Parker donated a vacant
forty-acre parcel of land on the outskirts of the city for a campus (Martin, 1960, p. 25).

Ground was broken on October 27, 1887, for the first building, the School of Mines (note: this building is still standing and is known as Old Main), but funds ran out before the roof was finished. By establishing a School of Agriculture and an Agricultural Experimental Station in 1889, the wily Board of Regents successfully gained an immediate $10,000 appropriation from the federal government under the 1887 Hatch Act. This grant insured the building's completion and subsequent annual allocations were received, including $15,000 under the Hatch Act and $15,000 under the second Morrill Act, with the latter increasing $1,000 annually for ten years. These and other funds provided for the furnishing of the building and the staffing of the two schools (Martin, 1960, p. 28).

These developments were not accomplished easily, however, and the official opening was not until October, 1891, a few years later, with a staff of six persons and a student enrollment of thirty-two. Of these, only six qualified as freshmen, the others needing more preparation due to the lack of general educational facilities in the Territory.

One of the earliest responsibilities accepted by the newly appointed faculty was to travel throughout the state contacting both farmers and mine operators. This effort was
designed to enlist the cooperation of these people in seeking to improve their operating techniques and products. In addition, the results of the research projects, completed in the experimental stations, were published in bulletins and then distributed to all interested parties. There is little doubt that these early efforts led to reciprocal cooperation with generous gifts from the mining companies and the all important votes of the farm-sponsored legislators contributing to the University's later growth.

The Territory's population increased slowly but steadily in these early years, as did the University's enrollment, which reached 225 students in 1900. Many new courses were added to the curriculum in the fields of business and science, and a second major building, a library and museum, was erected in 1905 at a cost of $25,000 (Martin, 1960, p. 85).

The years 1910 and 1912 were years of great achievement in the Arizona Territory. Two major events took place which shaped the future of the University. The Roosevelt Dam was completed in 1910, and the Territory achieved statehood in 1912. The former accomplishment, on the Salt River near Phoenix, created a new irrigation system and effectively raised the value of farm properties more than 150%. Many university people were involved in the success of both of these endeavors, and it is to their credit that the University growth spurted at this point in time. This
growth was made possible by the increased tax flow stimulated by higher land values and by additional funds stemming from lands reserved to the benefit of the University when the territory became a state. New colleges were organized within the University's framework, new agricultural experimental stations were opened throughout the state, enlarging the concept of the campus as being statewide in scope rather than local, and properties adjoining the campus were purchased for future expansion.

In the intervening years until 1959, the school's growth was punctuated by sporadic spurts and stops depending on the economic conditions both locally and nationally. The government enlisted the services of the faculty and facilities during both World Wars for concentrated training programs for service personnel. The depression years stifled growth somewhat, but the University's impetus was difficult to contain. The enrollment of 1,369 in 1921 grew to 2,272 in 1931, 2,922 in 1942, and 13,058 in 1959 (Martin, 1960, pp. 278, 279).

From these humble origins, The University of Arizona has grown to its present central campus of approximately 250 acres, 25,000 students, 8,000 faculty and other staff, a total plant worth nearly one hundred million dollars, and unlimited possibilities for the future (Lee, 1970).
CHAPTER IV

DESCRIPTION OF THE UNIVERSITY
STUDY AREA

The University study area consists of all those real properties located within the boundary streets of East Mabel Street, North Olsen Avenue, East Eighth Street, and North Euclid Avenue (see Figure 3). Since the birth of The University of Arizona in 1885 on the site of the original forty-acre gift, the main campus has expanded to approximately 250 acres (see Figures 4-8). This expansion was accomplished by acquiring adjacent properties as they were needed for specific purposes or were offered for sale by their owners. The acquisition program was based on the advice given by the Report of the Committee on Future Development of The University of Arizona (Vol. III, 1949). In its report the Committee recommended that "The University administration, recognizing the need for additional ground, has for some years been acquiring property adjacent to the campus, as opportunity has presented itself, and that this policy be steadily continued" (p. 234).

The overall design of the study area surrounding the University follows a classical grid pattern. The streets are laid out in a North-South, East-West arrangement with the major arteries located on section and half-section lines.
Figure 3. Map Showing Study Area
Figure 4. The University of Arizona Campus, 1959
Figure 5. The University of Arizona Campus, 1964
Figure 6. The University of Arizona Campus, 1966
Figure 7. The University of Arizona Campus, 1967
Figure 8. The University of Arizona Campus, 1968
The streets are all paved but many have no sidewalks. Most of the alleys in this area are unpaved, creating dust problems. Because of the proximity of this area to the University, there is much on-street curb parking by students and employees, which gives the area a crowded appearance.

Neighborhood residences are thirty to fifty years old and are typically one-story, two bedroom, one bath houses with painted, stucco-covered masonry walls and flat roofs. The yards are small and landscaping is sparse. Many houses have been enlarged over the years with rooms being added to rent to students. Some have sleeping rooms in separate buildings in the rear yards.

The apartment developments are mixed in quality and spotted throughout the area. Generally, the apartments' design follows that of the residences, being one-story, stucco-covered masonry buildings. There are a few two-story apartment structures within the district, but most of these are outside of the research area and are of recent construction. The number of apartments within each of the complexes in the research area ranges from two to twelve with the average grouping being eight. They are predominantly two-bedroom apartments and are rented furnished to students on a monthly basis. Many of these older apartments have no provisions for off-street parking.

Commercial areas which directly serve the University population are located at points on the periphery of the
campus. The major student-related concentrations are at the intersections of Park and Speedway, Park and University Boulevard, Park and East Sixth Street, and Speedway and Campbell Avenue. Almost exclusively student oriented commerce exists at both Park and University Boulevard and Park and Sixth Street intersections. The others, while heavily University oriented, serve a larger market area. The commercial units near the campus are subject to both vehicular and pedestrian congestion and lack of adequate parking presents a problem. The arrangement and design of these commercial areas have left much to be desired in terms of aesthetics and convenience. However, some of the areas, notably the Park and University Boulevard development, present a high potential for pleasant and convenient design.

Commercial and professional services are housed mostly in typical glass-fronted store buildings. These structures average 16 feet by 60 feet and are invariably located at the front property line, creating serious parking problems. Curb parking, allowed on narrow major streets, forms a bottleneck to through traffic. Some of these properties have rear parking areas which are difficult to enter and leave. This handicap is offset somewhat by the large pedestrian market represented by campus students and personnel.

Practically every personal and retail service is present in this area, including barber and beauty shops, gas
stations, clothing stores, book and record shops, banks, drug and grocery stores, laundry and dry-cleaners, as well as others. To date, the University has not pursued purchasing these commercial properties with the exception of some properties at Sixth and Park and on Park near Speedway.

The University study area presents a pattern of residential uses intermixed with apartments and added-on houses with clusters of business areas on main traffic arteries. The activity stimulated by the attractions of the University creates a certain frenetic quality to this entire neighborhood. This quality is intensified by the active curb-side parking and the overall picture is one of dis-repair and neglect.
CHAPTER V

METHODOLOGY

Introduction

The measurement of the impact of an expanding university upon the values of its surrounding real properties required an accumulation of data which reflected the value fluctuations of these properties as the University's acquisition time approached (the "taking-time"). The data needed for this analysis included the number of monthly sales, individual prices paid, and the square feet of the properties transferred during the study period, 1949-1968.

This study was originally organized with the 1968 University of Arizona main campus boundaries delimiting the investigative unit. These boundaries were East Speedway Boulevard, North Campbell Avenue, East Sixth Street, and North Park Avenue (see Figure 3). All of the properties within these boundaries had been designated for acquisition by The University of Arizona and many were absorbed into the main campus during the study years.

The Coronado Heights Subdivision was chosen as the control for this study. This development is located approximately one mile from the campus, somewhat removed from the University's influence, and was similar to the
investigative unit in terms of age, size, and quality of improvements, as well as the mix of land uses.

This study design was abandoned, however, when a preliminary investigation of the sales data for the control area revealed a predominance of vacant land sales which would have introduced an irreconcilable bias into the analyses.

The study was reorganized by eliminating this external control area, expanding the study district boundaries a radius of two blocks in all directions, and creating an internal control by dividing all property transfer data into two purchasing entities—The University of Arizona and all non-University purchasers. The properties to be investigated were the 135 blocks, including their 2,576 lots, lying within the new boundaries of East Mabel Street, North Olsen Avenue, East Eighth Street, and North Euclid Avenue (see Figure 3). These boundaries excluded the medical school complex located north of Mabel Street near Campbell Avenue, but did include all properties lying south of this area, many of which were purchased by the University for future use. The elimination of the medical school complex maintained a constant depth of the study area around the main campus.

It was recognized at the inception of this study that the prices paid for properties adjoining this expanding university, although basically predicated on market values,
also included another element unique to a situation where the terminal purchaser has the power of condemnation under its right of eminent domain. Thus, an expression by the University of its intent to acquire certain properties, inherently included the threat of a forced sale if negotiations were unsuccessful. Of the 453 parcels purchased by this university during the term of the study, only six were condemned, a testimonial to its negotiating techniques.

Of these properties acquired by The University of Arizona, some were sales initiated by the property owners but, in most instances, the University pursued the purchase by making overtures to the owners. All negotiations were based on appraised values of the subject property's worth at the time of purchase (Houston, 1970). These evaluations were usually derived by the appraisers through a synthesis of three real property evaluation techniques: the market comparison approach, the cost approach, and the income approach (Allison, 1968).

The market approach to value is based on a comparison of the subject property with other similar properties sold within a relatively short time period prior to the appraisal date. The appraiser would normally search the records for current sales made of properties resembling the property under consideration as to: location, type, size, age, and condition of improvements; size of lot; and type of property use (Parvin, 1968). The comparative quality of
similar properties rests heavily on the locational require-
ment for many reasons: newly developed areas usually have
construction activities completed in a prescribed time
period with resultant comparables as to age, size, and con-
struction styles; the shapes and sizes of lots tend to be
similar, following patterns formed by established streets
and alleys; and the impact of exogenous forces affecting
real property values are relatively consistent on properties
in the same locale. Thus, an appraiser of properties within
the study area would be inclined to find comparables nearby,
raising the possibility that some University purchases might
have been included in the appraiser's research, directly
affecting the values of the properties they were in the
process of acquiring.

This influence might also have prevailed in the
second appraisal technique—the cost approach. This method
of determining the value of real property is based upon an
estimate of current replacement costs for the improvements,
depreciating this amount by some sum reflecting the improve-
ments' existing physical condition, and the addition of the
lot value as derived from the market approach (Johnson,
1968). The possible effects of the University in this mar-
ket approach to the value of the lot is reiterated to illus-
strate that invariably the improvements found on the proper-
ties purchased by the University would be destroyed, ready-
ing the lot for future new buildings. Thus, in reality, the
property was being purchased for the value of the land itself. This situation created the possibility of added concentration on the lot values in the appraiser's report and the resultant weighting effect of prior University purchasing activity on the property's value.

Although the current replacement costs for the improvements were independent of the University's influence, their depreciation was not. Any planned University expansion was usually publicly announced indicating the anticipated new boundaries (see Figure 9). The property owners within these announced new boundaries, anticipating an imminent purchase by the University, were reluctant to expend any possibly non-recoverable funds for repairs or maintenance other than those needed for immediate requirements. The resultant depreciating physical condition of the improvements explains somewhat Murphy's (1966) observations of the blighted quality of housing in a university's vicinity. This depreciation was also reflected directly in the appraiser's report.

The inhibiting effect on property values created by a public announcement of expansion was also extended to commercial properties. In determining the value of income property, the income approach is used. This appraisal technique is based on net annual rental receipts as a percentage return on investment. It is applied to various income properties such as commercial and professional buildings and
Figure 9. Map Indicating Anticipated New Boundaries — Courtesy University of Arizona Physical Plant Department.
apartment structures (Hollenbaugh, 1968). Since the net annual rental receipts are a function of gross rents collected less costs, a property's value is dependent on the quality of the tenants and their ability to pay a rental amount compatible with a desired return on investment.

The University of Arizona's effects on the values of income properties within the study area were felt in various ways. Besides the depreciation on the improvements, there were two somewhat offsetting value changes contributed to by this institution's expansion efforts. The acquisition of certain income properties and their removal from the rental market created an inventory scarcity matched by a stronger rental position for the remaining units. This advantageous situation would normally have resulted in higher rents. However, these positive rental possibilities were minimized to a large degree during the study period by the changing quality of the tenants. Not as recognizable in apartment or office tenancies, the impermanent nature of the new commercial tenants matched their rental position. Anticipating the possibility of the University's acquisition of the property they occupied, long-term retail and service tenants moved out to the announced new boundaries or elsewhere, leaving many vacancies in their wake. The owners of these vacant buildings, among whom was the writer, faced with continuing costs of maintenance, taxes, and insurance, sought to minimize their losses during this waiting time by
accepting tenants they would not have accepted under more permanent conditions. Their rents, in many instances, did not develop the income which could have been received under more stable circumstances. These lowered rents might then have been reflected in the appraiser's evaluation report as a lower total value for the property.

The study began with the accumulation of individual sales information for each of the above described lots during the entire study period. This information was secured from the records of the offices of the Pima County Recorder and the Tucson branch of the Transamerica Title Insurance Company. Also made available to the author was a comprehensive list of all purchases made by the University during the years 1959-1968 (Houston, 1970). This list was used to confirm the data secured from the public records.

A decision was made to use full prices paid for properties rather than their assessed values. This decision was predicated on the need for actual market value comparisons, since assessed valuation cannot be relied upon at all times as indicative of absolute values for individual parcels. "It is known that in many cases, market values are frequently appreciably higher or lower than the assessed valuations" (Spengler, 1930, p. 27).

Prior to 1968, each Arizona county assessor, at his own discretion, assigned certain assessment rates to various real properties according to their uses (Arizona Revised
Statutes). Improvements on the land were carried in the records at some historically appraised value less an automatic annual 2% depreciation. This depreciation factor reflected an assumed fifty-year economic life for said improvements. Thus, many of the subject properties in this study, being older properties, would have little or no recorded value for the improvements as they approached their fiftieth year. Others would have an unrealistic value based on the arbitrary assignment of the assessment rates. Simultaneously, the values placed on the land were based on some figure determined at some prior point in time and infrequently brought current. In other words, the inconsistency of the public assessment system during the bulk of the study period would have made the data practically worthless.

The Arizona legislature initiated a property tax equalization program in 1963, by establishing a Division of Appraisal and Assessment Standards (Arizona Revised Statutes). This division designated five years for the re-appraisal and re-evaluation of all privately owned real property in the State of Arizona. This program, effective January 1, 1968, called for all properties to be entered into the various county recorders' records at their actual cash or full market value. All assessors were then directed to apply a uniform assessment rate to each category of property use. These rates were established by the legislature to be 18% of full value for residential use, 25% for
apartments and commercial use, 40% for industrial use, and 60% for mines, utilities, and railroad uses (Arizona Property Tax Laws, 1967).

Since the new system came into effect too late for the present study, actual sales prices, as secured from the recorded transfer documents, were utilized to accumulate the required data. However, the equalization program should make future research projects concerned with real property values in Arizona much less complex.

The annual average dollars paid per square foot of land was utilized as a common comparison unit of value for the first ten years of the study period, a time of sporadic acquisitions by The University of Arizona. The monthly average dollars paid per square foot of land was utilized for the latter ten years to allow for a more intensive examination of value fluctuations during the University's concentrated acquisition program.

The decision to use average dollars paid per square foot of land purchased as a common comparison unit of value was based upon:

1. The differences in lot sizes of the properties investigated. Any bias introduced because of these variances was minimized in the averaging process.

2. The number of sales of vacant lots reported during the study period. There were 218 such vacant lot sales, representing approximately 11-1/2% of the total 1,902 sales.
3. The relative compatibility of all properties transferred. The data represent all types of property uses, residential, apartments, business, vacant, and others. The quantity of data collected tends to average out any variances in sales prices that might be affected by terms of the sales, conditions of the improvements, or sizes of the lots. It is recognized, however, that these latter variables introduce some bias into the study.

4. The lack of alternatives for a comparison unit. To use dollars paid per square foot of improvements negates the vacant lot sales. It also presents the problem of determining and evaluating the footage of those improvements invariably destroyed by the University on properties acquired by them for use in their building program.

Compilation of the Data

The Tucson branch of the Transamerica Title Insurance Company maintains complete records of all realty transactions in Pima County, Arizona. Included in these records are subdivision tract books and microfilm copies of all instruments recorded by the office of the Pima County Recorder. The instruments investigated that were pertinent to this research were Deeds, Mortgages, Contracts For The Sale of Real Estate, and Plats and Maps of Subdivisions including their lots and
blocks. These documents provided the necessary information to determine the sales prices and sizes of the properties studied.

Prior to 1965, the title company kept a reference system of realty transactions in large tract books. Entries were made on appropriate pages referring to a County Docket Book and Page where the actual instrument was recorded. Copies of these recorded instruments were reduced to microfilm and kept in separate files. Subsequent to 1965, the title company eliminated the tract book reference method and established a system of placing microfilm copies of every transaction directly into a jacket specifically identified for each individual parcel of real property. Since the investigative time period ran from 1949 through 1968, spanning the above transition time, both types of records were examined.

All sales made prior to 1965 were reviewed in the large tract books. These books are divided into separate pages for each block within each recorded subdivision. Those properties not subdivided are kept in acreage according to their legal descriptions. Each of these pages is preceded by a map of the block concerned, delineating each individual lot as to its size and description. The pages in these tract books contain references to the lot involved by legal description, the type of instrument recorded, the
date of recording, and the Docket Book and Page where the instrument was recorded.

A careful examination of each of the pages containing the properties in the study area resulted in a comprehensive list of sales made prior to 1965 as represented by references to deeds and contracts. Careful attention was paid to the elimination of transfers made by Quit-Claim Deeds, Gift Deeds, or Joint Tenancy Deeds executed expressly for changing Community Property Estates, since these instruments do not usually contain any measurable sales information. The lists were completed to 1968 by examining each jacket in the microfilm file for instruments pertinent to the study. This latter effort was more rewarding than the initial tract book examination since actual copies of the instruments themselves were available.

Since entries were made as each transfer occurred, precise chronological listings of all recorded sales were secured. This helped immeasurably in arranging the data. The results of this initial effort were complete lists of properties sold during the study period by legal descriptions, dates and types of instruments, and the Docket Books and Pages where copies of these instruments could be found. These lists formed the basic data from which final determination of sales prices would be made.

After the lists were accumulated and notations made of those properties specifically purchased by The University
of Arizona, a careful examination of each individual document was required. The contract form revealed the full price of the sale directly in its contents. An entry onto the inventory of this information completed this step in the process. Those sales represented by deeds were more complicated. Here some mathematical computations were required, including an inspection of the United States Revenue Stamps affixed thereto, and the determination of the balances of existing encumbrances at the time of each sale.

United States Revenue Stamps represented a taxing method imposed by the Federal Government on the sale of real estate (Federal Excise Tax Reports, 1954). This tax was repealed effective January 1, 1968 (Federal Excise Tax Reports, 1968). The tax rate was $1.10 per thousand dollars of monies directly concerned with the sale. No tax was imposed on monies represented by existing encumbrances assumed by the buyer. Thus, a $10,000 cash sale was taxed $11.00. A $10,000 sale with $3,000 cash and a new purchase money mortgage was also taxed $11.00. However, a $10,000 sale represented by $3,000 cash and sold subject to an existing encumbrance balance of $7,000, was only taxed on the cash involved or $3.30. These taxes were paid by the purchase from the government of stamps in various denominations and evidence of payment was to affix the stamps to the face of the deed. An inspection of the amount of these
stamps presumably revealed the actual cash changing hands at the time of the sale. Most local realty appraisers considered tax stamps, prior to their repeal, as reliable indicators of actual prices paid.

Where the deed had no reference in its contents to any existing mortgages or other encumbrances, the price, as represented by the affixed stamps, was assumed to be the price paid for said property and was entered directly into the inventory. Wherever reference was made to existing encumbrances, the Docket Book and Page of said instrument was noted, as was the exact date of the sale.

Examination was then made of the instruments representing the encumbrances revealed in the deeds. These loan instruments had a copy of the note attached. This indicated the original amount of the loan, the terms, and the interest rate. By applying a loan amortization schedule, the balance of the existing encumbrance could be determined. This balance was added to the cash amount represented by the stamps and the total price was entered onto the inventory. Where the deed revealed more than one encumbrance, the above described process was repeated in each case.

The prices for each sale of all properties in the study area were thus accumulated for nineteen years of the twenty-year research time. Coincidental with the repeal of the federal tax on realty sales, the State of Arizona entered into a property tax equalization program, changing
the system of property inventory in all county assessor's records from a depreciation method to an actual cash value method. In addition to a complete re-evaluation of all privately owned real estate, the Division of Appraisal and Assessment Standards required each seller of real estate to file an **Affidavit Of Value** form at the time of each transfer of realty. This affidavit testified to the market value of the property as evidenced by the sales price. This information became part of the various County Assessor's records. These records were then checked at the Pima County Assessor's office for sales prices on property transfers during 1968, and the appropriate entries were made on the inventory.

These efforts resulted in a chronological list of prices paid for properties purchased by The University of Arizona and the non-university purchasers during the entire study period. Copies of the pertinent subdivision blocks and lots were then secured to determine the lot sizes of the properties involved, and entries were made as to the square feet of land involved in each transaction. The entire inventory was then totalled annually for comparisons between the two classifications of purchasers. Individual sales prices were added annually as were the lot square footages. By dividing the total annual square feet of land purchased into the corresponding year's total prices paid, an annual average price paid per square foot of land was secured.
The University's land acquisition program was sporadic and somewhat limited during the first ten years of the study period. Some years had no sales reported and only 58 of its 453 purchases were recorded in 1949 through 1958. To avoid discontinuities in the time series data, a decision was made to limit the trend analyses to the more active latter ten-year period. The data were arranged on a monthly basis during the years 1959-1968. Time series analyses were then pursued, regressing the dependent variables—number of sales, prices paid, square footage purchased, and dollars paid per square foot of land—against the independent variable, time. The regression lines thus secured indicated the trends that had prevailed during the 120-month period investigated.

Testing for a linear relationship, these trend analyses were based on the formula \( Y = a + bX \) where \( a \) is the \( Y \)-intercept and \( b \) is the slope of the regression line. \( Y \) was the dependent variable and had for its values the total number of monthly sales, prices paid, square feet purchased, and dollars paid per square foot. \( X \) was the independent variable and its values were the month numbers, 1, 2, 3, ..., 120. Also, the activities of non-university purchases were regressed against the University's acquisition activity to identify any associations that existed over time regarding total monthly prices paid and square feet transferred.

Finally, value fluctuations of properties in subdivisions throughout the general Tucson community were examined for comparisons to the statistical results.
CHAPTER VI

ANALYSIS OF THE DATA

Introduction

A compilation of the data collected is displayed on the tables and figures appended hereto. These data represent the total number of sales, total amounts paid, total square footage of land transferred, and average dollars paid per square foot of land of all real properties purchased by individuals and by The University of Arizona within the study boundaries during the twenty-year period, 1949-1968. Sales made to individuals include transactions between private persons, corporations, churches, foundations, and others, and are identified collectively as non-university purchases.

A total of 2,576 properties were investigated. The number of purchases reported totalled 1,902, with 1,449 being made by non-university purchasers and 453 made by The University of Arizona. The difference in the number of transactions appears to be due to the terminal quality of the sales made to the University versus the repetitive nature of the non-university exchanges. The data revealed in the latter instance that some of the properties were sold
many times during the study period, others were sold infrequently, and some not at all.

To test the validity of the hypothesis that real property values rise as a university's taking-time approaches, regression analyses were made of the cogent variables over a 120-month time period during which The University of Arizona was most active in acquiring adjoining lands for expansion. These regression analyses, as illustrated on the following figures, utilize the formula \( Y = a + bX \), where \( a \) is the \( Y \) intercept, \( b \) the slope of the regression line, and \( X \) the specific month. Each analysis assumes a linear relationship between the variables.

Restatement of the Problem

For purposes of this study it was hypothesized that the anticipation of taking by purchase or condemnation of real property surrounding an expanding university results in its market value increasing in direct relationship to the approaching "taking-time." Market value is considered to be the average dollars paid per square foot of land, and "taking-time" is descriptive of that certain period of time when the University will purchase each property within the study boundaries. Therefore, the value trends developed by the data over the study time period should indicate the impact of the University's expansion program on adjoining real property values.
Annual Sales Data

Table I presents the annual totals of numbers of sales recorded, total amounts paid, total square feet of land transferred, and average dollars paid per square foot of land by the two purchasing entities.

The University of Arizona's activities were limited during the early years, with only 58 of 453 total purchases recorded in the period 1949 through 1958. Its activity increased gradually in 1955 through 1958, but approximately 89% of its acquisitions were made during the latter ten years of the study period.

On the other hand, non-university transfer activity followed a reverse pattern, diminishing in these later years. This lessening in private activity might be explained by the decreasing number of properties available for sale due to the terminal quality of the University's purchases which removed many properties from the market. Another reason could be the desire of some of the remaining property owners to increase their economic yields by awaiting a more advantageous sale directly to the University.

The erratic nature of the total amounts paid and the total square footages of land purchased annually by the University is a reflection of the annual allocations made by the Arizona Legislature for The University of Arizona's capital expenditures. Mr. H. T. Lucas, University Land Agent, indicated in a personal interview on August 25, 1970,
Table I. Annual Sales Data

<table>
<thead>
<tr>
<th>Year</th>
<th>University</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Non-University</th>
<th></th>
<th></th>
<th></th>
</tr>
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<td>1949</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>96</td>
<td>1,246,395</td>
<td>921,711</td>
<td>1.342</td>
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<td>1950</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>106</td>
<td>1,105,500</td>
<td>943,680</td>
<td>1.171</td>
<td></td>
</tr>
<tr>
<td>1951</td>
<td>2</td>
<td>9,500</td>
<td>9,500</td>
<td>1.000</td>
<td>105</td>
<td>1,350,300</td>
<td>941,619</td>
<td>1.434</td>
<td></td>
</tr>
<tr>
<td>1952</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>96</td>
<td>1,244,310</td>
<td>760,099</td>
<td>1.636</td>
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</tr>
<tr>
<td>1953</td>
<td>1</td>
<td>6,500</td>
<td>4,750</td>
<td>1.368</td>
<td>82</td>
<td>950,350</td>
<td>595,915</td>
<td>1.594</td>
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<td>1954</td>
<td>3</td>
<td>23,000</td>
<td>14,250</td>
<td>1.614</td>
<td>67</td>
<td>752,420</td>
<td>605,204</td>
<td>1.243</td>
<td></td>
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<td>1955</td>
<td>10</td>
<td>93,500</td>
<td>47,500</td>
<td>1.968</td>
<td>73</td>
<td>804,061</td>
<td>590,855</td>
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<td>27</td>
<td>309,000</td>
<td>196,780</td>
<td>1.567</td>
<td>77</td>
<td>1,120,950</td>
<td>612,568</td>
<td>1.829</td>
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<td>9</td>
<td>88,500</td>
<td>80,500</td>
<td>1.099</td>
<td>78</td>
<td>1,120,550</td>
<td>774,998</td>
<td>1.445</td>
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<td>1958</td>
<td>6</td>
<td>106,375</td>
<td>58,120</td>
<td>1.830</td>
<td>67</td>
<td>874,300</td>
<td>545,142</td>
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<td>1959</td>
<td>30</td>
<td>378,215</td>
<td>205,406</td>
<td>1.841</td>
<td>84</td>
<td>1,147,119</td>
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<td>1960</td>
<td>16</td>
<td>181,150</td>
<td>90,668</td>
<td>1.997</td>
<td>77</td>
<td>1,288,450</td>
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<td>1961</td>
<td>37</td>
<td>913,645</td>
<td>301,195</td>
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<td>67</td>
<td>886,105</td>
<td>521,109</td>
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</tr>
<tr>
<td>1962</td>
<td>38</td>
<td>852,625</td>
<td>352,242</td>
<td>2.420</td>
<td>74</td>
<td>1,505,500</td>
<td>729,231</td>
<td>2.064</td>
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<tr>
<td>1963</td>
<td>33</td>
<td>448,770</td>
<td>225,724</td>
<td>1.988</td>
<td>52</td>
<td>823,950</td>
<td>507,327</td>
<td>1.624</td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td>54</td>
<td>853,150</td>
<td>436,499</td>
<td>1.954</td>
<td>62</td>
<td>1,234,865</td>
<td>527,931</td>
<td>2.339</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>84</td>
<td>1,397,000</td>
<td>575,825</td>
<td>2.426</td>
<td>46</td>
<td>733,529</td>
<td>362,010</td>
<td>2.026</td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>47</td>
<td>785,675</td>
<td>362,397</td>
<td>2.167</td>
<td>51</td>
<td>826,850</td>
<td>456,304</td>
<td>1.812</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>42</td>
<td>957,618</td>
<td>355,927</td>
<td>2.690</td>
<td>49</td>
<td>724,250</td>
<td>402,653</td>
<td>1.798</td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>14</td>
<td>252,195</td>
<td>122,190</td>
<td>2.063</td>
<td>40</td>
<td>994,050</td>
<td>361,199</td>
<td>2.752</td>
<td></td>
</tr>
</tbody>
</table>
that the University spends all the monies allocated by the legislature each year for land acquisition. Thus, an inspection of the total amounts paid would indicate approximately what was allotted each year for this purpose. As a result of this technique of land acquisition, the data on Table I appear to reveal no recognizable pattern in the University's series of annual data on total amounts paid and square footages acquired.

An inspection of the dollars paid per square foot of land by the University reveals a fluctuation among the individual years and a general rising value over the entire study period. The unusual peak of $3.03 per square foot of land in 1961 is a result of a relatively large number of business and apartment properties purchased in this year. The University bought seven of these properties which are included in the 37 transfers reported. These properties correlated higher prices with smaller lot sizes.

The non-university data illustrate a fairly stable activity record over the entire study period. There were some fluctuations but the general consistency of transactions seems to reflect the long-term trend. There is, however, a discernible rising trend in property values as indicated by the University's rise from $1.00 to $2.06 and the non-university's rise from $1.34 to $2.75.
Non-University Total Number of Monthly Purchases

Figure 10 illustrates the distribution of the number of monthly transactions among non-university purchasers during the ten-year period, 1959-1968. The number of monthly sales are arranged along the vertical Y axis, and range from 0 to 14. The months are arranged along the horizontal X axis and run from 1 to 120. There is a relatively wide scattering of the data with a few extreme points of 0 and 14 sales reported.

The data reported on Table I for the years 1959-1968 are repeated here on a monthly basis together with a regression line indicating the trend of number of monthly sales over time. Assuming a linear relationship between the variables, the data develop the following equation: \( Y = 6.93 - 0.03X \), where \( Y \) = total number of monthly purchases, and \( X = 1 \) at January, 1959. The correlation coefficient is \(-0.3922\).

If \( Y \) had tended to increase as \( X \) increased, the correlation would be a positive or direct correlation. If \( Y \) tends to decrease as \( X \) increases, as is the case illustrated on this chart, the correlation is called negative or inverse correlation (Spiegel, 1961, p. 241).

The activity of non-university purchasers decreased \( 0.03 \) sales per month over the 120-month period investigated. This analysis confirms the observations made on Table I of the annual sales decrease.
Figure 10. Non-University Total Number of Monthly Sales, 1959-1968
The bulk of the dispersions fell within the range of 2.0 to 8.5 sales per month. There were four months during the entire period when no sales were reported. Other wide discrepancies occurred in the 12th (December, 1959) and 100th (April, 1967) month when the most sales, 14, were recorded. Only four other months had ten or more sales. There appears to be no recognizable fluctuating pattern of sales activity but only an apparent consistency of transfers over the entire period.

The University of Arizona Total Number of Monthly Purchases

Figure 11 illustrates The University of Arizona's purchasing activities during the latter ten years of the study period in terms of numbers of monthly purchases. The range is from 0 purchases to a high of 19 in one month. The bulk of the data lie in the lower range.

The data develop the equation: \( Y = 2.55 + .01X \). The correlation coefficient is .1391.

There is a slight positive correlation of the number of University purchases against time, with an increase of .01 sale per month. This is compared to the .03 sale per month decrease in non-university activity.

Of the 120 months investigated, 17 had no purchases recorded. These months tend to occur in groups at the beginning of the period, from the 20th to the 26th month,
Figure 11. The University of Arizona Total Number of Monthly Sales, 1959-1968
and the five months at the end of the period. There were also no acquisitions reported for May, 1962 and July, 1963. These months of zero purchases are surrounded by other months of relatively low purchases. This clustering also occurs around the months of greater numbers of purchases.

These phenomena probably result from the fiscal operations of the University as superimposed on a calendar presentation. That is, the University would have funds available for completing acquisitions at similar times in the years investigated. Since the data were accumulated from the recordings of completed transactions, this cyclical effect would result. Thus, a pattern of acquisition of properties by the University would appear to follow a cyclical format based on funds available.

The largest total number of monthly purchases, 19, occurred in the 83rd month during November, 1965. This month's activity was surrounded by other months of relatively high total sales. This is consistent with the year 1965 being the largest total acquisition year in the study period (see Table I).

Non-University Total Monthly Amounts Paid

Figure 12 illustrates the dispersion of non-university total monthly amounts paid for real properties within the study boundaries during the ten years, 1959-1968.
Figure 12. Non-University Total Monthly Amounts Paid, 1959-1968
The range on the Y axis runs from $0 to $263,500. There is a fairly wide dispersion of the data although most monthly totals fall below the $158,000 mark.

The data develop the equation: \( Y = 103,380.79 - 308.68X \), where \( Y \) = the total monthly amounts paid, and \( X = 1 \) at January, 1959. The correlation coefficient is \(-.1944\).

This diminishing factor of $308.68 per month follows the pattern established on Figure 10, showing a lessening of activity by non-university purchasers as the University taking-time approaches. The negative slope on Figure 12 appears to be more pronounced than the negative slope concerning numbers of monthly sales on Figure 10. This could indicate a drop in property values over time since there were approximately the same relative number of sales per month at relatively less total amounts paid.

The exceptionally high month of April, 1967, the 100th month, reflects a concentrated number of acquisitions of properties by a single buyer attempting successfully to put an entire block together near The University of Arizona Medical College for a hotel project.

The University of Arizona Total Monthly Amounts Paid

Figure 13 illustrates the total amounts paid each month by The University of Arizona for its property acquisitions during 1959-1968, the years of its most active expansion program. The range along the Y axis is from $0 to
Figure 13. The University of Arizona Total Monthly Amounts Paid, 1959-1968
$357,870, although most of the amounts lie below $143,150. The disperson of points is more concentrated in the lower ranges than those of non-university total monthly amounts.

The data develop the equation: \( Y = 42,262.92 + 268.39X \). The correlation coefficient is .1558.

The University's monthly average amounts paid are much lower than the non-university amounts—$42,262.92 versus $103,380.79—but the slope is positive as illustrated on this figure. That is, The University of Arizona tended to pay more for its property over the period reviewed while non-university activities revealed an opposite trend. The magnitudes of the positive and negative slopes of the monthly amounts purchased on Figures 12 and 13 are almost equal in their opposite trends. For example, in the last month of the analysis, the positive \( bX_{120} \) factor was $32,206.80 ($268.39 \times 120), while the negative \( bX_{120} \) factor was $37,041.60 ($-308.68 \times 120). This, it appears that non-university purchasers were lowering their total purchase amounts at almost the same rate as the University was increasing its.

The differences in total monthly amounts paid between the two purchasing entities is a reflection of the differences in the total number of monthly transactions (refer to 6.93 on Figure 10 and 2.55 on Figure 11). The high variance, as illustrated in the 83rd month, corresponds
to the largest number, 19, of monthly acquisitions made during the study period. On the other hand, the variances illustrated in the 34th and 97th months related to the purchases of higher priced apartment and commercial properties.

Non-University Total Monthly Square Feet of Land Purchased

Figure 14 illustrates the total monthly square feet of land acquired by non-university purchasers. The range on the Y axis is from 0 to 131,510 square feet, with a fairly wide dispersion of monthly totals. Most of these lie between 15,000 and 75,000 square feet.

The data develop the equation: \( Y = 59,258.50 - 260.07X \), where \( Y \) = total monthly square feet of land purchased, and \( X \) = 1 at January, 1959. The correlation coefficient is \(-.3445\).

A recurrent pattern of lessening activity for non-university purchasers is reiterated with this negative trend in monthly square feet transferred. The magnitude of this decline is less than the negative magnitude of the slope of total monthly dollars paid by this category of purchasers indicating a certain firming of values, but there is a recognizable consistency of the decline in general purchasing activity by the non-university entity as the University taking-time approached.

The high dispersions in the 12th and 100th months correspond exactly with the high total number of monthly sales (Figure 10), but not so clearly with the high total monthly amounts paid (Figure 12). This would indicate a
Figure 14. Non-University Total Monthly Square Feet of Land Purchased, 1959-1968
higher correlation with the former category than with the latter and may be explained by the higher prices secured for smaller size lots supporting apartment and business improvements.

The University of Arizona Total Monthly Square Feet of Land Purchased

Illustrating The University of Arizona's total monthly square feet of land acquired over the ten-year period, Figure 15 reflects the clustering in the lower ranges revealed on prior figures. The Y axis ranges from 0 to 136,800 square feet, but there is only one month at this latter figure. Most of the data occur between 0 and 50,000 square feet, with some between 50,000 and 83,000.

The data develop the equation: \( Y = 18,312.76 + 113.20X \). The correlation coefficient is .1628.

This positive trend is as consistent for the University as the negative trend is for the non-university purchasers. As is the reverse in the latter category, the magnitude of the increase in square feet each month is not as large as the increase in total monthly dollars spent (see Figure 13) indicating a certain rising trend in value over time.

Non-University Versus University Total Monthly Amounts Paid

Figure 16 illustrates the non-university monthly amounts paid as a function of The University of Arizona's
Figure 15. The University of Arizona Total Monthly Square Feet of Land Purchased, 1959-1968
Figure 16. Non-University Versus University Total Monthly Amounts Paid, 1959-1968
acquisition activities. The Y axis indicates the non-university amounts and ranges from $0 to $263,500. The X axis is the University monthly amounts paid and ranges from $0 to $357,870. The data develop the equation: \( Y = 90,432.50 - .10X \), where \( Y \) = total monthly amounts paid, and \( X = 1 \) at January, 1959. The correlation coefficient is \( -.1062 \).

Thus, non-university activity in terms of total monthly amounts diminished slightly each month as the University's increased.

The data are widely dispersed with many overlapping amounts as indicated by the larger valued digits along the trend line. It appears that the University's activities had little effect on non-university total monthly amounts paid.

**Non-University Versus University Total Monthly Square Feet of Land Purchased**

Figure 17 depicts the two purchasing entities' activities in terms of total monthly square feet transferred. The Y axis consists of monthly non-university square feet transactions and ranges from 0 to 131,510 square feet. The University's monthly acquisitions are displayed along the X axis and range from 0 to 136,800 square feet. The data develop the equation: \( Y = 69,113.36 - .44X \), where \( Y \) = total monthly square feet purchased, and \( X = 1 \) at January, 1959. The correlation coefficient is \( -.1677 \).

The data are more closely clustered toward the lower totals although the individual entries are still widely dispersed. Thus, non-university activity, in terms of
Figure 17. Non-University Versus University Total Monthly Square Feet of Land Purchased, 1959-1968
square feet transferred, diminished more rapidly than did the monthly amounts paid, as depicted on the previous figures, indicating a rising value trend.

**Non-University Monthly Average Dollars Paid Per Square Foot of Land**

Figure 18 illustrates the monthly average dollars paid per square foot of land in non-university transactions. The equation resulting from the data is: 

\[ Y = 1.742 + 0.0041X \]

where \( Y \) = monthly average dollars paid per square foot of land, and \( X = 1 \) at January, 1959. The correlation coefficient is .1666.

This would indicate little increase in value each month (less than one cent) but a total positive change of .492, or approximately a 28-1/2% increase in value over the entire ten-year period.

This increase in value in the face of constantly decreasing variables can be explained by an examination of the magnitudes of the declines in these prior variables. This examination reveals a larger than one to one drop in total amounts paid versus total square feet purchased, -$308.68 versus -260.07 square feet. This imbalance would result in less monthly total dollars being spent for more monthly total square feet, resulting in a continuing increase in value as time elapsed as exhibited on this figure.

This rise in value might also be partially explained by a simultaneous inflationary trend over the same time period as revealed in "Consumer Prices" (1968, p. A-64; see also this study, Table II). Utilizing this source as an
Figure 18. Non-University Monthly Average Dollars Paid per Square Foot of Land, 1959-1968
Table II. Consumer Prices

<table>
<thead>
<tr>
<th>Year</th>
<th>All Items</th>
<th>Home Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>101.5</td>
<td>101.4</td>
</tr>
<tr>
<td>1960</td>
<td>103.1</td>
<td>103.7</td>
</tr>
<tr>
<td>1961</td>
<td>104.2</td>
<td>104.4</td>
</tr>
<tr>
<td>1962</td>
<td>105.4</td>
<td>105.6</td>
</tr>
<tr>
<td>1963</td>
<td>106.7</td>
<td>107.0</td>
</tr>
<tr>
<td>1964</td>
<td>108.1</td>
<td>109.1</td>
</tr>
<tr>
<td>1965</td>
<td>109.9</td>
<td>111.4</td>
</tr>
<tr>
<td>1966</td>
<td>113.1</td>
<td>115.7</td>
</tr>
<tr>
<td>1967</td>
<td>118.2</td>
<td>122.6</td>
</tr>
<tr>
<td>1968 (Sept.)</td>
<td>122.2</td>
<td>129.1</td>
</tr>
</tbody>
</table>

Base years 1957-59 = 100.

Source: "Consumer Prices" (1968).

indication of national trends in general consumer prices and home ownership prices, an examination of these indices reveals an increase of approximately 20% in the former instance and 28% in the latter. Assuming a comparable quality of these national trends with the trend in local real property values, the values of properties transferred to non-university purchasers, in real dollar terms, remained constant as the taking-time approached.
The values along the Y axis range from $.750 to $6.515 per square foot of land. Their dispersion is more concentrated on this display than on previous non-university figures. Most of the data lie between $1.00 and $2.80 with only very few wide variances, the most significant of which occurred in the 113th month. In this month, May, 1968, non-university purchasers paid an average of $6.515 per square foot of land. An examination of the individual sales data for that month revealed a single sale of business property for $115,000 for 11,650 square feet of land among three other relatively "normal" sales. This singularly variable sale affected the average to the degree displayed. The other high and low variances occurred sporadically without any apparent pattern.

The University of Arizona Monthly Average Dollars Paid Per Square Foot of Land

Figure 19 illustrates the monthly average dollars paid per square foot of land for properties acquired by The University of Arizona during the study months. The data develop the equation: \( Y = 2.263 + .0013X \). The correlation coefficient is .0519.

This positive trend is very small per month and results in a .156 rise in the 120th month, or an approximate increase of 7% over the entire period, reflecting a general
Figure 19. The University of Arizona Monthly Average Dollars Paid per Square Foot of Land, 1959-1968
consistency in prices paid for properties needed by the University for expansion.

The range along the Y axis is from $1,000 to $13,045. The concentration of data lies between $1.40 and $3.00 with most of the variances above $3.00 occurring in the later months. The highest variance, $13,045, appears in the 27th month when one purchase of business-use property was made. Other high variances, 5.72, 4.10, 4.06, correspond to similar single apartment or business property acquisitions. Coincidentally, the low variances, 1.08, 1.14, also occur where single purchases were made, but of residential-use property.

The trend equations indicate that the University paid an average of $2,263 per square foot of land in the first period while non-university transactions show a $1,742 factor. The difference of $.521 represents an approximate 30% premium paid by the University at this point in time. The 60th month reveals a university factor of $2,341 versus a non-university factor of $1,988 or an approximate 18% difference. This premium shrinks to approximately 8% in the last period when comparing the University's $2,419 per square foot of land to the non-university's $2,234.

Thus, it appears that the University was able to maintain a generally consistent purchasing position in the face of increasing values of its surrounding properties. The 7% increase in property values purchased by the
University decreases to a loss when viewed in real dollar terms. The magnitude of this loss would be approximately 13% when compared to overall price trends and approximately 21% when compared to the increased costs in home ownership during the time period.

Pima County Assessor's Average Cash Values
For Lots In Subdivisions In The Study Area

Table III displays the Pima County, Arizona, Assessor's average full cash value for lots in subdivisions in the study area. Data from the assessor's records were utilized on this and on the following tables to illustrate the trend of property values from 1959 to 1968. Spengler wrote that "... assessed values may be used to indicate relative changes in land values for areas over a period of time . . ." (Spengler, 1930, p. 27).

The average cash values for lots in the 15 subdivisions reported in the study area are listed for the two years, 1959 and 1968, the beginning and ending periods of the analytical study time. The Pima County Assessor's office had completed an in-depth reappraisal of all privately owned real property during the interim period and the differences of values indicate the changes that occurred over these ten years.

The 1959 average cash value for lots in the University study area was $893. This increased to $2,721 in 1968,
Table III. Pima County Assessor's Average Cash Values for Lots in Subdivisions in the Study Area

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>1959</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barne's Addition</td>
<td>$ 717</td>
<td>$2,222</td>
</tr>
<tr>
<td>Buell's Addition</td>
<td>869</td>
<td>2,222</td>
</tr>
<tr>
<td>Buena Vista Addition</td>
<td>652</td>
<td>2,222</td>
</tr>
<tr>
<td>Drake's Addition</td>
<td>869</td>
<td>2,777</td>
</tr>
<tr>
<td>Fairmount Addition</td>
<td>869</td>
<td>3,333</td>
</tr>
<tr>
<td>Feldman's Addition</td>
<td>652</td>
<td>1,111</td>
</tr>
<tr>
<td>Nob Hill Addition</td>
<td>956</td>
<td>2,500</td>
</tr>
<tr>
<td>Olsen's Addition</td>
<td>652</td>
<td>2,777</td>
</tr>
<tr>
<td>Plumer and Steward No. 2</td>
<td>521</td>
<td>3,333</td>
</tr>
<tr>
<td>Rincon Court Addition</td>
<td>673</td>
<td>2,222</td>
</tr>
<tr>
<td>Rincon Heights</td>
<td>978</td>
<td>2,777</td>
</tr>
<tr>
<td>Shelton Addition</td>
<td>652</td>
<td>2,222</td>
</tr>
<tr>
<td>Speedway Heights Addition</td>
<td>869</td>
<td>2,777</td>
</tr>
<tr>
<td>University Extension</td>
<td>1,304</td>
<td>3,333</td>
</tr>
<tr>
<td>University Manor Addition</td>
<td>2,173</td>
<td>5,000</td>
</tr>
<tr>
<td>Overall Average</td>
<td>893</td>
<td>2,721</td>
</tr>
<tr>
<td>Average Ten-Year Increase</td>
<td></td>
<td>204.70%</td>
</tr>
</tbody>
</table>
an approximate 204.70% rise. These amounts do not represent specific values for individual properties but are an average of the data of the assessor's property values in this area for these two time periods. It illustrates the direction taken by these values and the approximate magnitude of this change.

**Pima County Assessor's Average Cash Values For Lots In Subdivisions Immediately Surrounding the Study Area**

Table IV displays the average cash values of lots in subdivisions surrounding the University study area. These developments are generally older subdivisions, much like those in the study area, and as such, offer a cogent comparison basis. The 1959 average lot value in these 11 districts was $703 which increased to $2,570 in 1968, an approximate 265.50% rise.

The magnitude of this positive change is somewhat higher than that of the study area which might indicate a certain inhibiting effect of The University of Arizona on its surrounding property values. However, as the investigation moves away from the study area other variables are introduced and few, if any, positive statements can be made about causal factors on property values.
Table IV. Pima County Assessor's Average Cash Values for Lots in Subdivisions Immediately Surrounding the Study Area

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>1959</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bingham Addition</td>
<td>$ 869</td>
<td>$2,500</td>
</tr>
<tr>
<td>Blenman Addition</td>
<td>695</td>
<td>2,983</td>
</tr>
<tr>
<td>Coronado Heights</td>
<td>869</td>
<td>2,922</td>
</tr>
<tr>
<td>Desert Highlands</td>
<td>652</td>
<td>2,338</td>
</tr>
<tr>
<td>Jefferson Park</td>
<td>543</td>
<td>3,294</td>
</tr>
<tr>
<td>Mansfield Heights</td>
<td>478</td>
<td>1,405</td>
</tr>
<tr>
<td>New Deal Acres</td>
<td>782</td>
<td>2,461</td>
</tr>
<tr>
<td>Olsen's Addition</td>
<td>521</td>
<td>2,972</td>
</tr>
<tr>
<td>Riecker's Addition</td>
<td>760</td>
<td>3,227</td>
</tr>
<tr>
<td>Schumaker Addition</td>
<td>478</td>
<td>1,327</td>
</tr>
<tr>
<td>Speedway Heights</td>
<td>1,086</td>
<td>2,850</td>
</tr>
<tr>
<td>Overall Average</td>
<td>703</td>
<td>2,570</td>
</tr>
<tr>
<td>Average Ten-Year Increase</td>
<td></td>
<td>265.50%</td>
</tr>
</tbody>
</table>
Table V displays average cash values for lots in subdivisions, in the general Tucson community, formed in 1949, the beginning of the study period. The 1959 average lot value of these 13 subdivisions was $1,028, while the 1968 figure was $5,137, a significant increase of approximately 399.70%.

An examination of the subdivisions reported on this table reveals sharp increases in Indian House Estates and Tanque Verde Country Estates, both relatively rural areas in 1949 but encompassed in the city's expansion in 1968, barely twenty years later.

Table VI displays the average lot values for subdivisions formed in 1954. The average lot value in 1959 was $880 which increased to $3,058 in 1968, a rise of approximately 247.50%.

The 27 subdivisions reported represent a much broader area of the community and offer a more comprehensive comparison to the study area's increase of approximately 204.70%.
Table V. Pima County Assessor's Average Cash Values for Lots in Subdivisions Recorded in 1949

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>1959</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyer Addition</td>
<td>$586</td>
<td>$2,100</td>
</tr>
<tr>
<td>Broadway Estates</td>
<td>500</td>
<td>2,750</td>
</tr>
<tr>
<td>Casas Adobes Estates No. 2</td>
<td>3,304</td>
<td>5,961</td>
</tr>
<tr>
<td>Hoffman Addition</td>
<td>608</td>
<td>2,600</td>
</tr>
<tr>
<td>Indian House Estates</td>
<td>2,608</td>
<td>11,500</td>
</tr>
<tr>
<td>National City No. 10</td>
<td>260</td>
<td>1,550</td>
</tr>
<tr>
<td>North Campbell Estates</td>
<td>739</td>
<td>3,677</td>
</tr>
<tr>
<td>Norym-Tragle Addition</td>
<td>695</td>
<td>2,861</td>
</tr>
<tr>
<td>Oracle Foothills Estates No. 2</td>
<td>792</td>
<td>5,227</td>
</tr>
<tr>
<td>Sabino Knolls Estates</td>
<td>543</td>
<td>8,577</td>
</tr>
<tr>
<td>Sierra Estates</td>
<td>456</td>
<td>2,500</td>
</tr>
<tr>
<td>Tanque Verde Country Estates</td>
<td>2,173</td>
<td>16,666</td>
</tr>
<tr>
<td>Vista Del Pueblo Annex</td>
<td>108</td>
<td>822</td>
</tr>
<tr>
<td>Overall Average</td>
<td>1,028</td>
<td>5,137</td>
</tr>
<tr>
<td>Average Ten-Year Increase</td>
<td></td>
<td>399.70%</td>
</tr>
</tbody>
</table>

Table VI. Pima County Assessor's Average Cash Values for Lots in Subdivisions Recorded in 1954

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>1959</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casas Adobes Estates Resubdivision</td>
<td>$2,173</td>
<td>$4,322</td>
</tr>
<tr>
<td>Clara Vista Addition</td>
<td>2,391</td>
<td>5,000</td>
</tr>
<tr>
<td>Crest View Addition</td>
<td>1,086</td>
<td>5,227</td>
</tr>
<tr>
<td>Douglas Terrace</td>
<td>521</td>
<td>2,511</td>
</tr>
<tr>
<td>Edmund Gardens</td>
<td>500</td>
<td>2,461</td>
</tr>
<tr>
<td>El Centro Estates</td>
<td>543</td>
<td>2,600</td>
</tr>
<tr>
<td>Estrella Addition</td>
<td>130</td>
<td>500</td>
</tr>
<tr>
<td>Flowing Wells Village</td>
<td>217</td>
<td>2,200</td>
</tr>
<tr>
<td>Glower Addition</td>
<td>347</td>
<td>1,650</td>
</tr>
<tr>
<td>Green Hills Addition</td>
<td>695</td>
<td>2,900</td>
</tr>
<tr>
<td>Loma Verde Addition</td>
<td>434</td>
<td>2,588</td>
</tr>
<tr>
<td>Manana Vista</td>
<td>1,300</td>
<td>2,700</td>
</tr>
<tr>
<td>Milstone Manor</td>
<td>1,413</td>
<td>3,650</td>
</tr>
<tr>
<td>Ocotillo Park</td>
<td>500</td>
<td>2,427</td>
</tr>
<tr>
<td>Patterson Estates</td>
<td>847</td>
<td>5,600</td>
</tr>
<tr>
<td>Pontatoc Uplands</td>
<td>3,470</td>
<td>6,250</td>
</tr>
<tr>
<td>Prose Addition</td>
<td>652</td>
<td>1,944</td>
</tr>
<tr>
<td>Rincon Estates</td>
<td>434</td>
<td>2,677</td>
</tr>
<tr>
<td>Rosemont Park</td>
<td>1,739</td>
<td>2,938</td>
</tr>
<tr>
<td>San Fernando Village</td>
<td>434</td>
<td>2,984</td>
</tr>
<tr>
<td>San Paul Village</td>
<td>500</td>
<td>2,500</td>
</tr>
<tr>
<td>San Rafael Estates</td>
<td>652</td>
<td>3,577</td>
</tr>
<tr>
<td>Santa Maria Addition</td>
<td>195</td>
<td>1,750</td>
</tr>
<tr>
<td>Tucson Foothill Estates No. 1</td>
<td>1,086</td>
<td>5,127</td>
</tr>
<tr>
<td>Villa Serena Addition</td>
<td>565</td>
<td>1,900</td>
</tr>
<tr>
<td>Vistas Las Catalinas No. 2</td>
<td>347</td>
<td>2,027</td>
</tr>
<tr>
<td>Yale Estates</td>
<td>608</td>
<td>2,500</td>
</tr>
<tr>
<td>Overall Average</td>
<td>880</td>
<td>3,058</td>
</tr>
<tr>
<td>Average Ten-Year Increase</td>
<td></td>
<td>247.50%</td>
</tr>
</tbody>
</table>
Table VII displays the average lot values from the 58 subdivisions formed in 1959, an active year for new developments in Tucson. This array is even more comprehensive than those values in the prior table, with areas in every part of Tucson being represented.

An inspection of changes in the individual subdivisions reveals some that were slight, note Coronet Park #1 and Shadow Mountain Estates. Others were more impressive, note Desert Hills, Lots 1-82, where the change reflects an approximate 600% increase.

The average 1959 lot value of these subdivisions was $798, while the average value of these same lots in 1968 was $2,279, a 185.60% rise over that period. This is slightly less than the rate of appreciation of 204.70% reported in the study area.

An observation of the data on the tables described in this chapter reveals a clearly defined rising trend in Tucson's real property values from 1959 to 1968. The study area's properties were as much a part of that rising trend as were the other properties investigated. The only major difference was in the average values for lots in subdivisions formed in 1949. This difference (204.70% versus 399.70%) might have revealed a negative University effect, but this observation is immediately mitigated by the rate
Table VII. Pima County Assessor's Average Cash Values for Lots in Subdivisions Recorded in 1959

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>1959</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algonquin Heights</td>
<td>$522</td>
<td>$2,100</td>
</tr>
<tr>
<td>Bahia Estates</td>
<td>543</td>
<td>1,944</td>
</tr>
<tr>
<td>Buena Ventura</td>
<td>652</td>
<td>1,477</td>
</tr>
<tr>
<td>Casas Adobes Estates (lots 448-465)</td>
<td>2,391</td>
<td>4,777</td>
</tr>
<tr>
<td>Catalina Foothills Estates #5</td>
<td>3,260</td>
<td>6,111</td>
</tr>
<tr>
<td>Citation Park (lots 1-112)</td>
<td>673</td>
<td>1,800</td>
</tr>
<tr>
<td>Cloud Ridge East</td>
<td>391</td>
<td>2,200</td>
</tr>
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<tr>
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<td>173</td>
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Table VII.—Continued

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<th>Neighborhood</th>
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<td>Shadow Mountain Estates</td>
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<td>Sunrise Addition</td>
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<td>Valentine Terrace</td>
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<tr>
<td>Vista Del Sahuara II</td>
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<td>Wrangler Ranches</td>
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<td>Overall Average</td>
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<tr>
<td>Average Ten-Year Increase</td>
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of gain reported for other Tucson properties, which closely approximated that of the study area. Therefore, according to the assessor's estimate of property values, the study area enjoyed the same relative increase as did the average values of properties in different areas throughout the community.
CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

This study is an investigation of the effects of an expanding university on the value of real properties peripheral to its main campus. It tests the hypothesis that the anticipation of taking by purchase or condemnation of properties surrounding an expanding university, results in their market values increasing in direct relationship to the approaching "taking time." The University of Arizona at Tucson was chosen as the subject university, and the study concerns the fluctuations of the values of real properties surrounding its main campus during the twenty years, 1949-1968.

Conclusions

1. The University of Arizona had no measurable effect on its peripheral real property values during the years 1949-1968.

The establishment of a university includes the selection of a parcel of land to act as the site for the construction of facilities necessary to serve the needs of the students, faculty, and staff. The final decision for the choice of a specific location is usually achieved after
resolving many political and economic factors. Many times the locational decision is reached as a compromise between two communities or other political entities, or as a result of the donation of land from the federal or state governments, or as a private person's gift. This latter instance was the situation that prevailed for The University of Arizona in 1886 when a 40-acre gift was accepted by the Arizona Board of Regents.

This site was located approximately two miles east of the then existing City of Tucson and, after completion of the first building, resulted in houses and other buildings being constructed up to and around the campus boundaries. This pattern of development followed the theories of city growth advanced by Burgess, Hoyt, Harris, and Ullman, who wrote that city growth takes place in an outward direction from the central city, along established roadways, toward a magnetic node (see Chapter II).

In the 86 years following the University's inception, the private property developments surrounding the campus proceeded at a pace corresponding to the growth of the University itself. This institution found itself bound by a ring of high density residential and commercial improvements while needing more room for itself. As a land-grant college and under the financial control of the Arizona legislature, the University could only acquire additional properties when allocations were provided for these capital
improvement purposes. Each year requests were made of the legislature by the Board of Regents for funds to acquire adjoining properties to provide required facilities for an expanding student enrollment. Depending on the fiscal conditions prevailing in the state, as well as the political make-up of the legislature, funds were allocated to The University of Arizona to be utilized by its physical plant director according to a priority of needs.

Although this University's lateral expansion began almost immediately after its inception, a concentrated emphasis on increasing the main campus took place during the twenty-year study period when the campus expanded to approximately 250 acres. This was accomplished by the acquisition of adjacent real properties as funds became available.

This expansion effort was based upon advice given by the committee on the future development of The University of Arizona in a report presented in 1949 (Report of The Committee on Future Development of The University of Arizona, Vol. III, 1949). The annual sales data (Table I) reveal a slow response to this advice, although 58 properties were acquired by the University during the years 1949-1958. The University's acquisition program was sporadic during these first ten years of the study, with some years having no purchases, others a few, and 1956 a spurt of 27. This
inconsistent activity prevented a comprehensive analysis of the data for this early period.

The annual average prices paid by The University of Arizona for properties acquired during the years 1949-1958 ranged from a low of $1.00 per square foot of land to a high of $1.96. These amounts are compared to the non-university's low of $1.17 per square foot of land and its high of $1.82. These average annual prices fluctuated erratically for each purchasing entity, revealing no identifiable trend as the University taking-time approached.

The University's acquisition program accelerated in 1959 when 20 properties were purchased, and remained at this relatively active level until 1968. This consistent activity allowed for an in-depth analysis of value fluctuations during these latter ten years.

Non-university purchasing activity diminished regularly as the University's increased. Based on regression analyses of data for the 120 months, 1959-1968, this inverse relationship applied to the average number of monthly sales, the average total of monthly amounts paid, and the average monthly square feet transferred. Non-university activity decreased at the rate of .03 sales per month while the University's increased at the rate of .01 purchases per month (see Figures 10 and 11). Non-university total amounts paid decreased $308.68 per month while the University's increased $268.39 per month (see Figures 12 and
The amount of non-university square feet transferred decreased 260.07 square feet per month while the University's increased 113.20 square feet per month (see Figures 14 and 15).

These inverse relationships were verified in the analyses of non-university purchasing activities as a function of the University's property acquisition decisions. In terms of monthly amounts paid, the trend for non-university purchasers was to pay less each month, \$.10, as the University paid more. This trend is repeated in terms of square feet transferred. As the University increased its activities, non-university square feet transfers diminished at the rate of .44 square feet per month (see Figures 16 and 17).

These inverse relationships might be explained by the decreasing number of properties available for sale due to the terminal quality of the University's purchases. Another reason could be the desire of some of the remaining property owners to increase their economic yields by awaiting a more advantageous sale to the University.

The analyses of the monthly average dollars paid per square foot of land, this study's unit for measuring value, reverses these inverse trends. The analyses indicate that both purchasing entities enjoyed positive value trends for the ten years. The value of properties transferred to non-university purchasers increased at the rate of \$.0041 per
month, while the values of properties purchased by The University of Arizona increased at the rate of $.0013 per month (see Figures 18 and 19). These data translate into an approximate 28-1/2% increase in value for non-university property transfers, and an approximate 7% increase in values for the University's acquisitions.

The amount of dollars paid per square foot of land is determined by dividing the number of square feet purchased into the amounts paid. Thus, the positive value trends are a result of the total square feet transferred fluctuating at a different rate than the total amounts paid. This is the situation for the non-university purchasers where the square feet purchased declined at the rate of 260.07 square feet per month while the amounts paid declined at a faster rate, $308.68 per month. Thus, more monthly square feet were purchased for less monthly dollars, resulting in a rising value trend.

This is also the situation for the University where the amounts paid increased at the rate of $268.39 per month while the square feet acquired increased at the rate of 113.20 square feet per month. Thus, the University paid more monthly dollars for less square feet resulting in a rising value trend.

From these results it might appear that The University of Arizona had a positive effect on its adjoining real property values. However, an examination of national
economic trends and local real estate value fluctuations during these same years reveals that this was not the case.

Nationally, the consumer price indices for the years 1959 through 1968, as reported in the November, 1968 Federal Reserve Bulletin (Consumer Prices, p. A-64), revealed a 20% inflationary trend for general consumer prices and, more specifically, a 28% inflationary trend for home ownership prices. Assuming a comparable quality between these national trends and the local real estate market, and utilizing the prices of home ownership as the basic comparison unit, there would appear to be, in real dollar terms, a net loss in value of approximately 21% for properties purchased by The University of Arizona during this period. More significant is the reduction of the reported rise in values of properties transferred to non-university purchasers to no net gain. In other words, there was no measurable University effect on the values of properties surrounding the main campus despite an active acquisition program, since the change in values as reflected by the sales prices of those properties traded in the open market parallel almost exactly the national change in housing prices.

This observation is reinforced by the data describing the local real estate value fluctuations during this time period. The data displayed on Tables II through VI reveal a consistent increase in real property values for the
general Tucson community, including the study area. These data are the Pima County Assessor's evaluations of the values of lots in subdivisions located in every area of greater Tucson for the years 1959 and 1968, the time boundaries of the statistical analyses. All of these lots were reappraised by the County Assessor during the years 1963 to 1967 to fulfill the obligations imposed by the Arizona Legislature that a property tax equalization program be implemented for the state of Arizona (Arizona Revised Statutes). Thus, a relatively accurate measurement of property value trends for these years is represented by these data.

The assessor's average value for lots in subdivisions in the study area increased approximately 204% from 1959 to 1968. The assessor's average value for lots in subdivisions immediately surrounding the study area increased approximately 265% for these same years. Lots in subdivisions formed in 1949 increased in value approximately 399%, while lots in subdivisions formed in 1954 and 1959 increased in value approximately 247% and 185% respectively. Thus, the assessor's value of properties in the study area increased at relatively the same rate as the assessor's value of general community properties, and it can be said that The University of Arizona has no measurable effect upon the values of its peripheral properties.
2. The University of Arizona was able to maintain a relatively constant buying position during its most active acquisition period, 1959-1968, with an approximate 7% rise in its average property purchase costs, despite a national inflationary trend of approximately 20% and rising community real estate values.

The average monthly prices paid by The University of Arizona for properties it acquired for expansion purposes increased from $2,263 per square foot of land in January, 1959, to $2,419 per square foot of land in December, 1968 (see Figure 19). This indicates an approximate 7% rising trend or less than 1% per year for ten years. The ability of the University to maintain a relatively constant buying position in the face of a national economic inflationary trend of approximately 2% per year (see Table II) and sharply rising local property values (see Tables III-VI) was probably a result of a combination of circumstances peculiar to universities and to institutions having the powers of condemnation under the rights of eminent domain. Inherent in these powers is the ability to inhibit the values of properties designated for future acquisition.

The University of Arizona paid more than $7,650,000 over the two decades 1949-1968 for properties surrounding its main campus. This amount represents the totals of 453
individual purchases where specific property prices were based upon their market values at the time of acquisition. These market values were determined by appraisal evaluations of the properties' worth (Houston, 1970). These evaluations were affected by the University's actions.

The developments surrounding The University of Arizona include the entire spectrum of land uses. Ranging from single, well-kept residential units to houses converted to apartments and sleeping rooms, and including apartment structures, offices, and store buildings, the university area presents the frenetic, well-used quality associated with a magnetic node that not only attracts and repels thousands of users daily but also seasonally. Murphy's description of blighted areas near universities (Murphy, 1966) seems to apply to the study area. He wrote that

Attractive as many university campuses are their presence often seems to have a blighting effect upon the housing in the vicinity. This is largely because rooms are in great demand near the campus, and houses which may at one time have been occupied by faculty families have long since gone over to a roominghouse function. Places of this type take on a battered appearance. As the need for office space, laboratories, and classrooms expands, the university buys adjacent property, thereby pushing the blighted roominghouse district farther and farther into the better residential areas. Even the small commercial centers near the larger universities suffer from the encroaching campus. Often when the university has not acquired the land outright, it is held under option, thus giving a temporary and somewhat shoddy character to the business activities. As these enterprises are forced out, they are likely to find new locations by edging into the surrounding residential areas,
pushing the roominhouse district ahead of them (p. 144).

The appraisals of properties in the study area would probably reflect this blighting effect of the university.

Invariably, any university expansion plans are announced in the local news media including the publishing of a map of the anticipated new boundaries (see Figure 9). These announcements serve to sterilize the values of properties within these new boundaries. Many owners become reluctant to expend any possibly non-recoverable funds for maintaining their properties in anticipation of an imminent university purchase. Commercial tenants seek to relocate on the new periphery leaving vacant stores in their wake. These reactions tend to lower the values of the properties affected.

The appraisal of real estate in most instances, involves a synthesis of three evaluation techniques: the market comparison approach, the cost approach, and the income approach (Allison, 1968). The possible effects of The University of Arizona's expansion activities on these appraisal techniques were described in the introduction to the methodology (Chapter V) but are reviewed here for added emphasis.

The market approach relies almost entirely on a comparison of the subject property with other similar properties sold within a relatively short time period prior to
the appraisal date. The comparability of these properties relies heavily on similarities of location; type, size, age, and condition of improvements; size of lot; and type of property use (Parvin, 1968). The age and location requirements would create the possibility that the appraiser would utilize the sales of properties in the study area for evaluating other units nearby. It also raises the possibility that some prior university purchases might be included in the appraiser's research, directly affecting the values of properties they were in the process of acquiring.

The cost approach is based upon an estimate of the subject property's current replacement costs for its improvements less some sum reflecting the improvements' depreciation, plus the lot value as determined by the market approach (Johnson, 1968). The sterilizing effects of the University's expansion announcements would be reflected most directly in this appraisal technique when measuring the condition of the improvements in estimating a depreciation factor.

The income approach is based on determining a net annual income as a percentage return on investment. It is applied to various income properties such as commercial, professional, office, and apartment buildings (Hollenbaugh, 1968). Since net annual income is a function of gross rents received less costs, a property's value is strongly dependent on the quality of the tenants and their continued
occupancy. Expansion announcements jeopardize these variables by motivating commercial tenants to relocate and creating vacancies in their wake. These weakened income positions are then probably reflected in the appraiser's report as lowered values.

The synthesis of these three techniques resulted in a certain value for the subject property. This value then became the basis for negotiations between the University and the property owner. The data indicate that The University of Arizona paid an average of $2.263 per square foot of land at the beginning of the statistical study period (see Figure 19), while non-university purchasers paid an average of $1.742 per square foot of land (see Figure 18). The difference of $.521 represents an approximate 30% premium being paid by the University during the early months of 1959. This difference decreased to approximately 18% by January, 1964 ($2.341 versus $1.988), and to approximately 8% in the last month, December, 1968 ($2.419 versus $2.234).

Thus, although The University of Arizona maintained a relatively level rate for its acquisition costs during the study period, it consistently paid more than market value as measured by non-university prices. It would appear that this practice is the result of a desire to avoid enforcing the University's condemnation powers. Only 6 of the 453 properties acquired during the study period had been condemned (Houston, 1970).
Recommendations

The implications of the results of this study are that the values of properties surrounding an expanding university fluctuate independently of that institution's influence, disproving the hypothesis that they rise as the university's taking-time approaches. Also, an institution having condemnation powers can, with the judicious use of these powers, somewhat control the values of properties it intends to acquire. This appears to be the situation at The University of Arizona in Tucson. The effects of other universities and similar public or quasi-public institutions on their peripheral property values could be the subject for future studies.

The University of Arizona's successful application of its present land acquisition techniques should certainly be continued in light of the results of this study. Always subject to the Arizona Legislature's controls as far as allocations for capital expenditures are concerned, the University's land acquisition department has effectively balanced the purchase of lands needed for expansion with those funds that are allocated for these purposes.

However, some of the hardships on the adjacent land owners which are precipitated by the advance announcement of expansion are recognized and sympathized with by the University land agents. The uncertainty as to when the properties will be acquired seems to be the basic weakness
of the present system. "The University wishes it could buy all the properties within the announced new boundaries at one time to alleviate any hardships imposed on the property owners," reported Mr. Holly Lucas, University Land Agent (Lucas, 1970). He indicated this approach was improbable since the amount of funds necessary to achieve this goal would be impossible to secure from the state. In addition, the management of these properties in the interim period until they were needed would be too costly for the University to bear.

The continued expansion of The University of Arizona seems inevitable due to the constant increase in enrollment. The existing facilities appear to be utilized to their present capacity. Should this expansion be continued in a lateral direction? It would seem that the size of a campus would be subject to the economic concept of diminishing returns to scale, that is, there should be some optimum size which would most efficiently serve a desired enrollment. Applying Castaldi's formula for an efficient campus size as 50 acres per thousand students (Castaldi, 1969, p. 75), a 20,000-student enrollment would require a 1,000-acre campus. The University of Arizona has approximately 250 acres for more than 20,000 students.

Due to limited funds for land acquisition, the alternative would be to utilize the existing campus more intensively by expanding vertically. This might diminish
the aesthetic beauty now enjoyed on this campus but it would be a more efficient use of the land. This would complement Barnes' observations that "The University has a clear responsibility to use its land as efficiently as possible . . . [since] any [lateral] expansion . . . must result in high costs to the taxpayers and loss of vitally needed and irreplaceable land and tax revenue to the city" (Barnes, 1958, p. 146).
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