MEASURING QUALITY OF HOUSING1/

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Abstract

Statistics on housing condition produced by the Bureau of the Census have heretofore been based on subjective ratings made by census enumerators. One of the major goals of the 1970 Census of Housing is that of replacing the subjective rating with one based on objective criteria. This paper reports the results of studies evaluating the reliability and accuracy of enumerator ratings. It also reports the results of a multi-variate analysis to measure the association between 1960 condition ratings and objective characteristics. It is concluded that adequate census tract statistics on housing condition could have been produced in 1960 from information supplied by householders. It is proposed that, in 1970, measures of housing quality consist of combinations of objective housing characteristics.

The development of a measure of housing quality which would produce reliable and accurate statistics has been one of the major concerns of the Bureau of the Census, beginning with the first census of housing in 1940. It has also posed one of its most difficult problems.

We have never considered it possible to conceive a single measure that could sum up all the components of housing quality. In 1960 we defined <u>quality</u> in the instructions we gave our census enumerators in these words.

"Item H6 calls for information about the <u>quality</u> of housing. It tells how many housing units are not providing adequate shelter and are, in their present condition, endangering the health, safety, or well-being of their occupants. We call such units <u>dilapidated</u>. For the units that are <u>not</u> <u>dilapidated</u>, we need to know how many are in good repair and, therefore, <u>sound</u>; and how many are in need of repair and, therefore, <u>deteriorating</u>."

Except for the use of a two-fold, instead of a three-fold classification in 1950, the wording on this point was essentially the same in both censuses.

In the first census of housing the concept underlying our efforts to measure housing quality was the degree of hazard to safety. The enumerator was instructed that a housing unit was to be rated as "Needing major repairs," if the continued neglect of the needed repairs would "seriously impair the soundness of the structure and create a hazard to its safety as a place of residence." However, this rating measured only the physical condition without indicating the level of quality. A tar paper shack could be rated as "Not needing major repairs." In 1950, principally to remedy this defect, units were classified as "Dilapidated" or "Not Dilapidated."

In 1960 a three-way classification was adopted--Sound, Deteriorating, and Dilapidated. Special efforts were taken to make the 1960 definition of Dilapidation identical with that used in 1950. A Sound unit was defined as having no defects or only slight defects which normally would be corrected during the course of regular maintenance. A Deteriorating unit was defined as needing more repair than would be provided during the course of regular maintenance. A Dilapidated unit was defined as one in which the defects were either so critical, or so widespread that the structure should be extensively repaired, rebuilt, or torn down.

The application of the concepts was virtually the same in the last three decennial censuses. Enumerators were instructed to observe each unit and then make an overall judgment according to specified criteria. They were also instructed that their ratings were to reflect only the physical condition of the structure and the unit, and that such factors as neighborhood quality, race or color of inhabitants, for example, were not to be considered. Unlike 1940, in 1950 enumerators were provided with detailed written criteria and instructions as well as photographs depicting levels of condition. In addition, audio-visual techniques were used in training. The 1960 training techniques and instructions were essentially the same as in 1950, except that modifications were made to reflect the three-way classification.

The Census Bureau's condition classification has been combined with availability of plumbing facilities, by the Public Housing Administration, to form a classification which identifies housing as standard or substandard. Although these terms do not appear in census publications, beginning with the 1950 census, tabulations have been provided to which the "substandard" and "not substandard" labels could be directly applied. In terms of the published census categories, a "substandard" unit is:

I/ Based upon an unpublished report, <u>Quality of</u> <u>Housing</u>, by Leon Pritzker and Joseph Selove, April 1966, Bureau of the Census.

- 1. Dilapidated
 - OR
- lacks one or more of the following facilities:
 - a. hot running water in the structure;
 - b. flush toilet for private use;
 - c. bathtub or shower for private use.

Since 1960 we have devoted considerable time and money to research on methods of improving the measurement of housing and neighborhood quality. The decision that the 1970 census will be conducted by mail has greatly influenced the conduct of the research. Our objective in examining the methods of measurement employed in the 1960 census was to establish their value in providing statistics which could serve as a standard of adequacy. In our judgment, the data provided in the 1960 census fell far short of satisfying the requirements of such a standard.

By adequate, we mean that the statistics should --

- 1. Provide reliable and accurate data with respect to current levels of quality;
- 2. be comparable geographically;
- be built up from data obtained for individual housing units to which individual values should be assigned;
- 4. be based on methods that distinguish various levels of quality of individual housing units.

Our examination of the data we obtained in 1960 on quality of housing, and the methods we employed for that purpose, has led us to the following conclusions:

> The 1960 census statistics on condition, that is, whether Sound, Deteriorating, or Dilapidated, are unreliable and inaccurate. On reliability, our best estimate is that if we had sent back a second group of enumerators to rate the housing units of the United States, only about one-third of the units rated as Dilapidated or Deteriorating by the first group would have been rated the same by the second group of enumerators. (See Table 1.)

With regard to accuracy, it appears that the number of Dilapidated units was understated by at least one-third. The effect of this understatement is to grossly distort estimates of the trend in Dilapidated housing from 1950 to 1960. (See Tables 2 and 3.) The statistics on Dilapidated or Deteriorating housing for blocks appear to be of very low accuracy.

Statistics for tracts within any given city are adequate, however. This finding is consistent with the others. The random errors of measurement (including enumerator variability) tend to cancel out on the tract level.

There is little evidence which defines quantitatively the reasons why condition data were poor in quality in the 1950 and 1960 censuses. It is believed that one of the chief reasons is the subjective interpretation of the specific criteria by enumerators when making the overall judgment on condition. Some factors which may influence the enumerators are: (a) the socioeconomic background of the enumerators, or the quality of the neighborhoods and homes in which the enumerators themselves live; (b) the level of instruction given by the supervisory personnel; (c) race or color of the occupants; (d) neighborhood factors such as heavy traffic, noises and odors from commercial establishments, and mixed land usage; (e) general housekeeping habits of occupants, shabbiness of interior and exterior, and artificial fronts of structures. Condition is, at best, a difficult concept to apply, particularly for marginal units. The instructions may have been misinterpreted despite the fact that more time was devoted in training on condition than on any other housing item. Another contributing factor is that the overall determination of condition should be based on observation of the inside and outside of the entire structure. In any decennial census, the enumerator typically sees only one or two rooms or he may conduct the enumeration on the doorstep, or in the public hallway or foyer. In addition, the three-way classification of condition used in 1960 may have contributed to the poorer quality of reporting of condition because it increased the complexity of the rating process and provided the enumerator with an intermediate category in which to place doubtful cases.

2. The Public Housing Administration "Standard - Substandard" classification, although affected adversely by the poor quality of the enumerator ratings, appears to have been a more adequate measure of housing quality in 1960 than the classification based on structural condition alone. (See Table 3.) There is evidence that about one-fourth of the units which could be classified as "substandard" from the findings of one group of enumerators, would have been differently classified from the findings of a second group of enumerators.

However, the trend appears to have been measured adequately for the decade 1950-1960. The erroneous classifications of structural condition were, in effect, corrected by the plumbing facilities data. 3. We see no feasible method of improving the quality of enumerator condition ratings in a decennial census. This is a consequence of the ambiguities, nonoperational elements, and complexities of the rating process itself, as well as of biasing factors in the environment in which ratings have to be made.

In anticipation of the possibility that the 1970 census would be taken by mail, studies were made (in 1962 and 1963 $\frac{1}{2}$) to test the collection of data on structural condition through selfenumeration. These studies were conducted in the following four areas: the Washington, D.C.-Maryland-Virginia Standard Metropolitan Statistical Area; Philadelphia, Pennsylvania; Fort Smith, Arkansas; and Huntington Township in Suffolk County, New York. Their primary purposes were: (a) to determine how information on condition obtained by mail enumeration would compare with that obtained by direct enumeration in the 1960 census or by ratings from "experts," and (b) to determine the relationship of tenure (whether owner- or renter-occupied) of unit and question wording to respondents' replies.

It was assumed that it would not be feasible to ask the respondents in a mail enumeration if their units were Sound, Deteriorating, or Dilapidated. Therefore, the kinds of questions varied from a set of comparative terms ranging from "excellent" to "very bad," to lists of deficiencies about specific parts of the structure such as the roof, porch, exterior walls, etc. The responses to these questions did not automatically classify units into the three-way classification of condition. It was necessary to devise methods which "translated" the respondents! answers into three categories of condition used in 1960. The results were then compared with those from the 1960 census and ratings made by "experts" who were representatives from the Bureau of the Census, Bureau of the Budget, and the housing agencies. In interpreting the results, it should be recognized that considerable difficulty was experienced in translating the respondents' replies. In addition, the number of cases in these studies was quite small and the only city where a probability sample was used was in Fort Smith, Arkansas.

Data for Fort Smith, Arkansas, (see Table 4) are generally consistent with the findings for the other areas included in this study. In this test, the experts determined condition for the sample units by using the 1960 concepts and instructions. The respondents indicated the condition of their units by checking a set of comparative terms and a list of objective deficiencies. The respondents' replies were then translated into categories which were as close as we could come to the 1960 classification. The data in Table 4 indicate that, as it was used in Fort Smith, self-enumeration does not yield condition data comparable to those obtained in direct enumeration, particularly for units at the lower end of the scale. The major problem of measuring condition through self-enumeration under these conditions is that householders rate their units more favorably than "experts," homeowners to a greater extent than renters. While it is recognized that the experts tend to be more critical in their ratings, the same general bias by tenure is found when the results of selfenumeration are compared with those obtained by the 1960 enumerators.

Following these experiments with self-enumeration we turned to regression methods to help identify the characteristics which are related directly to quality of housing. Utilizing data collected in the 1960 census, the analyses related four measures of housing quality to "objective" population and housing characteristics. (See Attachment 2.) The four measures of housing quality were:

- 1. proportion Deteriorating,
- 2. proportion Dilapidated,
- 3. proportion Deteriorating plus Dilapidated,
- 4. proportion "Substandard."

The results we have obtained to date are based upon block, enumeration district, and tract data from the 1960 census for six cities. Four of these six were chosen at random from cities of population between 100,000 and 200,000 in 1960. The other two, Louisville and Cleveland, were selected because a census had been recently completed in each of these cities.

The independent variables were grouped to provide three separate analyses for each dependent variable and for each type of area. The groups were: "population" variables, "housing" variables, and the combination of the two. The classification of the independent variables as "population" and "housing" variables was arbitrary. The "housing" variables were defined as those variables that could be measured by a census of housing in which no population data at all were collected. Some of the "population" variables, on the other hand, reflect the characteristics both of the housing units and of their occupants (e.g., persons per room).

The computations of coefficients of multiple correlation are based upon census tapes containing data for the 25-percent sample of housing units in 1960.

Our research has indicated the following about the 1960 condition rating and its relation to objective characteristics.

1. There is a gradient in the coefficients of multiple correlation by size of area. The correlations are lowest for

I/ "Self-Enumeration of Housing Condition," Housing Division, Bureau of the Census, 1964.

blocks, increasing somewhat for enumeration districts, and are at a maximum for tracts. (See Table 5.) Our analyses thus far indicate that errors in the ratings themselves play an important role in this gradient.

2. At the tract level, the amount of variance explained is, in our judgment, high enough to warrant the use of objective characteristics as substitutes for the enumerator rating of condition. Although the evidence is not as direct as for tracts, our judgment is that objective characteristics will differentiate blocks and enumeration districts, as well as tracts, with respect to quality of housing.

Comparison of the rank orders of areas based on regressed values and on actual ratings provides one type of operational translation of what these coefficients of correlation signify. Census tracts in Fort Wayne, Indiana, one of the six cities used in our regression study, were ranked by quartiles according to the percent of units which were Deteriorating or Dilapidated in 1960, both according to the actual ratings obtained in 1960, and the values predicted by the regression equations. The tracts which were placed in identical quartiles by both the observed and the predicted values contained 90 percent of the units which were Deteriorating or Dilapidated. (See Table 6.)

3. The estimated multiple correlations for all types of areas--blocks, enumeration districts and tracts, were found to be generally highest where the proportion "substandard" was used as the dependent variable.

One set of estimates included as an independent variable the percent of units with bathrooms for private use, the other set excluded this variable. We recognize that the standardsubstandard classification itself gives heavy weight to the presence of a bathroom, and thus, the inclusion of this variable may appear to involve some type of circular reasoning. However, the presence or absence of a bathroom for private use is an "objective" factor that can be obtained readily in a self-enumerative census. Thus, it seemed appropriate to check on the hypothesis that the presence or absence of a bathroom plus other "objective" factors can substitute effectively for the present definition of the standard-substandard classification. The evidence clearly supports this hypothesis. The bathroom variable produces substantial increases in the correlations.

The statistics based on the "standard-substandard" classification appear to have played a much more important part in the establishment of housing policy and in the execution of housing programs than the statistics on structural condition. A comment is in order therefore about its usefulness as a measure of housing quality in 1970.

One important reason for the adequacy of the statistics based on the "standard-substandard" classification is that the statistics reflect primarily an "objective" characteristic of housing units--the extent of availability of plumbing facilities. In the 1950 census, only about four percent of the units which were classified as "substandard" were Dilapidated units with all plumbing facilities. In the 1960 census this rose to about nine percent. However, in the large cities (cities of 100,000 inhabitants or more) the Dilapidated units with all plumbing facilities made up 15-20 percent of the total "substandard."

Some housing analysts believe that, because of the increased enforcement of housing codes since 1960, there has been widespread installation of plumbing facilities in poor housing. This installation is sufficient to classify low-quality housing as "standard." Thus, the contention is that in 1970 the "standard-substandard" classification will no longer help identify housing of low quality. We would agree that the identification of housing and neighborhood quality by this system will probably be less effective in 1970 than it was in 1960. The question is one of degree, however.

If it is accepted that a modified "standardsubstandard" classification is the most useful one, then to overcome this difficulty, the Bureau of the Census must find ways of strengthening this classification by the addition of other directly measurable components of housing quality. We are preparing to test other objective factors for this purpose. This brings me to a discussion of our present plans.

We have considered a number of methods for identifying the quality level of individual units. Three of these start by defining a value on the quality scale underlying each characteristic below which a unit would be classified as inadequate with respect to that characteristic. (For example, a unit could be classified as inadequate if it did not have a complete bathroom for private use.)

The alternatives are:

- 1. A simple count of inadequacies for each unit.
- 2. A weighted count of inadequacies where each one is weighted in terms of its importance for a given index of quality of housing.
- 3. For block tabulations we could identify units without a complete bathroom for exclusive use, and units with a complete

bathroom, but with a number of specified deficiencies. This implies, of course, that the availability of a private bathroom for exclusive use will be taken to indicate inadequate housing, without further qualifications.

We plan to conduct a series of surveys to develop and test measures of housing quality which will consist of combinations of objective characteristics. At present, the list consists of these items:

1. Availability of a complete bathroom, for private use.

(A complete bathroom includes a flush toilet, a bath or shower with piped hot and cold water, and a lavatory with hot and cold piped water.)

2. Availability of a complete kitchen, for private use.

(A complete kitchen includes a refrigerator, cook stove, and a sink connected to piped hot and cold water, all in the same room or space.)

- 3. Kind of heating equipment.
- 4. Age of structure.
- 5. Number of closets.

(This will be expressed as a ratio of closets per room.)

- 6. Whether there is a telephone in the unit.
- 7. The rent paid or asked.
- 8. Value, or price asked.

We have two objectives in these surveys. The first is to determine how well a measure consisting of objective housing characteristics compares with values obtained by an intensive appraisal of housing quality. The second is to determine the sensitivity of our proposed measures to city size and area differences.

To meet the first objective, the survey plan calls for a comparison between measures based on the items I have just described, and values obtained in an intensive appraisal of housing quality. For this purpose we may use some version of the method developed some years ago by the Committee on the Hygiene of Housing of the American Public Health Association. This method is marked by the use of a rating scale on which penalty points are assigned for certain deficiencies in the structure and the unit, as well as those in the physical neighborhood environment. The number of penalty points assigned to a specific item increases with the seriousness of the condition. Regression methods will be used to determine what combinations of housing characteristics are most closely related to the total

penalty score, and its subtotals. The APHA penalty scores, and components of those scores will serve as the dependent variables. The characteristics collected on a census schedule supplemented in part by some of the items collected as part of the intensive appraisals will serve as the independent variables.

To meet the second objective, surveys will be conducted in cities selected to provide representation by size of city (population) and geographic region.

- Five aspects of this program require emphasis:
 - First, our measures will be applicable to individual housing units.
 - Second, the principal purpose of whatever measure we employ, will be to identify housing which gives indications of having a high probability that it is hazardous to health and safety.
 - Third, by basing our measures of housing quality on objective characteristics, we afford ourselves a greater degree of flexibility than was previously possible in differentiating between levels of quality. Just as mail order catalogues distinguish between good, better, and best merchandise, so, the Bureau of the Census may find it possible in the future to differentiate not only between adequate and inadequate housing, but also to divide the adequate housing into classes of "good," "better," and "best."
 - Fourth, as we increase the number of objective characteristics, we may also find it possible to develop a measure of neighborhood quality.
 - Fifth, we will have a much greater degree of assurance than formerly, that the data we will provide on housing quality in one census will be comparable with data which will be collected in censuses to follow. This follows from the fact that measures of housing quality will reflect not judgment, which is subject to a high degree of individual bias, but rather descriptions of the actual facilities and characteristics of the housing unit.

Evaluation program	Census rating				
rating		Sound	Deteriorating	Dilapidated	
NUMBER					
Total	48,853	40,485	6,255	2,113	
Sound	38,751	35,792	2,703	256	
Deteriorating	6,820	3,928	2,275	617	
Dilapidated	3,282	765	1,277	<u>1,240</u>	

Table 1.--CONDITION OF OCCUPIED HOUSING UNITS; 1960 CONTENT EVALUATION ESTIMATES DISTRIBUTED BY CONDITION RATING IN THE 1960 CENSUS OF HOUSING¹

		Total	Sound	Deteriorating	Dilapidated
PERCENT					
Total	100.0	100.0	82.9	12.8	4.3
Sound	79.3	100.0	92.4	7.0	0.7
Deteriorating	14.0	100.0	57.6	33.4	9.0
Dilapidated	6.7	100.0	23.3	38.9	<u>37.8</u>

 $\underline{1}$ / Units correctly included in census, and for which condition ratings were obtained or imputed in both the census and the evaluation study.

SOURCE: U. S. Bureau of the Census. <u>Evaluation and Research Program of the U. S. Censuses</u> of Population and Housing, 1960. <u>Accuracy of Data on Housing Characteristics</u>. Series ER 60, No. 3, Washington, D. C., 1964, table 2A.

Table	2ESTIMATES	OF NET	ERROR]	IN NUMBERS	AND PERCENTAGE DISTRIBU-
	TIONS OF O	CCUPIED	UNITS (CLASSIFIED	BY INDICATORS OF
QUALITY OF HOUSING, 1960 <u>vs.</u> 1950					
		1		والمراد المسود المتعاد متمكنا ومستوهبها	

	Estimated net error (Census estimates minus evaluation program estimates)							
Classification	Number		Percentage points		Relative error $\left(\frac{C-EP}{EP} \ge 100\right)$			
	1950 (000)	1960 (000)	1950	1960	1950	1960		
Sound	x	1,734	x	3.6	x	4.5		
Not Sound	x	-1,734	x	-3.6	x	-17.2		
Deteriorating	x	-565	x	-1.2	x	-8.3		
Not Deteriorating	x	565	x	1.2	x	1.3		
Dilapidated	343	-1,169	0.9	-2.4	10.3	-35.6		
Not Dilapidated	-343	1,169	-0.9	2.4	-0.9	2.6		
Substandard ^{1/}	-48	-585	-0.1	-1.2	-0.3	-7.3		
Not Substandard ¹ /	48	585	0.1	1.2	0.2	1.4		

1/ Not an official designation by the Bureau of the Census. Includes units which were Dilapidated, or, if not Dilapidated, lacked one or more of the following: piped hot water in the structure, flush toilet for exclusive use, bathtub or shower for exclusive use.

x--Classification not available for 1950.

SOURCES: (1) 1950 Census data from U.S. Census of Housing: 1960, Volume IV, <u>Components of</u> <u>Inventory Change</u>. Final report HC(4), Part IA, No. 1, table 1.

- (2) 1950 data from U.S. Bureau of the Census, <u>Bureau of the Census Technical Paper</u> <u>No. 4, 1960</u>, table 14; and <u>Post-Enumeration Survey, 1950</u>, <u>Results Memorandum #22</u>, December 22, 1953, table 1.
 (2) 1960 beta from the termination of the census technical Paper
- (3) 1960 data from U. S. Bureau of the Census, <u>Accuracy of Data on Housing Character-istics</u>, <u>Series ER 60</u>, No. 31, 1964, tables 2A and 3A.

	Differences, 1960-1950 according to:					
Classification	Censuses o ir	of Housing	Evaluation studies in:			
	Number of units (000)	Percent	Number of units (000)	Percent		
Dilapidated Not dilapidated	-1,635 11,690	-41.9 29.9	-6 9,318	-0.2 23.2		
Substandard Not substandard	-6,782 16,837	-44.5 60.8	-6,829 16,134	-43.1 57.5		

Table 3.--ESTIMATES OF NET ERRORS IN TRENDS OF OCCUPIED UNITS CLASSI-FIED BY CENSUS INDICATORS OF QUALITY OF HOUSING, 1960 vs. 19501/

1/ Based on adjusted data. 1950 evaluation program data adjusted for nonresponse. 1960 evaluation program data adjusted for coverage error and nonresponse. SOURCE: See table 2.

Table	4PERCENTAG	E AGREEMEN	T BETWEEN	"EXPERT"	AND RES	PONDENT	RATINGS
	OF COND	ITION FOR	IDENTICAL	UNITS BY	TENURE,	FOR	
		FORT SMI	TH, ARKAN	SAS: 1962	2		

	Total		Respondent rating as percent of "expert" rating			
"Expert" rating	number of units	Percent	Sound	Probably sound	Probably not sound	Not sound
Owner-occupied units:						
Sound Not sound <u>l</u> /	10,788 931	100 100	<u>94</u> 44	4 29	2 27	0 <u>0</u>
Renter-occupied units:						
Sound Not sound <u>l</u> /	4,388 1,795	100 100	<u>83</u> 46	13 20	2 6	2 <u>28</u>

1/ The category "not sound" is a combination of Deteriorating and Dilapidated as defined for the 1960 Census.

	(legification and variable group		Average of H		
	classification and variable group	Blocks	E.D.'s	Tracts	
I.	HOUSING VARIABLES				
	 A. Deteriorating B. Dilapidated C. Deteriorating and Dilapidated D. Substandardbathroom variable excluded1/ E. Substandardbathroom variable included1/ 	.512 .465 .587 .579 .820	.661 .626 .709 .730 .908	.833 .795 .856 .884 .960	
II.	POPULATION VARIABLES				
	A. DeterioratingB. DilapidatedC. Deteriorating and DilapidatedD. Substandard	•539 •439 •596 •669	.700 .619 .725 .835	.914 .847 .922 .955	
III.	HOUSING AND POPULATION VARIABLES COMBINED				
	 A. Deteriorating. B. Dilapidated. C. Deteriorating and Dilapidated. D. Substandardbathroom variable excluded1/ E. Substandardbathroom variable included1/ 	.579 .511 .648 .708 .839	.740 .698 .773 .865 .928	•932 •896 •944 •966 •980	

Table 5.--UNWEIGHTED AVERAGE COEFFICIENTS OF MULTIPLE CORRE-LATION FOR BLOCKS, E.D.'s, AND TRACTS IN SIX CITIES

1/ Bathroom variable is percent of units with bathroom for private use.

Table 6.--ESTIMATED QUARTILE DISTRIBUTION OF TRACT RANKINGS BY PERCENT OF ALL UNITS WHICH WERE "DETERIORATING" OR "DILAPIDATED" IN 1960, CROSS-TABULATED BY QUARTILE DISTRIBUTION OF TRACTS ACCORDING TO REGRESSED VALUES--FT. WAYNE, INDIANAL

	Quartile rank of tract accord-	Quartile rank according to regressed value				
	ing to observed value	1	2	3	4	
Α.	NUMBER OF TRACTS 1 2 3 4	<u>10</u>	<u>8</u> 22	1 <u>6</u> 3	1 2 <u>6</u>	
в.	NUMBER OF DETERIORATING AND DILAPIDATED UNITS 1	<u>4.548</u>	<u>1,515</u> 157	265 <u>347</u> 72	140 97 <u>106</u>	
с.	PERCENT DISTRIBUTION OF DETERIORAT- ING AND DILAPIDATED UNITS 1 2 3 4	<u>62.8</u>	<u>20.9</u> 2.2	3.7 <u>4.8</u> 1.0	1.9 1.3 <u>1.5</u>	

 \underline{l} Based on regressions computed specifically for Ft. Wayne. Input from data contained in the 25-percent sample detailed record of the 1960 Census.

Attachment 2

List of variables used in stepwise regression for six-city analysis

	Variable	Numerator	Denominator	
l.	Median family income			
2.	Percent Negro population	Number of Negroes	Total persons	
3.	Percent nonrelatives of head	Number of nonrelatives	Total persons	
4.	Percent persons 25+ years of age with less than 5 years of school	Persons 25+ years of age w/less than 5 years of school	Persons 25+ years of age	
5.	Percent persons 25+ years of age with less than 8 years of school	Persons 25+ years of age w/less than 8 years of school	Persons 25+ years of age	
6.	Percent of families with less than \$3,000 of income	Families with less than \$3,000 of income	Total families	
7.	Percent of persons unemployed	Unemployed persons in civilian labor force	Persons in civilian labor force	
8.	Percent of persons employed as household workers, service employees, or laborers	Persons employed as household workers, service employees, laborers	Employed persons	
9.	Percent of females employed as household workers	Females employed as house- hold workers	Employed females	
10.	Percent of owner-occupied units	Owner-occupied units	Occupied units	
11.	Percent of units occupied by nonwhites	Units occupied by non- whites	Occupied units	
12.	Percent of units classified "deteriorating"	"Deteriorating" units	All units	
13.	Percent of units classified "dilapidated"	"Dilapidated" units	All units	
14.	Percent of units classified "deteriorating" or "dilapidated"	"Deteriorating" or "dilapidated" units	All units	
15.	Percent of units "substandard"	"Substandard" units	All units	
16.	Percent of units with bathroom for exclusive use	Units with bathroom for exclusive use	All units	
17.	Percent of units in structures containing 3 or more units	Units in structures with 3+ units	All units	
18.	Percent of units in structures built 1939 or earlier	Units in structures built 1939 or earlier	All units	
19.	Percent of units heated by "other means with flue," "other means without flue," or "not heated"	Units heated by "other means with flue," "other means without flue," or "Not heated"	All units	
20.	Percent of units heated by "other means without flue" or "not heated"	Units heated by "other means without flue" or "not heated"	All units	
21.	Percent of occupied units with one person occupancy	Occupied units with one person occupancy	Occupied units	
22.	Percent of occupied units with 1.01 or more persons	Occupied units with 1.01+ persons per room	Occupied units	

	Variable	Numerator	Denominator
23.	Percent of occupied units occupied by recent movers	Occupied units occupied by recent movers	Occupied units
24.	Percent of owner-occupied units valued under \$10,000 or renter-occupied units with gross rent less than \$80	Owner-occupied units valued under \$10,000 and renter-occupied units with gross rent less than \$80	Occupied units except renter- occupied with "no cash rent"
25.	Percent of owner-occupied units valued under \$10,000 or renter-occupied units with gross rent less than \$60	Owner-occupied units valued under \$10,000 and renter-occupied units with gross rent less than \$60	Occupied units except renter- occupied with "no cash rent

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