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A GEOGRAPHICAL APPROACH TO RESIDENTIAL CONSTRUCTION COST STRUCTURE

BY

GARY K. HIGGS*
WILLIAM H. CHEEK*

Introduction

The single-family residence is generally the largest and most important purchase of any household unit. Those employed in building these residences also constitute a large proportion of the domestic construction industry and the unique emotional status of a home has made the residence construction and related industries one of the principal material economic indicators.1

The result of this importance is that this industry has become economically very sensitive and a focus of much government and private attention. The intensity of this interest has been heightened by sharp rises in component and finished unit costs and widening of regional cost variation.2, 3

The continuing and increasing attention to the housing construction industry has resulted in a great many studies and reports. Generally these works have tended to focus on the nature of the building industry, its technology and methods, the demand for housing, and to a lesser degree the financial aspects of housing; within this body of literature housing prices and cost and their regional variations have received some attention but yet have not been fairly well understood.4

Housing has demonstrated to be lead witness regarding economic conditions because it is a postponable durable, the sale of which is very sensitive to fund's availability of funds and to market conditions. These factors and the unique emotional status of a home have made the residence construction and related industries one of the principal material economic indicators.

One aspect, however, has received little study, though it has been a persistent trait of the housing-cost picture in the U.S.A. This is the regional variation in cost of comparable dwellings and the relative position of local markets such as Omaha's Standard Metropolitan Statistical Area.

To find this regional-variation factor and the setting of a local market one must, first, identify and delineate regions of different housing costs and account for the inter-regional cost variations on a basis of differences in housing-component costs. In such a study, involving comparison of related values (component costs with total cost), the question of suitable comparable data constitutes a major obstacle. This is further complicated in the instance of the housing industry by the confidentiality and disbursed and private natures of much of the cost information. For these reasons two of the component-cost figures employed in the study—labor and material costs—are industry figures. The third component, cost-landcost, is a privately derived government value. The total housing unit costs

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Their accuracy and reality have been attested to by numerous studies and by the consistency of their nature over a period of many years. Thus if progress is to be made in understanding the functional causes of regional-cost variation in housing in some sense it will be necessary to employ data from different sources. The possible lack of conformity in such a situation must be accepted as an unavoidable but recognized problem.

National Cost Setting for Single-Family Housing Units

Each year there are approximately 1,000,000-2,000,000 new homes completed in the United States. Figure 1 shows five different housing-cost zones, defined on a county basis by calculating an index for dollar building costs for a standard dwelling unit for the Year 1972. The index thus obtained standardizes for the extremes of variability in dollar cost and provides a common frame of reference and base of comparison across the entire nation. In this manner, Figure 1 represents a housing-cost surface. 10

From a visual inspection of this illustration, it is obvious there is a clear regional pattern of cost difference and a striking variation among regions. In general, the apparent spatial cost structure conforms to the typical notion that housing tends to be more expensive in the Southwest and Northwest and lower in the South and Midwest. An equally obvious pattern is that housing tends to be cheaper in smaller communities (outstate regions) than in the major urban areas. The extremes on this cost surface are represented by such regions as the Boston-to-Washington Corridor and the Northern Montana-North Dakota-Idaho Region, 11,12,13

The regional variations in housing cost which have great implication for quality of life and regional economic well-being can be, when viewed in light of the cost of housing components, more completely understood.

Component Costs. The typical residential unit is a result of thousands of very different individual parts and services. This presents a complication in deriving housing-component cost. Fortunately these components can be grouped into three main categories: land, labor, and material. In doing so the loss of accuracy is not significant. Placing these many different items together in this way greatly simplifies the problem of locating a landlord's contribution to the final cost. The pattern of the dollar cost of each of these categories has been indexed and mapped on a county basis to produce component-cost surfaces (similar to Figures II, III, IV) thus representing regions and regional variation in cost of land, labor and materials. 14

The total cost can be a regional variation through the component cost is, however, complicated by the fact that these cost categories do not constitute equal proportions of the final cost. Thus these component-cost surfaces must be weighted and considered as accounting for various proportions of the total value and regional variation in Figure I. The labor-cost index (Figure II) represents the influence of the major construction labor-cost and shows an index range of values from .85-1.20. The labor-cost surface reveals patterns variation ranging from low values in such regions as the Detroit-Cleveland-Buffalo Corridor to high values in the Great Lakes and the Great Basin. The extremes on this cost surface are represented by such regions as the Detroit-Cleveland-Buffalo Corridor and the Southern Florida. These areas tend to be fairly small, covering only small sections of states or portions of adjacent states and centering on densely populated regions. These small high-cost pockets contrast with the generally much larger but frequently interrupted areas of low and very low cost (.41-.71) in the South and West.

Between the high and low land-cost areas are two subzones of moderate values (.71-.96) and (.96-1.20), which have distinct regional configurations. The moderately low index values in the range of .71-.96 tend to occur in the interior of the South, in the lower and western part of the Midwest, and in the Mountain States. These areas generally have low material costs in the range of .90-1.20 to occur as pockets—South Florida, New Orleans, Dallas, Fort Worth, the Mid-Atlantic, Colorado, and in the urban areas of the West Coast. It is notable that these pockets are points and zones of moderate but not extremely rapid growth; this situation tends to cause shortages of vacant, "close-in" prime residential land. This shortage of relatively central land rather than an absolute shortage of land on the high-growth rate may be the prime reason for the existence of the islands of slightly higher cost in the generally moderate-cost zones. Such a condition is further supported by the fact that certain areas with high-growth rates but with extensive supplies of available easily accessible land (notably Phoenix, Albuquerque, Tucson) tend to have moderately low land cost. The pattern of land cost seems to reflect not demand, rate of change in demand, nor supply interaction but rather demand and proximate supply more than any other factors.

The material-cost index (Figure IV) presents a somewhat simpler image of spatial cost variation with a much narrower value range (.90-1.13) than the other component-cost surfaces. The greatest extent of the nation (Northwest Interior, Western Coastal Area, Southern Midwest, Southeast and Great Lakes Areas) fall into a moderate cost range with values of .95-1.05. Only relatively small areas of the nation, the Northern Interior, Western Interior, Southern Interior, Northern Coastal and Interior Mountains, and several isolated pockets have low material cost ranges in the .80-.90.

In considering the material-cost surface, perhaps the most outstanding regional feature is the Interior Southwest. The existence of this isolated zone of high-materials cost stands out in striking contrast to the lesser cost zones even in the rapidly growing areas of the urban and industrial areas. Such a situation, which is distinct, probably necessary for land since it is believed that such finished lot values were more relevant to total housing cost than general land values and that more closely represents land-cost input into total housing cost than do regional or area average figures. Using finished-lot cost in this manner does, however, lose some of the relative significance of these lot values inevitably includes some labor and material elements—preparation of land, streets, sewers, and utilities.
relatively strong growth, increased building activity, high material transport cost, a general scarcity of local building materials such as cement, wood, and metals, and the intense competitive demand for building materials on the California Coast.

Summary. In relating these component surfaces to the total-cost surface it's possible to note that the highs and lows of total cost can be principally attributed to the high and low, or a correspondence of highs and lows of the component surfaces. For example, considering that these component surfaces constitute differing proportions of the total-cost surface, one can observe that the high total-cost zones of the Boston-Washington Corridor and the Southwest Coast and interior regions appear to be related to high component costs in the labor and materials categories, with high-cost land contributing to high total cost only in the Eastern-and-Western-Coast portions of these zones. Similarly, the extensive areas of total cost surface median value appear to be the result of generally mid-range values for all components or in some cases, such as the Southern Interior and agricultural regions of the Midwest, compensating high- and low-cost zones for different components.

U.S.A. Heartland

Within the context of these broad national patterns and
that the variance in the total-housing costs were most closely related to material costs (correlation .58) and progressively less well related to labor, (.38) and land (.14). Clearly all these factor costs are marked related to total costs but materials has a significantly higher relation to total housing costs than either labor or land.

Finally, it is possible by again inspecting Figure I-V to note that, despite some local inconsistencies, the general cost zones for each component tend to parallel each other and emulate the traditional cost patterns of high costs in the Northeast, Great Lakes and West Coast Areas, low costs in the South, and moderate costs throughout the great interior section of the nation.

**TABLE I**

INDEX VALUES OF TOTAL COSTS FOR HEARTLAND AREAS, BY LAND, LABOR, MATERIALS, TOTAL, SINGLE-FAMILY HOUSING

<table>
<thead>
<tr>
<th></th>
<th>Land</th>
<th>Labor</th>
<th>Materials</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northwestern Nebraska</td>
<td>.72</td>
<td>.03</td>
<td>.06</td>
<td>.81</td>
</tr>
<tr>
<td>Eastern and Southern Nebraska</td>
<td>.83</td>
<td>.03</td>
<td>.06</td>
<td>.92</td>
</tr>
<tr>
<td>Omaha</td>
<td>.90</td>
<td>.03</td>
<td>.04</td>
<td>1.00</td>
</tr>
<tr>
<td>Lincoln</td>
<td>.76</td>
<td>.06</td>
<td>.04</td>
<td>.96</td>
</tr>
<tr>
<td>Iowa</td>
<td>.81</td>
<td>.03</td>
<td>.06</td>
<td>.90</td>
</tr>
<tr>
<td>Kansas</td>
<td>.83</td>
<td>.03</td>
<td>.04</td>
<td>.90</td>
</tr>
<tr>
<td>Topeka</td>
<td>.64</td>
<td>.02</td>
<td>.06</td>
<td>.72</td>
</tr>
<tr>
<td>Western South Dakota</td>
<td>.74</td>
<td>.09</td>
<td>.06</td>
<td>.90</td>
</tr>
<tr>
<td>Eastern South Dakota</td>
<td>.74</td>
<td>.09</td>
<td>.06</td>
<td>.90</td>
</tr>
<tr>
<td>Sioux Falls</td>
<td>.74</td>
<td>.09</td>
<td>.06</td>
<td>.90</td>
</tr>
</tbody>
</table>

**TABLE II**

CORRELATION OF TOTAL COSTS, AND LAND, LABOR AND MATERIALS COSTS FOR SINGLE-FAMILY HOUSING

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Land</th>
<th>Labor</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
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<td>.14</td>
<td>.51</td>
<td>.06</td>
</tr>
<tr>
<td>Land</td>
<td>.14</td>
<td>1.00</td>
<td>.51</td>
<td>.06</td>
</tr>
<tr>
<td>Labor</td>
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<tr>
<td>Materials</td>
<td>.06</td>
<td>.06</td>
<td>.06</td>
<td>1.00</td>
</tr>
</tbody>
</table>

(See Table I). In Figure V the total index values have been approximated for the four states of the Upper Plains Region. Some of small-scale, localized markets in this area appear as isolated islands—particularly Sioux Falls and Omaha Council Bluffs, Lincoln; however, Dawson and Topeka merge statistically with their states and are indistinct in terms of housing-cost differences.

Conclusions

From the overall point of view, on the National Inter-regional Scale, much of the total-cost variation can be attributed to land cost since it has the greatest areal range of values. Because labor costs, however, constitute such a large share of total cost they, too, account for a large proportion of the inter-regional total variance. Materials, on this basis, appear to be the single least consequential factor in the cost spread. This observation is confirmed by a correlation of the component index values and the total-cost values (Table II); this illustrates.
A CASE STUDY OF PROPERTY TAX ASSESSMENT RATIO IN OMAHA

BY

GARY CARLSON

Introduction

The City of Omaha’s recent purchases of properties for the Central Park Mall Project and the Airport Authority Purchase for the East Omaha Airport Expansion provide illustrations of the extent of assessment variation property tax in Omaha. In both cases, it is evident that the property on the whole was underestimated before acquisition. It is further evident that substantial variation in property tax assessments among the individual properties of piece existed before acquisition.

Central Park Mall Project

The City of Omaha has acquired 41 separate parcels for the Central Park Mall Project. The properties acquired were mainly commercial and warehousing property. The “offered” price and the tax value (full market value) as shown on the tax rolls prior to acquisition are shown in Table I for each of the 41 parcels. As can be noted, the tax value as a percentage of appraised value ranged from 39 to 152 percent. At the extremes were parcel number 36 which had an appraised value of $150,000 and a tax value of only $58,700 while parcel number 47 had an appraised value of $110,200 and a tax value of $168,000. Another way of viewing the property dispersion through the sales/assessment ratio. In Nebraska, the actual assessment value by statute is 35 percent of the appraised value of the property. Hence, a $40,000 house would have an actual assessment value of $14,000 for tax purposes. Since the consolidated mill levy for 1975 is 97.5 mills, the tax for the $40,000 unit would be $3,875 for the year. The sales/assessment ratio, then, should be 35 percent. Two points are illustrated in Table I.

First, the actual sales/assessment ratio for the aggregated total was 21.24 percent—indicating a tax value on the property under-assessed. Second, the variation among the properties in the actual assessment ratio was substantial, ranging from 14 to 53 percent. To measure the actual dispersion of assessment within the Central Park Mall Area, the intra-area coefficient of dispersion (the average assessment error) was calculated from the median assessment value. As Table II, it is noted, the error was 28 percent for the Central Park Mall Project.

East Omaha Airport Expansion

A total of 96 parcels have been acquired by the Airport Authority for the East Omaha Airport Expansion, as well as the density, scattered residential area. (See Table III.) Similar conclusions concerning tax assessment variations are evident. First, the tax value as a percentage of appraised value ranged from 10 to 321 percent. Second, the actual sales/assessment ratio for the aggregated total was 27 percent—identical to the ratio in the Central Park Mall Project. Finally, the intra-area coefficient of dispersion (the assessment error) was calculated from the median assessment value. As Table IV, it is noted, the error was 28 percent for the Central Park Mall Project.

Conclusions

The finding that the aggregated average assessment ratio level. Based on the 1975 mill levy, another $24,000 in revenue annual generated for the city from these two areas from these tax collections.

Not only could the City generate more revenue from the property tax, it could also receive these revenues from the property owners in the Central Park Mall Project, for example, one parcel of property was undervalued by about $3,200 per year while at the other extreme, another parcel was overvalued by about $2,000 per year. (This is based on the median assessment ratio of 27 percent.) Similarly, the extremes in the East Omaha Airport Expansion Project show one parcel being assessed at a rate of 154 percent and another at 40 percent. This would be much more equitable for each to pay their fair share.

A study by the Advisory Commission on Intergovernmental Relations (ACIR) and the 1972 Census of Governments for 1971 show the intra-area coefficient of dispersion at 18.9 percent for Nebraska (based on single-family homes with FHA insured mortgages, 1971). The 20 and 30 percent figures found in the Central Park Mall and East Omaha Airport Expansion Projects is almost 60 percent higher than the average. Again, if this is true for other older areas of Omaha, it must indicate a significant dispersion in the property values. So far, the problem of paying a fair share is more severe in the older areas of the City.

Finally, it must be noted that local assessment valuations are used widely in state constitutions, state laws or home rule charters as the base for ceilings on local debt and property tax rates. Extreme and varying underassessment means that regulatory agencies within the state assessors, with the level of assessment in Douglas County approximately 25 percent below the required 35 percent rate, while the tax and debt limit statutes have effectively raised property taxes in the City.

The net effect to local government is a mandatory hand-to-mouth operation with little hope for long-range financial planning.
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The Center for Applied Urban Research (CAUR) is a part of the College of Public Affairs and Community Service of the University of Nebraska at Omaha. It was established to carry out research on current problems facing community leaders and officials. The range of its activities includes studies on urban finance and taxation, governmental, education, health, welfare, housing and community development, recreation, transportation, intergovernmental relations and the many other aspects of urban communities large and small.

The Center's research staff of eleven full-time professionals includes eight Ph.D.'s in Economics, Geography, Political Science, and Statistical and a senior government official on assignment from the U. S. Department of Housing and Urban Development under the Intergovernmental Personnel Mobilization Program. Graduate and undergraduate students with training in urban planning, sociology, public administration and other urban-related skills, as well as faculty members from other departments of the University of Nebraska and Creighton University, are available to the Center as needed for various research projects.

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The research staff consists of urban, state, regional and national advisory committees and boards to make available the Center's research findings and conclusions to decisions and urban problems.

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