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Volume Title: Residential Real Estate: Its Economic Position as Shown by Values, Rents, Family Incomes, Financing, and Construction, Together with Estimates for All Real Estate

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longer term proportions of construction done during the several decades.

c Demolitions and Other Losses

The basis of estimating the reduction in dwelling units during 1920-29 due to demolitions, fire, flood, and other losses is described in Note C. For the earlier decades there are virtually no empirical data. Aggregate property loss by fire in the United States as reported by the National Board of Fire Underwriters in the four decades following 1890 totaled \$1,373, \$2,168, \$2,457, and \$5,053 million respectively, only a portion of which was in residential property (see Note C). Even if the proportion of the total that was residential property were known, it would be difficult even to approximate the number of dwelling units destroyed by fire, owing to the lack of a satisfactory measure of urban property values over a long period. The larger loss that might be expected in later years because of the larger number of dwellings in existence, might be partly or wholly offset by improved fire protection methods and equipment.

During the 1920's demolitions of dwellings (many in good condition) to make way for other buildings constituted a large proportion of all losses. This accompanied the rapid urbanization, most pronounced in large metropolitan areas, and was probably a much less important factor in earlier years. Consequently, it was estimated that average annual losses, including those from demolitions, fire, flood, and other causes were 5, 5½, and 6 units per 10,000 population respectively in the three decades 1890-99, 1900-09, and 1910-19, comparable with 6.97 units during 1920-29 derived from empirical data and separate estimates for demolitions and other losses as described in Note C.

d Conversions

In the absence of empirical data for earlier years, annual conversions were estimated on the same basis as for 1920-29, namely, at 1½ units per 10,000 population. Since, as thus estimated, they averaged less than 3 per cent of total building, a considerable margin of error in the conversions estimate would not materially affect estimated total new building.

6 Limitations of the Estimates

The chief limitations of the estimates are due to the nature and scope of the data available. The estimates

for 1920-36 are based on a sample of building permits for cities, which, in terms of both population and dwelling units built over a period, has varied from about 40 to 60 per cent of total nonfarm dwellings. While this is a fairly large sample for the country as a whole, the representation varies widely by regions and size of population groups.

Any estimate of the value of construction based on either building permits or contracts awarded presents difficulties in interpretation with respect to the time at which construction actually occurs. Both permits and contracts report a lump sum as of a given date, but the actual expenditure for materials and labor is usually spread over several months. The estimates presented herewith are annual totals; monthly trends are not attempted. Owing to the marked concentration of residential building in the summer, particularly in 1-family dwellings which comprise the bulk of residential building, there is no serious distortion to the annual figures due to carry-overs from one year to the next, and any error that may arise from this cause is much smaller than for certain types of nonresidential and heavy engineering construction. Furthermore, the extreme range of fluctuation in the national totals over a period of years and the marked differences in regional trends tend to reduce the significance of short term fluctuations in the national totals.

The tables in this chapter should not be taken as implying as fine a degree of accuracy as might be inferred from computations to the last digit or to thousands of dollars. The figures were carried out for the purpose of checking with reported data and other computations. Furthermore, important parts of the basic material refer to items that cannot be defined exactly. For example, a family dwelling unit may be any one of several types—an apartment, a flat over a store, a row house, in a 2-family dwelling, or a 1-family detached dwelling. Dwelling units may vary in size from 1 to 10 or more rooms. A single family dwelling may be anything from a 1-room shack with a minimum of improvements to a 10- or 20-room mansion on an estate. While these represent extremes they are included in the figures currently reported by the Bureau of Labor Statistics without segregation by number of rooms or material of structure. Despite these variations, the series of dwelling units and average values for the last 17 years are quite consistent.

Notes: Supplementary Information concerning Construction

A Value of Residential Construction, Present Estimates Compared with F. W. Dodge Corporation and Other Estimates

Unlike previous estimates of the total value of new residential construction, the present estimates are based primarily on building permits in relation to

changes in the number of families, rather than on contracts awarded. This method was chosen only after detailed analysis of both series. The advantages and disadvantages of the permits series are discussed in Chapter V. Contracts awarded, as published by the F. W. Dodge Corporation, are gathered for a commer-

TABLE EM 8

Value of Residential Building (millions of dollars), Comparison of Estimates and Reported Data ¹

| | CONTRACTS AWARDED | | | | EXPENDITURES, 48 STATES | | |
|------|---|-------------------------------|--------------------------------------|---|-------------------------|-------------------------------|--|
| | NUMBER ESTIMATE 48 states ² | 48 STATES | | BUILDING PERMITS 257 cities ⁶ | 48 STATES | | |
| | | FESB estimate ³ | F. W. Dodge estimate ⁴ | | 37 states ⁵ | WPA estimates ⁷ | Dept. of Commerce estimates ⁸ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1920 | 1,122 | .. | 743 | 673 | .. | .. | 1,545 |
| 1921 | 1,841 | .. | 1,146 | 1,027 | 937 | .. | 1,661 |
| 1922 | 3,115 | .. | 1,735 | 1,555 | 1,612 | .. | 2,734 |
| 1923 | 3,980 | .. | 2,073 | 1,807 | 2,001 | .. | 3,640 |
| 1924 | 4,244 | .. | 2,399 | 2,112 | 2,070 | .. | 4,195 |
| 1925 | 4,754 | 3,050 | 3,076 | 2,748 | 2,462 | 4,253 | 4,505 |
| 1926 | 4,314 | 2,965 | 2,958 | 2,671 | 2,256 | 4,056 | 4,496 |
| 1927 | 4,064 | 2,856 | 2,879 | 2,573 | 1,906 | 4,204 | 4,175 |
| 1928 | 3,813 | 3,095 | 3,069 | 2,788 | 1,859 | 4,338 | 3,869 |
| 1929 | 2,623 | 2,127 | 2,139 | 1,916 | 1,433 | 3,098 | 3,324 |
| 1930 | 1,456 | 1,222 | 1,240 | 1,101 | 601 | 1,654 | 2,118 |
| 1931 | 1,005 | 900 | 901 | 811 | 426 | 1,222 | 1,343 |
| 1932 | 282 | 311 | .. | 280 | 103 | 432 | 615 |
| 1933 | 204 | .. | .. | 249 | 91 | 398 | 287 |
| 1934 | 214 | .. | .. | 249 | 76 | 416 | 235 |
| 1935 | 585 | .. | .. | 479 | 212 | 764 | 467 |
| 1936 | 1,202 | .. | .. | 802 | 473 | 1,245 | 964 |

¹ Other than on farms; includes nonhousekeeping dwellings (hotels, clubs, etc.)

² New building only.

³ Federal Employment Stabilization Board, published in National Bureau Bulletin 52, November 15, 1934, p. 17

⁴ F. W. Dodge Corporation; excludes new construction and remodeling projects under \$5,000

⁵ F. W. Dodge Corporation; totals for 1920-22 estimated (by F. W. Dodge Corporation) on basis of actual contract totals in 27 states; 1923 and 1924, on basis of 36 states. Includes repair contracts over \$5,000 prior to 1930, over \$2,000 in 1930 and 1931, and over \$1,000 since 1932.

⁶ Bureau of Labor Statistics, Building Construction, February 1937, p. 65

⁷ Construction Expenditures and Employment, 1925-36, Table 1, p. 39, June 1, 1937

⁸ Construction Activity in the United States, 1915-37 (Department of Commerce, Domestic Commerce Series, No. 99, Jan. 1938), Table 12, p. 43. (Figures in col. 7 are for new construction alone. For totals including additions, alterations, repairs, and maintenance see *ibid.*, Table 5, col. 1, p. 22, and Table 12, col. 4, p. 43.)

cial news service, and adaptation of the data for statistical purposes is of secondary importance. The chief difficulties in attempting to use them as the basis for estimating in the earlier years were, first, the distortion in total residential construction and 1-family unit costs caused by the exclusion of contracts under \$5,000 prior to 1930. Nor could this omitted construction be measured accurately from the reported data themselves. Second, the data on the number of family units constructed are incomplete. Finally, 11 western states are not represented. Since 1935 the F. W. Dodge Corporation has undertaken to provide virtually complete coverage of new nonfarm residential building within the 37 eastern states, except for that covered by contracts under \$2,000, an undetermined amount. The exclusion of contracts under \$5,000 ¹ prior to 1930 caused a greater understatement of residential construction than is gen-

¹ The minimum was lowered to \$2,000 in 1930; in 1932 it was lowered to \$1,000 for both new and alteration work. Beginning in 1935 the minimum for new work was restored to \$2,000, the minimum for repairs remaining at \$1,000. The \$5,000 minimum was apparently not always strictly adhered to, as the average value of 1-family dwellings reported in some southern and western states in earlier years was as low as \$4,700-4,800, or below the nominal minimum of \$5,000.

erally recognized, and the resulting trend of the contracts reported is not representative for either the 37 states or the country as a whole, as may be demonstrated by the following rough tests for 1920-29. In Table EM 8, column 3, are F. W. Dodge Corporation estimates of contracts awarded for residential structures in all 48 states, involving contracts over \$5,000 each, amounting to an aggregate of \$22 billion. This total includes cost of hotels. Even if this indicated volume of construction were all in housekeeping dwellings and the average cost per family unit were as low as \$5,000, it would represent only 4,400,000 units for the decade. This falls considerably short of the ten-year increase of 5,541,000 in occupied nonfarm dwelling units shown by the 1930 Census. It is 2,600,000 units less than the probable total of about 7,000,000 units built during the decade, when allowance is made for the 1,500,000 additional units built to offset demolitions, fire, and other losses, and for the increase in vacancy. For the total of \$22 billion to have accounted for 7,000,000 dwelling units built, the average cost per unit would have had to be as low as \$3,143, which is much less than actual unit costs indicate.

This understatement is confirmed by contract data on residential floor space for 1920-29, which in 37

eastern states amounted to 4,143,859,000 square feet.² Table E 5 indicates that the dwelling units built in the 11 western states (Mountain and Pacific divisions) were approximately 19 per cent of the number in the 37 eastern states. Thus, if the floor space for 37 states is raised 19 per cent to include the 11 western states, a total of approximately 4,931,000,000 square feet is indicated for all 48 states. With an average as low as 1,000 square feet per dwelling unit this would mean only 4,931,000 units. However, it is unlikely that the floor space per unit for all types could have averaged as low as 1,000 square feet, since many 1-family dwellings averaged 1,500 to 2,500 or more square feet, and this type predominates. Apartments usually range from 700 to 1,000 square feet, but their number would be insufficient to reduce the average to 1,000. Thus a composite average of 1,200–1,500 square feet per unit seems more likely, and if applied to the 4,931,000,000 square feet would represent between 4,100,000 and 3,287,000 units in contrast to the net increase of 5,541,000 occupied dwelling units and the total of 7,035,000 units built.

Further evidence of the omission of a considerable number of 1-family and possibly 2-family dwellings is disclosed by a comparison of permits and contracts. In 1925 the aggregate value of 1- and 2-family dwellings for which permits were issued in 257 cities was approximately \$1,425 million; contracts awarded in 37 eastern states for 1- and 2-family dwellings totaled \$1,295 million,³ an amount actually less than shown by building permits in the 257 cities, although the non-farm area presumably covered by the contracts data was more than 80 per cent greater than that of the 257 cities in terms of population, and 66 per cent greater in terms of the 1920–29 increase in families as shown by the 1930 Census. In 1928 contracts for 1- and 2-family dwellings in 37 states totaled \$1,409 million. If this high level had been maintained every year throughout 1920–29 the total would have been nearly \$14.1 billion; a liberal allowance of 20 per cent for the 11 western states would raise this hypothetical total to \$16.9 billion for all 48 states. At \$5,000 per unit, the Dodge minimum for single contracts, this would have represented 3,390,000 units, or approximately 2 million fewer than the 5,360,000 units that the estimates in this study indicate as the ten-year total of 1- and 2-family dwelling units (Table E 3). Or, for the Dodge data to have accounted for the 5,360,000 1- and 2-family dwelling units, with the aggregate value of \$16.9 billion, would imply an average cost per unit of only \$3,150, an average clearly too low in view of the large number of contracts actually reported averag-

ing \$6,000–9,000 and higher for 1-family dwellings. The actual level of contracts awarded during the decade of course averaged less than the reported 1928 peak level of \$1,409 million, probably one-third to one-half. Thus, contracts data, if available for all 48 states throughout 1920–29, would probably have included considerably fewer than 3,000,000 1- and 2-family dwelling units, owing chiefly to the exclusion of contracts under \$5,000.

Exclusion, because of the \$5,000 minimum, of as many 1-family dwellings from the contracts data as are indicated above would go far toward explaining the difference in trend in the contracts awarded and building permit series. For example, the estimates in this study based on the latter indicate that in terms of family units, building of 1-family dwellings reached a peak in 1925, while apartment building reached highest levels during 1926–28. Also, exclusion of many 1-family dwellings because of the \$5,000 limit, and possible underreporting in small centers where the 1-family type prevails, would tend to overweight the contracts series with apartments. Inclusion of contracts for all 1-family dwellings, with a peak in 1925, would probably have brought the combined total of contracts awarded to a maximum in 1925 instead of 1928, with the totals in earlier years much higher than reported. Thus the contracts series as reported for 37 states were not representative of the trend of total residential building throughout much of the period under consideration.

In an effort to determine average unit costs from contracts the following difficulties were encountered: since during most of the period covered by the estimates, contracts for repairs were not segregated, the cost of new buildings alone cannot be derived with certainty. Nor can accurate unit costs be obtained directly from contracts for all types of dwellings in earlier years, as the number of family units in apartment buildings, and hence average unit costs, can be merely approximated from the data on square feet of floor space—an uncertain method.

While family units in detached 1- and 2-family dwellings can be derived from the number of buildings reported in contracts, 1-family unit costs cannot be taken as representing actual averages throughout much of the period because the exclusion of contracts under \$5,000 prior to 1930 probably excluded one-half or more of all 1-family dwellings built.⁴

Also, average unit costs in different regions would

² Reported in contracts for 37 states, 1925–29, and estimated by F. W. Dodge Corporation for 1920–24 on the basis of contracts in 27–36 states (Table EM 9).

³ Architectural Record, July 1936, Vol. 80, No. 1, p. 24.

⁴ A study of over 25,000 residential building permits in Minneapolis, 1920–32, classified according to size of project, showed that on the average over three-fourths of all the permits were for projects under \$5,000 (The Construction Industry in Minnesota, p. 63). Even if liberal allowance is made for the probable undervaluation of these permits, more than half would remain in the less than \$5,000 classification.

be affected in varying degree by the \$5,000 minimum, as it would tend to exclude a much larger proportion of dwellings in the southern and western than in the northeastern states.

Another complication is introduced by the fact that the F. W. Dodge 1-family classification did not include all 1-family dwellings. Row houses or groups of 2-or-more detached dwellings (both 1- and 2-family) that were built by one contractor were classed as "housing developments." Two-family dwellings have been segregated only since 1928; i.e., prior to 1928, many 1- and 2-family dwellings were included in the "housing developments" classification.

Despite the difficulties in applying contracts cost data, they might still seem preferable on the ground that they would constitute a larger sample. Within the 37 eastern states, at least, they presumably had nearly double the coverage of the permit series for 257 cities, on a population basis, since contracts were reported for villages and suburban areas outside city limits. Though the permit series covers only areas within city limits, it furnishes virtually as large an absolute sample as contracts which cover the entire nonfarm area within the 37 states. In 1922 and 1923 the value of residential building permits in 257 cities (Table EM 8) actually exceeded contracts awarded in 37 states (col. 4) and averaged only slightly less than the estimated total of contracts in all 48 states (col. 3). Since building permits are not distorted by the exclusion of any one type of dwelling or range of values, they constitute a more representative and dependable sample for the cities reported. Adjustments must be made for undervaluation in permits and for the differences in unit costs between unreported areas and reporting cities, but they can be made with less uncertainty than is involved in attempting to adjust contracts for those excluded, for lack of data on family units, and for non-representation in the 11 western states.

Acknowledgment is due the F. W. Dodge Corporation for making available to the National Bureau of Economic Research many detailed data on contracts awarded, ordinarily available only to subscribers to the Dodge Statistical Service. While these data were not used in the National Bureau's estimates, they serve as valuable collateral material on building trends.

Estimates of the value of residential construction in the United States annually, 1925-32 (Table EM 8, col. 2), prepared by the Federal Employment Stabilization Board from contracts awarded, and published in National Bureau *Bulletin* 52, are almost identical with F. W. Dodge Corporation estimates (col. 3), and, for 1925-29, considerably lower than National Bureau estimates (col. 1).

Two additional series of estimates on the value of nonfarm residential construction have been published

recently in connection with estimates of total expenditures for all types of construction (Table EM 8). The estimates prepared for the Works Progress Administration by Peter A. Stone for 1925-36⁵ (col. 6) were based on residential contracts awarded and have a different trend from the estimates presented in this volume. Instead of a peak in residential construction in 1925 and a continuous decline to 1928, the WPA estimates decrease from 1925 to 1926, but increase in 1927 to a peak in 1928. Although projects under \$5,000, excluded from contracts awarded, were allowed for, year-to-year changes in the contracts as reported were assumed to be representative of the course of all residential construction, resulting in the 1928 peak. As explained above, this assumption is not valid. The estimates (col. 7) prepared under the direction of L. J. Chawner and published by the Department of Commerce are based mainly on building permits. For rural nonfarm areas and population groups under 25,000 the estimates of value were obtained by multiplying estimated nonfarm dwelling units by average costs per dwelling unit for population groups classified by size and relation to metropolitan districts. For the larger cities the method is described as follows:

"The cost of residential buildings for which permits are estimated to have been issued in all cities having a population of more than 25,000 during the years 1921 to 1932 (and more than 10,000 during the years 1933 to 1935) was calculated for each group in the proportion which the total population of all cities in each group was to the population of the reporting cities in each group. This adjustment was not large, because of the fact that the population of the reporting cities over this period was more than 90 per cent of all cities exceeding 25,000 in population."⁶

The adjustment would have been larger had building in non-reporting cities been estimated on the basis of their population growth rather than on total population. Since Department of Commerce estimates for residential construction were to be combined with data for other types of construction, for which the time of completion differed widely, the residential estimates were converted to a calendar year expenditures basis ". . . by adding one-third of the cost of the buildings for which permits were issued in the preceding year to two-thirds of the cost in a given year."⁷ This apparently overcorrects for the difference between the value of residential construction started in a given calendar year and of expenditures on work in progress during the year, especially during periods of rapid change in construction such as the early 1920's and 1930's. In those years, a correction based on actual monthly data

⁵ Construction Expenditures and Employment, 1925-36 (WPA, June 1937).

⁶ Construction Activity in the United States, 1915-37 (Domestic Commerce Series, No. 99, January 1938), p. 38.

⁷ Ibid., footnote to col. 2, Table 12, p. 43.

TABLE EM 9

Dwelling Units Built, Square Feet of Floor Space in Residential Contracts Awarded in 37 States, and Number of Families Provided for in 257 Cities, 1920-1936

| | NEW NONFARM DWELLING UNITS BUILT | | | SQ. FT. OF FLOOR SPACE, RESIDENTIAL CONTRACTS AWARDED ³ 37 STATES (millions of square feet) | FAMILIES PROVIDED FOR, 257 CITIES ⁴ (thousands) |
|------|-------------------------------------|---|--|---|--|
| | NBER estimates (1) | Brookings ¹ (thousands of units) (2) | Dept. of Commerce ² (3) | | |
| 1920 | 247 | 213 | 300 | 174 | ... |
| 1921 | 449 | 446 | 432 | 237 | 225 |
| 1922 | 716 | 705 | 676 | 358 | 377 |
| 1923 | 871 | 846 | 814 | 407 | 454 |
| 1924 | 893 | 872 | 827 | 436 | 443 |
| 1925 | 937 | 951 | 894 | 560 | 491 |
| 1926 | 849 | 845 | 841 | 521 | 462 |
| 1927 | 810 | 781 | 757 | 495 | 406 |
| 1928 | 753 | 736 | 713 | 568 | 389 |
| 1929 | 509 | 472 | 510 | 388 | 244 |
| 1930 | 286 | 260 | 303 | 230 | 125 |
| 1931 | 212 | 200 | 219 | 190 | 98 |
| 1932 | 74 | 80 | 94 | 74 | 27 |
| 1933 | 54 | 70 | 64 | 73 | 26 |
| 1934 | 55 | 60 | 59 | 64 | 22 |
| 1935 | 144 | 150 | 138 | 136 | 56 |
| 1936 | 282 | 300 | 275 | 223 | 115 |

¹ The Recovery Problem in the United States (*Brookings Institution, 1937*), p. 639. The estimates carry this footnote: "Data which became available after this table went to press indicate that the estimates for 1925, 1926 and 1936 should be reduced by 30,000-50,000 while those for 1920 and 1929 should be increased by a similar amount."

² Construction Activity in the United States, 1915-37 (*Department of Commerce, Domestic Commerce Series, No. 99, Jan. 1938*), Table 10, p. 41.

³ F. W. Dodge Corporation; includes nonhousekeeping dwellings
⁴ Bureau of Labor Statistics, Building Construction, Feb. 1937, p. 65

for the closing months of each year results in a much smaller adjustment than a one-third—two-thirds allocation of annual totals.

The discussion of Department of Commerce methods of estimating residential construction concludes with the statement:

"... it is believed that estimates have been secured for the years 1921 to 1936 which do not have a margin of error in excess of plus or minus 15 per cent."⁸

⁸ *Ibid.*, p. 45.

B Comparison with Other Estimates of Physical Volume

Although the aggregate value of residential construction had been estimated at various times, no series was generally available prior to 1936 of total family units built annually in nonfarm areas over a period of years. Reflecting the widespread interest in the problem and research by several interested agencies, results of four sets of estimates¹ were presented between December 1936 and March 1937. These estimates are compared in Table EM 9 together with related data on residential floor space reported in contracts awarded and number of families provided for as reported in building permits. Certain features of the Brookings estimates (col. 2) are described in *The Recovery Problem in the United States* (p. 650):

"For the nonfarm area outside of the 257 cities, an estimate for the decade 1920-29 was first obtained by assuming that the number of new units erected bore the same relation to the increase in the number of families that prevailed in a group of smaller cities included in the 257 (82 cities with a population of 25,000-50,000). This estimated total for the decade

¹ Preliminary results of National Bureau estimates of both value and number of nonfarm dwellings built annually since 1920, together with discussion of some problems encountered in their preparation, were presented at the meeting of the American Statistical Association, December 28, 1936 (see *Journal of the American Statistical Association, March 1937*, p. 97). In January 1937 the Brookings Institution published estimates of new nonfarm dwelling units built annually, 1920-36, as part of a chapter on accumulated needs in durable goods, in *The Recovery Problem in the United States*, pp. 183-8. In March 1937 L. J. Chawner of the Bureau of Foreign and Domestic Commerce presented estimates on nonfarm dwelling units built annually, 1915-36, in *The Annals, American Academy of Political and Social Science, Vol. 190*, p. 25. These estimates have since been published in revised form in *Construction Activity in the United States, 1915-37. Notice of the completion of a report "... embodying a series of estimates on housing construction during the years 1920-36, with a forecast for 1937..."* by the Federal Housing Administration was made in the *Journal of the American Statistical Association, March 1937*, but the complete series was not cited. Estimates for selected years were referred to in a press release, December 27, 1936, and in the third annual report of the Federal Housing Administration, January 28, 1937.

as a whole was then distributed among the ten years in accordance with the distribution of the decade's construction, shown by these 82 cities. For years since 1929, construction in the nonfarm area outside the 257 cities has been estimated by other methods, too varied to detail here."

Although the estimates for unreported nonfarm areas are based on a rather small sample, 82 cities, they do not differ materially from the NBER estimates (col. 1) which are based on more cities and more detailed processes. The Brookings estimates, prepared by George Terborgh, pioneered in basing the estimates of construction upon the relation of building to the increase in the number of families.

The methods by which the Department of Commerce estimates (col. 3) were obtained are described in *Construction Activity in the United States, 1915-37* (pp. 40-41):

"The estimation of the number of new family units involved two steps. First, by using the number of family units for which permits were issued in each size group of cities, classified according to their satellite and nonsatellite character, rates showing the number of units per 10,000 persons annually were computed. These rates formed the basis for estimating the number of family units in smaller cities, for which actual reports were not available. The actual rates used were determined after a careful study of the relationships between building rates in cities of different size and relationship to metropolitan areas. In calculating the rates for satellite cities, an adjustment based upon the Real Property Inventory was used. In the case of nonsatellite communities the building rates used as the basis of estimation were substantially less than those obtained directly from the larger reporting cities. The second step involved the extension of these rates to the cities in rural nonfarm areas from which actual reports were not received. This extension was based upon the population of the smaller cities and rural nonfarm areas."

Considerable uncertainty is introduced into the estimates of building in small cities and rural nonfarm areas, when their population is taken as a basis and building rates from larger cities are projected, without adjustment for differences in population growth as between reporting and unreported areas. Analyses made in connection with the present study indicate

that per capita building rates of a town or city are closely related to population growth (see Ch. V, sec. 1 b).

Although not strictly comparable with the data on family units, the F. W. Dodge data on square feet of floor space in residential construction (col. 4) constituted the other chief series previously available that directly measured the trend of physical volume of residential building over a period of years. As mentioned in Note A it is difficult to translate the data on square feet of floor space into number of dwelling units.

Our estimates were based upon the number of families provided for, as reported in building permits in 257 cities and published by the Bureau of Labor Statistics, (col. 5).

C Fire, Flood, and Other Losses

Demolition permits are not usually issued for dwellings completely destroyed by fire, flood, windstorm, or earthquake. Fire losses in residential buildings alone are not available on a national basis, but reports from 7 states (Illinois, Indiana, Iowa, Kansas, Louisiana, Massachusetts, Oregon; *President's Conference on Housing, 1931, Part VIII, p. 5*) for 1930 indicate that 58 per cent of the total number and 32 per cent of the aggregate fire losses were in dwellings. On the basis of a ten-year average of approximately \$500 million aggregate property loss reported by the National Board of Fire Underwriters, a loss of \$160 million is indicated for dwellings. If this represented the complete destruction of dwellings averaging, say, \$5,000, it would mean a loss of some 32,000 dwellings a year. However, only a small portion of the aggregate dollar loss represents complete destruction of dwellings. (Average loss per fire in dwellings in the 7 reporting states in 1930 was only \$770.) Most of the loss is repaired and the property continued in use. Consequently 15,000 dwellings per year would probably be a generous estimate of the units completely destroyed by fire, even allowing for losses not covered by insurance and for relatively higher losses in rural than in urban areas. In the absence of specific data, it was assumed that losses due to floods, earthquakes, windstorms, and other causes would raise the total losses (other than by demolition) to 25,000 units per year, with a range of 20,000-30,000.

Note to Part Two: Supplementary material developed by the NBER, but not included in detail in this volume. The following bodies of data not reproduced in Part Three are in the form of tabulations unless otherwise designated.

I Supplementary Value and Rent Data

1) Values and rents for 139 cities from 1930 *Census of Population* (for complete list see Tables A 6

and B 5). The description of this tabulation in Part Two, Ch. II, sec. 2 indicates the character of the material.