Chapter Title: Estimation of Decade Totals, 1840–60

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Estimation of Decade Totals, 1840-60

The backward projection for the 1840's and 1850's must be made without direct benefit of the Ohio bench-mark production. For the decade of the 1850's, two bases for projection are available giving quite different results. The nationwide census of dwellings, when adjusted to show nonfarm decade increments, shows an increment for the 1860's 18.2 per cent less than that for the 1850's (see Table 13). The entire country except the South, with its special problems of household and farm identification, shows a 12 per cent decline for the sixties. The census of occupations, however, shows that incremental growth of nonagricultural employment in the sixties was 14.4 per cent ahead of that in the fifties. The rate of growth of urban population manifested a similar rise. If the order of magnitude of these census counts and derived estimates is valid, it can only mean that dwelling production in the fifties ran ahead and in the sixties ran behind the underlying population growth. To this extent the building boom of the fifties must have corresponded in intensity with the building boom of the eighties, the profiles of which show up clearly in the behavior of Ohio rates of nonfarm residential building per unit of growth of urban population or nonagricultural employment.[44] For the fifties we accept the dwelling count for the country minus the South, adjusted for the count of farm increments, and record for the fifties a decade total of 113.6 per cent of that accepted for the sixties. Such a decade total is consistent with such annual index behavior as we have for

[44] See comparison of the following rates of dwelling production:

	Ohio Nonfarm Dwelling Units Produced per 1,000 Urban Population Increase	Estimated Nationwide Dwelling Units Produced per 1,000 Nonfarm Employment Increment
1860's	230.8	696
1870's	178.1	442
1880's	327.6	578
1890's	282.6	551

SOURCE: Tables 1, 8, and 11.

the decade; and the implicit rate of decade increase is free from problems of southern estimation.

The decade of the forties presents other problems. We have no dwelling count for it. The incremental growth of nonagricultural employment and of urban population (which was then the smaller portion of nonfarm population) was only 71.6 per cent and 63.5 per cent, respectively, of the corresponding magnitudes of the fifties. This suggests a smaller volume of dwelling production for the forties than for the fifties. But rates of dwelling production for these magnitudes can vary widely, as we have just seen. If the boom of the early and middle fifties was exuberant, the long-swing contraction of the early forties was equally prominent in the scattered records of the time. It would be improper to impress this judgment, however well supported it may seem, into our statistical series. At this juncture it is fortunate that the 1840 *Census of Manufacturers* included a count of dwellings erected in the census year of record. Nationwide, some 54,113 dwellings were enumerated. Recent use of the 1840 census returns indicates that its results hold up under careful scrutiny, but that adjustment is often needed for careless enumeration or for omissions.[45] The reliability of the census housing count was subjected to a twofold evaluation for Ohio and the nation.

The housing returns by counties in Ohio for number and value were expressed as number of houses built per capita and as value per house built, per person, and per dollar of assessed value of real property. Analysis of the value returns showed that returns for three relatively large counties involved probable valuation error because of abnormally high housing values per house relative to total assessed property.[46]

[45] See use of the 1840 Census return by Gallman, "Commodity Output, 1839-1899," and by Richard A. Easterlin, "Interregional Differences in Per Capita Income, Population, and Total Income, 1840-1950," *Trends in the American Economy*, Studies in Income and Wealth, Vol. 24, Princeton for NBER, 1960.

[46] The reported values of newly erected houses expressed per house built and as a fraction of total assessed real property in 1841 were as follows:

County	Dollar value per house	Value of houses as fraction of assessed real property
Franklin	$5,688	2.53%
Hamilton	3,188	13.88
Licking	4,389	27.61
Statewide (less above three counties)	522	1.97
Original statewide	1,012	3.81

Whereas the enumeration in Franklin County probably understated housing numbers (indicated by absence of returns for wooden houses), the enumeration for Hamilton and Licking clearly overstated values.

Elimination of these returns reduces the average value per house from $1,012 to $639, which compares closely with the nationwide census average of $775.[47] However, even this level of value was felt to be untrustworthy. Valuation errors must have been widespread since many—perhaps most—dwellings were erected wholly or largely by owner occupants using, in considerable measure, unpurchased materials. Ground values and investment in site improvements may also have been incorporated in estimates of value.

Number of houses is a more workable magnitude than housing values. The reliability of the number count was checked by comparing rates of per capita building against rates of population growth, in scatter diagrams of county observations for 1840 Census population per houses built, showing (1) the decennial rate of population change between 1830 and 1840, and (2) per cent growth of assessed real estate in 1841 over 1835. The relationship indicated by use of method (2) was more systematic (see Chart 11). Seventeen counties were excluded as they lacked the requisite 1835 valuation bench mark or record of housing production. As expected, we found a broad field of scatter on a semilog scale for the 62 correlated counties but a perceptible tendency of high rates of building to correlate positively with high rates of assessed property growth. The broad linear band excluded 18 counties as having improbable rates of per capita building in view of rates of indicated property growth. Two of the excluded counties specified the number of masonry houses but not of wooden, and a few others specified only wooden but no masonry construction. Ten of the excluded counties with enumerated population of 9 per cent of the state aggregate lacked any entry on housing enumeration, though economic indexes indicated growth over the decade and since 1835.[48] The housing census was taken as part of the schedule of manufacturing, which enumerators might readily neglect in newly settled western country. There are thus grounds for presuming that the housing count for the included 44 counties was more reliably recorded than that

[47] The computed $522 (see footnote 46) was adjusted to a statewide value allowing for the differential in value per house in the excluded three counties and rest of state in the middle 1860's.

[48] The ten counties experienced a population growth during 1830 of 38.6 per cent or considerably less than the state average. Four of the counties with little or no increase in cultivated acreage between 1835 and 1841 experienced a 50 per cent rise in the assessed value of town property. The other six counties experienced a market rice in both farm acreage and town property. Altogether, it is unlikely that an area holding 9 per cent of the state's population would be totally devoid of residential building during 1839-40.

CHART 11

Number of Persons Per House Erected in Ohio, by Counties, 1840, and Per Cent Growth of Assessed Real Property, 1841 Over 1835

1841 as per cent of
1835 real property

Number persons per house built, 1840
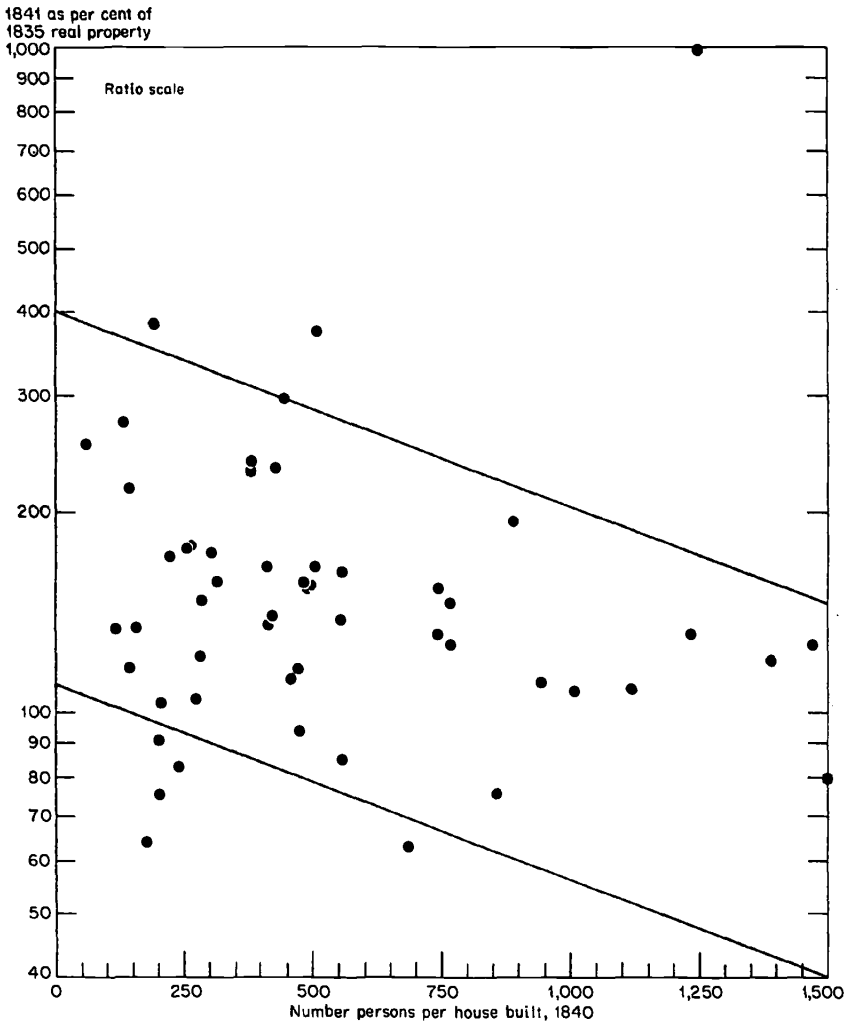
Note: Nine observations with high values not shown on this restricted scale.

Source: Ohio Board of Equalization, *Proceedings*, Columbus, Ohio, record of valuation by counties, 1835, pp. 28-30; abstract ... of valuation by counties, 1841, pp. 60-62; *Compendium of the 6th Census*, 1840, pp. 326ff; *Ohio Population*, p. 26.

for the excluded counties, and that it may serve as a bench mark for projecting statewide rates of building. If we apply the per capita rates of building for the included counties to the statewide aggregate, we derive a total statewide housing production of 4,159 units or some 11.4 per cent over the original enumeration.

A similar tendency to undercount numbers and to overcount value probably characterizes the returns of the nationwide housing census. A detailed examination of the county returns for all other states was precluded by limitations of time and resources. A check was made, however, of the usability of the various statewide housing counts by reducing them to per capita building rates. The array of rates is presented in Table 14. The housing count for Alabama, with its very low rate of building, seems erroneous, since Alabama was on the frontier of western settlement during much of the thirties.[49] At the other extreme there was ground for doubt about the first nine states with extremely high rates of per capita residential building in 1839-40, all located in the frontier zone of settlement during the thirties.[50] In the aggregate, their decennial rate of population increase in 1840 over 1830 was 169.9 per cent compared with 22.7 per cent for all other states. For seven of the states, a population count conducted statewide was available between 1835 and 1838. The percentage annual population growth in the years preceding 1840 correlated closely with per capita rates of housing production in 1840 as shown by the clear line of regression (see Chart 12), with only the return for Iowa, then on the outer fringe of settlement, out of line. Qualitative information collected by frontier historians also indicates that rates of building and in-migration in the frontier states were sometimes heavy in the years immediately before 1840.[51]

[49] Decennial population increases for Alabama were 142.1 per cent for 1820-30 and 90.9 per cent for 1830-40. Relatively heavy migration in the late 1830's and early 1840's was reported (Minnie Boyd, *Alabama in the Fifties,* New York, Columbia University Press, 1931, p. 18). It seems probable that Census enumerators in Alabama did not enumerate slave cabins under the manufacturing schedules.

[50] Ray Billington, *Westward Expansion,* New York, Macmillan, 2nd ed., 1960, Chaps. XIV-XV; *The Growth of the American Economy,* H. F. Williamson, ed., New York, Prentice-Hall, 2nd ed., 1951, p. 93.

[51] The doubling of population in Arkansas between 1835 and 1840 is associated with a report that the panic of 1837 caused many eastern farmers to pour into the state (*The Arkansas Guide,* Arkansas Writer's Project, WPA 1941, p. 39). The nationwide crisis of 1837 was registered in Arkansas in 1841 according to another report (*Arkansas Centennial,* Arkansas Democrat, 1936, p. 12). William Pooley, in his review of the settlement in Illinois between 1830 and 1850, dated the peak of settlement in the period 1837-40 and believed that much of it

TABLE 14

ARRAY OF PER CAPITA RESIDENTIAL BUILDING RATES,
TWENTY-NINE STATES, 1840

State	Number of Houses Built per 1,000 Persons
1. Wisconsin	16.64
2. Iowa	11.56
3. Arkansas	11.26
4. Illinois	9.38
5. Missouri	6.81
6. Indiana	6.73
7. Mississippi	6.36
8. Michigan	6.22
9. Florida	5.79
10. Georgia	3.80
11. Maine	3.40
12. Kentucky	2.87
13. South Carolina	2.87
14. New Jersey	2.86
15. Rhode Island	2.73
16. New York	2.64
17. Pennsylvania	2.57
18. North Carolina	2.47
19. Louisiana	2.46
20. Ohio	2.46
21. Virginia	2.42
22. Massachusetts	2.13
23. Maryland	2.09
24. Connecticut	1.97
25. Delaware	1.94
26. Vermont	1.85
27. New Hampshire	1.83
28. Tennessee	1.56
29. Alabama	0.91

SOURCE: *Compendium of the 6th Census,* 1840, p. 361; *Historical Statistics,* 1960, p. 13.

CHART 12

Scatter Diagram of Percentage Growth of Population, Annually, 1835-40, and Per Capita Housing Production, Seven States, 1840

Housing production, 1840,
per 1,000 persons, census population

Per cent annual population growth, 1835-38 to 1840

$$Y_c = 2.66 + .494 X_1$$
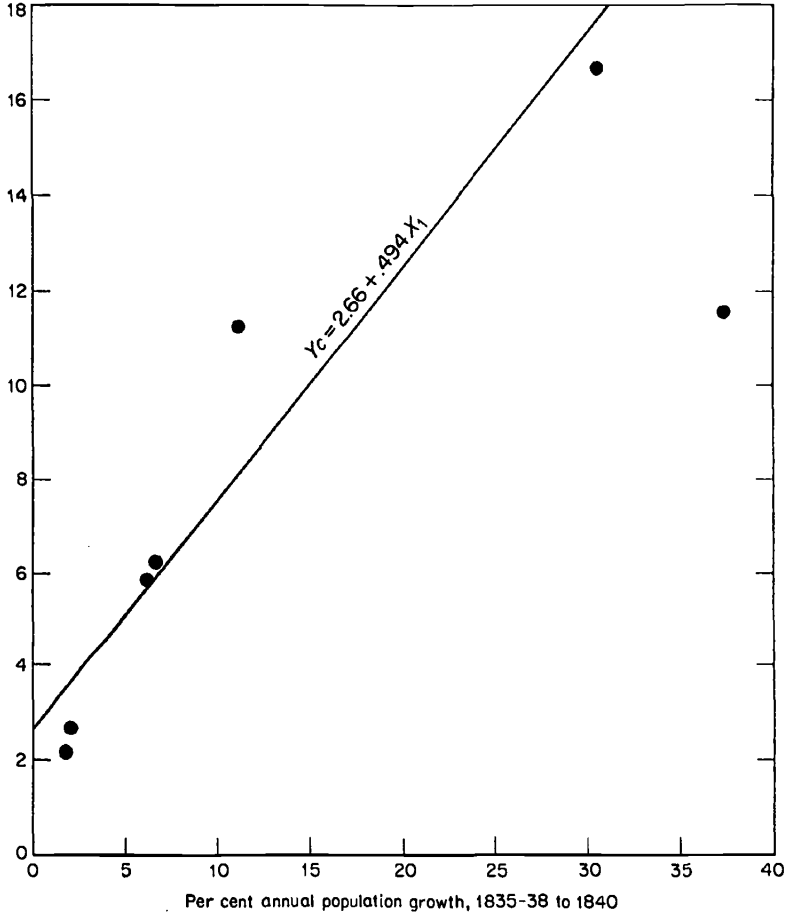
Source: Figures for 1840 from Table 14. Figures for 1835 or 1838 from: Wisconsin—John Hunt, *Wisconsin Almanac*, 1856, p. 79; Florida—*Florida Becomes a State*, Florida State Library, 1945, p. 132; Arkansas—Arkansas Democrat, *Arkansas Centennial*, 1936, p. 3; Iowa—*Iowa Guide*, Federal Writers Program, 1938, p. 550; Michigan and Massachusetts—Murray Kane, "Some Considerations on the Safety Valve Doctrine," *Mississippi Valley Historical Review*, Sept. 1936, pp. 183-4; New York—*Census of State of New York*, for 1835.

If returns throughout the range of the per capita building array are consistent, it is reasonable to hold that the number count of houses built in 1839-40 is acceptable, subject only to the qualification that adjustment would be needed for omitted counties or categories of building. Using our revised Ohio rates of per capita building as a guide, we estimated national production at 54,359 dwellings, or slightly over the enumerated quantity. Since rates of population growth in Ohio exceeded the national average, Ohio building rates per capita should not tend to understate. Regression analysis also adds confirmation to the recorded census count.[52] In any case our quantity needs to be adjusted by an allowance for farm dwellings erected in the census year. Here, too, all we know is the decennial distribution after 1840 of occupied labor force increments between agricultural and other pursuits. This distribution suggests that in any given year an appreciable share—from perhaps one-third to three-fourths —of the dwellings erected in 1839-40 must have been nonfarm. Are we far off in concluding that any estimate for 1840 residential nonfarm building falling within a range of 16,000 to 45,000 would lie within the range of acceptability indicated by the evidence brought under review? If we allow for this order of magnitude and accept the annual behavior of our available annual indexes and bear in mind the need for a fit with the succeeding decade, we find a total of 520,000 units for the forties

was in reaction to the 1837 crisis and crop failure in New England ("The Settlement of Illinois from 1830-1850," *University of Wisconsin Bulletin,* History Series, Vol. I, 1908, pp. 337 ff., 339 ff., 568 ff.). Murray Kane conducted a careful review of population and migration data during the thirties and concluded that the balance of evidence supported the hypothesis that the migration movement westward "reached a peak just prior to the precipitation of the panic and contracted during recession." He collected evidence that leading frontier urban centers, such as Cincinnati, Chicago, and Detroit, were affected by nationwide business cycles with little lag ("Some Considerations on the Safety Valve Doctrine," *Mississippi Valley Historical Review,* Sept. 1936). Kane took little reckoning of the fact that the upswing of the thirties was twin peaked and that the "recession" for many communities may easily date from 1839 or 1840. The rejoinders to Kane's work and other critical articles and the subsequent discussion provided only meager additional evidence (see review of literature in Billington, *Westward Expansion,* 2nd ed., 1960, pp. 762 ff.). The 1840 housing census, when analyzed in terms of the "safety valve" hypothesis, makes up a significant item of new evidence.

[52] If we use a freehand linear regression, and utilize the 2.57 per cent average annual rate of growth of nationwide population between 1837 and 1840 (for annual estimates see *Historical Statistics,* 1949, p. 26), we derive an estimated number of 3.3 houses built per 1,000 of 1840 census population; and this applied to the 1840 census population yields 56,497 dwellings. The least squares regression, $Y_c = 2.66 + .494X_1$, based on six observations, yielded a national estimate of 67,083,000 houses.

(43.3 per cent of the estimated total for the fifties) would be a plausible estimate. It would fit the 1840 order of magnitude, the annual time series, and the pattern of decade increments. A decade production on that scale, however, would have involved relatively low rates per unit of urban increment or nonfarm employment. The rates compared with the succeeding decades are shown in the next tabulation.

					Residential Production per 1,000 of	
	Size of Increment (thousands)				Increment*	
	1840's	*1850's*	*1860's*	*1840's*	*1850's*	*1860's*
Nonfarm employment	1,095.3	1,528.8	1,750.1	474.8	786.2	606.2
Urban population	1,699	2,673	3,685	306.1	449.7	287.9

* Assuming dwelling production of 520,000 units in 1840's, 1,202,000 in 1850's, and 1,061,000 in 1860's (*Historical Statistics*, 1949, Series A195-209, p. 14; Series D38, p. 72).

I regard the stipulated 1840 rates of housing production as well within the range of possibility. Statewide quinquennial reports on building materials produced in Massachusetts show very high amplitudes of rise from 1840 to 1855.[53] And Gallman's quinquennial estimates for deflated value of total construction involve a pattern of movement on a scale comparable to that of our estimates.[54] For these reasons and with the indicated reservations, our decade projections and annual series include a set of estimates for the 1840's. These estimates are regarded as only showing the pattern of probable long-swing movement and as defining the outer limit of the long-swing amplitude consistent with all our present information.

[53] Massachusetts state census reports show the following per cent increases for 1855 over 1840 for dollar value at current prices: bricks produced, 845; building stone, 147; lumber planed or sawed, 1,062.

[54] With 1839-40 as a base, the quinquennial index relatives for four quinquennial years are appended:

		Gallman Construction, Deflated Total Value	
Year	Our Residential Estimates	Variant A	Variant B
1839-40	100	100	100
1844-45	128	117	121
1849-50	261	155	164
1854-55	383	281	293
1859-60	258	294	318

SOURCE: Table 15, and Gallman, "Commodity Output, 1839-1899," *Trends in the Nineteenth Century*, p. 63, lines 6, 11.

Since residential building would be expected to fluctuate more violently in its growth path than total construction, the two sets of series are reasonably consistent, especially in over-all gradient.