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Nonfarm Real Estate and Trade*

9.1. Introduction

This chapter details the estimation of the current-price and constant-price (1860) capital stock on a decadal basis from 1840 to 1900 for nonfarm residential and trade real estate and equipment. It also provides estimates for churches and schools, and government buildings.

The “residential” category is self-explanatory. The “trade” category is a residual made up primarily of the property of commercial and financial establishments and vacant lots. (Kuznets [1946, 206] refers to it as “other industrial.”) Only in 1900 does the census report residential and trade real estate separately. For other years we were forced to make the division on the basis of the proportional distribution observed in 1900. Since the residential category makes up about 75 percent of the total, an error in the estimated residential/trade ratio would affect the accuracy of the residential category much less than it would the trade estimate. If, for example, we were to use a ratio of 75 percent, and the true ratio were 70 percent, the error in our residential estimate would be only about 6 percent, while the error in our trade estimate would be 20 percent. The method thus leaves open the possibility of considerable error in our earlier (prior to 1880) trade estimates. We have therefore attempted to use 1840 census data on capital in trade to test the relevance of the 1900 ratio for the earlier period.

At the time Kuznets and Goldsmith developed their wealth estimates, one of the major unresolved problems they faced was the accurate

* The substance of this chapter was written by Gallman. “We” and “our” refers to Gallman and Howle.

estimation of nonfarm land values in the nineteenth century. Since the census figures include both land and improvements, it was necessary to deduct the value of land in order to estimate improvements. Their divergence of opinion was great: Kuznets (1946, 206) assumed that land values made up about 50 percent of the total, Goldsmith, 25 percent (Goldsmith 1952, 259).

We have limited information, extending back as far as 1850, on the land-to-improvements ratio in nonagricultural real estate. Since this ratio is crucial to our estimates, it is appropriate that we first look into this problem.

9.2. Deduction of Land Values

In developing his 1900 land-to-improvements ratio for trade and residential real estate, Kuznets (1946, 206) first obtained a ratio for all taxable nonutility real estate, as follows:

The ratio of the value of land to the total value of real estate is extrapolated from 1922—by the comparable ratio for five sample states. The data for the latter ratio in 1922 are the percentages for California, Colorado, Indiana, Minnesota, and West Virginia (National Wealth and Income), weighted by the value of taxable property reported for those states (Estimated National Wealth); the data for the 1900 ratio are from *Wealth Debt and Taxation* (Special Report of the Census Office, Washington, 1907, table 2).

In this way he was able to estimate the value of all nonutilities improvements. Then, by deducting the value of improvements in agriculture, mining, and manufacturing, he obtained the value of trade (his “other industrial”) and residential improvements. Land values were computed similarly.

There is considerable evidence, however, that the 1922 Federal Trade Commission ratios are too high. (e.g. see Keller 1939). Kuznets’s 1900 ratio would not be affected by this if the 1922 ratios for his five sample states were overstated to the same extent. If the 1900 ratios for the sample are accurate, Kuznets’s extrapolation would compensate for any uniform overstatement of the 1922 ratios.

The 1900 ratios were computed by the census from tax appraisal data together with ratios for manufacturing for the same five states (US Bureau of the Census 1907, table 2). The census compares the manufacturing ratios with those obtained from the Census of Manufactures:

If the five states are taken as a whole the value of land as shown by the census of manufactures constitutes 47.8 percent of the total (of land and improvements), while the assessed valuation gives to that land a percentage of 56.6. Considered in this way the figures seem to indicate that in these states the land connected with manufacturing establishments is assessed at a higher proportion of its true value than are the buildings and other improvements (US Bureau of the Census 1907, table 2).

It is possible that this was true of the residential property in these states as well. In fact, in view of the doubt as to the level of the 1922 ratios (also based on tax data), one may well conclude that tax assessments generally allot to land a disproportionately large share of total valuation.

Winnick (1953) used an alternative approach to establish the proportion of land in nonagricultural residential real estate. He estimated this ratio on the basis of Federal Housing Administration data for the years 1936 to 1949, and data for a limited number of cities before 1936. He used no source material prior to 1907, but extrapolated the ratio from 1907 to 1890. Winnick shows the share of land in total residential real estate declining from 40 percent in 1890 and 36.3 percent in 1900 to 18 percent in 1950.

Winnick also points out that the aggregate nonfarm ratio (i.e., residential and nonresidential) in fifteen cities in 1936 ran about 40 percent above the residential ratio. This could not be true for the earlier period. Between 1840 and 1900, residential real estate made up roughly three-quarters of all residential and trade real estate. If the ratio of land to land-and-improvements were 40 percent higher for all real estate than for residential real estate alone, the nonresidential ratio would be impossibly high: 94 percent.

We accepted Winnick's residential ratio of 36.3 percent for 1900, but we could not accept an aggregate ratio 40 percent above it (50.8 percent). Instead we set the trade ratio at 65 percent, which is as high as seems reasonable for this period. Since residential real estate made up about three-fourths of residential and trade real estate, the 36.3 percent ratio for residential and the 65 percent ratio for trade yield an aggregate ratio of 43.5 percent for residential and trade real estate together—a value a little lower than the one adopted by Kuznets, but higher than the one preferred by Goldsmith. This seems to be the largest land value ratio that the data on residential real estate will allow for 1900.

We next extrapolated the 1900 ratios to 1840. We had tax appraisal ratios for a few states, from which we computed a series intended to describe

the trend in the national ratio. The variation in this series from year to year is small. No clear trend is indicated. We therefore used our 1900 ratios (0.363 for residential and 0.650 for other commercial) for all previous years.

9.3. Ratio of Residential to Residential and Trade Real Estate

E. A. Keller (1939, 116–18) estimated the value of nonfarm residential real estate—both owned and rented—for 1922. The owned property estimate was based on the number of owner-occupied houses and their median value, the rented estimate on the capitalization of rentals (at 8.5 percent). A comparison of residential with other commercial and nonfarm real property indicates that residences alone made up 0.793 of the total. This seems high, and it may be that the capitalization rate was inappropriate for this period.

A corresponding ratio for 1900 was estimated by the census to be 0.75: “The values arbitrarily assigned to ‘general residence property’ and ‘other business property’ are respectively three-fourths and one-fourth of the difference obtained by subtracting from the total value of ‘all taxed real property and improvements’ the sum of the value of taxed farm realty, the value of land and buildings in factories, and the arbitrary and of course imperfect estimate of the value of mining realty” (US Bureau of the Census 1907, 18).

Grebler, Blank, and Winnick (1956, 365) estimate that nonfarm residential real estate was worth \$14,974 million in 1890, a figure close to Kuznets’s \$14.423 million, although derived in a very different way. (They base their figure on estimates of the number and average value of dwellings.) It is roughly 76.3 percent of our estimate of trade and residential real estate, which suggests that the 1900 ratio of 0.75, established by the census, was a good guess. We used 0.75 for all years, since we believe the available information inadequate to extrapolate a trend.

9.4. Improvements and Land

1880–1900. The censuses of this period contain aggregate estimates of all taxable nonutility real estate, as well as estimates of some of their components. The aggregates appear to be expressed in market values. In order to obtain estimates of trade and nonagricultural residential real estate,

TABLE 9.1 **Value of trade and nonagricultural residential real estate, measured in current prices, 1880–1900, in millions of dollars**

		1880	1890	1900
1	Taxable nonutility real estate	\$9,811 ^a	\$35,711.20 ^b	\$46,324.80
2	Agricultural real estate	^a	13,279.30	16,440.40
3	Mining real estate	^a	^b	1,674.10
4	Manufacturing real estate	1,377	2,811.00	3,670.80
5	Trade and nonagricultural residential real estate	8,504	19,620.90	24,541.50

Notes: ^a1880 total excludes agriculture and mining. ^b1890 total excludes mining.

Sources: 1880, line 1: US Census Office 1884a, 11. Lines 2 and 3: excluded in total. Line 4: line 2 + line 4, table 8.8. Line 5: line 1 – line 4. [Rhode: The 1880 census places the value of “residential and business real estate, including water-power” at \$9,881m.] 1890, line 1: US Census Office 1895c, 5, 13. Line 2: US Bureau of the Census 1949, series E-3. Line 3: US Census Office 1895c, 7, makes clear that the mining real estate is omitted. Line 4: line 2 + line 4, table 8.8. Line 5: line 1 – line 2 – line 4. 1900, line 1: US Bureau of the Census 1907, 16. Line 2: US Bureau of the Census 1907, 16. This is the same sum used in chapter 7, less \$174.3 million for tax-exempt agricultural real estate not included in line 1. Line 3: line 44 + line 46, column 7, table 8.3. Line 4: table 8.8 above, less a deduction for tax-exempt property. Line 5: line 1 – line 2 – line 3 – line 4. [Rhode: There is a small discrepancy here.]

we had only to subtract our estimates of the other categories of real estate included in the aggregates. In each case, it is fairly clear from the census context which categories were included.¹ The derivation of the trade and nonagricultural residential residual is given for 1900, 1890, and 1880 in table 9.1.

1860. In order to make estimates for 1870 it was necessary first to deal with 1850 and 1860. We will therefore discuss the earlier years first. Once again we began by establishing the total value of real estate, and then obtained the value of residential and trade real estate as a residual. For 1860 there are two sources of the required aggregate value, since the census gives real estate values based both on tax appraisals and on owner valuations (US Census Office 1866, 294–95). As part of the population census, marshals asked each person the value of his or her real property. Each marshal was also to report the value of real and personal property returned in his district on the tax duplicate. He was then to sum up the values of real and personal property and mark up the sum, so that it reflected true value (US Census Office 1860).

Unfortunately for us, the marshals were not asked to estimate the true value of real property separately. However, limits on this value are readily established. The lower limit consists of the tax return itself, and rests on the assumption that only personal property was undervalued for tax purposes. The lower limit (tax appraisal) estimate is \$6,973 million.

TABLE 9.2 **Value of trade and nonagricultural residential real estate, measured in current prices, 1860, in millions of dollars**

1	Total real estate, per owner estimates	\$10,930
2	Less agricultural real estate	6,645
3	Less 75 percent of manufacturing real estate	366
4	Less 75 percent of mining real estate	62
5	Less 10 percent of certain utilities real estate	20
6	Trade and nonagricultural residential real estate (line 1 minus the sum of lines 2, 3, 4, and 5)	3,837

Sources: Line 1: US Census Office 1866, 319. Line 2: This is the census of agriculture figure underlying the work in chapter 7, above. See, e.g., US Bureau of the Census 1949, series E-3. Line 3: $0.75 \times (\text{line 2} + \text{line 4})$, table 8.9. Line 4: $0.75 \times (\text{line 44} + \text{line 46})$, table 8.3. Line 5: A guess. Line 6: Line 1 – line 2 – line 3 – line 4 – line 5.

The upper limit rests on the assumption that only real property was undervalued for tax purposes, and is derived by subtracting the tax return of personal property from the marshals' estimates of the true value of real and personal property. The upper limit estimate is \$11,048 million. An intermediate estimate may be formed based on the assumption that the two types of property were undervalued for tax purposes to the same degree. It is \$9,323 million.²

The sum of the owner valuations of real property came to \$10,930 million (see table 9.2). This figure falls within the limits established by the tax data, if just within them. However, the tax-based estimates include property owned by corporations, whereas the owner-based estimate does not (see below). At a guess, a quarter of the property of mining and manufacturing firms and perhaps 55 percent of railroad property needs to be added to the owner valuation before it can be properly compared with the tax-based estimate. These adjustments raise the owner-based figure to \$11,465 million, placing it just outside the upper limit established by the tax data.³ The two forms of evidence, therefore, yield somewhat different results, although they are not strikingly far apart.

We chose to use the owner-based figure, rather than any of the tax-based figures, for three reasons: (1) the owner-based figure involved less processing than did the tax-based estimates; (2) we think it is more likely to be accurate than is the sum of tax duplicate values, adjusted by census marshals; and (3) the agricultural property estimates, which form a large part of the total value of property and thus figure importantly in the derivation of the residential and trade residual, are also based chiefly on appraisals of property rendered by owners, and are therefore more likely

to be consistent with the aggregate owner-based estimates than with tax appraisals. The “Instructions to the Marshals” imply that owner estimates involve only real property reported as owned by individuals (US Census Office 1860). Governmental property and property of charitable institutions was to be excluded, while corporate stock held by individuals was to be included in personal property. The census figure of the value of real property, therefore, excludes the value of governmental and charitable institutions, and most corporate assets. We assumed that all railroads and most other utilities were so excluded. We could not make this assumption for manufacturing and mining firms, which were often small-scale, one-owner ventures, but manufacturing and mining interests do not make up a large portion of total nonfarm assets. We assumed, arbitrarily, that 75 percent of manufacturing and mining real property was included in the owner-based appraisal of real property. We also assumed that 10 percent of the value of the property of utilities, other than railroads and canals, was so included. As can be seen from the relative magnitudes in table 9.2, these matters are not of great importance.⁴

1850. Table 9.3 contains all of the published census data on total real and personal property in 1850. Tax duplicate data were collected by the marshals and true value estimates were made, in exactly the way in which they were to be made in 1860. Owner valuations of real property were collected, but were never totaled and published. However, Lee Soltow (1975) has sampled the manuscript census, and his data can be used to derive an 1850 aggregate comparable to the sum of the owner valuations of 1860.

Following precisely the methods described in connection with the 1860 estimates above, we obtained the following estimates from the 1850 data.⁵ The lower limit (tax appraisal) was \$3,899 million and the upper limit, \$4,941 million. This intermediate value, generated using the assumptions outlined above, was \$4,574 million.

Soltow’s (1975, 76–77) work provides us with estimates in 1850 and 1860 of the average value of real estate (owner valuation) owned by free

TABLE 9.3 1850 census wealth data, based on tax appraisals, in millions of dollars

1	Assessed value of real estate	\$3,899
2	Total assessed valuation, real and personal estate	6,025
3	Total “true value,” taxed real and personal estate	7,067
4	Difference between lines 3 and 2	1,042
5	Ratio of line 4 to line 2	0.173

Source: De Bow 1854, 190.

males twenty years old or older. With this information, plus the number of free males twenty years old or older at each of the two dates,⁶ we developed an extrapolator for the 1860 value of real property (owner valuations), an extrapolator that covers most of the value of real property. The procedure yields an estimate of the market value of real estate (owner valuations) in 1850 of \$5.2 million, which lies above the upper limit of the value of real estate in 1850 set by use of the tax data (see above). Thus, the results are similar to those obtained for 1860, but the margin between the owner-based and tax-based estimates is greater in 1850 than in 1860.

We ran a check on these results. We assumed that the markup ratios for real and personal property were the same in each year, and that the marshals understated them by the same proportion in each year. The following formula, then, can be used to work out the correct markup ratio in 1850: 1850 true markup ratio / 1850 marshal's markup ratio = 1860 true markup ratio / 1860 marshal's markup ratio. The 1860 marshals' markup ratio is taken from note 2 to this chapter, the 1860 true ratio from table 9.4, and the 1850 marshals' markup ratio from table 9.3. The true 1850 ratio, then, is 0.3307, which yields an estimate for the value of total real estate of \$5.2 billion (\$5,188 million), exactly the value we obtained by the extrapolation on Soltow's data. (The tax-based estimate is more comprehensive than the owner-based estimate—see table 9.4—but the difference is slight.)

Table 9.5 contains the derivation of our nonagricultural residential and trade real estate estimate, based on the adjusted tax-based estimate of total real property above. The figure obtained—\$1,516 million—is very close to values that can be derived from Goldsmith's (1952) work.⁷ Since

TABLE 9.4 1860 ratio of appraised to true value of taxable real estate, in millions of dollars

1	1860 owners' estimate, total real estate	\$10,930
2	Add 25% of manufacturing real estate	122
3	Add 25% of mining real estate	21
4	Add 55% of railway real estate	392
5	Estimate of 1860 taxable real estate	11,465
6	Tax appraisal total, before markup	6,973
7	Correct amount of markup	4,492
8	Ratio of line 7 to line 6	0.6442

Sources: Line 1: table 9.2, line 1. Line 2: $0.25 \times (\text{line 2} + \text{line 4}, 1860, \text{table 8.8})$. Line 3: $0.25 \times (\text{line 44 and 46}, 1860, \text{table 8.3})$. Line 4: $0.55 \times \text{current value of land and improvements, table 10.9}$. Line 5: line 1 + line 2 + line 3 + line 4. Line 6: see text (note 2) regarding tax duplicates. Line 7: line 5 – line 6.

TABLE 9.5 **Value of trade and nonagricultural residential real estate, measured in current prices, 1850, in millions of dollars**

1	Total taxable real estate	\$5,188
2	Agricultural real estate	3,272
3	Taxable portion of railroad real estate	83
4	Manufacturing real estate	272
5	Mining real estate	25
6	Taxable portion of other utility property	20
7	Trade and nonagricultural residential real estate	1,516

Sources: Line 1: see text. Line 2: De Bow 1854, 169; also given in US Bureau of the Census 1949, series E-3. Line 3: The railroad real property figure is a total of land and improvements from table 10.6. We estimated that 50 percent of the total rail assets were included in the tax appraisal. This estimate is based on our 1880 analysis, indicating that about 65 percent of all railroads were in the tax appraisal at that time. Of thirty-three states, seventeen clearly recorded appraisals on county tax books, while eight exempted most or all rail property from property taxes per se. Of the remaining eight, some taxed certain categories of rail property (e.g., all except roadbeds), or the methods of taxation were such that we cannot determine if appraisals were made. Using a rough probability estimate for the latter, we feel that about 65 percent of all rail property was valued for taxation in 1880. For 1850, the percentage was probably slightly lower, hence our 50 percent estimate. The source of data for our taxation study was Adams, Williams, and Oberly 1880. Line 4: line 2 + line 4, table 8.8. Line 5: mining improvements and mining land estimates, line 44 + line 46, table 8.3. Line 6: a guess. Line 7: line 1 – line 2 – line 3 – line 4 – line 5 – line 6.

Goldsmith's sources and methods are very different from ours, the check is reassuring.

1870. No separate estimate is available for the “true value” of real estate in 1870. As in 1850, only the tax assessments of real and personal property, separately, and the “true” value of the two, together, are given. We therefore had to develop a markup ratio for real estate in order to adjust the tax appraisals to their true value. Once again, we had Soltow's work as a test of our results.

The 1880 census gives no total “true value” for total *taxable* real estate, only an appraisal value. In order to get a markup ratio for 1880 to compare with earlier years, we had to develop a taxable real estate true value total from the various categories listed in the census.

The ratio computed in table 9.6 is comparable to the 1860 ratio given in table 9.5. The 1870 ratio should probably be closer to the 1880 ratio of 0.707 than to the 1860 ratio of 0.644. The difference between the two ratios is small, and as a first approximation we applied the 1880 markup ratio to the 1870 appraisal of all taxable real estate: $(1 + 0.707) \times \$9,915 \text{ million} = \$16,925 \text{ million}$. Since the test using Soltow's data to form an extrapolator (see section 9.4.3 above) gives an extraordinarily close check (\$16.9 billion), we chose to adopt this figure.

TABLE 9.6 **1880 appraised and true value of taxable real estate, in millions of dollars**

1	True value of farms	\$10,197
2	True value of residential and business real estate	9,881
3	True value of railroad real estate (to extent taxed)	1,568
4	True value of mining real estate	602
5	Total true value of taxable real estate	22,248
6	Appraised value of taxable real estate	13,037
7	Line 5 less line 6	9,211
8	Ratio of line 7 to line 6 (markup ratio)	0.707

Sources: Lines 1, 2, and 6: US Census Office 1884a, 9, 11. Note that the value in line 2 is a census estimate.

Line 3: $0.65 \times (\text{line 6} + \text{line 7, table 10.9})$ (see notes to table 9.5). Line 4: line 44 + line 46, table 8.3.

Line 5: line 1 + line 2 + line 3 + line 4.

TABLE 9.7 **Value of trade and nonagricultural residential real estate, current prices, 1870, in millions of dollars**

1	Taxable real estate	\$16,925
2	Less agricultural real estate	9,263
3	Less mining real estate	256
4	Less manufacturing real estate	1,072
5	Less taxable portion of railroad real estate	1,033
6	Less taxable portion of other utilities real estate	30
7	Trade and nonagricultural residential real estate	5,271

Sources: Line 1: See text. Line 2: US Census Office 1872, 81. (N.B.: US Bureau of the Census 1949, series E-3, in this instance is wrong. It apparently refers to Superintendent Walker's conversion of current value to "gold" value.) Line 3: line 44 + line 46, table 8.3. Line 4: line 2 + line 4, table 8.8. Line 5: This is 60 percent of our table 10.9 estimate. See notes to line 3, table 9.5. Line 6: a guess. Line 7: line 1 – line 2 – line 3 – line 4.

We next deducted the other categories of taxable real estate to get the non-agricultural residential and trade residual, \$5,270 million (see table 9.7).

1840. The 1840 census did not investigate the aggregate value of real property. We were forced to rely on other sources for our residential and trade real estate figure, but we had census data on property in trade that were useful in checking our result. Ezra Seaman (1852, 282) concluded that "the value of all dwelling houses in the United States in 1840, and the improvements around them, including yards, fences, outhouses, and trees, may be estimated at over a thousand million dollars." Assuming that this value includes farm barns, it can be compared with our 1850 estimate as in table 9.8.

A 27.3 percent increase in per capita residential wealth between 1840 and 1850 is indicated. This is not unreasonable. Tax appraisal data for Virginia and New York show per capita increases of 16.1 percent and 19.2 percent, respectively, for all taxable real property.⁸ Because of the inclusion of agricultural land, all real property increases in value more slowly

TABLE 9.8 **Value of residential real estate, population, and the ratio of the former to the latter, 1840 and 1850**

		1840	1850
1	Value of residences, etc., in millions	\$1,000	\$1,736
2	Population, in millions	17.1	23.3
3	Residential value per person	\$58.50	\$74.50

Sources: Line 1: the 1840 estimate is from Seaman 1852, 282. The 1850 estimate is our estimate of nonagricultural residential real estate, plus our estimate of agricultural buildings (see tables 7.2 and 9.11). It was assumed that the yards underlying farm residences were of negligible value. Line 2: US Bureau of the Census 1960, series A 2. Line 3: line 1 ÷ line 2.

than residences, yards, and so on. Our data indicate that a per capita increase of 27.3 percent in the latter implies about a 19 percent increase in the former. Seaman's 1840 estimate therefore seems acceptable, and we assumed that it includes farm barns.

We next had to complete the estimate and divide it between agricultural and nonagricultural assets. We had all the necessary information to do this, except for the division of improvements between the two sectors. We obtained this information by extrapolation, on the basis of the results of a regression that relates changes in the ratio of agricultural buildings to trade and nonagricultural residential improvements, to changes in the ratio of agricultural workers to nonagricultural workers using national data for 1850, 1860, 1870, 1880, 1890, and 1900.⁹ The regression provided the last piece of information necessary to complete the 1840 estimates.

The trade real estate estimate in table 9.9 is the result of our heroic use of a 1900 ratio for 1840. The 1840 census, unlike later censuses, lists the capital invested in the major categories of commerce. This information provides a very rough but interesting check on our trade/trade-and-residential ratio, and also on the level of our 1840 real estate estimate in general. The "commerce" capital figure in the 1840 census is \$391 million. Our trade real estate estimate is equal to 50 percent of this value. The 1840 census "commerce" figure undoubtedly excludes many industrial categories that are included in our heterogeneous residual category called "trade," so that the true ratio of "trade" real estate to "trade" capital was probably less than 50 percent in 1840. The only other estimate of the ratio of trade real estate to trade capital is a 1922 figure of 39 percent by Kuznets.¹⁰ The similarity between the 1840 and 1922 results is encouraging, but the early "trade" estimates must still be considered among the weakest in our series.

TABLE 9.9 **Value of trade and nonagricultural residential real estate, current prices, 1840, in millions of dollars**

1	All residences, yards, etc.	\$1,000
2	Trade real estate	195
3	Residential and trade real estate	1,195
4	Agricultural buildings	415
5	Nonagricultural residential and trade improvements	441
6	Yards	339
7	Residential and trade real estate	1,195

Sources:

Line 1: Seaman's estimate; see table 9.8.

Lines 2, 4, 5, and 6: The values were obtained by solving the following equations:

i. From our regression equation: line 4 = $0.942 \times$ line 5; see section 9.4.

ii. From our nonagricultural residential and trade improvements-to-total real estate ratio:

Line 5 = $0.565 \times$ (line 5 + line 6); see section 9.2,

iii. From our nonagricultural residential/residential and trade real estate ratio:

line 2 = $0.25 \times$ (line 5 + line 6); see section 9.3.

iv. Line 2 = line 4 + line 5 + line 6 – line 1.

Line 3: line 1 + line 2.

Line 7: line 4 + line 5 + line 6.

9.5. Trade Equipment

Hardly any information on the value of trade equipment is available. We include this category only to make our total equipment figure comparable to our total improvements figure. Like Kuznets (1946, 214), we assumed that the ratio of trade equipment to trade real estate was 0.333 for the entire period. The only justification is approximate ratio applied to a small sample of Massachusetts nonmanufacturing corporations in 1920–21.

9.6. Summary for Nonfarm Residential and Trade Real Estate and Equipment

Table 9.10 provides estimates for the value of trade equipment. Table 9.11 summarizes the results for trade and nonresidential real estate.

9.7. Real Estate in Churches, Schools, and Government Buildings

This section details the estimation of the current-price and constant-price (1860) capital stock on a decadal basis from 1840 to 1900 for churches and schools, and government buildings (see table 9.12). For churches, we

TABLE 9.10 Value of trade equipment, measured in current and 1860 prices, 1840–1900, in millions of dollars

		1840	1850	1860	1870	1880	1890	1900
1	Value at current prices	65	126	319	439	708	1,633	2,073
2	Price index	140	137	100	117	98	86	74
3	Value at 1860 prices	46	92	319	375	722	1,899	2,761

Sources: Line 1: $0.333 \times$ line 5, table 9.11. Line 2: Brady's index of office furniture (Brady 1966, pp. 110, 111), extrapolated to 1869 on the price index of furniture and to 1899 on the price index of sewing machines (p. 109), adjusted to reflect the "o" years rather than the "9" years, per the adjustment factor for buildings, described in the notes to table 8.9, and extrapolated to 1840 on the mean of the indexes in lines 2 and 5 of table 8.9. Line 3: $100 \times$ line 1 $\div$ line 2.

TABLE 9.11 Value of trade and nonagricultural residential real estate, measured in current and 1860 prices, 1840–1900, in millions of dollars

		1840	1850	1860	1870	1880	1890	1900
1	Trade and nonagricultural residential real estate	780	1,516	3,837	5,271	8,504	19,621	24,539
2	Nonagricultural residential real estate	585	1,137	2,878	3,953	6,378	14,716	18,404
3	Nonagricultural residential improvements	373	724	1,833	2,518	4,063	9,374	11,723
4	Nonagricultural residential land	212	413	1,045	1,435	2,315	5,342	6,681
5	Trade real estate	195	379	959	1,318	2,126	4,905	6,135
6	Trade improvements	68	133	336	461	744	1,717	2,147
7	Trade land	127	246	623	856	1,382	3,188	3,988
8	Price index of houses and churches	95	96	100	128	130	135	132
9	Nonagricultural residential improvements, at 1860 prices	393	754	1,833	1,967	3,125	6,944	8,881
10	Price index of stores and factories	105	106	100	95	114	91	89
11	Trade improvements, at 1860 prices	65	125	336	485	653	1,887	2,412

Sources: Line 1: See tables 9.1, 9.2, 9.5, 9.7, and 9.9. Line 2: line 1 $\times$ 0.75; see text. Line 3: line 2 $\times$ 0.637; see text. Line 4: line 2 $\times$ 0.363; see text. Line 5: line 1 $\times$ 0.25; see text. Line 6: line 5 $\times$ 0.35; see text. Line 7: line 5 $\times$ 0.65; see text. Line 8: table 7.2. Line 9: $100 \times$ line 3 $\div$ line 8. Line 10: table 8.9, line 2b. [Rhode: 95 in 1870 is not consistent with the source, which lists 90.] Line 11: $100 \times$ line 6 $\div$ line 10.

adopted Weiss's (1975, 150–52) current-price estimates, which he treats as net. For educational facilities, we adopted Weiss's (1969, 157–60) current price estimate, covering public and private sectors, schools and colleges. Again we assume the estimates are net. Weiss's deflation procedure suggests that he regards the data as expressed in market values or reproduction costs. The capital consists chiefly of buildings, but also includes some

TABLE 9.12 **Value of churches, schools, and government buildings, measured in current and 1860 prices, 1840–1900, in millions of dollars**

	1840	1850	1860	1870	1880	1890	1900
1 Price index	95	96	100	128	130	135	132
Churches							
2 Value, at current prices	50	87.4	171.4	354.5	520	679.4	1,040
3 Value, at 1860 prices	52.6	91.0	171.4	277	400	503.3	787
Schools							
4 Value, at current prices	37	69	114	179	281	471	785
5 Value, at 1860 prices	39	72	114	140	216	349	595
Government buildings							
6 Value, at current prices	8	10	16	22	46	92	124
7 Value, at 1860 prices	8	9	16	21	44	94	111

Sources: Line 1: Brady's adjusted price index of houses, churches, and schools, taken from table 7.2. Line 2: Weiss 1975, 151, dates these figures to 1839, 1849, etc., by which he designates the census year, which covered parts of two calendar years. We date the figures here by the date to which the wealth returns refer, June of 1840, 1850, etc. Line 3: $100 \times \text{line 2} \div \text{line 1}$. Line 4: Weiss 1969, 158. Line 5: $100 \times \text{line 4} \div \text{line 1}$. Lines 6 and 7: derived from data in Weiss 1969, table 49, column 3, and table 50, columns 3 and 4, in the manner described in the text. Weiss dates his estimates to 1839, 1849, etc., by which he apparently refers to the census year, a year incorporating parts of two calendar years (1839 and 1840, etc.). We have identified the estimates with the second calendar year contributing to the census year, 1840, 1850, etc.

land and equipment. Thus we deflated using the adjusted Brady index of houses, churches, and schools (see table 7.2).

Government investments in canals, river improvements, railroads, education, and inventories (including inventories of monetary metals) are treated in other sections of this volume. Here we are concerned exclusively with the value of governmental buildings, the land on which they stood, and the equipment they contained. We adopted Weiss's (1969, 150–56) series, to which we added his estimates of the value of marine hospitals (federal hospitals). Weiss provides figures on constant-price (1860) net capital stock, but reports only gross stocks in current prices. We extrapolated his 1860 net estimate on his gross series, to obtain net estimates in current prices for all years. We deflated his figures on the net value of marine hospitals by his implicit deflator for government buildings. While buildings were the principal element of capital covered by Weiss, small amounts of land and equipment also form part of his series. We did not attempt to disentangle these three elements of government property.

Estimates better devised to meet our current requirements could be made by rearranging the elements that make up the Weiss estimates, and by introducing the adjusted Brady deflators described in previous sections (Weiss used the unadjusted Brady series). But the necessary details are not available in Weiss's published work, and the improvements to be

expected from the additional work would not be large, particularly in the context of the full array of our national capital stock estimates. Thus, we did not attempt to carry out these rearrangements and adjustments.

9.8. Conclusion

This chapter presents estimates of the capital stock in the nonfarm residences, the trade sector, churches and schools, and government buildings.