

3.

A price index for residential property in Stockholm, 1875–2012¹

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3.1. Introduction

This chapter presents a new series of real prices for residential properties in Stockholm from 1875 up to 2012.² For the period up to 1957, the study is based on a sample of 13,812 prices of sold residential properties and also uses official statistics. Sources and methods are described in section 3.2 below. Various phases in housing prices and business cycles are discussed in section 3.3. Price volatility is briefly studied in section 3.4, where some comparisons are made with other European cities. The relationship between sold properties and total stock is discussed in section 3.5. Section 3.6 reports the results of a repeated sales analysis. A concluding discussion follows.

3.2. Sources and method

Official statistics on prices of residential properties in Sweden have been published since 1952. These series use the average sales price ratio, defined as the ratio between purchasing prices and local authorities' assessment values for taxation purposes. In order to construct a comparable price index for the period before 1952, it is necessary to find data on actual sales prices as well as tax assessment values for a number of properties.

The property tax valuations used in this study have been drawn from the annual

1 Part of this research has been financed by the Ragnar Söderberg Foundation, for which we are very grateful.

2 Residential property is divided here into two groups: apartment buildings (Swedish *hyreshus*) and houses (Swedish *småhus, 1- och 2-familjshus, radhus, etc.*).



One of the sources used in this study is Stockholms adresskalender, which from 1931 includes information on the most recent sales price and the year in which this purchase was made.

publication *Stockholms adresskalender*.³ The purchase prices, on the other hand, stem from the register of certificates of title to properties in the archive of the Stockholm magistrates' court.⁴ This register is chronologically ordered and gives information on the property's official name, the names of the seller and buyer, and the purchase price. For this study, systematic samples of about 200 property sales per year have been drawn from the register (see Appendix, Table A3.2). The sales price ratio has been calculated by dividing the sales price by the tax assessment value.

Beginning in 1931, *Stockholms adresskalender* includes information on the most recent sales price and the year of that purchase. This means that data on tax assessment values and sales prices can be found in the same volume, which saved a great deal of time for this study. Data on about 150–200 transactions a year have been drawn for the period 1930–38. From 1939 onwards the number of transactions decreased, sometimes to only about 30; for most of these years all purchases have been included.

A drawback with the register of certificates of title is that it does not state the date of purchase, only the date of issue of the title. The legal framework requires that the request for title is to reach the magistrate within three months of the purchase. However, this was not always adhered to. In 1939, for example, 79 per cent of the bills of sale were dated in the same year as the issue of title; in the next two years the figure had dropped to 61 and 66 per cent, respectively, which reflected the lower activity in the property market after the outbreak of war.⁵ In the present study no correction has been made for the fact that some of the purchases were made in the year before the issue of title.

The administrative borders of the City of Stockholm changed during the period of investigation. Several suburban areas (Brännkyrka, Bromma, Enskede, and Spånga) were incorporated during the early 20th century; these incorporations are disregarded in the present study, which is confined to the inner city. Property values were much lower in the incorporated areas. In 1930, for example, the average tax assessment value was 426,000 SEK in the inner city but only 23,000 SEK in Brännkyrka and 36,000 SEK in Bromma.⁶ Confining the study to the inner city throughout the period makes for better comparability over time.

We have spliced the price series constructed in this study to Statistics Sweden's statistics on property prices. The latter have been published since 1952 but for the first five years, 1952–56, only as summary statistics for this period as a whole.⁷ It

3 For the period 1882–1926, *Stockholms adresskalender* has been scanned and can be downloaded as pdf files from Stockholmskällan (<http://www.stockholmskallan.se>). They are partly searchable.

4 Diarium över beviljade lagfarter, Stockholms rådhusrätts första avdelnings arkiv, Stockholms stadsarkiv.

5 "Lagfarna fastighetsköp 1939–1941" (1941–1942), p. 13.

6 *Statistisk årsbok för Stockholms stad* 1932, p. 156.

7 Hammarberg (1958).

should be noted that Statistics Sweden's published statistics refer to the whole of Stockholm City, not just the inner city.

In the first half of the 20th century, general tax assessments of residential properties were carried out approximately every fifth year in Stockholm. In the last decades of the 19th century, such tax assessments were done at shorter intervals, about every third year.⁸

According to the instructions, a tax assessment value should be set in accordance with the property's value in the area in question. This general sales value (*allmänna saluvärdet*) was defined as "the amount a sensible buyer would be assumed to pay for the property, if it was sold within the circle of clients that would be expected for such a property, and bought for a suitable use with regard to the character of the estate".⁹ There was no automatic link to the most recent purchase price. On the contrary, it was emphasized that the most recent price would not necessarily represent the general sales value since it was liable to be affected by temporary circumstances such as kinship, abnormal business activity, imperative reasons, imprudent agreement, etc.

The methodology for the construction of a price index for residential property for Stockholm is the same as the one described in Bohlin's (2014) study of Göteborg in this volume. Thus, information on sales prices as well as tax assessment values are used in the calculation of the index according to the so-called 'sales price ratio method' (*köpeskillingskoefficientmetoden*). The price index for residential property is calculated as the average sales price ratio multiplied by an index of tax assessment values. The sales price ratios and the index of tax assessment values are reported in the Appendix, Tables A3.2 and A3.4.

Information on the average change in taxation values from one assessment to the next has been obtained from a sample of between 190 and 346 properties that have been followed during at least two assessment years in the period 1876–1957. Altogether, this has given nearly 5,000 observations on changes in taxation values.

The effects of the tax assessments are discernible in Figure 3.1. Years with tax reassessments often stand out as local maxima in the curve. Between the reassessments, taxation values tend to lag behind sales prices.

Statistics Sweden's price index is published on their website for different types of property, extending back to 1975.¹⁰ Information on property prices for houses and

8 In the period 1875–1960, general property tax reassessments were carried out in Stockholm in 1876, 1879, 1882, 1884, 1887, 1890, 1893, 1896, 1898, 1903, 1908, 1913, 1918, 1922, 1928, 1933, 1938, 1945, 1952 and 1957.

9 The quote is from the law on the 1928 property assessment; Baehrendz (1927), p. 17. The same norm was used for a long time in subsequent reassessments; see Aldén (1921), p. 6; Sköld and Vanner (1937), pp. 10, 52, and Geijer, Rosenqvist and Sterner (1969). A new principle was introduced in the general assessment of 1975: the taxation value should henceforth be set to 75 per cent of the property's market value; *Allmän fastighetstaxering 1975, del 1* (1975), p. 16.

10 Statistics Sweden, Statistikdatabasen.



A View of Slussen. Painted by Carl August Tholander in 1898.

Source: Stockholm City Museum.

apartment buildings has, however, been processed since 1952, and since 1932 for agricultural property.¹¹

Statistics Sweden uses various methods to calculate the development of property prices.¹² There is no international standard in this field.

In the first place, Statistics Sweden's information is based on the Real Estate Price Index (FASTPI), which is calculated with the aid of the property stock's composition and information on prices of sold properties, where the primary material is land registration statistics.

Another method used by Statistics Sweden is based on the purchase price coefficient, calculated as the ratio of the purchase price (i.e. the property's market price) to the tax assessment value. This is a measure of how much prices have changed in relation to the level at the time of the tax assessment. This index has more to do with the entire stock of properties, whereas the Real Estate Price Index (FASTPI) reflects the price trend for properties that have been sold. As general assessments for tax purposes are adjusted every few years, the latter method is probably more suitable for constructing historical series.

¹¹ Statistics Sweden (2006), p.144; Hammarberg (1958).

¹² *Statistiska meddelanden*, BO 41 SM 1201.

Neither of the two methods used by Statistics Sweden corrects for the effect of buildings becoming older.

In his doctoral dissertation, Bo Sandelin (1977) used Statistics Sweden's earlier material as a basis for calculating the annual development of property prices in the periods 1952–56 and 1957–74. For this he adopted the purchase price coefficients published by Statistics Sweden. For the period 1952–56 he used the excess price percentage value (*överprisprocenten*), which states how much the selling price exceeded the tax assessment value and can be converted into a purchasing price coefficient. Since, according to Sandelin, no usable information is available on changes in tax assessment values in 1957, one cannot construct a price index that runs continuously from 1952 onwards. As calculations based on the purchase price coefficient do not allow for aging and other changes in the quality of properties, Sandelin made certain adjustments for such effects.

Statistics Sweden's material makes it possible to construct indexes for different parts of the country as well as for different types of property. However, it is not possible to construct an index that is completely in line with the present project's indexes for Stockholm and Göteborg. Another problem is how to judge various changes in taxation values that occurred in connection with the reassessments. Moreover, the geographic boundaries changed over time. Statistics Sweden's price indexes for residential properties are limited to houses; data on apartment buildings and commercial real estate exist only in raw form.

In the present study an index is presented at the national level, and for the Stockholm and Göteborg areas to achieve comparability with the series up to 1957. Two different types of index are presented, one for houses and the other for apartment buildings. The index for houses has risen much more than the apartment buildings index. This has to do with the regulation of rents, which have held rents down compared to a free market. Therefore, it is the index for houses that probably best reflects the market price. Since virtually all residential property in the inner city of Stockholm consisted of apartment buildings, the index up to 1957 is comparable to the index of apartment buildings from 1957 onwards.

For houses, the present study uses the weighted ratios of sales prices to taxed values up to 1975, while FASTPI is used from 1975. However, this is problematic for apartment buildings, because only a few were sold each year, and the ratios could therefore be biased towards a few large properties. Therefore, the unweighted ratios are used for apartment buildings when such information is available.

For the Stockholm region, the present study uses an index based on the urban area of the City of Stockholm up to 1969, the urban area of Stockholm County 1969–70, and Stockholm County from 1970.

For Göteborg, the present study uses an index based on the urban area of Göteborg & Bohus County for the period up to 1970, and on Göteborg & Bohus County for 1970–75. For houses, after 1975 the Göteborg index is based on Greater Göteborg. For apartment buildings, the index is based on Göteborg & Bohus County

(the material after 1996 is unpublished and has been bought from Statistics Sweden).¹³

3.3. Phases in property prices

Figure 3.1 describes the evolution of sales prices and taxation assessments in current prices in Stockholm 1875–1957. Figure 3.2 presents the same data in constant prices, where Statistics Sweden's CPI is used as deflator. The deflation aims at eliminating the effects of inflation (or deflation, which was quite marked in the early 1920s) on property prices. For the period up to World War I the deflation procedure has little effect since inflation was low. The following discussion focuses on the development in constant prices.

Five phases can be discerned in Stockholm property prices at constant values up to 1957:

Prices rise 1875–1909

Prices fall 1909–18

Prices rise 1918–31

Prices fall 1931–43

An uneven development 1943–57, with rising prices up to 1947 and falling prices after that.

The first and longest phase, from 1875 up to 1909, is characterized by growth in real property values. In this period the real price per sold property more than doubled. The annual increases averaged 2.4 per cent.

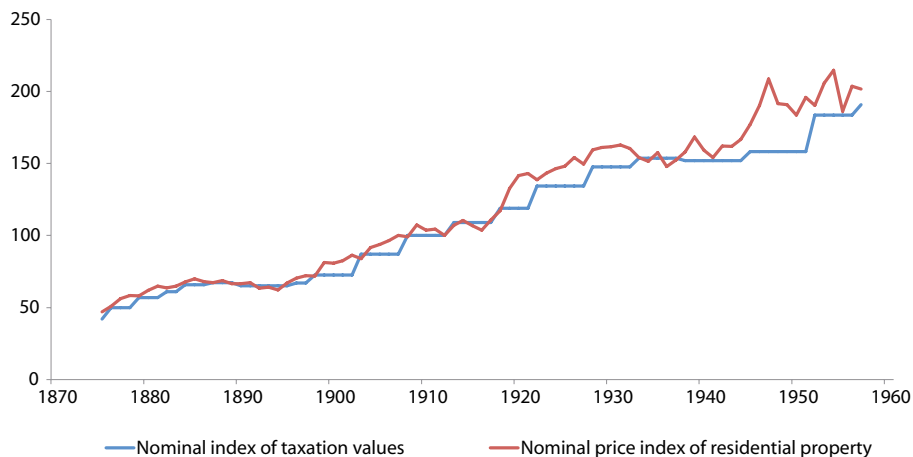
This phase has attracted a good deal of attention from historians. The notable overall increase conceals a number of marked fluctuations.

In the first half of the 1880s, trade in building sites was lively and housing construction was intense. Large residential areas were developed in the outer parts of the city. This expansive phase ended in a crisis of overproduction in the autumn of 1885. Many building contractors went bankrupt and the number of compulsory auctions rocketed. The crisis continued until 1893 but some recovery occurred in the latter half of the 1880s. Residential construction was still fairly extensive and a large number of apartments lacked tenants.¹⁴

13 'Prisstatistik för Hyreshus – Göteborg och Bohuslän', unpublished Excel-file.

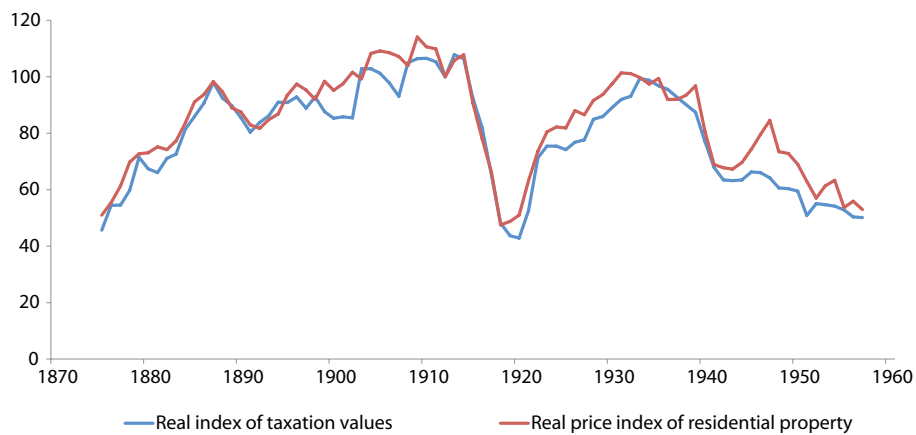
14 Hammarström (1979), pp. 40–41; Jacobsson (1996), pp. 66–70.

Figure 3.1: The sales price index and the index of taxation values in current prices in Stockholm, 1875–1957 (1912 = 100).



Sources: Diarium över beviljade lagfarter, Stockholms rådhusrätts första avdelnings arkiv; *Stockholms adresskalender*; *Stockholms fastighetskalender: Register över fastighetsbeståndet i Stockholm med uppgifter om ägare, värden, areal m.m.* (1932); *Fastighetskalender för Stockholms stad 1938* (1938).

Figure 3.2: The sales price index and the index of taxation values in constant prices in Stockholm, 1875–1957 (1912 = 100).



Sources: See Figure 3.1. CPI: Edvinsson and Söderberg (2010).

Residential construction was stimulated by the disposal of sites owned by Stockholm City, which dominated this market. The aim was to make a profit and use the proceeds to repay large loans and finance heavy investment in infrastructure, such as water conduits, sewers, gas and electricity.¹⁵ An example is the Rörstrand property, which occupied about 330,000 square meters and had been bought by the City in 1883. When the street system had been put in order, parts of the property were sold in 1885. By the end of that year the City had sold a seventh of the plot at a price which more than covered what the entire property had cost to buy.¹⁶

In the present study, a boom in real prices for Stockholm properties is evident around 1885, followed by depressed prices between 1889 and 1892. This gives the impression that the problems in the residential market were concentrated to a few years. One explanation may be that overproduction was largely confined to the exclusive, palatial buildings in north-eastern Stockholm (Östermalm). Demand had shifted to smaller apartments and these residences became hard to let out.¹⁷

These observations indicate that the real property prices in this study are not a direct indicator of problems in the residential market. There are no doubt other indicators which are more sensitive to cyclical fluctuations, for example the volume of residential construction and the extent of compulsory sales of residential property.

In late winter 1907, the business boom in Sweden came to an end due to a financial crisis that had started in the United States. In spring 1908, residential construction in Stockholm declined, partly due to a series of strikes and lockouts that brought all construction activity in the capital to a halt. As interest rates rose, many building contractors became unable to complete work in progress and went bankrupt.¹⁸ Compulsory sales of real property in Stockholm rose sharply in 1907 and went on increasing in the next two years.¹⁹ At the national level, building and construction slackened substantially in the three years 1907–09.²⁰ The index presented in this study only partially conforms to these fluctuations, as the average real price per property dropped markedly in 1908 but rose strongly in 1909.

During World War I, real property prices in Stockholm turned downwards. The drop in 1918 was the largest for a single year in this study, -28.0 per cent. By this time, the real price of residential property had more than halved since the peak year of 1909, an average decline of 9.3 per cent a year. Whereas national accounts show a sharp dip in building and construction in 1914²¹, the price index in this study did not drop until the subsequent year.

The war drove up the cost of building material and fuel, and interest rates for

15 Forsell (2003), pp. 165–169; Sheiban (2002), pp. 68–87.

16 Sheiban (2002), p. 73.

17 Sheiban (2002), pp. 256, 262.

18 See also Waldenström (2014).

19 Perlinge (2012), pp. 15–43; Fritz (1994), pp. 291–305.

20 Edvinsson (2005), p. 319.

21 Edvinsson (2005), p. 319.

mortgage loans also rose. Residential construction came to a virtual standstill. Rent controls were introduced in 1917: the law permitted landlords to raise rents to cover increased costs for fuel, interest rates, amortization and repairs but imposed a ceiling on profits.²² The law was opposed by property owners, who maintained that higher rents were needed to stimulate the production of housing. One of the critics was the economist Gustav Cassel, who argued that higher rents would lead to out-migration from the City, which he regarded as both economically and demographically sound.²³

After World War I, prices began to rise again. From the low in 1918 to the peak in 1931, real property prices rose at an average annual rate of 6 per cent. However, prices in 1931 were lower than before World War I. Rent control was formally abolished in 1923 but had already become of little importance. Residential construction was extensive during much of this period, in particular the years 1924–30, with the emphasis on small and medium-sized apartments.²⁴ People migrated from large, outmoded apartments to small, modern units even though access to bathrooms and central heating entailed a sizeable increase in rents. Demand for housing was affected by an unusually large net migration to Stockholm.²⁵

In 1932, real property prices in Stockholm began to drop again. The international depression had reached Sweden. In the national statistics, the downturn started a year earlier.²⁶ Compulsory auctions rose strongly in 1932 and remained at a high level up to 1937.²⁷ Average real property prices fell in 1931–43 at an average annual rate of 3.4 per cent. Despite upward tendencies in certain years and low interest rates, there was no recovery in the rest of the 1930s and prices fell by a further large amount during the war years 1940–43.

In the period 1943–46, real property prices rose at an annual average of as much as 5.7 per cent. Housing demand was boosted by a high level of marriages and births.²⁸ The introduction of rent controls in 1942 did not check the price rise in this period.

22 Jacobsson (1996), pp. 40–41, 138–142.

23 Forsell (2003), pp. 286–295.

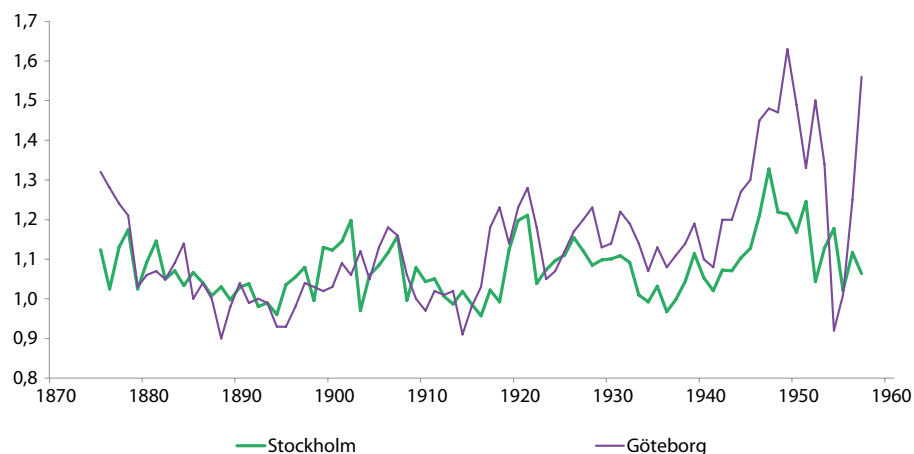
24 See statistics on residential construction in *Statistisk årsbok för Stockholms stad*.

25 Jacobsson (1996), pp. 170–175, 179.

26 Edvinsson (2005), p. 320.

27 Statistics on total real property sales, with compulsory sales specified, were published on a regular basis in *Statistisk årsbok för Stockholms stad*. These statistics refer to Stockholm as a whole, not only the inner city.

28 Data on births and marriages can be found in every issue of *Statistisk årsbok för Stockholms stad*.

Figure 3.3: Average sales price ratio in Stockholm and Göteborg, 1875–1957.

Source: Stockholm: Table A3.2; Göteborg: Bohlin (2014).

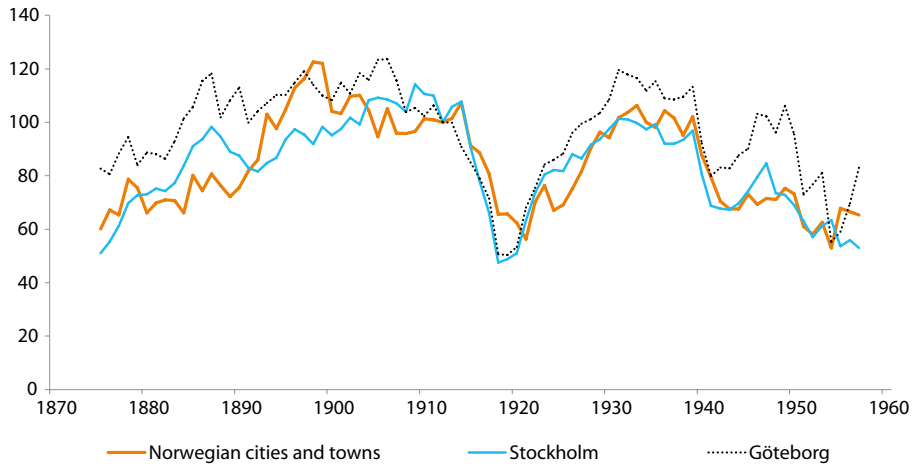
The average sales price ratio in Stockholm was similar to that of Göteborg up to the mid-1920s (Figure 3.3). After that, the Göteborg sales price ratio was generally higher than in the capital, particularly after 1940. In both cities, the sales price ratio tended to rise during the last decades of the period studied.

The evolution of property prices in Stockholm and Göteborg shows, as seen in Figure 3.4, striking resemblances with the series that have been published for the Norwegian towns of Oslo, Trondheim, Bergen, and Kristiansand.²⁹ In real terms, prices rose during the last decades of the 19th century. The upsurge was stronger in the Norwegian towns than in Stockholm. The upward tendency stopped already around 1900 in Norway, whereas it continued in Stockholm. In Stockholm as well as in Norway, real prices were reduced to a very low level around 1920. The subsequent upturn up to the 1930s' depression was a common trait, as was the falling trend after about 1935. Norwegian real prices reached a bottom level in 1954, which Eitrheim and Erlandsen explain by the strict rent control which was applied up to that year. The price level was then even somewhat below notations around 1920. The covariation of Norwegian and Stockholm prices was weak around the turn of the century 1900, but was clearly amplified from World War I onwards.

A series of property prices for USA, constructed by Robert J. Shiller, shows no evident long-run covariation with Stockholm prices.³⁰

²⁹ Eitrheim and Erlandsen (2004), p. 363.

³⁰ www.irrationalexuberance.com/fig2.1Shiller.xls.

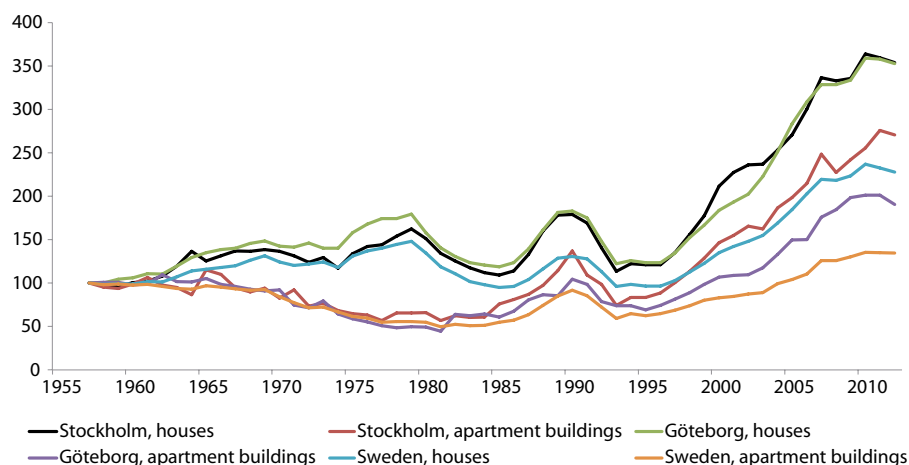
Figure 3.4: Real property price in Stockholm and Norway 1875–1957, index 1912 = 100.

Sources: Stockholm: see Table A3.4. Norway: Eitrheim och Erlandsen (2004), pp. 373–375 (nominal prices); Grytten (2004), p. 93 (consumer price index). Göteborg: Bohlin (2014).

Figure 3.5 presents the development of the price indices for residential property in Stockholm, Göteborg and at the national level, deflated by the Consumer Price Index from 1957 onwards. It shows that the price of 1- and 2-family houses increased much faster than that of apartment buildings. This is an effect of the regulation of rents, which was initially implemented in the early 1940s. At the national level the real price of apartment buildings was halved between 1957 and the early 1980s, followed by a rebound so that the level in 2012 was slightly above the level in 1957.

The development of the real price of apartment buildings in Stockholm was more positive than in the rest of the country. The real price of houses was basically flat between 1957 and the mid-1990s, although development was slightly more positive in Stockholm and Göteborg. The upturn since then is unprecedented, especially in Stockholm and Göteborg, where real prices around 2010 were more than 250 per cent above the level in 1957. The period 1995–2010 could, therefore, be viewed as unique from a historical perspective. It should also be emphasized that it is the price of houses that represents market conditions.

Figure 3.5: *The development of price indices for different types of residential property, deflated by the Consumer Price Index, 1957–2012 (1957=100).*

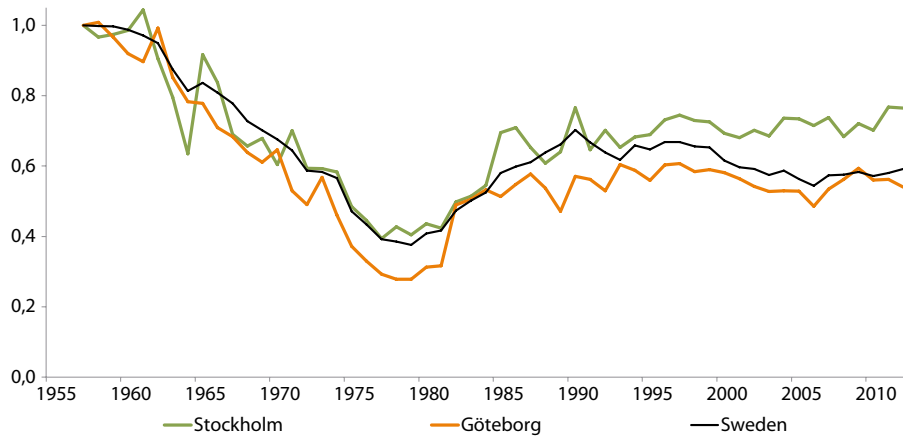


Source: Table A3.5.

Figure 3.6 presents price indexes for apartment buildings together with indexes for houses to illustrate the divergent development of the two types of markets. It shows that the fall in the relative price of apartment buildings roughly occurred between 1960 and 1980. There was then a recovery during the 1980s, but since then the level has stagnated. The relative price of apartment buildings in Göteborg has developed more negatively than in Stockholm.

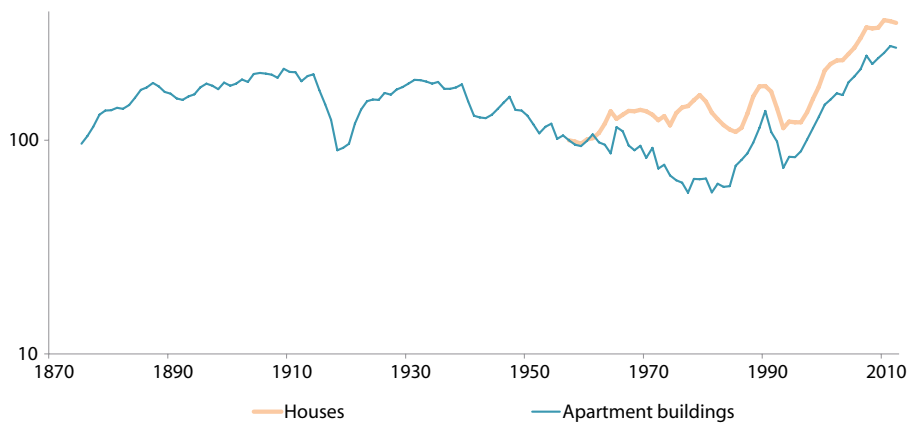
To what extent the price of apartment buildings declined relative to houses before 1957 is not possible to determine at this stage of research. A decline seems likely in that rent regulation began in the 1940s but the data presented by Hammarberg (1958) for 1952–56 show that at national level the two price categories developed similarly during those four years.

Figure 3.6: *The ratio of price indexes for apartment buildings to indexes for houses in various areas, 1957–2012 (1957=1).*



Source: Table A3.5.

Figure 3.7: *Real prices of apartment buildings and houses in Stockholm, 1875–2012 (index 1957 = 100).*



Source: Table A3.5.

Figure 3.7 gives a somewhat simplified view of the course of real property prices in Stockholm in the very long run, from 1875 up to 2012. Data before 1957 refer to the inner city, where apartment buildings were a much more important sector of the market than houses. Prices before that year are therefore assumed to reflect those for apartment buildings. This series can then be compared to the series for apartment buildings in the strict sense from 1957 onwards.

The real price of apartment buildings in the long run forms a rather flat curve, with a positive trend up to 1914 and a negative trend from about 1930 to 1980. This is in contrast to house prices, which show a predominantly upward curve from 1957 up to 2012. Rent regulation no doubt played a major role in the diverging trend of apartment buildings versus houses during the 1960s and 1970s. The gap between these series culminated around 1980, which probably gives an idea of the effects of rent regulation. After the mid-1980s, on the other hand, the movement of apartment building prices is very similar to that of houses. Rent regulation has been gradually dismantled, and in recent decades real rents have been allowed to increase at a much steeper rate than before.

3.5. Volatility in property prices

The volatility of prices can give information about turbulence in the property market. Volatility can be measured in several ways. A study of Herengracht in Amsterdam uses the standard deviation of the yearly percentage change in price.³¹ This price index is available on a biannual basis only. The higher the standard deviation, the greater are the short-run fluctuations from one year to the next. Volatility in real property prices in Stockholm, the Norwegian towns, and Herengracht is presented in Table 3.1.

Volatility in real prices turns out to have been far greater in Herengracht than in Stockholm in four out of five periods in Table 1. The volatility in Stockholm was somewhat lower than in Norway. Only in one period, 1909–1918, did volatility in real prices in Stockholm exceed that of Norway. The Herengracht index was particularly volatile in the mid-1930s, when the change from one two-year period to the next exceeded 40 per cent on two occasions.

Table 3.1: *Volatility in real property prices in Stockholm, the Norwegian towns, and Herengracht, Amsterdam, 1875–1957.*

Period	Stockholm	Norway	Herengracht
1875–1909	5.0	8.8	19.1
1909–1918	11.1	8.2	11.7
1918–1931	11.0	11.1	18.0
1931–1957	7.1	9.2	37.8
1875–1957	8.0	9.2	40.4

Sources: Stockholm: see Table A3.4. Norway: Eitheim and Erlandsen (2004), pp. 373–375 (nominal prices); Grytten (2004), p. 93 (CPI); Herengracht: Eichholtz (1996), Appendix.

³¹ Eichholtz (1997).

3.6. The relationship between sold properties and total stock

In his study of prices of residential property, Bo Sandelin remarks that the properties sold were not a random sample of the total stock of property. In estimating the price changes, however, he disregards this potential source of error and assumes that the price trends of properties sold were the same as for properties that did not change owner.³²

For Stockholm it is to some extent possible to clarify this issue on the basis of published statistics. For many years, *Statistisk årsbok för Stockholms stad* reported aggregated statistics on taxation values relating to the total stock of properties. This information can be used for assessing to what extent taxation values of properties sold departed from those of the total stock. Table 3.2 shows the distribution of the total stock of properties by taxation value for every tenth year from 1880 up to 1930.³³

The differential between the sample drawn for this study and the total stock of properties was largest in 1920. The properties in our sample that were *sold* in that year (N = 227) had an average taxation value of 368,000 SEK. The corresponding figure for the *total* stock of properties was 277,000 SEK (N = 6,514). In other words the average of the taxation value of properties sold was 33 per cent higher than the average of the total stock. The unusually large discrepancy in this particular year seems to indicate that the taxation values of 1920 (which had been set in 1918) did not keep up with the strong inflation at the end of World War I, whereas prices of sold properties did so to a larger extent. In the other years examined, the differential ranges from 6 per cent (1890) up to 19 per cent (1900). Generally, then, the properties sold should not be considered as a random sample of the total stock, but exhibit a shift towards higher taxation values.

Table 3.2 also reports the average taxation value per property, deflated by the CPI. The results confirm the view of the 1920s as a period of strongly rising property prices. Data for the period 1880–1910 also indicate substantially rising property prices, which is well in line with the results from the sample drawn for this study.

32 Sandelin (1977), p. 89.

33 This information is available for all intervening years as well. Data are presented at the parish level, which makes it possible to separate the inner city of Stockholm.

Table 3.2: Number of properties in Stockholm's inner city by taxation value, 1880–1930.

Taxation value, 1,000 SEK	1880	1890	1900	1910	1920	1930
<1	47	44	73	45	68	5
1–5	349	262	265	184	171	54
5–10	358	343	301	219	174	65
10–25	709	663	560	376	415	240
25–50	736	702	676	524	477	446
50–100	879	1257	1239	756	672	562
100–200	621	1223	1472	1436	1284	1069
200–300	172	369	514	1074	1168	1043
300–400	51	91	169	593	806	965
400–500	20	47	57	290	430	724
>500	17	52	116	461	849	2108
Exempted from taxation	183	270	269	445	763	324
Sum	4142	5323	5711	6403	7277	7605
Sum, excluding exempted	3959	5053	5442	5958	6514	7281
Sum of taxation value, million SEK	262	473	663	1265	1803	3100
Taxation value per property	66	94	122	212	277	426
Taxation value per property in this study	75	99	145	227	368	480
Ratio of taxation value per property in sample to total stock	1.13	1.06	1.19	1.07	1.33	1.13
Taxation value per property / CPI, 1900 = 100	55	86	100	158	70	179

Source: *Statistisk årsbok för Stockholms stad* 1882, p. 170 f; 1892, p. 182 f; 1902, p. 214 f; 1912, p. 360; 1922, pp. 134–136; 1932, p. 156. CPI: Edvinsson and Söderberg (2010).



Building site from central Stockholm, 1964.

Source: Stockholm City Museum.

3.7. A repeated sales analysis

Designing a price index for housing is complicated not least by the qualitative change being very difficult to measure. A price index shall preferably be based on constant qualities (which various hedonic price indexes attempt to take into consideration). Eitrheim and Erlandsen's (2003) series for Norway are based on comparing the price in sales of the same property, but at different times (a "repeated sales house price index"). This is one way of keeping quality constant. However, the method poses a number of problems. All sales are given the same weight, whereas a price index should give greater weight to a more expensive property. Moreover, the quality of the same property changes over time and increase the property's value (urban growth



Stockholm panorama. Lithography by Carl Johan Billmark 1868.

Source:

also leads to a small-town property becoming a property in a larger town, which can also be regarded as an increase in quality, while a price index that assumes constant quality should keep the town's population constant). Also the property grows older, which reduces its value.³⁴

Eitrheim and Erlandsen hope that one effect cancels out the other. However, the latter assumption could be questioned and it might have been more appropriate to focus on some benchmarks for a more in-depth analysis of the change in quality for properties sold during the period. However, there is no simple solution to the problem.

The repeated sales method was first proposed by Bailey, Muth and Nourse (1963). As the name indicates, the method utilizes information on identical properties which have been sold more than once. Because only matched models are used, there is no change in the quality mix to control for. In its basic form, the only information required is the price, sales date and address of the property. So this method is much less data-intensive than hedonic methods. Also, the repeated sales method automatically controls for micro location, something which hedonic methods are unable to do.

³⁴ See, for instance, Englund, Quigley and Redfearn (1999) for a broader discussion of different models for the construction of a real estate price index.

The simplest way to explain the repeated sales regression method in its basic form is to start from the time dummy hedonic model. Thus, it is assumed that the characteristics parameters are fixed over time. Since identical houses are compared, there is a second restriction involved: the characteristics of the properties are also assumed to be constant. In any given set of sample, individual properties are followed through time, so changes in the index occur only in response to changes in prices of individual properties sold. This approach solves the issue of varying composition that mean and median indices suffer from.

Here we construct a repeated sale index for the period 1875–1957, which is compared to the index based on the sale price ratio method. The repeated sales method has many useful characteristics. First, the method is based on sale prices of standard existing houses, not new construction, and thus tracks the investment value of houses over time. Second, the method successfully avoids the potential pitfalls of increased quality in housing over long periods of time.

The methodology applied here is based on Bailey, Muth and Nourse's (1963) concept of repeated sales. Let there be $T + 1$ time periods where sale can occur from $0, 1, \dots, T$ and t be the subscript for time. For a pair of sales of a given house i , prices and indices are related by the following expression:

$$\frac{P_{it1}}{P_{it}} = \frac{B_{t1}}{B_t} U_{it1} \quad (1)$$

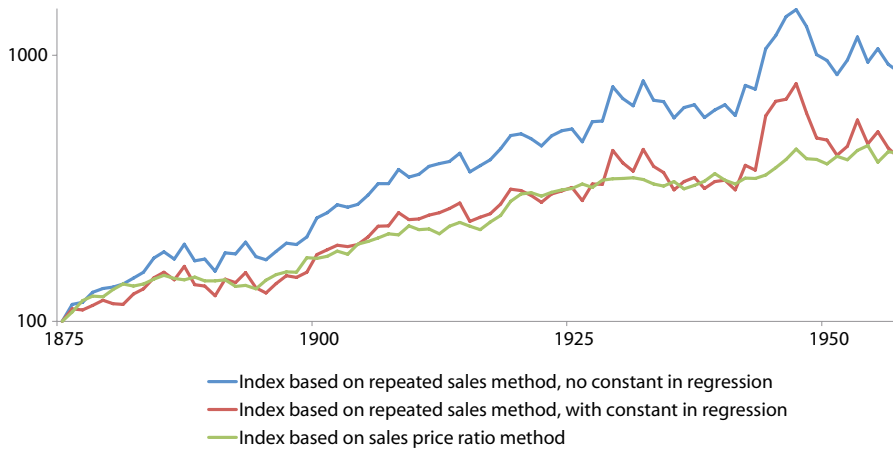
where P_{it} is the sale price of the i th house at the t th time period. Let t be the time at the first sale and $t1$ the time at the second ($t1 > t$) and let B denote the general house price index at time t . Finally, U_{it1} is the error term and is assumed to have a log normal distribution: $\log U_{it1} \text{ iid } N(0, s_u^2)$ where *iid* denotes independent and identically distributed. The model is then fitted on the logarithmic scale:

$$p_{it1} - p_{it} = b_{t1} - b_t + u_{it1} \quad (2)$$

where p , b and u are simply logarithmic versions of equation (1). Essentially, the expected difference in log prices between two sales of a house is thought to equal the difference in the corresponding log indices. The varying gap between sales is considered irrelevant and as a result the error terms are assumed to be homoskedastic.

Assuming the errors have an expected value of 0 and constant variance, the estimation of the repeated sales model is straightforward. Dwelling units that are sold very frequently, and those that are not resold for long periods have sometimes been excluded from the regressions in practical applications because such transactions might be 'unusual' and can bias the resulting price index. Reproducibility may be regarded as one of the strengths of the repeated sales method, but if the method for excluding observations differs from time to time, reproducibility might be endangered.

Figure 3.8: Real property price in Stockholm 1875–1957 according to three methods, index 1875 = 100.



In this study, over 5,000 cases of Stockholm property transactions are available for analysis with this method. The regression can be performed in two ways, with or without a constant. In this dataset, the regression with a constant appears to give more realistic results (a rise from index 100 in 1875 to 414 in 1957, compared to a rise to 870 for the same period when the model is estimated without a constant). The former result implies a similar price rise in the long run as the index reported above based on the sales price ratio method, where the index in 1957 stood at 430. All three indices are shown in Figure 3.8.

One problem with the repeated sales estimate is that the constant term is as large as 0.212. This means that each new property transaction adds a value of 24 per cent independently of the price during the preceding years. Possibly this could be an expression of short-run profits or of quality improvements to the property in question.

The preliminary conclusion is that the sales price ratio method seems to be preferable, at least until the results from the repeated sales analysis have been studied in more detail. A closer look at the results would involve an examination of different time periods and different parts of Stockholm.

3.8. Concluding discussion

A series of prices of residential properties in the inner city of Stockholm, 1875–2012, has been presented above. The study draws on a sample of nearly 14,000 prices of sold properties and also relies on published official statistics. Five phases can be discerned in the evolution of real prices:

1. Prices rise 1875–1909
2. Prices fall 1909–1918
3. Prices rise 1918–1931
4. Prices fall 1931–1981
5. Prices rise 1981–2012, though this period includes the bubble around 1990 when a sharp upturn in property prices was followed by a substantial fall.

These phases have been discussed against the background of the characteristics of the construction business and various macroeconomic conditions. Prices of residential property in Stockholm generally reacted with a certain lag to downturns in the macroeconomic environment. Such lags have been noted in connection with the problems of the latter half of the 1880s, the crisis of 1907–08, the beginning of World War I, and the depression of 1931.

The ratio of sales prices to taxation values has been calculated on an annual basis. During the period 1875–1945, this ratio averaged 1.06 (standard deviation 0.06). In other words, taxation values were in general not much below the market prices of real property. After World War II the ratio tended to be higher, with an average of 1.16 (standard deviation 0.09). For many decades, then, taxation values tended to be fairly realistic as indicators of market prices of real property, though this was not the case towards the end of the period studied here.

For the period 1880–1930, the relationship between the sample drawn and the total stock of properties was discussed. The properties sold cannot in general be regarded as a random sample of the existing stock, since they tend to exhibit higher taxation values. This is notable above all in 1920, when the average taxation value of our sample of sold properties exceeded the corresponding value of the total stock by 33 per cent. For several other years, though, this differential was substantially smaller, from 6 to 13 per cent.

A comparison with Norwegian towns and Göteborg shows large similarities in the evolution of property prices compared to Stockholm.

Volatility in real property prices in Stockholm was substantially lower than in Herengracht in Amsterdam, and somewhat below that of the Norwegian towns. None of the three volatility series show any marked tendency over time to rise or fall.

For the construction of a long-term property price index for Stockholm, the sales price ratio method appears to give more stable and realistic results than does the repeated sales method.



A view of the corner of Görgatan and Ölandsgatan, Södermalm, Stockholm. Painted by Victor Forssell (1846–1931) in 1891.

Source: Stockholm City Museum.



The House of Bourgoise Widows, Interior. The room was divided with a folding screen to be utilized for many different activities. Painted by Josabeth Sjöberg before 1879.

Source: Stockholm City Museum.

Appendix

Table A3.1: *Ratio of average taxation assessment values in years of general taxation assessments to the same value in the previous period.*

Year	Average	Standard deviation	Max	Min	N
1876	1.19	0.21	1.83	0.73	249
1879	1.14	0.18	1.90	0.80	251
1882	1.07	0.15	1.77	0.65	261
1884	1.08	0.10	1.64	0.58	301
1887	1.02	0.17	1.88	0.56	286
1890	0.97	0.13	1.80	0.55	312
1893	1.00	0.14	1.79	0.67	334
1896	1.03	0.10	1.56	0.52	337
1898	1.08	0.14	1.88	0.75	344
1903	1.20	0.18	1.85	0.74	302
1908	1.15	0.18	1.88	0.82	271
1913	1.09	0.17	1.89	0.66	269
1918	1.09	0.15	1.86	0.56	252
1922	1.13	0.17	1.88	0.73	229
1928	1.10	0.16	1.65	0.64	224
1933	1.04	0.12	1.54	0.60	206
1938	0.99	0.14	1.87	0.61	196
1945	1.04	0.14	1.89	0.80	191
1952	1.16	0.13	1.67	0.84	190
1957	1.04	0.04	1.18	1.00	88

Table A3.2: Yearly averages of sales price ratios in Stockholm, 1875–1957, unweighted and weighted by purchasing price, respectively.

Year	Average sales price ratio unweighted	Standard deviation unweighted	Average sales price ratio weighted	Standard deviation weighted	Min	Max	N
1875	1.12	0.26	1.20	0.24	0.50	1.82	174
1876	1.03	0.24	1.05	0.20	0.50	1.93	226
1877	1.13	0.27	1.15	0.24	0.50	1.90	175
1878	1.17	0.29	1.17	0.27	0.55	1.90	95
1879	1.02	0.27	1.02	0.27	0.50	1.88	140
1880	1.09	0.29	1.09	0.30	0.50	1.88	144
1881	1.15	0.28	1.15	0.26	0.60	1.87	146
1882	1.05	0.24	1.07	0.22	0.50	1.92	156
1883	1.07	0.26	1.06	0.23	0.55	1.99	148
1884	1.03	0.24	1.04	0.20	0.55	1.92	138
1885	1.07	0.25	1.07	0.24	0.57	1.87	132
1886	1.04	0.33	1.02	0.29	0.55	1.97	182
1887	1.01	0.27	1.03	0.24	0.55	1.96	186
1888	1.03	0.29	1.07	0.25	0.50	1.92	175
1889	1.00	0.26	1.02	0.21	0.50	1.88	157
1890	1.03	0.23	1.04	0.20	0.50	1.75	176
1891	1.04	0.28	1.05	0.27	0.50	1.96	204
1892	0.98	0.26	1.00	0.24	0.50	1.88	185
1893	0.99	0.24	1.02	0.21	0.51	1.75	199
1894	0.96	0.21	1.00	0.18	0.54	1.80	206
1895	1.04	0.26	1.09	0.25	0.50	1.97	173
1896	1.05	0.23	1.06	0.20	0.56	1.97	203
1897	1.08	0.24	1.12	0.23	0.56	1.92	181
1898	1.00	0.13	1.00	0.10	0.60	1.85	247
1899	1.13	0.23	1.14	0.22	0.60	1.97	227
1900	1.12	0.20	1.13	0.18	0.60	1.93	205
1901	1.14	0.23	1.15	0.19	0.50	1.89	177
1902	1.20	0.26	1.16	0.24	0.52	1.96	201
1903	0.97	0.18	0.98	0.17	0.54	1.93	210
1904	1.06	0.22	1.07	0.19	0.50	1.75	203
1905	1.09	0.22	1.10	0.22	0.57	1.86	196
1906	1.12	0.23	1.14	0.21	0.50	1.92	171

Table A3.2 (cont.): Yearly averages of sales price ratios in Stockholm, 1875–1957, unweighted and weighted by purchasing price, respectively.

Year	Average sales price ratio unweighted	Standard deviation unweighted	Average sales price ratio weighted	Standard deviation weighted	Min	Max	N
1907	1.16	0.23	1.17	0.22	0.58	1.93	195
1908	1.00	0.21	1.02	0.21	0.54	1.91	230
1909	1.08	0.24	1.09	0.23	0.62	1.96	221
1910	1.04	0.24	1.05	0.21	0.50	1.98	206
1911	1.05	0.23	1.04	0.20	0.56	1.81	191
1912	1.01	0.24	1.00	0.19	0.50	1.87	194
1913	0.99	0.22	1.00	0.19	0.50	1.92	196
1914	1.02	0.22	1.00	0.16	0.54	1.93	193
1915	0.99	0.24	0.96	0.18	0.50	1.97	165
1916	0.96	0.20	1.01	0.26	0.53	1.85	209
1917	1.02	0.19	1.03	0.15	0.53	1.88	226
1918	0.99	0.17	1.00	0.18	0.60	1.85	233
1919	1.12	0.22	1.18	0.24	0.62	1.89	232
1920	1.20	0.21	1.26	0.23	0.74	1.99	227
1921	1.21	0.23	1.22	0.22	0.57	1.98	209
1922	1.04	0.19	1.06	0.18	0.62	1.79	213
1923	1.07	0.21	1.14	0.24	0.50	1.94	191
1924	1.10	0.21	1.09	0.16	0.53	1.97	190
1925	1.11	0.22	1.10	0.19	0.52	1.92	210
1926	1.15	0.24	1.13	0.21	0.52	1.86	209
1927	1.12	0.20	1.11	0.18	0.58	1.94	205
1928	1.09	0.23	1.07	0.20	0.50	1.93	204
1929	1.10	0.21	1.07	0.19	0.51	1.90	190
1930	1.10	0.14	1.09	0.12	0.80	1.75	204
1931	1.11	0.17	1.11	0.16	0.68	1.86	200
1932	1.09	0.17	1.07	0.17	0.63	1.58	175
1933	1.01	0.13	1.01	0.12	0.51	1.50	169
1934	0.99	0.16	1.01	0.20	0.55	1.92	205
1935	1.03	0.23	1.02	0.19	0.52	1.83	173
1936	0.97	0.16	0.97	0.13	0.52	1.95	140
1937	1.00	0.13	1.01	0.10	0.56	1.63	200
1938	1.04	0.15	1.07	0.15	0.55	1.61	145

Table A3.2 (cont.): Yearly averages of sales price ratios in Stockholm, 1875–1957, unweighted and weighted by purchasing price, respectively.

Year	Average sales price ratio unweighted	Standard deviation unweighted	Average sales price ratio weighted	Standard deviation weighted	Min	Max	N
1939	1.11	0.18	1.11	0.17	0.54	1.72	109
1940	1.05	0.17	1.07	0.19	0.52	1.73	86
1941	1.02	0.14	1.04	0.12	0.50	1.48	135
1942	1.07	0.13	1.06	0.10	0.77	1.77	152
1943	1.07	0.20	1.05	0.18	0.56	1.77	98
1944	1.10	0.16	1.09	0.15	0.83	1.72	140
1945	1.13	0.18	1.13	0.17	0.73	1.90	83
1946	1.21	0.22	1.26	0.26	0.91	1.82	45
1947	1.33	0.28	1.45	0.30	1.00	1.95	31
1948	1.22	0.21	1.26	0.22	0.57	1.62	52
1949	1.21	0.21	1.21	0.22	0.92	1.94	105
1950	1.17	0.23	1.25	0.33	0.74	1.88	83
1951	1.25	0.28	1.21	0.24	0.99	1.91	37
1952	1.04	0.21	1.05	0.21	0.65	1.79	121
1953	1.13	0.22	1.13	0.21	0.83	1.90	76
1954	1.18	0.22	1.17	0.20	0.73	1.89	63
1955	1.02	0.24	1.02	0.23	0.54	1.62	96
1956	1.12	0.28	1.18	0.30	0.65	1.93	129
1957	1.06	0.23	1.05	0.23	0.60	1.92	83

Sources: Diarium över beviljade lagfarter, Stockholms rådhusrätts första avdelnings arkiv; *Stockholms adresskalender*; *Stockholms fastighetskalender: Register över fastighetsbeståndet i Stockholm med uppgifter om ägare, värden, areal m.m.* (1932); *Fastighetskalender för Stockholms stad 1938* (1938).

Table A3.3: Medians, geometric means, and 5 % trimmed means of sales price ratios in Stockholm, 1875–1957.

Year	Median	Geometric mean	5 % trimmed mean
1875	1.09	1.09	1.12
1876	1.00	1.00	1.01
1877	1.10	1.10	1.12
1878	1.13	1.14	1.16
1879	1.00	0.99	1.01
1880	1.03	1.05	1.08
1881	1.04	1.11	1.13
1882	1.00	1.03	1.03
1883	1.02	1.04	1.06
1884	1.00	1.01	1.01
1885	1.00	1.04	1.05
1886	0.98	0.99	1.02
1887	1.00	0.98	0.98
1888	1.00	0.99	1.01
1889	1.00	0.97	0.99
1890	1.00	1.00	1.02
1891	1.00	1.01	1.01
1892	0.93	0.95	0.96
1893	0.99	0.96	0.98
1894	0.98	0.94	0.95
1895	1.00	1.00	1.02
1896	1.00	1.03	1.04
1897	1.03	1.06	1.07
1898	1.00	0.99	0.99
1899	1.07	1.11	1.11
1900	1.08	1.11	1.11
1901	1.12	1.12	1.14
1902	1.16	1.17	1.19
1903	0.99	0.96	0.96
1904	1.00	1.04	1.05
1905	1.05	1.07	1.07
1906	1.09	1.09	1.11
1907	1.12	1.14	1.15

Table A3.3 (cont.): Medians, geometric means, and 5 % trimmed means of sales price ratios in Stockholm, 1875–1957.

Year	Median	Geometric mean	5 % trimmed mean
1908	1.00	0.98	0.99
1909	1.04	1.06	1.06
1910	1.00	1.02	1.02
1911	1.01	1.03	1.04
1912	0.99	0.98	0.99
1913	0.99	0.96	0.98
1914	1.00	1.00	1.00
1915	0.97	0.96	0.97
1916	0.95	0.94	0.94
1917	1.00	1.01	1.01
1918	0.99	0.98	0.98
1919	1.08	1.10	1.11
1920	1.16	1.18	1.19
1921	1.17	1.19	1.20
1922	1.02	1.02	1.03
1923	1.05	1.05	1.06
1924	1.06	1.08	1.09
1925	1.09	1.09	1.10
1926	1.14	1.13	1.16
1927	1.11	1.10	1.12
1928	1.04	1.06	1.07
1929	1.06	1.08	1.09
1930	1.07	1.09	1.09
1931	1.07	1.10	1.10
1932	1.07	1.08	1.09
1933	1.00	1.00	1.01
1934	1.00	0.98	0.98
1935	1.00	1.01	1.02
1936	0.98	0.95	0.97
1937	1.00	0.99	1.00
1938	1.03	1.03	1.04
1939	1.07	1.10	1.10
1940	1.03	1.04	1.05

Table A3.3 (cont.): Medians, geometric means, and 5 % trimmed means of sales price ratios in Stockholm, 1875–1957.

Year	Median	Geometric mean	5 % trimmed mean
1941	1.01	1.01	1.02
1942	1.05	1.07	1.06
1943	1.02	1.05	1.06
1944	1.07	1.09	1.09
1945	1.11	1.11	1.11
1946	1.15	1.19	1.19
1947	1.23	1.30	1.33
1948	1.20	1.20	1.26
1949	1.17	1.20	1.22
1950	1.05	1.15	1.25
1951	1.19	1.22	1.22
1952	1.00	1.02	1.03
1953	1.07	1.11	1.11
1954	1.11	1.16	1.17
1955	0.95	1.00	1.01
1956	1.05	1.09	1.10
1957	1.01	1.04	1.05

Sources: See Table A3.2.

Table A3.4: Index series for nominal taxation assessment values of residential properties, nominal and real prices of residential property, and CPI, Stockholm 1875–1957 (1912 = 100).

Year	Index of taxation values	Nominal price index residential property	Real price index residential property	Repeated sales index	CPI
1875	42.0	46.9	51.0	39.1	91.9
1876	50.0	50.9	55.4	43.5	91.9
1877	50.0	56.2	61.3	43.1	91.7
1878	50.0	58.3	69.7	44.9	83.6
1879	57.0	58.0	72.8	46.9	79.8
1880	57.0	61.8	73.1	45.6	84.5
1881	57.0	64.9	75.2	45.3	86.3
1882	61.0	63.6	74.2	49.5	85.7
1883	61.0	64.9	77.3	51.8	83.9
1884	65.8	67.7	83.7	57.0	80.8
1885	65.8	69.8	91.1	59.7	76.6
1886	65.8	68.1	93.7	56.0	72.7
1887	67.2	67.3	98.3	62.8	68.5
1888	67.2	68.8	94.7	53.7	72.7
1889	67.2	66.6	89.0	53.0	74.9
1890	65.1	66.7	87.5	48.8	76.1
1891	65.1	67.2	82.9	56.4	81.1
1892	65.1	63.5	81.7	54.7	77.7
1893	65.1	64.1	84.8	59.6	75.6
1894	65.1	62.2	86.8	52.3	71.6
1895	65.1	67.0	93.5	49.9	71.7
1896	67.1	70.4	97.3	54.1	72.3
1897	67.1	72.0	95.4	58.0	75.5
1898	72.5	71.7	91.9	57.2	78.0
1899	72.5	81.4	98.3	59.7	82.7
1900	72.5	80.9	95.2	69.8	85.0
1901	72.5	82.4	97.5	72.7	84.5
1902	72.5	86.3	101.7	75.6	84.9
1903	87.0	83.8	99.2	74.6	84.5
1904	87.0	91.5	108.3	76.1	84.5
1905	87.0	93.8	109.1	81.3	85.9
1906	87.0	96.5	108.5	89.2	88.9

Table A3.4 (cont.): Index series for nominal taxation assessment values of residential properties, nominal and real prices of residential property, and CPI, Stockholm 1875–1957 (1912 = 100).

Year	Index of taxation values	Nominal price index residential property	Real price index residential property	Repeated sales index	CPI
1907	87.0	100.1	107.1	89.2	93.5
1908	100.0	99.1	103.9	100.2	95.3
1909	100.0	107.2	114.1	94.4	94.0
1910	100.0	103.8	110.6	94.7	93.8
1911	100.0	104.4	109.9	98.1	95.0
1912	100.0	100.0	100.0	100.0	100.0
1913	109.0	107.0	105.8	103.7	101.1
1914	109.0	110.4	107.8	108.7	102.4
1915	109.0	106.9	90.9	92.9	117.7
1916	109.0	103.7	78.0	96.3	133.0
1917	109.0	110.8	66.0	99.1	167.8
1918	118.8	117.2	47.5	107.9	246.6
1919	118.8	132.7	48.8	122.6	272.2
1920	118.8	141.5	51.0	121.1	277.3
1921	118.8	143.0	63.2	116.3	226.2
1922	134.3	138.7	73.6	109.5	188.3
1923	134.3	143.3	80.5	117.7	178.1
1924	134.3	146.3	82.2	120.8	178.1
1925	134.3	148.2	81.8	124.4	181.1
1926	134.3	154.0	88.0	111.1	175.0
1927	134.3	149.6	86.5	128.4	172.9
1928	147.7	159.3	91.6	127.8	174.0
1929	147.7	161.1	93.7	171.5	171.9
1930	147.7	161.6	97.5	154.2	165.8
1931	147.7	162.7	101.3	143.4	160.7
1932	147.7	160.3	101.1	172.9	158.6
1933	153.6	154.2	99.8	149.5	154.5
1934	153.6	151.4	97.4	141.7	155.5
1935	153.6	157.6	99.3	122.1	158.6
1936	153.6	147.8	92.0	131.1	160.7
1937	153.6	152.5	92.0	135.7	165.8
1938	152.1	157.9	93.5	123.3	168.9

Table A3.4 (cont.): Index series for nominal taxation assessment values of residential properties, nominal and real prices of residential property, and CPI, Stockholm 1875–1957 (1912 = 100).

Year	Index of taxation values	Nominal price index residential property	Real price index residential property	Repeated sales index	CPI
1939	152.1	168.4	96.8	130.9	174.0
1940	152.1	159.2	80.6	132.6	197.5
1941	152.1	154.2	68.8	121.9	224.1
1942	152.1	162.1	67.7	151.0	239.5
1943	152.1	161.8	67.3	144.5	240.5
1944	152.1	166.8	69.6	231.2	239.5
1945	158.1	177.1	74.3	262.7	238.4
1946	158.1	190.4	79.5	267.0	239.5
1947	158.1	208.6	84.6	305.9	246.6
1948	158.1	191.6	73.4	237.5	261.0
1949	158.1	190.7	72.8	191.1	262.0
1950	158.1	183.5	69.0	187.8	266.1
1951	158.1	195.8	62.9	164.5	311.1
1952	183.4	190.2	57.0	178.1	333.6
1953	183.4	205.8	61.3	223.7	335.7
1954	183.4	214.6	63.4	181.8	338.7
1955	183.4	186.2	53.7	202.0	346.9
1956	183.4	203.5	55.9	175.1	364.3
1957	190.8	201.8	53.0	161.5	380.7

Sources: See Table A3.2. CPI: Edvinsson and Söderberg (2010).

Table A3.5. *Indices of residential property prices in Stockholm, Göteborg and Sweden, 1957–2012 (1957 = 100).*

Year	Stockholm, houses	Stockholm, apartment buildings	Göteborg, houses	Göteborg, apartment buildings	Sweden, houses	Sweden, apartment buildings
1957	100	100	100	100	100	100
1958	103	99	104	105	103	102
1959	101	99	110	106	104	104
1960	110	108	116	107	108	107
1961	114	119	124	111	114	110
1962	127	115	130	129	119	113
1963	144	115	144	123	129	113
1964	170	108	161	126	142	116
1965	164	151	177	138	152	127
1966	183	153	194	137	164	133
1967	199	137	204	139	174	135
1968	202	133	216	138	187	136
1969	211	143	226	138	200	141
1970	222	134	232	150	202	137
1971	230	161	247	131	211	136
1972	230	137	271	133	226	133
1973	256	151	277	157	245	143
1974	254	148	304	140	256	145
1975	319	155	377	140	312	147
1976	374	166	442	146	361	157
1977	422	166	511	150	411	161
1978	497	212	562	156	467	180
1979	562	227	621	173	512	192
1980	595	259	621	194	530	216
1981	592	251	619	196	524	219
1982	600	299	624	305	531	251
1983	612	315	643	325	531	266
1984	629	343	680	362	552	289
1985	659	458	717	368	573	332
1986	718	509	778	426	604	362
1987	873	570	914	528	683	417
1988	1110	675	1118	601	809	516

Table A3.5 (cont.). *Indices of residential property prices in Stockholm, Göteborg and Sweden, 1957–2012 (1957 = 100).*

Year	Stockholm, houses	Stockholm, apartment buildings	Göteborg, houses	Göteborg, apartment buildings	Sweden, houses	Sweden, apartment buildings
1989	1318	845	1341	632	951	629
1990	1461	1118	1495	854	1066	749
1991	1508	974	1563	879	1140	761
1992	1283	899	1353	717	1035	661
1993	1087	710	1168	706	919	568
1994	1193	814	1230	723	961	633
1995	1211	834	1236	692	967	625
1996	1217	890	1242	749	972	650
1997	1366	1017	1359	826	1040	695
1998	1573	1148	1538	898	1140	748
1999	1799	1305	1693	998	1245	813
2000	2167	1502	1884	1095	1382	851
2001	2387	1623	2027	1143	1492	890
2002	2529	1775	2169	1176	1587	939
2003	2589	1775	2434	1284	1692	973
2004	2779	2046	2756	1459	1855	1089
2005	2981	2187	3120	1649	2033	1145
2006	3355	2399	3448	1674	2264	1233
2007	3842	2837	3750	2006	2506	1437
2008	3931	2685	3880	2180	2579	1486
2009	3954	2852	3930	2334	2632	1534
2010	4340	3047	4282	2400	2826	1615
2011	4400	3377	4381	2461	2847	1653
2012	4370	3340	4356	2351	2811	1663

Sources: Statistics Sweden (1963–2012); Statistics Sweden (1950–1967); 'Prisstatistik för Hyreshus – Göteborg och Bohuslän', unpublished Excel-file; Sandelin (1977); Statistics Sweden, Statistik-databasen.

References

Unpublished references

Statistics Sweden

Fastighetspriser och lagfarter, www.scb.se/BO0501.

‘Prisstatistik för Hyreshus – Göteborg och Bohuslän’, unpublished Excel-file received by email from Niclas Sjölund, Statistics Sweden, 2013-06-25.

Statistikdatabasen, www.scb.se.

Stockholms stadsarkiv

Stockholms rådhusrätt, 1 avd., D 4 Beviljade lagfarter.

Stockholmskällan, www.stockholmskallan.se

Published references

Aldén, G (1921), *Förordningarna om ny fastighetstaxering 1921–1922*, Hökerbergs, Stockholm.

Allmän fastighetstaxering 1975, del 1 (1975), Statistiska Centralbyrån, Stockholm.

Baehrendz, E (1927), *De nya författningarna rörande fastighetstaxeringen 1927–1928*, Hökerbergs, Stockholm.

Bailey, M J, R Muth, and H O Nourse (1963), ‘A Regression Method for Real Estate Price Index Construction’, in *Journal of the American Statistical Association*, Vol. 4, pp. 933–942.

Bohlin, J (2014), ‘A price index for residential property in Göteborg, 1875–2010’, in Edvinsson, R, T Jacobson, and D Waldenström (eds.), *Historical Monetary and Financial Statistics for Sweden, volume 2: House Prices, Stock Returns, National Accounts, and the Riksbank Balance Sheet, 1620–2012*, Sveriges Riksbank and Ekerlids förlag, Stockholm.

Edvinsson, R (2005), *Growth, Accumulation, Crisis. With New Macroeconomic Data for Sweden 1800–2000*, Almqvist & Wiksell International, Stockholm.

Edvinsson, R, and J Söderberg (2010), ‘The evolution of Swedish consumer prices 1290–2008’, in Edvinsson, R, T Jacobson, and D Waldenström (eds.), *Historical Monetary and Financial Statistics for Sweden: Exchange rates, prices, and wages, 1277–2008*, Sveriges Riksbank and Ekerlids förlag, Stockholm.

Eichholtz, P (1996), ‘A Long Run House Price Index: The Herengracht Index, 1628–1973’, University of Limburg, and University of Amsterdam, the Netherlands.

Eichholtz, P (1997), ‘A Long Run House Price Index: The Herengracht Index, 1628–1973’, in *Real Estate Economics*, Vol. 25, pp. 175–192.

Eitrheim, Ø, and S Erlandsen (2004), ‘House Price Indices for Norway 1819–2003’, in Eitrheim, Ø, J T Klovland and J F Qvigstad (eds.), *Historical Monetary Statis-*

- tics for Norway*, Norges Bank, Oslo.
- Englund, P, J Quigley, and C Redfearn (1999), 'The Choice of Methodology for Computing Housing Price Indexes: Comparisons of Temporal Aggregation and Sample Definition', in *Journal of Real Estate Finance and Economics*, Vol. 19, pp. 91–112.
- Fastighetskalender för Stockholms stad 1938* (1938), Lundgren, N (ed.), Bonnier, Stockholm.
- Forsell, H (2003), *Hus och hyra. Fastighetsägande och stadstillväxt i Berlin och Stockholm 1860–1920*, Stads- och kommunhistoriska institutet, Stockholm.
- Fritz, S (1994), *Louis Fraenckel 1851–1911. Bankman och finansman*, Almqvist & Wiksell International, Stockholm.
- Geijer, E, E Rosenqvist, and H Sterner (1969), *Taxering av fastighet*, fifth edition, Norstedts, Stockholm.
- Grytten, O (2004), 'A Consumer Price Index for Norway 1516–2003', in Eitrheim, Ø, J T Klovland and J F Qvigstad (eds.), *Historical Monetary Statistics for Norway*, Norges Bank, Oslo.
- Hammarberg, C (1958), 'Priserna på bostads- och affärsfastigheter åren 1952–1956', in *Statistisk tidskrift*, Ny följd, Vol. 7, pp. 247–276.
- Hammarström, I (1979), 'Urban Growth and Building Fluctuations. Stockholm 1860–1920', in *Growth and Transformation of the Modern City. The Stockholm Conference September 1978*, Swedish Council for Building Research, Stockholm.
- Jacobsson, E (1996), *... och mödan gav sin lön. Om bostadspolitik och bostadskooperation i Stockholm 1870–1930*, Ekonomisk-historiska institutionen, Stockholm University, Stockholm.
- 'Lagfarna fastighetsköp 1939–1941' (1941–1942), in Årsbok, Institutet för värdering av fastigheter i Stockholm, Svensk byggtjänst, Stockholm.
- Perlinge, A (2012), *Bubblan som sprack. Byggboomen i Stockholm 1896–1908*, Stockholmia Förlag, Stockholm.
- Sandelin, B (1977), *Prisutveckling och kapitalvinster på bostadsfastigheter*, National-ekonomiska institutionen, Göteborgs universitet, Göteborg.
- Sheiban, H (2002), *Den ekonomiska staden. Stadsplanering i Stockholm under senare hälften av 1800-talet*, Arkiv, Lund.
- Sköld, P E, and A Vanner (1937), *Fastighetstaxeringen 1937–1938*, Tiden, Stockholm.
- Statistics Sweden (1950–1967), *Skattetaxeringarna samt fördelningen av inkomst och förmögenhet*, Stockholm.
- Statistics Sweden (1963–2012), *Statistiska Meddelanden*, R 1963:18, R 1966:36, R 1966:37, R 1968:5, R 1968:23, P 1969:9, P 1971:2, P 1971:19, P 1973:2, P 1973:29, P 1974:21, P 1976:9, P 1975–1999, BO 41 SM 1201.
- Statistics Sweden (2006), *Bostads- och byggnadsstatistik årsbok 2006: Boende, byggande och bebyggelse*, Örebro.
- Statistisk tidskrift*, Statistics Sweden, Stockholm.

Statistisk årsbok för Stockholms stad, Stockholms stads statistiska kontor, Stockholm.

Stockholms adresskalender, Stockholm.

Stockholms fastighetskalender: Register över fastighetsbeståndet i Stockholm med uppgifter om ägare, värden, areal m.m. (1932), B. Wahlström, Stockholm.

Waldenström, D (2014), 'Swedish stock and bond returns, 1856–2012', in Edvinsson, R, T Jacobson, and D Waldenström (eds.), *Historical Monetary and Financial Statistics for Sweden, volume 2: House Prices, Stock Returns, National Accounts, and the Riksbank Balance Sheet, 1620–2012*, Sveriges Riksbank and Ekerlids förlag, Stockholm.