APPENDIX O

MORTGAGE INTEREST RATES AND BOND YIELDS

The Mortgage Interest Rate Series

THIS study made use of two long mortgage interest rate series covering all types of Manhattan real estate. One, from the *Real Estate Analyst*, is shown in column 1 of Table O-1. The data are derived from the *Real Estate Record and Guide*, which publishes interest rates for mortgage loans on Manhattan properties. The data were read from charts in terms of midyear values and therefore involve some small error. The other series is given by Clarence D. Long, Jr., in his *Building Cycles and the Theory of Investment*[1] and is based on data from the *Real Estate Record and Guide* for 1905 to 1934, covering new loans made during four weeks of each year, usually the last week in March, June, September, and December.

Because of the possible error in the data read from charts and the limited coverage in Long's series, a new series was compiled for this study, beginning in 1905, and is shown in column 2 of Table O-1. The annual figures for 1905-1932 represent the weighted arithmetic average of interest rates on mortgage loans made in the first four weeks in March, July, and November of each year. For 1933-1950, complete monthly figures for March, July, and November were used, weighted by the dollar amounts of the loans at various interest rates. The classification of rates in the source is by half per cent intervals from 4 to 6 per cent. Before 1905, only three classifications were used by the *Real Estate Record and Guide*: under 5 per cent, 5 per cent, and over 5 per cent. This crude classification would make any compilation of averages from this source a dubious one.

Equivalent data were available in the same source for the Bronx. Since most mortgage loans in the Bronx were on residential properties, a similar series for this borough more closely reflects interest rates on residential mortgages (column 3 of Table O-1). Coverage and methods are the same as for the Manhattan series in column 2.

Interest rates for a portion of the loans made are not listed in the *Record and Guide*, either because the rates were unavailable or because they were unusual rates that did not fit into the standard classification. Although rates on these loans were not specified, the amounts of the loans were, and it was thus possible to calculate the proportion of loans made in the sample period in each year that were not included in the data upon which the weighted averages were based. These percentages

[1] Princeton University Press, 1940, Table 18.

are given in Table O-2. For both Manhattan and the Bronx substantial and greatly varying percentages of the loans made had no interest rates listed.

Generally speaking, the two Manhattan series and the Long series conform closely. Except for three or four years, the Manhattan series B and Long's series are almost identical for the overlap period. There is some difference in level, but not in movement, between the Manhattan series A and B. The former lies somewhat above the latter in 1905-1920 and 1933-1950, but the two are very close in the intervening twelve years. As a result, series A shows a slightly smaller rise in interest rates between 1905-1920 and 1920-1930, and a slightly smaller decline between the twenties and the post-1934 period. In addition, the decline between 1932 and 1934 in series A is less sharp.

The Bronx and Manhattan B series parallel each other closely over the entire period 1905-1940, with the former lying consistently above the latter (except for 1907). The movement of the two series is quite close except for the greater stability of the Bronx series during the twenties.

The Chicago series (column 4 of Table O-1) is given by Homer Hoyt in his *One Hundred Years of Land Values in Chicago*[2] in graph form and is apparently a crude approximation for property in the central business district, derived largely from files of the *Chicago Tribune*.

The St. Louis series (column 5) is compiled by the *Real Estate Analyst* from the *St. Louis Daily Record*. Here again, small errors may be involved in reading the values from graphs.

While the Chicago data are too rough and limited in coverage to permit comparison with the New York series, differentials between the St. Louis and New York rates are worthy of brief analysis. The spread between the two Manhattan series and the St. Louis series has a downward trend although it exhibits considerable fluctuation. The persistent difference in rates reflects in part a difference in the type of property and perhaps in the average size of loan. St. Louis mortgages represent a higher proportion of residential properties, and a large proportion of these are one- to four-family houses. It is interesting to note in this connection that there is comparatively little difference between St. Louis and Bronx mortgage interest rates, although the Bronx rates are mostly somewhat lower. The narrowing of the differential between Manhattan and St. Louis rates probably reflects the increased mobility of mortgage funds.

[2] Chicago University Press, 1933.

Comparison of Mortgage Interest Rates
with Long-Term Bond Yields

This comparison was attempted for the purpose of examining the extent to which movements in mortgage interest rates are related to movements in "the" long-term interest rate; that is, the extent to which mortgages are part of the capital market and are subject to the same general forces that influence the price of long-term investment funds. Such an attempt raises, of course, the question as to what kind of interest rate series might serve as a standard of comparison. The "pure" long-term interest rate would serve best in this role. The going interest rate on any form of debt of given maturity may be viewed as being comprised of three components: pure interest, an allowance for risk, and the cost to the lender of making and holding the loan. To the extent that a degree of unity exists in the capital market, the pure interest component will be common to the interest rates on all types of debt, while the other two components will vary with the specific characteristics of any particular debt. Changes in pure interest over time should therefore produce changes in mortgage interest rates, provided that risk allowances and lending costs do not have compensating movements.

While no "pure" interest rate is available in practice, it can be closely approximated. The first choice is likely to be United States bonds, for which the risk allowance is taken to equal zero and the cost of lending approaches zero. However, government bonds have fulfilled this requirement only in recent years. Before 1941 most government issues contained complete or partial tax exemption, and before 1914 (when a federal income tax had not yet been imposed) many issues of governments carried a bank note issue privilege. The yields on federal bonds, therefore, were influenced by actual and expected income tax rates and by the needs of the national banking system for currency. Government bonds therefore were not used for comparison.

Instead, two nongovernmental bond yield series are linked together and presented in Table O-1. For the period 1900-1952 the National Bureau of Economic Research's annual series of the "basic" yield of corporate bonds was available. In this series, basic yields at any point of time are defined as the yield on the "best" or lowest-yielding bonds at that date. Bond quotations were ascertained by the National Bureau for a large number of bonds each month of the first quarter in any given year, converted to yield, and then averaged. These yields were arrayed as points on a term-to-maturity chart and a lower boundary line was drawn through the lowest points, although in exceptional cases some points fall below this line. The ordinate of this boundary line was taken as the basic yield. Since this boundary line would have

different ordinates (yields) for different maturities, the yield on 30-year maturities was selected here for comparison with mortgage interest rates. Although a 30-year maturity is considerably longer than the average term of mortgages during most of this period, a 30-year bond was probably at least as "liquid" or "shiftable" as a 10-year mortgage, in view of the highly organized market for corporate bonds. Also, experimentation indicated that the use of basic bond yields drawn from any maturity between 20 and 60 years would have produced but small differences. At any rate, mortgage loans and bonds of the longer maturities are to a large degree considered substitutes by financial institutions; that is, they compete with each other in institutional portfolios.

For the period before 1900 Macaulay's bond yields were available. Among these, his index of a sample of the five "best" or lowest-yielding bonds is the one most comparable with the National Bureau's basic yields. By coincidence, Macaulay's series and the basic yield series contained almost identical yields for 1900, 3.29 and 3.30 respectively, and could thus be linked without difficulty. This fortuitous circumstance should not obscure some differences in the two series. In the first place, while the National Bureau's basic yield is given by the ordinate of a "boundary" line drawn under the points of lowest yield, Macaulay's series is a geometric average of the five lowest-yielding bonds. Other things being equal, Macaulay's yields would tend to be higher than basic yields, depending on the range of yields of the five samples. This difference is somewhat minimized by Macaulay's use of a geometric average. Second, Macaulay's measure is not an actual yield but is an index of yield linked to a January 1936 base. Macaulay's method of constructing this index offers a selection of three alternative indexes of "best bond" yield.[3] Depending upon which of the three indexes was plotted, the time series would have resulted in different levels although the direction of movement would have remained unaffected. Even this last statement requires a qualification, since the National Bureau's basic yield series is the monthly average of the first quarter of a given year while Macaulay's bond prices are January quotations. Nevertheless, the linkage of the two series provided a useful indicator of the movement of the "pure" interest rate over a sixty-five-year period.

[3] One index is based on the percentage change in the average yield of the same five bonds between one January and the *following* January. The second is based upon the percentage change of the same sample from one January to the *preceding* January. The third takes the percentage change of two *different* groups of lowest yield bonds between any January and the preceding January. This last measure, which works out to be approximately the geometric average of the first two indexes, was selected for comparison with mortgage interest rates.

TABLE O-1

Selected Series of Mortgage Interest Rates
and Corporate Bond Yields, 1879-1952
(*per cent*)

	AVERAGE MORTGAGE INTEREST RATES					BOND YIELDS
	Manhattan		Bronx	Chicago	St. Louis	
	A	B				
	(1)	(2)	(3)	(4)	(5)	(6)
1879	5.92	..	..	7.0	..	5.30
1880	5.78	..	..	7.0	..	5.02
1881	5.80	..	..	7.0	..	4.48
1882	5.65	..	..	6.0	..	4.45
1883	5.43	..	..	6.0	..	4.53
1884	5.35	..	..	5.0	..	4.41
1885	5.20	..	..	5.0	..	4.29
1886	5.10	..	..	5.0	..	3.94
1887	5.14	..	..	5.0	..	3.92
1888	5.20	..	..	5.0	..	4.01
1889	5.13	..	..	5.0	..	3.82
1890	5.45	..	..	5.0	..	3.87
1891	5.38	..	..	5.0	..	4.05
1892	5.20	..	..	5.0	..	3.98
1893	5.20	..	..	5.0	6.15	3.94
1894	5.16	..	..	5.0	6.10	3.94
1895	5.04	..	..	5.0	6.03	3.74
1896	5.12	..	..	5.0	5.97	3.71
1897	5.04	..	..	5.0	6.00	3.64
1898	4.96	..	..	4.0	5.99	3.46
1899	5.05	..	..	4.0	5.80	3.29
1900	5.17	..	..	4.0	5.66	3.30
1901	5.11	..	..	4.0	5.82	3.25
1902	5.09	..	..	4.0	5.62	3.30
1903	5.18	..	..	4.0	5.61	3.45
1904	5.35	..	..	4.0	5.60	3.60
1905	5.50	5.29	5.50	4.0	5.42	3.50
1906	5.68	5.33	5.50	4.0	5.45	3.55
1907	5.45	5.37	5.34	4.0	5.65	3.80
1908	5.60	5.47	5.58	4.0	5.80	3.95
1909	5.35	5.09	5.33	4.0	5.76	3.77
1910	5.35	5.14	5.38	4.0	5.80	3.80
1911	5.47	5.24	5.51	4.5	5.90	3.90
1912	5.46	5.32	5.60	4.5	5.85	3.90
1913	5.50	5.23	5.59	4.5	5.89	4.00
1914	5.58	5.38	5.60	4.5	5.90	4.10
1915	5.60	5.40	5.73	4.5	5.92	4.15
1916	5.50	5.48	5.72	4.5	5.90	4.05
1917	5.47	5.27	5.58	4.5	5.86	4.05
1918	5.55	5.41	5.70	4.5	5.90	4.75
1919	5.65	5.49	5.70	5.0	5.97	4.75

TABLE O-1 (continued)

(*per cent*)

| | AVERAGE MORTGAGE INTEREST RATES | | | | | BOND |
| | Manhattan | | | | | |
	A (1)	B (2)	Bronx (3)	Chicago (4)	St. Louis (5)	YIELDS (6)
1920	5.75	5.67	5.84	5.5	6.00	5.10
1921	5.97	5.98	5.99	6.1	6.18	5.17
1922	5.95	5.87	5.98	5.5	6.09	4.71
1923	5.91	5.87	5.95	5.5	6.03	4.61
1924	5.92	5.87	5.97	5.5	6.03	4.66
1925	5.90	5.78	5.97	5.5	6.02	4.50
1926	5.89	5.85	5.96	5.0	6.02	4.40
1927	5.88	5.79	5.95	5.0	6.02	4.30
1928	5.85	5.71	5.93	5.0	6.00	4.05
1929	5.92	5.92	5.98	5.0	6.03	4.42
1930	5.95	5.92	5.99	5.0	6.04	4.40
1931	5.75	5.61	5.91	5.5	6.03	4.10
1932	5.77	5.71	5.88	5.5	6.02	4.70
1933	5.60	4.95	5.12	5.5	6.00	4.15
1934	5.45	4.48	4.79	..	5.78	3.99
1935	5.26	4.97	5.01	..	5.78	3.50
1936	5.09	4.81	5.24	..	5.75	3.20
1937	5.11	4.82	5.08	..	5.70	3.08
1938	5.00	4.66	5.16	..	5.50	3.00
1939	5.05	4.76	5.10	..	5.46	2.75
1940	5.03	4.72	4.89	..	5.29	2.70
1941	4.90	4.53	..	..	5.16	2.65
1942	4.98	4.77	..	..	5.15	2.65
1943	4.77	4.42	..	..	5.21	2.65
1944	4.71	4.32	..	..	5.16	2.60
1945	4.70	4.48	..	..	5.15	2.55
1946	4.74	4.42	..	..	5.00	2.43
1947	4.80	4.44	..	..	5.01	2.50
1948	4.91	4.49a	..	..	5.13	2.80
1949	4.93	4.57	..	..	5.01	2.74
1950	4.95	4.52	..	..	4.96	2.58
1951	4.93	4.55	..	..	5.05	2.67
1952	5.00	4.75	..	..	5.26	3.00

a Exclusive of two mortgage loans totaling over $95 million at unusual rates.

Column   Source

1   Covers loans on all types of properties. *1879-1904: Real Estate Analyst*,
     November 26, 1938, p. 1106. *1905-1949: Ibid.*, December 30, 1949, p.
     525. *1950-1952: Ibid.*, June 30, 1952, p. 279. Used by special permission
     of the copyright owners, Roy Wenzlick & Co. of St. Louis.

2   Covers loans on all types of property. Compiled from data in the *Real
     Estate Record and Guide*, New York. The source data prior to 1905 are
     in such broad class intervals of interest rates that averages derived from
     them would not be superior to those shown in column 1.

Notes to Table O-1 (continued)

Column	Source

3   Covers loans on all types of property. Since a major portion of mortgage loans in the Bronx were on residential properties, this new series should be more indicative than the Manhattan series of rates in residential mortgage financing. Compiled for this study from data in the *Real Estate Record and Guide*, New York. No data are available for the Bronx after 1940. Source data are listed as "Bronx" through March 1931, and as "West Bronx—23rd and 24th Wards only" thereafter. Annexed district records were apparently included up to July 21, 1927, and excluded thereafter.

4   Covers loans on commercial properties. Homer Hoyt, *One Hundred Years of Land Values in Chicago*, Chicago University Press, 1933, p. 349. The data apparently refer to mortgages on high-quality property in the central district, which explains the fact that the Chicago series in most years is below the Manhattan series.

5   Covers loans on all types of property. *1893-1904: Real Estate Analyst*, May 27, 1942, p. 166. *1905-1949: Ibid.*, December 30, 1949, p. 525. *1950-1952: Ibid.*, June 30, 1952, p. 279. Used by special permission of the copyright owners, Roy Wenzlick & Co. of St. Louis.

6   *1879-1899:* Frederick R. Macaulay, *Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields and Stock Prices in the United States since 1856*, National Bureau of Economic Research, 1938, Table 5, col. 3, pp. A111-A112. See *ibid.*, pp. A110-A111, for an exposition of techniques. *1900-1942:* David Durand, *Basic Yields of Corporate Bonds, 1900-1942*, National Bureau of Economic Research, Technical Paper 3, 1942, Table 1, pp. 5-6. An extension of Durand's series has been published by the National Industrial Conference Board (*Economic Almanac 1953-54*, p. 19).

TABLE O-2
Per Cent of the Amount of Mortgage Loans Made in Manhattan
and the Bronx for Which No Interest Rate Is Listed
in the *Real Estate Record and Guide*

	Manhattan	*Bronx*		*Manhattan*	*Bronx*
1905	2.4	3.7	1928	20.1	4.7
1906	17.3	20.6	1929	7.3	9.5
1907	20.4	18.9	1930	11.8	9.7
1908	20.7	20.6	1931	18.6	29.5
1909	17.7	18.4	1932	7.3	27.3
1910	20.1	15.4	1933	24.0	19.5
1911	22.0	23.2	1934	44.5	51.3
1912	17.7	22.7	1935	38.0	25.0
1913	22.8	22.3	1936	33.9	21.4
1914	31.0	34.9	1937	37.9	20.2
1915	21.2	33.9	1938	24.6	19.0
1916	22.6	30.8	1939	45.2	15.6
1917	13.8	34.8	1940	48.4	40.1
1918	42.1	30.7	1941	53.4	
1919	11.8	9.0	1942	53.2	
1920	10.8	13.6	1943	61.4	
1921	19.9	13.4	1944	62.9	
1922	25.2	9.3	1945	42.1	
1923	15.6	4.8	1946	38.4	
1924	12.9	4.2	1947	38.6	
1925	11.5	5.8	1948	24.5	
1926	18.5	3.8	1949	37.0	
1927	11.7	4.1	1950	44.0	

TABLE O-3

Average Contract Interest Rates on Outstanding Residential Mortgages,
by Principal Types of Holders, 1934, 1940, and 1950

(per cent)

TYPE OF HOLDER	FIRST MORTGAGES ON DWELLINGS IN VARIOUS CITIES, 1934				FIRST MORTGAGES, 1940, 1- TO 4-FAMILY HOUSES (5)	FIRST MORTGAGES, ALL RESIDENTIAL PROPERTIES, 1950 (6)
	Simple Averages		Weighted Averages			
	Owner-Occupied (1)	Rented (2)	Owner-Occupied (3)	Rented (4)		
All holders	6.26	6.39	6.18	6.24	5.54	5.0
Life insurance companies	6.09	6.11	5.98	5.99	5.42	4.5
Savings and loan associations	6.72	6.95	6.73	6.98	5.92	5.0
Commercial banks	6.34	6.47	6.26	6.37	5.67	4.5
Savings banks	6.32	6.42	6.26	6.35	5.53	4.5
Mortgage companies	6.44	6.57	6.39	6.49	5.61	4.5
Title and trust companies	6.24	6.27	6.18	6.19	..	..
HOLC	5.00	5.00	5.00	5.00	4.50	..
Individuals	6.26	6.45	6.18	6.30	5.79	6.0
Others	6.14	6.35	6.09	6.20	5.49	5.0

Source

Column

1-4 David L. Wickens, *Residential Real Estate*, National Bureau of Economic Research, 1941, pp. 256-259. Fifty-two cities for owner-occupied and thirty cities for rented dwellings.

5 *Census of Housing 1940*, Bureau of the Census, Vol. IV, Part 1, p. 9. Simple averages.

6 *Census of Housing 1950*, Vol. IV, Part 1, p. 27. Median interest rates.

TABLE O-4
Average Interest Rates on Residential Mortgages Outstanding, by Population Size Groups, 1890-1940
(*per cent*)

AREA	ALL MORTGAGES ON OWNER-OCCUPIED HOUSES		AREA	FIRST MORTGAGES ON OWNER-OCCUPIED ONE-FAMILY HOUSES
	1890 (1)	*1920* (2)		*1940* (3)
Cities of 100,000 or more	5.7	6.0	Cities of 100,000 or more	5.43
Cities of 25,000 to 100,000	6.2	6.1	Cities of 50,000 to 100,000	5.48
Areas outside cities of 25,000 or more	6.6	6.3	Urban areas outside principal metropolitan districts	5.67
			Rural nonfarm areas outside principal metropolitan districts	5.78

Column	Source
1-2	*Mortgages on Homes in the United States, 1920,* Bureau of the Census, 1923, p. 118. Rates for 1890 are effective interest rates. Those for 1920 and 1940 are contract rates. Weighted averages.
3	*Census of Housing 1940,* Vol. IV, Part 1, pp. 18, 23, 33, and 88. Simple averages.

TABLE O-5
Percentage Distribution of Number of Amortized and Nonamortized
Residential Mortgages Outstanding, 1934, 1940, and 1950

| TYPE OF MORTGAGE[a] | FIRST MORTGAGES ON DWELLINGS IN FIFTY-TWO CITIES, 1934 | | FIRST MORTGAGES ON NONFARM OWNER-OCCUPIED ONE-FAMILY HOUSES, 1940 | ALL MORTGAGES ON ALL RESIDENTIAL PROPERTIES, 1950 | |
	Owner-Occupied (1)	Rented (2)	(3)	Owner-Occupied (4)	Rented (5)
Straight term loans	38.2	43.4	14.7	5.3[b]	3.0[b]
Fully amortized loans	39.3	32.7	} 85.3[c]	90.1	87.2
Other	22.5	23.9		4.7[d]	9.8[d]

[a] Straight term loans: Principal payable at maturity. Fully amortized loans: Complete amortization of principal by regular payment during the life of the loan. Other: Loans not fully amortized but for which payments on principal are required during the life of the loan.

[b] Includes loans payable on demand with no regular principal payments required.

[c] Includes all loans which required regular payment of some sort on principal.

[d] Includes loans payable on demand but with regular principal payments required.

Source

Column
1-2 David L. Wickens, Residential Real Estate, National Bureau of Economic Research, 1941, pp. 278-279.

3 Census of Housing 1940, Bureau of the Census, Vol. IV, Part 1, p. 10. Excludes mortgages for which no report was made on method of principal payment, as well as those mortgages for which no regular payment of any sort (either principal or interest) was required. These amounted to 7.7 per cent of those requiring regular payment and stating method of principal payment.

4-5 Census of Housing 1950, Vol. IV, Part 1, pp. 53 and 366.

TABLE O-6

Average Loan-to-Value Ratios of Mortgage Loans Made by Selected
Financial Institutions on One- to Four-Family Houses, 1920-1947[a]
(per cent)

	Life Insurance Companies (1)	Commercial Banks (2)	Savings and Loan Associations (3)
1920	46	48	59
1921	44	49	56
1922	47	51	58
1923	48	50	57
1924	50	52	58
1925	49	50	60
1926	51	51	57
1927	51	54	56
1928	53	53	60
1929	52	53	61
1930	53	50	59
1931	52	50	59
1932	49	51	64
1933	46	57	56
1934	53	50	61
1935	53	60	60
1936	61	61	62
1937	64	60	62
1938	67	63	64
1939	69	69	64
1940	73	72	68
1941	76	68	68
1942	80	67	68
1943	81	66	70
1944	82	61	73
1945	76	61	73
1946	75	70	77
1947	69	69	74

[a] Weighted averages.

Column	Source
1	Raymond J. Saulnier, *Urban Mortgage Lending by Life Insurance Companies*, National Bureau of Economic Research, 1950, p. 134.
2	Carl F. Behrens, *Commercial Bank Activities in Urban Mortgage Financing*, National Bureau of Economic Research, 1952, p. 105. Weighted averages.
3	J. E. Morton, *Urban Mortgage Lending: Comparative Markets and Experience*, Princeton University Press for the National Bureau of Economic Research, 1956, p. 175.