

Title	INTEREST RATES OF JAPANESE LONG-TERM NATIONAL BONDS: HAVE INTEREST RATES BEEN LIBERALIZED?
Sub Title	
Author	PETTWAY, Richard H.
Publisher	Keio Economic Society, Keio University
Publication year	1982
Jtitle	Keio economic studies Vol.19, No.1 (1982.) ,p.91- 100
JaLC DOI	
Abstract	
Notes	
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA00260492-19820001-0091

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INTEREST RATES OF JAPANESE LONG-TERM NATIONAL BONDS: HAVE INTEREST RATES BEEN LIBERALIZED?

Richard H. PETTWAY*

Japan has followed a long-standing policy of low interest rates to encourage economic growth and to keep interest costs on the national debt as low as possible. To implement this policy in the long-term national bond market, both primary and secondary markets were regulated until 1977.¹ At present, the primary market remains regulated whereas the secondary market is unregulated. Historically, secondary market yields of long-term national bonds have been higher than subscriber's yields on national bonds in the primary market. Market yields have been much higher than subscriber's yields when interest rates are high and during periods of rising interest rates. The differential narrows when interest rates are low or when interest rates are falling.² As of September 30, 1981, the Japan Securities Research Institute found a differential of 135 to 143 basis points between the current market yield of 10 year national bonds selling in the secondary market and the subscriber's yield on newly issued national bonds.³ If these conditions were to continue, the primary market would be restricted and remain underdeveloped as most investors would choose to purchase existing national bonds in the secondary market.

Against this background the requirements for long-term financing began to grow as the government deficit became much larger. Between 1974 and 1981 the yearly amount of new national bonds sold more than quintupled. In fact, the volume of new long-term national bonds budgeted since 1978 has been over ¥10 trillion each year. With this huge level of national bond sales, has the government liberalized its low interest rate policy in the primary market for national bonds so as to remove the impediment to its development? Has the differential between market yields in the secondary market and subscriber's yields in the primary market narrowed recently? The purposes of this note are to describe the nature of the process in which Japanese long-term national bonds are sold and to measure the changes that have occurred between market yields and subscriber's yields of long-term national bonds during 1981 and early 1982.

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¹ Financial institutions who underwrote the purchase of new long-term national bonds could not sell them in the secondary market until April 1977. The no sale restriction was initially dropped to the first year and then in April 1981 dropped to the first three months of the bond's life.

² '82 *Japan's Securities Market, Fact Book*. (Tokyo: Securities Public Information Center of Japan, Inc., 1982), page 6.

³ *Securities Market in Japan, 1982*. (Tokyo: Japan Securities Research Institute, 1982), page 81.

Mechanics of the Underwriting and Sale of Long-Term National Bonds

National bonds sold in Japan may be classified legally into construction bonds and deficit-financing bonds. Construction bonds are issued under the Public Finance Law within the government budget for public works, fiscal investments, and loans. Deficit-financing bonds are special legislative authorized bonds to finance general account expenditures. Since 1972 these government bonds have had a 10 year maturity and the size of each issue has increased dramatically. Since 1978 the annual volume of these long-term bonds has been in excess of 10 trillion yen (approximately \$42.6 billion) per year.⁴ The interest on these bonds is payable semi-annually and the bonds are sold in the primary market using the "commissioned underwriting" method.

"Commissioned underwriting" rather than "strict" or "stand-by" underwriting which is used in Europe and America is employed in Japan. The underwriting in Japan is divided into two main parts: (1) an "issuing house" function which advertises the issue and receives applications and subscriptions from the public on the issuer's behalf after the announcement date, and (2) a "stand-by" underwriting function under which a selling group will purchase any portion of the issue not subscribed for during the offering period. From the view point of the Ministry of Finance (MOF) concerning the sale of national bonds, there is really no difference between "commissioned underwriting" and normal underwriting performed in America or Europe.

There are differences, however, on the underwriting side that should be understood. First, there is a commissioning contract to offer bonds between the Ministry of Finance (MOF) and the Bank of Japan (BOJ). Then there is a contract to handle the bond offering and underwriting between the BOJ and the managing underwriter.⁵ There is an underwriting group contract among syndicate members which represents many different firms.⁶ These are the "issuing houses." Finally there is a contract between underwriters and the group of 60 securities companies as well as the bond selling group with 162 members. The bonds find their way to individuals and to other investors either from the bond selling group or from the 60 securities companies. Banks which are members of the underwriting group can not sell bonds directly to individuals, other than in the secondary market, until April 1983.⁷

⁴ *Handbook of the Japanese Bond Market, 1982*. (Tokyo: The Industrial Bank of Japan, Limited, 1982), pages 22-23.

⁵ The managing underwriter represents the underwriting syndicate and the position rotates annually among four chairman banks of the Federation of Bankers Associations of Japan.

⁶ The underwriting syndicate is made up of representatives of city banks (13), long-term credit banks (3), local banks (5), trust & banking companies (1), mutual loan & savings banks (1), credit associations (1), the Norinchukin Bank (1), life insurance companies (1), non-life insurance companies (1), and securities companies (6). Note there are 33 representatives in the syndicate which act for many more banking and financial firms.

⁷ See the *Handbook of Japanese Bond Market, 1982, op. cit.*, pages 39 and 49; and *Securities Market in Japan, 1982, op. cit.*, pages 58-60.

The pricing procedures on these long-term national bonds generally work in the following manner. During the last week of a month prior to the sale, representatives of MOF, BOJ, and the underwriting syndicate establish the size of the issue, its maturity (normally 10 years), and begin to discuss the pricing of the issue. During the first week of the sales month, MOF makes a proposal on pricing and the underwriting syndicate makes a proposal on pricing. Usually each issue is priced slightly below par (99.75% to 98.25%) so the main concern is establishing the coupon and thereby the yield on each issue. After negotiations and agreement as to price, yield, and coupon rate, a contract is signed between the underwriting syndicate and BOJ acting as fiscal agent for MOF. During the offering period underwriters, securities companies, and members of the selling group obtain orders and commitments on the issue at the agreed upon price. The date of issuance and settlement is usually the twentieth day of the selling month. Subsequently, after the issue has been sold, members of the underwriting group, securities companies, and selling group member will receive commission payments from the BOJ. Generally these commissions are approximately 1% of the value of the bonds sold.⁸ Thus, the government through the BOJ receives the total gross receipts from the sales of national bonds and disburses a commission for the sale, rather than the netting process at the underwriter level employed in Europe and America.

An important institutional rule to understand is that the recently sold long-term national bond is not listed on the Tokyo Exchange until after its first interest payment, six months after the sale date.⁹ During the initial period, the recently issued national bonds may be traded in the over-the-counter market, but the number of trades is usually very small. After listing on the Tokyo Exchange, bond trading become more active. The prices on public trades of national bonds on the Tokyo Exchange are very influential because of the wide dissemination of this trading information to the public. Thus, even though the actual volume of the over-the-counter market sales is vastly larger than the volume of sales of national bonds on the Tokyo Exchange, prices and yields in both markets are very closely related and interrelated.

One other characteristic of the national bond market of Japan must be described in detail, that is the "coupon effect" of low-coupon bonds. By observing yields on long-term national bonds trading in the secondary market, it has been noticed that low-coupon national bonds trade at lower prices and higher required

⁸ Most of this material was obtained by personal interviews with representatives of Toyo Securities and W. I. Carr Sons & Company.

⁹ Actually the length of the period between sale and listing is not always exactly six months. Bonds issued from January through March will have their first interest payment on May 20 and will be listed on July 1. The bonds issued from April through June will have their first interest payment on August 20 and be listed on October 1. The bonds issued from July through September will have their first interest payment on November 20 and be listed January 1. The bonds issued from October through December will have their first interest payment on February 20 and will be listed April 1.

yields than bonds with higher coupon rates with approximately the same maturity. There have been many suggestions for this prevalent condition,¹⁰ but the condition seems to continue in the current market and this effect must be considered in the following empirical section.

Measuring the Differential Between Secondary Market Yields on Long-Term National Bonds and Current Subscriber's Yields on New Long-Term National Bonds

Historically in Japan there has been a differential between secondary market yields on existing national bonds and subscriber's yields. Many economists would believe that this condition could not continue indefinitely as it is an indication of an inefficient and underdeveloped primary market. It has been thought that this condition was maintained in the past by the Japanese government's low interest rate policy. But with the increased sales of new long-term national bonds in amounts over 10 trillion yen per year and averaging over 800 billion yen per month during the past year, it would be very unusual for market rates to be much greater than subscriber's yields.¹¹ In essence, it is felt that the government would have to liberalize its low interest rate policy so as to finance the large deficit and construction budget passed by the Diet. The purpose of this second part of the paper is to determine the differential between secondary market yields and subscriber's yields in the Japanese national bond market since January 1981. This is a very interesting period of unusually high interest rates for Japan and other developed economies and any artificial restraint on the national bond yields in Japan would have significant impact upon international capital flows and exchange rate valuations.

In Exhibit I are found the monthly average yields on long-term national bonds for Japan, U.S., U.K., and West Germany.¹² Additionally, the differentials between the long-term bond yields of Japan versus each of these countries in basis points each month is shown. The yen exchange rate of the \$, the £, and the DM are also shown each month. For example, in October of 1981, the average bond yield on Japan national 10 year bonds was at its peak of 9.03%. Also, in October the

¹⁰ Akio Kuroda and Takashi Okubo, *On the Determination of Yields in the Japanese Secondary Bond Market: An Expectations Theory Approach*. (Tokyo: Discussion paper series No. 7, the Bank of Japan, Monetary and Economic Studies Department, August 1981). Also by comparing the yields on 6.1% national bonds due May 1988 with the yields on the 8.0% national bonds due February 1990, one can readily see over the period from March 1981 through March 1982 that the 6.1% coupon bonds had a much higher yield which averaged 67 basis points higher with a peak of 107 basis points in July 1981 and a low of 27 basis points higher in March 1982. See *Nomura Investment Review*. (Tokyo: Nomura Research Institute, April 1982), page 44. Thus, the "coupon effect" is very real and also quite persistent.

¹¹ The amount of new national bonds to be sold net of refunding was budgeted to be ¥12.027 trillion and ¥11.657 trillion in fiscal 1981 and 1982 respectively. See *Nomura Investment Review, op. cit.*, page 45.

¹² It must be realized that the method of calculating the yield-to-maturity in Japan is different from the method used in Europe and North America. For a good explanation of these methods see A. Kuroda and T. Okubo, *op. cit.*, pages 11-16.

EXHIBIT I. BOND YIELDS OF MAJOR COUNTRIES, DIFFERENCES, AND YEN EXCHANGE RATES

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
Date	Japan 10 ¥ Gov. %	U.S. 10 ¥ Gov. %	(2-3) × 100 basis points	U.K. 10 ¥ Gov. %	(2-5) × 100 basis points	W. Germ. Aver. Do. Bonds %	(2-7) × 100 basis points	Yen Rate ¥/\$ ¥	Yen Rate ¥/£ ¥	Yen Rate ¥/DM ¥	
1981	1	8.23	11.88	-365	13.97	-574	9.46	-123	202.0/\$	485.8/£	100.6/DM
	2	8.15	12.64	-449	13.84	-569	11.01	-286	205.9/\$	479.5/£	96.1/DM
	3	7.85	12.48	-463	13.66	-581	10.78	-293	208.8/\$	465.5/£	99.0/DM
	4	7.90	12.98	-508	13.66	-576	11.15	-325	215.1/\$	468.6/£	99.6/DM
	5	8.08	13.44	-536	14.40	-632	12.20	-412	220.7/\$	461.2/£	96.3/DM
	6	8.00	12.71	-471	14.69	-669	11.70	-370	224.2/\$	443.0/£	94.4/DM
	7	8.51	13.37	-486	15.28	-677	12.05	-354	232.0/\$	435.1/£	95.1/DM
	8	8.85	13.84	-499	15.23	-638	12.33	-348	233.7/\$	425.1/£	93.4/DM
	9	8.71	14.48	-577	15.81	-710	11.51	-280	230.0/\$	417.4/£	97.6/DM
	10	9.03	14.38	-535	16.34	-731	11.07	-204	231.4/\$	426.3/£	102.8/DM
	11	8.15	12.96	-481	15.72	-757	10.24	-209	223.7/\$	425.6/£	100.6/DM
	12	8.12	13.28	-516	16.00	-788	10.19	-207	218.9/\$	417.3/£	97.0/DM
1982	1	8.08	14.14	-606	15.44	-786	10.28	-220	224.6/\$	423.8/£	98.0/DM
	2	8.08	13.90	-582	15.09	-701	10.19	-211	235.2/\$	434.3/£	99.4/DM
	3	7.75	13.16	-541	14.01	-626	9.49	-174	240.7/\$	435.2/£	101.2/DM
	4	7.70	13.08	-538	14.20	-605	9.08	-138	244.9/\$	434.6/£	102.3/DM
	5	8.10	12.88	-478	13.92	-582	8.80	-70	236.9/\$	429.9/£	102.5/DM

Source of raw data: *Bond Market Indicators 1982/7, No. 55* (Tokyo: Daiwa Securities Co. Ltd., 1982).

EXHIBIT II. ISSUE TERMS ON NEW 10 YEAR NATIONAL BONDS AND MARKET YIELDS
ON EXISTING LONG-TERM NATIONAL BONDS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Issue number	Date of issue Year/Month/ Day of sale	Volume of new issues (Bill) ¥	Price % of par	Coupon rate %	Yield on new issue % subscriber's yld.	Average yield of Bonds on 1st of month (% mkt. yld.)	Average yield of Bonds of 1 day prior to sale (% mkt. yld.)	Average % yield of Bonds over 2 weeks prior to sale (market yield)	Diff. (6-7) × 100. (basis points)	Diff. (6-8) × 100. (basis points)	Diff. (6-9) × 100. (basis points)
33	56/3/20	510.6	89.75	8.00	8.227	8.15	7.95	8.010	+ 7.7	+27.7	+21.7
34	56/3/20	708.9	98.75	8.00	8.227	8.15	7.95	8.010	+ 7.7	+27.7	+21.7
35	56/4/20	300.2	98.75	8.00	8.227	7.85	7.843	7.824	+37.7	+38.4	+40.3
36	56/5/22	200.0	98.50	7.60	7.868	7.883	8.177	8.044	- 1.5	-30.9	-18.1
38	56/7/20	1000.0	98.00	7.60	7.959	8.057	7.967	7.977	- 9.8	- 0.8	- 1.8
39	56/8/20	500.0	98.00	7.60	7.959	8.223	8.410	8.337	-26.4	-45.1	-37.8
40	56/9/30	833.4	98.00	8.00	8.367	8.530	8.435	8.403	-16.3	- 6.8	- 3.6
41	56/9/30	666.6	98.00	8.00	8.367	8.530	8.435	8.403	-16.3	- 6.8	- 3.6
42	56/10/20	800.0	98.00	8.00	8.367	8.758	8.630	8.635	-39.1	-26.3	-26.8
42	56/11/20	700.0	98.00	8.00	8.367	8.640	8.062	8.414	-27.3	+30.5	- 4.7
42	56/12/20	700.0	98.25	7.70	8.015	8.100	8.077	8.010	- 8.5	- 6.2	+ 0.5
43	57/1/20	500.0	98.25	7.70	8.015	8.002	7.942	7.942	+ 1.3	+ 7.3	+ 8.3
44	57/2/20	700.0	98.25	7.70	8.015	7.988	7.968	8.042	+ 2.7	+ 4.7	- 2.7
45	57/3/20	1000.0	98.25	7.70	8.015	7.980	7.635	7.707	+ 3.5	+38.0	+30.8
46	57/4/20	800.0	98.25	7.50	7.811	7.753	7.783	7.747	+ 5.8	+ 2.8	+ 6.4
47	57/5/20	700.0	98.25	7.50	7.811	7.730	7.797	7.730	+ 8.1	+ 1.4	+ 8.1
Total sum									-70.7	+55.6	+38.7
Average									- 4.4	+ 3.5	+ 2.4

SOURCE: *Nihon Keizai Shimbun*.

rates on U.S. government 10 year bonds was 14.38% for a differential of 535 basis points above Japanese rates. Further, U.K. rates in October were 16.34% or 731 basis points above Japanese rates; whereas West German rates were 11.07% and 204 basis points higher. Finally for October the \$ was equal to 231.4¥, the £ was equal to 426.3¥, and the DM was equal to 102.8¥. It is clear from data in Exhibit I that interest rates in these developed countries move in closely related ways and that these interest rate levels and differentials affect exchange rates. It should be noted that Japanese interest and exchange rates are more closely related to rates in the U.S. and U.K. than to rates in West Germany. But, the message is clear that when there are large differences in interest rates the country with the higher interest rates will generally have an appreciating currency if everything else is the same. This condition is well described in the relationship between Japan and the U.S., but perhaps other factors such as inflation expectation differentials are affecting the exchange rate and interest rate relationships of Japan versus U.K. and Japan versus West Germany. Certainly these conditions existed in the secondary markets, but what was their effect upon the Japanese government's low-interest rate policy in the regulated primary market? Were interest rates in the primary market liberalized?

On Exhibit II, are listed the 16 issues of long-term national bonds which have been sold from January 1981 through May 1982. Each issue of national bonds has been given its specific number for easy identification. This number is found in column (1) and the date of issue of each long-term national bond issue is found in column (2).¹³ Columns (3), (4), (5) contain the volume, price, and coupon rate respectively. The calculated yield to maturity at the date of issue, or the subscriber's yield on each new issue is found in column (6).

Since we are concerned in this section with differences between subscriber's yield found in column (6) and market yields on comparable securities at approximately the same time, we must be careful to define how the market yields are going to be determined. Obviously, we want to measure the market yields on long-term national bonds which will be similar in maturity to the new issue. This desire is complicated by two factors: (1) no new government bonds are listed or traded on the Tokyo Exchange until after the first interest payment, and (2) "coupon effects" are often prevalent in market prices and yields of some of the low-coupon bonds. Even though over-the-counter quotes can be obtained on new issues before they are listed, we feel that these quotes are not reliable as there are few trades and the trades that do occur during this period before listing on the Tokyo Exchange tend

¹³ The first number in the date of issue is the year of Showa, the current reign and method of annual measurement in Japan. For easy reference the following Showa years correspond to the following Western calendar years:

1 Showa = 1926	30 Showa = 1955	55 Showa = 1980
10 Showa = 1935	40 Showa = 1965	56 Showa = 1981
20 Showa = 1945	50 Showa = 1975	57 Showa = 1982

to be "distress sales."¹⁴ Therefore, we chose to look only at the Tokyo Exchange yields on long-term national bonds with maturities of 9 years 0 months through maturities of 9 years 6 months and average the yields on these listed issues. Thus, yields in all listed national bonds with maturities of 9 years or longer were averaged to determine the market yields. Since the averages occasionally contain some bonds which have "coupon effects," it is hoped that the averaging process employed reduces the impact of this characteristic upon the analysis.¹⁵

After using a methodology of determining an average of all listed national bonds with a maturity of 9 years or more, the date when these yields are selected is critical. Since we said previously that the pricing of these issues occurs during the last week prior to the month of sale and during the first week of the sale month, an important yield to be used in the pricing is the average yield-to-maturity on long-term national bonds during this pricing period. In column (7) of Exhibit II is listed the average yield on the first day of trading in the month of sale. This is an average yield of all national bonds with maturities of 9 years or more which are listed on the Tokyo Exchange on this date. The difference between the subscriber's yield on each issue found in column (6) and this definition of market yield is found in column (10).

Another way of determining the market yield of national bonds is to determine the average of all listed national bonds with maturities of 9 year or more on the day before the date of issue. The average yields on long-term national bonds one day prior to the date of issue is found in column (8). The comparison between the subscriber's yields and market yields defined in this way is found in column (11).

The final method used to determine the market yield on listed and traded long-term national bonds is to measure the average yield on each issue which has a maturity of nine years or more on each day for two weeks prior to the date of issue. This average daily yield is found in column (9) and is the average of daily yields on all long-term national bonds of 9 years or longer maturity for the two weeks prior to the date of issue of each new national bond. For example, issue number 38 was sold 56/7/20, and thus the average yield of all long-term national bonds traded on the Tokyo Exchange each day from 56/7/3 through 56/7/19 were

¹⁴ Again remember that banks can not sell national bonds which they underwrote during the first three months of the bond's life. See footnote 1. The statement about "distress sales" is based upon an interview with representatives of Toyo Securities.

¹⁵ A reason why the difference between subscriber's yields and market yields found by the Japan Securities Research Institute discussed in footnote number 2 is so much higher than the differences found in this study is the fact that the Institute used over-the-counter quotes on one bond which was not yet listed and which had a "coupon effect." The reason why there was a "coupon effect" on the bond they priced is because its coupon rate was only 7.6% when the market was demanding over 9% on new issues and the coupon on new issues was 8.0%. Therefore, the Institute's yield was based upon only one security and in this case that security has a "coupon effect" which caused the yield to be higher than other national bonds of the same general maturity.

collected and averaged to obtain an average daily market yield of 7.977% found in column (9). The difference between subscriber's yields in column (6) and market yields defined in this manner is found in column (12).

Therefore, a most important part of Exhibit II is found in the comparisons between the subscriber's yields and the market yields defined in one of the three ways. These comparisons are found in columns (10), (11), and (12). The unit of measurement is basis points which are 1/100 of a percentage point. If subscriber's yields were one full percentage point less than the measured market yield on long-term national bonds, this would be represented in column (10), (11), and (12) as 100.0 basis points. Column (10) contains the average market yield of long-term national bonds less subscriber's yields during the critical pricing period at the first of each sales month. The data illustrate that there was a slight negative differential over all the sixteen issues between subscriber's yields and market yields, but in total it is only about 70 basis points, less than 1 percentage point, and about -4 basis points on each issue on average. However, using the definition of market yield as the average of the long-term national bond yields either during the two weeks prior to the date of issue or on the day before the date of issue, it is clear that the differences become slightly reversed. Subscriber's yields were a bit higher than market yields in total and on each issue on average. But notice this difference is quite small, less than 4 basis points on each issue, .0004. Therefore, these small differences may be entirely random and may not be significant.

An interesting phenomenon seems to be occurring in this market, namely the market yields tend to be highest relative to subscriber's yields during the critical pricing week, but market yields become more in line with subscriber's yields before the date of sale of a new issue of national bonds. Of the sixteen cases, twelve cases showed a decline in market yields after the first of the selling month, so that the comparison of market yields versus subscriber's yields was much closer at the date of sale than at the pricing date. Thus, it seems that it is a reasonable policy to slightly over price the new issue compared to existing listed issues during the first of the sales month, as the market yields have a tendency to decline on average during the period until the date of issue of the national bonds.

In summary, this study during a period when interest rates in Japan and other developed economies were high and when there was an increase in Japan national bond sales, has found that subscriber's yields and market yields are very close to one another. This study does not find that the characteristic of market yields being higher than subscriber's yields which has been found in past studies of the long-term national bond market valid in the long-term national bond market from 1981 through the middle of 1982. Therefore the condition of subscriber's yields less than market yields which has been called detrimental to the development of the primary bond market has been removed and subscriber's yields have been liberalized to be reasonably equal to current market yields on listed long-term national bonds. This brief study has found that conditions in the primary market for national bonds have improved to the point that previous impediments to its

efficiency and growth no longer exist. This is a good sign and if these conditions continue, these markets will grow and function efficiently to finance the future needs of the Japanese government.

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