Recommended

Conventions for the Norwegian Certificate and Bond Markets

Version 6.0

June 2024
www.finansfag.no

Preface

The NFF's Bond Committee has compiled *Recommended Conventions for the Norwegian Certificate and Bond Markets*. The aim has been to establish and maintain a set of guidelines for fixed income trading conventions in Norway. The first version of this document was compiled in 2001 and has thereafter been amended. Please see change log. This document will be available to the market in general, and will be published on NFF's web pages – www.finansfag.no.

The NFF's Bond Committee consists of:

Christian Heggen, DnB, chairman
Nils Gunnar Baumann, Kommunalbanken
Morten Bredesen, Nordic Trustee
Henrik Fosby, Nordic Bond Pricing
Maria Granlund, Alfred Berg Kapitalforvaltning
Erlend Hellum, Folketrygdfondet
John Hoel, Danske Bank
Jacob Børs Lind, Danske Capital
Phillip Oksnes, KLP

Atle Sigmundstad, Pareto Securities, and Odd Weidel, Nordea Markets, have compiled and written the first version this document.

Alexandra H. Larsen and Karl Johan Haarberg are responsible for the English version of the first version of this document.

This is only a recommendation. Each individual must assess whether this recommendation is appropriate for their purpose.

Finance Society Norway (Forening for finansfag Norge)
Oslo, June 2024

Table of contents

CHANGE LOG

Date	Version number	Chapter	Amendment
February 2001			Initial version of this document
18th May 2015	3.0	2.6 and 2.9	• Amended description of ex-coupon period according to new convention implemented for bonds having coupon date as of 2nd April 2015 and which are registered in VPS.
		4.1	• Amended to reflect introduction of settlement cycle of T+2 for bonds. • Amended last possible settlement date before maturity
		4.3	• Clarified that banking days are also used for FRNs.
		4.4	• Updated description of allocation of tickers for listed bonds.
28th January 2020	4.0	2.4	• Clarification in headline that the description applies to fixed rate bonds
		2.4	• Added description of the convention for yield calculation for trades having settlement date up to and including settlement date for payment of the initial issue
		2.4	• Added description that future coupon periods

			are calculated using day count convention 30E/360 for fixed rate bonds
14. March 2022	5.0	1	• Including FRNs with Nowa as the reference rate
		2.6	• Added calculation of accrued interest for FRNs with Nowa as the reference rate
			• Updated examples to better reflect current interest rates
		5	• Removed chapter on ISIN
4. April 2024	6.0	2.4	• For bonds with Nowa as the reference rate, Nibor in the formula is replaced with compounded Nowa

1 INSTRUMENTS / TYPES OF SECURITIES

Security	Market quote	Yield calculation	Coupon payment	Accrued interest
Deposits/ Repos	Nominal annual interest rate	To maturity	Actual/365	Actual/365
Unlisted Certificates	Nominal annual interest rate	To maturity	Actual/365	Actual/365
Listed Private Certificates	Price or nominal annual interest rate	To maturity	Actual/365	Actual/365
Listed Treasury Bills	Price or annual yield	To maturity	Zero coupon	Zero coupon
Bonds (maturity/interest reset date < 1 year)	Price or nominal annual interest rate	To maturity or next interest reset date	30/360 (not modified)	Actual/365
Floating Rate Notes (FRNs)	Price or spread to NIBOR	FRN trades on a discount margin	Actual/360 (modified)	Actual/360
Floating Rate Notes (FRNs)	Spread against Nowa or price	FRNs trades on a discount margin	Actual/365 (modified)	Actual/365
Bonds (maturity > 1 year)	Price or annual yield	Term to maturity or next interest reset date	30/360 (not modified)	Actual/365

- Not modified, i.e. the coupon date is not adjusted (moved) even though the date is a non-banking day. Coupon payment is made on the first subsequent banking day. (See section 2.8.)

- Modified, i.e. the coupon payment date has to be a banking day, and this should be made clear in the terms of the issue/indenture. Coupon payment is due on that day. (See section 2.8.)

2 INTEREST RATE AND PRICE CONVENTIONS

2.1 Yield on deposits

The yield is the annualised, capitalised return on an investment in a given period.

In Norway, the yield on deposits with a term less than 12 months is calculated according to the following formula:

$$Yield = \left(\left(1 + \frac{\frac{r_{nom}}{100}}{n} \right)^{n} - 1 \right) \cdot 100$$

where:

r_{nom} = coupon interest
n = number of periods per year

Example:

A nominal interest rate of 2% p.a. with semi-annual payments gives:

$((1+0.02/2)^2-1) * 100 = 2.01\%$

Implied assumptions in the above example:
The principal amount and the accrued interest are reinvested at the same nominal rate of interest, throughout the investment period.

2.2 Calculating bond yields

The formula for calculating bond yields can be derived from the formula for calculating bond prices. (See section 2.4.)

For Norwegian fixed rate bonds, 30/360 (not modified) interest rate conventions apply. (It should be noted that fixed rate issues with a semi-annual coupon where 28 February and 29, 30 or 31 August are coupon dates, will not comprise terms of 180 days.)

Definition:

Interest is calculated on the basis of a 360-day year, comprising 12 months each of 30 days, with the exception of periods where:

a) the last day of the period is the 31st calendar day, and the first day of the period is neither the 30th nor the 31st of the month, in which the month containing the last day of the period shall not be reduced to 30 days; or

b) the last day of the period is the last calendar day in February, in which February shall not be extended to a 30-day month.

2.2.1 Yields for fixed rate bonds with put/call/reset clauses

Yield is calculated to the next put/call/interest-reset date, unless otherwise specified. (See section 2.1.2.)

2.2.2 Yields on amortisation issues where the next capital repayment is known and the coupon for the next period is fixed

For bond transactions made when the redemption has taken place, and the nominal rate of interest for the next term is fixed, yet prior to the term date, the nominal principal amount of the transaction and the yield shall be calculated excluding the repayment, unless otherwise specified.

2.2.3 Coupon

This is the nominal rate of interest for a security. The coupon is set on the issue of a security, and applies for a specific period.

2.3 Nominal rate of interest

This is the nominal rate of interest, expressed as an annual rate, for the period in question. For example, NIBOR, a certificate rate or some other agreed interest rate defined within a 12-month horizon. For a 6-month certificate with a 2% coupon, the nominal rate of interest at the start of the certificate will be 2% at par value (100). This will also be the nominal rate of interest earned if the certificate is held to maturity. The yield will be higher. (See formula in 2.1.)

2.4 Formula for calculating bond prices for bonds having fixed coupon rates

Both listed and unlisted bonds are traded at quoted prices. The price is calculated on the basis of the transaction rate of interest, which provides the basis for calculating the amount due. This amount can be split into two components, accrued interest and capital sum. Accrued interest is not rounded off. The capital sum is calculated by multiplying the

nominal amount with the price (rounded off and calculated on the basis of the total amount).

The amount paid can also be expressed as follows:

Total cost = clean price + accrued interest = present value of cash flows

The present value of cash flow (with annual payments)

$$K = \sum_{t=1}^{n} C_t \cdot (1+r)^{-t}$$

C_t= cash flow in year t
r= discount rate
t= time in years to the payment date

This gives us the following formula for price given a yield on a trade having settlement date up to and including payment date for the initial issue:

$$P = \sum_{j=1}^{n} \left(\frac{A_j}{(1+y)^{t_j}} \right)$$

A_j	=	Cash flow on the payment date j, i.e. the total coupon interest plus capital repayment
j	=	Number of this payment
t_j	=	Number of years for cash flow j calculated using day count convention 30E/360
n	=	Number of remaining payments
P	=	Price as a percent of nominal value
y	=	Yield

With regard to bonds traded during a term, accrued interest and the 'odd' term occurring at the start of the period must be taken into account. Accrued interest is calculated and paid out on the basis of actual days/365. The year is then divided into equal periods using day count convention 30E/360 for bonds having fixed coupon rate. This gives the following formula, which applies for terms of equal length, except the first, odd period.

$$P + I = \sum_{j=1}^{n} \frac{A_j}{(1+y)^{\left(\frac{t}{365} + Uj\right)}}$$

I	=	Accrued interest on settlement day
Uj	=	Number of years from next coupon date to coupon date j using day count convention 30E/360
t	=	number of calendar days from settlement date to the next payment date (including leap years). If settlement occurs on a coupon date, t = 0

(*N.B: the cash flows for Norwegian fixed rate bonds are discounted in accordance with the Norwegian interest rate conventions*.)

This gives us the price (P) of the bond in NOK. In order to find the clean price or rate, the price is divided by the nominal principal amount purchased.

$$\text{Rate} = \frac{\text{P}}{\text{Face value}}$$

Accrued interest is calculated as follows (in this case for fixed rate loans):

$I = C \cdot \frac{t}{365}$ (365 is also used in leap years)

where:

C	=	annual coupon rate in per cent
t	=	actual number of calendar days (incl. leap years) between settlement date and previous coupon payment (Also see section 2.6.)

Example 1. Calculating bond prices

Coupon = 2,125 %
Maturity date = 18. May 2032
Settlement date = 16. February 2022
Yield = 2,1325 %
No. Days to next coupon payment = 91 (=> 91/365 = 0,2493)

$$K = 2{,}125 * (1{,}021325)^{-0{,}2493} + 2{,}125 * (1{,}021325)^{-1{,}2493} + 2{,}125 * (1{,}021325)^{-2{,}2493} + 2{,}125 * (1{,}021325)^{-3{,}2493} + 2{,}125 * (1{,}021325)^{-4{,}2493} + 2{,}125 * (1{,}021325)^{-5{,}2493} + 2{,}125 * (1{,}021325)^{-6{,}2493} + 2{,}125 * (1{,}021325)^{-7{,}2493} + 102{,}125 * (1{,}021325)^{-8{,}2493} - (1 - 0{,}2493) * 2{,}125$$

$$K = 2{,}1139 + 2{,}070 + 2{,}0265 + 1{,}9842 + 1{,}9022 + 1{,}8625 + 1{,}8236 + 85{,}8096 - 1{,}5952$$
$$265 + 1{,}9842 + 1{,}9022 + 1{,}8625 + 1{,}8236 + 85{,}8096 - 1{,}5952$$

$$K = 99{,}9396 \approx 99{,}94$$

2.4.1 Formula for calculating the price of floating rate notes (FRNs)

$$\boldsymbol{P} = \frac{\sum_{i=2}^{N}\left[\frac{\left(Nibor_{Spot}+Kup\ spread\right)*HS_i*\frac{d_i}{360}+Avdrag_i}{\prod_{j=2}^{i}\left(1+(Nibor_{Spot}+DM)*\frac{d_j}{360}\right)}\right]+\frac{HS_{N+1}}{\prod_{j=2}^{N}\left(1+(Nibor_{Spot}+DM)*\frac{d_j}{360}\right)}+Gjeldende\ Kup*HS_1*\frac{d_1}{360}}{1+\left(Nibor_{T_1}+DM\right)*\frac{dager_{T_1}}{360}} - AI$$

P	Clean Price
AI	Accrued Interest
N	Number of coupon payments remaining
$Nibor_{Spot}$	Today's Nibor with the same maturity as the coupon period
$Kup\ spread$	Contractual coupon
$Current\ Kup$	The current coupon rate of the bond
HS_i	Principal in period *i*
d_i	Number of days in the coupon period *i*
Installments	Installments in period *i*
DM	Discount Margin
$Nibor_{T1}$	Nibor rate from settlement to first coupon
$days_{T1}$	Number of days from settlement to first payment

For bonds with Nowa as the reference rate, Nibor in the formula is replaced with compounded Nowa. Compounded Nowa is calculated as described in the bond's loan agreement.

2.5 Rounding off

Bonds with more than 12 months to maturity are quoted to two decimal places on the Oslo Stock Exchange. Two decimals are used when converting yield to price; the price in the example above would have been converted to 99.94.

Bonds with less than 12 months to redemption and certificates are quoted to four decimal places on the Oslo Stock Exchange. Unlisted certificates quoted in terms of interest rates, are converted to prices. Four decimals are used in converting a nominal interest rate to price. The amount is rounded off to the nearest whole NOK.

2.6 Calculation of accrued interest for bonds (secondary market)

Accrued interest is calculated as follows:

$$I = C \cdot \frac{t}{365}$$

where:

C	=	coupon interest in per cent p.a.
t/365	=	actual number of calendar days between the settlement date and the previous coupon date divided by 365 (360 for loans with a floating interest rate linked to NIBOR)

The coupon interest up to settlement day t for bonds with Nowa is calculated as follows: The recommended interest convention is capitalized average rate calculated using the shifting observation period. The number of days per observation shift is specified in the loan agreement, but two or five days are most common.

$$C_t = \frac{365}{E_d - S_d} \times \left[\prod_{u \in AP_{S,E}} \left(1 + \delta_{u,u+1} \times Nowa_u\right) - 1 \right]$$

Where

S_d is the start date in the observation period that begins d banking days before the previous coupon date
E_d is the end date in the observation period is d banking days before settlement day t
$\delta_{x,y}$ is the day count fraction is from and including calendar day x up to, but not including, calendar day y

$$\delta_{x,y} = \frac{number\ of\ days\ between\ x\ and\ y}{365}$$

$AP_{S,E}$ are all fixing days for Nowa in the observation period up to settlement day t
u denotes a fixing day
$u + 1$ denotes the fixing day immediately following fixing day u
$Nowa_u$ is Nowa the overnight rate on the rate day u

In bonds where the coupon interest is calculated based on the Nowa Yield Index (Nowai), the coupon interest up to the settlement date (t) can be calculated as follows:

$$C_t = \left[\frac{Nowai_{E_d}}{Nowai_{S_d}} - 1\right] \cdot \frac{365}{E_d - S_d}$$

Accrued interest for bonds using Nowa as the reference rate is calculated as follows:

$$I = C_t \cdot \frac{t}{365}$$

Clarifications:

1. Accrued interest is to be calculated according to the number of calendar days over 365 (360) days, from and including the previous payment, alternatively settlement date for payment of the issue, up to but not including the payment date. However, see clause 5 below.

2. In leap years, 29 February is counted in, divided by 365.

3. Accrued interest at the year-end shall, for taxation purposes, be calculated on 1 January. In practice, this means at 2400 on 31 December or at 0000 on 1 January. This definition requires that 1 January is the settlement day. For periodic settlements and calculations, most models use the actual settlement day, or 31 December. As a result, accrued interest is calculated up to and including 30 December (to 31 December). In order for the system reports of this type to match with statements from the Norwegian Registry of Securities (VPS) which form the basis of calculation of wealth tax, 1 January has to be used as the settlements date. Alternatively, a separate calculation can be made for accrued interest at the year-end.

4. The entire coupon will be paid to the investor holding the bonds on 2 banking day prior to the payment date. This means that trades carried out in the ex-coupon period (The ex-coupon period starts 1 banking day prior to the interest payment date, confer clause 2.8.) are made on the basis of subtracting interest. Minus interest is calculated as from the settlement date until the next interest payment date, or the date on which a bond is interest bearing.

5. For FRNs (‘floaters’) where coupons are calculated on the basis of actual days/360, accrued interest is calculated in the same manner, using actual days/360 basis.

6. Nowa and Nowai for interest day t are published at 09:00 on day t+1. Therefore, calculation of accrued interest and dirty price upon secondary market trading can only be done after 09:00 on the trading day for bonds with a two-day observation period and two-day settlement.

2.7 Principles for calculating repo transactions

The name "repo" is derived from the English phrase "repurchase agreement". A repo involves lending or borrowing a security for a given period. A spot price is agreed. Thereafter, the forward price is calculated, based on an agreed interest rate. The rate of interest at which the trade is agreed, (i.e. the repo rate), is based on the equivalent short money market rate over the same period.

2.7.1 Calculating repo rates

Calculating the repurchase value of a security on a repo's maturity date, requires a series of calculations of the various cash flows that arise:

$$\text{Interest} = \frac{D \cdot r_{repo} \cdot d}{100 \cdot 365}$$

where:

D	=	dirty price, spot
r_{repo}	=	agreed repo rate
d	=	repo term in days

This gives us the amount of interest due on the repo's maturity date. However, contract notes are based on a price, and thus we have to do the following calculation to find the price:

$$P_r = \frac{\text{Nominal value} \cdot c \cdot d}{100 \cdot 365}$$

where:

P_r	=	accrued interest on the security during the repo period
c	=	coupon

Settlement interest – P_r = interest rate differential in NOK.

To determine what the interest rate difference is in basis points (bps), in relation to the nominal value of the security traded; we simply put

$$\text{Interest rate differential in bps} = \frac{\text{spread (in NOK)} \cdot 100}{\text{Nominal value}}$$

which gives us:

Market price + interest rate differential in bps = closing price

2.7.2 Treatment of coupon payments due during a repo

The agreed repo rate does not represent an interest rate that is actually paid, but it is used in order to calculate the repurchase price. In the repurchase price calculation, the repo rate used is based on the actual number of days (actual/365). In the event that the coupon falls due for payment during the term of the repo, it is assumed that the coupon is reinvested at the repo rate for the remainder of the period.

Example 2: A repo transaction

Underlying security: NST 484

Repo term	=	23.02.22 to 28.02.22 (5 days)
Coupon	=	2.152% p.a.
Maturity	=	18.05.32
Yield	=	2.1325% (i.e. start price 999396)
Repo rate	=	0.75% p.a.
Principal	=	NOK 50 million (nominal value)
Accrued int.	=	16.02.22 to 23.02.22 (7 days)

Dirty price: $\frac{50.000.000*99,9396}{100} + \frac{50.000.000*2,125*7}{100*365} = 49.990.176,71$

Repo rate in NOK: $\frac{49.990.176,71*0,75*5}{100*365} = 5.135,98$

Accrued interest: $\frac{50.000.000*2,125*5}{100*365} = 14.554,79$

Interest rate differential in NOK: -9.418,82

Interest rate differential in bps: -0,0188376

On lending securities, the price is (28.02.22): 99,9208 ≈ 99,92

2.8 Treatment of coupons that theoretically are paid on non-banking days

Security	Modified payment date	Modified amount	Coupon payment	Accrued interest
Deposits / Repos	Yes	Yes	Actual/365	Actual/365
Unlisted Certificates	Yes	Yes	Actual/365	Actual/365
Listed Private Certificates	Yes	Yes	Actual/365	Actual/365
Listed Treasury Bills	Yes	Zero coupon	Zero coupon	Zero coupon
Bonds (Maurity/interest reset date < 1 year)	No	No	30/360 (not modified)	Actual/365
Bonds with a floating interest rate using NIBOR as the reference rate"	Yes	Yes	Actual/360	Actual/360
Bonds with floating interest rates using Nowa as the reference rate	Yes	Yes	Actual/365	Actual/365
Bonds (Maturity > 1 year)	No	No	30/360 (not modified)	Actual/365

Normal price calculation of fixed rate bonds does not take into account that the actual coupon payment date varies from the theoretical (calculated) coupon date (i.e. there are no 'true-yield' calculations). In general, payment is made on the first following banking day. That is, a coupon that in theory should have been paid on a Saturday is paid on the first following banking day, usually a Monday. In other words, neither the payment date (not modified) nor the amount (fixed amount) is adjusted. The opposite is the case for Floating Rate Notes.

These factors do affect, to a certain degree, quoted bond yields where the actual cash flow differs from the theoretical. The idea behind a repo agreement is that an investment or funding transaction can be done at the repo rate, with the underlying security as collateral. Hence coupon payments are to be reinvested or discounted based on the actual payment date.

However, in a loan agreement, the choice of interest rate convention is optional.

The problem should not apply to transactions in certificates.

2.9 Settlement during the ex-coupon period

For issues in which the original term to maturity is more than 12 months, the ex-coupon period starts 1 banking day prior to the interest payment date. The ex-coupon amount is also calculated for the last period before final maturity. For trades executed during this period, the accrued interest will be negative.

$$I = C \cdot \frac{-t_2}{365}$$

where:

C	=	coupon interest in per cent p.a.
t_2	=	actual number of calendar days between settlement date and the next interest payment date

After amending the convention in April 2015, record date for coupon payments are the same both for bonds having original term to maturity of more than 12 months and certificates.

3 CALENDAR CONVENTIONS

3.1 28 February and coupon payments

Coupon payments for fixed rate bonds are made on the basis of whole months (30/360 not modified), and the amount is identical each time. In the event that the coupon date is 28 February, the coupon payment is usually made for the whole number of months after the previous coupon payment. This also applies in leap years, unless otherwise agreed in the loan agreement. Fixed rate bonds would not normally have an interest payment due on 29 February.

In the case of fixed rate bonds with semi-annual payments, the interest payment date is usually on the same calendar day in the respective months. If the interest payment dates are on different calendar dates, then the loan agreement shall include precise details concerning the calculation and size of each payment.

3.2 End of month conventions for FRNs

As a general principle, use of the ‘modified following business day’ is recommended for FRNs, as this is the principle used for NIBOR. If the payment date is not a banking day, the modified following business day convention implies that the payment date is moved to the first following banking day. However, if this action results in the date being moved

to a different month, the payment date is moved to the first banking day prior to the original payment date.

Alternatively, the 'following business day' principle can be used. In this case, it is acceptable to move the payment date to the following calendar month.

The choice of principle shall be clearly specified in both the loan agreement and the loan description document.

3.3 End of month conventions for fixed rate bonds

Payments/value dating for fixed rate bonds are made on the interest payment date. If this falls on a non-banking day, payment is made on the following banking day regardless of whether this is the following month or not. Even though the coupon date is moved, bondholders will not receive any compensation (30/360 not modified).

4 TRADING CONVENTIONS

4.1 Settlement days

Bonds and certificates are traded with settlement 2 trading days after the trade date. A business day will normally be a banking day, and vice versa. Exception is New Year's Eve, which is a banking day, but not trading (business) day. Deviating settlement cycle may be agreed upon.

The final settlement day for a bond or certificate is 2 banking days prior to redemption. This is also the last possible date for increasing the issue.

4.2 Settlement routines in the event of non-delivery

The underlying principle is that Norwegian law applies. In practice, a situation in which one of the parties to a trade fails to deliver (cash or securities) is corrected by completing settlement as soon as practically possible, as the parties are under an obligation to, and normally want to complete the transaction.

4.2.1 In the event that the seller is unable to deliver the securities

General practice has been to delay settlement by one day. The buyer pays the same agreed trade price, the following banking day. As a result, the repo rate is zero, and involves a considerable economic penalty for the seller who is not necessarily the offending party.

Hence, the NFF makes the following recommendation: settlement is delayed by one business day. The buyer and seller agree on a compensation interest (i.e. a new repo rate) for the day in question, and a new price is calculated.

4.2.2 Should the buyer have insufficient funds

In the event that the buyer has insufficient funds:
NFF recommends that settlement be postponed by one banking day. The buyer and seller agree on a compensation interest (i.e. a new repo rate) for the day in question, and a new price is calculated.
In both cases, the party who does not receive delivery, be it cash or securities, may demand penalty interest from the party causing non-delivery, in order to cover e.g. direct costs arising from the failed trade (such as settlement of other trades failing as a result of the non-delivery of securities from the first trade).

4.3 Put/call – period of notice

Type of security	Put/call period of notice
Fixed rate loans	15/30 banking days are normal
FRNs	15 banking days normal put notice.
Certificates	None

For issues with a callable step-up interest rate, confer the loan agreement.

4.5 Calculation of interest rates (as from – to)

When calculating coupon payments, interest is calculated as from the previous interest payment date, to the subsequent payment date (as from ddmmyy to DDMMYY). In the same way, accrued interest, in connection with transactions on days that are not interest payment days, is calculated from and including the previous interest payment date to the settlement date (as from ddmmyy to DDMMYY).

This method of calculation applies to all interest bearing securities (fixed rate bonds, FRNs and certificates).