

Topic: Callable Bonds

Ally buys a 10 year callable bond. The bond matures at the end of 10 years for 10,000. The bond has semi-annual coupons at a rate of 7.5% convertible semi-annually.

The bond can be called at the end of 5 years for a call value of 10,225.

The bond can be called at the end of 7 years for a call value of 10,125.

The bond can be called at the end of 9 years for a call value of 10,050.

The bond is purchased to yield 7% convertible semi-annually.

Determine the price of the bond.

Solution:

Calculate the value at each call date and the maturity date and select the lowest price.

N	I/Y	PMT	FV	CPT PV
10	3.5	$(10,000)(0.0375)=375$	10,225	10,367.42
14	3.5	375	10,125	10,350.24
18	3.5	375	10,050	10,356.66
20	3.5	375	10,000	10,355.31

The lowest present value is the price → 10,350.24

The Vinyard Corporation issues a 10 year callable bond. The bond matures for its par value of 10,000. The bond has coupons payable semi-annually at a rate of 7.5% compounded semi-annually.

The bond is callable at the end of 6 years with a call value of 10,250.

The bond is callable at the end of 8 years with a call value of 10,125.

The bond is purchased to yield 6.8% compounded semi-annually.

Determine the price of the The Vinyard's bond.

Solution:

n	I/Y	PMT	FV	CPT PV
(6)(2)=12	6.8/2=3.4	(10,000)(0.075/2)=375	10,250	10,507.59
(8)(2)=16	3.4	375	10,125	10,499.70
(10)(2)=20	3.4	375	10,000	10,501.97

Answer is lowest price of 10,499.70

ROPS Corporation issues a 25 year callable bond with a par and maturity value of 100,000. The bond has semi-annual coupons at a rate of 8% convertible semi-annually.

The bond is callable at the end of 10 years. The call value at the end of 10 years is 119,500.

The bond is callable at the end of 15 years. The call value at the end of 15 years is 114,500.

Calculate the price of this bond to ensure a yield of 6% convertible semi-annually.

Solution:

N	I/Y	PMT	FV	CPT PV
(10)(2) = 20	6%/2 = 3	(100,000)(0.08/2) = 4000	119,500	125,674.15
(15)(2) = 30	3	4000	114,500	125,574.25
(25)(2) = 50	3	4000	100,000	125,729.76

We select the lowest price so Price = 125,574.25

A callable bond matures at the end of 20 years for 10,000. The bond pays coupons at a rate of 7% convertible semi-annually.

The bond can be called at the end of 14 year for a call value of 10,500. The bond can be called at the end of 16 years for a call value of 10,350. Finally, the bond can be called at the end of 18 years for a call value of 10,200.

Determine the price of this callable bond to yield a return of 7% convertible semi-annually.

Solution:

I/Y	N	FV	PMT	CPT PV
7/2=3.5	14*2=28	10,500	(10,000)(0.07/2)=350	10,190.83
3.5	32	10,350	350	10,116.41
3.5	36	10,200	350	10,057.97
3.5	40	10,000	350	10,000.00

Price is 10,000 since that is the lowest price.

A callable bond matures at the end of 20 years for its par value of 10,000. The bond pays coupons at a rate of 7% convertible semi-annually.

The bond can be called at the end of 14 years for a call value of 10,500. The bond can be called at the end of 16 years for a call value of 10,350. Finally, the bond can be called at the end of 18 years for a call value of 10,200.

Determine the price of this callable bond to yield a return of 6% convertible semi-annually.

Solution:

N	I/Y	PMT	FV	CPT PV
(14)(2)=28	6%/2=3	(10,000)(0.07/2)=350	10,500	11,156.74
(16)(2)=32	3	350	10,350	11,155.36
(18)(2)=36	3	350	10,200	11,160.62
(20)(2)=40	3	350	10,000	11,155.74

Price = 11,155.36

A 20 year callable bond has a maturity value equal to the par value of 20,000 and semi-annual coupons paid at a coupon rate of 7.5% convertible semi-annually. The bond may be called at the end of 12 years for a call value of 21,500. The bond may be called at the end of 15 years for a call value of 20,800. Finally, the bond may be called at the end of 18 years for a call value of 20,300.

Yang purchased the bond at issue to yield 6% convertible semi-annually.

Determine the price that Yang paid.

Solution:

Calculate the value at each call date and the maturity date and select the lowest price.

N	I/Y	PMT	FV	CPT PV
24	3	$(20,000)(0.0375)=750$	21,500	23,278.23
30	3	750	20,800	23,269.66
36	3	750	20,300	23,378.35
40	3	750	20,000	23,467.22

The lowest present value is the price → 23,269.66

Jackson purchases a callable bond. The bond matures at the end of 20 years for 52,000. The bond pays semi-annual coupons of 1300.

The bond can be called at the end of 14 years. The call value is 54,925.

The bond can be called at the end of 16 years. The call value is 53,950.

The bond can be called at the end of 18 years. The call value is 52,975.

Jackson buys the bond to yield 4% convertible semi-annually.

Determine the price of the bond.

Solution:

Calculate the price at each call date and the maturity date and pick the lowest price.

$$\boxed{I/Y} \leftarrow 4\% / 2 = 2; \boxed{PMT} \leftarrow 1300$$

<i>N</i>	<i>FV</i>	<i>PV</i>
28	54,925	59,123.20
32	53,950	59,136.50
36	52,975	59,105.07
40	52,000	59,112.42