

5.7: Pricing and Reporting Term Bonds

Learning Objectives

At the end of this section, students should be able to meet the following objectives:

1. Understand the difference between a stated interest rate in a debt contract and an effective interest rate negotiated by the debtor and creditor.
2. Compute the price of a term bond when the stated cash interest rate is different from the effective interest rate.
3. Determine the amount of interest to be compounded each period when the stated cash interest rate is different from effective interest rate.
4. Prepare all journal entries for a term bond when the stated cash interest rate is different from the effective interest rate.

Question: If the buyer and the seller negotiate an effective rate of interest that is the same as this stated rate, an amount equal to face value is paid for the bond. If the stated interest to be paid is 7 percent each year and a negotiated annual rate of 7 percent is accepted by the parties, the bond is issued for face value. No discount or premium results; the debtor and creditor are satisfied with the interest being paid. The effective rate method is not needed because the cash interest and the effective interest are the same—7 percent is paid and recognized as interest.

However, the negotiated rate often differs from the cash rate stated in a bond contract. Market interest rate conditions change quickly. The interest that creditors demand will often shift between the printing of the indenture and the actual issuance day. Or the financial reputation of the company might vary during this time. Information travels so quickly in this technology age that news about companies—both good and bad—spreads rapidly throughout the business community.

To illustrate, assume that Smith Corporation decides to issue \$1 million in bonds to the public on January 1, Year One. These bonds come due in four years. In the interim, interest at a stated cash rate of 5 percent will be paid each year starting on December 31, Year One. These are term bonds because interest is conveyed periodically by the debtor but the entire face value is not due until the end of the term.

No investors can be found who want to purchase Smith Corporation bonds with only a 5 percent annual return. Therefore, in setting an issuance price, annual interest of 6 percent is negotiated. Possibly, interest offered by other similar companies is 6 percent so that Smith had to match this rate to entice investors to buy its bonds. Or some event has taken place recently that makes Smith seem slightly more risky causing potential creditors to demand a higher rate of return. A list of market conditions that can impact the price of a bond would be almost unlimited. How is the price of a bond calculated when the stated cash rate is different from the effective rate that is negotiated by the two parties involved?

Answer: The pricing of a bond always begins by identifying the cash flows established by the contract. These amounts are set and not affected by the eventual sales price. The debtor is legally obligated to make these payments regardless of whether the bond is sold for \$1 or \$10 million.

Here, Smith Corporation must pay \$50,000 per year in interest (\$1 million \times 5 percent) for four years and then the \$1 million face value:

Cash Flows in Bond Contract

\$50,000 annually for four years

\$1,000,000 in four years

After the cash flows are identified, the present value of each is calculated at the negotiated rate. These present values are then summed to get the price to be paid for the bond. The \$50,000 interest payments form an annuity since equal amounts are paid at equal time intervals. Because this interest is paid at the end of each period starting on December 31, Year One, these payments constitute an ordinary annuity¹. As determined by table, formula, or Excel spreadsheet, the present value of an ordinary annuity of \$1 at an effective annual interest rate of 6 percent over four years is \$3.46511². Thus, the present value of the four interest payments is \$50,000 times \$3.46511 or \$173,256 (rounded). Note that the present value computation requires the multiplication of one annuity payment (\$50,000) rather than the total of the interest payments (\$200,000).

Present Value of an Ordinary Annuity of \$1

Periods	PRESENT VALUE OF ORDINARY ANNUITY (annuity in arrears -- end of period payments)															
	RATE PER PERIOD															
	0.25%	0.50%	0.75%	1.00%	1.50%	2.00%	2.50%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%	12.00%
1	0.99751	0.99502	0.99256	0.99010	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593	0.91743	0.90909	0.89286
2	1.99252	1.98510	1.97772	1.97040	1.95588	1.94156	1.92742	1.91347	1.88609	1.85941	1.83339	1.80802	1.78326	1.75911	1.73554	1.69005
3	2.98506	2.97025	2.95556	2.94099	2.91220	2.88388	2.85602	2.82861	2.77509	2.72325	2.67301	2.62432	2.57710	2.53129	2.48685	2.40183
4	3.97512	3.95050	3.92611	3.90197	3.85438	3.80773	3.76197	3.71710	3.62990	3.54595	3.46511	3.38721	3.31213	3.23972	3.16987	3.03735
5	4.96272	4.92587	4.88944	4.85343	4.78264	4.71346	4.64583	4.57971	4.45182	4.32948	4.21236	4.10020	3.99271	3.88965	3.79079	3.60478
6	5.94785	5.89638	5.84560	5.79548	5.69719	5.60143	5.50813	5.41719	5.24214	5.07569	4.91732	4.76654	4.62288	4.48592	4.35526	4.11141
7	6.93052	6.86207	6.79464	6.72819	6.59821	6.47199	6.34939	6.23028	6.00205	5.78637	5.58238	5.38929	5.20637	5.03295	4.86842	4.56376
8	7.91074	7.82296	7.73681	7.65168	7.48593	7.32548	7.17014	7.01969	6.73274	6.46321	6.20979	5.97130	5.74664	5.53482	5.33493	4.96764
9	8.88852	8.77906	8.67158	8.56602	8.36052	8.16224	7.97087	7.78611	7.43533	7.10782	6.80169	6.51523	6.24689	5.99525	5.75902	5.32825
10	9.86386	9.73041	9.59958	9.47130	9.22218	8.98259	8.75206	8.53020	8.11090	7.72173	7.36009	7.02358	6.71008	6.41766	6.14457	5.65022
11	10.83677	10.67703	10.52067	10.36763	10.07112	9.78685	9.51421	9.25262	8.76048	8.30641	7.88687	7.49867	7.13896	6.80519	6.49506	5.93770
12	11.80725	11.61893	11.43491	11.25508	10.90751	10.57534	10.25776	9.95400	9.38507	8.86325	8.38384	7.94269	7.53608	7.16073	6.81369	6.19437
13	12.77532	12.55615	12.34235	12.13374	11.73153	11.34837	10.98318	10.63496	9.98565	9.39357	8.85268	8.35765	7.90378	7.48690	7.10336	6.42355
14	13.74096	13.48871	13.24302	13.00370	12.54338	12.10625	11.69091	11.29607	10.56312	9.89864	9.29498	8.74547	8.24424	7.78615	7.36669	6.62817
15	14.70420	14.41662	14.13699	13.86505	13.34323	12.84926	12.38138	11.93794	11.11839	10.37966	9.71225	9.10791	8.55948	8.06069	7.60608	6.81086
16	15.66504	15.33993	15.02431	14.71787	14.13126	13.57771	13.05500	12.56110	11.65230	10.83777	10.10590	9.44665	8.85137	8.31256	7.82371	6.97399
17	16.62348	16.25863	15.90502	15.56225	14.90765	14.29187	13.71220	13.16612	12.16567	11.27407	10.47726	9.76322	9.12164	8.54363	8.02155	7.11963
18	17.57953	17.17277	16.77918	16.39827	15.67256	14.99203	14.35336	13.75351	12.65930	11.68959	10.82760	10.05909	9.37189	8.75563	8.20141	7.24967
19	18.53200	18.08236	17.64683	17.22601	16.42617	15.67846	14.97889	14.32380	13.13394	12.08532	11.15812	10.33580	9.60360	8.95011	8.36492	7.36578
20	19.48449	18.98742	18.50802	18.04555	17.16864	16.35143	15.58916	14.87747	13.59033	12.46221	11.46992	10.59401	9.81815	9.12855	8.51356	7.46944
21	20.43340	19.88798	19.36280	18.85698	17.90014	17.01121	16.18455	15.41502	14.02916	12.82115	11.76408	10.83553	10.01680	9.29224	8.64869	7.56200
22	21.37995	20.78406	20.21121	19.66038	18.62082	17.65805	16.76541	15.93692	14.45112	13.16300	12.04158	11.06124	10.20074	9.44243	8.77154	7.64485
23	22.32414	21.67568	21.05331	20.45582	19.33086	18.29220	17.33211	16.44361	14.85684	13.48857	12.30338	11.27219	10.37106	9.58021	8.88322	7.71843
24	23.26598	22.56287	21.88915	21.24339	20.03041	18.91393	17.88499	16.93554	15.24696	13.79864	12.55036	11.46933	10.52876	9.70661	8.98474	7.78432
25	24.20547	23.44564	22.71876	22.02316	20.71961	19.52346	18.42438	17.41315	15.62208	14.09394	12.78336	11.65358	10.67478	9.82258	9.07704	7.84314
26	25.14496	24.33463	23.58708	22.86771	21.54584	20.34966	19.24866	18.23196	16.31441	14.64411	13.27445	12.09404	11.05778	10.27365	9.42891	8.05518
27	26.08445	25.22412	24.43657	23.68226	22.34584	21.13966	20.02866	18.99996	16.96441	15.24411	13.81445	12.57445	11.50445	10.65445	9.78445	8.14545
28	27.02394	26.11361	25.28606	24.50175	23.14584	21.92966	20.80866	19.77196	17.62441	15.84445	14.37445	13.07445	11.95445	10.97445	10.02445	8.24545
29	27.96343	27.00310	26.14555	25.32124	23.94584	22.71966	21.58866	20.54196	18.37445	16.54445	14.97445	13.62445	12.45445	11.42445	10.41445	8.34545
30	28.90292	27.99259	27.18504	26.33759	24.94584	23.70966	22.56866	21.51196	19.29445	17.42445	15.84445	14.45445	13.24445	12.17445	11.12445	8.47545
31	29.84241	28.88208	28.03453	27.14708	25.73584	24.48966	23.33866	22.27196	20.02445	18.14445	16.59445	15.14445	13.89445	12.76445	11.65445	8.56545
32	30.78190	29.77157	28.88402	27.95657	26.52584	25.26966	24.10866	23.03196	20.74445	18.82445	17.24445	15.74445	14.45445	13.28445	12.13445	8.65545
33	31.72139	30.65106	29.72351	28.76606	27.31584	26.04966	24.87866	23.79196	21.46445	19.50445	17.86445	16.32445	14.97445	13.75445	12.56445	8.74545
34	32.66088	31.49055	30.52306	29.53759	28.06584	26.78966	25.59866	24.49196	22.12445	20.12445	18.44445	16.84445	15.37445	14.11445	12.87445	8.83545
35	33.60037	32.37002	31.35251	30.33706	28.84584	27.55966	26.35866	25.24196	22.82445	20.78445	19.04445	17.39445	15.84445	14.54445	13.27445	8.92545
36	34.53986	33.25941	32.20190	31.18657	29.67584	28.36966	27.15866	26.03196	23.56445	21.48445	19.69445	17.99445	16.39445	15.04445	13.72445	9.01545
37	35.47935	34.14886	33.05139	31.94606	30.58584	29.26966	28.04866	26.91196	24.32445	22.19445	20.36445	18.61445	16.94445	15.54445	14.27445	9.10545
38	36.41884	35.03835	33.90092	32.76357	31.49584	30.16966	28.93866	27.79196	25.14445	22.96445	21.09445	19.31445	17.59445	16.14445	14.82445	9.19545
39	37.35833	35.92784	34.75241	33.52306	32.31584	30.97966	29.73866	28.58196	25.92445	23.74445	21.82445	19.99445	18.17445	16.64445	15.07445	9.28545
40	38.29782	36.81733	35.59190	34.33759	33.12584	31.78966	30.52866	29.36196	26.74445	24.51445	22.54445	20.66445	18.81445	17.14445	15.56445	9.37545
41	39.23731	37.70682	36.47139	35.15706	33.93584	32.58966	31.31866	30.14196	27.52445	25.26445	23.24445	21.32445	19.44445	17.74445	15.85445	9.46545
42	40.17680	38.59631	37.32092	35.94657	34.74584	33.39966	32.12866	30.94196	28.34445	26.04445	24.00445	22.04445	20.11445	18.24445	16.04445	9.55545
43	41.11629	39.48580	38.15041	36.75706	35.55584	34.00966	32.73866	31.54196	29.14445	26.84445	24.76445	22.76445	20.79445	18.89445	16.24445	9.64545
44	42.05578	40.37529	39.00092	37.56759	36.36584	34.81966	33.54866	32.35196	30.04445	27.44445	25.32445	23.28445	21.29445	19.37445	16.44445	9.73545
45	42.99527	41.26478	39.85241	38.37806	37.17584	35.62966	34.35866	33.16196	30.84445	28.14445	26.04445	24.00445	22.04445	20.04445	16.64445	9.82545
46	43.93476	42.15427	40.70292	39.18857	37.98584	36.43966	35.16866	33.97196	31.64445	28.94445	26.80445	24.72445	22.66445	20.59445	16.84445	9.91545
47	44.87425	43.04376	41.55241	40.00000	38.79584	37.24966	35.97866	34.78196	32.52445	29.74445	27.56445	25.48445	23.39445	21.29445	17.04445	10.00545
48	45.81374	43.93325	42.40292	40.80000	39.60584	38.05966	36.78866	35.59196	33.34445	30.64445	28.42445	26.30445	24.17445	21.49445	17.24445	10.09545
49	46.75323	44.82274	43.25241	41.60000	40.41584	38.86966	37.59866	36.40196	34.15445	31.44445	29.18445	27.04445	24.87445	21.69445	17.44445	10.18545
50	47.69272	45.71223	44.10292	42.40000	41.22584	39.67966	38.20866	37.01196	34.96445	32.54445	30.26445	28.09445	25.91445	21.89445	17.64445	10.27545

The second part of the cash flows promised by this bond is a single payment of \$1 million in four years. The present value of \$1 in four years at a 6 percent annual rate is \$0.79209 so the present value of the entire \$1 million is \$792,090.

Present Value of \$1

Periods	PRESENT VALUE OF \$1																
	RATE PER PERIOD																
	0.25%	0.50%	0.75%	1.00%	1.50%	2.00%	2.50%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%	11.00%	12.00%
1	0.99751	0.99502	0.99256	0.99010	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593	0.91743	0.90909	0.90090	0.89286
2	0.99502	0.99007	0.98517	0.98030	0.97066	0.96117	0.95181	0.94260	0.92456	0.90703	0.89000	0.87344	0.85734	0.84168	0.82645	0.81162	0.79719
3	0.99254	0.98515	0.97783	0.97059	0.95632	0.94232	0.92860	0.91514	0.88900	0.86384	0.83962	0.81630	0.79383	0.77218	0.75131	0.73119	0.71178
4	0.99006	0.98025	0.97055	0.96098	0.94218	0.92385	0.90595	0.88849	0.85480	0.82270	0.79209	0.76290	0.73503	0.70843	0.68301	0.65873	0.63552
5	0.98759	0.97537	0.96333	0.95147	0.92826	0.90573	0.88385	0.86261	0.82193	0.78353	0.74726	0.71299	0.68058	0.64993	0.62092	0.59345	0.56743
6	0.98513	0.97052	0.95616	0.94205	0.91454	0.88797	0.86230	0.83748	0.79031	0.74622	0.70496	0.66634	0.63017	0.59627	0.56447	0.53464	0.50663
7	0.98267	0.96569	0.94904	0.93272	0.90103	0.87056	0.84127	0.81309	0.75992	0.71068	0.66506	0.62275	0.58349	0.54703	0.51316	0.48166	0.45239
8	0.98022	0.96089	0.94198	0.92348	0.88771	0.85349	0.82075	0.78941	0.73069	0.67684	0.62741	0.58201	0.54027	0.50187	0.46651	0.43393	0.40388
9	0.97778	0.95610	0.93496	0.91434	0.87459	0.83676	0.80073	0.76642	0.70259	0.64461	0.59190	0.54393	0.50025	0.46043	0.42410	0.39092	0.36061
10	0.97534	0.95135	0.92800	0.90529	0.86167	0.82035	0.78120	0.74409	0.67556	0.61391	0.55839	0.50835	0.46319	0.42241	0.38554	0.35218	0.32197
11	0.97291	0.94861	0.92109	0.89632	0.84893	0.80426	0.76214	0.72242	0.64958	0.58468	0.52679	0.47509	0.42888	0.38753	0.35049	0.31728	0.28748
12	0.97048	0.94191	0.91424	0.88745	0.83639	0.78849	0.74356	0.70138	0.62460	0.55684	0.49697	0.44001	0.39711	0.35553	0.31863	0.28584	0.25666
13	0.96806	0.93722	0.90743	0.87866	0.82403	0.77303	0.72542	0.68095	0.60057	0.53032	0.46884	0.41496	0.36770	0.32618	0.28966	0.25751	0.22917
14	0.96565	0.93256	0.90068	0.86996	0.81185	0.75788	0.70773	0.66112	0.57748	0.50507	0.44230	0.38782	0.34046	0.29925	0.26333	0.23199	0.20426
15	0.96324	0.92792	0.89397	0.86135	0.79985	0.74301	0.69047	0.64186	0.55526	0.48102	0.41727	0.36245	0.31524	0.27454	0.23939	0.20900	0.18270
16	0.96084	0.92330	0.88732	0.85282	0.78803	0.72845	0.67362	0.62317	0.53391	0.45811	0.39365	0.33873	0.29189	0.25187	0.21763	0.18829	0.16312
17	0.95844	0.91871	0.88071	0.84438	0.77639	0.71416	0.65720	0.60502	0.51337	0.43630	0.37136	0.31657	0.27027	0.23107	0.19784	0.16963	0.14564
18	0.95605	0.91414	0.87416	0.83602	0.76491	0.70016	0.64117	0.58739	0.49363	0.41552	0.35034	0.29586	0.25025	0.21199	0.17986	0.15282	0.13004
19	0.95367	0.90959	0.86765	0.82774	0.75361	0.68643	0.62553	0.57029	0.47464	0.39573	0.33051	0.27651	0.23171	0.19449	0.16351	0.13768	0.11611
20	0.95129	0.90506	0.86119	0.81954	0.74247	0.67297	0.61027	0.55368	0.45639	0.37689	0.31180	0.25842	0.21455	0.17843	0.14864	0.12403	0.10367
21	0.94892	0.90056	0.85478	0.81143	0.73150	0.65978	0.59539	0.53755	0.43883	0.35894	0.29416	0.24151	0.19866	0.16370	0.13513	0.11174	0.09256
22	0.94655	0.89608	0.84842	0.80340	0.72069	0.64684	0.58086	0.52198	0.42196	0.34185	0.27751	0.22571	0.18394	0.15018	0.12285	0.10067	0.08264
23	0.94419	0.89162	0.84210	0.79544	0.71004	0.63416	0.56670	0.50669	0.40573	0.32557	0.26180	0.21095	0.17032	0.13778	0.11168	0.09069	0.07379
24	0.94184	0.88719	0.83583	0.78757	0.69954	0.62172	0.55288	0.49193	0.39012	0.31007	0.24698	0.19715	0.15770	0.12640	0.10153	0.08170	0.06588
25	0.93949	0.88277	0.82961	0.77977	0.68921	0.60953	0.53939	0.47791	0.37512	0.29530	0.23300	0.18425	0.14602	0.11597	0.09230	0.07361	0.05838
30	0.92783	0.86103	0.79919	0.74192	0.63976	0.55207	0.47674	0.41196	0.30832	0.23138	0.17411	0.13137	0.09938	0.07537	0.05348	0.03836	0.03332
35	0.91632	0.83982	0.76988	0.70591	0.59387	0.50003	0.42137	0.35538	0.25342	0.18129	0.13011	0.09366	0.06763	0.04899	0.03558	0.02592	0.01894
40	0.90495	0.81914	0.74165	0.67165	0.55126	0.45289	0.37243	0.30656	0.20829	0.14205	0.09722	0.06678	0.04603	0.03184	0.02209	0.01538	0.01075
50	0.82863	0.77929	0.68825	0.60804	0.47500	0.37153	0.29094	0.22811	0.14071	0.08720	0.05429	0.03395	0.02132	0.01345	0.00852	0.00542	0.00346

four years followed by a single payment of \$1 million. Mathematically, that is equivalent to earning a 6 percent rate of interest each year for four years.

Figure 14.12 January 1, Year One—Term Bonds Issued at an Effective Rate of 6 Percent

Cash	965,346	
Bonds Payable		965,346

An alternative is to debit cash for \$965,346 and credit Bonds Payable for the face value of \$1,000,000 and debiting discount on bonds for 34,654. The bonds would still be shown on the balance sheet at 1,000,000 less 34,654 (a contra liability account) to equal 965,346.

Check Yourself

Harboe, Inc. prepared an indenture that would allow it to borrow \$500,000 using term bonds. The indenture requires annual payments of 4.0% interest for 10 years and then repayment of the face value of \$500,000 at the maturity date. After the indenture was prepared but before Harboe was actually able to set up the deal, interest rates fell in the market place and Harboe was able to negotiate with a group of investors to sell them the term bonds at an effective rate of 3% per year. How much would Harboe borrow with this effective interest rate?

- A. \$500,000
- B. \$700,000
- C. \$372,045
- D. \$542,649

The correct answer is D. First calculate the cash payment for interest required – $500,000 \times .04 = 20,000$. This is an ordinary annuity so we multiply it by the factor from the first table above for 10 years at the effective rate (3%). $20,000 \times 8.5302 = 170,604$. Then take the maturity value of 500,000 and multiply by the 10 year 3% factor from the second table (.74409) = 372,645. Add these two together and get \$542,649 (record using a debit to cash and credit to bond payable).

Question: Recording the payments on the bonds must consider two things. First, the recorded principal of this term bond must be raised gradually from \$965,346 to the \$1 million face value over these four years. Second, the cash interest of 5 percent paid each year has to be adjusted to the annual 6 percent effective rate negotiated by the two parties. How does a debtor report a bond payable over its life if the stated interest rate and the effective rate differ?

Answer: At the end of Year One, Smith Corporation pays \$50,000 cash interest to the bondholders (\$1 million face value \times the 5 percent stated rate) as specified in the contract. However, reported interest on this debt must be recognized at the agreed upon rate of 6 percent that led to the initial principal payment of \$965,346. The \$34,654 discount below face value (\$1 million less \$965,346) was accepted by Smith (the debtor) as a means of increasing the actual annual rate of return from 5 percent to 6 percent.

The effective rate is reflected in the financial statements by recognizing interest in Year One of \$57,921 (rounded), which is the \$965,346 principal times 6 percent. The \$7,921 difference between the effective interest expense of \$57,921 and the cash interest payment of \$50,000 will eventually be paid but not until the end of the four-year term when \$1 million rather than \$965,346 is conveyed to the bondholders. Therefore, at the end of Year One, this extra \$7,921 is compounded. Only the portion of this interest that is not being paid is added to the principal.

Figure 5.17 December 31, Year One—Payment of Cash Interest at 5 Percent Rate

Interest Expense	50,000	
Cash		50,000

Figure 5.18 Compounding Adjustment to Bring Interest to Effective Annual Rate of 6 Percent³

Interest Expense	7,921	
Bond Payable		7,921

If you are using a discount then the credit would be to reduce the discount on bonds instead of bonds payable.

Interest expense reported on the income statement for Year One of \$57,921 (\$50,000 + \$7,921) equals the 6 percent effective rate times the principal of the debt for that period. The liability reported for the bond payable at the end of Year One has begun to move closer to the \$1 million face value. It is now \$973,267 (\$965,346 + \$7,921) as a result of the compounding.

Reported figures for the remaining three years of this bond contract can be computed to verify that the ending balance does grow to \$1 million by the time of payment.

Figure 5.19 Reported Bond Figures for the Remaining Three Years until Maturity⁴

	<u>Year Two</u>	<u>Year Three</u>	<u>Year Four</u>
Beginning Bond Principal	\$973,267	\$981,663	\$990,563
Effective Rate	6%	6%	6%
Interest Expense (rounded)	58,396	58,900	59,437
Stated Cash Interest	50,000	50,000	50,000
Interest Compounded (added to principal)	8,396	8,900	9,437
Ending Bond Principal	981,663	990,563	1,000,000

Through the use of the effective rate method, interest expense of 6 percent is recognized each period and the principal balance of the liability gradually grows to equal the face value of the bond.

Check Yourself

For the bonds issued above by Harboe, Inc. for \$542,649 in cash, how much interest expense should be recorded for the year after Harboe borrowed the money?

- A. \$15,000
- B. \$200,000
- C. \$16,279
- D. \$21,706

The correct answer is C. The interest expense recorded is always the carrying amount of the bonds \$542,649 x effective interest rate 3% = \$16,279. The difference between the 20,000 paid and the interest expense recorded (20,000 – 16,279=3,721) will reduce the carrying amount of the bonds to (\$542,649 – \$3,721 = 538,928) to be used to calculate effective interest for the second year.

Key Takeaway

In the issuance of a term bond, the stated cash interest rate is often different from the effective interest rate negotiated by the creditor and the debtor. To compute the amount to be exchanged for this bond, the cash flows must be determined based on the specifics of the contract and their present value calculated. The resulting total is the amount paid so that the agreed upon rate of

interest is earned over the life of the bond. The bond is initially recorded at present value to reflect its principal at that time. Cash interest payments are recorded thereafter and then adjusted based on the effective interest rate. The interest rate stated in the contract times the face value provides the amount of the cash payments. The principal times the effective rate gives the interest to be recognized for the period. The difference in the effective interest and the cash payment is compounded (added to the principal of the debt).

¹ An annuity with payments made at the beginning of each period is known as an annuity due. If the interest here had been paid starting on January 1, Year One, the payments would form an annuity due rather than an ordinary annuity. The cash flow pattern for notes and bonds is more likely to be in the form of an ordinary annuity since interest is not typically paid in advance.

²The mathematical formula to determine the present value of an ordinary annuity of \$1 is $(1 - 1/[1 + i]^n)/i$, where i is the appropriate interest rate (6 percent in this illustration) and n is the number of payment periods (four). If using an Excel spreadsheet, the present value of a \$1 per period ordinary annuity for four periods at an annual rate of interest of 6 percent can be found by typing the following data into a cell: =PV(.06,4,1,,0).

³These two entries are often combined. Students should use one entry or two depending on which is easiest to understand.

⁴Interest expense for the final year has been increased by \$3 so that the final bond payable balance is exactly equal to the \$1 million that must be paid. Slight adjustments of this type are common to compensate for numbers having been rounded.

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