

TABLE A.3 Present value of an annuity of \$1 per period for t periods = $[1 - 1/(1 + r)^t]/r$

| Number of Periods | Interest Rate | | | | | | | | |
|-------------------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|
| | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% |
| 1 | .9901 | .9804 | .9709 | .9615 | .9524 | .9434 | .9346 | .9259 | .9174 |
| 2 | 1.9704 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 1.8334 | 1.8080 | 1.7833 | 1.7591 |
| 3 | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 |
| 4 | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5460 | 3.4651 | 3.3872 | 3.3121 | 3.2397 |
| 5 | 4.8534 | 4.7135 | 4.5797 | 4.4518 | 4.3295 | 4.2124 | 4.1002 | 3.9927 | 3.8897 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4.6229 | 4.4859 |
| 7 | 6.7282 | 6.4720 | 6.2303 | 6.0021 | 5.7864 | 5.5824 | 5.3893 | 5.2064 | 5.0330 |
| 8 | 7.6517 | 7.3255 | 7.0197 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 |
| 9 | 8.5660 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9952 |
| 10 | 9.4713 | 8.9826 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4177 |
| 11 | 10.3676 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 |
| 12 | 11.2551 | 10.5753 | 9.9540 | 9.3851 | 8.8633 | 8.3838 | 7.9427 | 7.5361 | 7.1607 |
| 13 | 12.1337 | 11.3484 | 10.6350 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | 7.9038 | 7.4869 |
| 14 | 13.0037 | 12.1062 | 11.2961 | 10.5631 | 9.8986 | 9.2950 | 8.7455 | 8.2442 | 7.7862 |
| 15 | 13.8651 | 12.8493 | 11.9379 | 11.1184 | 10.3797 | 9.7122 | 9.1079 | 8.5595 | 8.0607 |
| 16 | 14.7179 | 13.5777 | 12.5611 | 11.6523 | 10.8378 | 10.1059 | 9.4466 | 8.8514 | 8.3126 |
| 17 | 15.5623 | 14.2919 | 13.1661 | 12.1657 | 11.2741 | 10.4773 | 9.7632 | 9.1216 | 8.5436 |
| 18 | 16.3983 | 14.9920 | 13.7535 | 12.6593 | 11.6896 | 10.8276 | 10.0591 | 9.3719 | 8.7556 |
| 19 | 17.2260 | 15.6785 | 14.3238 | 13.1339 | 12.0853 | 11.1581 | 10.3356 | 9.6036 | 8.9501 |
| 20 | 18.0456 | 16.3514 | 14.8775 | 13.5903 | 12.4622 | 11.4699 | 10.5940 | 9.8181 | 9.1285 |
| 21 | 18.8570 | 17.0112 | 15.4150 | 14.0292 | 12.8212 | 11.7641 | 10.8355 | 10.0168 | 9.2922 |
| 22 | 19.6604 | 17.6580 | 15.9369 | 14.4511 | 13.1630 | 12.0416 | 11.0612 | 10.2007 | 9.4424 |
| 23 | 20.4558 | 18.2922 | 16.4436 | 14.8568 | 13.4886 | 12.3034 | 11.2722 | 10.3741 | 9.5802 |
| 24 | 21.2434 | 18.9139 | 16.9355 | 15.2470 | 13.7986 | 12.5504 | 11.4693 | 10.5288 | 9.7066 |
| 25 | 22.0232 | 19.5235 | 17.4131 | 15.6221 | 14.0939 | 12.7834 | 11.6536 | 10.6748 | 9.8226 |
| 30 | 25.8077 | 22.3965 | 19.6004 | 17.2920 | 15.3725 | 13.7648 | 12.4090 | 11.2578 | 10.2737 |
| 40 | 32.8347 | 27.3555 | 23.1148 | 19.7928 | 17.1591 | 15.0463 | 13.3317 | 11.9246 | 10.7574 |
| 50 | 39.1961 | 31.4236 | 25.7298 | 21.4822 | 18.2559 | 15.7619 | 13.8007 | 12.2335 | 10.9617 |

continued on next page

| 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% | 36% |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| .9091 | .8929 | .8772 | .8696 | .8621 | .8475 | .8333 | .8065 | .7813 | .7576 | .7353 |
| 1.7355 | 1.6901 | 1.6467 | 1.6257 | 1.6052 | 1.5656 | 1.5278 | 1.4568 | 1.3916 | 1.3315 | 1.2760 |
| 2.4869 | 2.4018 | 2.3216 | 2.2832 | 2.2459 | 2.1743 | 2.1065 | 1.9813 | 1.8684 | 1.7663 | 1.6735 |
| 3.1699 | 3.0373 | 2.9137 | 2.8550 | 2.7982 | 2.6901 | 2.5887 | 2.4043 | 2.2410 | 2.0957 | 1.9658 |
| 3.7908 | 3.6048 | 3.4331 | 3.3522 | 3.2743 | 3.1272 | 2.9906 | 2.7454 | 2.5320 | 2.3452 | 2.1807 |
| 4.3553 | 4.1114 | 3.8887 | 3.7845 | 3.6847 | 3.4976 | 3.3255 | 3.0205 | 2.7594 | 2.5342 | 2.3388 |
| 4.8684 | 4.5638 | 4.2883 | 4.1604 | 4.0386 | 3.8115 | 3.6046 | 3.2423 | 2.9370 | 2.6775 | 2.4550 |
| 5.3349 | 4.9676 | 4.6389 | 4.4873 | 4.3436 | 4.0776 | 3.8372 | 3.4212 | 3.0758 | 2.7860 | 2.5404 |
| 5.7590 | 5.3282 | 4.9464 | 4.7716 | 4.6065 | 4.3030 | 4.0310 | 3.5655 | 3.1842 | 2.8681 | 2.6033 |
| 6.1446 | 5.6502 | 5.2161 | 5.0188 | 4.8332 | 4.4941 | 4.1925 | 3.6819 | 3.2689 | 2.9304 | 2.6495 |
| 6.4951 | 5.9377 | 5.4527 | 5.2337 | 5.0286 | 4.6560 | 4.3271 | 3.7757 | 3.3351 | 2.9776 | 2.6834 |
| 6.8137 | 6.1944 | 5.6603 | 5.4206 | 5.1971 | 4.7932 | 4.4392 | 3.8514 | 3.3868 | 3.0133 | 2.7084 |
| 7.1034 | 6.4235 | 5.8424 | 5.5831 | 5.3423 | 4.9095 | 4.5327 | 3.9124 | 3.4272 | 3.0404 | 2.7268 |
| 7.3667 | 6.6282 | 6.0021 | 5.7245 | 5.4675 | 5.0081 | 4.6106 | 3.9616 | 3.4587 | 3.0609 | 2.7403 |
| 7.6061 | 6.8109 | 6.1422 | 5.8474 | 5.5755 | 5.0916 | 4.6755 | 4.0013 | 3.4834 | 3.0764 | 2.7502 |
| 7.8237 | 6.9740 | 6.2651 | 5.9542 | 5.6685 | 5.1624 | 4.7296 | 4.0333 | 3.5026 | 3.0882 | 2.7575 |
| 8.0216 | 7.1196 | 6.3729 | 6.0472 | 5.7487 | 5.2223 | 4.7746 | 4.0591 | 3.5177 | 3.0971 | 2.7629 |
| 8.2014 | 7.2497 | 6.4674 | 6.1280 | 5.8178 | 5.2732 | 4.8122 | 4.0799 | 3.5294 | 3.1039 | 2.7668 |
| 8.3649 | 7.3658 | 6.5504 | 6.1982 | 5.8775 | 5.3162 | 4.8435 | 4.0967 | 3.5386 | 3.1090 | 2.7697 |
| 8.5136 | 7.4694 | 6.6231 | 6.2593 | 5.9288 | 5.3527 | 4.8696 | 4.1103 | 3.5458 | 3.1129 | 2.7718 |
| 8.6487 | 7.5620 | 6.6870 | 6.3125 | 5.9731 | 5.3837 | 4.8913 | 4.1212 | 3.5514 | 3.1158 | 2.7734 |
| 8.7715 | 7.6446 | 6.7429 | 6.3587 | 6.0113 | 5.4099 | 4.9094 | 4.1300 | 3.5558 | 3.1180 | 2.7746 |
| 8.8832 | 7.7184 | 6.7921 | 6.3988 | 6.0442 | 5.4321 | 4.9245 | 4.1371 | 3.5592 | 3.1197 | 2.7754 |
| 8.9847 | 7.7843 | 6.8351 | 6.4338 | 6.0726 | 5.4509 | 4.9371 | 4.1428 | 3.5619 | 3.1210 | 2.7760 |
| 9.0770 | 7.8431 | 6.8729 | 6.4641 | 6.0971 | 5.4669 | 4.9476 | 4.1474 | 3.5640 | 3.1220 | 2.7765 |
| 9.4269 | 8.0552 | 7.0027 | 6.5660 | 6.1772 | 5.5168 | 4.9789 | 4.1601 | 3.5693 | 3.1242 | 2.7775 |
| 9.7791 | 8.2438 | 7.1050 | 6.6418 | 6.2335 | 5.5482 | 4.9966 | 4.1659 | 3.5712 | 3.1250 | 2.7778 |
| 9.9148 | 8.3045 | 7.1327 | 6.6605 | 6.2463 | 5.5541 | 4.9995 | 4.1666 | 3.5714 | 3.1250 | 2.7778 |

TABLE A.4 Future value of an annuity of \$1 per period for t periods = $[(1 + r)^t - 1]/r$

| Number of Periods | Interest Rate | | | | | | | | |
|-------------------|---------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% |
| 1 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 2 | 2.0100 | 2.0200 | 2.0300 | 2.0400 | 2.0500 | 2.0600 | 2.0700 | 2.0800 | 2.0900 |
| 3 | 3.0301 | 3.0604 | 3.0909 | 3.1216 | 3.1525 | 3.1836 | 3.2149 | 3.2464 | 3.2781 |
| 4 | 4.0604 | 4.1216 | 4.1836 | 4.2465 | 4.3101 | 4.3746 | 4.4399 | 4.5061 | 4.5731 |
| 5 | 5.1010 | 5.2040 | 5.3091 | 5.4163 | 5.5256 | 5.6371 | 5.7507 | 5.8666 | 5.9847 |
| 6 | 6.1520 | 6.3081 | 6.4684 | 6.6330 | 6.8019 | 6.9753 | 7.1533 | 7.3359 | 7.5233 |
| 7 | 7.2135 | 7.4343 | 7.6625 | 7.8983 | 8.1420 | 8.3938 | 8.6540 | 8.9228 | 9.2004 |
| 8 | 8.2857 | 8.5830 | 8.8932 | 9.2142 | 9.5491 | 9.8975 | 10.260 | 10.637 | 11.028 |
| 9 | 9.3685 | 9.7546 | 10.159 | 10.583 | 11.027 | 11.491 | 11.978 | 12.488 | 13.021 |
| 10 | 10.462 | 10.950 | 11.464 | 12.006 | 12.578 | 13.181 | 13.816 | 14.487 | 15.193 |
| 11 | 11.567 | 12.169 | 12.808 | 13.486 | 14.207 | 14.972 | 15.784 | 16.645 | 17.560 |
| 12 | 12.683 | 13.412 | 14.192 | 15.026 | 15.917 | 16.870 | 17.888 | 18.977 | 20.141 |
| 13 | 13.809 | 14.680 | 15.618 | 16.627 | 17.713 | 18.882 | 20.141 | 21.495 | 22.953 |
| 14 | 14.947 | 15.974 | 17.086 | 18.292 | 19.599 | 21.015 | 22.550 | 24.215 | 26.019 |
| 15 | 16.097 | 17.293 | 18.599 | 20.024 | 21.579 | 23.276 | 25.129 | 27.152 | 29.361 |
| 16 | 17.258 | 18.639 | 20.157 | 21.825 | 23.657 | 25.673 | 27.888 | 30.324 | 33.003 |
| 17 | 18.430 | 20.012 | 21.762 | 23.698 | 25.840 | 28.213 | 30.840 | 33.750 | 36.974 |
| 18 | 19.615 | 21.412 | 23.414 | 25.645 | 28.132 | 30.906 | 33.999 | 37.450 | 41.301 |
| 19 | 20.811 | 22.841 | 25.117 | 27.671 | 30.539 | 33.760 | 37.379 | 41.446 | 46.018 |
| 20 | 22.019 | 24.297 | 26.870 | 29.778 | 33.066 | 36.786 | 40.995 | 45.762 | 51.160 |
| 21 | 23.239 | 25.783 | 28.676 | 31.969 | 35.719 | 39.993 | 44.865 | 50.423 | 56.765 |
| 22 | 24.472 | 27.299 | 30.537 | 34.248 | 38.505 | 43.392 | 49.006 | 55.457 | 62.873 |
| 23 | 25.716 | 28.845 | 32.453 | 36.618 | 41.430 | 46.996 | 53.436 | 60.893 | 69.532 |
| 24 | 26.973 | 30.422 | 34.426 | 39.083 | 44.502 | 50.816 | 58.177 | 66.765 | 76.790 |
| 25 | 28.243 | 32.030 | 36.459 | 41.646 | 47.727 | 54.865 | 63.249 | 73.106 | 84.701 |
| 30 | 34.785 | 40.568 | 47.575 | 56.085 | 66.439 | 79.058 | 94.461 | 113.28 | 136.31 |
| 40 | 48.886 | 60.402 | 75.401 | 95.026 | 120.80 | 154.76 | 199.64 | 259.06 | 337.88 |
| 50 | 64.463 | 84.579 | 112.80 | 152.67 | 209.35 | 290.34 | 406.53 | 573.77 | 815.08 |
| 60 | 81.670 | 114.05 | 163.05 | 237.99 | 353.58 | 533.13 | 813.52 | 1253.2 | 1944.8 |

continued on next page

| 10% | 12% | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% | 36% |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 2.1000 | 2.1200 | 2.1400 | 2.1500 | 2.1600 | 2.1800 | 2.2000 | 2.2400 | 2.2800 | 2.3200 | 2.3600 |
| 3.3100 | 3.3744 | 3.4396 | 3.4725 | 3.5056 | 3.5724 | 3.6400 | 3.7776 | 3.9184 | 4.0624 | 4.2096 |
| 4.6410 | 4.7793 | 4.9211 | 4.9934 | 5.0665 | 5.2154 | 5.3680 | 5.6842 | 6.0156 | 6.3624 | 6.7251 |
| 6.1051 | 6.3528 | 6.6101 | 6.7424 | 6.8771 | 7.1542 | 7.4416 | 8.0484 | 8.6999 | 9.3983 | 10.146 |
| 7.7156 | 8.1152 | 8.5355 | 8.7537 | 8.9775 | 9.4420 | 9.9299 | 10.980 | 12.136 | 13.406 | 14.799 |
| 9.4872 | 10.089 | 10.730 | 11.067 | 11.414 | 12.142 | 12.916 | 14.615 | 16.534 | 18.696 | 21.126 |
| 11.436 | 12.300 | 13.233 | 13.727 | 14.240 | 15.327 | 16.499 | 19.123 | 22.163 | 25.678 | 29.732 |
| 13.579 | 14.776 | 16.085 | 16.786 | 17.519 | 19.086 | 20.799 | 24.712 | 29.369 | 34.895 | 41.435 |
| 15.937 | 17.549 | 19.337 | 20.304 | 21.321 | 23.521 | 25.959 | 31.643 | 38.593 | 47.062 | 57.352 |
| 18.531 | 20.655 | 23.045 | 24.349 | 25.733 | 28.755 | 32.150 | 40.238 | 50.398 | 63.122 | 78.998 |
| 21.384 | 24.133 | 27.271 | 29.002 | 30.850 | 34.931 | 39.581 | 50.895 | 65.510 | 84.320 | 108.44 |
| 24.523 | 28.029 | 32.089 | 34.352 | 36.786 | 42.219 | 48.497 | 64.110 | 84.853 | 112.30 | 148.47 |
| 27.975 | 32.393 | 37.581 | 40.505 | 43.672 | 50.818 | 59.196 | 80.496 | 109.61 | 149.24 | 202.93 |
| 31.772 | 37.280 | 43.842 | 47.580 | 51.660 | 60.965 | 72.035 | 100.82 | 141.30 | 198.00 | 276.98 |
| 35.950 | 42.753 | 50.980 | 55.717 | 60.925 | 72.939 | 87.442 | 126.01 | 181.87 | 262.36 | 377.69 |
| 40.545 | 48.884 | 59.118 | 65.075 | 71.673 | 87.068 | 105.93 | 157.25 | 233.79 | 347.31 | 514.66 |
| 45.599 | 55.750 | 68.394 | 75.836 | 84.141 | 103.74 | 128.12 | 195.99 | 300.25 | 459.45 | 700.94 |
| 51.159 | 63.440 | 78.969 | 88.212 | 98.603 | 123.41 | 154.74 | 244.03 | 385.32 | 607.47 | 954.28 |
| 57.275 | 72.052 | 91.025 | 102.44 | 115.38 | 146.63 | 186.69 | 303.60 | 494.21 | 802.86 | 1298.8 |
| 64.002 | 81.699 | 104.77 | 118.81 | 134.84 | 174.02 | 225.03 | 377.46 | 633.59 | 1060.8 | 1767.4 |
| 71.403 | 92.503 | 120.44 | 137.63 | 157.41 | 206.34 | 271.03 | 469.06 | 812.00 | 1401.2 | 2404.7 |
| 79.543 | 104.60 | 138.30 | 159.28 | 183.60 | 244.49 | 326.24 | 582.63 | 1040.4 | 1850.6 | 3271.3 |
| 88.497 | 118.16 | 158.66 | 184.17 | 213.98 | 289.49 | 392.48 | 723.46 | 1332.7 | 2443.8 | 4450.0 |
| 98.347 | 133.33 | 181.87 | 212.79 | 249.21 | 342.60 | 471.98 | 898.09 | 1706.8 | 3226.8 | 6053.0 |
| 164.49 | 241.33 | 356.79 | 434.75 | 530.31 | 790.95 | 1181.9 | 2640.9 | 5873.2 | 12940.9 | 28172.3 |
| 442.59 | 767.09 | 1342.0 | 1779.1 | 2360.8 | 4163.2 | 7343.9 | 22728.8 | 69377.5 | * | * |
| 1163.9 | 2400.0 | 4994.5 | 7217.7 | 10435.7 | 21813.1 | 45497.2 | * | * | * | * |
| 3043.8 | 7471.6 | 18535.1 | 29220.0 | 46057.5 | * | * | * | * | * | * |

*The factor is greater than 99,999.

TABLE A.5 Cumulative normal distribution

| d | $N(d)$ | d | $N(d)$ | d | $N(d)$ | d | $N(d)$ | d | $N(d)$ | d | $N(d)$ |
|-------|--------|-------|--------|------|--------|-----|--------|------|--------|------|--------|
| -3.00 | .0013 | -1.58 | .0571 | -.76 | .2236 | .06 | .5239 | .86 | .8051 | 1.66 | .9515 |
| -2.95 | .0016 | -1.56 | .0594 | -.74 | .2297 | .08 | .5319 | .88 | .8106 | 1.68 | .9535 |
| -2.90 | .0019 | -1.54 | .0618 | -.72 | .2358 | .10 | .5398 | .90 | .8159 | 1.70 | .9554 |
| -2.85 | .0022 | -1.52 | .0643 | -.70 | .2420 | .12 | .5478 | .92 | .8212 | 1.72 | .9573 |
| -2.80 | .0026 | -1.50 | .0668 | -.68 | .2483 | .14 | .5557 | .94 | .8264 | 1.74 | .9591 |
| -2.75 | .0030 | -1.48 | .0694 | -.66 | .2546 | .16 | .5636 | .96 | .8315 | 1.76 | .9608 |
| -2.70 | .0035 | -1.46 | .0721 | -.64 | .2611 | .18 | .5714 | .98 | .8365 | 1.78 | .9625 |
| -2.65 | .0040 | -1.44 | .0749 | -.62 | .2676 | .20 | .5793 | 1.00 | .8413 | 1.80 | .9641 |
| -2.60 | .0047 | -1.42 | .0778 | -.60 | .2743 | .22 | .5871 | 1.02 | .8461 | 1.82 | .9656 |
| -2.55 | .0054 | -1.40 | .0808 | -.58 | .2810 | .24 | .5948 | 1.04 | .8508 | 1.84 | .9671 |
| -2.50 | .0062 | -1.38 | .0838 | -.56 | .2877 | .26 | .6026 | 1.06 | .8554 | 1.86 | .9686 |
| -2.45 | .0071 | -1.36 | .0869 | -.54 | .2946 | .28 | .6103 | 1.08 | .8599 | 1.88 | .9699 |
| -2.40 | .0082 | -1.34 | .0901 | -.52 | .3015 | .30 | .6179 | 1.10 | .8643 | 1.90 | .9713 |
| -2.35 | .0094 | -1.32 | .0934 | -.50 | .3085 | .32 | .6255 | 1.12 | .8686 | 1.92 | .9726 |
| -2.30 | .0107 | -1.30 | .0968 | -.48 | .3156 | .34 | .6331 | 1.14 | .8729 | 1.94 | .9738 |
| -2.25 | .0122 | -1.28 | .1003 | -.46 | .3228 | .36 | .6406 | 1.16 | .8770 | 1.96 | .9750 |
| -2.20 | .0139 | -1.26 | .1038 | -.44 | .3300 | .38 | .6480 | 1.18 | .8810 | 1.98 | .9761 |
| -2.15 | .0158 | -1.24 | .1075 | -.42 | .3372 | .40 | .6554 | 1.20 | .8849 | 2.00 | .9772 |
| -2.10 | .0179 | -1.22 | .1112 | -.40 | .3446 | .42 | .6628 | 1.22 | .8888 | 2.05 | .9798 |
| -2.05 | .0202 | -1.20 | .1151 | -.38 | .3520 | .44 | .6700 | 1.24 | .8925 | 2.10 | .9821 |
| -2.00 | .0228 | -1.18 | .1190 | -.36 | .3594 | .46 | .6772 | 1.26 | .8962 | 2.15 | .9842 |
| -1.98 | .0239 | -1.16 | .1230 | -.34 | .3669 | .48 | .6844 | 1.28 | .8997 | 2.20 | .9861 |
| -1.96 | .0250 | -1.14 | .1271 | -.32 | .3745 | .50 | .6915 | 1.30 | .9032 | 2.25 | .9878 |
| -1.94 | .0262 | -1.12 | .1314 | -.30 | .3821 | .52 | .6985 | 1.32 | .9066 | 2.30 | .9893 |
| -1.92 | .0274 | -1.10 | .1357 | -.28 | .3897 | .54 | .7054 | 1.34 | .9099 | 2.35 | .9906 |
| -1.90 | .0287 | -1.08 | .1401 | -.26 | .3974 | .56 | .7123 | 1.36 | .9131 | 2.40 | .9918 |
| -1.88 | .0301 | -1.06 | .1446 | -.24 | .4052 | .58 | .7190 | 1.38 | .9162 | 2.45 | .9929 |
| -1.86 | .0314 | -1.04 | .1492 | -.22 | .4129 | .60 | .7257 | 1.40 | .9192 | 2.50 | .9938 |
| -1.84 | .0329 | -1.02 | .1539 | -.20 | .4207 | .62 | .7324 | 1.42 | .9222 | 2.55 | .9946 |
| -1.82 | .0344 | -1.00 | .1587 | -.18 | .4286 | .64 | .7389 | 1.44 | .9251 | 2.60 | .9953 |
| -1.80 | .0359 | -.98 | .1635 | -.16 | .4364 | .66 | .7454 | 1.46 | .9279 | 2.65 | .9960 |
| -1.78 | .0375 | -.96 | .1685 | -.14 | .4443 | .68 | .7518 | 1.48 | .9306 | 2.70 | .9965 |
| -1.76 | .0392 | -.94 | .1736 | -.12 | .4522 | .70 | .7580 | 1.50 | .9332 | 2.75 | .9970 |
| -1.74 | .0409 | -.92 | .1788 | -.10 | .4602 | .72 | .7642 | 1.52 | .9357 | 2.80 | .9974 |
| -1.72 | .0427 | -.90 | .1841 | -.08 | .4681 | .74 | .7704 | 1.54 | .9382 | 2.85 | .9978 |
| -1.70 | .0446 | -.88 | .1894 | -.06 | .4761 | .76 | .7764 | 1.56 | .9406 | 2.90 | .9981 |
| -1.68 | .0465 | -.86 | .1949 | -.04 | .4840 | .78 | .7823 | 1.58 | .9429 | 2.95 | .9984 |
| -1.66 | .0485 | -.84 | .2005 | -.02 | .4920 | .80 | .7881 | 1.60 | .9452 | 3.00 | .9987 |
| -1.64 | .0505 | -.82 | .2061 | .00 | .5000 | .82 | .7939 | 1.62 | .9474 | 3.05 | .9989 |
| -1.62 | .0526 | -.80 | .2119 | .02 | .5080 | .84 | .7995 | 1.64 | .9495 | | |
| -1.60 | .0548 | -.78 | .2177 | .04 | .5160 | | | | | | |

This table shows the probability [$N(d)$] of observing a value less than or equal to d . For example, as illustrated, if d is **-.24**, then $N(d)$ is **.4052**.

KEY EQUATIONS

CHAPTER 2

1. The balance sheet identity or equation:

$$\text{Assets} = \text{Liabilities} + \text{Shareholders' equity} \quad [2.1]$$

2. The income statement equation:

$$\text{Revenues} - \text{Expenses} = \text{Income} \quad [2.2]$$

3. The cash flow identity:

$$\begin{aligned} \text{Cash flow from assets} &= \\ \text{Cash flow to creditors} &+ \\ \text{Cash flow to stockholders} & \end{aligned} \quad [2.3]$$

where:

- a. Cash flow from assets = Operating cash flow (OCF) – Net capital spending – Change in net working capital (NWC)
 - (1) Operating cash flow = Earnings before interest and taxes (EBIT) + Depreciation – Taxes
 - (2) Net capital spending = Ending net fixed assets – Beginning net fixed assets + Depreciation
 - (3) Change in net working capital = Ending NWC – Beginning NWC
- b. Cash flow to creditors = Interest paid – Net new borrowing
- c. Cash flow to stockholders = Dividends paid – Net new equity raised

CHAPTER 3

1. The current ratio:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} \quad [3.1]$$

2. The quick or acid-test ratio:

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}} \quad [3.2]$$

3. The cash ratio:

$$\text{Cash ratio} = \frac{\text{Cash}}{\text{Current liabilities}} \quad [3.3]$$

4. The ratio of net working capital to total assets:

$$\begin{aligned} \text{Net working capital to total assets} \\ = \frac{\text{Net working capital}}{\text{Total assets}} \end{aligned} \quad [3.4]$$

5. The interval measure:

$$\begin{aligned} \text{Interval measure} \\ = \frac{\text{Current assets}}{\text{Average daily operating costs}} \end{aligned} \quad [3.5]$$

6. The total debt ratio:

$$\begin{aligned} \text{Total debt ratio} \\ = \frac{\text{Total assets} - \text{Total equity}}{\text{Total assets}} \end{aligned} \quad [3.6]$$

7. The debt-equity ratio:

$$\begin{aligned} \text{Debt-equity ratio} \\ = \frac{\text{Total debt}}{\text{Total equity}} \end{aligned} \quad [3.7]$$

8. The equity multiplier:

$$\begin{aligned} \text{Equity multiplier} \\ = \frac{\text{Total assets}}{\text{Total equity}} \end{aligned} \quad [3.8]$$

9. The long-term debt ratio:

$$\begin{aligned} \text{Long-term debt ratio} \\ = \frac{\text{Long-term debt}}{\text{Long-term debt} + \text{Total equity}} \end{aligned} \quad [3.9]$$

10. The times interest earned (TIE) ratio:

$$\text{Times interest earned ratio} = \frac{\text{EBIT}}{\text{Interest}} \quad [3.10]$$

11. The cash coverage ratio:

$$\begin{aligned} \text{Cash coverage ratio} \\ = \frac{\text{EBIT} + \text{Depreciation}}{\text{Interest}} \end{aligned} \quad [3.11]$$

12. The inventory turnover ratio:

$$\begin{aligned} \text{Inventory turnover} \\ = \frac{\text{Cost of goods sold}}{\text{Inventory}} \end{aligned} \quad [3.12]$$

13. The average days' sales in inventory:

$$\begin{aligned} \text{Days' sales in inventory} \\ = \frac{365 \text{ days}}{\text{Inventory turnover}} \end{aligned} \quad [3.13]$$

14. The receivables turnover ratio:

$$\text{Receivables turnover} = \frac{\text{Sales}}{\text{Accounts receivable}} \quad [3.14]$$

15. The days' sales in receivables:

$$\text{Days' sales in receivables} = \frac{365 \text{ days}}{\text{Receivables turnover}} \quad [3.15]$$

16. The net working capital (NWC) turnover ratio:

$$\text{NWC turnover} = \frac{\text{Sales}}{\text{NWC}} \quad [3.16]$$

17. The fixed asset turnover ratio:

$$\text{Fixed asset turnover} = \frac{\text{Sales}}{\text{Net fixed assets}} \quad [3.17]$$

18. The total asset turnover ratio:

$$\text{Total asset turnover} = \frac{\text{Sales}}{\text{Total assets}} \quad [3.18]$$

19. Profit margin:

$$\text{Profit margin} = \frac{\text{Net income}}{\text{Sales}} \quad [3.19]$$

20. Return on assets (ROA):

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Total assets}} \quad [3.20]$$

21. Return on equity (ROE):

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Total equity}} \quad [3.21]$$

22. The price-earnings (PE) ratio:

$$\text{PE ratio} = \frac{\text{Price per share}}{\text{Earnings per share}} \quad [3.22]$$

23. The market-to-book ratio:

$$\text{Market-to-book ratio} = \frac{\text{Market value per share}}{\text{Book value per share}} \quad [3.23]$$

24. Enterprise value:

$$\text{Enterprise value} = \text{Total market value of the stock} + \text{Book value of all liabilities} - \text{Cash} \quad [3.24]$$

25. The EBITDA (earnings before interest, tax, depreciation, and amortization) ratio:

$$\text{EBITDA ratio} = \frac{\text{Enterprise value}}{\text{EBITDA}} \quad [3.25]$$

26. The DuPont identity:

$$\begin{aligned} \text{ROE} &= \underbrace{\frac{\text{Net income}}{\text{Sales}}}_{\text{Return on assets}} \times \underbrace{\frac{\text{Sales}}{\text{Assets}}}_{\text{Profit margin}} \times \underbrace{\frac{\text{Assets}}{\text{Equity}}}_{\text{Total asset turnover}} \\ &\quad \times \text{Equity multiplier} \end{aligned} \quad [3.26]$$

CHAPTER 4

1. The dividend payout ratio:

$$\begin{aligned} \text{Dividend payout ratio} &= \frac{\text{Cash dividends}}{\text{Net income}} \\ &= \frac{\text{Cash dividends}}{\text{Net income}} \end{aligned} \quad [4.1]$$

2. The internal growth rate:

$$\text{Internal growth rate} = \frac{\text{ROA} \times b}{1 - \text{ROA} \times b} \quad [4.2]$$

3. The sustainable growth rate:

$$\text{Sustainable growth rate} = \frac{\text{ROE} \times b}{1 - \text{ROE} \times b} \quad [4.3]$$

CHAPTER 5

1. The future value of \$1 invested for t periods at a rate of r per period:

$$\text{Future value} = \$1 \times (1 + r)^t \quad [5.1]$$

2. The present value of \$1 to be received t periods into the future at a discount rate of r :

$$\text{PV} = \$1 \times [1/(1 + r)] = \$1/(1 + r)^t \quad [5.2]$$

3. The relationship between future value and present value (the basic present value equation):

$$\begin{aligned} \text{PV} \times (1 + r)^t &= \text{FV}_t \\ \text{PV} &= \text{FV}_t / (1 + r)^t = \text{FV}_t \times [1/(1 + r)^t] \end{aligned} \quad [5.3]$$

CHAPTER 6

1. The present value of an annuity of C dollars per period for t periods when the rate of return or interest rate is r :

Annuity present value

$$\begin{aligned} &= C \times \left(\frac{1 - \text{Present value factor}}{r} \right) \\ &= C \times \left\{ \frac{1 - [1/(1 + r)^t]}{r} \right\} \end{aligned} \quad [6.1]$$

2. The future value factor for an annuity:

$$\begin{aligned} \text{Annuity FV factor} &= (\text{Future value factor} - 1)/r \\ &= [(1 + r)^t - 1]/r \end{aligned} \quad [6.2]$$

3. Annuity due value = Ordinary annuity value $\times (1 + r)$

[6.3]

4. Present value of a perpetuity:

$$\text{PV for a perpetuity} = C/r \quad [6.4]$$

5. Growing annuity present value

$$= C \times \left[\frac{1 - \left(\frac{1 + g}{1 + r} \right)^t}{r - g} \right] \quad [6.5]$$

6. Growing perpetuity present value

$$= \frac{C}{r - g} \quad [6.6]$$

7. Effective annual rate (EAR), where m is the number of times the interest is compounded during the year:

$$\text{EAR} = [1 + (\text{Quoted rate}/m)]^m - 1 \quad [6.7]$$

8. Effective annual rate (EAR), where q stands for the continuously compounded quoted rate:

$$\text{EAR} = e^q - 1 \quad [6.8]$$

CHAPTER 7

1. Bond value if bond has (1) a face value of F paid at maturity, (2) a coupon of C paid per period, (3) t periods to maturity, and (4) a yield of r per period:

Bond value

$$= C \times [1 - 1/(1+r)^t]/r + F/(1+r)^t$$

$$= \frac{\text{Present value}}{\text{of the coupons}} + \frac{\text{Present value}}{\text{of the face amount}}$$
[7.1]

2. The Fisher effect:

$$1 + R = (1 + r) \times (1 + h)$$
[7.2]

$$R = r + h + r \times h$$
[7.3]

$$R \approx r + h$$
[7.4]

CHAPTER 8

1. Per-share present value of common stock, where D_1 is the cash dividend paid at the end of the period, and R is the required return:

$$P_0 = (D_1 + P_1)/(1 + R)$$
[8.1]

2. Per-share present value of common stock with zero growth, where the dividend is constant and R is the required return:

$$P_0 = D/R$$
[8.2]

3. The dividend growth model:

$$P_0 = \frac{D_0 \times (1 + g)}{R - g} = \frac{D_1}{R - g}$$
[8.3]

4. The dividend growth model can be modified slightly to give the price of a stock as of Time t :

$$P_t = \frac{D_t \times (1 + g)}{R - g} = \frac{D_{t+1}}{R - g}$$
[8.4]

5. Two-stage growth model:

$$P_0 = \frac{D_1}{R - g_1} \times \left[1 - \left(\frac{1 + g_1}{1 + R} \right)^t \right] + \frac{P_t}{(1 + R)^t}$$
[8.5]

6. The two-stage growth model can be modified to give the price of a stock at Time t :

$$P_t = \frac{D_{t+1}}{R - g_2} = \frac{D_0 \times (1 + g_1)^t \times (1 + g_2)}{R - g_2}$$
[8.6]

7. Required return:

$$R = D_1/P_0 + g$$
[8.7]

8. Stock valuation using benchmark PE evaluation:

$$\text{Price at Time } t = P_t = \text{Benchmark PE ratio} \times \text{EPS}_t$$
[8.8]

CHAPTER 9

1. Net present value (NPV):

$$\text{NPV} = \text{Present value of future cash flows} - \text{Investment cost}$$

2. Payback period:

Payback period = Number of years that pass before the sum of an investment's cash flows equals the cost of the investment

3. Discounted payback period:

Discounted payback period = Number of years that pass before the sum of an investment's *discounted* cash flows equals the cost of the investment

4. The average accounting return (AAR):

$$\text{AAR} = \frac{\text{Average net income}}{\text{Average book value}}$$

5. Internal rate of return (IRR):

IRR = Discount rate or required return such that the net present value of an investment is zero

6. Profitability index:

$$\text{Profitability index} = \frac{\text{PV of cash flows}}{\text{Cost of investment}}$$

CHAPTER 10

1. Bottom-up approach to operating cash flow (OCF):

$$\text{OCF} = \text{Net income} + \text{Depreciation}$$
[10.1]

2. Top-down approach to operating cash flow (OCF):

$$\text{OCF} = \text{Sales} - \text{Costs} - \text{Taxes}$$
[10.2]

3. Tax shield approach to operating cash flow (OCF):

$$\text{OCF} = (\text{Sales} - \text{Costs}) \times (1 - T_c) + \text{Depreciation} \times T_c$$
[10.3]

CHAPTER 11

1. Accounting break-even point:

$$Q = (FC + D)/(P - v)$$
[11.1]

2. Project operating cash flow (OCF), ignoring taxes:

$$\text{OCF} = (P - v) \times Q - FC$$
[11.2]

3. Relationship between operating cash flow (OCF) and sales volume, ignoring taxes:

$$Q = (FC + OCF)/(P - v)$$
[11.3]

4. Cash break-even point:

$$Q = FC/(P - v)$$

5. Cash break-even point:

$$Q = (FC + OCF^*)/(P - v)$$

where

OCF^* = Zero NPV cash flow

6. Degree of operating leverage (DOL):

$$\text{DOL} = 1 + FC/\text{OCF}$$
[11.4]

CHAPTER 12

1. Total dollar return on an investment:

$$\text{Total dollar return} = \text{Dividend income} + \text{Capital gain (or loss)}$$
[12.1]

2. Total cash if stock is sold = Initial investment +

$$\text{Total return}$$
[12.2]

3. Standard deviation of returns, $SD(R)$ or σ :

$$SD(R) = \sqrt{\text{Var}(R)}$$

4. Variance of returns, $\text{Var}(R)$ or σ^2 :

$$\text{Var}(R) = \frac{1}{T-1} [(R_1 - \bar{R})^2 + \dots + (R_T - \bar{R})^2] \quad [12.3]$$

5. Geometric average return:

$$\begin{aligned} \text{Geometric average return} &= [(1 + R_1) \times \\ &\quad (1 + R_2) \times \dots \times \\ &\quad (1 + R_T)]^{1/T} - 1 \end{aligned} \quad [12.4]$$

6. Blume's formula:

$$\begin{aligned} R(T) &= \frac{T-1}{N-1} \times \text{Geometric average} + \\ &\quad \frac{N-T}{N-1} \times \text{Arithmetic average} \end{aligned} \quad [12.5]$$

CHAPTER 13

1. Risk premium:

$$\text{Risk premium} = \text{Expected return} - \text{Risk-free rate}$$

2. Expected return on a portfolio:

$$E(R_p) = x_1 \times E(R_1) + x_2 \times E(R_2) + \dots + x_n \times E(R_n) \quad [13.2]$$

3. Risk and return:

$$\begin{aligned} \text{Total return} &= \text{Expected return} + \\ &\quad \text{Unexpected return} \\ R &= E(R) + U \end{aligned} \quad [13.3]$$

4. Components of an announcement:

$$\text{Announcement} = \text{Expected part} + \text{Surprise} \quad [13.4]$$

5. Systematic and unsystematic components of return:

$$\begin{aligned} R &= E(R) + \text{Systematic portion} + \\ &\quad \text{Unsystematic portion} \end{aligned} \quad [13.5]$$

6. Total risk:

$$\text{Total risk} = \text{Systematic risk} + \text{Unsystematic risk} \quad [13.6]$$

7. The reward-to-risk ratio:

$$\text{Reward-to-risk ratio} = \frac{E(R_i) - R_f}{\beta_i}$$

8. The market risk premium:

$$\text{SML slope} = E(R_M) - R_f$$

9. The capital asset pricing model (CAPM):

$$E(R_i) = R_f + [E(R_M) - R_f] \times \beta_i \quad [13.7]$$

CHAPTER 14

1. Required return on equity, R_E (dividend growth model):

$$R_E = D_1/P_0 + g \quad [14.1]$$

2. Required return on equity, R_E :

$$R_E = R_f + \beta_E \times (R_M - R_f) \quad [14.2]$$

3. The cost of preferred stock, R_p :

$$R_p = D/P_0 \quad [14.3]$$

4. The market value of a firm's debt and equity:

$$V = E + D \quad [14.4]$$

5. The percentages of a firm's capital represented by debt and equity:

$$100\% = E/V + D/V \quad [14.5]$$

6. The weighted average cost of capital (WACC):

$$\text{WACC} = (E/V) \times R_E + (D/V) \times R_D \times (1 - T_c) \quad [14.6]$$

7. The weighted average cost of capital (WACC) with preferred stock:

$$\text{WACC} = (E/V) \times R_E + (P/V) \times R_P + (D/V) \times R_D \times (1 - T_c) \quad [14.7]$$

8. Calculating a firm's "adjusted" taxes:

$$\text{Taxes}^* = \text{EBIT} \times T_c \quad [14.8]$$

9. Adjusted cash flow from assets (CFA):

$$\begin{aligned} \text{CFA}^* &= \text{EBIT} + \text{Depreciation} - \text{Taxes}^* - \\ &\quad \text{Change in NWC} - \text{Capital spending} \\ &= \text{EBIT} + \text{Depreciation} - \text{EBIT} \times T_c - \\ &\quad \text{Change in NWC} - \text{Capital spending} \end{aligned} \quad [14.9]$$

10. Simplified adjusted cash flow from assets (CFA):

$$\text{CFA}^* = \text{EBIT} \times (1 - T_c) + \text{Depreciation} - \text{Change in NWC} - \text{Capital spending} \quad [14.10]$$

11. The value of a firm today is:

$$V_0 = \frac{\text{CFA}_1^*}{1 + \text{WACC}} + \frac{\text{CFA}_2^*}{(1 + \text{WACC})^2} + \frac{\text{CFA}_3^*}{(1 + \text{WACC})^3} + \dots + \frac{\text{CFA}_t^* + V_t}{(1 + \text{WACC})^t} \quad [14.11]$$

12. Firm value, using the growing perpetuity formula:

$$V_t = \frac{\text{CFA}_{t+1}^*}{\text{WACC} - g} \quad [14.12]$$

13. Weighted average flotation cost, f_A^* :

$$f_A = (E/V) \times f_E + (D/V) \times f_D \quad [14.13]$$

CHAPTER 15

1. Rights offerings:

- Number of new shares:
Number of new shares
= $\frac{\text{Funds to be raised}}{\text{Subscription price}}$ [15.1]

- Number of rights needed:
Number of rights needed to buy a share of stock
= $\frac{\text{Old shares}}{\text{New shares}}$ [15.2]

- Value of a right:
Value of a right = Rights-on price - Ex-rights price

CHAPTER 16

1. Modigliani-Miller propositions (no taxes):

- a. Proposition I:

$$V_L = V_U$$

- b. Proposition II:

$$R_E = R_A + (R_A - R_D) \times (D/E)$$

2. Modigliani-Miller propositions (with taxes):

- a. Value of the interest tax shield:

Present value of the interest tax shield

$$= T_C \times D$$

- b. Proposition I:

$$V_L = V_U + T_C \times D$$

- c. Proposition II:

$$R_E = R_U + (R_U - R_D) \times (D/E) \times (1 - T_C)$$

[16.1]

2. The Baumol-Allais-Tobin (BAT) model:

- a. Opportunity costs:

$$\text{Opportunity costs} = (C/2) \times R$$

[19A.1]

- b. Trading costs:

$$\text{Trading costs} = (T/C) \times F$$

[19A.2]

- c. Total cost:

$$\text{Total cost} = \text{Opportunity costs} + \text{Trading costs}$$

[19A.3]

- d. The optimal initial cash balance:

$$C^* = \sqrt{(2T \times F)/R}$$

[19A.4]

[16.2]

3. The Miller-Orr model:

- a. The optimal cash balance:

$$C^* = L + (3/4 \times F \times \sigma^2/R)^{1/3}$$

[19A.5]

[16.4]

- b. The upper limit:

$$U^* = 3 \times C^* - 2 \times L$$

[19A.6]

- c. The average cash balance:

$$\text{Average cash balance} = (4 \times C^* - L)/3$$

[19A.7]

CHAPTER 18

1. Basic balance sheet identity:

$$\begin{aligned} \text{Net working capital} + \text{Fixed assets} \\ = \text{Long-term debt} + \text{Equity} \end{aligned}$$

[18.1]

2. Net working capital:

$$\begin{aligned} \text{Net working capital} &= (\text{Cash} + \text{Other current assets}) \\ &- \text{Current liabilities} \end{aligned}$$

[18.2]

3. Cash identity:

$$\begin{aligned} \text{Cash} &= \text{Long-term debt} + \text{Equity} + \\ &\text{Current liabilities} - \\ &\text{Current assets other than cash} - \\ &\text{Fixed assets} \end{aligned}$$

[18.3]

4. The operating cycle:

$$\begin{aligned} \text{Operating cycle} &= \text{Inventory period} + \\ &\text{Accounts receivable period} \end{aligned}$$

[18.4]

5. The cash cycle:

$$\begin{aligned} \text{Cash cycle} &= \text{Operating cycle} - \\ &\text{Accounts payable period} \end{aligned}$$

[18.5]

6. Total cash collections:

$$\begin{aligned} \text{Cash collections} &= \text{Beginning accounts receivable} + \\ &1/2 \times \text{Sales} \end{aligned}$$

[18.6]

CHAPTER 19

1. Float measurement:

- a. Average daily float:

$$\text{Average daily float} = \frac{\text{Total float}}{\text{Total days}}$$

[19.1]

- b. Average daily float:

$$\begin{aligned} \text{Average daily float} \\ = \text{Average daily receipts} \\ \times \text{Weighted average delay} \end{aligned}$$

[19.2]

CHAPTER 20

1. The size of receivables:

$$\text{Accounts receivable} = \text{Average daily sales} \times \text{ACP}$$

[20.1]

2. NPV of switching credit terms:

- a. Cash flow with old policy = $(P - v)Q$

[20.2]

- b. Cash flow with new policy = $(P - v)Q'$

[20.3]

- c. Present value of switching:

$$PV = [(P - v)(Q' - Q)]/R$$

[20.4]

- d. Cost of switching:

$$\text{Cost of switching} = PQ + v(Q' - Q)$$

[20.5]

- e. NPV of switching:

$$\begin{aligned} \text{NPV of switching} &= -[PQ + v(Q' - Q)] + \\ &[(P - v)(Q' - Q)]/R \end{aligned}$$

[20.6]

- f. Break-even point of switching:

$$Q' - Q = PQ/[(P - v)/R - v]$$

[20.7]

3. NPV of granting credit:

- a. With no repeat business:

$$\text{NPV} = -v + (1 - \pi)P/(1 + R)$$

[20.8]

- b. With repeat business:

$$\text{NPV} = -v + (1 - \pi)(P - v)/R$$

[20.9]

4. The economic order quantity (EOQ) model:

- a. Total carrying costs:

$$\begin{aligned} \text{Total carrying costs} \\ = \text{Average inventory} \\ \times \text{Carrying cost per unit} \\ = (Q/2) \times CC \end{aligned}$$

[20.10]

b. Total restocking cost:

$$\begin{aligned} \text{Total restocking cost} \\ = \text{Fixed cost per order} \\ \times \text{Number of orders} \\ = F \times (T/Q) \end{aligned} \quad [20.11]$$

c. Total costs:

$$\begin{aligned} \text{Total costs} &= \text{Carrying costs} \\ &+ \text{Restocking costs} \\ &= (Q/2) \times CC + F \times (T/Q) \end{aligned} \quad [20.12]$$

d. Q^* :

$$\begin{aligned} \text{Carrying costs} &= \text{Restocking costs} \\ (Q^*/2) \times CC &= F \times (T/Q^*) \end{aligned} \quad [20.13]$$

e. The optimal order size Q^* :

$$Q^* = \sqrt{\frac{2T \times F}{CC}} \quad [20.14]$$

5. Net incremental cash flow = $P'Q \times (d - \pi)$ 6. NPV = $-PQ + P'Q \times (d - \pi)/R$ **CHAPTER 21**

1. Expected percentage change in the exchange rate:

$$\begin{aligned} \text{a. } [E(S_1) - S_0]/S_0 &= h_{FC} - h_{US} \\ \text{b. } E(S_1) &= S_0 \times [1 + (h_{FC} - h_{US})] \end{aligned} \quad [21.1] \quad [21.2]$$

2. Purchasing power parity (PPP):

$$E(S_t) = S_0 \times [1 + (h_{FC} - h_{US})]^t \quad [21.3]$$

3. Interest rate parity (IRP) condition:

$$\begin{aligned} \text{a. Exact, single period: } F_1/S_0 &= (1 + R_{FC})/(1 + R_{US}) \\ \text{b. Approximate, single period: } (F_1 - S_0)/S_0 &= R_{FC} - R_{US} \\ \text{c. } F_1 &= S_0 \times [1 + (R_{FC} - R_{US})] \end{aligned} \quad [21.4] \quad [21.5] \quad [21.6]$$

4. International Fisher effect (IFE):

$$R_{US} - h_{US} = R_{FC} - h_{FC} \quad [21.7]$$

CHAPTER 24

1. Value of a call option at maturity:

$$\begin{aligned} \text{a. } C_1 &= 0 \text{ if } S_1 - E \leq 0 \\ \text{b. } C_1 &= S_1 - E \text{ if } S_1 - E > 0 \end{aligned} \quad [24.1] \quad [24.2]$$

2. Bounds on the value of a call option:

$$\begin{aligned} \text{a. Upper bound: } C_0 &\leq S_0 \\ \text{b. Lower bound: } C_0 &\geq 0 \text{ if } S_0 - E < 0 \\ C_0 &\geq S_0 - E \text{ if } S_0 - E \geq 0 \end{aligned} \quad [24.3] \quad [24.4]$$

3. Value of a call option (simple case):

$$\begin{aligned} S_0 &= C_0 + E/(1 + R_f) \\ C_0 &= S_0 - E/(1 + R_f) \end{aligned} \quad [24.5]$$

4. Value of a call that is certain to finish in the money:

$$\begin{aligned} \text{Call option value} \\ = \text{Stock value} \\ - \text{Present value of the exercise price} \\ C_0 = S_0 - E/(1 + R_f) \end{aligned} \quad [24.6]$$

CHAPTER 25

1. Put-call parity condition (PCP):

$$\begin{aligned} \text{a. Share of stock + A put option} \\ = \text{Present value of strike price + A call option} \end{aligned} \quad [25.1]$$

$$\text{b. } S + P = PV(E) + C \quad [25.2]$$

$$\begin{aligned} \text{c. Stock price: } S &= PV(E) + C - P \\ S &= PV(E) + C - P \end{aligned} \quad [25.3]$$

$$\text{d. } S + P = E \times e^{-Rt} + C \quad [25.4]$$

2. The Black-Scholes call option formula:

$$C = S \times N(d_1) - E \times e^{-Rt} \times N(d_2) \quad [25.5]$$

PCP and the balance sheet identity:

$$\begin{aligned} d_1 &= [\ln(S/E) + (R + \sigma^2/2) \times t]/(\sigma \times \sqrt{t}) \\ d_2 &= d_1 - \sigma \times \sqrt{t} \end{aligned} \quad [25.6]$$

3. PCP and the balance sheet identity:

$$\begin{aligned} \text{a. Value of risky bond + Put option} \\ = \text{Value of risk-free bond} \end{aligned} \quad [25.7]$$

$$\begin{aligned} \text{b. Value of risky bond} &= \text{Value of risk-free bond} \\ &- \text{Put option} \\ &= E \times e^{-Rt} - P \end{aligned} \quad [25.8]$$

$$\begin{aligned} \text{c. Value of assets (S)} &= \text{Value of stock (C)} \\ &+ (E \times e^{-Rt} - P) \end{aligned} \quad [25.9]$$

$$\begin{aligned} \text{d. Value of assets (S)} \\ = \text{Value of stock (C)} \\ + \text{Value of bonds } (E \times e^{-Rt} - P) \end{aligned} \quad [25.10]$$

CHAPTER 26

4. The NPV of a merger:

$$\text{NPV} = V_B^* - \text{Cost to Firm A of} \\ \text{the acquisition} \quad [26.1]$$

ANSWERS TO SELECTED END-OF-CHAPTER PROBLEMS

C

CHAPTER 2

2. \$310,470
6. \$1,219,000
10. \$1,290,000
12. a. \$96,755
 b. \$17,800
 c. \$13,100
 d. \$1,155
18. a. -\$45,000
 b. \$165,000
19. a. 2017: \$3,069
 2018: \$3,959
 b. \$42
 c. Fixed assets sold = \$118
 Cash flow from assets = \$4,399
 d. Cash flow to creditors = \$221
 Debt retired = \$337

- k. 7.47%
l. 12.29%
m. 9.91%
n. 15.58%

CHAPTER 4

2. \$990
5. \$318.00
12. 6.04%
16. 9.89%
19. 1.36 times
21. Sustainable growth rate = 15.46%
 New borrowing = \$11,904.11
 Internal growth rate = 6.17%

CHAPTER 5

2. \$8,929.88; \$13,734.06; \$363,508.30;
\$487,874.54
6. 9.01%
10. \$150,568,214.49
14. -4.46%
18. \$400,897.66; \$154,563.40

CHAPTER 6

2. Net income = \$835,000
ROA = 6.47%
ROE = 11.60%
6. EPS = \$3.74
DPS = \$1.29
BVPS = \$32.94
Market-to-book ratio = 1.97 times
PE ratio = 17.40 times
P/S ratio = 1.48 times
10. 82.74 days
18. \$208.37
22. Firm A: 14.29%
 Firm B: 16.36%
26. a. 1.17 times; 1.30 times
 b. .69 times; .79 times
 c. .45 times; .45 times
 d. .81 times
 e. 8.19 times
 f. 18.24 times
 g. .34 times; .36 times
 h. .53 times; .57 times
 i. 1.53 times; 1.57 times
 j. 5.22 times

2. @ 5%: $PV_x = \$27,145.49$
 $PV_y = \$26,409.81$
@ 15%: $PV_x = \$18,846.75$
 $PV_y = \$20,448.15$
6. \$252,415.91
10. \$744,680.85
14. First National EAR = 13.92%
 First United EAR = 13.85%
18. \$32,529.18
22. APR = 1,733.33%
 EAR = 313,916,515.69%
26. \$38,126.53
30. 5.64% semiannual
 2.78% quarterly
 .92% monthly
38. \$3,058,897.35
42. \$343,996.22
46. Profit = \$3,815.99
 Break-even rate = 12.14%

- 50.** \$84,121.21
54. \$1,103.54
58. PV of lease payments = \$20,899.86
 PV of purchase = \$19,601.94
 Break-even resale price = \$26,446.80
60. 17.51%
64. 3.033 points
70. Value of payments at 65 = \$328,996.36
74. \$178,442.82; \$144,645.85

CHAPTER 7

- 4.** 2.97%
8. 5.75%
12. Approximate real rate = 2.50%
 Exact real rate = 2.45%
26. YTM = 4.89%; Current yield = 5.23%
28. a. \$298.13
 b. First year = \$14.79; Last year = \$47.26
 c. \$28.07

CHAPTER 8

- 2.** 10.82%
6. \$3.72
10. \$13,975,043
14. \$33.22
18. \$68.64
20. \$69.69

CHAPTER 9

- 4.** 1.89 years; 2.23 years; 3.40 years
8. \$2,816.58; -\$4,028.70
12. a. 19.71%; 18.76%
 b. \$6,330.67; \$8,138.59
 c. 16.48%
16. a. 1.141; 1.267
 b. \$8,870.02; \$4,146.13
22. a. $C = I/N$
 b. $C > I/\text{PVIFA}_{R\%, N}$
 c. $C = 2.0 * I/\text{PVIFA}_{R\%, N}$

CHAPTER 10

- 2.** \$703,400,000
8. \$1,348,448
12. $\text{CF}_0 = -\$2,570,000$
 $\text{CF}_1 = \$1,034,389.60$
 $\text{CF}_2 = \$1,124,684.00$
 $\text{CF}_3 = \$1,311,176.40$
 $\text{NPV} = \$183,422.80$
16. -\$122,979.65
22. \$.03126

CHAPTER 11

- 2.** Total costs = \$10,093,300
 Marginal cost = \$57.54
 Average cost = \$69.61
 Minimum revenue = \$287,700
8. $D = \$311,624$
 $P = \$46.97$
 $VC = \$74.94$
12. OCF = \$85,642
 $DOL = 3.043$
18. $DOL = 1.53$
 $DOL_A = 2.63$
22. $\Delta \text{NPV}/\Delta P = \$219,078.85$
 $\Delta \text{NPV}/\Delta Q = \$1,606.58$
30. $DOL = 1.35$
 $\Delta \text{OCF} = +4.51\%$

CHAPTER 12

- 2.** $R_D = 2.23\%$
 $R_C = 9.23\%$
6. $r_G = 2.91\%$
 $r_C = 3.20\%$
16. $R_A = 10.89\%$
 $R_G = 10.62\%$
20. 11.02%; 10.78%; 10.32%

CHAPTER 13

- 2.** 10.04%
6. 10.80%
10. a. 10.51%
 b. $\sigma_p^2 = .01378$
 $\sigma_p = 11.74\%$
14. .88
16. 3.32%
24. $C = \$383,070.87$
 $R_F = \$101,929.13$
26. $\beta_I = 1.74$
 $\sigma_I = 6.78\%$
 $\beta_{II} = .83$
 $\sigma_{II} = 18.08\%$

CHAPTER 14

- 2.** 10.46%
4. $R_A = 11.89\%$
 $R_G = 11.88\%$
8. Book value = \$135,000,000
 Market value = \$115,150,000
 Aftertax cost = 4.84%
12. a. $E/V = .3373$
 $D/V = .6627$
 b. $E/V = .8108$
 $D/V = .1892$

- 16.** a. $D/V = .2684$
 $P/V = .0461$
 $E/V = .6854$
 b. 8.68%
20. \$25,626,741

CHAPTER 15

- 2.** a. \$53; anything greater than \$0
 b. 744,681; 5.24
 c. \$52.04; \$.96
6. 3,133,641
12. \$22.05
14. \$29,904.31

CHAPTER 16

- 2.** a. \$1.86; \$3.10; \$4.02
 b. \$2.11; \$4.02; \$5.46
6. a. \$5.36; \$5.54; \$5.27
 b. \$71,250; \$71,250
 c. \$71,250
 d. \$4.23; \$4.38; \$4.16
 e. \$71,250; \$71,250; \$71,250
10. \$1,369,200
12. a. 13.64%
 b. 9.40%
 c. 16.18%; 12.79%; 9.40%
16. \$446,147.50

CHAPTER 17

- 2.** a. 5,000 new shares
 b. 12,500 new shares
4. a. \$40.80
 b. \$59.13
 c. \$47.72
 d. \$119.00
 e. 883,333; 609,500; 755,250; 302,857
8. Shares outstanding = 281,750
 Capital surplus = \$2,529,000
10. $P_0 = \$45.84$
 $D = \$28.20$

CHAPTER 18

- 2.** Cash = \$1,385
 Current assets = \$6,160
4. a. I,I
 b. I,N
 c. D,D
 d. D,D
 e. D,N
 f. I,I

- 8.** a. \$264.00; \$252.00; \$279.00; \$279.45
 b. \$243.00; \$264.00; \$252.00; \$279.00
 c. \$250.00; \$260.00; \$261.00; \$279.15
14. a. 3.03%
 b. 6.87%
 c. 6.77%
18. 9.51%

CHAPTER 19

- 2.** a. \$68,000
 -\$44,000
 \$24,000
6. a. \$68,000
 -\$22,000
 \$46,000
10. a. \$26,712
 b. 2.53 days
 c. \$26,712
 d. \$4.95
 e. \$10,865
10. NPV = \$4,450,000
 Net savings = \$111,250

APPENDIX 19A

- A.2** \$3,366.50
A.4 a. Opportunity cost = \$30
 Trading cost = \$350
 b. \$5,123.48
A.10 2.38%

CHAPTER 20

- 2.** \$2,608,219.18
6. Sales = \$625,907.41
 Accounts receivable turnover = 13.5185 times
10. NPV = \$160,207.89
12. Carrying cost = \$7,650
 Order cost = \$6,760
 EOQ = 423.01
 Orders = 55.32 per year
16. Net savings = \$1,631.25

APPENDIX 20A

- A.2** a. 1/20, net 30
 b. \$240,000
 d. NPV = -\$2,477,600
 Break-even price = \$108.42
 Break-even discount = 8.68%
A.4 b. \$70.45
 c. NPV = \$151,131.30

CHAPTER 21

6. Great Britain: 1.45%
 Japan: 1.19%
 Switzerland: 1.14%
10. b. Krone 8,4693
12. b. U.S. 1.64% greater

- 10.** \$263,144.11
14. \$5.48
16. Equity = \$3,245.62
 Debt = \$12,954.38
22. a. \$45,804.73
b. \$9,044.63
c. \$36,760.10; 11.40%
d. \$33,098.68; 13.50%
e. Bondholders lose \$3,661.42
 Stockholders gain \$3,661.42

CHAPTER 23

2. Price = \$17.81: Loss = \$1,725
 Price = \$17.64: Gain = \$2,525

CHAPTER 24

4. a. \$7.69
b. \$4.85
8. a. $E_0 = \$117.04$
 $D_0 = \$922.96$
b. $E_0 = \$190.78$
14. a. \$273,927.58
b. Abandon if $Q < 4,332$
20. a. \$4,274,450.63
b. \$3,819,874.85

CHAPTER 26

7. a. EPS = \$5.40
 PE = 11.11
9. .4215
13. a. £25.89
b. .8045

CHAPTER 27

2. -\$47,138.11
6. \$18,948.58

CHAPTER 25

2. \$6,791.91
6. 2.29%

USING THE HP 10B AND TI BA II PLUS FINANCIAL CALCULATORS

D

This appendix is intended to help you use your Hewlett-Packard HP 10B or Texas Instruments TI BA II Plus financial calculator to solve problems encountered in an introductory finance course. It describes the various calculator settings and provides keystroke solutions for nine selected problems from this book. Please see your owner's manual for more complete instructions. For more examples and problem-solving techniques, please see *Financial Analysis with an Electronic Calculator*, 7th edition, by Mark A. White (New York: McGraw-Hill, 2007).

CALCULATOR SETTINGS

Most calculator errors in introductory finance courses are the result of inappropriate settings. Before beginning a calculation, you should ask yourself the following questions:

1. Did I clear the financial registers?
2. Is the compounding frequency set to once per period?
3. Is the calculator in END mode?
4. Did I enter negative numbers using the $+\!-\!$ key?

Clearing the Registers

All calculators have areas of memory, called registers, where variables and intermediate results are stored. There are two sets of financial registers, the time value of money (TVM) registers and the cash flow (CF) registers. These must be cleared before beginning a new calculation. On the Hewlett-Packard HP 10B, pressing $\boxed{\text{F2}}$ {CLEAR ALL} clears both the TVM and the CF registers.¹ To clear the TVM registers on the TI BA II Plus, press $\boxed{\text{2nd}}$ $\boxed{\text{CLR TVM}}$. Press $\boxed{\text{2nd}}$ {CLR Work} from within the cash flow worksheet to clear the CF registers.

Compounding Frequency

Both the HP 10B and the TI BA II Plus are hard-wired to assume monthly compounding, that is, compounding 12 times per period. Because very few problems in introductory finance courses make this assumption, you should change this default setting to once per period. On the HP 10B, press $\boxed{1}$ $\boxed{\{P/YR\}}$. To verify that the default has been changed, press the $\boxed{\text{F2}}$ key, then press and briefly hold the $\boxed{\text{INPUT}}$ key.² The display should read “1P_Yr”.

On the TI BA II Plus, you can specify both payment frequency and compounding frequency, although they should normally be set to the same number. To set both to once per period, press the key sequence $\boxed{\text{2nd}}$ $\boxed{\{P/Y\}}$ $\boxed{1}$ $\boxed{\text{ENTER}}$, then press $\boxed{\downarrow}$ $\boxed{1}$ $\boxed{\text{ENTER}}$. Pressing $\boxed{\text{2nd}}$ {QUIT} returns you to standard calculator mode.

END Mode and Annuities Due

In most problems, payment is made at the end of a period, and this is the default setting (end mode) for both the HP 10B and the TI BA II Plus. *Annuities due* assume payments are made at the *beginning* of each period (begin mode). On the HP 10B, pressing $\boxed{\text{F2}}$ {BEG/END} toggles between begin and end mode. Press the key sequence $\boxed{\text{2nd}}$ {BGN} $\boxed{\text{2nd}}$ {SET} $\boxed{\text{2nd}}$ {QUIT} to accomplish the same task on the TI BA II Plus. Both calculators will indicate on the display that your calculator is set for begin mode.

¹The $\boxed{\text{F2}}$ key is colored orange and serves as a Shift key for the functions in curly brackets.

²This is the same keystroke used to clear all registers; pretty handy, eh?

Sign Changes

Sign changes are used to identify the direction of cash inflows and outflows. Generally, cash inflows are entered as positive numbers and cash outflows are entered as negative numbers. To enter a negative number on either the HP 10B or the TI BA II Plus, first press the appropriate digit keys and then press the change sign key, $+\!-\!$. Do *not* use the minus sign key, $-$, as its effects are quite unpredictable.

SAMPLE PROBLEMS

This section provides keystroke solutions for selected problems from the text illustrating the nine basic financial calculator skills.

1. Future Value or Present Value of a Single Sum

Compute the future value of \$2,250 at a 17 percent annual rate for 30 years.

| HP 10B | TI BA II PLUS |
|----------------------|---------------------------------|
| -2,250.00 PV | -2,250.00 PV |
| 30.00 N | 30.00 N |
| 17.00 I/YR | 17.00 I/Y |
| FV 249,895.46 | CPT FV 249,895.46 |

The future value is \$249,895.46.

2. Present Value or Future Value of an Ordinary Annuity

Betty's Bank offers you a \$20,000, seven-year term loan at 11 percent annual interest. What will your annual loan payment be?

| HP 10B | TI BA II PLUS |
|----------------------|--------------------------------|
| -20,000.00 PV | -20,000.00 PV |
| 7.00 N | 7.00 N |
| 11.00 I/YR | 11.00 I/Y |
| PMT 4,244.31 | CPT PMT 4,244.31 |

Your annual loan payment will be \$4,244.31.

3. Finding an Unknown Interest Rate

Assume that the total cost of a college education will be \$75,000 when your child enters college in 18 years. You presently have \$7,000 to invest. What rate of interest

must you earn on your investment to cover the cost of your child's college education?

| HP 10B | TI BA II PLUS |
|---------------------|-----------------------------|
| -7,000.00 PV | -7,000.00 PV |
| 18.00 N | 18.00 N |
| 75,000.00 FV | 75,000.00 FV |
| I/YR 14.08 | CPT I/Y 14.08 |

You must earn an annual interest rate of at least 14.08 percent to cover the expected future cost of your child's education.

4. Finding an Unknown Number of Periods

One of your customers is delinquent on his accounts payable balance. You've mutually agreed to a repayment schedule of \$374 per month. You will charge 1.4 percent per month interest on the overdue balance. If the current balance is \$12,000, how long will it take for the account to be paid off?

| HP 10B | TI BA II PLUS |
|----------------------|---------------------------|
| -12,000.00 PV | -12,000.00 PV |
| 1.40 I/YR | 1.40 I/Y |
| 374.00 PMT | 374.00 PMT |
| N 42.90 | CPT N 42.90 |

The loan will be paid off in 42.90 months.

5. Simple Bond Pricing

Mullineaux Co. issued 11-year bonds one year ago at a coupon rate of 8.25 percent. The bonds make semiannual payments. If the YTM on these bonds is 7.10 percent, what is the current bond price?

| HP 10B | TI BA II PLUS |
|---------------------|--------------------------------|
| 41.25 PMT | 41.25 PMT |
| 1,000.00 FV | 1,000.00 FV |
| 20.00 N | 20.00 N |
| 3.55 I/YR | 3.55 I/Y |
| PV -1,081.35 | CPT PV -1,081.35 |

Because the bonds make semiannual payments, we must halve the coupon payment ($8.25 \div 2 = 4.125 ==>$

\$41.25), halve the YTM ($7.10 \div 2 ==> 3.55$), and double the number of periods (10 years remaining $\times 2 = 20$ periods). Then, the current bond price is \$1,081.35.

6. Simple Bond Yields to Maturity

Vasicek Co. has 12.5 percent coupon bonds on the market with eight years left to maturity. The bonds make annual payments. If one of these bonds currently sells for \$1,145.68, what is its YTM?

| HP 10B | TI BA II PLUS |
|---------------------|----------------------------|
| -1,145.68 PV | -1,145.68 PV |
| 125.00 PMT | 125.00 PMT |
| 1,000.00 FV | 1,000.00 FV |
| 8.00 N | 8.00 N |
| I/YR 9.79 | CPT I/Y 9.79 |

The bond has a yield to maturity of 9.79 percent.

7. Cash Flow Analysis

What are the IRR and NPV of the following set of cash flows? Assume a discount rate of 10 percent.

| YEAR | CASH FLOW |
|------|-----------|
| 0 | -\$1,300 |
| 1 | 400 |
| 2 | 300 |
| 3 | 1,200 |

| HP 10B | TI BA II PLUS |
|-----------------------|---|
| -1,300.00 CFj | CF |
| 400.00 CFj | 2nd {CLR Work} |
| 1.00 {Nj} | -1,300.00 ENTER ↓ |
| 300.00 CFj | 400.00 ENTER ↓ |
| 1.00 {Nj} | 1.00 ENTER ↓ |
| 1,200.00 CFj | 300.00 ENTER ↓ |
| 1.00 {Nj} | 1.00 ENTER ↓ |
| {IRR/YR} 17.40 | 1,200.00 ENTER ↓ |
| 10.00 I/YR | 1.00 ENTER ↓ |
| {NPV} 213.15 | IRR CPT 17.40 NPV |
| | 10.00 ENTER |
| | ↓ CPT 213.15 |

The project has an IRR of 17.40 percent and an NPV of \$213.15.

8. Loan Amortization

Prepare an amortization schedule for a three-year loan of \$24,000. The interest rate is 16 percent per year, and the loan calls for equal annual payments. How much interest is paid in the third year? How much total interest is paid over the life of the loan?

To prepare a complete amortization schedule, you must amortize each payment one at a time:

| HP 10B | TI BA II PLUS |
|---|---|
| -24,000.00 PV | -24,000.00 PV |
| 16.00 I/YR | 16.00 I/Y |
| 3.00 N | 3.00 N |
| PMT 10,686.19 | CPT PMT 10,686.19 |
| 1.00 INPUT {AMORT} = 3,840.00 <= Interest | 2nd {AMORT} 2nd {CLR Work} |
| = 6,846.19 <= Principal | |
| = -17,153.81 <= Balance | 1.00 ENTER ↓ |
| 2.00 INPUT {AMORT} = 2,744.61 <= Interest | 1.00 ENTER ↓ -17,153.81 <= Balance |
| = 7,941.58 <= Principal | ↓ 6,846.19 <= Principal |
| = -9,212.23 <= Balance | ↓ 3,840.00 <= Interest |
| | ↓ |

(Continued)

| | | | | | | |
|------|--------------|---------|---|-----------------------|-----------|-----------------------|
| 3.00 | INPUT | {AMORT} | = | 1,473.96 <= Interest | | |
| | | | = | 9,212.23 <= Principal | 2.00 | ENTER |
| | | | = | 0.00 <= Balance | 2.00 | ENTER |
| | | | | | | ↓ |
| | | | | | -9,212.23 | <= Balance |
| | | | | | ↓ | 7,941.58 <= Principal |
| | | | | | ↓ | 2,744.61 <= Interest |
| | | | | | ↓ | |
| | | | | | 3.00 | ENTER |
| | | | | | | ↓ |
| | | | | | 3.00 | ENTER |
| | | | | | | ↓ |
| | | | | | 0.00 | <= Balance |
| | | | | | ↓ | 9,212.23 <= Principal |
| | | | | | ↓ | 1,473.96 <= Interest |
| | | | | | ↓ | |

Interest of \$1,473.96 is paid in the third year.

Enter both a beginning and an ending period to compute the total amount of interest or principal paid over a particular period of time.

| HP 10B | TI BA II PLUS |
|-------------------------------------|--|
| -24,000.00 PV | -24,000.00 PV |
| 16.00 I/YR | 16.00 I/Y |
| 3.00 N | 3.00 N |
| PMT 10,686.19 | CPT PMT 10,686.19 |
| 1.00 INPUT | 2nd {AMORT} 2nd {CLR Work} |
| 3.00 {AMORT} = 8,058.57 <= Interest | |
| | 1.00 ENTER ↓ |
| | 3.00 ENTER ↓ 0.00 <= Balance |
| | ↓ 24,000.00 <= Principal |
| | ↓ 8,058.57 <= Interest |

Total interest of \$8,058.57 is paid over the life of the loan.

9. Interest Rate Conversions

Find the effective annual rate (EAR) corresponding to a 7 percent annual percentage rate (APR) compounded quarterly.

| HP 10B | TI BA II PLUS |
|-------------|--------------------|
| 4.00 {P/YR} | 2nd {IConv} |
| 7.00 {NOM%} | 7.00 ENTER |
| {EFF%} 7.19 | ↓ ↓ |
| | 4.00 ENTER |
| | ↑ CPT 7.19 |

The effective annual rate equals 7.19 percent.



Name Index

- Altman, Edward I., 217–218
Bailey, Herbert S., Jr., 35–36
Benioff, Marc, 505
Black, Fischer, 595
Bohr, Niels, 94
Brin, Sergey, 1, 13, 505
Buffett, Warren, 163
Castro, Jason, 149
DeRozan, DeMar, 149
Ebbers, Bernie, 9
Fisher, Irving, 224
Ford, Henry, 383
Franklin, Benjamin, 139
Gilbert, Dan, 163
- Higgins, Robert C., 111
Ibbotson, Roger, 387, 391
Jobs, Steve, 13
Keynes, John Maynard, 641
Lay, Ken, 475
Leeson, Nicholas, 744
Lie, Erik, 806
Luck, Andrew, 149
Mayweather, Floyd, 11
Merton, Robert C., 808
Milken, Michael, 217
Miller, Merton H., 544
Modigliani, Franco, 544
Page, Larry, 1, 13, 505
Perry, Katy, 11
- Ritter, Jay, 509
Roll, Richard, 411
Rutledge, Thomas, 11
Santayana, George, 383
Shefrin, Hersh, 758
Siegel, Jeremy J., 405
Sinquefield, Rex, 387
Skilling, Jeff, 475
Stewart, Bennett, 475
Stumpf, John, 12
Tolstedt, Carrie, 12
Twain, Mark, 383
Weaver, Samuel, 321, 484
Wynn, Steve, 138
Zuckerberg, Mark, 1, 13

This page intentionally left blank



Formulas Index

- Absolute purchasing power parity, 719
Accounting break-even, 363
Accounts receivable, 675
Annuity due value, 164
Annuity future value (FV) factor, 163
Annuity present value, 158
Average cash balance, 669
Average daily float, 645
Balance sheet identity, 22, 607
Basic present value equation, 136
Benchmark price-earnings (PE) ratio, 249
Bond value, 199
Break-even application for switching credit policies, 682
Call option value, 800, 835, 837–838
 at expiration, 796
 in simple case, 799
Cash, 607
Cash collections, 621
Cash coverage ratio, 62
Cash cycle, 610, 613
Cash flow
 with new policy, 681
 with old policy, 680
Cash flow identity, 32, 50
Cash ratio, 60
Collection float, 643
Cost of equity capital, 542
Cost of switching credit policies, 681
Crossover rate, 293
Current price of stock, 240
Current ratio, 58

Days' sales
 in inventory, 62
 in receivables, 63
Debt-equity ratio, 61
Degree of operating leverage, 370
Disbursement float, 643
Dividend growth model, 243
Dividend payout ratio, 99
Dividends per share, 26, 579
DuPont identity, 69–70

Earnings per share, 26
EBIT, 538

EBITDA ratio, 68
Economic order quantity, 294
Effective annual rate (EAR), 169, 172
 with continuous compounding, 832
Enterprise value, 67
Equity multiplier, 61

Fisher effect, 224
Fixed asset turnover, 64
Float, 643
Future value (FV), 126

Growing annuity present value, 167
Growing perpetuity present value, 167

Income statement, 25
Interest rate parity, 723
Internal growth rate, 108, 110
International Fisher effect, 725
Interval measure, 60
Inventory period, 612
Inventory turnover, 62, 612

Levered firm, value of, 547
Long-term debt ratio, 61
Lower bound on call option value, 798

Market-to-book ratio, 67
M&M Proposition I with taxes, 546
M&M Proposition II, 542
 with taxes, 548

Net advantage to leasing, 901
Net incremental cash flow, 706
Net incremental gain from merger, 869, 876
Net present value (NPV)
 of granting credit, 685
 of merger, 877
 of switching credit policies, 681, 706–707
Net working capital (NWC), 607
 to total assets, 60
Net working capital (NWC) turnover, 64
Nominal rate, 225
Number of new shares for rights offering, 519

Number of rights needed to buy share of stock, 519
Operating cash flow (OFC), 330, 365, 366
Operating cycle, 609, 612
Opportunity costs, 665
Optimal cash balance (C^*), 666–667, 669

Payables period, 613
Payables turnover, 613
Present value (PV), 134
 of dividends per share, 579
 of interest tax shield, 546
 for perpetuity, 165
Price-earnings (PE) ratio, 66
Price-sales ratio, 67
Profit margin, 65
Put-call parity, 831–832, 834

Quick ratio, 59

Receivables period, 612
Receivables turnover, 63, 612
Relative purchasing power parity, 721
Return on assets (ROA), 65
Return on equity (ROE), 65, 69

Sustainable growth rate, 108, 110

Times interest earned, 61–62
Total asset turnover, 64
Total carrying costs, 692
Total cost, 666
Total costs of holding inventory, 693
Total debt ratio, 60
Total restocking costs, 693
Total value of Firm B to Firm A, 877
Trading costs, 666

Unbiased forward rate, 724
Uncovered interest parity, 725
Unlevered firm, value of, 547
Upper bound on call option value, 797

Value of assets, 850
Value of risk-free bond, 850
Value of risky bond, 850
- 

This page intentionally left blank

Subject Index

A

AAA bond rating, 212
AAR (average accounting return), 283–285, 299
Abandon project, option to, 812–813
ABC approach to inventory management, 690, 691
Abnormal return, 513, 514
Absolute priority rule, 563
Absolute purchasing power parity, 718–720
Accelerated cost recovery system (ACRS), 322
Accelerating collections, 652–653
Accounting
 average accounting return, 283–285, 299
 Generally Accepted Accounting Principles, 24, 26–27
 leasing and, 896–898, 906–907
 mental, 745–746
 mergers and acquisitions and, 867–868
Accounting break-even
 operating cash flow and, 364–365
 operating leverage and, 371–372
 overview, 361–363, 367
 uses for, 363–364
Accounting insolvency, 562
Accounts receivable, investment in, 675
Accounts receivable approach to credit policy analysis, 704–705
Accounts receivable financing, 625
Accounts receivable period, 609
ACHs (automated clearinghouses), 651–652
Acid-test ratio, 59–60
Acquisitions. *See* Mergers and acquisitions
ACRS (accelerated cost recovery system), 322
Active management, 757
Add-on interest, 190
Adjustment costs, 662–663
ADR (American Depository Receipt), 712

Affect heuristic, 746–747
Aftermarket, 504
Aftertax cash flow, 316
Agency costs, 11
Agency problem, 10
Agency relationship, 10
Aggregation, 93
Aging schedule, 687–688
Alphabet, 1, 11, 70–71, 253, 865
Ambiguity aversion, 749
American Depository Receipt (ADR), 712
American options, 791, 792
American quote, 715
Amortization schedule, 174
Amortized loans, 174–178
Anchoring bias, 749
Announcements and expected return, 428–429
Annual percentage rate (APR), 170–172
Annuity
 defined, 157
 future value for, 163–164
 growing, 167
 present value for, 157–163
Annuity due, 164
Annuity payment, 160
Annuity tables, 158–159
Apple, 6, 640
Appreciation of currency, 721
Appropriate discount rate. *See* Cost of capital; Required return
APR (annual percentage rate), 170–172
Arbitrage, limits to, 749–752
Arbitrage opportunities, 798
Arbitrageurs, 798
Arithmetic average return, 404, 407
Arrearage, 254
Articles of incorporation, 6
Asked price, 221
Ask price, 255
Aspirant group, 75
Asset management/asset utilization measures, 62–64
Assets. *See also* Current assets; Return on assets
 acquisition of, 864–865
 cash flow from, 32–34, 38

defined, 21
equity as call option on, 807–809
fixed, 21
fixed asset turnover, 64
goodwill, 867–868
illiquid, 23
intangible, 21
liquid, 23
overvalued, 443
portfolio of, 424–427, 431–434
short-term financial investing, 655–657
strategic allocation of, 272–273
tangible, 21
total asset turnover, 64, 110
wasting, 843
Asset-specific risk, 430
Assigning receivables, 625
Athletes, contracts for, 149
Auction market, 15–16
Automated clearinghouses (ACHs), 651–652
Automatic dividend reinvestment plans, 580
Availability bias, 749
Availability delay, 644
Available balance, 642
Average accounting return (AAR), 283–285, 299
Average accounting return rule, 284
Average collection period, 612, 675, 678
Average returns
 arithmetic and geometric averages, 404–407
 calculating, 393
 historical record, 393–394
 risk premiums, 394
Average tax rate, 30–32
Aversion
 to ambiguity, 749
 to loss, 743–744

B

Backdating employee stock options, 806–807
Balance sheets



- assets, 21
common-size, 55–56
debt and equity, 24
defined, 21
liabilities and owners' equity, 21–22
liquidity, 23
market value and book value, 24–25
net working capital, 22–23
percentage of sales approach, 99–101
sources and uses of cash and, 50–52
- Balloon payments, 177–178
Banker's acceptance, 679
Bankers and sustainable growth
 rate, 111
Bankrate.com, 176
Bankruptcy, 545, 562–565
Bankruptcy Abuse Prevention and
 Consumer Protection Act of
 2005, 564
Bankruptcy costs, 550–552
Base case, 353, 364–365
BASF, 458
Basic present value equation, 136
BATS Exchange, 259–260
Baumol–Allais–Tobin (BAT) model,
 664–667, 669
Beachheads, 870–871
Bearer form, 208
Bear hugs, 882
Behavioral finance
 biases, 741–742
 bubbles and crashes, 752–756
 framing effects, 743–746
 heuristics, 746–749
 limits to arbitrage, 750–752
 market efficiency and, 749–756
 overview, 740–741, 758
 professional money managers and,
 757–760
Bell curve, 399–400
Bellwether bonds, 221
Benchmark, choosing to compare
 financial statements, 74–78
Benefit-cost ratio (profitability index),
 296–297, 299
Ben-Hur (movie), 350
Best case scenario, 355
Best efforts underwriting, 503
Beta coefficient
 defined, 421
 risk premium and, 438–443
 systematic risk and, 434–438
Biases, 741–742
Bid-ask spread, 221
Bidders, 863
- Bid price
 dealers and, 255
 defined, 221
 setting, 333–335
Black–Scholes option pricing model (OPM)
 call option pricing formula, 835,
 837–838
 cumulative normal distribution, 836
 implied standard deviations, 846–848
 overview, 835
 put option valuation, 838–840
 varying risk-free rate, 845–846
 varying standard deviation, 844–845
 varying stock price, 840–843
 varying time to expiration, 843–844
Blanket inventory liens, 626
Blanket mortgages, 209
Blume's formula, 407
Boeing, 20
Bond markets
 overview, 218, 220
 price quotes, 223
 price reporting, 220–222
Bonds. *See also* Corporate bonds;
 Government bonds
 buying and selling, 220
 call-protected, 210
 catastrophe (cat), 215, 763
 CoCo, 216
 convertible, 216, 816–818
 credit rating of, 212
 crossover, 212
 “death,” 216
 defined, 21, 207
 determinants of yields, 226–230
 discount, 198
 Eurobonds, 712
 features and prices of, 196
 floating-rate, 214–215
 foreign, 712
 government, 212–213
 income, 215
 indenture, 208–211
 inflation-linked, 215
 interest rate risk on, 200–201
 Islamic (sukuk), 216
 junk, 212, 217–218
 level coupon, 196
 municipal, 213
 negative yield on, 195
 NoNo, 216
 par value, 196
 premium, 198
 put, 216, 818–819
 ratings of, 211–212
- risky, options and valuation of,
 849–850
types of, 215–216
values and yields of, 196–199, 203
yield to maturity, 201–202
zero coupon, 213–214
- Book balance, 642
Book value
 depreciation and, 323–324
 dilution of, 524–526
 market value compared to, 24–25
- Borrower, 206
Borrowing
 cash management and, 670
 short-term, 619–620, 623–627
- Bottom-up approach to operating cash
 flow, 330
- Brackets, 499
- Break-even analysis
 accounting break-even, 361–364
 fixed and variable costs, 358–361
- Break-even EBIT, 539
- Break-even effect, 744
- Broker, 255–256
- Bubbles, 752, 755–756
- Business cash advances, 625
- Business failure, 562
- Business interruption insurance, 764
- Business risk, 544
- Buybacks, 585–589
- Buyer of forward contracts, 769
- Bylaws, 6

C

- Calculatoredge.com, 166
- Call options
 equity as, 807–809, 848–849
 exercising, 840
 hedging with, 782
 overview, 779, 791–792
 upper and lower bounds on value of,
 797–798
 value of at expiration, 796–797
 valuing, 801–804
 warrants compared to, 815
- Call premium, 210
- Call price, 782
- Call-protected bonds, 210
- Call provision, 210, 818
- Capital. *See* Capital budgeting; Capital
 spending; Cost of capital; Net
 working capital
- Capital, raising
 dilution, 524–526

- 
- issuing long-term debt, 526–527
 issuing securities, 501
 overview, 495
 rights offering, 518–523
 seasoned equity offering, 513
 selling securities, 498–500
 shelf registration, 527
 underwriters, 502–505
 venture capital, 496–497
- Capital asset pricing model (CAPM),** 443–445
- Capital assets and acquisitions,** 873–874
- Capital budgeting.** *See also Net present value*
 at The Hershey Company, 321
 international, 726–728
 options and, 809–814
 overview, 2–3
 practice of, 297–299, 312
 using WACC to solve problems of, 458–459, 473–474
- Capital budgeting decision**
 options analysis in, 808
 options valuation in, 851–854
 overview, 2–3, 272–273
- Capital gains effect,** 867
- Capital gains taxes,** 581
- Capital gains yield,** 248
- Capital intensity ratio,** 100
- Capital intensive project,** 369
- Capital leases,** 895–896
- Capital market history**
 average returns, 393–394, 404–407
 efficiency and, 408–412
 lessons from, 394, 400, 402, 420, 431–432
 overview, 248–249–383
 returns on investments, 387–392
 variability of returns, 395–403
- Capital rationing,** 372–373
- Capital restructuring,** 535
- Capital spending**
 as component of cash flow from assets, 32, 33–34, 37
 for project, 318
 project cash flow and, 328
- Capital structure**
 cost of equity capital and, 541–545
 observations on, 560–562
 optimal, 536, 552–556
 overview, 3–4
- Capital structure decision**
 cost of capital and, 536
 financial leverage and, 537–541
 firm value, stock value, and, 535–536
- M&M theory and, 556–558
 overview, 3–4, 534, 535
 pecking-order theory and, 558–559
- Capital structure weights,** 465–466, 484
- CAPM (capital asset pricing model),** 443–445
- Captive finance company,** 684, 895
- Carrying costs**
 defined, 615, 617
 inventory and, 689, 692
- Cash**
 net working capital and, 607–608
 sources and uses of, 50–52, 608
- Cash acquisitions,** 877, 878–879
- Cash balance**
 held overseas, by U.S.-based companies, 711, 731–732
 overview, 622–623
 target, 662–669
 of U.S. corporations, 640
- Cash break-even,** 367
- Cash budget,** 621–623
- Cash collections.** *See Collections*
- Cash concentration,** 651–652
- Cash coverage ratio,** 62
- Cash cycle**
 calculating, 613
 defined, 609–610
 interpreting, 614
- Cash disbursements,** 622
- Cash discounts,** 677–678, 706–707
- Cash dividends.** *See Regular cash dividends*
- Cash equivalents,** 642
- Cash flow.** *See also Incremental cash flow; Operating cash flow; Project cash flow*
 aftertax, 316
 from assets, 32–34, 38
 common stock valuation and, 240–241
 to creditors and stockholders, 35–36
 defined, 32
 example of, 37–39
 financing and investing types of, 294
 to and from firm, 14–15
 future value for annuity cash flows, 163–164
 future value with multiple, 150–152
 of granting credit, 674–675
 hedging, 768
 nonconventional, 289–290
 present value for annuity cash flows, 157–163
 present value with multiple, 153–156
 projected and actual, 351
- projected total, 318–319
 relevant, 313
 statement of cash flows, 32–39, 52–54, 56
 timing of, 156–157
 unremitted, 728
- Cash flow time line,** 610
- Cash management**
 collection and concentration, 649–653
 costs of holding cash, 641–642
 disbursements, 653–655
 float, 642–648
 investing idle cash, 655–657
 liquidity management compared to, 642
 motives for liquidity, 641
 overview, 640
 target cash balance, determining, 662–670
- Cash-out,** 615
- Cash ratio,** 60
- Cash reserves,** 619
- Catastrophe (cat) bonds,** 215, 763
- Certificates of deposit,** 657
- Change in net working capital,** 32–33, 34, 38
- Check Clearing Act for the 21st Century of 2004,** 648
- Check kiting,** 647–648
- Chewable pills,** 881
- Chicago Board Options Exchange (CBOE),** 792, 794
- Chief risk officers,** 763
- Chipotle,** 420, 429
- Choosing**
 underwriters, 502
 venture capitalists, 497
- Class A shares,** 495
- Class B shares,** 495
- Class C shares,** 495
- Classes of common stock,** 252–253
- Classified boards,** 879
- Clawbacks,** 12
- Clean price,** 223
- Cleanup period,** 624
- Clearing,** 642
- Clientele effect,** 585
- Clustering illusion,** 748
- CoCo bonds,** 216
- Cognitive errors**
 biases, 741–742
 framing effects, 743–746
 heuristics, 746–749
- Coinsurance effect,** 852
- Collar,** 215



- Collateral, 209
 Collateralized loan obligation, 218
 Collected balance, 642
 Collectibles, return on, 138–139
 Collection float, 643
 Collection policy, 674, 687–688
 Collections
 accelerating, 652–653
 components of collection time, 649
 float management and, 644–645
 lockboxes, 649–650
 Combination approach to IRR, 296
 Comcast, 574
 Commercial drafts, 679
 Commercial liability insurance, 764
 Commercial paper, 626, 657
 Committed line of credit, 624
 Commodity price risk, hedging with options, 781
 Commodity swaps, 777
 Common-base year statements, 56
 Common-size statements, 54–56
 Common stocks
 features of, 251–254
 mergers and acquisitions, 864, 877–879
 Common stock valuation
 cash flows, 240–241
 components of required return, 248–249
 overview, 250
 special cases, 242–248
 using multiples, 249–250
 Company valuation with WACC, 479–481
 Compensating balance, 624–625, 641
 Competition in market, 352–353
 Compounding
 continuous, 172, 832–834
 defined, 125
 effective annual rates and, 168
 effect of, on future value, 129
 uses of, 131
 Compound interest, 125, 129
 Compound options, 783
 Concentration banks, 651
 Conditional sales agreement leases, 896
 Confirmation bias, 742
 Conglomerate acquisitions, 865
 Consideration, 863
 Consol, 165–166
 Consolidations, 863
 Constant growth rate, 242–245
 Constellation Brands, 420, 429
 Consumer credit, 674
 Consumer price index (CPI), 387, 392
 Contingency planning, 812–813
 Continuous compounding, 172, 832–834
 Contract operations, option to, 813
 Contribution margin per unit, 362
 Controlled disbursement accounts, 655
 Conventional factoring, 625
 Conversion premium, 816
 Conversion price, 816
 Conversion ratio, 816
 Conversion value, 817
 Convertible bonds, 216, 816–818
 Corporate bonds
 average annual returns on, 393, 406
 average return, standard deviation, and frequency distribution on, 399
 historical performance of, 388
 risk premium on, 394
 Corporate charters, 879
 Corporate finance, 2–4, 9
 Corporate restructuring movement, 217
 Corporate securities and options, 814–819
 Corporate tax rates, 29–30
 Corporations. *See also* International corporate finance
 cash balance of, 640
 control of, 10–13
 election of directors of, 251–252
 as form of business organization, 5–7
 international or multinational, 711
 valuation of, with WACC, 479–481
 Cost-cutting proposals, evaluating, 331–333
 Cost effects of credit policy, 679
 Cost of capital. *See also* Required return;
 Weighted average cost of capital calculating, 484
 capital structure and, 536
 defined, 446, 459
 divisional and project, 476–479
 financial policy and, 460
 optimal capital structure and, 553–554
 required return and, 459–460
 unlevered, 547
 Cost of equity
 calculating, 468–470, 484
 defined, 460
 dividend growth model approach, 460–462
 SML approach, 462–463
 Cost reductions of acquisitions, 871–872
 Costs. *See also* Cost of capital; Cost of equity
 of acquisitions, 876–879
 adjustment, 662–663
 agency, 11
 of bankruptcy, 550–552
 carrying, 615, 617, 689, 692
 of cash discounts, 678
 of compensating balances, 624–625
 of debt, 464, 470–471, 484
 of equity capital, 541–545
 financial distress, 551, 556
 financing, 315–316
 fixed and variable, 27, 358–361, 370
 of float, 645–646
 flotation, 482–485, 513, 581
 historical, 24
 of holding cash, 641–642, 663–664
 implementation, 750
 incremental, 360
 of initial public offerings, 513–517
 of inventory, 689–690
 of issuing securities, 513–517
 marginal, 360–361
 opportunity, 314–315, 665
 period, 28–29
 of preferred stock, 464–465
 product, 28
 restocking, 692–693
 shortage, 615–616, 617, 689–690
 sunk, 314
 trading, 665–666, 742
 transaction, 874, 906
 variable, 358–360
 Counteroffer offers, 882
 Coupon rate, 196
 Coupons, 196
 Covered interest arbitrage, 722–723
 CPI (consumer price index), 387, 392
 Crashes, 591, 740, 752–756
 Crash of 1929, 752–753
 Credit analysis, 674, 684–687
 Credit card receivable funding, 625
 Credit cost curve, 682–683
 Credit information, sources of, 686
 Credit instruments, 679
 Creditors, 35, 38, 206
 Credit period, 676–677
 Credit policy
 analysis of, 679–682, 704–707
 optimal, 682–684
 overview, 674–675
 terms of sale, 675–679
 Credit rating of bonds, 212
 Credit risk, 772
 Credit scoring, 686–687
 Cross-hedging, 773
 Crossover bonds, 212

Crossover rate, calculating, 293
 Cross-rate, 712, 715–717
 Crowdfunding, 499
 Crown jewels, 881
 Cumulative dividends, 254
 Cumulative voting, 251
 Currency appreciation and depreciation, 721
 Currency swaps, 713, 776
 Current assets
 alternative financing policies for, 616, 618–619
 defined, 21, 607
 liquidity of, 23
 size of firm's investment in, 615–616
 Current liability, 21, 607
 Current ratio, 58–59
 CVS Health, 49
 Cyclical activities, financing of, 655

D

Data on financial markets, 391
 Dates
 ex-dividend, 576–578
 expiration, 791
 ex-rights, 521
 holder-of-record, 522
 of payment, 576
 of record, 576
 settlement, 769
 Days' sales
 in inventory, 62–63
 in receivables, 63, 612, 675
 DCF analysis. *See* Discounted cash flow (DCF) analysis
 Deadhand pills, 881
 Dealer market, 15–16
 Dealers, 255–256
 "Death bonds," 216
 Debenture, 207, 209
 Debt
 cost of, 464, 470–471, 484
 equity and, 24, 206, 848–850
 interest paid on, as tax deductible, 545
 long-term, 207, 526–527
 preferred stock and, 254–255
 privately placed, 207
 public-issue, 207
 short-term, 206–207
 total debt ratio, 60–61
 unfunded, 207
 of U.S. government, 124
 Debt capacity, unused, 872
 Debt-equity ratio, 61, 536. *See also* Capital structure decision



Debt financing, 495, 537
 Debtors, 206
 Debt securities, 206–207. *See also* Bonds
 Decision making. *See also* Capital budgeting decision; Capital structure decision
 investment timing decisions, 810–811
 mutually exclusive investment decisions, 291–293
 short-term financial decisions, and net working capital, 606
 Declaration date, 576
 Deeds of trust, 208
 Default risk, 656, 706–707
 Default risk premium, 229
 Deferred call provision, 210
 Deferred compensation, 12, 13
 Degree of operating leverage (DOL), 369–370
 Delta, 842–843
 Depository transfer checks, 651
 Depreciation
 book and market value and, 323–324
 of currency, 721
 modified ACRS, 322–323, 324–325
 noncash items and, 27
 Depreciation tax shield, 331
 Derivative securities, 765, 783–784
 Derived-demand inventories, 695, 697
 Derived/dependent demand, 689
 Designated market maker (DMM), 256
 Diluted basis, earnings per share on, 815–816
 Dilution
 of proportionate ownership, 524
 of value, 524–526
 Direct bankruptcy costs, 551
 Direct leases, 894
 Directors of corporations, election of, 251–252
 Direct quote, 715
 Dirty price, 223
 Disbursement float, 642–643, 653–654
 Disbursements
 float management and, 644–645
 management of, 653–655
 Discount, 132
 Discount bonds, 198
 Discounted announcement or news, 429
 Discounted cash flow (DCF) analysis.
 See also Project cash flow
 of cost-cutting proposals, 331–333
 of equipment options, 335–337
 example of, 325–328

hard rationing and, 372
 limitations of, 351–352
 for setting bid price, 333–335
 Discounted cash flow (DCF) return, 287
 Discounted cash flow (DCF) valuation, 134, 274
 Discounted payback period, 281–283, 299
 Discounted payback rule, 281
 Discount factor, 134
 Discounting approach to IRR, 295
 Discount interest, 189–190
 Discount rate, 134, 137–140, 874
 Disposition effect, 745
 Distribution, 575
 Diversification
 effect of, 431–432
 mergers and acquisitions and, 876
 options valuation and, 851–852
 principle of, 432–433
 risk and, 420–421
 systematic risk and, 434
 unsystematic risk and, 433–434
 Divestitures and restructurings, 883–884
 Dividend growth, 132
 Dividend growth model, 243, 460–462
 Dividend market, 585
 Dividend payment, 575–576
 Dividend payout
 defined, 576
 high, factors favoring, 582–583
 low, factors favoring, 581
 taxes and, 581, 583, 595
 Dividend payout ratio, 99
 Dividend policy
 clientele effect, 585
 as determinant of growth, 110
 homemade, 579–580
 information content of dividends, 584
 irrelevance of, 578–579
 overview, 574, 592–594
 survey on, 594–595
 Dividends. *See also* Dividend payout; Dividend policy; Regular cash dividends
 characteristics of, 253–254
 cumulative and noncumulative, 254
 defined, 253, 575
 dividend payers and, 589–591
 growth of, 243
 information content of, 584
 liquidating, 575
 smoothing and stability of, 591–592
 special, 575
 stock, 596–599
 stock valuation and, 239



- Dividends per share, 576
 Dividend yield, 248, 576
 Divisional cost of capital, 477
 DMM (designated market maker), 256
 DMM's post, 257
 Dollar returns on investment, 383–385
 Dot-com crash, 591, 740, 755–756
 Double taxation, 6
 Dribble method of new equity issuance, 527
 Dual class capitalization, 882
 DuPont identity, 69–72
 Dutch auction underwriting, 503–504
- E**
- EAR (effective annual rate), 168–170, 832–834
 Earnings before interest and taxes (EBIT), 61–62, 538–539
 Earnings management, 43
 Earnings per share (EPS)
 acquisitions and growth in, 875–876
 defined, 26
 on diluted basis, 815–816
 dilution of, 524–526
 EBIT and, 538–539
 financial leverage and, 537–538
 stock repurchases and, 588–589
 Eastman Chemical Co., calculating WACC for, 467–473
 EBIT (earnings before interest and taxes), 61–62, 538–539
 EBITD and EBITDA, 62
 EBITDA ratio, 68
 Economic exposure, 768
 Economic order quantity, 694
 Economic order quantity (EOQ) model, 690–695
 Economic value added (EVA), 475
 Economies
 of scale, 871
 of vertical integration, 871–872
 EDGAR website, 28
 EDI (electronic data interchange), 648
 Effective annual rate (EAR), 168–170, 832–834
 Effective interest rate, 907
 Efficient capital market, 408–412
 Efficient markets hypothesis (EMH), 409–411
 E.F. Hutton, 647–648
EFN. *See* External financing needed
 Electronic communications network, 260
 Electronic data interchange (EDI), 648
 Electronic lockboxes, 650
 Employee stock options (ESOs), 804–807
 Employer's liability insurance, 764
 Endowment effect, 746
 Enron, 475
 Enterprise risk management (ERM)
 financial risk, 765–769
 forward contracts, hedging with, 769–772
 futures contracts, hedging with, 772–776
 insurance and, 764–765
 option contracts, hedging with, 778–784
 overview, 763–767
 swap contracts, hedging with, 776–778
 Enterprise value, 42, 67–68
 EPS. *See* Earnings per share
 Equipment options, evaluating, 335–337
 Equity. *See also* Return on equity
 as call option on assets of firm, 807–809
 debt and, 24, 206, 848–850
 in leveraged firm, valuation of, 848–849
 Equity carve-outs, 883–884
 Equity crowdfunding, 499
 Equity financing, 495
 Equity kickers, 815
 Equity multiplier, 61
 Equity securities, 206
 Equivalent annual cost, 336–337
 ERM. *See* Enterprise risk management
 Erosion, 315
 ESOs (employee stock options), 804–807
 Estimation risk, 351–352
 Ethical questions in float management, 647–648
 Eurobonds, 712
 Eurocurrency, 712
 European options, 791, 839. *See also* Black-Scholes option pricing model
 Eurotunnel (Chunnel), 356
 EVA (economic value added), 475
 Excess return, 394
 Exchange rate risk, 728–731, 781
 Exchange rates, 714–718
 Ex-dividend date, 576–578
 Exercise price and option valuation, 801, 830
 Exercising the option, 791
 Expand project, option to, 812
 Expected return
 announcements, surprises, and, 428–429
 overview, 421–423
 portfolio, 425–426
 risk and, 430–431
 Expected risk premium, 422
 Expenditures, planned or possible, 655
 Expiration date, 791
 Explicit options, 809
 Ex-rights date, 521
 Ex-rights price, 521–522, 531
 Extended pie model, 557–558
 External financing needed (EFN)
 capacity usage and, 103
 defined, 101
 growth and, 105–107
 External use of financial statement information, 73
 Extra cash dividend, 575
- F**
- Facebook, 1
 Face value, 196
 Factoring receivables, 625, 683
 Fair price provisions, 882
 Fallen angels, 212
 False consensus, 749
 Federal Bankruptcy Reform Act of 1978, 562, 563
 Fidelity Magellan Fund, volatility of, 398
 Field warehouse financing, 626
 Financial Accounting Standards Board (FASB), 867, 868, 896–897
 Financial break-even, 367–368
 Financial calculator
 Calculatedge.com, 166
 dos and don'ts, 130–131
 Financial distress costs, 551, 556
 Financial EDI (FEDI), 648
 Financial Industry Regulatory Authority (FINRA), 220, 261
 Financial leases, 895–896
 Financial leverage. *See also* Operating leverage
 cost of equity and, 542–543
 defined, 24
 effect of, 537–541
 taxes and, 556
 Financial leverage ratio, 61
 Financial management
 bankruptcy process and, 565
 capital budgeting decisions and, 2–3

- 
- capital structure decisions and, 3–4
goals of, 7–10
inefficient, and acquisitions, 874–875
working capital decisions and, 4
- Financial managers, 2, 688–689
- Financial markets. *See also Capital market history*
cash flows to and from firm, 14–15
foreign exchange, 713–714
primary and secondary, 15–16
transparency of, 220
- Financial planning. *See also Capital budgeting; Dividend policy*
assumptions of models of, 95–97
caveats on models for, 112–113
dimensions of, 93–94
long-term, 92–93
overview, 93
percentage of sales approach to, 98–103
purposes and results of, 94–95
short-term, 627–628
simple model for, 97–98
- Financial policy and cost of capital, 460
- Financial ratio, 57. *See also Ratio analysis*
- Financial risk, 544–545, 763–764. *See also Hedging*
- Financial statements
balance sheet, 21–25
benchmark for comparison of, 74–78
cash flow, 32–39, 52–54, 56
combined common-size and base year analysis, 56–57
common-base year, 56
common-size, 54–56
income, 25–29, 98–99
problems with analysis of, 78–79
pro forma, 96, 316–317
standardized, 54–57
taxes, 29–32
uses of information from, 50, 73
working knowledge of, 49
- Financing costs, 315–316
- Financing type cash flow, 294
- Finished goods, 689
- Finra-markets.morningstar.com, 219
- Firm commitment underwriting, 502–503
- Firms. *See Corporations; Life cycle of firms; Value of firms*
- Firm-specific risk, 750
- First-stage financing, 496
- Fisher effect, 224–225
- Five Cs of credit, 686–687
- Fixed assets, 21, 23
- Fixed asset turnover, 64
- Fixed costs, 360, 370
- Fixed price, 830
- Fixed repurchase strategy, 593
- Flat-rate tax, 31
- Flexible short-term financial policies, 614–615, 617
- Flip-in provisions, 880
- Float
collection float, 643
cost of, 645–646
defined, 642
disbursement float, 642–643, 653–654
EDI and, 648
management of, 644–648
measurement of, 644–645
net float, 643
- Floating-rate bonds, 214–215
- Floor brokers, 256–257
- Floor value of convertible bonds, 817–818
- Flotation costs
defined, 513
dividend payout and, 581
WACC and, 482–485
- Ford Motor Company, 252
- Forecasting risk, 351–352
- Foreign bonds, 712
- Foreign currency approach, 726, 727–728
- Foreign exchange, 712
- Foreign exchange market (forex, FX market), 713–714
- Forms of business organization, 5–7
- Forward contracts, 769–772, 779
- Forward exchange rate, 717
- Forward price, 769
- Forward rates, 724
- Forward trades, 717
- Foxconn, 272
- Frame dependence, 743
- Framing effects, 743–746
- Free cash flow, 34
- Frequency distributions, 395–396, 399
- Futures contracts, hedging with, 772–776
- Futures exchanges, 773
- Futures options, 781
- Future spot rates, 724
- Future value (FV)
for annuity cash flows, 163–164
with multiple cash flows, 150–152
overview, 125–129
present value compared to, 136
- Future value interest factor, 126, 128, 136
- G**
- Gambler's fallacy, 748
- GameStop, 239
- GE Capital Aviation Services, 893
- General cash offer, 501
- General Electric (GE), 312
- General equity funds (GEFs), 757–760
- Generally Accepted Accounting Principles (GAAP), 24, 26–27
- General Motors (GM), 70, 253
- General partnerships, 5
- Geometric average return, 404–407
- Get-evenitus, 744
- Gilts, 712
- Globalization, 712
- Global markets, 391, 401, 403
- Goals
of financial management, 7–10
of management, 10–11
- Going-private transactions, 865, 881
- Golden parachutes, 881
- Goodwill, 867–868
- Government bonds. *See also U.S. Treasury bonds*
average annual returns on, 393, 406
average return, standard deviation, and frequency distribution on, 399
historical performance of, 388
overview, 212–213
risk premium on, 394
year-by-year total returns on, 390, 392
- Greenmail, 879
- Green Shoe provision, 504, 514
- Green technology and products, 312
- Gross spread, 502, 514
- Growing perpetuity, 242
- Growth
external financing and, 105–107
as financial management goal, 93
financial policy and, 107–110
- Growth rates
estimating, 461–462
examples of, 91
research on, 104
- Growth stocks, 241, 402. *See also Small-company stocks*

**H**

Hanjin Shipping, 673
Hard rationing, 372–373
Hazard risk, 763
Hedging
cash flow, 768
defined, 765
financial risk, 766–767
with forward contracts, 769–772
with futures contracts, 772–776
long-term exposure, 768
maturing, 619
with option contracts, 778–784
short-run exposure, 768
with swap contracts, 776–778
The Hershey Company, 321, 484
Heuristics, 746–749
Historical costs, 24
Historical variance, 396
Holder-of-record date, 522
Holding period yield, 236
Home currency approach, 726–727
Homemade dividend policy, 579–580
Homemade leverage, 540–541
Horizontal acquisitions, 865
House money, playing with,
744–746
Hurdle rates, 484
Hybrid market, 256

I

Illiquid assets, 23
Immunization, 238, 765
Impinj, 516
Implementation costs, 750
Implicit interest rate, 907
Implied standard deviations (ISD),
846–848
Income, desire for, and dividend payout,
582
Income bonds, 215
Income component of return, 383
Income statements
common-size, 55–56
defined, 25–26
percentage of sales approach, 98–99
Incremental cash flow
acquisitions and, 874
from leasing, 899–900
overview, 313, 314–316
Incremental costs, 360
Incremental revenue, 361
Indenture
call provision, 210

defined, 208
protective covenants, 210
repayment, 209–210
security, 209
seniority, 209
terms of bond, 208
Independent demand, 689
Index funds, 757
Indirect bankruptcy costs, 551–552
Indirect exchange rate, 715
Inflation
average annual, 393, 406
interest rate and, 223–226
present value calculation and,
225–226
standard deviation and frequency
distribution of, 399
year-by-year, 391
Inflation-linked bonds, 215
Inflation premium, 227
Information and forms of market
efficiency, 411–412
Information content of dividends, 584
Initial public offering (IPO)
costs of, 513–517
defined, 501
lockup agreements, 504
quiet period, 504, 505
3Com/Palm mispricing, 750–751
underpricing and, 505–508,
510–512
Innovation, 429
Inside quote, 259
Insurance, 764–765, 819
Intangible assets, 21
Interest coverage ratio, 61–62
Interest on interest, 125–126
Interest-only loans, 174
Interest rate
of annuity, finding, 161–163
bond prices and, 199
Fisher effect, 224–225
implicit or effective, 907
inflation and, 223–226
real and nominal, 223–224
relative, 619
term structure of, 226–228
Interest rate caps, 783
Interest rate comparison, 167–172
Interest rate parity, 723–724
Interest rate risk, 200–201, 656,
781–782
Interest rate risk premium, 227–228
Interest rate swaps, 713, 776–778
Interest tax shield, 546
Internal equity and flotation costs, 485
Internal financing and pecking order,
558–559
Internal growth rate, 107–108, 110
Internal rate of return (IRR)
cost of capital and, 446
modified, 295–296
overview, 285–289, 299
problems with, 289–294
redeeming qualities of, 294–295
Internal rate of return rule, 286
Internal Revenue Service, 898
Internal use of financial statement
information, 73
International corporate finance
capital budgeting, 726–728
covered interest arbitrage, 722–723
exchange rate risk, 728–731
foreign exchange markets, exchange
rates, and, 713–718
forward and future spot rates, 724
interest rate parity, 723–724
international Fisher effect, 725
overview, 711–712
political risk, 731–732
purchasing power parity, 718–721
terminology, 712–713
uncovered interest parity, 725
International corporations, 711
International Fisher effect, 725
Interval measure, 60
Intrinsic value, 798
Inventory loans, 626
Inventory management
ABC approach, 690, 691
costs of inventory, 689–690
derived-demand inventories,
695, 697
economic order quantity (EOQ)
model of, 690–695
financial manager and, 688–689
types of inventory, 689
Inventory period, 609, 612
Inventory turnover, 62–63, 612
Investing
cash surpluses, 655–657
for more than one period, 125–129
for single period, 125
Investing type cash flow, 294
Investment timing decisions, 810–811
Invoices, 676
IPO. *See* Initial public offering
IRR. *See* Internal rate of return
ISDEX, 740
Islamic bonds (sukuk), 216

J

- Japan and Nikkei Index Crash, 755
 Joint stock companies, 7
 Joint ventures, 866
 Jumpstart Our Business Startups Act of 2012, 499
 Junk bonds, 212, 217–218
 Just-in-time inventory, 697

K

- Key employee retention plans, 564
 Key personnel insurance, 764

L

- Large-company stocks
 average annual returns on, 393, 406
 average return, standard deviation, and frequency distributions on, 399
 frequency distribution of returns on, 395
 historical performance of, 388
 overview, 387
 risk premium on, 394
 year-by-year total returns on, 389, 390, 392
 Large stock dividends, 596, 597
 Law of small numbers, 748
 Leases
 defined, 894
 financial, 895–896
 operating, 895
 Leasing
 accounting and, 896–898, 906–907
 buying compared to, 894–895, 900–903
 cash flows from, 899–900
 overview, 893
 from perspective of lessor, 903–904
 reasons for, 904–907
 taxes and, 898, 900, 905–906
 Ledger balance, 642
 Legacy effect of cash dividends, 593–594
 Legal bankruptcy, 562–565
 Legal questions in float management, 647–648
 Lenders, 206
 Lessees, 894
 Lessors, 894
 Letters
 of comment, 498
 of credit, 625
 Level coupon bonds, 196
 Leverage. *See* Financial leverage; Operating leverage

- Leveraged buyouts (LBOs), 217, 865, 881
 Leveraged firm, valuing equity in, 848–849

- Leveraged leases, 896
 Leveraged loans, 218

- Liability
 current, 21, 607
 employer's liability insurance, 764
 long-term, 21
 unlimited, 5

- LIBOR (London Interbank Offered Rate), 713

- Life cycle of firms
 dividend and payout policies and, 592
 early-stage financing and venture capital, 496–497
 new equity sales and value of firm, 513

- Limited liability companies (LLCs), 6–7

- Limited partnerships, 5

- Limits to arbitrage, 749–752

- Lines of credit, 624

- LinkedIn, 862, 865

- Liquid assets, 23

- Liquidating dividends, 575

- Liquidation, 562–563

- Liquidity, 23, 641

- Liquidity management, cash management compared to, 642

- Liquidity measures, 58–60

- Liquidity premium, 230

- Listing, 16

- Loan guarantees, 819

- Loans

- amortized, 174–178

- interest-only, 174

- inventory, 626

- leveraged, 218

- pure discount, 173

- secured, 625–626

- Stafford, 177

- term, 526

- unsecured, 624–625

- Lockboxes, 649–650

- Lockup agreements, 504, 882

- London Interbank Offered Rate (LIBOR), 713

- Long-term debt, 207, 526–527

- Long-term debt ratio, 61

- Long-term exposure, hedging, 768

- Long-term financial planning. *See* Financial planning

- Long-term leasing, 893

- Long-term liability, 21

- Long-term solvency measures, 60–62

- Loss aversion, 743–744

- Lower bound on call option value, 797–798

M

- MACRS (modified accelerated cost recovery system), 322–323, 324–325

- Mailing time, 644

- Make-whole call provision, 210

- Management buyouts, 865

- Managerial compensation, 11–13

- Managerial options, 811–814

- Marginal costs, 360–361

- Marginal revenue, 361

- Marginal tax rate, 30–32

- Marketability, 656

- Marketed claims, 558

- Market efficiency

- behavioral finance and, 749–756
 efficient capital markets, 408–412
 performance of professional money managers and, 757–760

- Marketing gains from acquisitions, 870

- Market risk, 430

- Market risk premium, 443

- Market-to-book ratio, 67

- Market value

- acquisitions and, 874
 book value compared to, 24–25
 depreciation and, 323–324
 dilution of, 524–526

- Market value measures, 66–68

- Marking-to-market, 772

- Martha Stewart IPO, 508

- Matching principle, 27

- Materials requirements planning (MRP), 695, 697

- Maturity, 196

- Maturity factoring, 625

- Maturity hedging, 619

- Mean reversion of equity return, 405

- Members of NYSE, 256

- Mental accounting, 745–746

- Mergers and acquisitions

- accounting for, 867–868
 cost of, 876–879
 defensive tactics of target firms, 879–882
 evidence on, 882–883
 financial side effects of, 875–876
 gains from, 869–875
 legal forms of, 863–866
 options valuation in, 851–852
 overview, 862–863
 taxes and, 866–867



- Metallgesellschaft AG, 775–776
 Micron Technology, 239
 Microsoft, 862, 865
 Miller-Orr model, 668–669
 MIRR (modified internal rate of return), 295–296
 Mispricings and limits to arbitrage, 749–752
M&M Proposition I, 541–542, 544, 546–547
M&M Proposition II, 542–543, 545, 547–548
M&M theory
 critics of, 556–557
 extended pie model, 557–558
 marketed and nonmarketed claims, 558
 Modified accelerated cost recovery system (MACRS), 322–323, 324–325
 Modified internal rate of return (MIRR), 295–296, 299
 Money. *See* Time value of money
 Money illusion, 746
 Money market, 655
 Money market securities, types of, 657
 Moody's, 211
 Mortgage calculator, 176
 Mortgage security, 209
 Mortgage trust indenture, 209
 MRP (materials requirements planning), 695, 697
 Multinational corporations, 711
 Multiple rates of return, 290
 Multiples, stock valuation using, 249–250
 Municipal notes and bonds, 213
 Municipal securities, 657
 Mutual (general equity) funds, 757–760
 Mutually exclusive investment decisions, 291–293
 Myopic loss aversion, 746
- N**
- NAICS (North American Industry Classification System), 75
 Narrow framing, 744
 NASDAQ, 16, 258–259, 740
 Near-cash, 642
 Negative covenant, 210
 Net advantage to leasing, 901
 Net cash inflow, 622
 Net float, 643
- Net income, 26
 Net operating losses, 872
 Net present value (NPV)
 calculating in U.S. dollars, 726
 estimating, 274–277
 evaluation of estimates of, 351–353
 flotation costs and, 483–485
 foreign currency approach to, 727–728
 home currency approach to, 726–727
 investment timing decision and, 810–811
 overview, 273–274, 299
 of switching credit policies, 680–681
 Net present value profile, 287
 Net present value rule, 275–276
 Net working capital (NWC)
 in capital budgeting, 315
 change in, 32–33, 34, 38
 overview, 22–23
 project cash flow and, 318, 319–322, 326–327
 short-term financial decision making and, 606
 tracing cash and, 607–608
 Net working capital to total assets ratio, 60
 News and expected return, 428–429
 New York Stock Exchange (NYSE)
 corporate securities and, 16
 Crash of October 1987 and, 754
 floor activity at, 257–258
 members of, 256–257
 operations of, 257
 transparency and, 220
 Nikkei Index Crash, 755
 “No free lunch” principle, 411
 Noise trader risk, 750
 Nominal rate, 223–225
 Noncash items, 27
 Nonconstant growth rate, 245–247
 Nonconventional cash flow and IRR, 289–290
 Noncumulative dividends, 254
 Nondiversifiable risk, 434. *See also* Systematic risk
 Nonmarketed claims, 558
 NoNo bonds, 216
 Nonrecourse basis, 896
 Normal distribution, 399–400
 North American Industry Classification System (NAICS), 75
 Notes, 207, 209
NPV. *See* Net present value
 Number of periods and time value of money, 140–142
- NWC. *See* Net working capital
 NWC turnover, 64
NYSE. *See* New York Stock Exchange
- O**
- OCF. *See* Operating cash flow
 October 1987 crash, 753–754
 Odd lots, 598
 Off-balance-sheet financing, 896–897
 100 percent financing, 907
 One-shot approach to credit policy analysis, 704
 Open interest, 773, 792
 Open market purchase, 586
 Operating cash flow (OCF)
 accounting break-even and, 364–365
 approaches to, 329–331
 break-even points and, 366–368
 calculating, 33
 as component of cash flow from assets, 32, 37
 sales volume and, 366
 Operating cycle
 calculating, 612
 defined, 609
 organizational chart and, 611
 Operating leases, 895
 Operating leverage. *See also* Financial leverage
 break-even and, 371–372
 capital structure decision and, 537–541
 measurement of, 369–371
 overview, 369
 Operational risk, 764
OPM. *See* Black-Scholes option pricing model
 Opportunity costs, 314–315, 665
 Optimal capital structure, 536, 552–556
 Optimal cash position. *See* Target cash balance
 Option backdating, 806–807
 Option contracts, 778–784, 792
 Option exchanges, 805–806
 Option premium, 779
 Option pricing model, 799–800
 Options. *See also* Call options; Option valuation
 capital budgeting and, 809–814
 employee stock, 804–807
 overview, 790–791
 payoffs, 793, 795–796

- 
- put, 779, 791–792
 quotations for, 792–793
 trading in, 792
Options analysis, applications of, 808
 Options calculators, 841, 847–848
Option valuation. *See also Black-Scholes option pricing model*
 corporate decisions and, 851–854
 equity and debt in leveraged firm, 848–850
 put-call parity, 830–834
Option value of convertible bonds, 818
Order flow, 257
 Ordinary annuity form of cash flow, 157
 Organizational charts, 2, 3, 611
OTCBB (Over-the-Counter Bulletin Board), 261
OTC (over-the-counter) market, 15, 258–259
OTCQX, OTCQB, and OTC Pink marketplaces, 260–261
 Over-allotment option, 504
 Overconfidence, 741–742
 Overdrafting of accounts, 647–648
 Overoptimism, 742
 Oversubscribed issue, 512
 Oversubscription privilege, 523
 Over-the-Counter Bulletin Board (OTCBB), 261
 Over-the-counter collection, 649
 Over-the-counter (OTC) market, 15, 258–259
 Overvalued assets, 443
 Owner equity, 21
- P**
- “Paralysis of analysis,” 356
Partial adjustment phenomenon, 510–511
 Partial amortization, 177
 Partnership agreements, 5
 Partnerships, 5
 Par value bonds, 196
 Passive management, 757
 Payables period, 613
 Payables turnover, 63–64, 613
 Payback period, 277, 299, 365
 Payback period rule, 277
 Payback rule, 277–280
 Payoff profile, 770
 Pecking-order theory, 558–559
 Peer group analysis, 74–75
 PE (price-earnings) ratio, 49, 66
 Percentage of sales approach
 balance sheet, 99–101
 income statement, 98–99
 scenarios for, 101–103
 Percentage returns on investment, 385–387
 Performance evaluation, using WACC for, 475
 Period costs, 28–29
 Perpetuity, 165–167
 PI (profitability index), 296–297, 299
 Pie model, 541–542, 556–558
 Planning horizon, 93
 Plug, 96
 Point on loan, 190
 Poison pills, 880–881
 Poison puts, 881
 Political risk, 731–732
 Portfolio betas, 437–438
 Portfolio expected return, 425–426
 Portfolios of assets, 424–427, 431–434
 Portfolio weight, 425
 Positive covenant, 210
 PPP (purchasing power parity), 718–721
 Precautionary motive for liquidity, 641
 Preemptive rights, 253
 Preferred stocks
 cost of, 464–465
 features of, 254–255
 as perpetuity, 165–166
 Premium bonds, 198
 Prepackaged bankruptcy, 564
 Present value (PV)
 for annuity cash flows, 157–163
 future value compared to, 136
 growing annuity and perpetuity PV, 167
 inflation and calculation of, 225–226
 with multiple cash flows, 153–156
 for multiple periods, 133–135
 for perpetuities, 165–166
 for single period, 132–133
 Present value interest factor, 134, 136
 Present value interest factor for annuities, 158
 Price behavior in efficient markets, 408–409
 Price-earnings (PE) ratio, 49, 66
 Price fluctuations, components of, 767
 Price-sales ratio, 66–67
 Primary market, 15, 255
 Principle of diversification, 432–433
 Private equity, 496
 Private issue securities, 501
 Privately placed debt, 207
 Private placement, 15, 526
 Privileged subscription, 518–523
 Processing delay, 644
 Procrustes approach, 112
 Product costs, 28
 Profit, repatriation of, 731–732
 Profitability index (PI), 296–297, 299
 Profitability measures, 64–66
 Profit margin
 defined, 65
 as determinant of growth, 109
 sustainable growth and, 112
 Profit motive, 410
 Pro forma statements, 96, 316–317
 Program trading, 754
 Project analysis and evaluation
 break-even analysis, 358–364
 capital rationing, 372–373
 NPV estimates, 351–353
 operating cash flow, sales volume, and break-even, 364–368
 operating leverage, 369–372
 overview, 350–351
 scenario and what-if analyses, 353–358
 Project cash flow
 depreciation, 322–325
 example of, 325–328
 net working capital, 319–321
 Project crowdfunding, 499
 Projected cash flow, 351
 Projected risk premium, 422
 Project operating cash flow, 317–318, 325–326
 Promissory notes, 679
 Prospectus, 498
 Protective covenant, 210
 Protective puts, 830
 Proxy, 252
 Proxy contests, 865
 Proxy fights, 13, 252
 Public-issue debt, 207
 Public issue securities, 501
 Public limited companies, 7
 Public offering, 15
 Purchase accounting method, 867–868
 Purchase order financing, 625–626
 Purchasing power parity (PPP), 718–721
 Pure discount loans, 173
 Pure play approach to estimating required return, 477–478
 Put bonds, 216, 818–819



Put-call parity, 830–834

Put options

- exercising, 839–840

- overview, 779, 791–792

- poison, 881

Put provision, 215

PV. *See* Present value

Q

Q ratio, 67

Quick ratio, 59–60

Quiet period, 505

Quoted interest rate, 168, 169–170

R

Randomness and representativeness heuristic, 747–748

Rate of return, 137–140

Ratio analysis

- asset management/turnover measures, 62–64

- long-term solvency measures, 60–62

- market value measures, 66–68

- overview, 57–58, 68

- profitability measures, 64–66

- short-term solvency/liquidity measures, 58–60

Raw material, 689

Real options, 808, 809, 811

Real rate, 223–225

Receipt of goods, 676

Receivables

- investment in, 675

- monitoring, 687–688

Receivables period, 612, 675

Receivables turnover, 63, 612

Recency bias, 748

Recognition/realization principle, 26

Red herring, 498

Registered form, 208

Registration statement, 498

Regret aversion, 746

Regular cash dividends

- overview, 575–576

- pros and cons of, 594

- as signal to market, 593

- stock repurchase compared to, 585–588

Regulation A, 498

Regulation CF, 499

Reinvestment approach to IRR, 295

Relative interest rates, 619

Relative purchasing power parity, 720–721

Relevant cash flow, 313

Reorder points, 695, 696

Reorganization, 562, 563–564

Repatriation, 731–732

Representativeness heuristic, 747–748

Repriced options, 805

Repurchase agreements, 657, 879

Repurchases, 585–589, 593

Required return. *See also* Cost of capital

- components of, 248–249

- cost of capital and, 459–460

- determinants of, 382

Residual value, 906

Restocking costs, 692–693

Restrictive short-term financial policies, 614–615, 617

Return on assets (ROA), 65–66, 803

Return on equity (ROE)

- DuPont identity and, 69–72

- financial leverage and, 537–538

- growth and, 109–111

- overview, 65–66

Return on investment (ROI). *See also*

- Expected return

- average returns, 393–394, 404–407

- dollar returns, 383–385

- percentage returns, 385–387

- total, 428, 431

- variability of, 395–403

Revenue effects

- of acquisitions, 870–871

- of credit policy, 679

Reverse convertible bonds, 216

Reverse splits, 598–599

Revolving credit arrangement, 624

Reward-to-risk ratio, 439–443

Rho, 846

Rights offering, 501, 518–523

Risk. *See also* Enterprise risk

- management

- asset-specific, 430

- business, 544

- commodity price, 781

- cost of capital and, 460

- credit, 772

- default, 656, 706–707

- diversification and, 420–421

- estimation, 351–352

- exchange rate, 728–731, 781

- financial, 544–545, 763–764

- firm-specific, 750

- forecasting, 351–352

- hazard, 763

interest rate, 200–201, 656, 781–782

market, 430

noise trader, 750

nondiversifiable, 434

operational, 764

overview, 445

political, 731–732

portfolio, 431–434

sentiment-based, 750

strategic, 764

systematic, 420, 430–431, 434–438

total, 434, 435

unique, 430

unsystematic, 420, 430–431, 433–434

variability of returns and, 400

Risk-free rate and option valuation, 801, 845–846

Risk-free return, 394

Risk Management Association, 75, 76–78

Risk premium

- beta and, 438–443

- on bonds, 394

- default, 229

- expected and projected, 422

- interest rate, 227–228

- market, 443

- overview, 402–404, 420

Risk profile, 766–767

ROA (return on assets), 65–66, 803

ROE. *See* Return on equity

ROI. *See* Return on investment

Round lots, 598

Royal Dutch/Shell price ratio, 751–752

S

Safety stocks, 695, 696

Sale and leaseback agreements, 896

Sales and cash collections, 621–622

Sales forecast, 96

Sales volume and operating cash flow, 366

Salvage value, 906

Samsung Note 7 cell phone, 356

Sarbanes-Oxley Act of 2002, 9–10, 806–807

Scenario analysis, 354–356

Scorched earth strategy, 881

Seasonal activities, financing of, 655, 656

Seasoned equity offering (SEO), 501, 513

SEC. *See* Securities and Exchange Commission

- 
- Secondary market, 15–16, 255
 Second-stage financing, 496
 Section 363 bankruptcy, 564
 Secured loans, 625–626
Securities
 as cash equivalents, 642
 corporate, and options, 814–819
 costs of issuing, 513–517
 debt, 206–207
 derivative, 765, 783–784
 equity, 206
 issuing, 501
 money market, 657
 private issue, 501
 public issue, 501
 selling to public, 498–500, 513
 short-term, 656–657
 trading in, 16
Securities Act of 1933, 498
Securities and Exchange Commission (SEC)
 EDGAR website, 28
 letters of comment from, 498
 registration of public offerings with, 15
 Rule 415, 527
Securities Exchange Act of 1934, 498
Security market line (SML)
 cost of capital and, 446
 cost of equity and, 462–463
 overview, 421, 443–445
 WACC and, 476–477
Self-attribution bias, 745
Sellers of forward contracts, 769–770
Selling call and put options, 791–792
Semiannual coupons, 199
Semistrong form efficient markets, 412
Seniority, 209
Sensitivity analysis, 356–357
Sentiment-based risk, 750
SEO (seasoned equity offering),
 501, 513
Service leases, 895
Settlement date, 769
Settlement price, 773
Shareholder equity, 21
Shareholders
 effects of mergers and acquisitions
 on, 882–883
 effects of rights offering on, 523
 rights of, 251–252, 253
Share rights plans, 880
Share warrants/rights, 518
Shark repellent, 882
Shelf registration, 527
Shortage costs, 615–616, 617, 689–690
Short-run exposure, hedging, 768
Short-term debt, 206–207
Short-term finance. *See also Cash management*
 borrowing, 619–620, 623–627
 cash budget, 621–623
 managers dealing with, 611
 operating and cash cycles, 608–614
 overview, 606–607
 plan for, 627–628
Short-term financial assets, investing,
 655–657
Short-term financial policy, 614–620
Short-term securities, characteristics of,
 656–657
Short-term solvency measures, 58–60
SIC (Standard Industrial Classification) codes, 74–75
Side effects of project, 315
Sight drafts, 679
Simple interest, 125
Simulation analysis, 357–358
Single-investor leases, 896
Sinking fund, 209–210
Sirius XM Satellite Radio, 91
Six Ps of planning, 92
Small-company stocks
 average annual returns on, 393,
 394, 406
 average return, standard deviation, and
 frequency distribution on, 399
 historical performance of, 388, 389
 overview, 387
 risk premium on, 394
 volatility and, 402
 year-by-year total returns on, 389, 390
Small-issues exemption, 498
Small stock dividends, 596–597
SML. *See Security market line*
Snap IPO, 495, 505
Society for Worldwide Interbank Financial Telecommunication (SWIFT), 714
Soft rationing, 372
Sole proprietorships, 4–5
Sources of cash, 50–52, 608
Special dividends, 575
Speculative motive for liquidity, 641
Spillover effects of project, 315
Spin-offs, 884
Split-ups, 884
Spot exchange rate, 717
Spot trades, 717
Spreading overhead, 871
Spreads, 255
Stafford loans, 177
Stakeholders, 13
Stand-alone principle, 313
Standard deviation
 historical, 399
 implied, 846–848
 option valuation and, 844–845
 overview, 396–397
 portfolio variance and, 427
Standard Industrial Classification (SIC) codes, 74–75
Standard & Poor's, 211
Standby fees, 523
Standby underwriting, 523
Standstill agreements, 879
Stated interest rate, 168, 169–170
Statements of cash flows, 52–54, 56
States of economy and expected return, 421
Static theory of capital structure, 552–556, 554, 558, 559
Stock dividends. *See Dividends*
Stockholders
 cash flow to, 35–36, 38
 managers and interests of, 11–13
Stock markets. *See also New York Stock Exchange*
 bubbles and crashes, 591, 740,
 752–756
 dealers and brokers, 255–256
 NASDAQ, 16, 258–260, 740
 reporting on, 260, 262
Stock options. *See Options*
Stockout, 615
Stock price and option valuation, 800,
 840–843
Stock price insurance, 855
Stock repurchases, 585–589, 593
Stocks. *See also Common stocks; Dividends; Large-company stocks; Preferred stocks; Small-company stocks; Stock markets*
 acquisition of, 864, 877–879
 employee stock options, 804–807
 growth, 241, 402
 safety, 695, 696
Stock splits, 596–599
Straight bond value, 816–817
Straight voting, 251–252
Strategic alliances, 866
Strategic asset allocation, 272–273
Strategic bankruptcy, 565
Strategic fits, 863, 870–871
Strategic options, 814
Strategic risk, 764



- Strike price, 791, 794, 830
 Strong form efficient market, 411–412
 Structured notes, 216
 Subjective approach to estimating required return, 478–479
 Sukuk (Islamic bonds), 216
 Sunk costs, 314
 Supermajority amendments, 879
 Supplemental liquidity provider (SLP), 256, 257
 Surpluses of cash, investing, 655–657
 Surplus funds and acquisitions, 872–873
 Surprise, 429
 Survivorship bias, 405, 760
 Suspend operations, option to, 813
 Sustainable growth rate, 108–109, 110–112
 Swap contracts, hedging with, 776–778
 Swap dealers, 777
 Swaps, 713
 Sweeteners, 815
 SWIFT (Society for Worldwide Interbank Financial Telecommunication), 714
 Symantec, 239
 Syndicates, 502
 Synergy from acquisitions, 869–870
 Systematic risk, 420, 430–431, 434–438
 Systematic risk principle, 435
- T**
- Takeovers, 865–866
 Tangible assets, 21
 Target cash balance
 BAT model, 664–667, 669
 Miller-Orr model, 668–669
 overview, 662–664
 Targeted repurchase, 586, 879
 Target firms
 defensive tactics of, 879–882
 defined, 863
 Taxability premium, 230
 Taxable acquisitions, 866–867
 Taxes
 acquisitions and, 866–867, 872–873
 average and marginal rates, 30–32
 cash balances held overseas and, 731–732
 corporate, with M&M Propositions I and II, 545–550
 corporate rates, 29–30
 dividend payout and, 581, 583, 595
 financial leverage and, 556
 leasing and, 898, 900, 905–906
 short-term securities and, 656–657
 stock repurchases and, 588
 weighted average cost of capital and, 466–467
 Tax-exempts, short-term, 657
 Tax-free acquisitions, 866–867
 Tax inversion, 31
 Tax-oriented leases, 896
 Tax Reform Act of 1986, 322, 867
 Tax shield approach to operating cash flow, 330–331
 Technical insolvency, 562
 Teen fashion industry, 534
 Tender offers, 586, 864
 Term loans, 526
 Terms of sale, 674, 675–679
 Term structure of interest rates, 226–228
 Theta, 843
 3Com/Palm mispricing, 750–751
 Time decay, 843
 Time drafts, 679
 Time horizon, 27
 Time line, 150
 Time premiums, 844
 Times interest earned ratio, 61–62
 Time to expiration and option valuation, 801, 843–844
 Time trend analysis, 74
 Time value of money
 calculations of, 142
 defined, 124–125
 discount rate, 137–140
 future value, 125–129, 136
 number of periods, 140–142
 present value, 132–136
 Time Warner, 20
 Tobin's Q ratio, 67
 Tombstone advertisement, 498, 499
 Top-down approach to operating cash flow, 330
 Toshiba, 20
 Total asset turnover, 64, 110
 Total capitalization, 61
 Total debt ratio, 60–61
 Total return, 428, 431
 Total risk, 434, 435
 Trade acceptance, 679
 Trade credit, 626–627, 674
 Trade discounts, 678
 Trade Reporting and Compliance Engine (TRACE), 220, 221
 Trading costs, 665–666, 742
 Trading range, 598
 Trading volume, 219
 Transaction costs
 in acquisitions, 874
 of leasing, 906
 Transaction motive for liquidity, 641
 Transactions exposure, 768
 Transitory changes, 768
 Translation exposure to exchange rate risk, 730–731
 Transparency of financial markets, 220
 Treasury yield curve, 229
 Trend analysis
 with combined common-size and base year statements, 56–57
 with common-base year financial statements, 56
 Triangle arbitrage, 717
 True leases, 896
 Trust deeds, 209
 Trust receipts, 626
 Turnover measures, 62–64
 Two-stage growth, 247–248
- U**
- Unbiased forward rates, 724
 Uncommitted lines of credit, 624
 Uncovered interest parity, 725
 Underpricing
 costs of issuing securities and, 514
 evidence on, 510
 explanations for, 511–512
 global, 509
 during Internet bubble, 505–508
 partial adjustment phenomenon, 510–511
 Underwater options, 805
 Underwriters, 502–505
 Underwriting for rights offerings, 523
 Unfunded debt, 207
 Uniform price (Dutch) auctions, 503–504
 Unique risk, 430
 Unlevered cost of capital, 547
 Unlimited liability, 5
 Unseasoned new issue, 501
 Unsecured loans, 624–625
 Unsystematic risk, 420, 430–431, 433–434
 Upper bound on call option value, 797
 Uses of cash, 50–52, 608
 U.S. Treasury bills
 average annual returns on, 393–394, 406

- 
- 
- average return, standard deviation, and frequency distribution on, 399
- historical performance of, 388, 389
- as money market securities, 657
- overview, 173
- risk premium on, 394
- year-by-year total returns on, 390, 392
- U.S. Treasury bonds**
- overview, 212–213
 - Series EE, 124, 141–142
 - yields and yield curve, 229
- U.S. Treasury market**, 220–222
- V**
- Valuation.** *See also* Common stock valuation; Option valuation of call options, 801–804 of company with WACC, 479–481 discounted cash flow and, 134, 274 of options, 796–801, 804
- Value.** *See also* Book value; Future value; Market value; Net present value; Present value; Time value of money
- of bonds, 196–199
 - of convertible bonds, 816–817
 - enterprise, 42, 67–68
 - face, 196
 - of preferred stocks, 254
 - residual, 906
 - of rights, 520–521
 - salvage, 906
 - sources of, 352–353
 - of stock splits and stock dividends, 597–598
- Value added**, 273, 475
- Value of firms**
- capital structure decision and, 535–536
- cost of equity and, 549–550
- Vanguard 500 Index Fund, 757–760
- Variability of returns**
- frequency distributions and, 395–396
 - historical record and, 397–399
 - normal distribution, 399–400
 - risk, reward, and, 400
 - in 2008, 400–402
- Variable costs**, 358–360
- Variance**
- calculating, 423–424
 - overview, 396–397
 - portfolio, 426–427
 - of return on underlying assets, 803
- Vega**, 845
- Venture capital**, 496–497
- Vertical acquisitions**, 865
- Volkswagen**, 420, 429
- Voting stock**, acquisition of, 864, 877–879
- W**
- WACC.** *See* Weighted average cost of capital
- Walmart**, 91
- Warrants**, 215, 815–816
- Wasting assets**, 843
- Weak form efficient markets**, 412
- Weighted average cost of capital (WACC)**
- calculating, 467–473
 - capital structure decision and, 536
 - capital structure weights, 465–466
 - company valuation with, 479–481
 - defined, 458, 459
 - finding estimates for, 472
 - flotation costs and, 482–485
- Weighted average flotation cost**, 482–485
- What-if analysis**, 353–358
- When-issued price**, 531
- White knights**, 881
- Whitemail**, 882
- White squires**, 882
- Winner's curse**, 333, 512
- Wire transfers**, 652
- Workers' compensation insurance**, 764
- Working capital**, 4. *See also* Net working capital
- Working capital management**, 606. *See also* Short-term finance
- Work-in-progress**, 689
- World Wrestling Federation IPO**, 508
- Worst case scenario**, 355
- Write-off**, 20
- Write-up effect**, 867, 873
- Y**
- Yahoo!**, 70–71
- Yahoo! Finance**, 104, 260
- Yield to maturity (YTM)**, 196, 201–202
- Z**
- Zero-balance accounts**, 654
- Zero coupon bonds**, 213–214
- Zero growth rate**, 242
- Zero-sum game**, stock options as, 795