

Time value analysis
and the
attractiveness of
alternative
investments finance
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Time value analysis

The time value analysis can provide the healthcare manager with the necessary information to make important decisions concerning financial strategies. The calculations of future cash flows at specific times are used to determine the attractiveness of alternative investments. The major limitation of the time value analysis is that a small change in cash flow may result in a distorted assessment of a potential investment. Incremental cash flows should be estimated with great care to consider only those that could change if a project or investment is accepted. The time value analysis of the Pensacola Surgery Centers will explore the company's investment opportunities.

The company has \$50, 000 in cash to invest in marketable securities. The option to invest in a bank certificate of deposit (CD) that return interest after 6 months to five years. The earned interest would be reinvested at its maturity date. The future value of a one year CD that pays 10 percent annual interest will total \$55, 000 at maturity (Table 1). The future value of a one year CD that pays 5 percent or 15 percent will total \$52, 500 and 57, 500 respectively. The other considerations are the bank's procedure of compounding the interest. The BankSouth offers a one year CD at 10 percent interest that is compounded semi-annually. This effective annual rate of 10.25 percent will yield a higher total of \$55, 125 that the annual CD. The Bank of America offers a 10 percent

Certificate of Deposit (CD)

\$50, 0000

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Investment

10%

Annual Interest

10%

Semi-Annual Interest

(10.25% effective)

10%

Daily Interest

(10.52% effective)

1-Year CD

\$55,000.00

\$55,125.00

\$55,257.79

5-Year CD

\$80,525.50

\$81,444.73

\$82,430.42

Table 1: Certificate of Deposit Summary.

CD that compounds daily. This results in a higher yield of \$55,258 with an effective annual rate of 10.52 percent. The BankSouth will likely offer a competitive rate on its semi-annual compounding CD of 10.3 percent to yield a total of \$55,283. The effective annual rate becomes 10.57 percent. The Pensacola Surgery Centers can place \$50,000 cash in a five year CD, and have the potential to significantly increase the earned interest. This will not allow other investments to utilize these funds during this five year period. The five year CD with interest compounded annually yields \$80,525. The semi-annual interest CD totals \$81,144.73, and the daily interest CD yields \$82,430.

The surgery clinic has the financial goal of having \$200,000 available for the purchase of a patient billing system in five years. If the clinic invested a lump sum in a one year CD with 10 percent annual interest, it would need to deposit \$124,184.26 today. Another choice would require the deposit of \$100,000 in a five year CD with an annual 15 percent interest to result in the necessary \$200,000 in funds.

The Pensacola Surgery Center may consider the option of an ordinary annuity to build the funds necessary for the computer application. The ability to make yearly payments to the account rather than an initial lump sum will decrease the amount of cash flow deterred from other investment opportunities. If five annual payments of \$32,000 are paid at the end of each year, the present value result is \$121,305 with an annual opportunity cost of 10 percent. The increase to \$138,543 will result if the interest is

compounded semi-annually. The future value of the annuity that pays 10 percent interest annually is \$195,363, and decreased to \$176,820 if compounded semi-annually. The annual interest necessary to accumulate the necessary \$200,000, by making the \$32,000 yearly payments, is 11 percent. Alternatively, the annual payment of \$32,759.50 with 10 percent interest is needed to reach the \$200,000 in funds. If the payments are changed to \$16,000 every six months, starting six months from today, the future value would total \$254,999 with 10 percent annual interest (Table 2). The future value of the payments with 10 percent interest compounded semi-annually yields \$201,246. The \$16,000 semi-annual payment schedule will accumulate the necessary funds for the capital expenditure.

Annuities

\$16,000

Semi-Annual

Payments

Future Value

10 % Annual Interest

Future Value

10% Semi-Annual Interest

Ordinary Annuity

\$254, 998. 79

\$201, 246. 28

Annuity Due

\$280, 498. 67

\$211, 308. 59

Table 2: Future Value of Annuities Summary.

The annuity due type is when the payments are made at the beginning of the period. This type of annuity will result in the maturity one period past the final payment. The present value of the same five annual \$32, 000 payments will yield \$133, 436 with an opportunity cost of 10 percent annually. The utilization of a 10 percent semi-annual interest rate will result in \$145, 470. The future value of the annuity if 10 percent annual interest is paid yields \$214, 899, and with 10 percent semi-annually the result is decreased to \$185, 661. The annual interest rate of 8 percent is needed to accumulate the required \$200, 000 funds with the yearly \$32, 000 payments. The reduced yearly payment of \$29, 781 is needed for an annuity with a 10 percent annual rate. The change of the payments to \$16, 000 every six months results in \$280, 499 in an annuity that compounds at 10 percent annually. This is decreased to \$211, 309 if the 10 percent interest is semi-annual. The annuity due with semi-annual payments results in a greater accumulation of funds necessary for the computer billing upgrade.

The Pensacola Surgery Centers would like to lease out extra space at one location for the term of five years. This venture will cost an estimated \$40,000 in initial renovations. The net present value (NPV) of the estimated lease cash flow totals \$58,618 (Table 3). The future value of the five year lease cash flow is expected to total \$76,223 when invested at 10 percent annually. The present value of this total yields only \$47,329 (difference of \$11,289) when compared to the NPV calculated initially. The inconsistency of the time value analysis is due to the incremental changes that may become magnified with end results. The manager must use reasonable judgment when interpreting these calculated results.

End of Year

Net Cash Flow

1

\$12,000

2

\$14,000

3

\$ 2,000

4

\$16,000

5

\$20, 000

Table 3: Estimated Lease Cash Flow

The further analysis of the lease will determine the dollar return on the investment and include the cost of the renovations. The return on investment (ROI) of the lease cash flow and the renovations total \$39, 390. The percentage rate of return utilizes the internal rate of return (IRR) calculation. The expected rate of return is 16 percent which exceeds the 10 percent opportunity cost by 6 percent. The ROI calculations support the clinic's financial investment in the lease agreement.

The contingency plan if the clinic is unable to accumulate the \$200, 000 necessary for the computer improvements will require them to borrow the funds. The loan will require yearly payments of \$63, 094. 16 for four years at 10 percent interest (Table 4). The total interest plus principal paid at the end of the loan is \$252, 376. 64. The business will be able to deduct the yearly interest payments on their income taxes for a total of \$52, 376. 64.

\$200, 000 Loan

Year

Payment

Interest

Repayment of Principle

1

\$ 63, 094. 16

\$20, 000. 00

\$ 43, 094. 16

2

\$ 63, 094. 16

\$15, 690. 58

\$ 47, 403. 58

3

\$ 63, 094. 16

\$10, 950. 23

\$ 52, 143. 93

4

\$ 63, 094. 16

\$ 5, 735. 83

\$ 57, 358. 33

Total

\$252, 376. 64

\$52, 376. 64

\$200, 000. 00

Table 4: Loan Amortization Schedule

The utilization of time value analysis aids in the financial decision making processes of the business's investment management. The calculations attempt to represent the opportunity cost of these potential investments. The discount rate used to conduct the analysis should reflect the risk associated with the investment and the risk of the organization. Good decisions are based on the understanding of the business's financial strategies, and the appropriateness of the analysis to these objectives. The post completion review of investment decisions should be conducted to assess the processes and results.