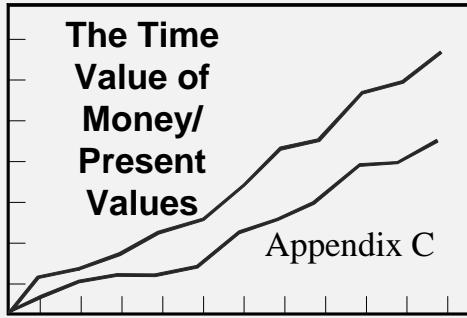


The Time Value of Money/ Present Values



Slide C-1

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THIS IS ABOUT THE BASICS

You should become familiar with the concept of present values and the basics of how they work using the tables. This is NOT intended to be a comprehensive course in business finance covered in 1 hour!

Slide C-2

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CONCEPT #1

What is worth more:

(A) \$1 today

OR

(B) \$1 One year from today?

\$1 today

IF you invested that \$1 for one year at only 3% interest compounding monthly, you would have \$1.0304 at the end of the year! What would you rather have in one year...\$1 or \$1.0304?

Slide C-3

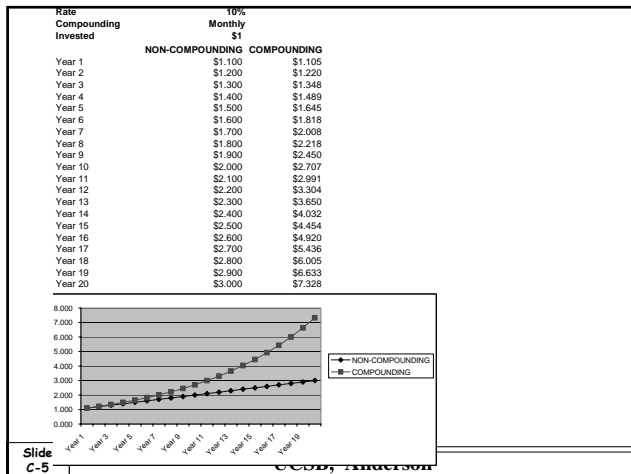
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CONCEPT #2

The impact of compounding interest is EXPONENTIAL!!!

Slide C-4

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Key Terminology

- **Present Value:** Today's value of money to be received in the future;
- **Future Value:** Value of an amount known today which will be received/ paid in the future.
- **Compound:** Interest earning interest. Compounding period should be stated, generally monthly
- **Annuity:** Payments over a period of time in equal amounts.
- **Payment Interval:** Frequency of annuity pmts.
- **Ordinary annuity:** payments made at the end of the payment interval
- **Annuity due:** payments made at the beginning of the payment interval

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Time-Value of Money basics

- \$1 today is worth more than \$1 tomorrow;
- GAAP seeks to present the "economic substance over legal form" of a transaction. Consequently, PV becomes relevant. Glaring example:
 - Real estate sold to buyer for \$10 million, payable as follows: \$7,500,000 due in cash at close of escrow; \$2,500,000 note payable bearing 0% interest payable in one lump-sum in 5 years.
 - » Is the sales price \$10 million
 - NO- \$2.5 million in 5 years is worth < \$2.5 million!
- The risk is commensurate with the reward- the higher the perceived risk, the higher the interest rate.

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Key Variables

Whether using a table, microsoft excel formula or a financial calculator, the key variables are:

- Present value and/ or Future value;
- Interest Rate
- Payment (if an annuity)
- Period (note: depends on compounding period)

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Present Value

Present Value? **\$20,000 in Future**

Dec. 31/98 Dec. 99 Dec. 00 Dec. 01 Dec. 02 Dec. 03 Dec. 31/04

BE6-2 Itzak Perlman needs \$20,000 in 4 years. What amount must he invest today if his investment earns 12% compounded annually?

What table do we use ?

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Present Value of a Single Sum

Table 6-2

Number of Periods	Discount Rate				
	4%	6%	8%	10%	12%
2	.92456	.89000	.85734	.82645	.79719
4	.85480	.79209	.73503	.68301	.63552
6	.79031	.70496	.63017	.56447	.50663
8	.73069	.62741	.54027	.46651	0.40388

What factor do we use ?

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Present Value of a Single Sum

Table 6-2

Number of Periods	Discount Rate				
	4%	6%	8%	10%	12%
2	.92456	.89000	.85734	.82645	.79719
4	.85480	.79209	.73503	.68301	.63552
6	.79031	.70496	.63017	.56447	.50663
8	.73069	.62741	.54027	.46651	0.40388

\$20,000 x .63552 = \$12,710.40

Funds Needed Factor Present Value

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Present Value

Present Value? **\$20,000 in Future**

Dec. 31/98 Dec. 99 Dec. 00 Dec. 01 Dec. 02 Dec. 03 Dec. 31/04

Itzak Perlman needs \$20,000 in 4 years. What amount must he invest today if his investment earns 12% compounded quarterly?

What table do we use ?

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Present Value of a Single Sum

Table 6-2

Number of Periods	Discount Rate				
	3%	4%	6%	9%	12%
4	0.88849	.85480	.79209	0.70843	.63552
8	0.78941	.73069	.62741	0.50187	0.40388
12	0.70138	0.6246	0.49697	0.35554	0.25668
16	0.62317	0.53391	0.39365	0.25187	0.16312

What factor do we use ?

Slide C-13

UCSB, Anderson

Present Value of a Single Sum

Table 6-2

Number of Periods	Discount Rate				
	3%	4%	6%	9%	12%
4	0.88849	.85480	.79209	0.70843	.63552
8	0.78941	.73069	.62741	0.50187	0.40388
12	0.70138	0.6246	0.49697	0.35554	0.25668
16	0.62317	0.53391	0.39365	0.25187	0.16312

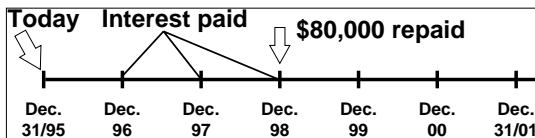
$$\mathbf{\$20,000 \times .62317 = \$12,463.40}$$

Funds Needed Factor Present Value

Slide C-14

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Present Value



Doc Company entered into a three year loan agreement that requires \$80,000 to be repaid at maturity plus annual interest payments in the amount of \$9,600. What is the present value of the interest payments assuming a market interest rate of 12%?

What table do we use ?

Slide C-15

UCSB, Anderson

Present Value of Ordinary Annuity

Table 6-4

Number of Periods	Discount Rate				
	4%	6%	8%	10%	12%
1	0.961	0.952	0.925	0.909	0.892
3	2.775	2.673	2.577	2.486	2.401
6	5.242	4.917	4.622	4.355	4.111
9	7.435	6.209	6.246	5.759	5.328

What factor do we use ?

Slide C-16

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Present Value of Ordinary Annuity



Table 6-4

Number of Periods	Discount Rate				
	4%	6%	8%	10%	12%
1	0.961	0.952	0.925	0.909	0.892
3	2.775	2.673	2.577	2.486	2.401
6	5.242	4.917	4.622	4.355	4.111
9	7.435	6.209	6.246	5.759	5.328

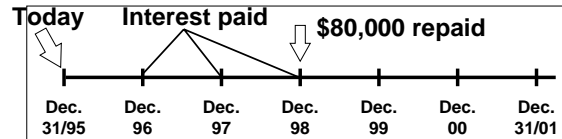
$$\$9,600 \times 2.401 (2.40183) = \$23,058$$

Interest Payment Factor Present Value

Slide C-17

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Present Value



Doc Company borrowed \$80,000 under a three year loan agreement that requires annual interest payments in the amount of \$9,600. What is the present value of the principle payment assuming a market interest rate of 12%?

What table do we use ?

Slide C-18

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Present Value of 1 (Single Sum)



Table 6-2

Number of Periods	Discount Rate				
	4%	6%	8%	10%	12%
1	.962	.943	.926	.909	.893
3	.889	.840	.794	.751	.712
6	.790	.705	.630	.564	.507
9	.703	.592	.500	.424	.361

What factor do we use ?

Slide C-19

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Present Value of 1 (single sum)



Table 6-2

Number of Periods	Discount Rate				
	4%	6%	8%	10%	12%
1	.962	.943	.926	.909	.893
3	.889	.840	.794	.751	.712
6	.790	.705	.630	.564	.507
9	.703	.592	.500	.424	.361

$$\$80,000 \times .712 (.71178) = \$56,942.40$$

Principal Borrowed Factor Present Value

Slide C-20

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Present Value of Ordinary Annuity

Summary --

PV of Interest \$23,058

PV of Principle 56,942.40

Total PV \$80,000