

**Accounting
Building Business Skills**

Paul D. Kimmel

Appendix B:
Time Value of Money

PowerPoint presentation by Kate Wynn-Williams
University of Otago, Dunedin
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Interest

- Interest = payment for use of another's money
- Interest = difference between principal and amount repaid or collected
- Principal = amount borrowed or invested

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Interest

- Simple interest – calculated on principal only:
 - principal X rate of interest X number of periods
- Compound interest – calculated on principal plus any interest earned but not yet paid out
 - involves two or more periods

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Interest

Bank One			City Corp		
Simple interest calculation	Simple interest	Accumulated year-end balance	Compound interest calculation	Compound interest	Accumulated year-end balance
Year 1 $\$1000.00 \times 9\%$	\$ 90.00	\$1090.00	Year 1 $\$1000.00 \times 9\%$	\$ 90.00	\$1090.00
Year 2 $\$1000.00 \times 9\%$	90.00	\$1180.00	Year 2 $\$1090.00 \times 9\%$	98.10	\$1188.10
Year 3 $\$1000.00 \times 9\%$	90.00	\$1270.00	Year 3 $\$1188.10 \times 9\%$	106.93	\$1295.03
	<u>\$270.00</u>			<u>\$295.03</u>	
					\$25.03 Difference

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Future Value Concepts

- Value of \$1 now is different from \$1 in future
- Future value = dollar amount at some future date of today's principal
 - assumes compound interest
 - more than one financial period
 - use formula or future value tables

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Future Value Concepts

- Future value of single amount – formula:

$$p \times (1 + i)^n$$
 - p = principal (present value)
 - i = interest rate for one period
 - n = number of periods
- Result shows future dollar equivalent for present value of principal

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Future Value Concepts

- Using future value tables:
 - table displays future value factors for single amount over various periods and interest rates
 - multiply principal by appropriate future value factor
 - same result as formula for future dollar equivalent for present value of principal
 - refer to Table 1, page 825.

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Future Value of Annuity

- Annuity = series of dollar amounts paid or received over a number of future periods
- Future value of annuity = sum of all amounts plus accumulated compound interest
 - assumes amounts paid or received are invested for remaining life of annuity
 - assumes amounts paid or received at end of each period

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Future Value of Annuity

- use series of future value factors or future value annuity tables
- tables display factors for equal annuity amounts over varying periods and interest rates
- series of future value factors is used for unequal annuity amounts
- future value of annuity table is used for equal annuity amounts
- refer to Table 2, page 827.

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Present Value Concepts

- Value of \$1 to be paid or received in future is different from value of \$1 now
- Present value = dollar amount in future, discounted to current value
 - used to evaluate capital budget and investment proposals
 - used in rate of return calculations

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Present Value Concepts

- Present value of single amount – use formula or present value tables
- Formula:
 - $PV = FV \div (1 + i)^n$
 - FV = future dollar amount
 - i = discount rate
 - n = number of periods
 - discount rate chosen to reflect desired rate of return

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Present Value Concepts

- Present value tables:
 - result shows same present value equivalent for future dollar amount
 - table displays discount factors for single amount over various periods and discount rates
 - multiply future value by appropriate discount rate
 - higher discount rates and/or longer time frame yield smaller present values
 - refer to Table 3, page 829.

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Present Value of Annuity

- Annual future payments or receipts expressed in current values
 - assumes amounts paid or received at end of each period
 - use series of present value discount rates or present value annuity tables
 - series of present value factors is used for unequal annual amounts
 - present value annuity table is used for equal amounts
 - refer to Table 4, page 831.

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Time Periods

- Time periods and interest rates often assumed to be annual
- Shorter time periods also used
 - monthly, quarterly, half-yearly
 - adjust annual interest rate to account for shorter periods
 - more frequent calculations affect compound interest yields

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Capital Budgeting Decisions

- Present and future value concepts central to capital budgeting decisions
- All cash inflows and outflows reduced to common comparable base
- Either express all cash flows in chosen future time period values
- Or express all future cash flows in present value

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Capital Budgeting Decisions

- May involve combination of single sum plus annuity amounts
- Positive net present value means acceptable proposal
 - present value of all cash inflows exceeds present value of all cash outflows

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