**ACF Exam Formula Sheet & Quick Reference Guide**

**Time Value of Money**

**Basic Formulas**

**Present Value:** $PV = \frac{FV}{(1 + r)^n}$

**Future Value:** $FV = PV \times (1+r)^n$

**Effective Annual Rate:** $EAR = (1 + \frac{r}{m})^m - 1$

m = compounding periods per year

**Excel Functions**

excel

=PV(rate, nper, pmt, [fv], [type])

=FV(rate, nper, pmt, [pv], [type])

=RATE(nper, pmt, pv, [fv], [type])

=NPER(rate, pmt, pv, [fv], [type])

**Portfolio Theory**

**Expected Return & Risk**

**Portfolio Return**: $E(R\_p) = \sum\_{i=1}^{n} w\_i \times E(R\_i)$

**Two-Asset Portfolio Variance**: $\sigma\_p^2 = w\_1^2\sigma\_1^2 + w\_2^2\sigma\_2^2 +

2w\_1w\_2\rho\_{12}\sigma\_1\sigma\_2$

**Portfolio Std Dev**: $\sigma\_p = \sqrt{\sigma\_p^2}$

**Correlation & Covariance**

**Correlation Range:** $-1 \leq \rho \leq 1$

• p = 1: Perfect positive correlation

• p = 0: No correlation

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• p = -1: Perfect negative correlation

**Covariance**: $Cov(A,B) = \rho\_{AB} \times \sigma\_A \times \sigma\_B$

**Excel Functions**

excel

=SUMPRODUCT(weights, returns)

=STDEV.S(range) or STDEV.P(range)

=CORREL(array1, array2)

=VAR.S(range) or VAR.P(range)

**Investment Returns**

**Holding Period Return**

$HPR = \frac{P\_1 - P\_0 + D}{P\_0}$

Where:

• P1 = Ending price

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• Po Beginning price

• D = Dividends/Income received

**Annualized Returns**

**Simple:** $r\_{annual} = \frac{HPR}{n}$

**Compound**: $r\_{annual} = (1 + HPR)^{1/n} - 1$

**Bond Valuation**

Bond **Pricing**

$P = \sum\_{t=1}^{n} \frac{C}{(1+y)^t} + \frac{F}{(1+y)^n}$

Where:

• C = Coupon payment

• F = Face value

⚫ y = Yield to maturity

n = Periods to maturity

• n=

**Bond Yields**

**Current Yield** = $\frac{\text{Annual Coupon}}{\text{Current Price}}$

**YTM**: Rate where PV of cash flows = Price

**Duration**

**Macaulay Duration**: Weighted avg time to cash flows

**Modified Duration** = $\frac{D\_{mac}}{1 + y}$

**Price Change** ≈ $-D\_{mod} \times \Delta *y* \times P$

**Excel Functions**

excel

=PRICE(settlement, maturity, rate, yld, redemption, frequency)

=YIELD(settlement, maturity, rate, pr, redemption, frequency) =DURATION(settlement, maturity, coupon, yld, frequency)

**Annuities & Perpetuities**

**Ordinary Annuity (End of Period)**

**PV**: $PV = PMT \times \frac{1 - (1+r)^{-n}}{r}$

**FV**: $FV = PMT \times \frac{(1+r)^n - 1}{r}$

**Annuity Due (Beginning of Period)**

Multiply ordinary annuity by $(1+r)$

**Perpetuity**

**PV** = $\frac{PMT}{r}$

**Growing Perpetuity**

**PV** = $\frac{PMT}{r - g}$ (where g = growth rate)

**Excel Functions**

excel

=PV(rate, nper, pmt, [fv], [type])

type: 0 = end (ordinary), 1 = beginning (due)

=PMT(rate, nper, pv, [fv], [type])

**Financial Statements**

**Balance Sheet Equation**

**Assets = Liabilities + Equity**

**Classifications**

**Current** (< 1 year):

• Current Assets: Cash, AR, Inventory, Prepaid

• Current Liabilities: AP, STD, Accrued expenses

**Non-Current** (> 1 year):

• Non-Current Assets: PP&E, Intangibles, LT investments

• Non-Current Liabilities: LTD, Deferred tax

**Statement Links**

**Retained Earnings Bridge**: $RE\_{end} = RE\_{begin} + \text{Net Income} - \text{Dividends}$

**Financial Ratios**

**Liquidity Ratios**

**Current Ratio** = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

**Quick Ratio** = $\frac{\text{CA - Inventory}}{\text{Current Liabilities}}$

**Cash Ratio** = $\frac{\text{Cash + Marketable Sec}}{\text{Current Liabilities}}$

**Leverage Ratios**

**Debt-to-Equity** = $\frac{\text{Total Debt}}{\text{Total Equity}}$

**Debt-to-Assets** = $\frac{\text{Total Debt}}{\text{Total Assets}}$

**Interest Coverage** = $\frac{\text{EBIT}}{\text{Interest Expense}}$

**Profitability Ratios**

**Net Margin** = $\frac{\text{Net Income}}{\text{Sales}}$

**ROA** = $\frac{\text{Net Income}}{\text{Total Assets}}$

**ROE** = $\frac{\text{Net Income}}{\text{Total Equity}}$

**DuPont Analysis**

**ROE** = Net Margin x Asset Turnover x Equity Multiplier

$ROE = \frac{NI}{Sales} \times \frac{Sales}{Assets} \times \frac{Assets}{Equity}$

**Capital Budgeting**

**Net Present Value**

$NPV = -C\_0+ \sum\_{t=1}^{n} \frac{CF\_t}{(1+r)^t}$

**Decision Rule**: Accept if NPV > 0

**Internal Rate of Return**

Rate where NPV = 0:

$0 = -C\_0 + \sum\_{t=1}^{n} \frac{CF\_t}{(1+IRR)^t}$

**Decision Rule:** Accept if IRR > Required Return

**Profitability Index**

$PI = \frac{\text{PV of Future Cash Flows}}{\text{Initial Investment}}$

**Decision Rule:** Accept if PI > 1

**Payback Period**

Time to recover initial investment **Decision Rule**: Accept if Payback < Target

**Excel Functions**

excel

=NPV(rate, value1, value2, ...) + initial\_investment

=IRR(values, [guess])

=XNPV(rate, values, dates)

=XIRR(values, dates, [guess])

**Key Excel Shortcuts**

**Financial Functions Summary**

PVO

FV0

**Function**

**Purpose**

Present value

Future value

**Key Arguments**

rate, nper, pmt

rate, nper, pmt

PMT()

Payment calculation

rate, nper, pv

RATE()

Interest rate

NPER()

Number of periods

NPV0)

Net present value

IRRO

Internal rate of return

nper, pmt, pv

rate, pmt, pv

rate, values

values

**Statistical Functions**

**Function**

AVERAGE()

STDEV.SO

VAR.S()

CORREL()

SUMPRODUCT()

**Purpose**

Mean

Sample std deviation

Sample variance

Correlation coefficient

Weighted calculations

**Quick Decision Rules**

**Time Value of Money**

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Higher discount rate → Lower PV

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• More time → Greater FV (if r > 0)

• More frequent compounding → Higher effective rate

**Portfolio Theory**

• Diversification works best with low/negative correlation

• Efficient frontier: Max return for given risk

• Cannot eliminate systematic risk

**Bonds**

• Interest rates ↑

←

• Longer duration

Bond prices↓

→ More price sensitive

• YTM > Coupon → Discount bond

• YTM < Coupon → Premium bond

**Capital Budgeting**

• NPV > 0 → Accept

• IRR > Required return

→>>

Accept

• For mutually exclusive: Choose highest NPV

• For capital rationing: Rank by Pl

**Financial Health**

• Current ratio > 1 → Can meet ST obligations

• Quick ratio > 1 → Good liquidity

• Interest coverage > 2 → Comfortable debt service

• D/E < 1 → Conservative leverage

**Common Mistakes to Avoid**

1. **TVM**: Not matching period with rate (annual vs. monthly)

2. **NPV**: Including initial investment in NPV function

3. **Bonds**: Forgetting semi-annual adjustments

4. **Ratios:** Using wrong assets for quick ratio

5. **Excel**: Wrong sign convention (cash flows)

6. **IRR:** Relying on IRR for mutually exclusive projects

7. **Duration:** Confusing Macaulay vs. Modified

8. **Returns:** Mixing arithmetic vs. geometric averages

**Last-Minute Reminders**

1. **Check units:** %, decimals, $, years vs. months

2. **Excel signs:** Outflows negative, inflows positive

3. **Compounding**: Adjust rates and periods together

4. **Significant figures:** Match the problem's precision

5. **Reasonableness:** Does your answer make sense?

**Good luck on your ACF exam**!