

07

Cost of Capital

Presented by

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Learning Objectives

By the end of this chapter, participants will be able to:

- Explain the meaning and importance of cost of capital
- Distinguish the cost of debt, preferred stock and common equity
- Calculate the before-tax and after-tax cost of debt
- Estimate the cost of preferred stock
- Calculate the cost of retained earnings
- Estimate the cost of newly issued common stock
- Apply CAPM and dividend-growth approaches
- Determine appropriate capital-structure weights
- Calculate the Weighted Average Cost of Capital
- Explain marginal cost of capital
- Apply project-specific discount rates
- Assess factors affecting an organization's cost of capital
- Use cost of capital in investment and financing decisions

Chapter Roadmap

This chapter covers:

1. Meaning of cost of capital
2. Importance of the required return
3. Sources of long-term finance
4. Cost of debt
5. Cost of preferred stock
6. Cost of retained earnings
7. Cost of new common equity
8. Capital-structure weights
9. Weighted Average Cost of Capital
10. Marginal cost of capital
11. Project-specific discount rates
12. Cost of capital and value creation

What Is Cost of Capital?

Cost of capital is the minimum rate of return that an organization must earn on its investments to satisfy the expectations of its capital providers. Capital providers may include:

- Lenders
- Bondholders
- Preferred shareholders
- Common shareholders
- Other long-term investors

Cost from the Organization's Perspective

From the organization's perspective, cost of capital is:

- The cost of obtaining financing
- The minimum acceptable investment return
- A benchmark for evaluating projects
- A measure of financing risk
- A required return for maintaining organizational value

Return from the Investor's Perspective

The same rate represents the return expected by investors.

For the Organization

It is a financing cost.

For the Investor

It is a required return.

Investor's Required Return = Organization's Cost of Capital

Why Cost of Capital Matters

Cost of capital is used to:

- Evaluate investment projects
- Discount future cash flows
- Select financing sources
- Determine capital structure
- Value companies
- Value stocks and bonds
- Measure financial performance
- Assess value creation
- Support strategic decisions

Cost of Capital as a Hurdle Rate

The cost of capital is often called the:

- Hurdle rate
- Required rate of return
- Discount rate
- Opportunity cost of capital
- Minimum acceptable return

A project should generally earn more than its relevant cost of capital.

Cost of Capital Decision Rule

If Project Return $>$ Cost of Capital

- The project may create value
- It may increase organizational wealth
- It may be financially acceptable

If Project Return $<$ Cost of Capital

- The project may destroy value
- It may fail to compensate investors
- It may be financially unacceptable

Opportunity Cost of Capital

The cost of capital reflects the return investors could earn from another investment with similar risk.

Example

If investors can earn 14% from investments of similar risk, an organization should not accept a project expected to return only 10%.

Cost of Capital and Risk

Cost of capital increases when perceived risk increases. Higher risk may arise from:

- Uncertain revenues
- High operating leverage
- Excessive debt
- Weak governance
- Political instability
- Currency exposure
- Poor liquidity
- Industry volatility

Risk–Return Relationship

Investors generally require:

- Lower returns for lower-risk investments
- Higher returns for higher-risk investments

Higher Risk → Higher Required Return

Higher Required Return → Higher Cost of Capital

Major Sources of Capital

The main long-term financing sources are:

- Long-term debt
- Preferred stock
- Retained earnings
- New common equity
- Lease financing
- Hybrid securities

Each source has a different cost.

Debt Capital

Debt capital may include:

- Bank loans
- Corporate bonds
- Debentures
- Lease obligations
- Development-bank financing
- Long-term notes
- Mortgage financing

Debt normally requires contractual interest and principal payments.

Preferred-Stock Capital

Preferred stock generally provides investors with:

- Fixed dividends
- Priority over common shareholders
- Limited voting rights
- No fixed maturity in many cases

Its cost is usually higher than after-tax debt but lower than common equity.

Common-Equity Capital

Common equity may come from:

- Retained earnings
- New common-stock issuance
- Additional owner investment
- Private-equity contributions

Common shareholders bear the highest residual risk.

Retained Earnings

Retained earnings are profits kept in the business rather than distributed as dividends.

Although no cash is paid to obtain retained earnings, they are not free.

They have an opportunity cost because shareholders could have received and invested the funds elsewhere.

New Common Equity

New common equity is raised by issuing additional common shares. Its cost may include:

- Shareholder required return
- Underwriting fees
- Legal fees
- Registration fees
- Marketing expenses
- Other flotation costs

Relative Cost of Capital Sources

The typical risk and cost hierarchy is:

1. Secured debt
2. Unsecured debt
3. Preferred stock
4. Retained earnings
5. New common equity

The actual ranking depends on risk, tax treatment and market conditions.

Component Cost of Capital

The component cost is the required return associated with each financing source. The main components are:

- Cost of debt
- Cost of preferred stock
- Cost of retained earnings
- Cost of new common equity

Before-Tax and After-Tax Costs

Some financing costs receive tax benefits.

Debt Interest

May be tax deductible.

Dividends

Are generally paid from after-tax income.

Therefore, debt is usually included in WACC using its after-tax cost.

What Is the Cost of Debt?

The cost of debt is the effective return required by lenders and bondholders. It may be estimated using:

- Loan interest rate
- Bond yield to maturity
- Current borrowing rate
- Credit-spread approach
- Effective interest rate

Before-Tax Cost of Debt

The before-tax cost of debt is the rate paid before considering tax savings. For a simple loan:

$$k_d = \text{Interest Rate}$$

For a bond, the yield to maturity is commonly used.

After-Tax Cost of Debt

Because interest may reduce taxable income:

$$kd (1 - T)$$

where

- kd = before-tax cost of debt
- T = corporate tax rate

After-Tax Debt Example

Assume

- Before-tax cost of debt: 12%
- Corporate tax rate: 30%

$$kd(1 - T) = 12\%(1 - 0.30)$$

$$kd(1 - T) = 8.4\%$$

The effective after-tax cost of debt is 8.4%.

Interest Tax Shield

The interest tax shield is the reduction in tax caused by deductible interest.

$$\textit{Tax Shield} = \textit{Interest Expense} \times \textit{Tax Rate}$$

Tax-Shield Example

Assume

- Annual interest expense: ETB 1,000,000
- Tax rate: 30%

$$\text{Tax Shield} = 1,000,000 \times 30\%$$

$$\text{Tax Shield} = \text{ETB } 300,000$$

Cost of a Bank Loan

For a straightforward loan, the effective cost should consider:

- Stated interest rate
- Commitment fees
- Processing fees
- Compulsory deposits
- Insurance
- Repayment structure
- Tax deductibility
- Other financing charges

Effective Loan Cost

Assume

- Loan amount: ETB 10 million
- Annual interest: 11%
- Upfront fees: 2%
- Net proceeds: ETB 9.8 million

The effective financing cost is higher than the stated 11% because the organization receives less than the face amount.

Cost of Bond Debt

The cost of existing bond debt is usually estimated using the bond's current yield to maturity. YTM reflects:

- Coupon payments
- Current market price
- Maturity value
- Remaining time to maturity
- Capital gain or loss

Approximate Bond Cost

An approximate before-tax bond cost is:

$$kd \approx \frac{I + (F - P) / n}{(F + P) / 2}$$

where

- I = annual interest
- F = face value
- P = net proceeds or market price
- n = years to maturity

Bond-Cost Example

Assume

- Annual interest: ETB 100
- Face value: ETB 1,000
- Net proceeds: ETB 950
- Maturity: 5 years

$$kd \approx \frac{100 + (1,000 - 950) / 5}{(1,000 + 950) / 2}$$

$$kd \approx 11.28\%$$

After-Tax Bond Cost

If the tax rate is 30%:

$$kd(1 - T) = 11.28\%(1 - 0.30)$$

$$kd(1 - T) = 7.90\%$$

Cost of New Debt

The cost of new debt should reflect the rate the organization would pay if it borrowed today. It should not automatically use:

- Historical interest rates
- Original bond coupon rates
- Old loan costs
- Accounting interest expense

Current marginal borrowing cost is more relevant.

Factors Affecting Cost of Debt

- Credit rating
- Debt ratio
- Interest coverage
- Collateral
- Loan maturity
- Currency
- Economic conditions
- Inflation
- Central-bank policy
- Liquidity
- Industry risk

Cost of Preferred Stock

The cost of preferred stock is the return required by preferred shareholders. For perpetual preferred stock:

$$k_p = \frac{D_p}{P_n}$$

where

- D_p = annual preferred dividend
- P_n = net proceeds from issue

Preferred-Stock Example

Assume

- Annual preferred dividend: ETB 12
- Net proceeds: ETB 100

$$k_p = \frac{12}{100}$$

$$k_p = 12\%$$

Preferred Dividend Calculation

If the dividend is stated as a percentage of par value:

Assume

- Par value: ETB 100
- Dividend rate: 10%

$$D_p = \text{Dividend Rate} \times \text{Par Value}$$

$$D_p = \text{ETB } 10$$

Preferred Stock with Flotation Cost

Assume

- Par value: ETB 100
- Dividend rate: 10%
- Market issue price: ETB 105
- Flotation cost: ETB 5

$$P_n = 105 - 5 = \text{ETB } 100$$

$$k_p = \frac{10}{100}$$

$$k_p = 10\%$$

Why Preferred Cost Is Not Tax Adjusted

Preferred dividends are generally paid from after-tax profit. Therefore:

- No interest-style tax shield is created
- Preferred cost is not multiplied by $(1 - T)$
- The full required return is included in WACC

Preferred Stock vs Debt

Preferred Stock	Debt
Dividends may be suspended	Interest is contractual
Usually no tax deduction	Interest may be tax deductible
Often no maturity	Normally has maturity
Lower priority than debt	Higher liquidation priority
Usually higher cost	Usually lower after-tax cost

Cost of Common Equity

The cost of common equity is the return required by ordinary shareholders. It compensates for:

- Time value of money
- Business risk
- Financial risk
- Market risk
- Uncertainty of dividends
- Residual-claim risk

Two Sources of Common Equity

Common equity may be financed through:

1. Retained earnings
2. New common-stock issuance

The cost of new equity is normally higher because of flotation costs.

Methods for Estimating Equity Cost

Common approaches include:

- Capital Asset Pricing Model
- Dividend Growth Model
- Bond Yield Plus Risk Premium
- Comparable-company approach
- Build-up method

Capital Asset Pricing Model

The CAPM estimates the required return on common equity.

$$k_e = R_f + \beta(R_m - R_f)$$

where

- R_f = risk-free rate
- $R_m - R_f$ = market risk premium
- β = equity beta

CAPM Components

Risk-Free Rate

Return on a low-default-risk investment.

Beta

Sensitivity of the company's equity return to market movements.

Market Risk Premium

Additional return required for investing in the market instead of a risk-free asset.

CAPM Example

Assume

- Risk-free rate: 6%
- Beta: 1.30
- Market return: 14%

$$ke = 6\% + 1.30(14\% - 6\%)$$

$$ke = 16.4\%$$

Meaning of Beta

Beta	Interpretation
1.00	Same systematic risk as the market
Above 1.00	More sensitive than the market
Below 1.00	Less sensitive than the market
0	No market sensitivity
Negative	Moves inversely to the market

Sources of Beta

Beta may be obtained from:

- Financial databases
- Stock-market data
- Comparable listed companies
- Industry averages
- Regression analysis
- Financial advisers

Private companies may need to use comparable-company betas.

Limitations of CAPM

- Beta is based on historical data
- Risk-free rates may change
- Market premiums are estimated
- Thin capital markets may reduce reliability
- Private-company beta is difficult to observe
- Country and currency risk may require adjustment

Dividend Growth Model

For a constant-growth dividend stock:

$$k_e = \frac{D_1}{P_0} + g$$

where

- D_1 = expected dividend next year
- P_0 = current share price
- g = expected constant growth rate

Dividend-Growth Example

Assume

- Current share price: ETB 100
- Expected next dividend: ETB 8
- Growth rate: 6%

$$k_e = \frac{8}{100} + 6\%$$

$$k_e = 14\%$$

Forecasting the Next Dividend

If the current dividend is D_0 :

Assume

- Current dividend: ETB 7.50
- Growth rate: 6%

$$D_1 = D_0(1 + g)$$

$$D_1 = 7.50(1.06) = \text{ETB } 7.95$$

Sustainable-Growth Estimate

Growth may be estimated as:

$$g = b \times ROE$$

where

- b = retention ratio
- ROE = return on equity

Retention Ratio

If a company distributes 40% of earnings:

$$b = 1 - \text{Dividend Payout Ratio}$$

$$b = 1 - 0.40 = 0.60$$

The retention ratio is 60%

Sustainable-Growth Example

Assume

- Retention ratio: 60%
- Return on equity: 15%

$$g = 0.60 \times 15\%$$

$$g = 9\%$$

Limitations of Dividend Growth Method

The method may be inappropriate when:

- Dividends are not paid
- Dividends are unstable
- Growth is not constant
- Share price is unreliable
- Required return is close to growth
- Dividend policy does not reflect earning capacity

Bond Yield Plus Risk Premium Approach

This approach estimates equity cost as:

$$k_e = \text{Company Bond Yield} + \text{Equity Risk Premium}$$

Equity investors require more return than bondholders because they bear greater risk.

Bond Yield Plus Risk Premium — Example

Assume

- Company bond yield: 10%
- Estimated equity risk premium over debt: 5%

$$k_e = 10\% + 5\%$$

$$k_e = 15\%$$

Advantages and Limitations

Advantages

- Simple
- Useful as a cross-check
- Links equity cost with company credit risk

Limitations

- Risk premium is subjective
- Depends on bond-yield accuracy
- Less theoretically precise than CAPM
- May be unsuitable when no traded debt exists

Cost of Retained Earnings

The cost of retained earnings is the return shareholders could have earned if profits had been distributed and invested elsewhere at similar risk. It is commonly estimated using:

- CAPM
- Dividend Growth Model
- Bond Yield Plus Risk Premium

Why Retained Earnings Are Not Free

Retained earnings belong economically to shareholders.

Management should retain profits only when the organization expects to earn at least the shareholders' required return.

Otherwise, shareholders may prefer dividends.

Retention Decision

Retain Earnings When

Expected project return exceeds the cost of retained earnings.

Distribute Earnings When

Suitable value-creating investments are unavailable.

New Common Equity

The cost of newly issued common shares is generally higher than the cost of retained earnings because of flotation costs.

$$k_n = \frac{D_1}{P_0(1 - F)} + g$$

where

– F = flotation-cost percentage

New-Equity Example

Assume

- Share price: ETB 100
- Expected dividend: ETB 8
- Growth rate: 6%
- Flotation cost: 5%

$$\text{Net proceeds} = 100(1 - 0.05) = \text{ETB } 95$$

$$k_n = \frac{8}{95} + 6\%$$

$$k_n = 14.42\%$$

Retained Earnings vs New Equity

Retained Earnings	New Common Equity
No flotation costs	Includes flotation costs
Lower component cost	Higher component cost
Limited by available profit	Can raise larger funds
Does not dilute ownership directly	May dilute ownership
Still has opportunity cost	Has opportunity and issuance costs

Flotation Costs

Flotation costs may include:

- Underwriting fees
- Legal fees
- Audit fees
- Registration fees
- Advertising
- Printing
- Advisory fees
- Exchange-listing costs

Why Weights Are Needed

Organizations often use several financing sources. The overall cost of capital depends on:

- Cost of each source
- Proportion of each source
- Tax treatment
- Target capital structure

Types of Capital-Structure Weights

Possible weights include:

- Book-value weights
- Market-value weights
- Target weights
- Marginal financing weights

Book-Value Weights

Book-value weights use amounts reported in the financial statements.

Advantages

- Easily available
- Stable
- Simple to calculate

Limitations

- Based on historical amounts
- May differ significantly from current economic values

Market-Value Weights

Market-value weights use current market values of financing sources. They are generally preferred because they reflect:

- Current investor expectations
- Current opportunity costs
- Current security values
- Economic financing proportions

Market Value of Debt

Market value of debt may be estimated using:

- Traded bond prices
- Present value of debt payments
- Book value when market and book values are similar
- Comparable borrowing rates

Market Value of Equity

For a listed company:

$$\text{Market Value of Equity} = \text{Share Price} \times \text{Shares Outstanding}$$

Capital-Structure Weight Formula

$$w_i = \frac{\text{Market Value of Component } i}{\text{Total Market Value of Capital}}$$

All weights should sum to 1 or 100%.

Weight Example

Market values — debt ETB 40 million, preferred stock ETB 10 million, common equity ETB 50 million.

$$\textit{Total} = 40 + 10 + 50 = \textit{ETB 100 million}$$

40%

Debt

10%

Preferred stock

50%

Equity

Target Capital Structure

The target capital structure is the financing mix management intends to maintain over time. It may be based on:

- Strategic financing policy
- Industry practice
- Credit-rating objectives
- Risk appetite
- Debt capacity
- Investor expectations
- Financial flexibility

Why Target Weights Matter

Investment decisions are forward-looking. Therefore, target weights may be more appropriate than current weights when:

- Current financing is temporary
- The organization plans restructuring
- A new financing strategy has been approved
- Market values are unusually distorted
- Long-term policy differs from current capital structure

What Is WACC?

Weighted Average Cost of Capital is the average required return on all long-term financing sources, weighted by their proportions.

It represents the organization's overall opportunity cost of capital.

WACC Formula

$$WACC = wd \cdot kd(1 - T) + wp \cdot kp + we \cdot ke$$

where

- wd = debt weight
- wp = preferred-stock weight
- we = common-equity weight

WACC Example — Assumptions

Source	Weight	Component Cost
Debt	40%	10% before tax
Preferred stock	10%	12%
Common equity	50%	16%

Tax rate: 30%

Calculate After-Tax Debt Cost

$$kd(1 - T) = 10\%(1 - 0.30)$$

$$kd(1 - T) = 7\%$$

Calculate Weighted Costs

Debt

$$0.40 \times 7\% = 2.80\%$$

Preferred Stock

$$0.10 \times 12\% = 1.20\%$$

Equity

$$0.50 \times 16\% = 8.00\%$$

Calculate WACC

$$WACC = 2.80\% + 1.20\% + 8.00\%$$

$$\mathbf{WACC = 12.00\%}$$

The organization's overall cost of capital is 12%.

Interpretation of WACC

A WACC of 12% means that the organization should generally earn at least 12% on investments of similar risk to maintain value.

Projects expected to earn less than 12% may not adequately compensate capital providers.

Assumptions Behind WACC

WACC is most appropriate when:

- Project risk is similar to existing operations
- Target capital structure remains stable
- Financing sources are accurately measured
- Component costs reflect current market conditions
- Tax benefits are available
- Cash flows and discount rate use consistent terms

Nominal and Real WACC

Nominal WACC

Includes inflation. Use nominal cash flows with nominal WACC.

Real WACC

Excludes inflation. Use real cash flows with real WACC.

Do not mix nominal and real values.

Before-Tax and After-Tax Consistency

If project cash flows are calculated after tax, use an after-tax discount rate.

If project cash flows are before tax, use a consistent before-tax rate.

Most corporate investment appraisals use after-tax cash flows and after-tax WACC.

Using WACC as a Discount Rate

WACC may be used to discount project cash flows when:

- The project has average organizational risk
- Financing proportions remain stable
- The project is in the existing line of business
- No unusual country or currency risk exists

WACC Decision Rule

If NPV at WACC > 0

The project may create value.

If NPV at WACC $= 0$

The project may earn exactly the required return.

If NPV at WACC < 0

The project may destroy value.

WACC and IRR

Accept the Project When

$IRR > WACC$

Reject the Project When

$IRR < WACC$

NPV remains the preferred decision criterion when rankings conflict.

One WACC Does Not Fit Every Project

Using the same WACC for every project may lead to incorrect decisions. Projects may differ in:

- Industry risk
- Country risk
- Technology risk
- Currency risk
- Market uncertainty
- Operating leverage
- Financial structure

Risk-Adjusted Discount Rate

A project-specific discount rate may be estimated as:

$$\text{Project Rate} = \text{Base WACC} + \text{Project Risk Adjustment}$$

Higher-risk projects require higher discount rates.

Example of Project-Specific Rate

Assume

- Corporate WACC: 12%
- New-project risk premium: 3%

$$\text{Project Discount Rate} = 12\% + 3\%$$

$$\text{Project Discount Rate} = 15\%$$

Consequence of Using the Wrong Rate

Rate That Is Too Low

- Overvalues risky projects
- May lead to excessive investment
- Understates risk

Rate That Is Too High

- Undervalues safe projects
- May reject valuable opportunities
- Reduces investment unnecessarily

Divisional Cost of Capital

A diversified organization may calculate separate costs of capital for:

- Manufacturing
- Retail
- Technology
- Real estate
- Financial services
- International operations

Each division may have a different risk profile.

Pure-Play Comparable Method

A project-specific equity cost may be estimated using comparable companies operating only in the relevant business. Steps:

1. Identify comparable companies
2. Obtain their equity betas
3. Remove financial leverage effects
4. Estimate the project's asset beta
5. Reapply the organization's target leverage
6. Calculate project-specific equity cost

Unlevering Beta

A simplified formula is:

$$\beta_A = \frac{\beta_E}{1 + (1 - T)(D / E)}$$

where

- β_A = asset beta
- β_E = equity beta
- D / E = debt-to-equity ratio

Relevering Beta

To apply the organization's target capital structure:

$$\beta E = \beta A [1 + (1 - T)(D / E)]$$

The relevered beta can then be used in CAPM.

What Is Marginal Cost of Capital?

Marginal Cost of Capital is the cost of raising one additional unit of new financing. It is relevant because:

- New funds may cost more than existing funds
- Retained earnings are limited
- Lenders may charge higher rates at higher debt levels
- New equity requires flotation costs

Marginal vs Historical Cost

Investment decisions should use the expected cost of new financing, not the historical cost recorded in the accounts. Historical financing may have been obtained under different:

- Interest rates
- Credit conditions
- Risk levels
- Market expectations

Breakpoint in the Cost of Capital

A breakpoint is the level of new financing at which the cost of one capital component changes.

$$\text{Breakpoint} = \frac{\text{Amount Available at Existing Cost}}{\text{Target Weight of That Source}}$$

Retained-Earnings Breakpoint

Assume

- Available retained earnings: ETB 12 million
- Target common-equity weight: 60%

$$\text{Breakpoint} = \frac{12}{0.60}$$

Breakpoint = ETB 20 million

After ETB 20 million of total new financing, new common equity may be required.

Marginal Cost Schedule

New Capital Raised	Applicable WACC
ETB 0–20 million	12.0%
ETB 20–35 million	13.2%
Above ETB 35 million	14.5%

The cost of capital may increase as more funds are raised.

Investment Opportunity Schedule

An Investment Opportunity Schedule ranks proposed projects from highest to lowest expected return.

Projects should normally be accepted while the expected project return exceeds the marginal cost of capital.

Expected Project Return > Marginal Cost of Capital

External Factors

External factors include:

- Market interest rates
- Inflation expectations
- Tax policy
- Economic growth
- Capital-market conditions
- Political stability
- Exchange rates
- Country risk
- Regulatory conditions

Internal Factors

Internal factors include:

- Capital structure
- Dividend policy
- Operating risk
- Financial leverage
- Credit quality
- Management reputation
- Governance
- Earnings stability
- Project selection
- Liquidity

Financial Leverage

Debt may initially reduce WACC because

- Debt is often cheaper than equity
- Interest may be tax deductible

However, excessive debt increases

- Default risk
- Equity risk
- Borrowing rates
- Financial distress costs
- Overall cost of capital

Optimal Capital Structure

The optimal capital structure is the financing mix that:

- Minimizes WACC
- Maximizes organizational value
- Maintains manageable risk
- Preserves financing flexibility
- Supports long-term strategy

Cost of Capital and Credit Rating

A lower credit rating may:

- Increase loan rates
- Increase bond yields
- Reduce borrowing capacity
- Increase collateral requirements
- Increase refinancing risk
- Raise overall WACC

Cost of Capital and Governance

Strong governance may reduce cost of capital by improving:

- Transparency
- Investor confidence
- Financial reporting
- Risk management
- Accountability
- Protection of investor rights

Common Cost-of-Capital Mistakes

- Using historical interest rates
- Using coupon rate instead of current debt cost
- Ignoring the tax shield
- Treating retained earnings as free
- Ignoring flotation costs
- Using book-value weights without justification
- Applying one WACC to every project
- Mixing nominal and real values
- Using inconsistent tax assumptions
- Ignoring country and currency risk

Cost-of-Capital Checklist

Before calculating WACC, confirm:

- Financing sources are identified
- Component costs are current
- Debt cost reflects current borrowing conditions
- Tax treatment is correct
- Equity method is appropriate
- Flotation costs are considered
- Market or target weights are used
- Weights total 100%
- Project risk is comparable
- Cash flows and discount rate are consistent

PRACTICAL EXERCISE

Practical Exercise: Calculate and Interpret WACC

Participants will:

- Calculate after-tax cost of debt
- Calculate cost of preferred stock
- Calculate cost of retained earnings
- Calculate cost of new common equity
- Determine capital-structure weights
- Calculate WACC
- Evaluate an investment project
- Conduct sensitivity analysis

PRACTICAL EXERCISE

Exercise Scenario

A company has the following target capital structure:

Financing Source	Target Weight
Debt	35%
Preferred stock	10%
Common equity	55%

Corporate tax rate: 30%

PRACTICAL EXERCISE

Debt Information

The company can issue bonds with:

- Face value: ETB 1,000
- Annual coupon: ETB 100
- Net proceeds: ETB 960
- Maturity: 8 years

Approximate the before-tax and after-tax cost of debt.

Calculate Before-Tax Debt Cost

$$kd \approx \frac{100 + (1,000 - 960) / 8}{(1,000 + 960) / 2}$$

$$kd \approx \frac{105}{980}$$

$$kd \approx 10.71\%$$

Calculate After-Tax Debt Cost

$$kd(1 - T) = 10.71\%(1 - 0.30)$$

$$kd(1 - T) = 7.50\%$$

Preferred-Stock Information

Assume

- Par value: ETB 100
- Annual dividend: ETB 11
- Net issue proceeds: ETB 95

$$k_p = \frac{11}{95}$$

$$k_p = 11.58\%$$

Common-Equity Information

Assume

- Current share price: ETB 80
- Expected next dividend: ETB 6
- Expected growth: 7%

$$k_e = \frac{6}{80} + 7\%$$

$$k_e = 14.50\%$$

PRACTICAL EXERCISE

Calculate Weighted Debt Cost

$$0.35 \times 7.50\%$$

$$= 2.63\%$$

PRACTICAL EXERCISE

Calculate Weighted Preferred Cost

$$0.10 \times 11.58\%$$

$$= 1.16\%$$

PRACTICAL EXERCISE

Calculate Weighted Equity Cost

$$0.55 \times 14.50\%$$

$$= 7.98\%$$

Calculate WACC

$$WACC = 2.63\% + 1.16\% + 7.98\%$$

$$WACC = 11.77\%$$

Interpret the Result

A WACC of approximately 11.77% means:

- Average-risk investments should earn at least 11.77%
- Future average-risk cash flows may be discounted at 11.77%
- Projects below this return may reduce value
- Higher-risk projects should use a higher rate

PRACTICAL EXERCISE

Investment Decision

Assume a proposed project has:

Assume

- Expected IRR: 14%
- Project risk: similar to existing operations
- WACC: 11.77%

The project may be financially acceptable, subject to positive NPV and qualitative assessment.

PRACTICAL EXERCISE

Sensitivity Analysis

Recalculate WACC if:

- Debt cost rises by 3%
- Equity beta increases
- Tax rate falls to 20%
- Equity weight increases to 70%
- Flotation costs increase
- The company's credit rating declines

Group Discussion

Each group should explain:

1. Which component has the greatest effect on WACC?
2. Why is equity more expensive than debt?
3. How does tax affect debt cost?
4. Why might WACC increase when more capital is raised?
5. When should a project-specific rate be used?
6. What financing mix would reduce risk?

Knowledge Check

1. What is cost of capital?
2. Why is it called a hurdle rate?
3. Why is debt cost tax adjusted?
4. How is preferred-stock cost calculated?
5. Why are retained earnings not free?
6. What are the main methods of estimating equity cost?
7. Why are market-value weights preferred?
8. What does WACC measure?
9. When should WACC not be used directly?
10. What is marginal cost of capital?

Knowledge Check Answers

1. Minimum return required by capital providers
2. Projects must normally exceed it to create value
3. Interest may reduce taxable income
4. Annual preferred dividend divided by net proceeds
5. Shareholders sacrifice alternative investment opportunities
6. CAPM, Dividend Growth Model and Bond Yield Plus Risk Premium
7. They reflect current economic values and required returns
8. The weighted average required return on long-term capital
9. When project risk differs from existing operations
10. The cost of raising an additional unit of capital

Action Plan

Select one organization and estimate:

- Current borrowing cost
- Tax rate
- After-tax debt cost
- Preferred-stock cost, where applicable
- Cost of common equity
- Market-value or target weights
- WACC
- Major cost-of-capital risks
- Suitable project hurdle rate
- Recommended financing improvement

Chapter Summary

- Cost of capital is the minimum required return on investment.
- It is the opportunity cost of funds supplied by investors.
- Debt cost should normally be adjusted for tax.
- Preferred-stock cost is based on dividends and net proceeds.
- Retained earnings have a shareholder opportunity cost.
- New equity is more expensive because of flotation costs.
- CAPM and dividend growth are common equity-cost methods.
- Market or target weights are generally preferred in WACC.
- WACC applies mainly to projects with average organizational risk.
- Higher-risk projects require higher discount rates.
- Marginal cost may increase as additional capital is raised.
- The goal is to finance investments that create sustainable value.

KEY MESSAGE

Cost of capital connects financing decisions with investment decisions.

It answers two essential questions:

What return do capital providers require?

What minimum return must an investment generate to create value?

THANK YOU

Questions and Discussion

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