econ371 Business Finance 1

Austin Xia

April 13, 2022

Contents

List of Figures

List of Tables

1 Basic Concepts in Finance

1.1 The Three Types of Firms

- Sole Proprietorships: Owned and run by one person, limitation: no seperation between firm and owner
- Partnerships:
  - general partnership: unincorporated business owned/run by more than 1 owner, owners have same right
  - limited partnership: owner's liability is limited to their investment, A limited partner has no management authority
  - limited liability partnership: for law and accounting firms, provides partial limitation of a partner's liability
- Corporation
  legally defined, seperated from its owners.
  Solely responsible for its own obligations. Owners no liable for any obligations
  ownership stake of corporation is divided into shares **stock**. The collection of all outstanding shares of a corporation is known as **equity** of the corporation
  owner of share of stock is **shareholder/stockholder/equity holder**, shareholders are entitled to dividend payment
  no limitation on who can be shareholder
  Corporate profit are subject to taxation seperate from its owners' tax obligations, so shareholders pay personal income tax after profit tax

Canada Revenue Agency allowed an exemption for double taxation **flow-through entities (income trust)**

- Business income trusts
- energy trusts
- real estate investment trust (REIT)

REIT continue to have no tax while others are now taxed

Definition 1.1.1 (flow-through entity)
A business in which all income produced flows to the investors and virtually no earnings are retained within the business

Definition 1.1.2 (income trust)
A trust that holds income-producing assets directly or holds all the debt and equity securities of an income-producing corporation within the trust

Definition 1.1.3 (business income trust)
A income trust holds all the debt and equity securities of a corporation (the underlying business)

Definition 1.1.4 (energy trust)
an income trust that holds resource porperties directly or holds all the debt and equity securities of a recource corporation within the trust

Definition 1.1.5 (unit holder)
the owner of an income trust

Definition 1.1.6 (REIT real estate investment trust)
an income trust that holds real estate properties directly or holds all the debt and securities of a corporation that owns real estate properties

1.2 the financial manager

- make investment decision. main type is production. expanding. doing stuff instead of buying profolio
- make financing decision. how to get money. cooperate loan, sell equity, new share, this will drop stock price
- manage short-term cash needs. inflation

1.3 goal of financial manager

- the overriding goal is maximize the wealth of stockholder/increase long-term value to company

1.4 financial manager's place in cooperation

the corporate management team:

- stockholders elect a board of directors
- the board make rules
- the ceo implement rules and policies set by the board

Ethics and incentives in corporation: **principle-agent problem** managers can put their self-interest before shareholders
to solve this, tie the top manager's conpensation to stock price/corporation profit

Definition 1.4.1 (board of director)
a group of people elected by shareholders who have ultimate decision making authority in corporation

Definition 1.4.2 (ceo cheif executive officer)
the person charged with running corportaion by instituting roles and policies set by board of directors

1.5 stock market

corporation can be private or publick

- private corporation has limited number of owners and no organized market for its shares
- public corporation has many owners and its shares trade on organized market. calling a stock market

private stock cannot be traded, it can be sold back to cooperation but not to public

private market vs secondary market

- the market where new shares of stock are issued by corporation and sold to investors
- markets, where shares of corporation are traded between investors, without involvement of the corporation like NYSE

Bid-Ask Market

Definition 1.5.1 (bid price)
the highest price in the market for which one is willing to buy the stock (should be slightly less than market price)

opposite is lowest ask vs highest bid

Definition 1.5.2 (bid-ask spread)
an implit **transaction cost** investors have to pay in order to trade **quickly**. extreme case is buy some stock then sell at once

stuff: exchange traded funds: similar to mutual fund. weighted average of bucket of stock/currency.

stuff: liquidity: high liquidity === how easy things can be coverted to money

Definition 1.5.3 (Limit order)
only until price reach some point, truade it

Definition 1.5.4 (market order)
buy immediately. customer ends up buying at highest ask and selling at lowest bid

1.6 Financial institutions

Definition 1.6.1 (financial institutions)
entities that provide financial services. like taking deposit, managing inverstment, brokering financial transactions, making loans.

the financial cycle:

- people invest/save money
- through loans and stock, money goes to companies who use it to fund growth through new products. generating profit and wages
- the money flows back to savers/investors

roles of financial institutions:

- move funds form savers to borrowers
- move funds through time
- help spread out risk-bearing

2 financial statement

2.1 firm's disclosure of financial statement

financial statements are accounting reports issued periodically to present past performance info and snapshot of firm's asset

investors, financial analysts managers etc rely on it to obtain info about a corporation

rules of financial statments:

generally accepted accounting principle (GAAP) are based on historical cost IFRS places more emphasis on fair value of assets/liability

2.2 the statement of financial position or balance sheet

List firm's asset, liabilities and equity.

provides a **snapshot** of the firm's financial position at a give point in time

balance sheet identity:

$$sharholder's equity = assets - liabilities$$

Definition 2.2.1 (current asset)
current assets is things that will be converted into cash in one year.
like Cash, accounts receivable, inventories(how much is used to create inventory)

long term asset has: **net property, plant, equipment**

total asset = current assets + long-term assets

Liabilities:

- current liabilities
  - accounts payable
  - notes payable/short-term debuts
- Long-term Liabilities
  - long-term debut

shareholder's equity = common stock (money spent when buying stock) + retained earnings

liquidation value or total shareholder's equity (book number of equity) = total assets - total liabilites

book value of equity is completely different from market value of equity

book vlaue of equity:

- not good esitmate of true value as an ongoing firm (but sometimes used as estimate of the liquidation value = value left after its assets were sold and Liabilities paid)
- an inaccurate assessment of actual value of firm equity
- often idffers substantially from amount investors are willing to pay for the equity

Definition 2.2.2 (market capitalization)
market capitalization = market value of equity = market price per share * number of share.
does not depend on book value of equity

liquidation value: value of firm after assets sold liability paid
market-to-book ratio: market value of equity / book value of equity
value stocks: firms with low market-to-book ratios
growth stocks: firms with high market-to-book ratios
we want market value of equity to be larger than book value of equity
enterprise value = market value of equity + debt - cash
because debut is used to expand, cash is just cash
present value of future cash flows === enterprise value
Net Working Capital = current assets - current Liabilities
shareholder's equity/book value of equity = assets - Liabilities
market capitalization = price per share * shares outstanding

2.3 income statement

gross profit= revenues - cost of sales
operating income = gross profit - operating income
earnings before interest and tax EBIT = operating income + other income
pretax income = EBIT + interest income
net income = pretax income - tax
earning per share = net income / shares outstanding
diluted EPS is EPS considering increase of shares by stock option/convertible bonds

2.4 statement of cash flow

contains operating activities, investment activities, financing activities
operating activity
minus increase in accounts receivable,
adds increase in account payable
minus increase to inventories
add depreciation
investment activity
subtract captial expenditure (increase in long-term-assets minus depreciation)
subtract investment or purchase
financing activity
minus dividends paid
adds cash received from sale/repurchasing stock
changes to short-term/long-term borrowing

2.5 income statement analysis

2.5.1 profitability ratio

gross margin = gross profit/sales
operating margin = operating income / sales
net profit margin = net income / sales

2.5.2 liquidity ratio

current ratio = current asset / current Liabilities
quick ratio = (current asset - inventory) / current liability

2.5.3 asset efficienty

asset turnover = sales / total asset
fixed asset turnover = sales / fixed assets

2.5.4 working capital ratio

accounts receivable days = accounts receivable / average daily sales
inventory days / inventory turnover = cost of good / inventory
interest coverage ratio = earnings / interest, how easily firm cover its interest payment

2.5.5 leverage ratios

debt-equity ratio = total debt / total equity
debt-to-capital ratio
net debt = total debt - excess cash - short-term investment
debut-to-enterprise-value ratio = net debt / (market value of equity + net debt)
enterprise value = market value of equity + net debt
equity multiplier = total assets / book balue of equity

2.5.6 valuation ratio

price-earning ratio (P/E) = market capitalization / net income = share price / earnings per share
PEG ratio = P/E / expected growth rate

2.5.7 operating returns

return on equity = net income / book value of equity

2.6 investment return

return on asset = net income / total assets
return on invested capical = EBIT(1-tax rate) / (book value of equity + net debt)
DuPont Identity: ROE = (net income / sales) (sales / total assets) (total assets/total equity)

3 time value of money

3.1 value cash flow at different points of time

rule 1: comparing and combining values
rule 2: compounding: calculate future value
rule 3: discounting: calculate value of future cash flow at an earlier point of time

3.2 perpetuities and annuities

perpetuities:
C = r * P, P is money in bank, r is interest rate
PV(C in perpertuity) = $\frac{C}{r}$
annuities:
PV(N-year annuitiy of C per year with interest r) = $C * \frac{1}{r}\left(1 - \frac{1}{(1+r)^N}\right)$
future value of annuitiy is just $PV * (1+r)^n$
if we add inflation it would be PV(growing perpetuity) = $\frac{C}{r-g}$
present value of growing annuity:

$$PV = C_1 * \frac{1}{r-g}\left(1 - (\frac{1+g}{1+r})^N\right)$$

4 interest rate

4.1 interest rate quotes and adjustment

Definition 4.1.1 (EAR effective annual rate)
the total amount of interest that will be earned at end of one year

Definition 4.1.2 (APR annual percentage rates, simple interest)
indicates amount of interest earned in one year without compounding
simple interest is interest earned without considering compounding

$$1 + EAR = (1 + \frac{APR}{m})^m$$

4.2 determinants of interest rates

Definition 4.2.1
nominal interest rates: quoted by banks that indicate rate money will grow
real interest rate: the rate of growth of purchasing power

$$1 + realRate = \frac{1 + norminalRate}{1 + inflationRate} = growthofmoney/growthofprice$$

Definition 4.2.2 (term structure)
relationship between investment term and interest rate

Definition 4.2.3 (yield curve)
plot of bond yields as function of matuirity date

interest rate determination: overnight rate: rate at which banks can borrow cash reserves on overnight basis from Bank of Canada

if interest rate expect to rise, long-term interest rate will be higher to attract investors

4.3 bond terminology

Definition 4.3.1 (bond indenture)
a statement of terms of a bond, as well as amounts and dates of all payments

Definition 4.3.2 (maturity date)
the final repayment date of a bond

Definition 4.3.3 (term)
the time remaining until final repayment date

Definition 4.3.4 (face value)
norminal amount used to compute interest payment
typically repaid at maturity
usually standard increments like 1000

Definition 4.3.5 (coupons)
the promised interest payments paid periodically until maturity date

coupon rate is expressed as APR,
CPN is each coupon payment

$$CPN = \frac{couponRate * faceValue}{numberOfPayment}$$

Definition 4.3.6 (zero coupon bonds)
only 2 cash flows

yeild to maturity:

$$1 + YTM_n = \frac{faceValue}{price}^{1/n}$$

5 stocks

Definition 5.0.1 (common stock)
share of ownership, gives rights to any common dividends, rights to vote on election

Definition 5.0.2 (ticker symbol)
a unique abbreviation assigned to each publicly traded compamny

Definition 5.0.3 (preferred stock)
are issued with stated dividend rates, in bankruptcy or dividend, preferred stock ranks higher
cumulative perferred stock entitle investors to reap any missed dividends

Definition 5.0.4 (proxy)
a written authorization for someone else to vote your shares.
a proxy contest is a contest between 2 or more groups competing to collect proxies to prevail in the matter up for shareholder vote

Definition 5.0.5 (cumulative vs non-cumulative perfered stock)
cumulative is all missed preferred dividends must be paid before common dividends may be paid
non-cumulative is current preferred dividends must be paid before common dividends may be paid

Definition 5.0.6 (dividend yield)
expected annual divident of stock divided by its current price.

Definition 5.0.7 (capital gain)
the amount by which the selling price exceeds initial purchase price
captical gain rate: $\frac{P1-P0}{P0}$

Definition 5.0.8 (total return)
$r_E = Div_1 P0 + \frac{P_1-P_0}{P_0}$ this is dividend yeild - capital gain rate

$P_0 = \frac{Div_1}{1+r_E} + \frac{Div_2+P_2}{(1+r_E)^2}$
constant dividend growth model some dividends grows at constant rate
$P_0 = \frac{Div_1}{r_E-g}$

5.1 estimating dividends

dividends versus investment and growth
increase dividend in 3 ways

- increase in earnings
- increase in dividend payout rate
- decrease in number of shares

dividend payout rate (fraction of firm's earnings taht firm pays out as dividend)

$Div = \frac{earnings}{sharesOutstanding} * dividendPayoutRate$
change in earnings = new inverstment * return on new investment
new investment = earnings * rentention rate
if dividend payout rate is constant,
g = retention rate * return on new investment

5.2 estimating dividends in dividend discount model

$$P_n = \frac{Div_{n+1}}{r_E - g}$$

if a firm do share repurchase, Div = Div + share repurchase
discounted free cash flow model enterprise value = market value + debt - cash
free cash flow = EBIT * (1-taxRate)+ depreciation - capital expenditure - increase in net working capital
discounted free cash flow model: V = PV(future free cash flow of firm)

$$P_0 = \frac{V_0 + cash_0 - debt_0}{sharesOutstanding}$$

since we are discounting cash flows to all investors, we use **weighted average cost of capital (WACC)**, r_{wacc}

$$V_0 = \frac{FCF_1}{1 + r_{wacc}} + \frac{FCF_2}{(1 + r_{wacc}^2)} ... + \frac{FCF_n}{(1 + r_{wacc}^n)} + \frac{V_n}{(1 + r_{wacc})^n}$$

for estimating the terminal value, we need to ssume a constant long-run growth rate g_{FCF} for free cash flows beyond year N

$$V_N = \frac{FCF_{N+1}}{r_{wacc} - g_{FCF}} = (\frac{1 + g_{FCF}}{r_{wacc} - g_{FCF}})FCF_N$$

5.3 valuation based on comparable firms

valuation multiples:

- price earnings ratio: most common, share price / earnings per share
- enterprise value multiples
- other multiples
  - multiples of sales
  - price-to-book value of equity
  - industry-specific ratios

we calculate P/E ratio using trailing earnings or forward earnings.
trailing is earnings over prior 12 months
forward is earnigns over coming 12 months, preferred as we most concerned about future earnings
forward P/E = $\frac{P_0}{EPS_1} = \frac{DividendPayoutRate(DIV/EPS)}{r_E - g}$
P/E ratio relates only to equity, ignoring debt, enterprise value multiples use a measure of earnings before interest payments are made.

- ebit
- ebitda
- free cash flow (because capital expanditure can vary, most common is to use enterprise value to EBITDA multiple)

when expected free cash flow growth constant,

$$V_0/EBITDA_1 = \frac{\frac{FCF_1}{r_w acc - g_{FCF}}}{EBITDA_1} = \frac{FCF_1/EBITDA_1}{r_{wacc} - g_{FCF}}$$

6 Fundamentals of Capital Budgeting

Definition 6.0.1 (capital budget)
a list of projects that a company plans to undertake during next period

Definition 6.0.2 (capital budgeting)
process of analyzing investing opportunities and deciding which ones to accept

Definition 6.0.3 (incremental earnings)
the amount by which a firm's earnings are expected to change as a result of an investment decision

incremental revenue and cost estimates: facts to consider:

- a new product has lower sales initailly
- average price and cost of production changes overtime
- competition tens to reduce profit

operating expenses vs captical expenditure:
cost of plant property and equipment is divided to be deducted when estimating earnings
capital cost allowance (for tax purpose)
the incremental cca deduction claimed at end of tax year is undepreciated capital cost multipled by CCA rate
$CCA_t = UCC_t * d$
$UCC_1 = 0.5 * CapEx\ UCC_t = CApEx * (1 - d/2) * (1 - d)^{t-2}$
incremental revenue and cost estimates
incremental EBIT = incremental revenue / incremental cost - CCA
CCA: capital cost allowance: canada revenue agency method of depreciation for income tax purpose
CCA rate: the proportion of underpreciated capital cost that can be claimed as cca in a given tax year
half-year rule: as assets may be purchased any time throughout a year, it can be assumed on average, an asset is owned for half a year during the first tax year of its ownership
undepreciated capital cost (UCC): the balance, at a point of time, calculated by deducting an asset's current and prior CCA amounts from original cost of the asset
incremental earnings forecast:

- pro forma statement: a statement that is not based on actual data but rather depicts a firm's financials under a given set of hypothetical assumptions
- taxes and negative ebit
- interest expense: unlevered net income: net income that does not include

converting from earnings to free cash flow(the incremental effect of a project on a firm's available cash)
capital expenditures and depreciation
net working capital = current assets - current liabilities = cash + inventory + receivables - payables
trade credit the difference between receivables and payables is net amount of firm's capital that is consumed as a result of these credit transactions