Management Practice

4. Financial

Jeroen.Bergmann@eng.ox.ac.uk

Course

Literature for the course:

Eisner, Howard. *Essentials of project and systems engineering management*. John Wiley & Sons, 2008.

Learning objective for this session:

- Able to read financial statements
- Able to check if financial statements are correct
- Understand cost for R&D
- Able to explain life cost against time

Literature for this session:

Gombola, Michael J., and J. Edward Ketz. "A note on cash flow and classification patterns of financial ratios." Accounting Review (1983): 105-114.

Importance of finance

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Some quotes:

“You have to understand accounting and you have to understand the nuances of accounting. It’s the language of business “

Warren Buffet, investor, industrialist and philanthropist

“The importance of money flows from it being a link between the present and the future.”

John Maynard Keynes, one of the most famous 20th-century economist

Lets start with the basics

Image source: Chriahcorp

Financial statements

- The financial statements often also provides additional background information, such as how the value of an asset has been determined.
- The statement is only as good as the data that is entered
- Robust predictions require complex comparative analysis to determine trends.

Key components of financial statement

- **Profit and loss account** (P&L) or income statement outlines how much have been earned during the year and what is available to invest or give back to shareholders.
- **Balance sheet** provides a snapshot of what the business owns, less any amounts payable to other parties on a particular day (usually end of financial year).
- **Cash flow statement** shows were cash is coming into and being used in running the business. It helps to determine its ability to meet its short-term liabilities, such as paying bills or repayment on loans.

Source: You do the math, Claire Warren

Interaction between components

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- The components interact with one another.

- For example: Equipment bought on Loan

P&L (12 months)	Balance Sheet (End of period)	Cash Flow (Continuously)
Depreciation of equipment (no cash) **Interest on loan**	**Asset: Equipment** (– Depreciation) Asset: VAT back as receivable (once) **Liability: Loan**	**Cash paid for equipment** (+VAT) **Loan** **Loan interest**

Profit and loss account

- It shows how the money received from sale of products and services is transformed into income.

- Very simply said it shows if the company makes a profit or a loss.

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Profit and loss account	2016	2017	% change
Revenue	173 843	209 891	21
Cost of sales	94 742	115 433	
Gross profit	79 101	94 458	19
Gross margin	46%	45%	
Administration and distribution expenses	55 790	67 405	
Operating profit	**23 311**	**27 053**	16
Operating margin	13%	13%	
Finance cost	1 404	1 049	
Finance income	1	1	
Profit before Tax	**21 908**	**26 005**	19
Income tax expense	6 333	7 521	
Profit for the year	**15 575**	**18 484**	19
After-tax profit percentage	9%	9%	

Accountant will normally have the latest year at the front

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Revenue (or turnover) is the amount that is made through the sale of products and services.

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Cost of sales are the cost directly attributed to the production or purchase of whatever the company sells or delivers and includes salary cost for employees directly involved in the production or delivery of process.

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Gross profit is the difference between revenue and costs of sales (e.g. 209891-115433=94458). It is the direct margin of what the company makes. A healthy business will aim to increase profit year on year.

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Operating profit is the profit or net income generated through business operations. It is after deduction of direct costs of sales and indirect expenses (e.g. administration & pension costs)

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Profit of the year takes into account any income or expenses relating to how the company is financed, as well as income tax. It shows the profit that can be paid out to shareholders in the form of dividends or retained within the business.

Balance sheet

- It shows the financial position of the company on a particular day and shows the total value of the net assets (assets minus liabilities) and working capital (Working Capital = Current Assets - Current Liabilities).

- In other words the sheet shows what the business owns (assets) and owes (liabilities).

- A balance sheet should be in balance!!

Balance Sheet - Assets	2016	2017
Assets		
Non-current assets		
Intangible assets	2 809	6 799
Property, plant and equipment	57 947	62 216
Total non-current assets	**60 756**	**69 015**
Current assets		
Inventory	21 560	23 304
Trade and other receivables	22 812	26 466
Cash and cash equivalents	20	1 520
Total current assets	**44 392**	**51 290**
Total assets	**105 148**	**120 305**

Balance Sheet – Equity and liabilities	2016	2017
Equity attributable to equity holders of the parent		
Issued capital and capital reserves	5 500	5 500
Retained earnings	29 306	42 176
Total equity	**34 806**	**47 676**
Non-current liabilities		
Deferred tax	17 384	17 457
Provisions	14 882	18 537
Interest bearing loans and borrowings	12 110	15 711
Current liabilities		
Trade and other payables	9 650	11 528
Income tax	1 917	1 789
Interest-bearing loans and borrowings	10 527	4 582
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Assets are anything (in)tangible that can be owned or controlled to produce a positive economic value.

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Non-current assets are assets that would not be turned into cash within a year.

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Intangible assets do not have a physical nature and include patents, brands and customers lists. They are usually spread over the period that they are perceived to have value (*amortisation*).

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Property, plant and equipment (*PP&E*) are physical assets that are used in day-to-day activities and include buildings and machinery. These are used over time and a charge is made to the P&L over the lifetime of the assets.

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Current assets are assets that can be turned into cash within a year.

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Inventory is stock held by the business that will either be sold or used in manufacturing or development. It is current as it normally held for less then a year.

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Income tax	[illegible]	[illegible]9
Interest-bear[illegible]	[illegible]	[illegible]2
Provisions	3 872	4 025
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Trade and other receivables is also known as **debtors** and it is the amount owed to the company by third parties. This also includes VAT.

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Cash and cash equivalents are considered to be the most liquid assets. Cash equivalents may be converted into cash within three months and include short-term government bonds and treasury bills. Movements in the cash balances are shown in the cash flow statement.

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Assets		
[illegible]		
[illegible]		
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Total equity is the value of assets that is left after all liabilities have been paid. It is the amount that shareholders can make a claim on. It contains the initial value of the shares plus the earnings that have been retained within the company (e.g. not been paid out as dividends to shareholders).

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Non-current liabilities are obligations that a company does not have to settle normally within an (accounting) year.

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Deferred Tax is an accounting term that is normally used to describe the tax payments that need to be paid in the future due to current activities.

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Provisions are liabilities for which the timing or amount of payment is uncertain, such as litigation cost or rising pension scheme deficits.

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Trade and other payables, also known as **creditors**, represents amounts payable for goods and services provided by a third party.

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Income tax. At the end of the year the company calculates its net profit and estimates its tax liability.

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Cash Flow Statement

- Cash is the lifeblood of the company. A profitable business can still go into administration if it can't pay their immediate bills.

- A healthy and growing company would normally spend and invest most of their cash to ensure income in the future.

Cash Flow Statement

MPiE

- The cash flow statement illustrates the movement of cash into and out of the company over a financial period (normally a year).
- **Net cash flow** is the term used to describe all cash received by the company over that period, minus the cash paid out. This is <u>not</u> the same as profit in the P&L, which consists of the income recorded when its earned and the liabilities when they arise, independent if whether cash has been received or paid.
- Depreciation of equipment does not come back in the cash flow statement. This is set as a given part of the total investment, which defined by the government (e.g. how much can you depreciate it per year).
- Paid investments and VAT (e.g. buying new equipment) will show up in cash flow, but not in profit and loss.

Cash flow statement	2016	2017
Cash flows from operating activities		
Profit before tax and finance cost	23 311	27 053
Depreciation and amortisation	5 489	6 088
Loss on disposal of plant	180	250
Operating cash flows before changes in working capital and provisions	28 980	33 391
(Increase) in net current assets	840	1 661
Additional cash contribution to reduce deficits (e.g. pension deficit)	1 400	1 600
Increase/(decrease) provision	648	634
Cash generated from operations	**27 388**	**29 496**
Interest paid	1 404	1 049
Interest received	1	1
Income tax paid	6 013	7 399

Cash flow statement	2016	2017
Net cash flows from operating activities	**19 972**	**21 049**
Cash flows from investing activities		
Proceeds from disposal of plant	98	135
Purchase of property, plant and equipment	5 742	6 539
Acquisition of subsidiaries	916	4 000
Net cash flows from investing activities	**6 560**	**10 404**
Cash flows from financing activities		
Dividends paid	3 960	5 200
Receipts of new bank loans	4 527	2 000
Repayment of bank loans	13 000	6 000
Net cash flows from financing activities	**12 433**	**9 200**
Net Increase in cash/cash equivalents	979	1 445
Cash/cash equivalents at 1st January	959	20
Cash/cash equivalents at 31st December	**20**	**1 465**

Cash flow statement	2016	2017
Cash flows from operating activities		
Profit before tax and finance cost	23 311	27 053
Depreciation and amortisation	5 489	6 088
Loss on disposal of plant	180	250
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Income tax paid	6 013	7 399

Cash flows from operating activities arise from the revenue producing activities of the business, including day-to-day trading. The best way is to start with the profit before tax and finance cost (see P&L).
This is then adjusted for accounting entries that do not relate to the exchange of cash, such as depreciation and amortisation, any losses made on the sale of assets (value of asset was greater then the cash received upon sale) and changes in provisions for future liabilities.

It is also important to make changes in net current assets (working capital). If the stock of a company rises from £10 000 to £15 000 then an additional £5 000 will be tied up in stock (cash outflow increase).

Cash flow statement	2016	2017
Net cash flows from financing activities	**12 433**	**9 200**
Net Increase in cash/cash equivalents	979	1 445
Cash/cash equivalents at 1st January	959	20
Cash/cash equivalents at 31st December	**20**	**1 465**

Net cash flows from operating activities consists of combining the cash generated from operations with the cash flow on interest paid, interest received and income tax paid.

Cash flow statement	2016	2017
		27 053
		6 088
Loss on disposal of plant	180	250
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Cash/cash equivalents at 31st December	**20**	**1 465**

Cash flows from investing activities are associated with the purchase and sale of non-current assets, such as property, plant and equipment and the income of investments held by the company. Acquisition consists of net of cash or debt acquired.

Cash flow statement	2016	2017
		27 053
		6 088
		250
working capital and provisions	28 980	33 391
(Increase) in net current assets	840	1 661
Additional cash contribution to reduce deficits (e.g. pension deficit)	1 400	1 600
Increase/(decrease) provision	648	634
Cash generated from operations	**27 388**	**29 496**
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Cash flows from operating activities		
Profit before tax and finance cost	23 311	27 053
Depreciation and amortisation	5 489	6 088
Loss on disposal of plant	180	250
Operating cash flows before changes in [illegible]	28 980	33 391
[illegible]	[illegible]	1 661
[illegible]	[illegible]	1 600
[illegible]	[illegible]	634
Cash generated from operations	**27 388**	**29 496**
Interest paid	1 404	1 049
Interest received	1	1
Income tax paid	6 013	7 399

Cash flows from financing activities are connected to the long-term financing of the company. This includes dividends paid out to those who have equity in the holding (parent) company, as well as debt financing (new bank loans or repayment on old ones).

Cash flow statement	2016	2017
Net cash flows from operating activities	**19 972**	**21 049**
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I[illegible]	[illegible]	634
C[illegible]	[illegible]	29 496
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Interest received	1	1
Income tax paid	6 013	7 399

Net increase (or decrease) in cash and cash equivalents shows the effect of the aforementioned cash flows over a given period.

Cash flow statement	2016	2017
Net cash flows from operating activities	**19 972**	**21 049**
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Costing R&D phase

MPiE

Some common cost:

- **Employee costs** (This relates to employing staff directly who are actively engaged in carrying out R&D itself)
- **Utilities** (Power, water, fuel used directly in carrying out R&D)
- **Software** (Computer software used directly in the R&D)
- **Capital expenditure** (expenditure by a business on acquiring or maintaining fixed assets (e.g. land, buildings and equipment))
- **Payments to clinical trials volunteers** (or other clinical validation cost)
- **Materials** (Consumable or transformable materials used directly in carrying out R&D)

Source www.gov.uk

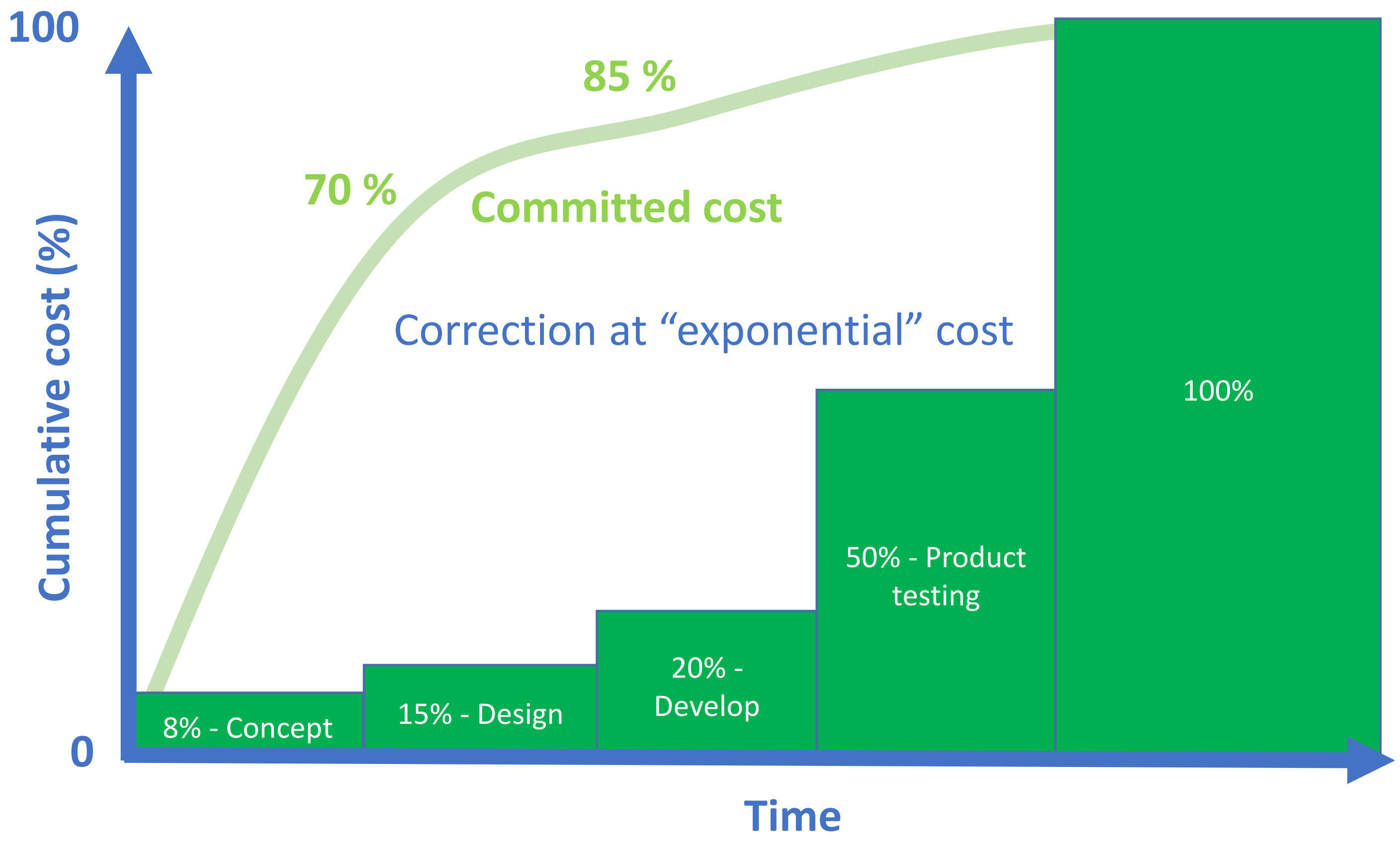
Product cost

Setup a bill of material (**BOM**), which lists all the materials, and parts it takes to making your product. Include part name, description, quantity used in the product, dimensions and weights, and the material it is made of.

It is widely recognised that **over 70% of the final product costs are determined during design** (Boothroyd, Dewhurst & Knight 2011: 7),

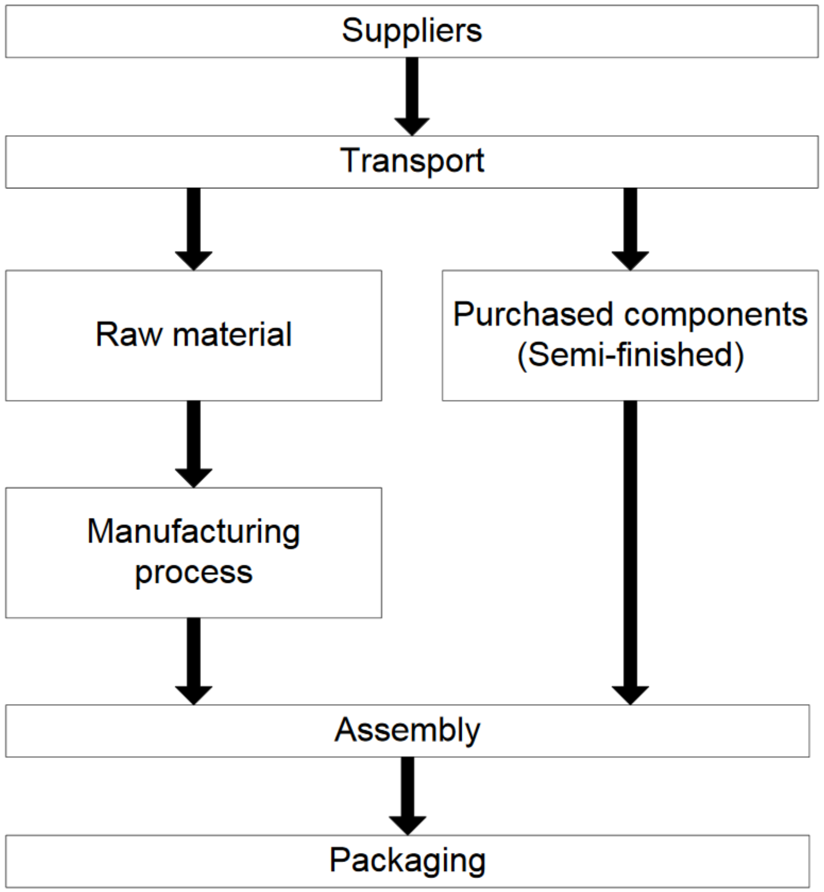
Product Cost= Material Cost + Assembly labour cost + Overheads
Material cost =parts, scrap, maybe amortized tooling to make parts.
Assembly labour = manufacturing, assembly, testing, packaging.

Committed life cycle cost against time



Source: INCOSE Systems Engineering Handbook, version 3 .

Production cost



Source: P Asking (2011)

VAT

Rate	% of VAT	What the rate applies to
Standard	20%	Most goods and services
Reduced rate	5%	Some goods and services, eg children's car seats and home energy
Zero rate	0%	Zero-rated goods and services, eg most food and children's clothes

Exempt from VAT see https://www.gov.uk/guidance/rates-of-vat-on-different-goods-and-services

Operating cycle

$$Number\ of\ days\ of\ inventory = \frac{Inventory}{Average\ day's\ cost\ of\ goods\ sold}$$

$$Number\ of\ days\ of\ receivables = \frac{Accounts\ receivable}{Average\ day's\ sales\ on\ credit}$$

$$Number\ of\ days\ of\ payables = \frac{Accounts\ payable}{Average\ day's\ purchases}$$

$$Operating\ cycle = Number\ of\ days\ of\ inventory + Number\ of\ days\ of\ receivables$$

$$\begin{gathered}Net\ operating\ cycle \\ = Number\ of\ days\ of\ inventory + Number\ of\ days\ of\ receivables\ - Number\ of\ days\ of\ purchases\end{gathered}$$

Liquidity

$$Current\ ratio = \frac{Current\ assets}{Current\ liabilities}$$

$$Quick\ ratio = \frac{Current\ assets\ - Inventory}{Current\ liabilities}$$

$$Net\ working\ capital\ to\ sales\ ratio = \frac{Current\ assets\ - Current\ liabilities}{Sales}$$

Profitability

$$Gross\ profit\ margin = \frac{Gross\ income}{Sales}$$

$$Oprating\ profit\ margin = \frac{Operating\ income}{Sales}$$

$$Net\ profit\ margin = \frac{Net\ income}{Sales}$$

Activity

MPiE

$$Earning\ per\ share = \frac{Net\ income\ available\ to\ shareholders}{Number\ of\ shares\ outstanding}$$

$$Dividends\ per\ share = \frac{Dividends\ paid\ to\ shareholders}{Number\ of\ shares\ outstanding}$$

$$Dividend\ payout\ ratio = \frac{Dividends}{Earnings}$$

$$Price\ earnings\ ratio = \frac{Market\ price\ per\ share}{Earnings\ per\ share}$$

$$Inventory\ turnover = \frac{Cost\ of\ goods\ sold}{Inventory}$$

$$Accounts\ receivable\ turnover = \frac{Sales\ on\ credit}{Accounts\ receivable}$$

$$Total\ asset\ turnover = \frac{Sales}{Total\ assests}$$

$$Fixed\ asset\ turnover = \frac{Sales}{Fixed\ assests}$$

Financial Leverage

$$Total\ debt\ assests\ ratio = \frac{Total\ debt}{Total\ assets}$$

$$Long\ term\ \ debt\ to\ assests\ ratio = \frac{Long\ term\ debt}{Total\ assets}$$

$$Total\ \ debt\ to\ equity\ ratio = \frac{Total\ debt}{Total\ shareholders'equity}$$

$$Equity\ multplier = \frac{Total\ assets}{Total\ shareholders'equity}$$

$$Times\ interest\ coverage\ ratio = \frac{Earnings\ before\ interest\ and\ taxes}{Interest}$$

$$Fixed\ charge\ coverage\ ratio = \frac{Earnings\ before\ interest\ and\ taxes + Lease\ payment}{Interest + Lease\ payment}$$

Shareholder and return ratios

$$Earnigs\ per\ share = \frac{Net\ income\ available\ to\ shareholders}{Number\ of\ shares\ outstanding}$$

$$Dividends\ per\ share = \frac{Dividends\ paid\ to\ shareholders}{Number\ of\ shares\ outstanding}$$

$$Dividend\ payout\ ratio = \frac{Dividends}{Earnings}$$

$$Price\ earnings\ ratio = \frac{Market\ price\ per\ share}{Earnings\ per\ share}$$

$$Basic\ earning\ power\ ratio = \frac{Operating\ income}{Total\ asset}$$

$$Return\ on\ assets = \frac{Net\ income}{Total\ asset}$$

$$Return\ on\ equity = \frac{Net\ income}{Shareholder's\ equity}$$

Source: Professor Pamela Peterson Drake

Company types

The main types are:

- **Sole trader**, you are <u>personally</u> responsible for any loses that you make.
- **Limited company**, it's responsible in its own right for everything it does and its finances are separate to your personal finances. Every limited company has 'members', the people or organisations who own shares in the company. Directors are responsible for running the company. Directors often own shares, but they don't have to.
- **Business partnership,** you and your business partner (or partners) personally share responsibility for your business.

An 'unincorporated association' is for a small organisation, which does not want to make a profit.

You also have 'social enterprises', which aims to help people or communities.

Source: Gov.uk

Standard industrial classification of economic activities (SIC)

- A condensed list of SIC codes for providing Companies House with a description of your company's nature of business can be found at:

www.gov.uk/government/publications/standard-industrial-classification-of-economic-activities-sic

- Apply the code that best describes your company

Questions?

jeroen.bergmann@eng.ox.ac.uk