Financial statements analysis

- A framework for financial statements analysis
- Risk Analysis
- Risk Analysis: Insolvency prediction and rating simulation
- Competitive analysis
- Financial Statement Analysis for Supplier/Customer Relationship Management

Our first case

University of Ferrara | Department of Economics and Management

OUR COMPANY

Balance Sheet	2018	2017		2018	2017
Cash	20	35	Notes Payable	450	350
Trade Receivables	320	280	Trade Payables	280	260
Inventory	330	280	**Short-Term Liabilities**	730	610
Short-Term Assets	670	595			
			Long-Term Financial Debt	1.467	1.719
Property, Plant, and Equipment	3.300	3.200	**Long-Term Liabilities**	1.467	1.719
Less Accumulated Depreciation	(480)	(400)			
Long-Term Assets	2.820	2.800	Share capital	600	600
			Reserves	453	300
			Earnings	241	166
			Total Equity	1.294	1.066
Total Assets	3.490	3.395	**Total Liabilities and Equity**	3.490	3.395

Income Statement	2018
Sales	2.100
- Beginning Inventory	(280)
- Purchasing costs	(1.390)
+ Ending Inventory	330
- Administrative Expenses	(300)
- Depreciation	(80)
+/- Non-recuring items	40
Interest Expense	(50)
Taxes	(130)
= Net Income	241

THE REPRESENTATIVE COMPETITOR

Balance Sheet	2018	2017		2018	2017
Cash	40	55	Notes Payable	210	200
Trade Receivables	320	250	Trade Payables	310	290
Inventory	220	150	**Short-Term Liabilities**	520	490
Short-Term Assets	580	455			
			Long-Term Financial Debt	1.383	1.499
Property, Plant, and Equipment	3.500	3.400	**Long-Term Liabilities**	1.383	1.499
Less Accumulated Depreciation	(480)	(400)			
Long-Term Assets	3.020	3.000	Share capital	800	800
			Reserves	653	500
			Earnings	244	166
			Total Equity	1.697	1.466
Total Assets	3.600	3.455	**Total Liabilities and Equity**	3.600	3.455

Income Statement	2018
Sales	1.800
- Beginning Inventory	(150)
- Purchasing costs	(1.090)
+ Ending Inventory	220
- Administrative Expenses	(300)
- Depreciation	(80)
+/- Non-recuring items	5
Interest Expense	(30)
Taxes	375
= Net Income	244

Is our company performing well?

Financial statement analysis

A framework for financial statements analysis

Financial Statements Analysis: Pros & Cons

CONs

- Financial Statements are unreliable
- Financial Statements are backward looking

PROs

- Financial Statements are publicly available
- They can be used together with other sources of information
- Financial Statements analysis is important for an understanding of the basic financial relationships
- In any case, many institutions (e.g. banks) rely on them for various purposes (e.g. rating)

Financial Statement Analysis: Introduction

Who?	Why?	What Information?
External perspective: analysts, banks, research institutes, other companies	Analysis for financial investments, analysis of credit, industry analysis, or the state of the economy, etc.	Mainly based on public financial statements and publicly available information
Internal perspective: the firm	Management purposes	Mainly based on internal financial statements (including division) and confidential information

Why and How analysing financial statements?

Why	*How*
Enterprise's financial performance	Focus on profitability, liquidity, independence, growth, risk
Competitive Analysis	Financial statements analysis of the company and comparison with competitors
Suppliers and customers' Analysis	Financial ratios used to uncover levers for a better management of suppliers and customers
Financial Simulation (What-if analysis)	Modeling of financial relations for simulation
Insolvency prediction and rating analysis	Simulation of rating and Z-score models

Warning!

The same labels are used to identify different concept

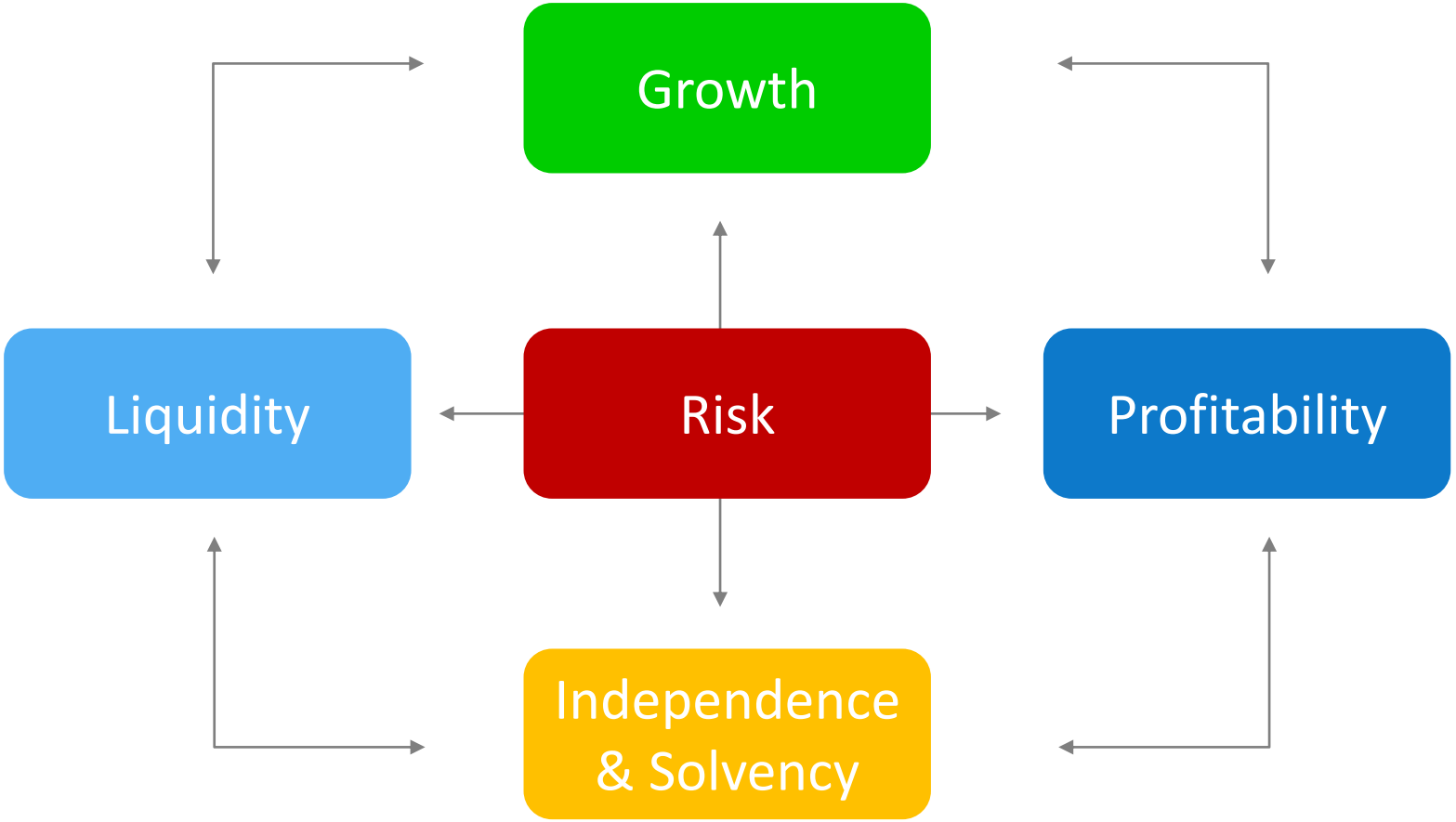
Example: ROI is used to identify different formulas of return on investments

Different labels are used to identify the same concept

Example: the same ratio is defined ROI or ROACE or ROCE

Please refer to labels and concepts shared during this course

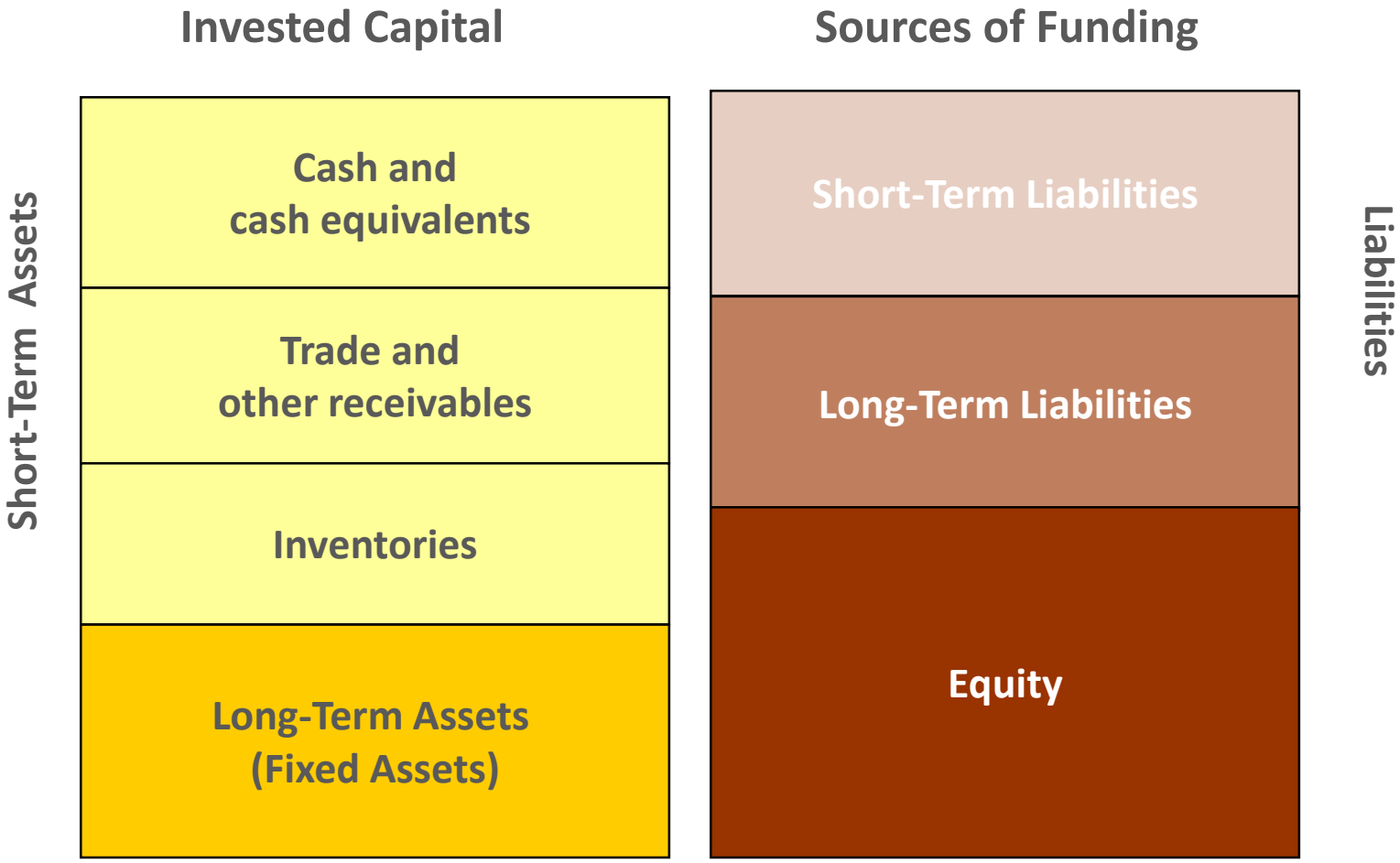
A framework for the analysis



Where the ratios come from: The reclassification of Financial Statements

- Reclassification of Balance Sheet
  - The short/long-term approach
  - The Net Capital Employed (managerial perspective) approach
- Reclassification of Income Statement (P&L)
- Reclassification of Cash Flow Statement (if the Cash Flow Statement does not exist the analyst should prepare it)

Reclassification of Balance Sheet
The short/long-term approach



About this criterion

The goal

To understand the short-term solvency of the firm, i.e. the ability of the firm to cover its short-term debts with the cash coming from its current assets

How to measure solvency

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \geq 2$$

$$\text{Quick Ratio} = \frac{\text{Current Assets - Inventories}}{\text{Current Liabilities}} \geq 1$$

Why Current and Quick ratios (and the short/long term approach) are unacceptable

Many focus on current and quick ratios, and agree that the higher these ratios, the safer the company

Also bankers like them: they want to ensure that companies have enough liquid assets to repay their loans in the event of distress

Usually, ALL they accept current ratios higher than 1 and quick ratios higher than 2: this way cash inflows form receivables and inventories will cover payables

A higher (which to many means "better") current ratio value is achieved by having higher levels of receivables and inventories and a lower level of payables

BUT

All this is quite at odds with sound working-capital practices!

In fact cashing sales and working with zero inventories is much better!

Source: Kaiser K. and Young S. D., Need Cash? Look Inside Your Company, Harvard Business Review, May 2009, pp. 64-71

Some technical criticisms against the two ratios (and the short/long term approach)

Since the day after the period financial statements refer to, the firm sells new products and buys new materials, so generating new receivables and new payables

Financial Statements are made publicly available some months after the end of the fiscal year: at that date the greatest part of receivables and payables have been already expired

If receivables' and payables' expirations do not match, the firm could be insolvent even with a larger current ratio

Debt can be reimbursed through other debts, not only through cashing credits

Other criticisms

- Financial ratios' meaning is blurred and fuzzy

$$\text{Cost of Debts} = \frac{\text{Financial costs (Financial interests)}}{\text{Total Liabilities}}$$

The average cost of debt is diluted since:

1) Among Total Liabilities are debts that do not generate interest costs (e.g. Trade payables).
2) Costs generated by some liabilities are elsewhere (e.g. cost for provisions in EBIT)
3) If sales increase, also purchased goods and services increase. So, other things held constant, trade payables also increase and the ratio decrease. However this is not an effect of financial decisions.

$$\text{Return on Net Assets} = \frac{\text{EBIT}}{\text{Total Net Assets}}$$

Numerator and Denominator are not homogenous:

1) EBIT is net of costs on trade payables (implicit interests); but they are not among Total Net Assets
2) This causes RONA to be lower than it should be

Reclassification of Balance Sheet
The Net Capital Employed (NCE) approach

Net Capital Employed or Net Operating Assets

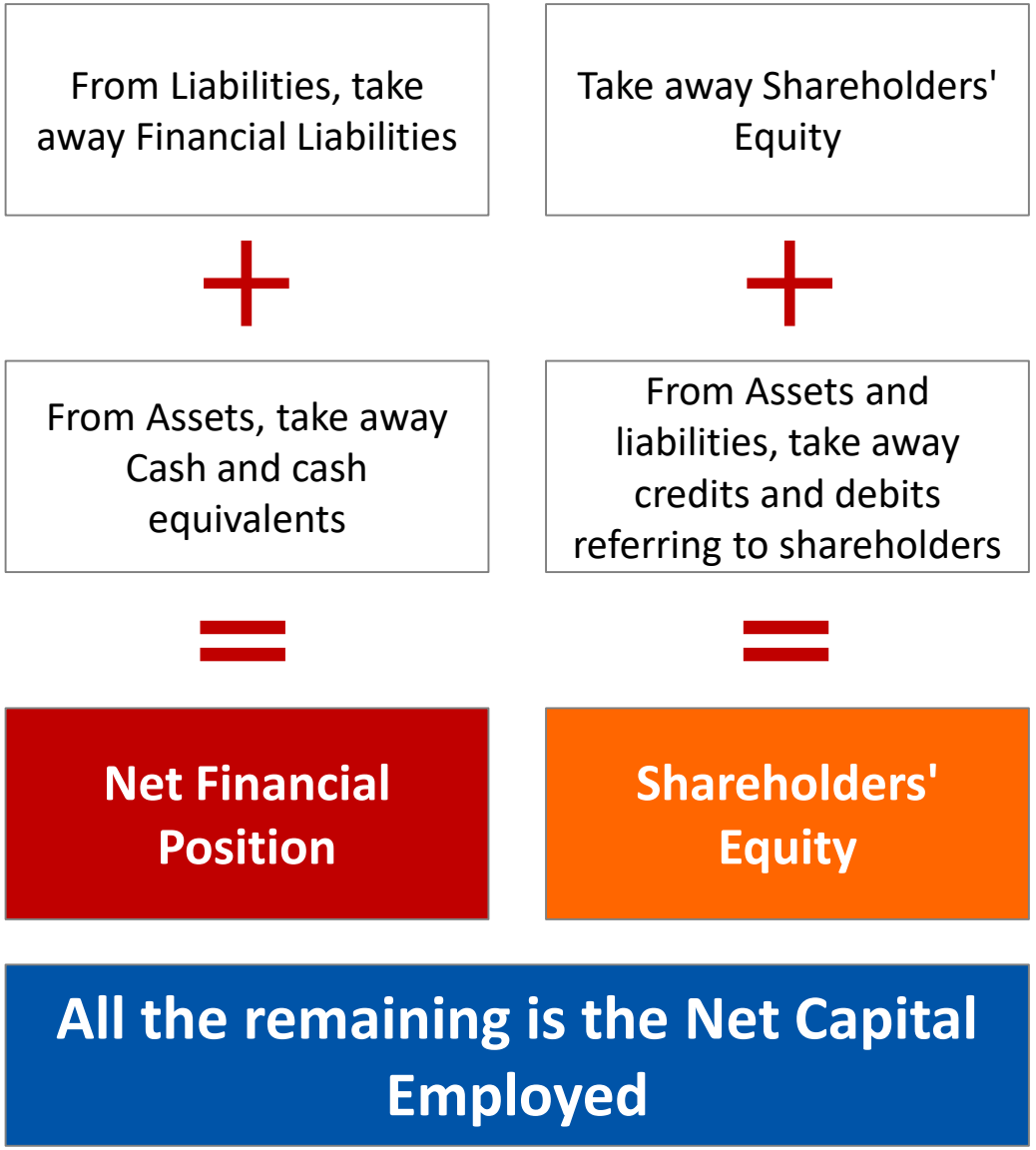
+ Trade receivables
+ Inventories
+ Other assets
- Trade payables
- Other liabilities
= Net Operating Working Capital (NOWC)

+ Tangible Assets
+ Intangible Assets
+ Financial Assets (especially held-to maturity)
- Provisions (e.g. for employee severance indemnities)
- Debt on tangible and intangible assets
= Net Fixed Capital Employed

+ Short-term financial liabilities
- Cash and cash equivalents
+ Long-term financial liabilities
= Net Financial Position

+ Share capital
- Claims on stockholders
+ Reserves
+ Retained earnings
= Shareholders' Equity

Tips for reclassifying the Balance Sheet



Benefits from adopting the NCE/NFP approach

Items are grouped in homogenous classes:

1) Business related investments
2) Financing Activities (Debt vs equity)

It distinguishes business-side from finance-side to perform a separate but integrated analysis of them

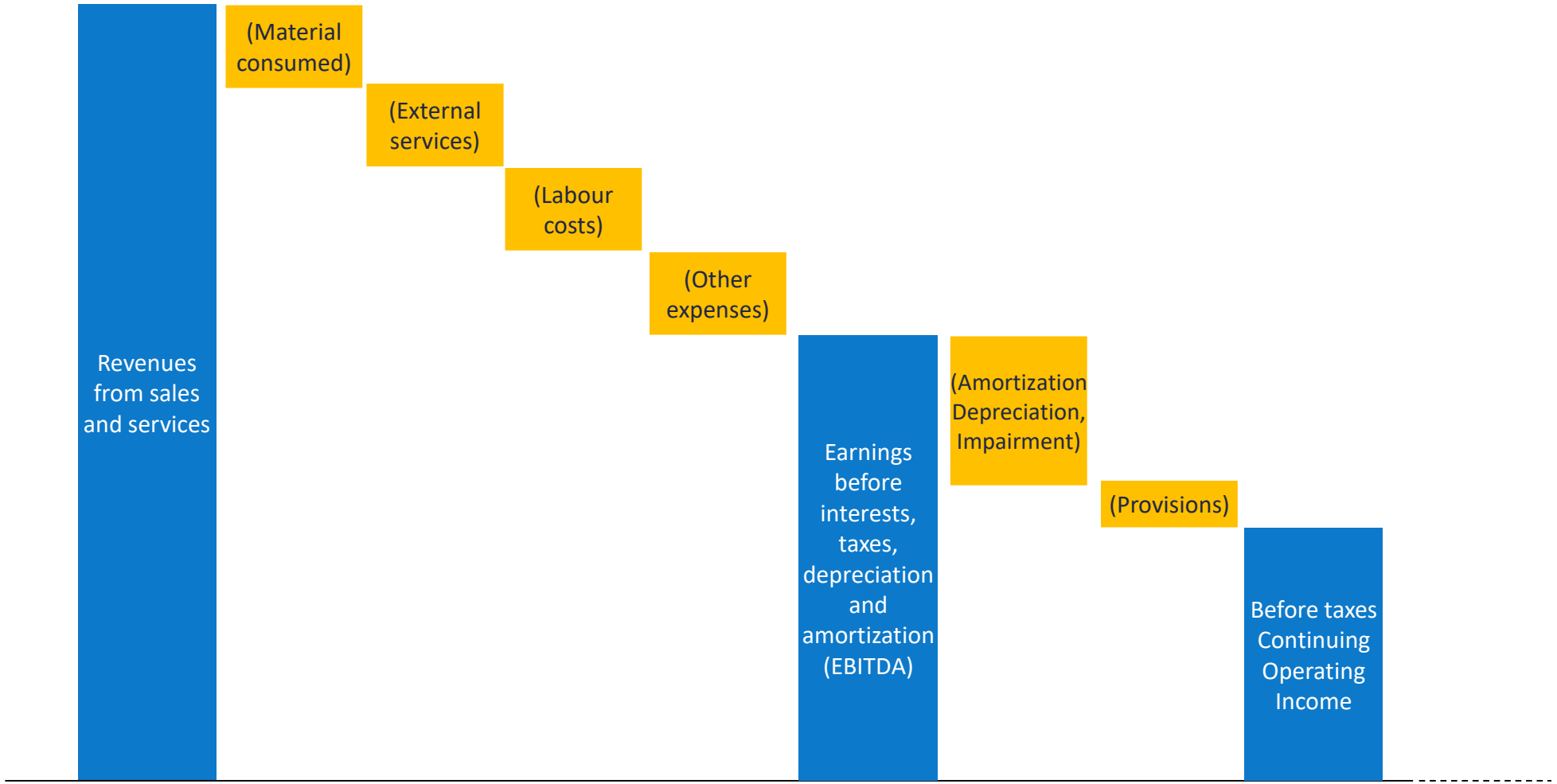
It focuses upon what really matters: the business (NCE) and the way firm has financed it (NFP & Equity)

It makes it possible to compare the cost of funds to the return from the business

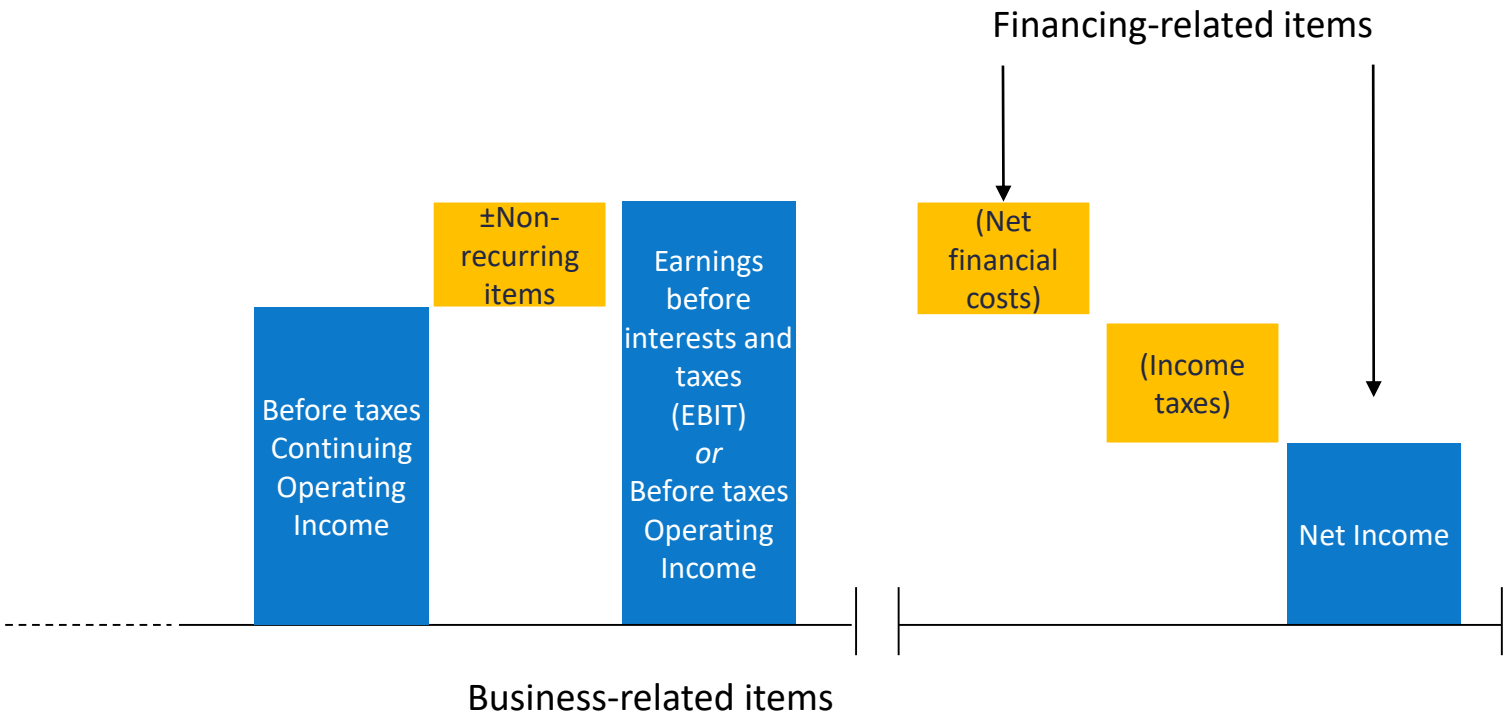
It shows who really makes financial decisions: ALL!

Finally, it makes it possible to calculate financial ratios (e.g. ROI) where numerator and denominator are consistent

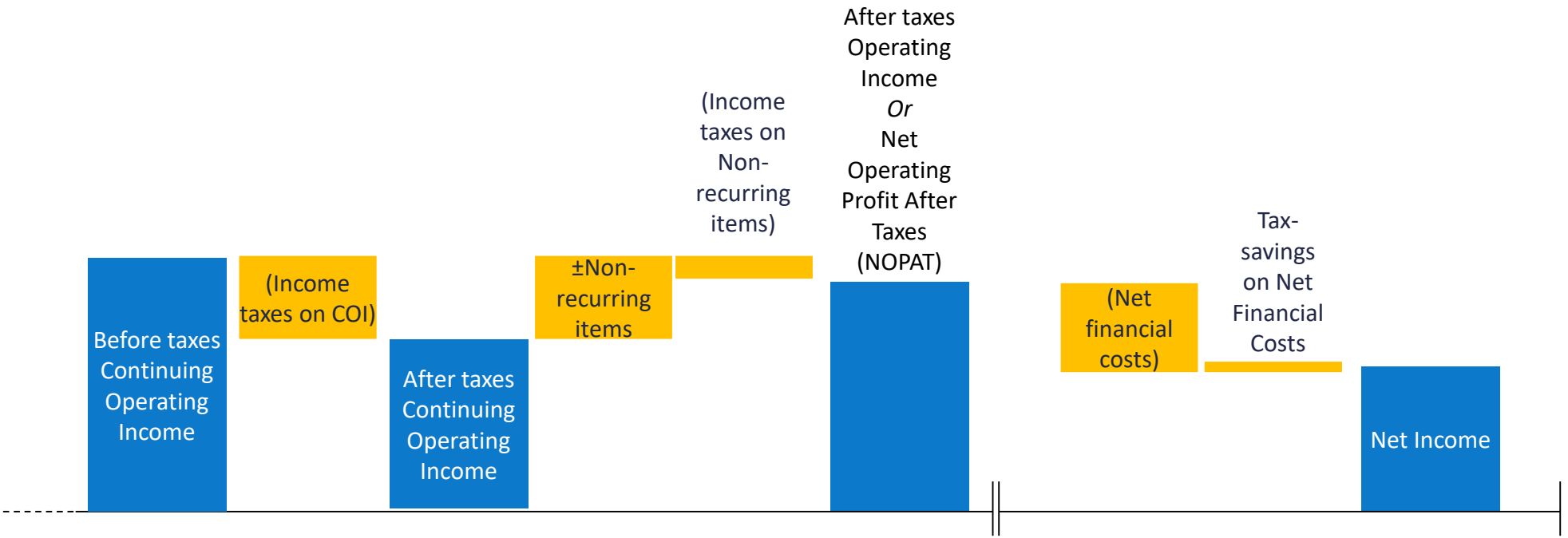
Reclassified Income Statement (1/2)



Reclassified Income Statement (2/2)



Reclassified Income Statement (2/2): After taxes figures



Example

Items	Values
Before taxes Continuing Operating Income	105
±Non-recurring items	20
(Net financial costs)	(15)
Earnings Before Taxes	110
(Income taxes @30%)	(33)
Net Income	77

(31.5)

(6)

4.5

Items	Values
Before taxes Continuing Operating Income	105
(Income taxes on COI)	(31.5)
After taxes Continuing Operating Income	**73.5**
±Non-recurring items	20
(Income taxes on Non-recurring items @30%)	(6)
After taxes Operating Income Or Net Operating Profit After Taxes (NOPAT)	**87.5**
(Net financial costs)	(15)
Tax-savings on Net Financial Costs	4.5
Net Income	**77**

Reclassified Income Statement: Other Margins

- **Value Added**

  Difference between the total value of its output and the value of the inputs of materials and services obtained from other enterprises

- **Cost of Goods Sold**

  The direct costs attributable to the production of the goods sold by a company

- **Contribution Margin**

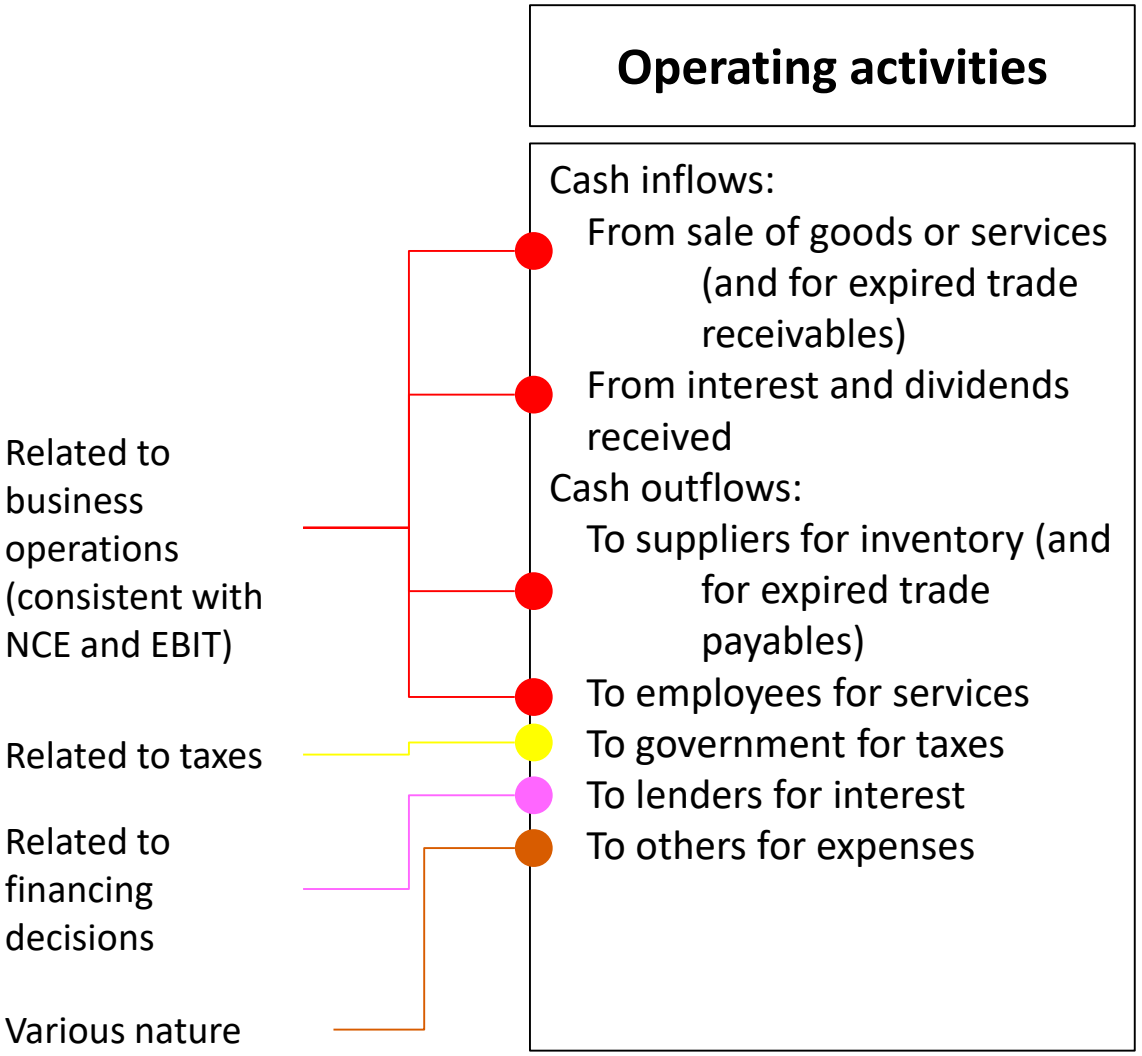
  Difference between sales revenue and variable expenses.

Memories of Cash Flow Statements

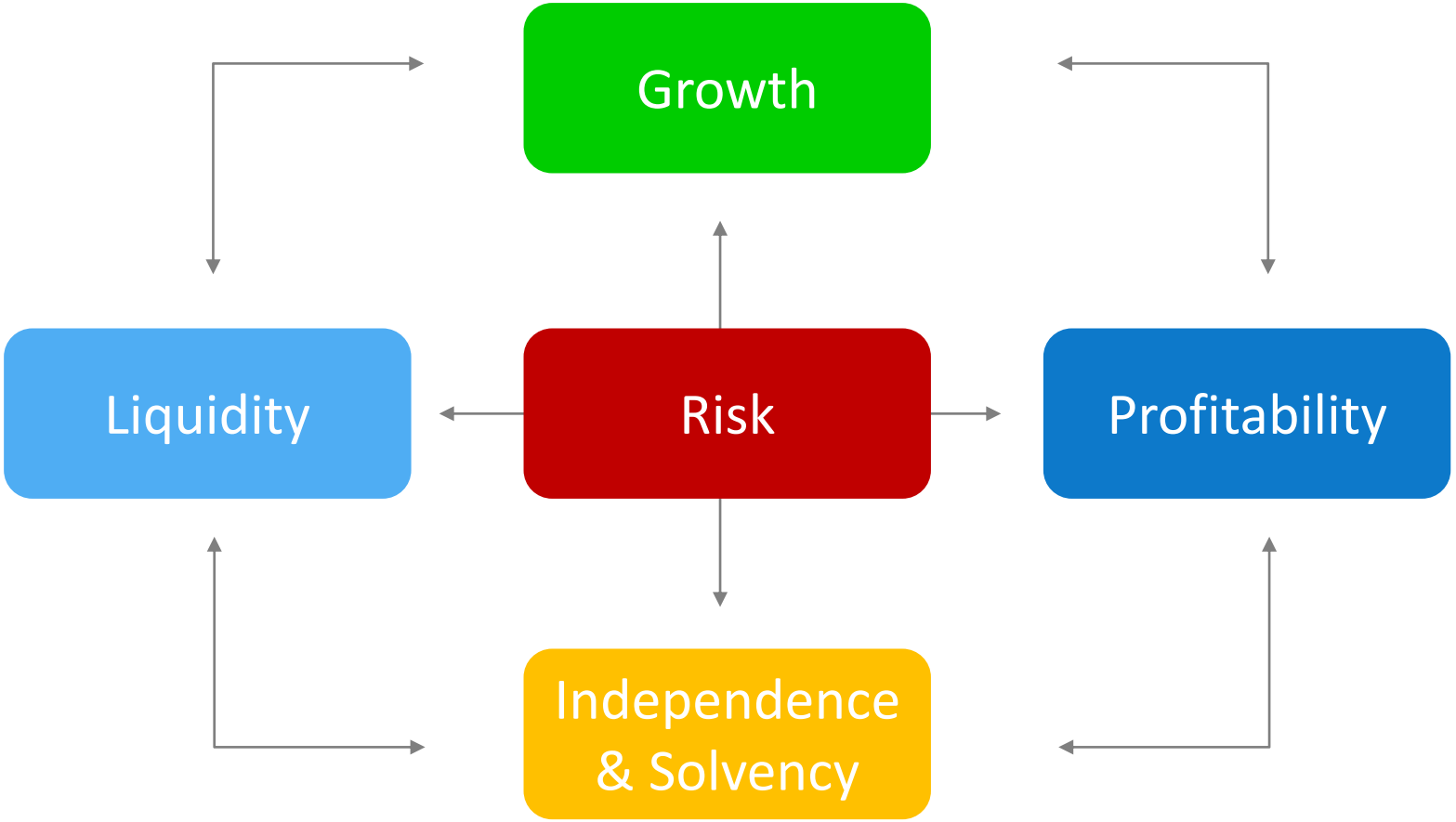
Cash Flow Statement: What you know

Operating activities	Investing activities	Financing activities
Cash inflows: From sale of goods or services (and for expired trade receivables) From interest and dividends received Cash outflows: To suppliers for inventory (and for expired trade payables) To employees for services To government for taxes To lenders for interest To others for expenses	Cash inflows: From sale of property, plant, and equipment From sale of investment on debt or equity securities of other entities From collection of principal on loans to other entities Cash outflows: To purchase sale of property, plant, and equipment To purchase investment on debt or equity securities of other entities To make loans to other entities	Cash inflows: From sale of ordinary shares From issuance of long term-debt (bond and notes) Cash outflows: To shareholders as dividends To redeem long-term debt or reacquire ordinary shares (treasury shares)

Cash Flow Statement: What you know



A framework for the analysis



A framework for the analysis

Profitability	
ROI (%)	Return On Investments
ROE (%)	Return On Equity
ROS (%)	Return On Sales
NCE Turnover (X)	Net Invested Capital Turnover
Tax rate (%)	Taxes paid in %

Liquidity	
CFOS (%)	Cash Flow on Sales
CFOD (%)	Cash Flow on Debt
DSO (dd)	Days Sales Outstanding
DPO (dd)	Days Payables Outstanding
DII (dd)	Days In Inventories
CCC (dd)	Cash Conversion Cycle

Independence & Solvency	
Leverage (X)	Debt to Equity Ratio
ROD (%)	Return On Debt

Growth	
Growth Rev. (%)	Growth of Sales
Growth NCE (%)	Growth of Net Capital Employed

Risk	
DOL (X)	Degree of Operating Leverage
DFL (X)	Degree of Financial Leverage
Int. Cov. (X)	Interest Coverage
Z-Score	A model for bankruptcy prediction

A framework for the analysis

Profitability ratios		Formulas
ROI (%)	Return On Investments	Operating Income/Average Net Capital Employed
ROE (%)	Return On Equity	Net Earnings/Average Equity
ROS (%)	Return On Sales	Operating Income/Sales
NCE Turnover (X)	Net Capital Employed Turnover	Sales/Average Net Capital Employed
Tax rate (%)	Taxes paid in %	Income taxes/Earnings before taxes

Liquidity ratios		Formulas
CFOS (%)	Cash Flow on Sales	Cash Flow from Operations/Sales
CFOD (%)	Cash Flow on Debt	Cash Flow from Operations/Average Net Financial Position
DSO (dd)	Days Sales Outstanding	Trade receivables at the end of period net of VAT/(Sales/365)
DPO (dd)	Days Payables Outstanding	Trade payables at the end of period net of VAT/(Purchasing costs/365)
DII (dd)	Days In Inventories	Inventory at the end of period/(Sales/365)
CCC (dd)	Cash Conversion Cycle	DSO + DII - DPO

Note: Average means (Value at the end of period t-1 + Value at the end of period t)/2

A framework for the analysis

Independence & Solvency ratios		Formulas
Leverage (X)	Debt to Equity Ratio	Average Net Financial Position/Average Equity
ROD (%)	Return On Debt	Net Financial Costs/Average Net Financial Position

Growth ratios		Formulas
Growth Rev. (%)	Growth of Sales	Sales (t)/Sales (t-1) - 1
Growth NCE (%)	Growth of Net Capital Employed	NCE (t)/NCE (t-1) - 1

Risk ratios		Formulas
DOL (X)	Degree of Operating Leverage	Contribution Margin/Operating Income
DFL (X)	Degree of Financial Leverage	Operating Income/(Operating Income - Net Financial Costs)
Int. Cov. (X)	Interest Coverage	EBIT/Net Financial Costs
Z-Score	A model for bankruptcy prediction	See Section on Risk Analysis

Note: Average means (Value at the end of period t-1 + Value at the end of period t)/2

Don't get fouled! Doing a Financial statements analysis in practice

- Create a model on a spreadsheet
  - The reclassification scheme
  - The relationships between financial statements and your schemes
  - Input formulas for the calculation of financial ratios (some providers offer ratios already calculated, but they could not be consistent with your approach!)
- How to import data into your model
  - By hand (time expensive and error intensive!)
  - Downloading them in a xls format (e.g. from AIDA)
  - Working with XBRL

The framework in action: An example

Profitability year: 2014			
Ratios	Competitor 1		Us
ROI (%)	3,6		22,3
ROE (%)	2,2		8,5
ROS (%)	4,3		7,0
Turnover (X)	0,8		3,2
Tax rate (%)	50,1		38,6

Liquidity year: 2014			
Ratios	Competitor 1		Us
CFOS (%)	13,2		17,3
CFOD (%)	19,3		155,8
DSO (dd)	121,8		24,4
DPO (dd)	188,3		109,5
DII (dd)	118,3		50,5
CCC (dd)	51,8		-34,6

Independence & Solvency year: 2014			
Ratios	Competitor 1		Us
Leverage (X)	1,4		0,1
ROD (%)	4,2		5,9

Growth year: 2014			
Ratios	Competitor 1		Us
Growth Rev. (%)	19,1		7,0
Growth NIC (%)	-5,0		-19,3

Risk year: 2014			
Ratios	Competitor 1		Us
DOL (X)	8,2		7,5
DFL (X)	3,9		1,3
Int. Coverage (X)	1,5		12,6
Z-score	0,8		1,9

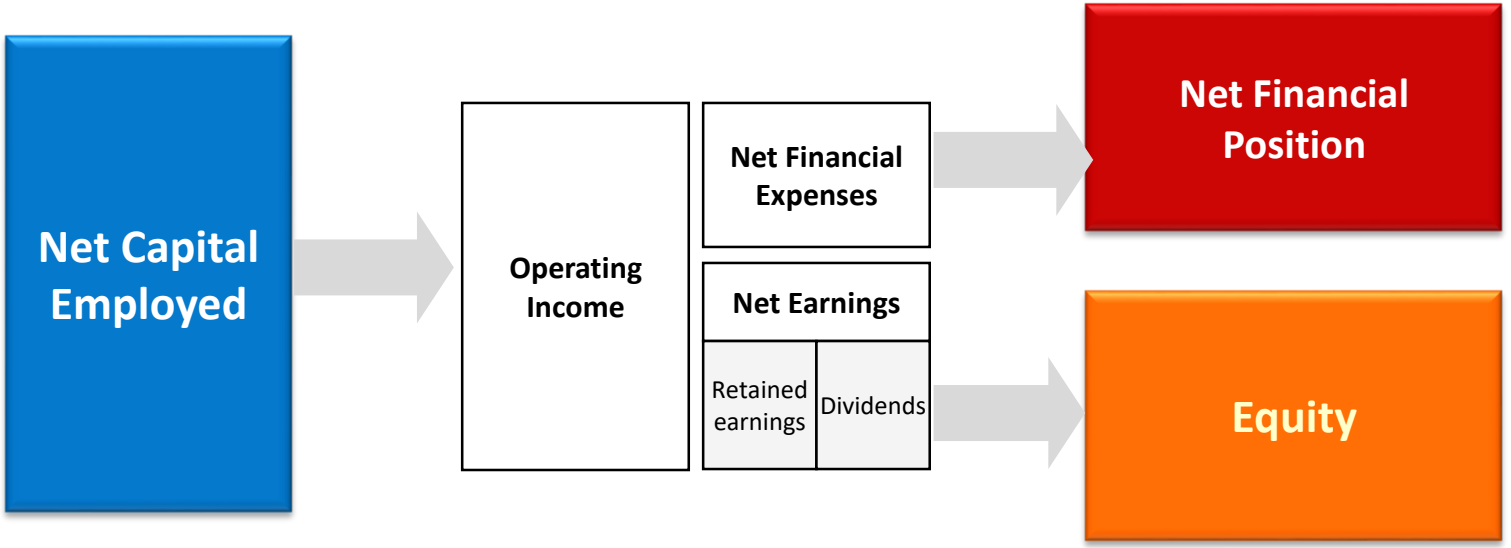
Competitor's Financial Ratios

Trend of competitor's Financial Ratios

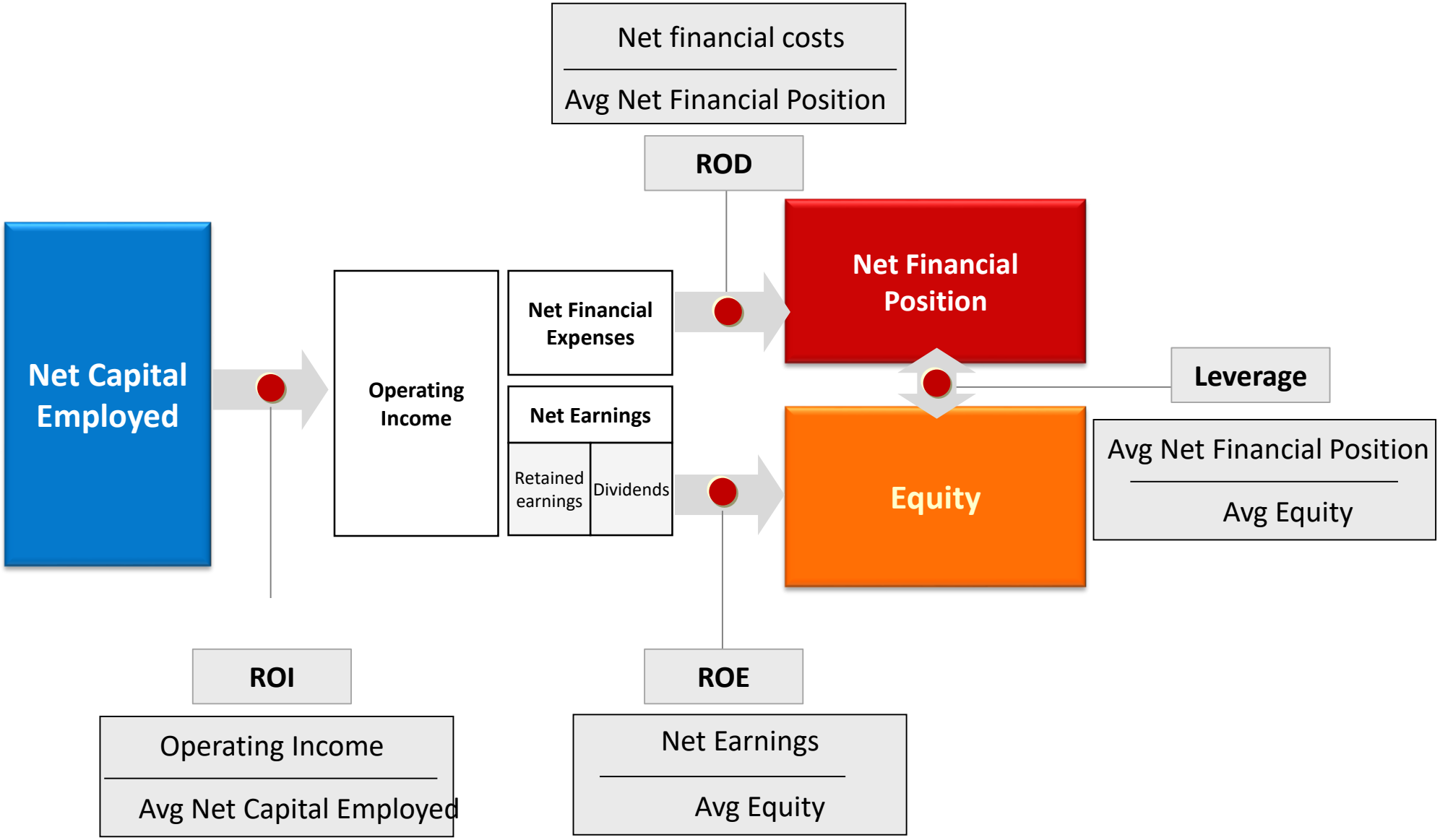
Our Financial Ratios

Traffic light comparison

Profitability analysis



Profitability analysis



Financial leverage

***Assumptions*:**
1) NO Extraordinary items
2) NO Taxes

	A	B
Net Capital Employed	1,000	1,000
Net Financial Debt	0	600
Equity	1,000	400

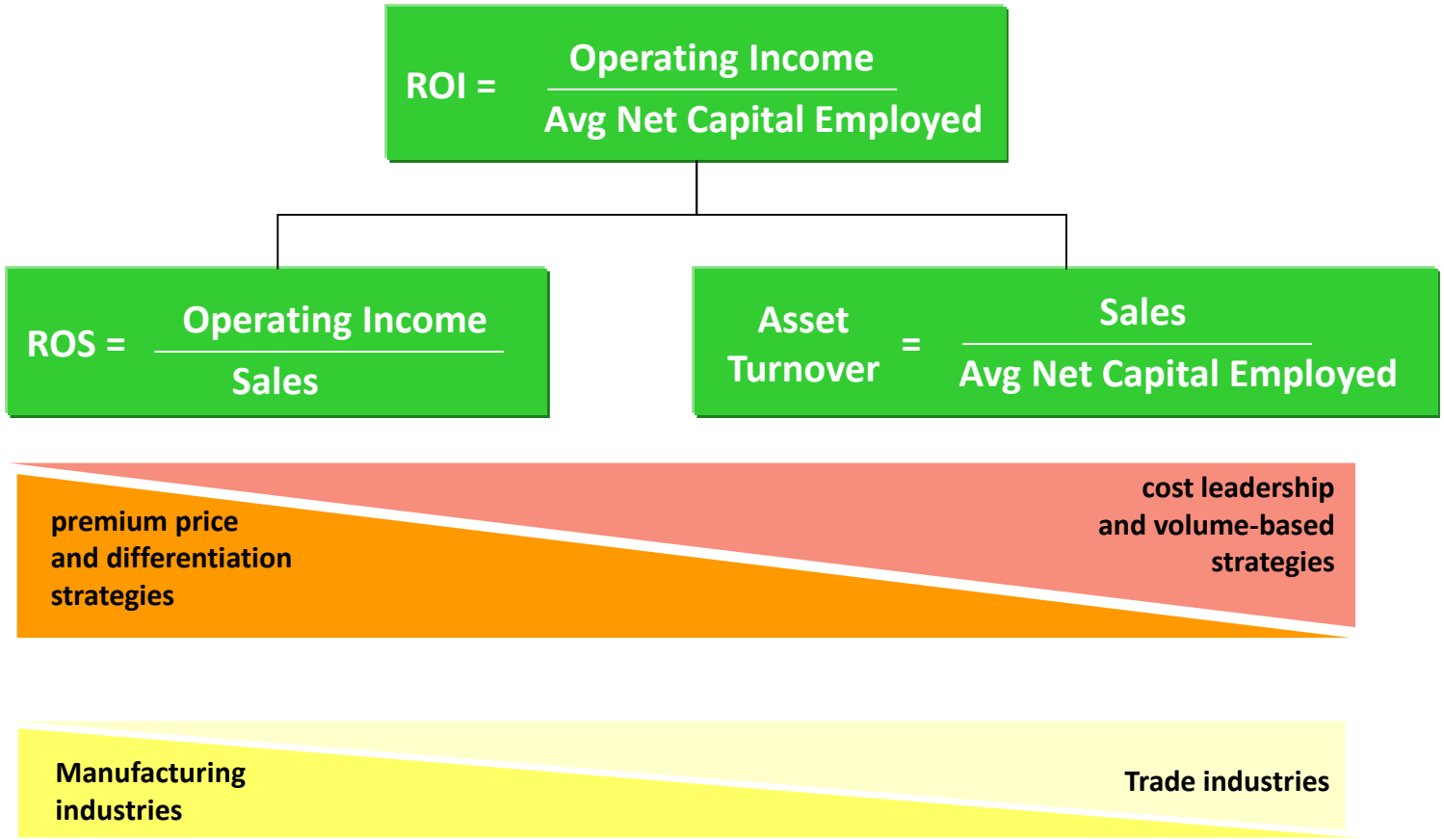
Operating Income	200	200
- Net Financial costs	0	(90)
= Net income	200	110
ROI	20.0%	20.0%
ROE	20.0%	27.5%
ROD	-	15.0%

Financial leverage

	A			B		
Net Capital Employed	1,000			1,000		
Net Financial Debt	0			600		
Equity	1,000			400		
variation in Operating Income	*-10%*	Base case	*+10%*	*-10%*	Base case	*+10%*
Operating Income	180	200	220	180	200	220
- Net Financial costs	-	-	-	(90)	(90)	(90)
= Net income	180	200	220	90	110	130

ROI	18.0%	20.0%	22.0%	18.0%	20.0%	22.0%
ROE	18.0%	20.0%	22.0%	22.5%	27.5%	32.5%
ROD	-	-	-	15.0%	15.0%	15.0%
variation in ROE	-10.0%		+10.0%	-18.2%		+18.2%

Analysis of ROI: The Du Pont Triangle



Southwest Airlines: Case study

Time flies when you're having fun!

Southwest Airlines started in 1971 when Rollin King and Herb Kelleher joined forces to start an airline and began services between Dallas, Houston, and San Antonio, Texas. Southwest became the first major airline to introduce a ticket-less travel, eliminating the need to print a paper ticket. Southwest became the fifth largest major airline in the US in 1999 after 28 years in service.

Source: http://www.southwest.com/about_swa/airborne.html

Southwest Airlines: Case study

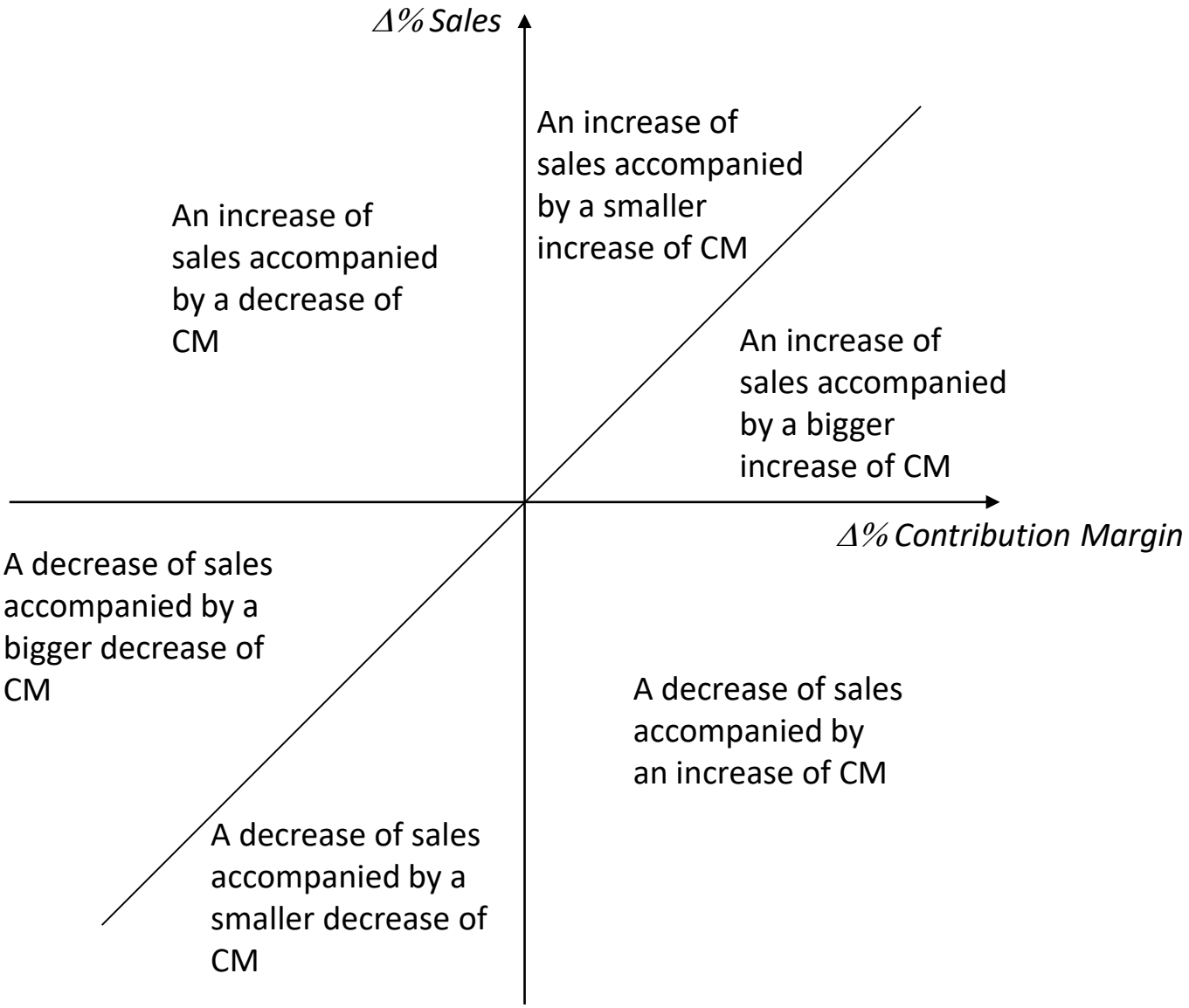
	SOUTHWEST	*INDUSTRY*
ROI	3.9%	3.4%
ROS	4.9%	6.8%
NCE Turnover	0.8	0.5

Source: our elaboration on data from Marketwatch and Bloomberg BusinessWeek, 2012

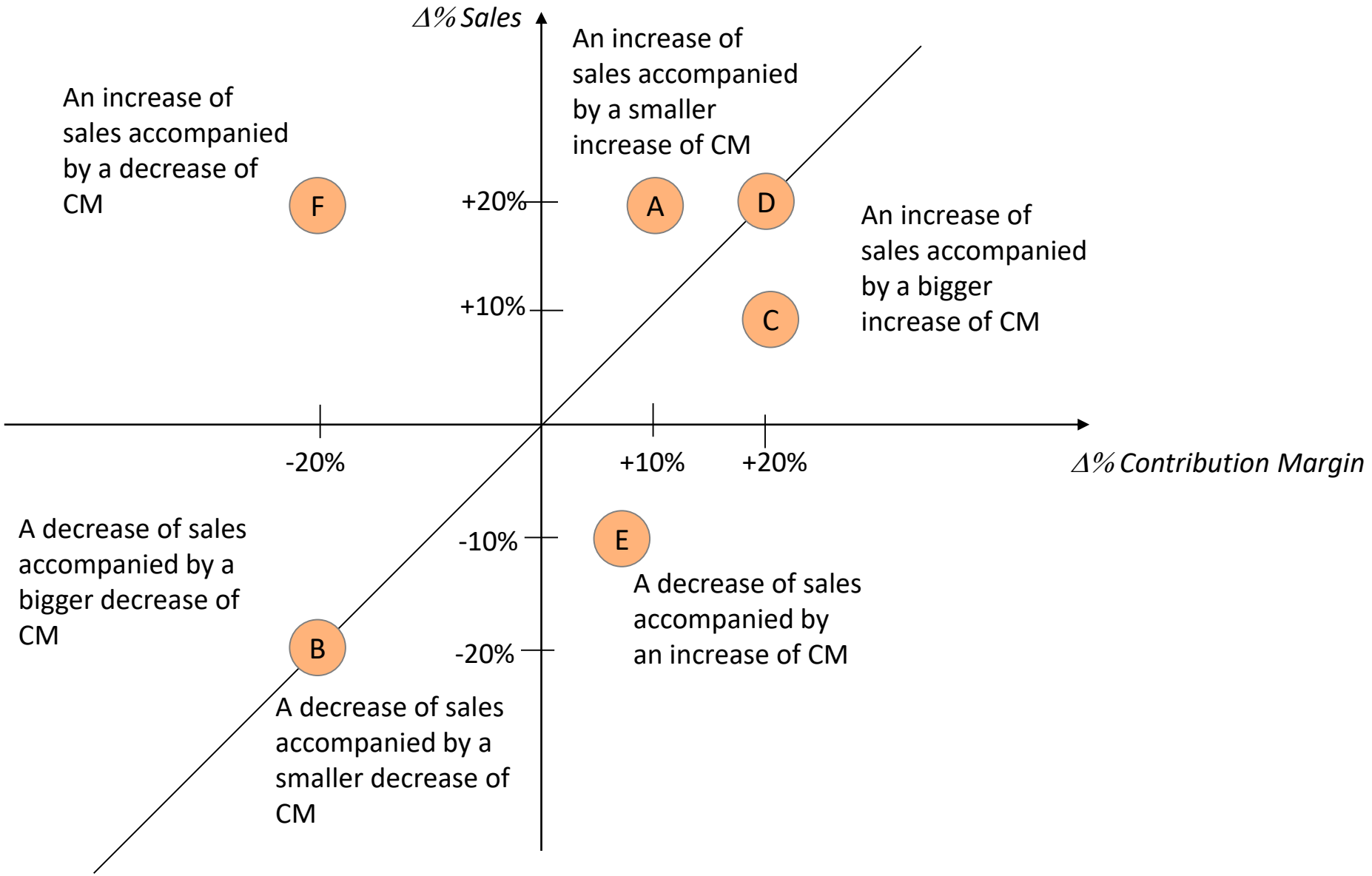
Who is going better?

	Company A		Company B		Company C		Company D		Company E		Company F	
	T	**T+1**	**T**	**T+1**	**T**	**T+1**	**T**	**T+1**	**T**	**T+1**	**T**	**T+1**
Sales	100	120	100	120	100	110	100	120	100	90	100	120
Contribution Margin	30	33	30	24	30	36	30	36	30	32	30	24
Δ Sales%		20%		20%		10%		20%		-10%		20%
Δ CM%		10%		-20%		20%		20%		7%		-20%
Contribution Margin% Sales	30%	28%	30%	20%	30%	33%	30%	30%	30%	36%	30%	20%

Growth versus profitability



Growth versus profitability



Financial statement analysis

Risk Analysis

The analysis of risk through financial statements

Business risk

Sales Std deviance

$$\sqrt{\frac{\sum_{i=1}^{N}(RV_i - \overline{RV})^2}{N}}$$

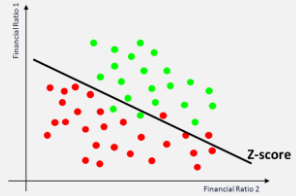
Degree of Operating Leverage

$$\frac{\text{Contribution Margin}}{\text{Operating Income}}$$

Degree of Combined Leverage

$$\frac{\text{Contribution Margin}}{\text{Operating Income} - \text{Net Financial Costs}}$$

Z-score models



Financial risk

Interest coverage

$$\frac{\text{Operating Income}}{\text{Net Financial Costs}}$$

Leverage

$$\frac{Net\ Financial\ Position}{Equity}$$

Degree of Financial Leverage

$$\frac{\text{Operating Income}}{\text{Operating Income} - \text{Net Financial Costs}}$$

Simulated Rating

AA
AA+
A

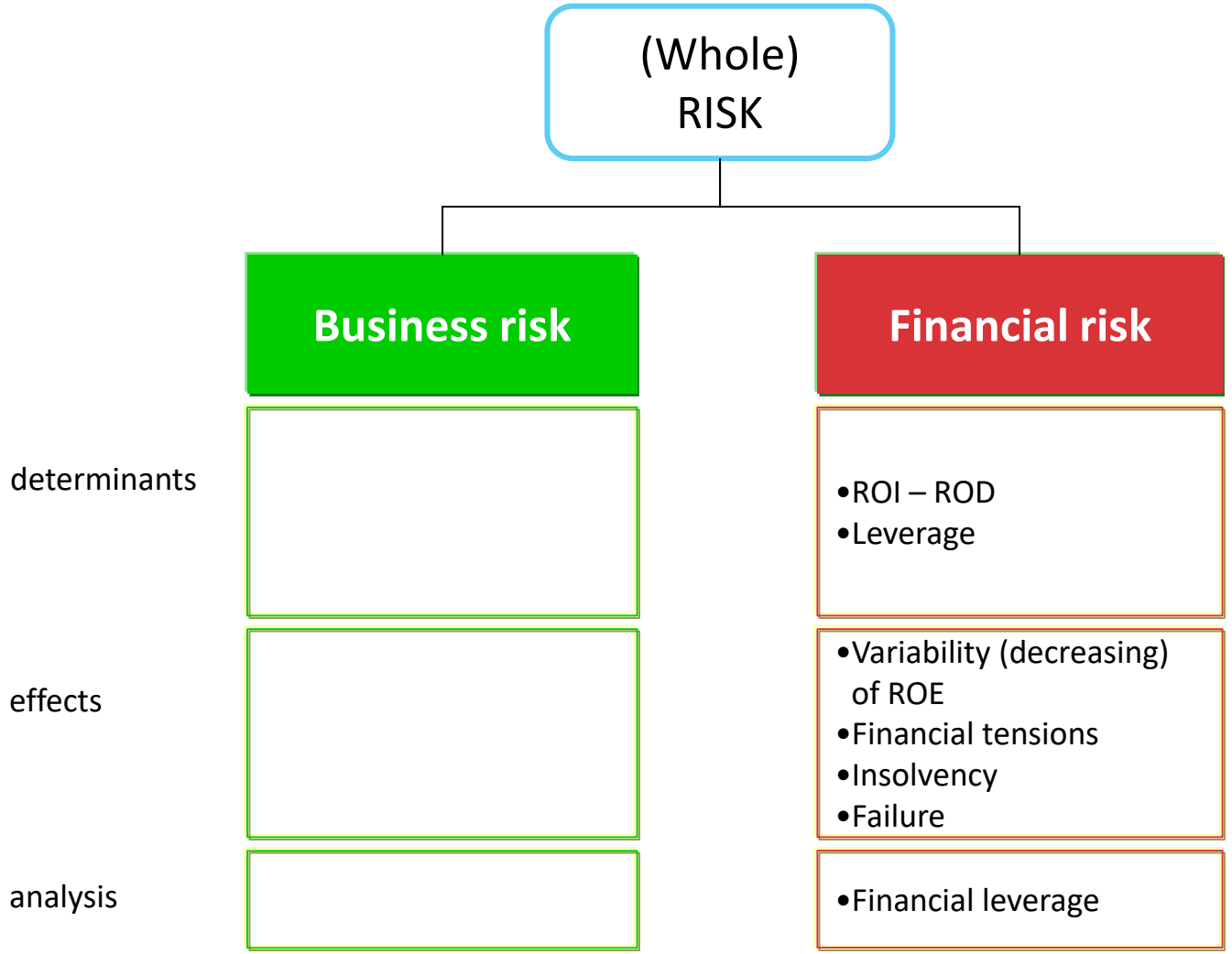
Beta

$$\frac{\sigma_I \rho_{i,MKT}}{\sigma MKT}$$

Financial risk

	Features for Provider (the investor)	*Features for the User (the company)*
Debt	• Interest is contractual • Repayment is contractual • The lender may require security **A LOW RISK INSTRUMENT**	• Interest must be paid • Repayment must be made • The lender may have the right to repossess or dispose of assets **A HIGH RISK INSTRUMENT**
Equity	• Dividends are at the discretion of the company • No requirement to repay the capital **A HIGH RISK INSTRUMENT**	• Can choose whether to pay dividends • No repayment obligation **A LOW RISK INSTRUMENT**

Analysis of Risk



Operating Leverage

	A	B
Number of units sold	100	100
Sale price	10	10
Variable cost per unit	5	7

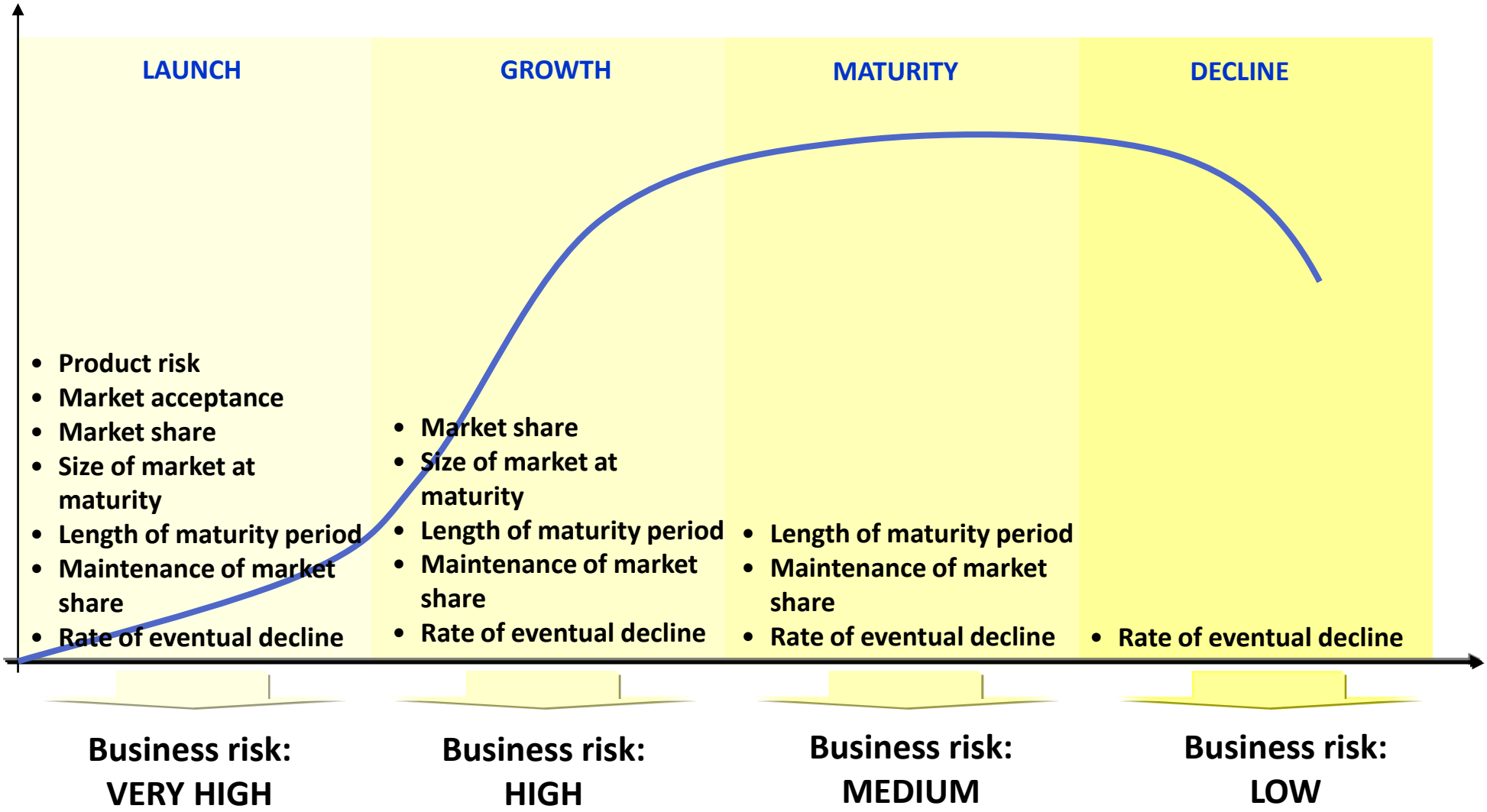
Revenues form sales	1,000	1,000
- Variable costs	(500)	(700)
= Contribution Margin	500	300
- Fixed Costs	(400)	(200)
= Operating Income	100	100

NCE	500	500
ROI	20.0%	20.0%

Operating Leverage

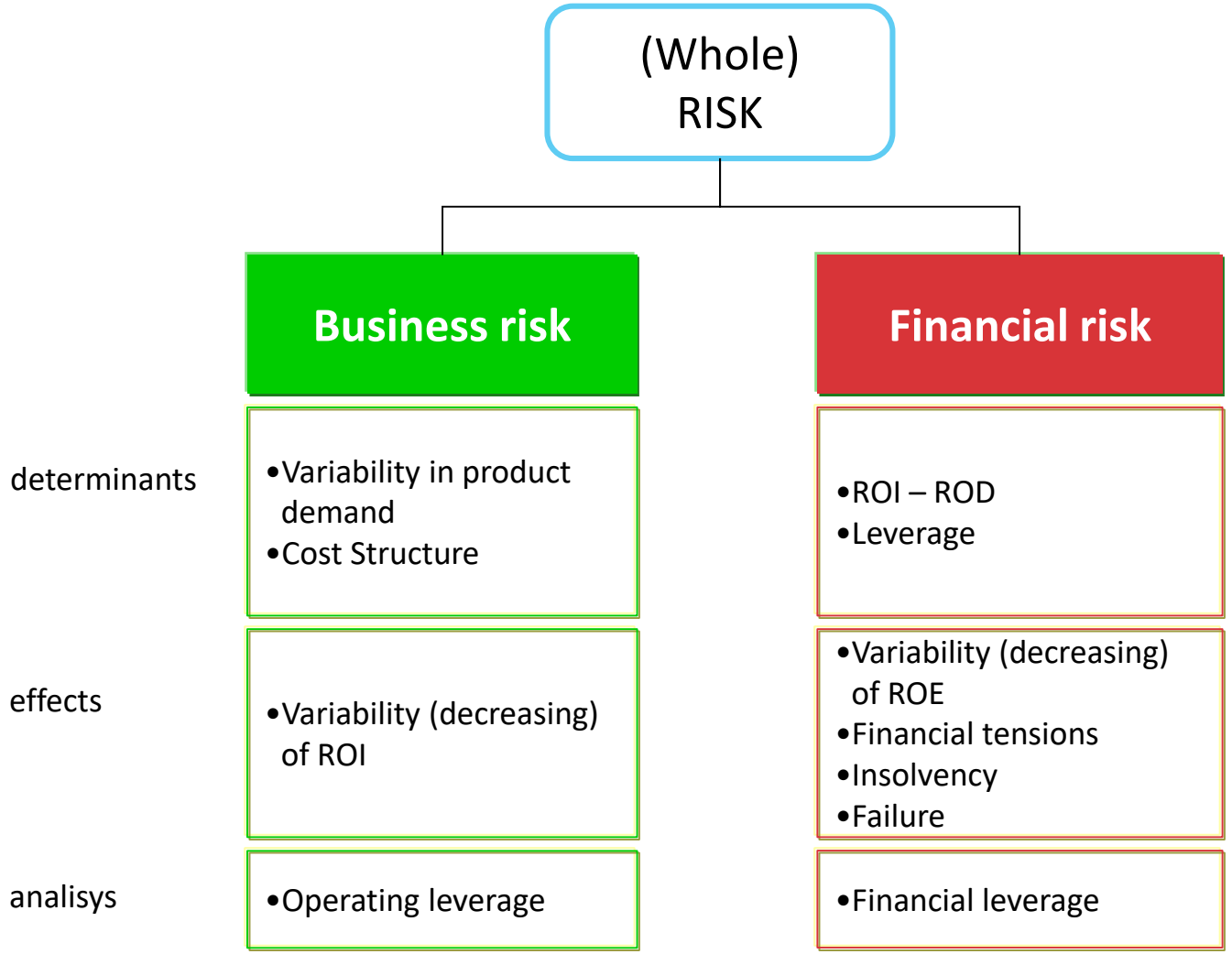
	A			B		
	-10%		**+10%**	**-10%**		**+10%**
Number of units sold	90	100	110	90	100	110
Sale price	10	10	10	10	10	10
Variable cost per unit	5	5	5	7	7	7
Revenues form sales	900	1,000	1,100	900	1,000	1,100
- Variable costs	(450)	(500)	(550)	(630)	(700)	(770)
= Contribution Margin	450	500	550	270	300	330
- Fixed Costs	(400)	(400)	(400)	(200)	(200)	(200)
= Operating Income	50	100	150	70	100	130
NCE	500	500	500	500	500	500
ROI	10.0%	20.0%	30.0%	14.0%	20.0%	26.0%
Variations % in ROI	**-50%**		**+50%**	**-30%**		**+30%**

Business risk and the product life cycle



Source: R. Bender e K. Ward, Corporate Financial Strategy, Elsevier, 2002

Analysis of Risk



Operating and Financial degree: A real case

Financial ratios	2015
Degree of Financial Leverage (X)	0.3
Degree of Operating Leverage (X)	35.0
Degree of Combined Leverage (X)	11.7

A variation in operating income generates a variation on net earnings 0.3 times greater

Example:

Δ Operating income:	-35%
Δ Net earnings:	-11,7%

A variation in the quantity of goods sold generates a variation on operating income 35 times greater

Example:

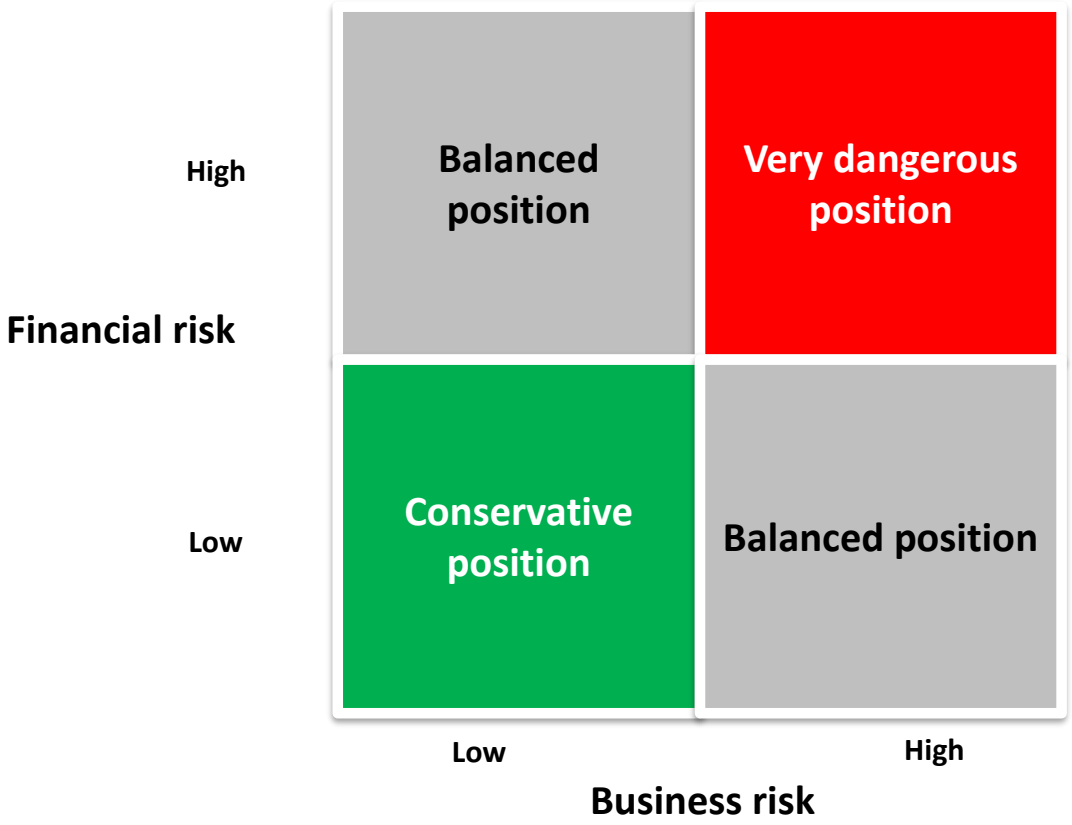
Δ Quantity goods sold:	-1%
Δ Operating income:	-35%

A variation in the quantity of goods sold generates a variation on net earnings 11.7 times greater

Example:

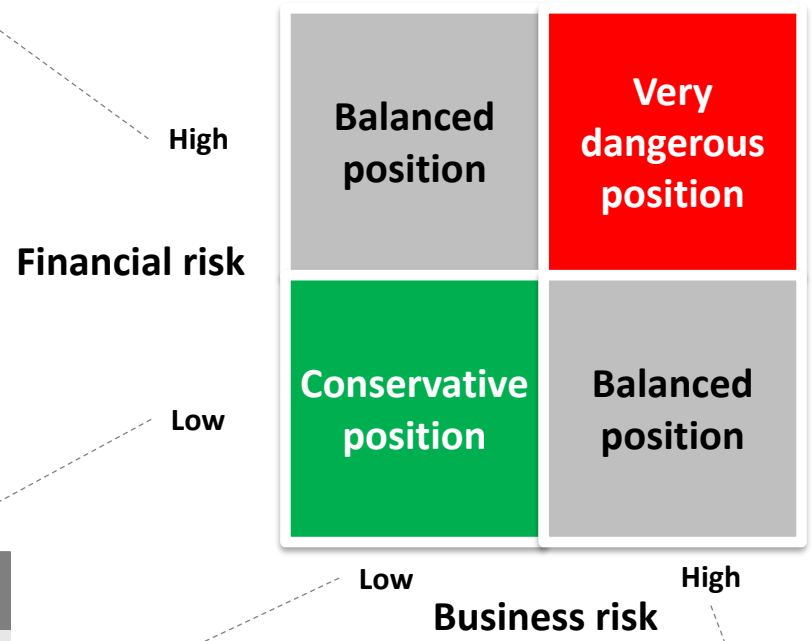
Δ Quantity goods sold:	-1%
Δ Net earnings:	-11,7%

Balancing business and financial risks



Balancing business and financial risks

Phenomenon	Measurement	Sign
Costs on debts	ROI-ROD	High
Level of financial debts	Leverage	High
	Degree of Financial Leverage	High
	Interest Coverage	Low



Phenomenon	Measurement	Sign
Costs on debts	ROI-ROD	Too low or Negative
Level of financial debts	Leverage	Low
	Degree of Financial Leverage	Low
	Interest Coverage	High

Phenomenon	Measurement	Sign
Demand increasing		
Demand stability	Sales std deviance	Low
Flexibility of cost structure	Degree of Operating Leverage	Low

Phenomenon	Measurement	Sign
Demand declining		
Demand instability	Sales std deviance	High
Rigidity of cost structure	Degree of Operating Leverage	High

Financial statement analysis

Risk Analysis: Insolvency prediction and rating simulation

How to use financial statements analysis

- Z-score models
  - Statistics-based models for bankruptcy prediction
- Rating simulation
  - Through a balanced comparison of a firm's financial ratios with financial ratios for classes of rating
  - Using statistical model for rating simulation

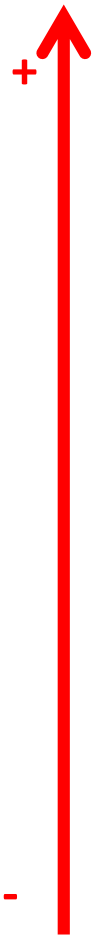
Rating grades

Moody's Investors Service	STANDARD &POOR'S	FitchRatings	
Aaa	AAA	AAA	*Investment Grade*
Aa	AA	AA	*Low Risk*
A	A	A	
Baa	BBB	BBB	
Ba	BB	BB	
B	B	B	
Caa	CCC	CCC	*High (Expected) Yield*
Ca	CC	CC	*High Risk*
C	C	C	

Moody's: Rating Scale for Long-Term Corporate Obligation Ratings

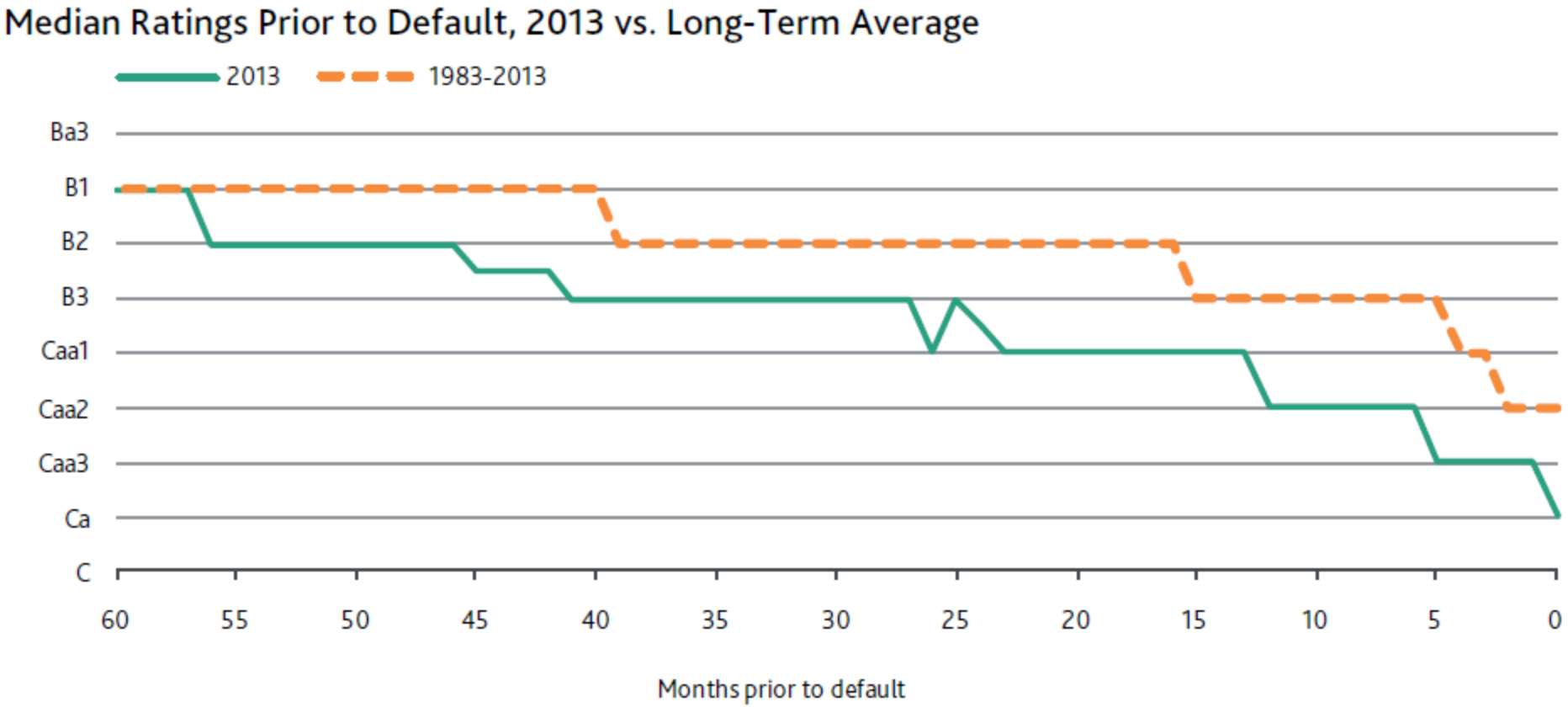
Aaa	highest quality with minimal credit risk
Aa	High quality with very low credit risk
A	upper-medium grade with low credit risk
Baa	moderate credit risk, speculative characteristics
Ba	Speculative elements and substantial credit risk
B	Speculative and high credit risk
Caa	Poor standing and very high credit risk
Ca	Highly speculative and likely in, or very near, default with some prospect of recovery of principal and interest
C	Lowest rated class of bonds and in default with little prospect for recovery of principal or interest

Rating and credit spread (in bps; 100 bps=1.0%)



	1yr	2yrs	3yrs	4yrs	5yrs	7yrs	10yrs	15yrs
AAA	25	33	42	49	54	57	59	64
AA+	25	34	43	50	56	59	63	71
AA	26	35	45	51	57	61	66	78
AA-	31	40	51	58	65	69	75	89
A+	35	45	58	66	73	78	84	99
A	40	49	64	73	80	86	94	110
A-	48	63	78	88	98	105	111	126
BBB+	56	76	92	104	115	124	128	142
BBB	64	89	107	120	133	142	146	158
BBB-	110	147	168	182	196	208	213	233
BB+	156	204	230	245	259	273	281	309
BB	202	262	292	308	322	339	349	385
BB-	251	341	383	405	388	439	448	482
B+	301	419	475	503	455	540	548	579
B	350	498	567	601	521	640	647	676

Rating and default rates



Source: Moody's Annual Default Study: Corporate Default and Recovery Rates, 1920-2013, 28 February 2014

Rating and default rates

Average Cumulative Credit Loss Rates by Letter Rating, 1982 - 2013*

	Year 1	Year 2	Year 3	Year 4	Year 5
Aaa	0.00%	0.02%	0.02%	0.02%	0.03%
Aa	0.02%	0.05%	0.09%	0.16%	0.26%
A	0.05%	0.13%	0.27%	0.43%	0.61%
Baa	0.11%	0.32%	0.56%	0.82%	1.11%
Ba	0.63%	1.83%	3.32%	4.98%	6.39%
B	2.41%	5.85%	9.29%	12.27%	14.87%
Caa-C	10.00%	17.01%	22.67%	27.10%	30.98%
Investment Grade	0.06%	0.17%	0.32%	0.49%	0.67%
Speculative Grade	2.89%	6.00%	8.97%	11.57%	13.77%
All Rated	1.14%	2.34%	3.44%	4.38%	5.16%

* Based on average default rates and senior unsecured bond recoveries measured on issuer-weighted basis

Source: Moody's Annual Default Study: Corporate Default and Recovery Rates, 1920-2013, 28 February 2014

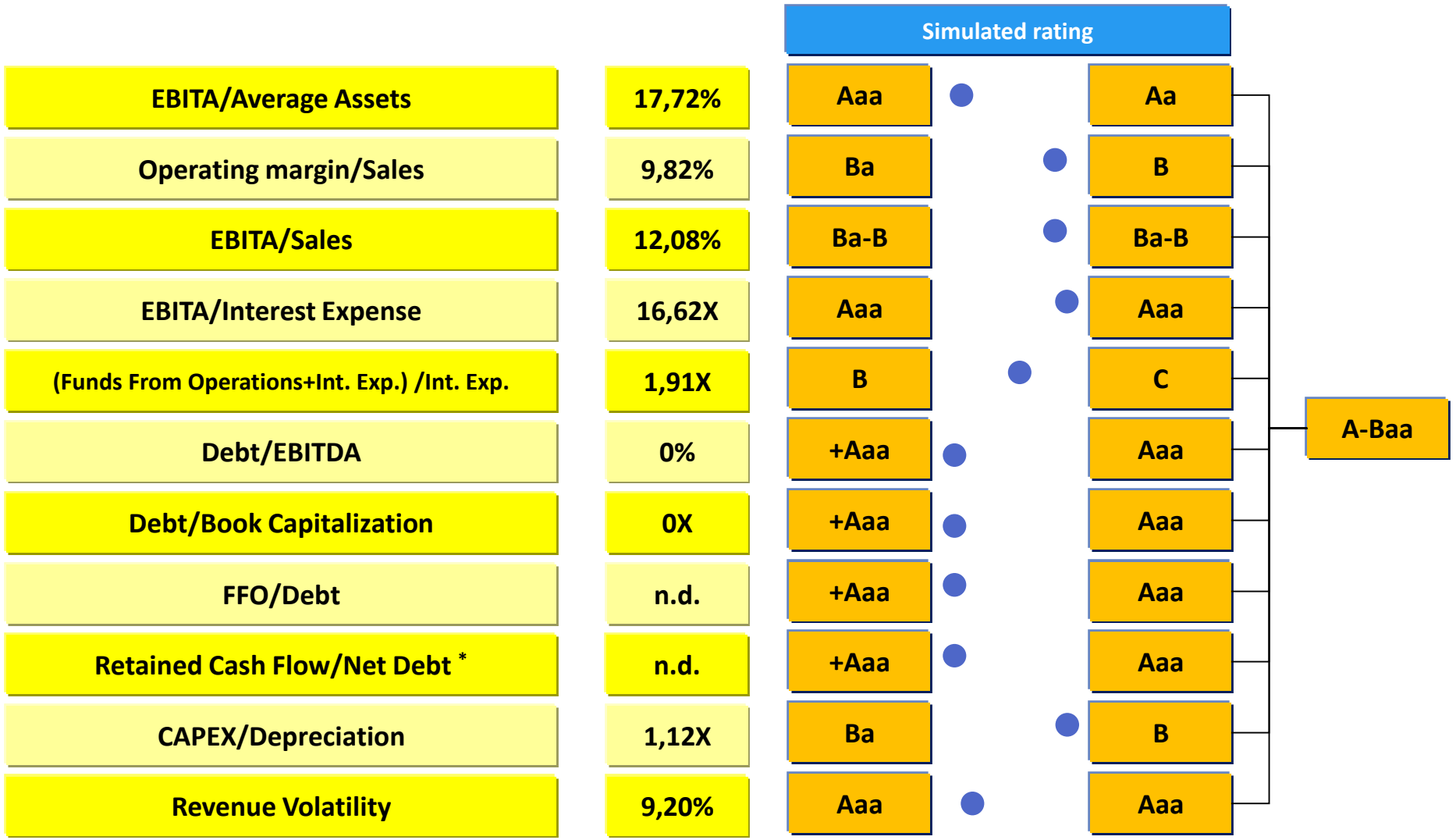
Rating and financial ratios

	EBITA / Average Assets	Operating Margin	EBITA Margin	EBITA / Interest Expense	(FFO + InExp) / IntExp
Aaa	20,9%	22,0%	25,1%	28,9	25,4
Aa	12,5%	15,4%	16,2%	16,7	16,6
A	12,1%	14,7%	15,5%	9,3	10,3
Baa	9,8%	13,5%	15,0%	5,5	6,9
Ba	8,7%	11,5%	12,6%	3,3	4,5
B	7,1%	9,2%	10,6%	1,7	2,7
C	3,8%	4,1%	5,7%	0,5	1,4

	Debt / EBITDA	DEBT / Book Capitalization	FFO / Debt	Retained Cash Flow / Net Debt	CAPEX / Depreciation	Revenue Volatility
Aaa	57,9%	19,3%	133,5%	1,3	1,4	11,2
Aa	175,9%	35,3%	48,7%	0,3	1,4	7,3
A	196,2%	40,8%	37,9%	0,3	1,4	10,8
Baa	273,7%	45,6%	27,5%	0,2	1,3	13,5
Ba	345,9%	52,2%	19,7%	0,2	1,3	16,6
B	511,9%	67,2%	11,9%	0,1	1,1	17,7
C	732,8%	85,3%	4,0%	0,0	0,7	14,8

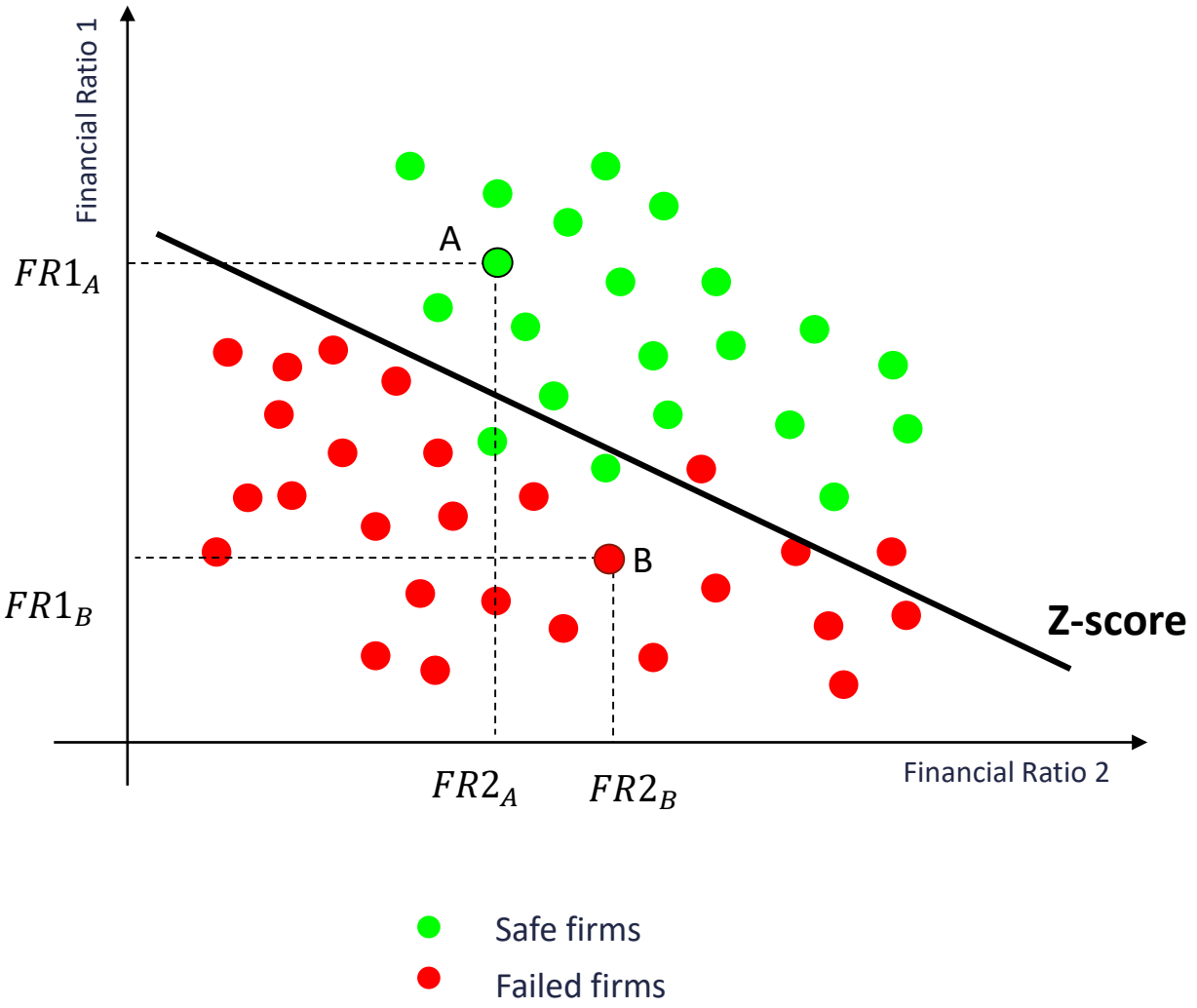
Source: Moody's Financial Metrics™ Key Ratios By Rating And Industry For Global Non-Financial Corporations: December 2013

Simulating rating for RDA (2013)

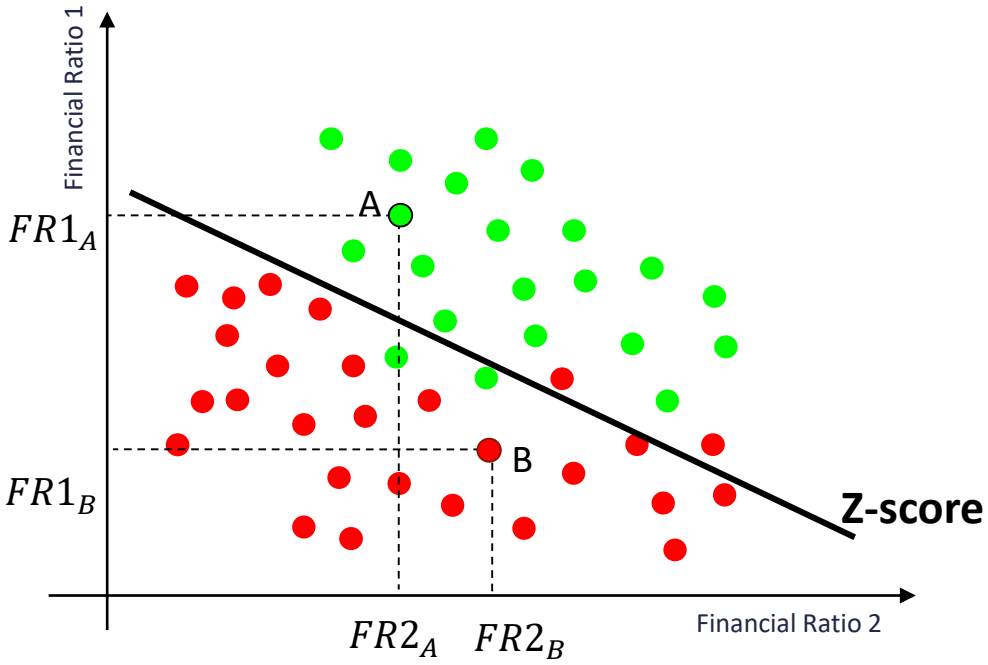


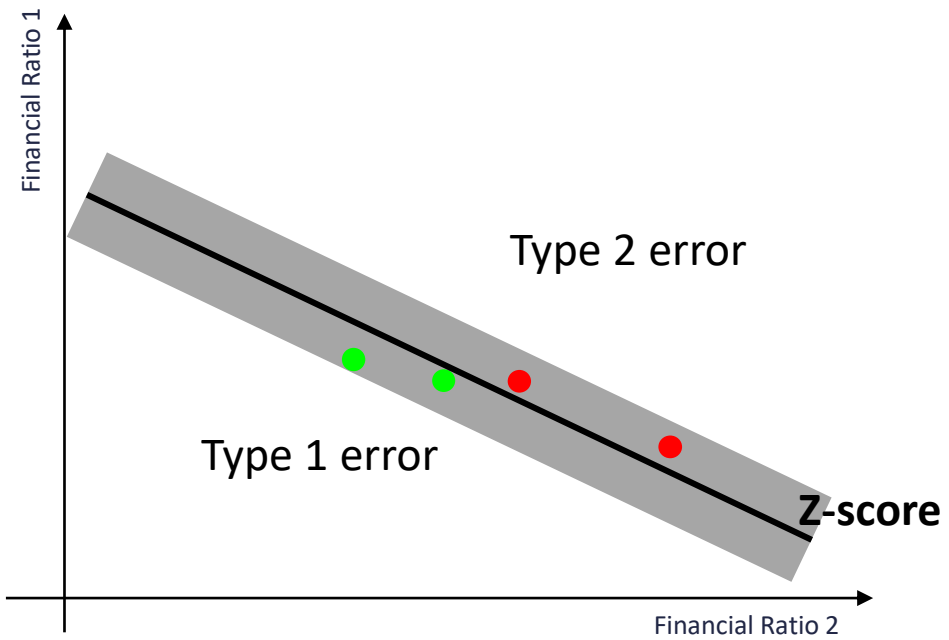
Note: Retained Cash Flow/Net = (FFO-dividends)/debt- cash & cash equivalent

Z-score: A primer



Z-score: A primer





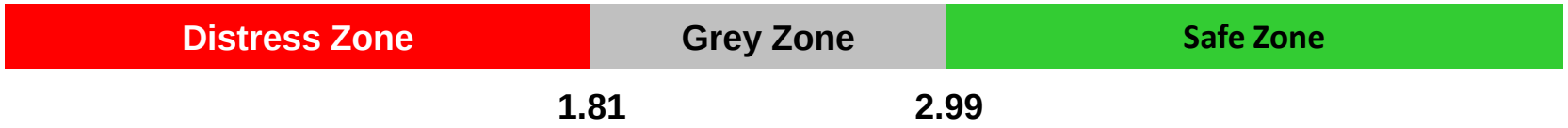
Safe firms

Failed firms

The Z–score (E. Altman)

For public (listed) firms

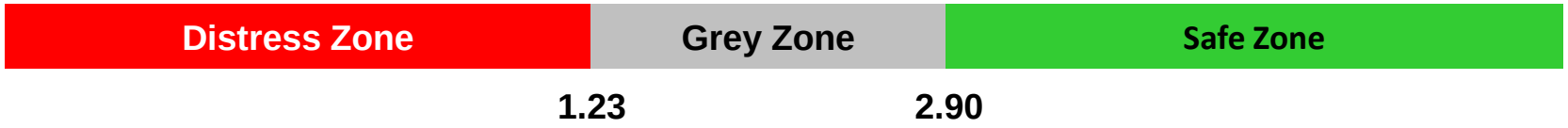
$$Z = 1.2\frac{Net\ Working\ Capital}{Total\ Assets} + 1.4\frac{Retained\ Earnings}{Total\ Assets} + 3.3\frac{EBIT}{Total\ Assets} + 0.6\frac{Market\ Value\ of\ Equity}{Book\ Value\ of\ Total\ Liabilities} + 0.99\frac{Sales}{Total\ Assets}$$



Source : Altman EI (1968) Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. J. Financ 23:589–609

For private (non-listed) firms

$$Z' = 0.717\frac{Net\ Working\ Capital}{Total\ Assets} + 0.847\frac{Retained\ Earnings}{Total\ Assets} + 3.107\frac{EBIT}{Total\ Assets} + 0.420\frac{Book\ Value\ of\ Equity}{Book\ Value\ of\ Total\ Liabilities} + 0.998\frac{Sales}{Total\ Assets}$$



Source : Altman EI (1983) Corporate Financial Distress A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy. Wiley Interscience, John Wiley and Sons

The Z–score (E. Altman)

$$Z'' = 3.25 + 6.56\frac{Net\ Working\ Capital}{Total\ Assets} + 3.26\frac{Retained\ Earnings}{Total\ Assets} +$$

$$6.72\frac{EBIT}{Total\ Assets} + 1.05\frac{Book\ Value\ of\ Equity}{Book\ Value\ of\ Total\ Liabilities}$$

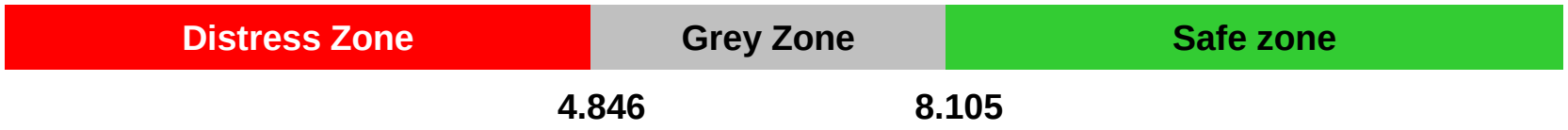
EM-SCORE	RATING
Z'' ≥ 8.15	AAA
7.60≤Z''<8.15	AA+
7.30≤Z''<7.60	AA
7.00≤Z''<7.30	AA-
6.85≤Z''<7.00	A+
6.65≤Z''<6.85	A
6.40≤Z''<6.65	A-
6.25≤Z''<6.40	BBB+
5.85≤Z''<6.25	BBB
5.65≤Z''<5.85	BBB-
5.25≤Z''<5.65	BB+
4.95≤Z''<5.25	BB
4.75≤Z''<4.95	BB-
4.50≤Z''<4.75	B+
4.15≤Z''<4.50	B
3.75≤Z''<4.15	B-
3.20≤Z''<3.75	CCC+
2.50≤Z''<3.20	CCC
1.75≤Z''<2.50	CCC-
Z''<1.75	D

Source : Altman EI (1983) Corporate Financial Distress A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy. Wiley Interscience, John Wiley and Sons;
Altman EI, Hotchkiss E (2006) Corporate Financial Distress & Bankruptcy , 3rd edition, John Wiley

Z–score for Italian SMEs

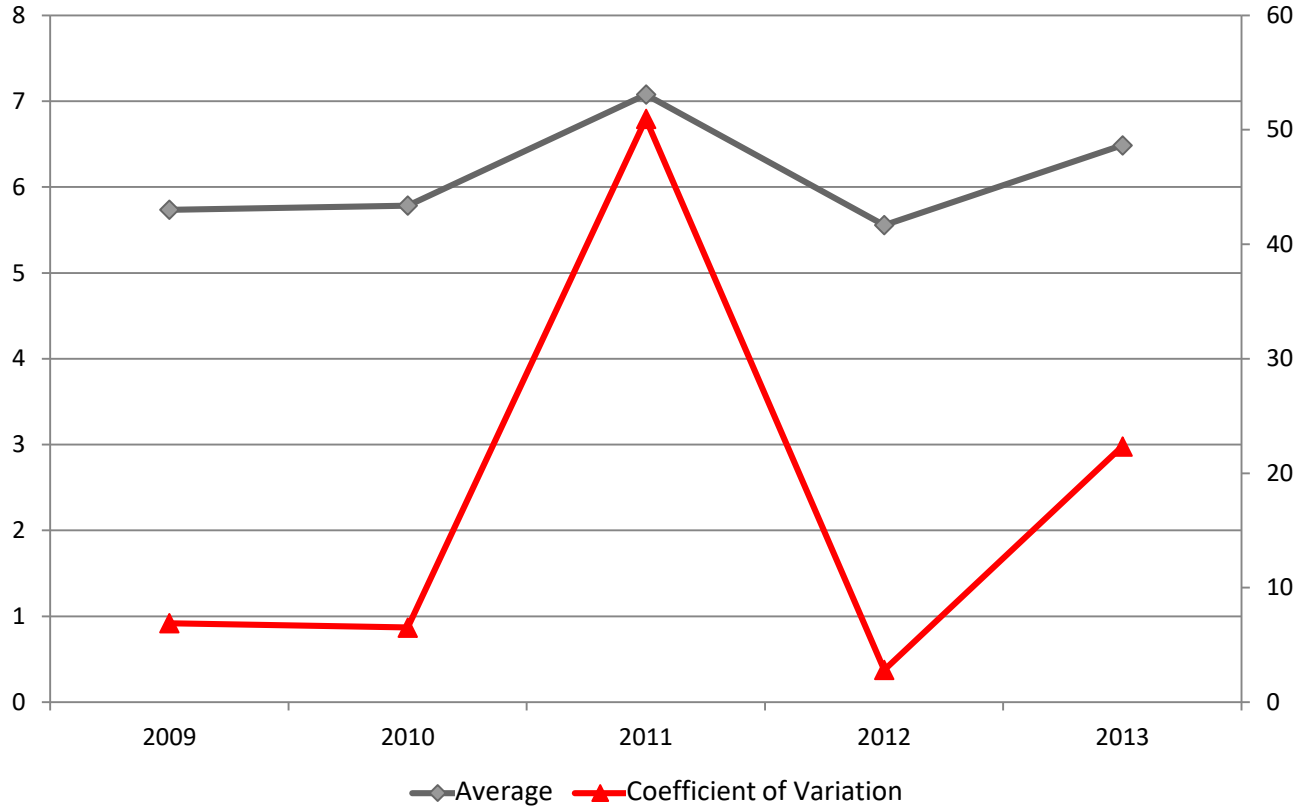
$$Z_{ITA} = 1.981\frac{Net\ Working\ Capital}{Total\ Assets} + 9.841\frac{Retained\ Earnings}{Total\ Assets}$$

$$+1.951\frac{EBIT}{Total\ Assets} + 3.206\frac{Book\ Value\ of\ Equity}{Book\ Value\ of\ Total\ Liabilities} + 4.037\frac{Sales}{Total\ Assets}$$



Source : Bottani P., Cipriani L., Serao F., (2004), Il modello di analisi Z-Score applicato alle PMI, Amministrazione & Finanza n. 1/2004, pp. 50-53

The solvency of Italian SMEs: An empirical analysis



Source: G. Marzo and E. Scarpino La solvibilità delle PMI italiane: un'analisi empirica, Amministrazione & Finanza n. 6/2015

The solvency of Italian SMEs: An empirical analysis

		Rating 2009																			
		Safe zone									Grey zone					Distress zone						
	Rating 2013	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	D	Total
Safe zone	AAA	**7,482**	1,014	538	471	200	254	283	142	355	159	280	170	92	88	111	105	711	69	26	76	**12,626**
	AA+	678	**380**	197	243	102	145	162	83	219	93	166	84	44	63	65	52	178	29	17	14	**3,014**
	AA	301	156	**118**	139	68	93	112	75	164	60	117	61	40	39	50	29	134	32	12	22	**1,822**
	AA-	271	183	145	**160**	80	122	176	77	193	88	152	98	37	46	67	32	168	33	7	15	**2,150**
	A+	148	81	53	73	**50**	61	78	46	109	56	93	58	25	43	18	33	85	16	7	10	**1,143**
	A	169	100	58	93	45	**73**	88	72	163	101	134	91	36	51	43	39	149	27	14	8	**1,554**
	A-	151	113	79	123	68	107	**132**	93	266	98	219	137	66	78	85	59	201	32	9	27	**2.143**
	BBB+	70	60	33	54	39	59	69	**54**	148	91	153	107	47	57	61	47	130	22	13	15	**1,329**
	BBB	190	141	99	132	91	135	231	150	**474**	215	502	346	207	186	199	171	380	77	42	41	**4,009**
Grey zone	BBB-	99	54	34	62	34	68	93	74	215	**122**	251	195	132	130	136	114	263	53	18	29	**2,176**
	BB+	175	81	77	111	68	118	149	120	434	262	**600**	488	345	346	381	301	577	145	62	53	**4,893**
	BB	103	63	44	61	36	56	85	72	242	154	483	**387**	279	346	433	335	575	143	61	62	**4,020**
	BB-	47	30	29	32	14	29	57	42	138	107	272	292	**198**	273	387	302	484	120	50	52	**2,955**
	B+	75	30	26	27	24	24	61	48	141	129	286	310	261	**364**	502	448	696	176	75	72	**3,775**
Distress zone	B	78	36	32	36	18	43	60	39	173	102	309	325	285	456	**714**	774	1.211	323	130	117	**5,261**
	B-	109	37	18	21	21	33	41	32	113	84	233	240	239	339	650	**903**	1.601	505	181	144	**5,544**
	CCC+	100	28	17	36	17	24	40	27	103	60	187	224	183	283	537	885	**2,260**	873	361	267	**6,512**
	CCC	86	15	15	13	16	11	22	18	55	43	108	109	78	140	286	501	1,616	**946**	473	377	**4,928**
	CCC-	42	5	11	12	5	8	16	16	27	18	49	49	50	66	106	179	650	469	**381**	304	**2,463**
	D	72	17	16	15	7	13	24	18	50	33	106	98	94	103	194	258	964	372	368	**670**	**3,492**
	Total	**10,446**	**2,624**	**1,639**	**1,914**	**1,003**	**1,476**	**1,979**	**1,298**	**3,782**	**2,075**	**4,700**	**3,869**	**2,738**	**3,497**	**5,025**	**5,567**	**13,033**	**4,462**	**2,307**	**2,375**	**75,809**

Source: G. Marzo and E. Scarpino La solvibilità delle PMI italiane: un'analisi empirica, Amministrazione & Finanza n. 6/2015

The solvency of Italian SMEs: An empirical analysis

Rating 2013 \ Rating 2009	Safe zone	Grey zone	Distress zone	Total
Safe zone	22,184	4,949	5,633	**32,766**
Grey zone	3,624	5,032	7,172	**15,828**
Distress zone	3,197	5,462	33,111	**41,770**
Total	**29,005**	**15,443**	**45,916**	**90,364**

Source: G. Marzo and E. Scarpino La solvibilità delle PMI italiane: un'analisi empirica, Amministrazione & Finanza n. 6/2015

Financial statement analysis

Using simulation

Three basic simulations

- *What if*
  - Example: what happens to net earnings if revenues reduce of 20%?
- *Goal seeking*:
  - Example: How much should costs reduce for generating a 15% ROS?
- *Impact analysis*
  - Example: which is the impact of DSO on operating income?

Using simulation

- Make financial relations explicit, using the basic accounting equations and the financial ratios formulas
- Use financial ratios to synthetize information

Using simulation: Example

Starting from last financial statements' figures, determine the impact of a 10% increase in revenues on trade receivables in two situations:

1) Maintaining DSO
2) Assuming that the company adds 10 days to DSO to increase its revenues

Item	Actual Value (k€)	Expected Value (k€)
Revenues from Sales	5,400	
Trade receivables (net of VAT)	814	
DSO		

Using simulation: Example

Starting from last financial statements' figures, determine the impact of a 10% increase in revenues on trade receivables in two situations:

Maintaining DSO

Item	Actual Value (k€)	Expected Value (k€)
Revenues from Sales	5,400	5,940
Trade receivables (net of VAT)	814	895
DSO	55	55

$$895 = 55 \times \frac{5{,}940}{365}$$

Assuming that the company adds 10 days to DSO to increase its revenues

Item	Actual Value (k€)	Expected Value (k€)
Revenues from Sales	5,400	5,940
Trade receivables (net of VAT)	814	1,058
DSO	55	65 (=55+10)

$$1{,}058 = 65 \times \frac{5{,}940}{365}$$

Financial statement analysis

Competitive Analysis

Comparables for competitive analysis

- Companies belonging to the same industry
- Companies belonging to the same strategic group
- Companies with very high performance
- Companies competing on the same territory
- Analysis with respect to the general trend and performance of national or global economy

Competitive Analysis: Where to get data and information

www.bizstats.com

www.mbres.it

www.starnet.unioncamere.it

https://aida.bvdinfo.com

www.cerved.com

www.nomisma.it

www.standardandpoors.com

www.csilmilano.it

http://ec.europa.eu/eurostat

www.moodys.com

www.fitchratings.com

www.hoovers.com

www.istat.it

www.infoimprese.it

www.confindustria.it/ASSOPUB.nsf/%28AC%29?OpenView&MenuID=91D5577F18E369F7C1256F6B005A4BBB

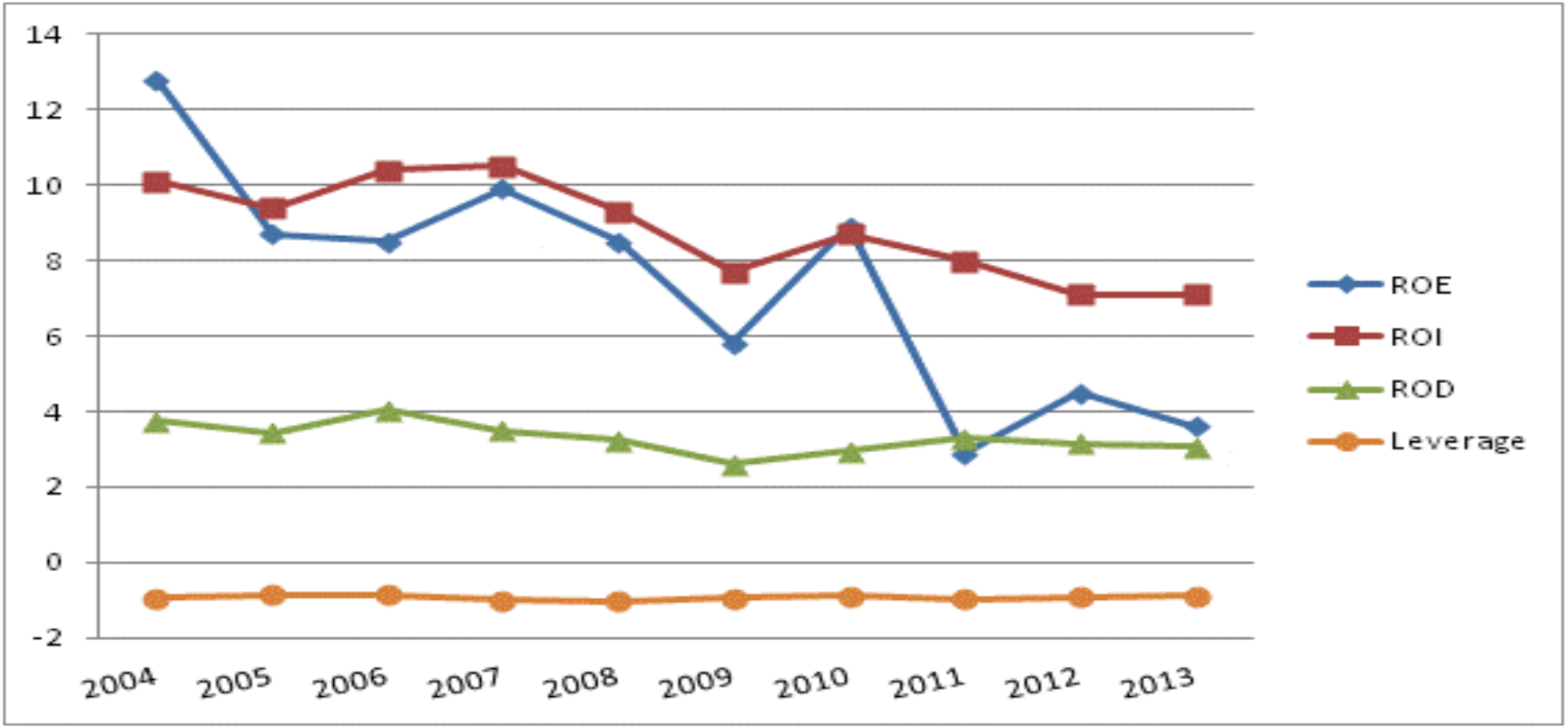
www.nielsen.com

www.agenziaentrate.gov.it

www.infocamere.it

www.prometeia.it

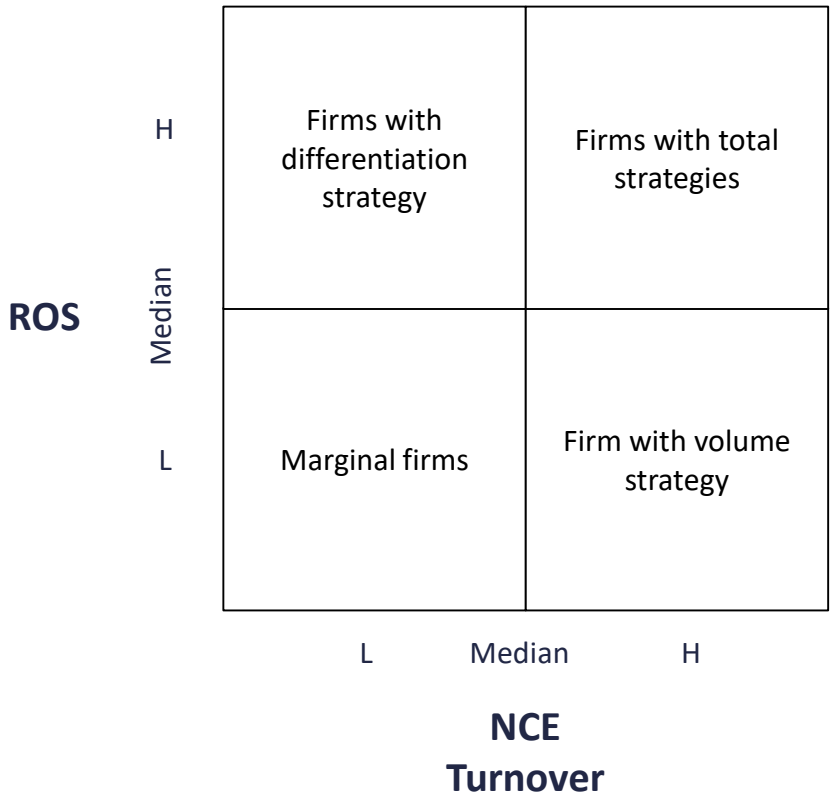
Competitive analysis: Average ratios of Italian non-financial firms



Source: our elaboration from R&S Mediobanca 2014

Competitive Analysis: Which strategy performs better?

- Dividing the sample firms at the level of the median ROI
- Distributing companies with ROI> ROI median in all four quadrants of the matrix
- Analysing the quadrant in which the largest number of companies with high ROI is distributed, using non-parametric tests for robustness analysis



Synthesizing financial ratios

Profitability year: 2014			
Ratios	COMPETITOR		OUR FIRM
ROI (%)	-2,5		22,3
ROE (%)	-0,9		8,5
ROS (%)	-1,7		7,0
Turnover (X)	1,5		3,2
Tax rate (%)	61,5		38,6

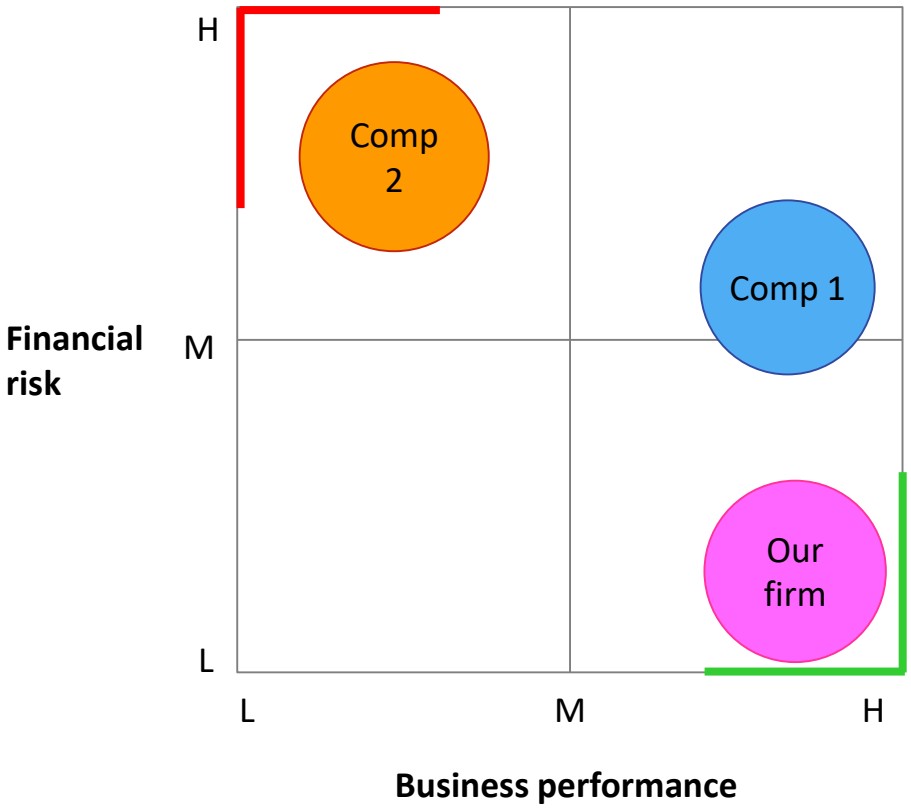
Liquidity year: 2014			
Ratios	COMPETITOR		OUR FIRM
CFOS (%)	9,6		17,3
CFOD (%)	36,6		155,8
DSO (dd)	84,0		24,4
DPO (dd)	79,8		109,5
DII (dd)	42,2		50,5
CCC (dd)	46,4		-34,6

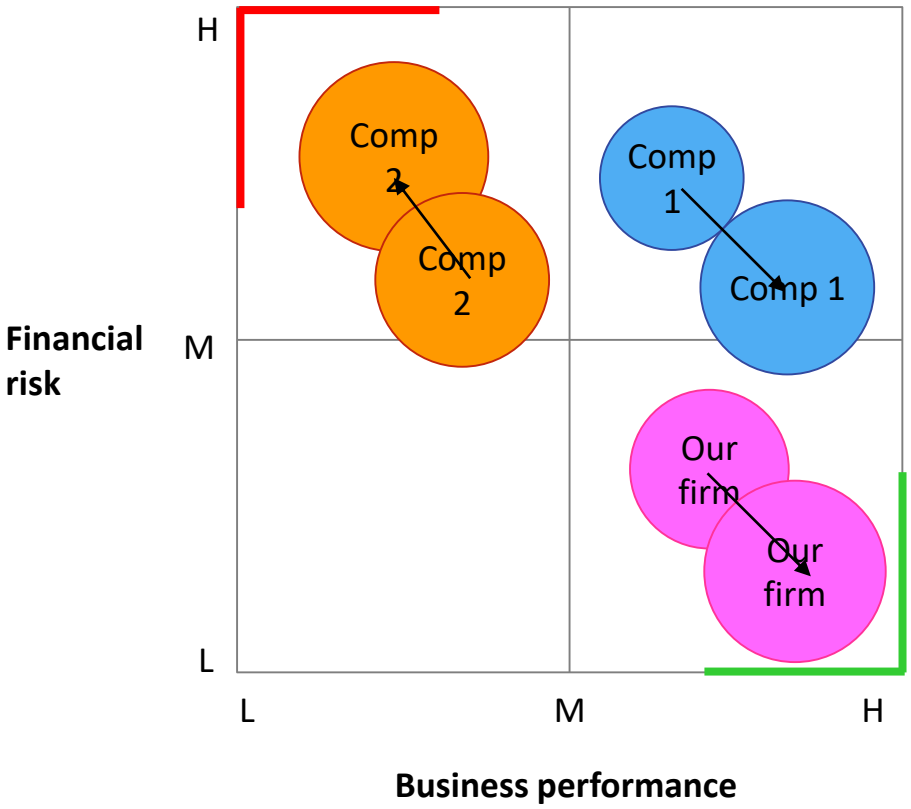
Independence & Solvency year: 2014			
Ratios	COMPETITOR		OUR FIRM
Leverage (X)	0,8		0,1
ROD (%)	2,4		5,9

Growth year: 2014			
Ratios	COMPETITOR		OUR FIRM
Growth Rev. (%)	0,3		7,0
Growth NIC (%)	-12,4		-19,3

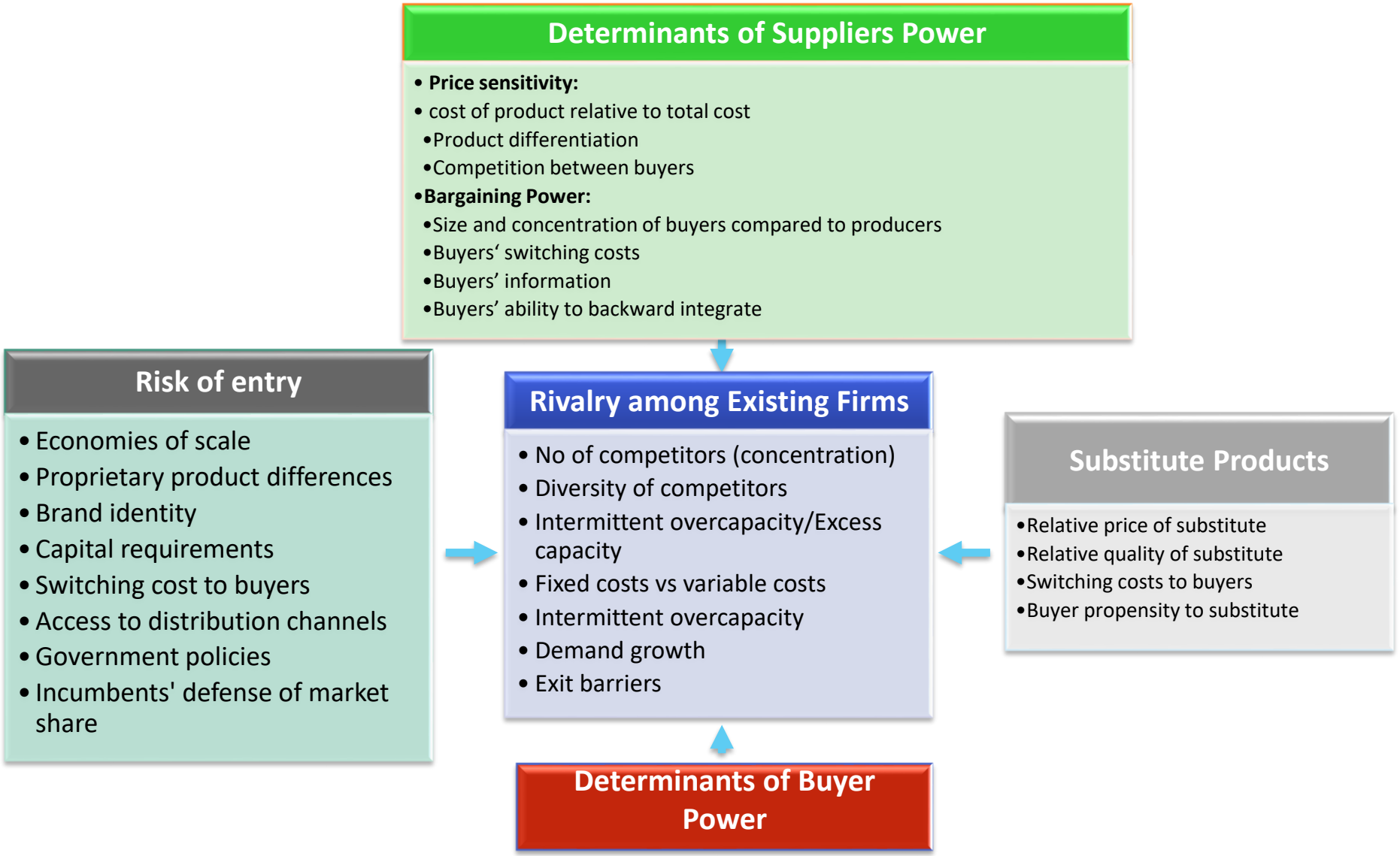
Risk year: 2014			
Ratios	COMPETITOR		OUR FIRM
DOL (X)	-13,2		7,5
DFL (X)	4,9		1,3
Int. Coverage (X)	-2,3		12,6
Z-score	1,5		3,1

Synthesizing financial ratios: The Performance-Risk Matrix®

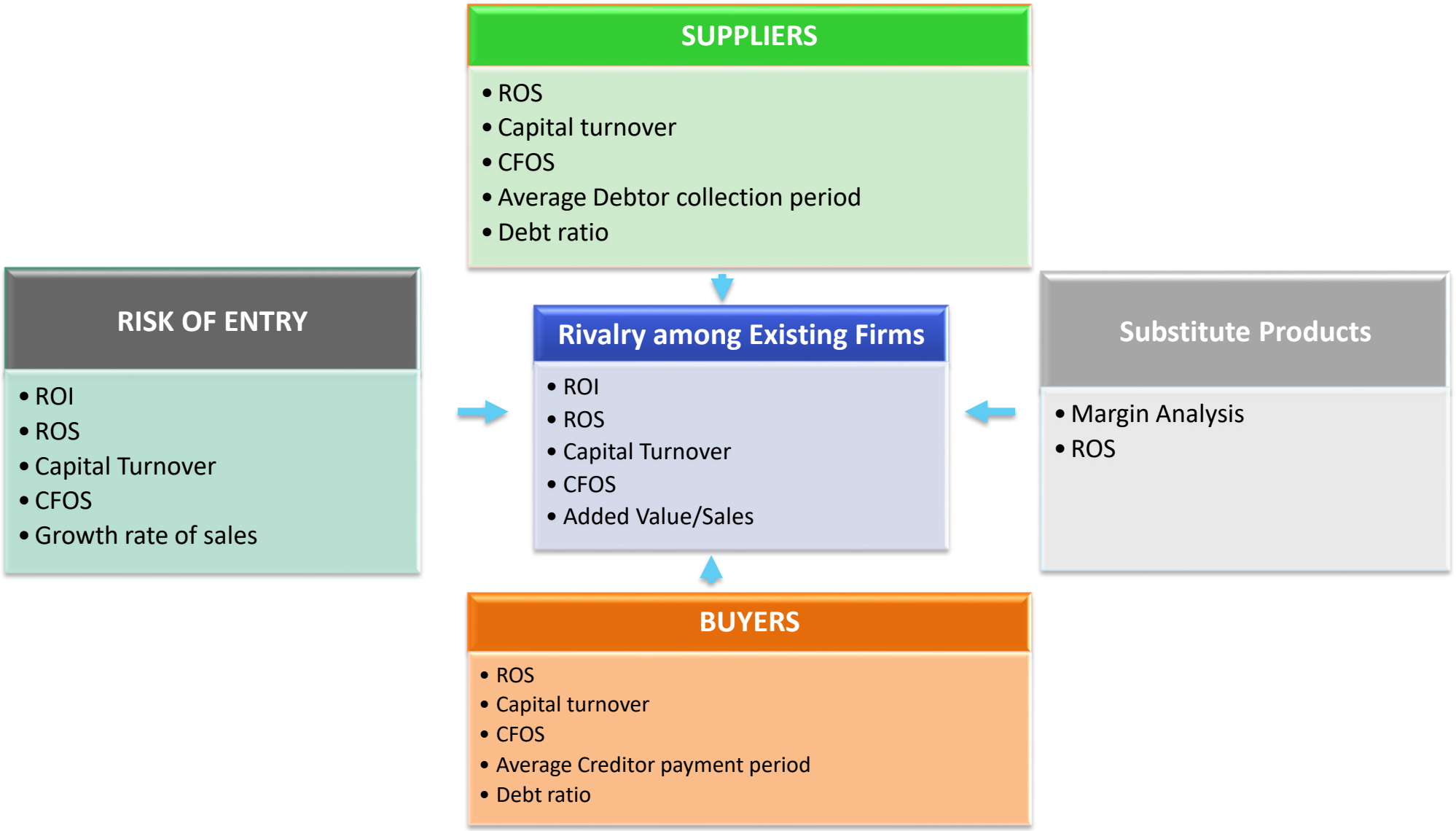




Porter's Five Forces model



Porter's Five Forces model and financial ratios



Financial statement analysis

Financial Statement Analysis for Supplier/Customer Relationship Management

Financial Statement Analysis for Supplier/Customer Relationship Management

- Understanding financial sustainability of supplier/customer
- Identify drives for negotiation
- Estimate effects of changes in purchasing costs of factors of production on company's results
- Identification of possible policies for managing the financial relationship
- Searching for alternative suppliers/customers
- Assessment of opportunities for collaboration and/or integration

Financial Statement Analysis for Supplier Relationship Management

Ratios	High	Low
ROI ROS	Opportunities to trade or outsourcing	There is no room for negotiation, price is likely to increase; leaving the business
Differences between DSO and DPO	Possibility to negotiate payment term	Low possibility to extend payment terms
Acid test	Possibility to negotiate payment term	Possibility to get discounts on the prices against cash payment
Net Working capital to Sales	Difficulty in supporting the growth of new orders	Little difficulty in supporting the growth of new orders
Operating Leverage	An increase of purchasing volume could lead to an increase in profitability	Increasing volumes of purchase do not necessarily lead to increases in income
Debt-to-Equity ratio Financial expenses/Sales	Difficulty to get trade credit	Greater possibility to get trade credit

Source: Silvi R., Analisi di bilancio. La prospettiva manageriale, MacGrawHill, 2012

Financial Statement Analysis for Supplier Relationship Management

Supplier A		Opportunities/Critical issues	Supplier B	
• ROI • ROS	17% 25%	• Low ROS makes difficult to review conditions of contract, a rise in prices is expected • As regarding A, there are opportunities to bargain (granting discounts)	• ROI • ROS	4% 6%
• Debt to Equity ratio • Financial expenses/Sales%	4 5%	• A could be sensitive to credit leverage given the high debt ratio and the high proportion of financial expenses to sales • B could grant an extension of credit	• Debt to Equity ratio • Financial expenses/Sales%	0,75 1%
• Acid test • Current ratio	0,75 1,75	• A is not likely to grant extension of credit, due to possible liquidity tensions in the short-term. Supplier could grant discounts against cash payment, due to low liquidity and high ROS	• Acid test • Current ratio	1,52 1,68
• WC/sales	20%	• The high financial requirements of A may make difficult to foster EBITDA and firm's size. • The lower financial requirements of B could support 's growth	• WC/sales	13%

Source: Silvi R., Analisi di bilancio. La prospettiva manageriale, MacGrawHill, 2012